

APPENDIX E

FAUNA AND FLORA ASSESSMENT



FLORA AND FAUNA ASESMENT

Proposed Car Park 2, Thredbo Alpine Resort

Prepared for
Event Hospitality and Entertainment Pty Ltd

20 December 2018



DOCUMENT TRACKING

Item	Detail
Project Name	Flora and Fauna Assessment - Proposed Friday Flat Car Park 2, Thredbo Alpine Resort
Project Number	18HNG_10774
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Approved by	Ryan Smithers
Status	Final
Version Number	2
Last saved on	20 December 2018
Cover photos	Vegetation and habitats within the study area and immediate surrounds. All photos Ryan Smithers 2018.

This report should be cited as 'Eco Logical Australia 2018. *Flora and Fauna Assessment - Proposed Friday Flat Car Park 2, Thredbo Alpine Resort*. Prepared for Event Hospitality and Entertainment Pty Ltd.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Dabyne Planning.

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Template 29/01/2014

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Executive summary

This report describes the biological environment and assesses the potential effects on threatened and migratory species, endangered populations and ecological communities of a proposal to construct a new car park, known as Car Park 2, in the Friday Flat area of Thredbo Alpine Resort.

The proposal comprises a new car park, above Friday Drive, with 95 car spaces, on and off ramps, drainage, and landscaping. It is anticipated that it will result in the removal of approximately 0.2 ha of partially disturbed native vegetation and the removal of up to 12 native tree plantings.

The proposal will not trigger the Biodiversity Offsets Scheme (BOS), as it will not affect any land identified on the Biodiversity Values Map and the total clearing of native vegetation associated with the proposal will not exceed the 1 ha threshold which applies to the Thredbo Resort Area.

The study area and immediate surrounds was found to support two native vegetation communities PCT 679 *Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion* and PCT 637 *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion*, with much of the study area comprising Exotic Grassland or other heavily disturbed vegetation. Forty plant species were recorded within the study area or immediate surrounds during the survey period. No threatened flora species were recorded within the study area and none are considered likely to occur there given the absence of suitable habitats. The PCT 637 which occurs in the study area and surrounds is considered to comprise the *Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps EEC*, which is listed on the BC Act. Only approximately 0.02 ha of the Montane Peatlands and Swamps EEC is expected to be affected by the proposal. The area to be affected is also either heavily modified or otherwise depauperate in nature, given that it comprises a very narrow band of wet heath and bog species associated with a minor watercourse.

Whilst the study area provides a small amount of potential habitat for threatened fauna species such as the Broad-toothed Rat, Gang-gang Cockatoo, Olive Whistler, and Flame Robin, similar habitats are extensive in the locality and the habitats to be affected are small in the context of the extent of similar habitats contiguous with the study area. Furthermore, the proposal will not affect any potentially important habitats for threatened fauna species nor sever any linkages between habitats or otherwise permanently restrict fauna movement.

An assessment of the effects of the proposal on threatened species, populations and ecological communities which may be directly or indirectly affected by the proposal was undertaken by applying the five factors from Section 7.3 of the *Biodiversity Conservation Act 2016*. This assessment concluded that the proposal is unlikely to have a significant effect on threatened species, populations or ecological communities or their habitats.

Following consideration of the administrative guidelines for determining significance under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*, it is concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance or Commonwealth land, and a referral to the Commonwealth Environment Minister is not necessary.

Notwithstanding the relatively minor impacts on vegetation and fauna habitats associated with the proposal, the impact mitigation measures described in Section 5 are also recommended to be incorporated into the proposal.

1 Introduction

Eco Logical Australia Pty Ltd (ELA) was engaged by Event Hospitality and Entertainment Pty Ltd to prepare a flora and fauna assessment to accompany a proposal to construct a new car park, known as Car Park 2, in the Friday Flat area of Thredbo Alpine Resort. This flora and fauna assessment provides the findings of a review of relevant literature, database searches and field survey. It also addresses relevant statutory considerations and makes recommendations to ameliorate the potential impacts of the proposal on vegetation and habitats.

The aim of this investigation was to assess the ecological impacts of the proposal on flora, fauna and habitats within the study area. The objectives of this investigation were:

- To identify and describe the flora species and vegetation communities present in the study area, their condition and conservation significance.
- To identify and describe the fauna habitats present in the study area and their condition.
- To identify the fauna species which are present or likely to occur in the study area, and describe their conservation significance.
- To assess the impacts of the proposal on vegetation, fauna, habitats, and other environmental features as necessary.
- To make recommendations regarding any environmental management and impact mitigation/amelioration measures, which can be implemented to limit the effects of the proposal on vegetation, fauna, habitats, and other environmental features as necessary.

1.1 The proposal

The proposal comprises a new car park, above Friday Drive, with 95 car spaces, on and off ramps, drainage, and landscaping, as shown in **Figure 1** and **Photos 1-5**. A more detailed description of the proposal is provided in the Statement of Environmental Effects (Dabyne Planning 2018).

1.2 Direct and indirect impacts

Direct impacts on flora and fauna arising from the proposal will comprise the removal of approximately 2000 m² of native vegetation, and the removal of approximately 12 native tree plantings.

Indirect impacts associated with the proposal are expected to be minor as:

- The footprint of the proposed direct impacts is relatively small and predominantly limited to already heavily disturbed or modified vegetation.
- The proposal will be implemented using low impact methods and with adequate safeguards. These include undertaking the excavation from existing disturbed areas or within the proposed footprint, and thus not extending the disturbance footprint beyond the proposed car park.

The proposal is not anticipated to result in any substantial changes in surface or subsurface hydrology, which may lead to the loss or adverse modification of vegetation communities or associated habitats. The proposal is not expected to have any substantial long-term adverse impacts on habitat connectivity, given the limited areas of vegetation that will be affected.

The proposal will not affect directly or indirectly any area of land mapped within the Biodiversity Values Map as defined in the NSW *Biodiversity Conservation Regulation 2017* (BC Reg). The area of native vegetation affected will be approximately 0.2 ha, which is well below the threshold (1 ha) trigger for the Biodiversity Offset Scheme (BOS).

Flora and Fauna Assessment - Proposed Friday Flat Car Park 2, Thredbo Alpine Resort



Figure 1: The proposal – overview

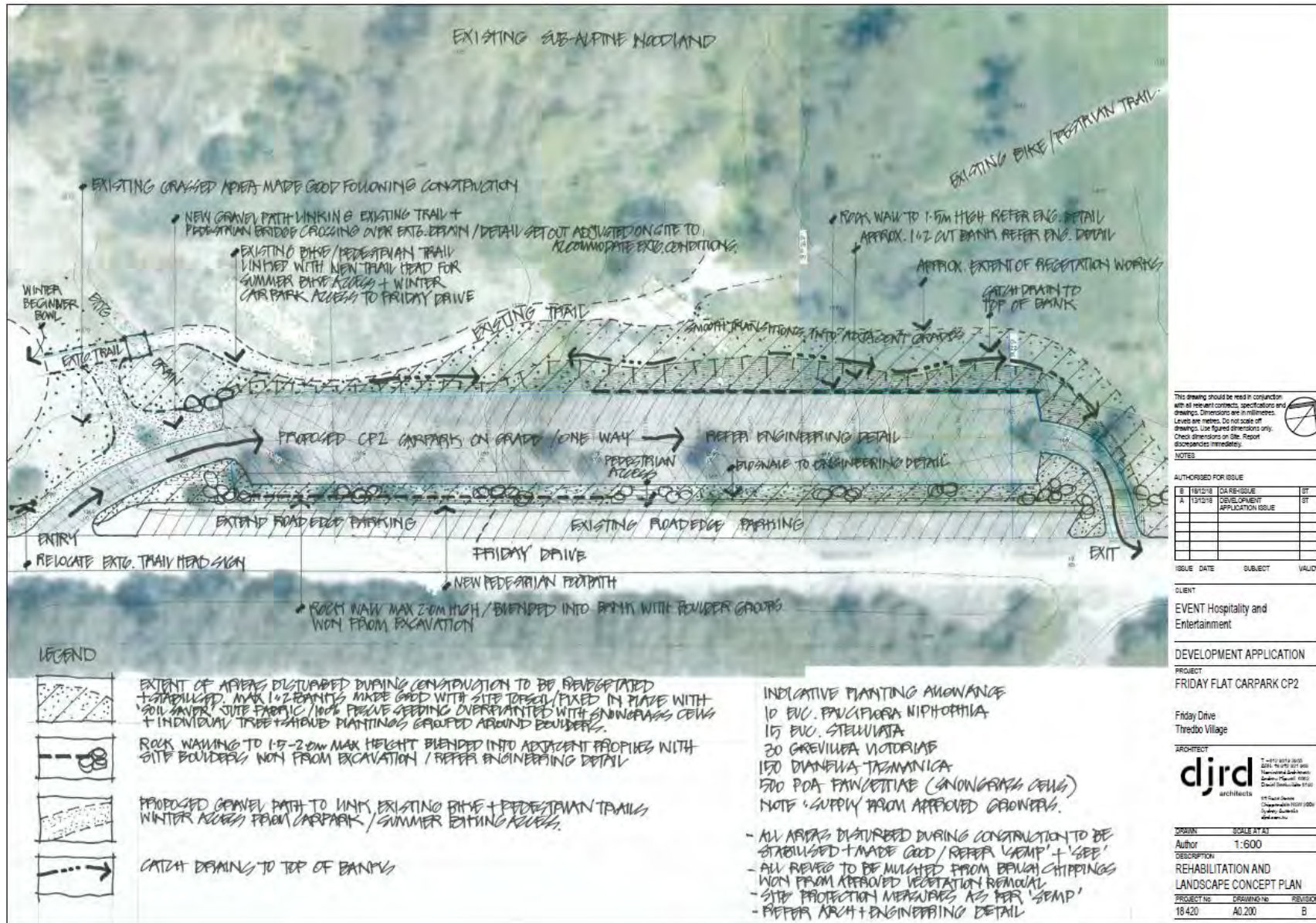


Figure 2: Proposal – detail



Photo 1: The proposed car park will largely affect areas that are already heavily modified and dominated by exotic grasses that are regularly mown, with eucalypt plantings. This photo shows the southern parts of the proposed car park.



Photo 2: The proposed car park will largely affect areas that are already heavily modified and dominated by exotic grasses that are regularly mown, with eucalypt plantings. This photo shows the northern parts of the proposed car park.



Photo 3: Looking southward from the northern parts of the proposed car park showing some of the eucalypt tree plantings that will be removed during construction of the proposed embankment that is part of the proposed car park.



Photo 4: The approximate location of the proposed on ramp at the southern end of the proposed car park.



Photo 5: The location of the off ramp in the northern parts of the proposed car park.

1.3 Subject site, study area and locality

The subject site comprises those areas, as described in Section 1.1 and **Figure 1** and **Figure 2**, which will be directly impacted by the proposal. The study area extends approximately 5 m beyond the limits of the subject site given the relatively minor indirect impacts anticipated beyond the development footprint.

The locality for the purposes of this report is the area of land within a 5 km radius of the study area.

1.4 Topography, geology and soils

The study area occupies gently sloping predominately east facing slopes at an altitude of approximately 1370 m Australian Height Datum (AHD). The study area is underlain by Silurian granodiorite (Ecology Australia 2002). Soils are likely to comprise a mix of alpine humus soils, comprising sandy clay loams, and peat at lower depths. The study area includes two small unnamed first order watercourses, one in the middle and one at the northern end, which are tributaries of the Thredbo River.

1.5 Disturbances

The vast majority of the study area has already been disturbed in association with the existing resort development and vegetation management. Much of the study area is dominated by exotic grasses and regularly mown, as shown in **Photos 1-5**. The only less disturbed vegetation that will be affected by the proposal is on the western margins of the study area.

1.6 Planning and legislation

It is not the intention of this assessment to document all the legislation and planning instruments that are relevant to the proposal. A detailed analysis of the statutory environment is provided in the Statement of Environmental Effects for the proposal (Dabyne Planning 2018). However, the legislation and planning instruments which are relevant to the assessment of potential impacts on terrestrial flora and fauna are discussed in brief below.

1.6.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EPA Act) is the principal planning legislation for NSW, providing a framework for the overall environmental planning and assessment of development proposals. This proposal is to be assessed under Part 4 of the EPA Act. The EPA 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.

1.6.2 Biodiversity Conservation Act 2016

As of 25 August 2017, the *Threatened Species Conservation Act 1995* was repealed by the *Biodiversity Conservation Act 2016* (BC Act). The BC Act introduces a new mandatory framework for addressing impacts on biodiversity from development and clearing, including the Biodiversity Offsets Scheme (BOS) and Biodiversity Assessment Method (BAM). As the proposal will not trigger the BOS, a Biodiversity Development Assessment Report (BDAR) is not required and a flora and fauna assessment has been prepared. The impacts of the proposed development will be subject to a test of significance with respect to the Section 7.3 of the BC Act.

1.6.3 State Environmental Planning Policy (Kosciuszko National Park—Alpine Resorts) 2007

State Environmental Planning Policy (Kosciuszko National Park—Alpine Resorts) 2007 identified the Minister for Planning as the determining authority for development within the NSW Alpine Resorts. SEPP (Kosciuszko National Park—Alpine Resorts) 2007 requires the Minister for Planning to refer for comment any development application in the Alpine Resorts to the Director General of the NSW Office of Environment and Heritage (OEH).

1.6.4 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national scheme for protecting the environment and conserving biodiversity values. Approval from the Commonwealth Minister is required under the EPBC Act if the action will, or is likely to, have a significant impact on matters considered to be of national environmental significance (MNES). MNES relevant to the proposal include species and ecological communities that are listed under the Act. The EPBC Act does not define significant impact but identifies matters that are necessary to take into consideration.

2 Methods

2.1 Database and literature review

Data gathered during all field studies and the literature review was analysed and interpreted in accordance with the provisions of legislation and planning controls pertaining to flora and fauna. Threatened and migratory species, threatened populations and threatened ecological communities (TECs) that have been recorded, or have the potential to occur within the locality have been assessed for their likelihood to inhabit the study area (**Appendix A**). All listed species and TECs considered likely to occur within the study area, or to be affected by the proposal, require consideration pursuant to Section 7.3 of the BC Act and under the EPBC Act.

2.2 Field surveys

ELA conducted flora and fauna surveys within the study area and surrounds on 5 September and 6 December 2018.

2.2.1 Flora surveys

A botanical survey was conducted in the study area by ELA Senior Ecologist Ryan Smithers on 5 September and 6 December 2018.

Community identification and floristic audit

The study area was surveyed to document the flora species present, including those of conservation significance, and the location and extent of vegetation communities including any TECs encountered. All flora species encountered within the study area were identified to species level. A description of the vegetation was then prepared with general observations made of the wider area. The vegetation was assessed according to the floristic and structural classifications of Ecology Australia (2002) and was classified to a Plant Community Type (PCT).

Targeted searches

Specific searches for plant species of conservation significance known from the locality were conducted targeting areas of potential habitat.

Limitations

The floristic audit undertaken recorded as many species as possible and provides a comprehensive but not definitive species list. More species would probably be recorded during a longer survey over more seasons and years. Nevertheless, the techniques used in this investigation are considered adequate to gather the data necessary to identify potential ecological constraints to the proposal.

Flora survey effort

The flora survey effort employed a total of three person-hours.

2.2.2 Fauna surveys

Field investigations for fauna were conducted in conjunction with the flora surveys on 5 September and 6 December 2018.

Habitat analysis

A description of the fauna habitats in the study area was prepared because the type of habitat in an area influences which animals occur there, as well as diversity and abundance. This habitat assessment also has an important role in predicting threatened fauna likely to occur in an area. The information collected usually includes the type of vegetation present, the presence/absence of rock habitats, tree hollows, ponds, streams, wetlands, foraging substrates and other features likely to attract threatened fauna. The study area and immediate surrounds were traversed to identify habitat components, which were recorded and described.

Diurnal surveys

Specific searches were conducted for habitats or resources of relevance for those threatened fauna species known from subalpine and montane areas, and which might be anticipated to occur given the vegetation communities and habitats present. In particular, targeted searches were undertaken for evidence of *Mastacomys fuscus* (Broad-toothed Rat).

Opportunistic fauna surveys involved observations of animal activity, habitat surveys and searches for indirect evidence of fauna. Diurnal mammal searches were conducted in areas of potential habitat across the study area, with emphasis on searches for scats, tracks, burrows, diggings and scratchings.

Limitations

The results of fauna surveys can be optimised by conducting investigations over a long period to compensate for the effect of unfavourable weather, seasonal changes and climatic variation. In general, the longer the survey the more species will be detected. Results can also be improved by using a wide range of techniques, since some species are more likely to be detected by a particular method.

However, surveys are subject to constraints that determine the amount of time allocated, the methods used and the timing of the work. Thus, the results should be viewed in the light of these limitations. The fauna detected during the survey period are a guide to the native fauna present, but are by no means a definitive list of the species occurring in the study area. Nevertheless, the techniques used in this investigation are considered adequate to gather the data necessary to identify potential ecological constraints to the proposal.

Survey effort

The fauna survey effort employed a total of three person-hours.

3 Results

3.1 Database and literature review

Appendix A provides a list of threatened and migratory species and threatened ecological communities (TEC) that have been recorded from database searches within a 5 km radius of the study area. The potential for each of these species to occur in the study area and the importance of the habitats within the study area are also discussed in **Appendix A**, and a decision made regarding the need for further assessment in this report. Some species which are not known from subalpine habitats have been excluded from **Appendix A**.

3.2 Flora

The native vegetation within the study area has been typed to a PCT with reference to the classifications of Ecology Australia (2002). The study area supports two native vegetation communities; PCT 679 *Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion* and PCT 637 *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion*, with Exotic Grassland with Tree Plantings occupying the most heavily disturbed parts of the study area, as shown in **Figure 3**, and **Photos 6-8**.

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

PCT 679 occurs in the western less disturbed parts of the study area, as shown in **Figure 3** and **Photo 6**. It equates to the Tall Subalpine Heath of Ecology Australia (2002) and is relatively common throughout the subalpine and montane tracts within the Thredbo Resort area and within the Thredbo Valley (Ecology Australia 2002).

It is characterised by a patchy cover of *Eucalyptus stellulata* (Black Sallee) and *Eucalyptus pauciflora* (Snow Gum) above a patchy heath/shrubland dominated by *Cassinia monticola*, *Grevillea australis* (Alpine Grevillea), *Bossiaea foliosa*, *Olearia phlogopappa* subsp. *serrata*, *Ozothamnus thyrsoides* (Sticky Everlasting), and occasional *Hakea microcarpa* (Small-fruit Hakea). The dense groundcover includes species such as *Poa fawcettiae*, *Hovea montana* (Alpine Hovea), *Oxylobium ellipticum*, *Coronoides scorpioides*, *Leptorhynchus squamatus* (Scaly Buttons), *Asperula gunnii*, *Acrothamnus hookeri*, *Geranium antrorsum*, *Scleranthus biflorus* (Two-flowered Knawel), *Oreomyrrhis eriopoda* (Australian Carraway), *Carex breviculmis*, *Stellaria pungens*, *Veronica gracilis* (Slender Speedwell), and *Ranunculus lappaceus* (Common Buttercup).

3.2.2 PCT 637 *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion*

A small and very narrow patch of this community, which equates with the Subalpine Bog of Ecology Australia (2002), occurs where a minor watercourse traverses the central parts of the study area. It also occurs on the northern extremities of the study area, beyond the subject site, and is extensive on the flats adjacent to the Thredbo River, as shown in **Figure 3**. The community is characterised by a heath dominated by *Baeckea gunniana*, *Baeckea utilis* (Mountain Baeckea), and *Epacris paludosa* (Swamp Heath), over species associated with bogs and wet areas such as *Empodisma minus* (Spreading Rope Rush), *Carex appressa*, and *Acaena novae-zelandiae* (Bidgee Widgee), as shown in **Photo 7**. The community is quite disturbed in the eastern parts of the study area as shown in **Photo 8**, and is far more diverse in the larger patches that occur nearby along the Thredbo River.



Photo 6: Typical PCT 679 within the study area showing the patchy heath and tree cover.



Photo 7: The narrow band of PCT 637 associated with the small watercourse which traverses the central parts of the study area. The community extends further to the west of the study area.



Photo 8: The band of PCT 637 is highly degraded in the eastern parts of the study area.

3.2.3 Exotic grassland with tree plantings

The most heavily disturbed parts of the study area support a regularly mown grassland dominated by exotic grasses, with patches of native grasses and forbs, and scattered tree plantings, as shown in **Photos 1-5**. These areas are characterised by an abundance of exotic grasses and herbs such as *Festuca* spp. (Fescues), *Anthoxanthum odoratum* (Sweet Vernal Grass), *Holcus lanatus* (Yorkshire Fog) and *Agrostis capillaris* (Browntop Bent) and a range of exotic herbs, particularly *Hypochaeris radicata* (Flatweed), *Acetosella vulgaris* (Sheep Sorrel), and *Achillea millefolium* (Yarrow). The tree plantings area mostly *Eucalyptus stellulata* and *Eucalyptus pauciflora*.

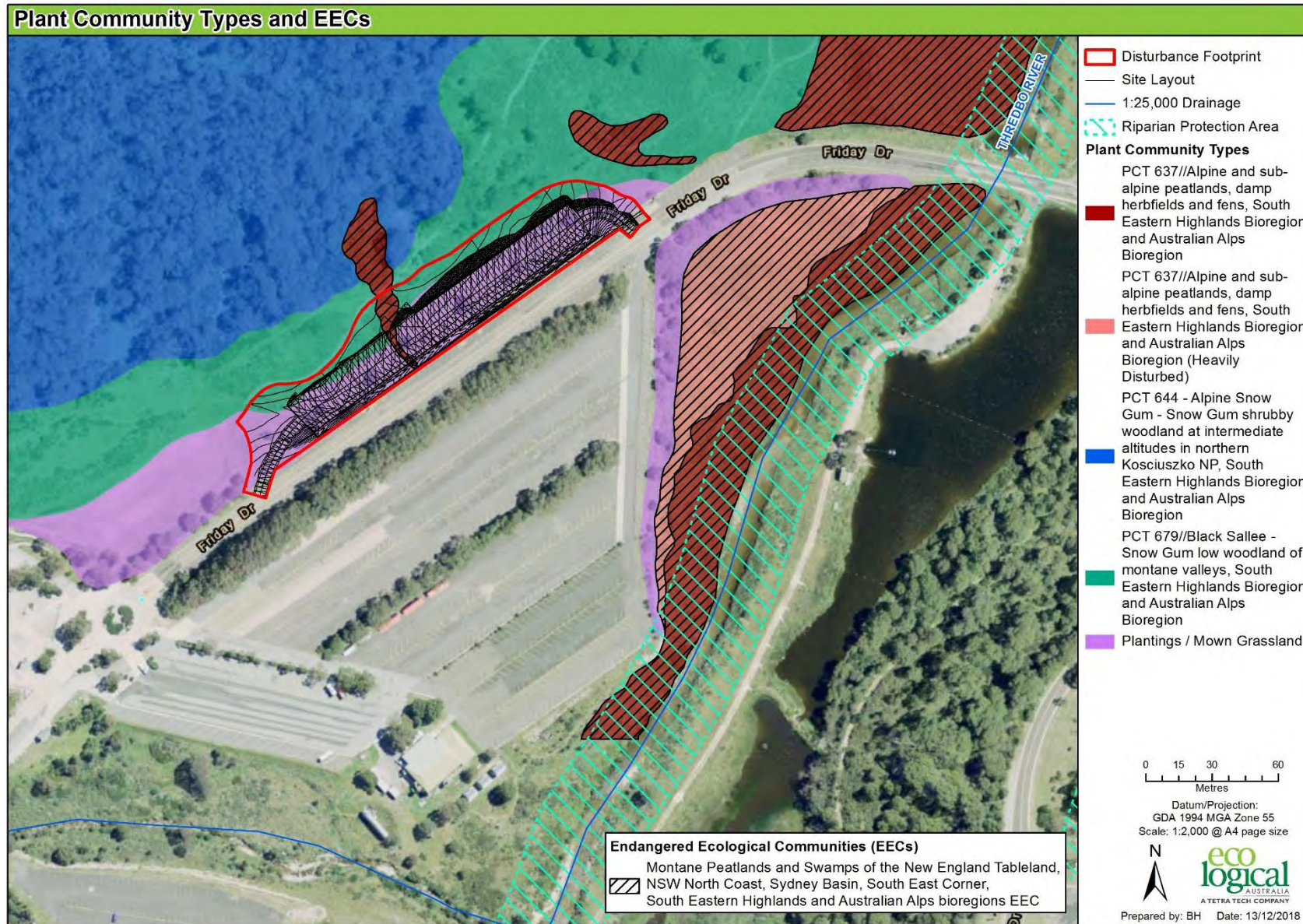


Figure 3: Vegetation within and surrounding the study area.

3.2.4 Flora species

Forty plant species were recorded within the study area or immediate surrounds during the survey period, including 33 native species and 7 exotics, and this species list appears in **Appendix B**. No threatened flora species were detected within the study area and it is highly unlikely that any occur there.

3.3 Fauna

3.3.1 Fauna habitats

The study area contains a limited range of fauna habitats given its small size and largely disturbed nature. However, the study area is surrounded by extensive areas of native vegetation and a relatively diverse range of native fauna are likely to occur there from time to time. In particular, the heath and trees provide potential habitat for native birds, mammals, reptiles, amphibians and invertebrates.

The heath within and surrounding the study area provides sheltering and foraging habitat for the Broad-toothed Rat. Minor evidence of the species (scats), which is likely to be relatively widespread in the Thredbo Resort area (TAV 1997 and Green 2002), was detected within the study area. Other common small mammal species such as *Antechinus swainsonii* (Dusky Antechinus) and *Rattus fuscipes* (Southern Bush Rat) may also occur within the study area.

The study area provides a small amount of foraging, sheltering and nesting habitat for species such as *Acanthiza pusilla* (Brown Thornbill) and the threatened *Petroica phoenicea* (Flame Robin), which was recorded in the study area during the survey period. The Flame Robin is amongst the most common birds during the summer in the more open subalpine and alpine habitats in the locality, and is recorded regularly throughout the Thredbo Resort Area. It is possible, although unlikely that threatened birds such as the *Callocephalon fimbriatum* (Gang-gang Cockatoo) and *Pachycephala olivacea* (Olive Whistler) may also forage in the study area from time to time.

The study area provides habitat for *Vombatus ursinus* (Common Wombat) and evidence of the species was observed in a number of locations surrounding the study area. However the proposal will not affect any wombat burrows.

There are only very limited rock habitats within the study area and no logs and dead trees so there is only very limited basking and foraging resource for reptiles. The study area provides a small amount of habitat for reptiles associated with heaths and grassland including *Eulamprus tympanum* (Southern Water Skink), *Pseudemoia entrecasteauxii* (Mountain Log Skink), *Pseudemoia pagenstecheri* (Grassland Tussock Skink), and *Austrelaps ramsayi* (Highlands Copperhead).

The limited water habitats within the study area provide a small foraging and breeding resource for frogs such as *Crinia signifera* (Common Eastern Froglet) and possibly other common species, although no frogs were calling during the survey period. The Exotic Grasslands within the study area are likely to be utilised by exotic species such as *Lepus timidus* (Brown Hare), *Oryctolagus cuniculus* (Rabbits) and *Cervus unicolour* (Sambar Deer).

3.3.2 Fauna species

Twelve native fauna species were detected within the study area or immediate surrounds during the survey period, including three mammals, eight birds, and one reptile, as listed in **Table 1**. A much more diverse range of native and exotic fauna would either be resident within the study area or occur there from time to time. The fauna detected during the survey period are a reflection of the limited survey effort and only provide a guide to the fauna species that would occur there.

Table 1: Fauna species recorded within the study area or immediate surrounds

Category	Common Name	Scientific Name	Detection Method
Mammals	Broad-toothed Rat	<i>Mastacomys fuscus</i>	Scats
	Common Wombat	<i>Vombatus ursinus</i>	Activity sign & scats
	Sambar Deer*	<i>Cervus unicolor*</i>	Scats
Birds	Brown Thornbill	<i>Acanthiza pusilla</i>	Observed
	Crimson Rosella	<i>Platycercus elegans</i>	Observed
	Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	Call recognition
	Flame Robin	<i>Petroica phoenicea</i>	Observed
	Little Raven	<i>Corvus mellori</i>	Observed
	Shining Bronze-Cuckoo	<i>Chalcites lucidus</i>	Call recognition
	Spotted Pardalote	<i>Pardalotus punctatus</i>	Call recognition
White-browed Scrubwren	<i>Sericornis frontalis</i>	Observed	
Reptiles	Tussock Skink	<i>Pseudemoia sp.</i>	Observed

Bold denotes threatened species. * denotes exotic species.

4 Impact assessment

4.1 Impacts on vegetation communities

The proposal will result in the removal or disturbance of approximately 0.18 ha of the PCT 679 *Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion* vegetation community. PCT 679 equates with the Tall Subalpine Heath mapped by Ecology Australia (2002). Ecology Australia (2002) estimate that there is approximately 64.7 ha of the community within the Thredbo Resort area (Ecology Australia 2002). The community also occurs up and downstream of the Thredbo Village on the flats adjacent to the Thredbo River and on adjacent lower slopes.

In this context, the loss or disturbance of approximately 0.18 ha of PCT 679 (at most 0.28% of the extent of the community with the Thredbo Resort area) is a relatively minor and acceptable impact

The proposal will result in the removal or disturbance of approximately 0.02 ha of the PCT 637 *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion*. PCT 637 equates with the Subalpine Bog mapped by Ecology Australia (2002). Subalpine Bog is relatively restricted within the Thredbo Resort area, and not well mapped. However, it is extensive in association with the Thredbo River up and downstream of the Thredbo Resort area, including to the immediate north of Friday Drive, as shown in **Photo 9**.

In this context the loss or further disturbance of approximately 0.02 ha of PCT 637, much of which is already heavily modified, is a relatively minor and acceptable impact.

4.2 Impacts on threatened ecological communities

The small area of PCT 637 within the study area and immediate surrounds comprises one endangered ecological community:

- The *Montane Peatland and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions endangered ecological community* (EEC) (hereafter referred to as the Montane Peatland and Swamps) which is listed on the BC Act.

The small area of PCT 637 within the study area is not considered to comprise the *Alpine Sphagnum Bogs and Associated Fens* EEC (hereafter referred to as the Alpine Sphagnum Bogs and Associated Fens) which is listed on the EPBC Act, given the absence of key species such as Sphagnum.

The proposal will result in the loss of a very small degraded area of Montane Peatland and Swamps which is of limited significance, approximately 0.02 ha, in the context of the extent and generally superior condition of the local occurrence of the community. The community is relatively extensive in the higher subalpine and alpine areas in the locality, and nearby along the Thredbo River, as shown in **Figure 3** and **Photo 9**.

4.3 Impacts on flora species of conservation significance

No threatened flora species, or flora species identified on the schedules of the Kosciuszko National Park Plan of Management (KNPPOM) (DEC 2006), were recorded within the study area during the survey period and none are expected to occur there.



Photo 9: The flats along the Thredbo River to the north of Friday Drive support relatively large areas of Montane Peatland and Swamps which is in excellent condition relative to the small patch within the study area.

4.4 Impacts on fauna habitats

Whilst the study area provides a small amount of known or potential habitat for a range of native fauna species, including threatened species, such as Broad-toothed Rat and Flame Robin, similar habitats are widespread in adjacent areas, and elsewhere within the locality, and will continue to be available to these species. The impacts associated with the proposal are limited to the removal or modification of a relatively small amount of native vegetation (approximately 0.2 ha), and up to 12 tree plantings, none of which provide important fauna habitats. Some sheltering and foraging habitat will be affected. However, this is a very small proportion of the sheltering and foraging habitat available in the areas immediately surrounding the study area, and the loss or modification of this habitat is not likely to adversely impact on fauna generally, or any threatened species.

The proposal will not affect any known Broad-toothed Rat nests or other important habitats for the species. No concentrations of scats or other evidence of nesting activity was detected during the survey period. Evidence of Broad-toothed Rat is widespread in the locality, and it is unlikely that a development such as proposed, would impact adversely of any individual or local population of the species. The proposal will not affect the Gang-gang Cockatoo, Olive Whistler or Flame Robin given the highly mobile nature of these species and the very small area of habitat affected relatively to the extent of similar habitat in the locality.

The proposal will not result in substantial modifications to the hydrological environment nor will it create barriers which prevent the movement and dispersal of fauna species. Similar developments have been undertaken over the years within and in areas immediately adjacent to the study area, and elsewhere within the NSW Alps, with negligible impacts on the hydrological environment and associated ecosystems.

Under these circumstances, the impacts of the proposal on fauna habitats are relatively minor and acceptable.

4.5 Threatened species likelihood of occurrence

As a result of database searches and field surveys, the threatened species and communities identified in **Table 2** are known or considered to have the potential to occur within the study area or immediate surrounds (**Appendix A**). The potential impact of the proposal on these entities has been assessed (**Appendix C**) pursuant to relevant statutory assessments.

Table 2: Threatened species with the potential to be affected by the proposal

Scientific Name	Common Name	FM Act	BC Act	EPBC Act	Occurrence
Fauna					
<i>Mastacomys fuscus</i>	Broad-toothed Rat	—	V	V	Known
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	—	V	—	Potential
<i>Petroica phoenicea</i>	Flame Robin	—	V	—	Known
<i>Pachycephala olivacea</i>	Olive Whistler	—	V	—	Potential

V = Vulnerable, E = Endangered

4.6 Conclusion of Test of Significance

A test of significance under Section 7.3 of the BC Act was undertaken for those threatened species and ecological communities known within the study area and immediate surrounds or with potential to occur there (**Table 2**). The outcome of the assessment was that it is highly unlikely that the proposal would significantly impact on those threatened entities assessed (**Appendix B**).

Recommendations have been provided in Section 5 to further ameliorate the potential impacts of the proposal.

4.7 Conclusion of EPBC assessment

An impact assessment under the EPBC Act was undertaken on threatened species known within the study area and immediate surrounds or with potential to occur there (**Table 2**).

The outcome of this assessment was that it is highly unlikely that the development would significantly impact on the threatened entities assessed (**Appendix C**). A referral to the Commonwealth under the EPBC Act is not necessary.

5 Recommendations

To further mitigate the potential impacts of the proposal, the following recommendations for impact mitigation and amelioration are suggested.

Vegetation and habitat management

1. All disturbance should be kept to the minimum required to achieve the proposal. In particular, excavation and any vegetation removal should be undertaken so as to minimize damage to surrounding vegetation and associated habitats.
2. All machinery to be used during the construction phase should be limited to the existing disturbed areas and the footprint of the proposal as far as is possible.
3. As far as is possible, excavation and other activities should be undertaken from existing disturbed areas so as to not extend the disturbance footprint beyond the proposal.
4. The proposal should be constructed and implemented in accordance with best practice design standards to ensure that there are no adverse modifications to the hydrological environment that may impact on surrounding vegetation and associated habitats.
5. Appropriate safeguards should be in place during the proposed works to limit the potential for invasive plants or pathogens, chemicals or any other pollutants to enter the environment in association with the proposed development.

Sediment control

6. Appropriate sediment control measures should be implemented prior to any construction work for the proposal and retained in place until exposed areas of soil or vegetation are stabilised and/or revegetated.
7. Drainage management and sediment control measures are to have particular regard to the prevention of any sedimentation of watercourses or vegetation communities adjoining the study area.

Rehabilitation

8. Rehabilitation activities should be consistent with the resort areas rehabilitation guidelines (NGH Environmental 2007).

6 Conclusion

This report describes the biological environment and assesses the potential effects on threatened and migratory species, endangered populations and ecological communities of a proposal to construct a new car park, known as Car Park 2, in the Friday Flat area of Thredbo Alpine Resort.

The study area and immediate surrounds was found to support two native vegetation communities PCT 679 *Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion* and PCT 637 *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion*, with much of the study area comprising Exotic Grassland or other heavily disturbed vegetation. Forty plant species were recorded within the study area or immediate surrounds during the survey period. No threatened flora species were recorded within the study area and none are considered likely to occur there given the absence of suitable habitats. The PCT 637 which occurs in the study area and surrounds is considered to comprise the *Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps EEC*, which is listed on the BC Act. Only approximately 0.02 ha of the Montane Peatlands and Swamps EEC is expected to be affected by the proposal.

Whilst the study area provides a small amount of potential habitat for threatened fauna species such as the Broad-toothed Rat, Gang-gang Cockatoo, Olive Whistler, and Flame Robin, similar habitats are extensive in the locality and the habitats to be affected are small in the context of the extent of similar habitats contiguous with the study area. Furthermore, the proposal will not affect any potentially important habitats for threatened fauna species nor sever any linkages between habitats or otherwise permanently restrict fauna movement.

An assessment of the effects of the proposal on threatened species, populations and ecological communities which may be directly or indirectly affected by the proposal was undertaken by applying the five factors from Section 7.3 of the *Biodiversity Conservation Act 2016*. This assessment concluded that the proposal is unlikely to have a significant effect on threatened species, populations or ecological communities or their habitats.

Following consideration of the administrative guidelines for determining significance under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999*, it is concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance or Commonwealth land, and a referral to the Commonwealth Environment Minister is not necessary.

Notwithstanding the relatively minor impacts on vegetation and fauna habitats associated with the proposal, the impact mitigation measures described in Section 5 are also recommended to be incorporated into the proposal.

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Appendix A: Likelihood of occurrence

Summary of initial assessment to determine the likelihood of occurrence of threatened species, populations and ecological communities in the proposal site.

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Additional flora species have been added where the study area is considered to provide potential habitat and additional fauna species that may inhabit the study area have also been included by correlating species habitat requirements with the existing environment. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the study area, results of the field survey and professional judgement.

The terms for likelihood of occurrence are defined below:

- “yes” = the species was or has been observed on the site
- “likely” = a medium to high probability that a species uses the site
- “potential” = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the site
- “no” = habitat on site and in the vicinity is unsuitable for the species.

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
FLORA						
<i>Argyrotegium nitidulum</i> syn. <i>Euchiton nitidulus</i>	Shining Cudweed	-	V	V	A mat-forming silver-leaved perennial daisy growing in tall alpine herbfield or open heathland above or close to the treeline. The species is known in NSW only from the high alpine area in the vicinity of Mt Kosciuszko. The species was not observed within the study area despite good survey coverage. There is no suitable habitat for the species within the study area.	No
<i>Carex archeri</i>	Archer's Carex	-	E	-	This species is associated with alpine herbfield, sod tussock grassland or alpine heathland and is known in NSW only from the Club Lake and upper Thredbo River areas. There is no suitable habitat for the species within the study area.	No
<i>Carex raleighii</i>	Raleigh Sedge	-	E	-	This species is associated with alpine herbfield, sod tussock grassland or alpine heathland. There is no suitable habitat for the species within the study area.	No
<i>Glycine latrobeana</i>	Clover Glycine	-	CE	V	Clover Glycine is found across south-eastern Australia in native grasslands, dry sclerophyll forests, woodlands and low open woodlands with a grassy ground layer. There is no suitable habitat for the species within the study area.	No
<i>Haloragis exalata</i> subsp. <i>exalata</i>	Square Raspwort	-	-	V	The Square Raspwort appears to be a post-disturbance coloniser, based on observations of large numbers of plants on disturbed roadsides, cleared power-line easements, and recently burnt or flooded areas. The nearest populations are in the Geehi Valley. There is no suitable habitat for the species within the study area.	No
<i>Prasophyllum bagoense</i>	Bago Leek-orchid	-	E	CE	The Bago Leek-orchid is endemic to NSW, and is currently known from a single population at McPhersons Plain, east of Tumbarumba in the Southern Tablelands.	No

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Pterostylis oreophila</i>	Blue-tongued Orchid	-	CE	CE	In New South Wales, the Blue-tongued Greenhood is known from a few small populations within Kosciuszko National Park and a population of about 40 plants (possibly now extinct) in Bago State Forest and adjoining Crown Leases south of Tumut. It grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. It less commonly grows in peaty soils and sphagnum mounds. It flowers from November to January. There is a small amount of marginal potential habitat for the species within the Subalpine Riparian Scrub within study area however it is considered highly unlikely that it would occur there.	Unlikely
<i>Ranunculus anemoneus</i>	Anemone Buttercup	-	V	V	This perennial forb of the alpine and upper alpine zones tends to occur in areas where snow persists late into the warm season. The species is relatively common in the higher subalpine and alpine areas in the locality. This species was not observed within the study area despite good survey coverage.	Unlikely
<i>Rytidosperma pumilum</i>	Feldmark Grass	-	V	V	Feldmark Grass is limited to a tiny area of feldmark - about 3ha - of the Main Range of Kosciuszko National Park between Mt Northcote and Mt Lee. There is no suitable habitat for the species within the study area.	No
<i>Rytidosperma vickeryae</i>	Perisher Wallaby Grass	-	E	-	This perennial grass is associated with treeless subalpine streamside vegetation and has been recorded from Perisher, Betts, and Spencers Creeks and tributaries, and Happy Jacks Plain. It is associated with bogs and sphagnum mounds. There is no suitable habitat for the species within the study area.	No
<i>Thesium australe</i>	Austral Toadflax	-	V	V	This species is semi-parasitic on roots of a range of grass species, mainly Kangaroo Grass.	No

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
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ENDANGERED ECOLOGICAL COMMUNITIES

Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps	-	EEC	-	The plant community characterizing this EEC is associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. It occurs on undulating tablelands and plateaus, above 400-500 m elevation, generally in catchments with basic volcanic or fine-grained sedimentary substrates or, occasionally, granite.	Yes
Alpine Sphagnum Bogs and Associated Fens	-	-	EEC	This EEC is typically found in alpine, subalpine and montane environments. It can usually be defined by the presence of sphagnum moss, even though it may sometimes only be a minor component. It is dominated by shrubs or species such as <i>Empodisma minus</i> and is found in permanently wet areas, such as along streams, valley edges, valley floors where soils are waterlogged.	No
Natural Temperate Grassland of the Southern Tablelands (NSW and ACT)	-	CEEC	EEC	This community is associated with valleys influenced by cold air drainage and open plains in the Southern Tablelands. The vegetation communities within the study area do not comprise this community.	No
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	EEC	EEC	Box Gum Woodland occurs where rainfall is between 400 and 1200 mm per annum, on moderate to highly fertile soils at altitudes of 170 m to 1200 m. It occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria	No
Snowy River Aquatic Ecological Community	EEC	-	-	The bed, banks, floodplains and associated vegetation of the Snowy River and all its tributaries potentially comprise part of this EEC. The ephemeral watercourse within the study area does not comprise this EEC.	No

Disclaimer: Data extracted from the Atlas of NSW Wildlife and EPBC Act Protected Matters Report are only indicative and cannot be considered a comprehensive inventory.

CE = Critically Endangered; E = Endangered; EEC = Endangered Ecological Community; V = Vulnerable

Scientific name	Common name	FM Act	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
FISH						
<i>Maccullochella peelii</i>	Murray Cod	-	-	V	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. There is no suitable habitat within the study area.	No
<i>Macquaria australasica</i>	Macquarie Perch	-	-	E	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks (. Spawning occurs just above riffles (shallow running water). The Macquarie Perch was once widespread through the cooler upper reaches of the southern tributaries of the Murray-Darling river system in Victoria and New South Wales (Anonymous 1974; McDowall 1996), however its distribution did not usually extend to the sources of these rivers. There is no suitable habitat within the study area.	No
<i>Prototroctes maraena</i>	Australian Grayling	-	E	V	Currently, the Australian Grayling occurs in streams and rivers on the eastern and southern flanks of the Great Dividing Range, from Sydney, southwards to the Otway Ranges of Victoria and in Tasmania. The species is found in fresh and brackish waters of coastal lagoons, from Shoalhaven River in NSW to Ewan Ponds in South Australia. It is absent from the inland Murray-Darling system (DPI 2006; McDowall 1980b). There is no suitable habitat within the study area.	No

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
MAMMALS					
<i>Burramys parvus</i>	Mountain Pygmy-possum	E	E	This species lives only in the alpine and subalpine areas of the highest mountains of Victoria and NSW. It lives in rocky areas where boulders have accumulated below mountain peaks and is frequently associated with alpine heathlands dominated by Mountain Plum Pine. The nearest core habitats for the species are at Charlotte Pass. Given the absence of preferred sheltering or foraging habitat within the study area it is considered unlikely that the species would occur there.	Unlikely
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	The species prefers moist forest types and is often associated with escarpments. There is no denning habitat for the species within the study area and the potential foraging habitat within the study area would form only a small proportion of the home range of the species, which has been estimated at between 800 ha and 2000 ha.	Unlikely
<i>Mastacomys fuscus</i>	Broad-toothed Rat	V	V	This species occurs in two widely separated areas in NSW, the Barrington Tops area and the wet alpine and subalpine heaths and woodlands of the Kosciuszko NP and adjacent areas. The species lives in a complex of runways through dense vegetation of wet grass, sedge or heath and under the snow in winter.	Yes
<i>Petauroides volans</i>	Greater Glider	V	V	This species is associated with tall moist forests. It would not occur within the study area.	No
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. The nearest known population is more than 50 km southeast of the study area.	No
<i>Phascolarctos cinereus</i>	Koala	V	—	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% with acceptable <i>Eucalypt</i> food trees. It is highly unlikely that the species would ever occur in the study area and would not be resident there.	No

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Pseudomys fumeus</i>	Smoky Mouse	E	E	Occurs in heath on ridge tops and slopes in sclerophyll forests, heathland and open forest along the coast and inland to sub-alpine regions. Occasionally occurs in ferny gullies. It is considered highly unlikely that the species would occur within the study area or immediate surrounds given its rarity and the nature of the habitats there.	Unlikely
<i>Pteropus poliocephalus</i>	Grey-headed Flying-Fox	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. Camps are often located in gullies, typically close to water, in vegetation with a dense canopy. There are no camps in the locality and the species would not occur within the study area.	No

AMPHIBIANS

<i>Litoria spenceri</i>	Spotted Tree Frog	CE	E	The Spotted Tree Frog is associated with a range of vegetation communities from montane forest at high altitudes to wet and dry forest at moderate to low altitudes respectively. It occurs along sections of streams with steep banks, invariably in steeply dissected country or gorges with numerous rapids and waterfalls. It is restricted to riffle and cascade stream sections with exposed rock banks, resulting in a highly patchy distribution along most streams. Adults and juveniles most likely remain in the vicinity of the stream, rarely venturing far from the riparian zone. Tadpoles occur predominantly in slow-flowing sections of streams. There is no suitable habitat within the study area.	No
<i>Litoria raniformis</i>	Southern Bell Frog	E	V	This species is usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys and in irrigated rice crops, particularly where there is no available natural habitat. There is no suitable habitat within the study area.	No

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Litoria verreauxii alpina</i>	Alpine Tree Frog	E	V	This species occurs in the alpine and subalpine zones of south-eastern NSW and Victoria. It is found in a wide variety of habitats including woodland, heath, grassland and herbfields. It breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, dams and drainage channels that are still or slow flowing. The species has disappeared from much of its former range in the last 20 years and is restricted to a few breeding sites in murky ponds. There is no suitable breeding habitat for the species within the study area and it is highly unlikely that it would occur there.	Unlikely
<i>Pseudophryne corroboree</i>	Southern Corroboree Frog	E	E	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.	Unlikely
REPTILES					
<i>Cyclodomorphus praealtus</i>	Alpine She-oak Skink	E	E	In NSW, the species is known from open alpine heath and tussock grassland within the Kosciuszko region, preferring treeless or lightly treed areas. The study area does not include any suitable habitat for this species and it is considered unlikely that it would occur there.	Unlikely
<i>Liopholis guthega</i>	Guthega Skink	E	E	This species is known from the Snowy Mountains and the Bogong High Plains and is associated with rocky areas in a range of alpine and subalpine vegetation communities. The species lives in extensive colonies associated with a deep burrow network that is constructed in eroded granite and humus soils beneath boulders and shrubs. The species occurs above 1800 m.	No

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
BIRDS					
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	E, M	Associated with temperate eucalypt woodland and open forest including forest edges, wooded farmland and urban areas with mature eucalypts, and riparian forests of River Oak (<i>Casuarina cunninghamiana</i>). The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes. As such it is reliant on locally abundant nectar sources with different flowering times to provide a reliable supply of nectar. The species would not occur within the study area.	No
<i>Botaurus poiciloptilus</i>	Australasian Bittern	V	E	This species favours permanent freshwater wetlands with tall, dense vegetation, particularly bulrushes and spikerushes. It hides during the day amongst dense reeds and feeds at night. It breeds during summer with nest built in secluded places in densely vegetated wetlands on a platform of reeds. There is no habitat for the species within the study area.	No
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	Gang-gang Cockatoos live as pairs inhabiting woodlands of south-eastern Australia. The species feeds primarily on the seeds of eucalypts and acacias and breeds in tree hollows. The species is typically associated with taller montane forests in the region but is sometimes observed foraging in Snow Gums and on the side of roads. The species may forage within the study area from time to time.	Potential
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	—	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west. It inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and <i>Acacia</i> woodland. It is considered unlikely that the species would occur within the study area.	Unlikely

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Lathamus discolor</i>	Swift Parrot	E	CE	Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts. Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as Swamp Mahogany (<i>Eucalyptus robusta</i>), Spotted Gum (<i>Corymbia maculata</i>), Red Bloodwood (<i>C. gummifera</i>), Mugga Ironbark (<i>E. sideroxylon</i>), and White Box (<i>E. albens</i>). It is considered highly unlikely that the species would occur within the study area.	Unlikely
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	E	CE, M	Breeds only in coastal south-west Tasmania and spends the winter in coastal Victoria and South Australia. It nests in hollows in eucalypt trees which grow adjacent to its feeding plains. In early October the birds arrive in the south west and depart after the breeding season usually in March and April. It feeds on the seeds of several sedges and heath plants, including buttongrass. Its main food preferences are found in sedgelands which have not been burned for between 3-15 years. Also included in the diet are seeds of three Boronia species and the everlasting daisy (<i>Helichrysum pumilum</i>). After breeding, migrating birds move gradually northwards up the west coast, through the Hunter Group and King Island in Bass Strait and on to the mainland. On the journey the birds usually feed on beach-front vegetation including salt tolerant species such as sea rocket (<i>Cakile maritima</i>). They also eat various coastal native and introduced grasses. There is no habitat for the species within the study area.	No
<i>Pachycephala olivacea</i>	Olive Whistler	V	-	This species is usually associated with moist tall forests at high elevations but has been occasionally recorded at lower altitudes. Breeding occurs above 300m within habitats providing both a thick understorey and moderate canopy. In the alps the species is more typically associated with subalpine woodlands with a heathy understorey. It is likely that the species would occur within the study area from time to time.	potential

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Petroica rodinogaster</i>	Pink Robin	V	-	The Pink Robin is found in Tasmania and the uplands of eastern Victoria and far south-eastern NSW, almost as far north as Bombala. It inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies. In the alps the species is more typically associated with Montane Forests rather than subalpine heaths. The species may forage within the study area from time to time.	Unlikely
<i>Petroica boodang</i>	Scarlet Robin	V	-	This species is found in south-eastern Australia and south-west Western Australia. In NSW it occupies open forests and woodlands from the coast to the inland slopes. The Scarlet Robin breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. There is no suitable habitat for the species within the study area and it is considered unlikely that it would occur there.	Unlikely
<i>Petroica phoenicea</i>	Flame Robin	V	-	The Flame Robin is found in south-eastern Australia (Queensland border to Tasmania, western Victoria and south-east South Australia). In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. The species is well known from the locality and was observed within the study area during the survey period.	Yes

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
MIGRATORY TERRESTRIAL AND WETLAND SPECIES LISTED UNDER EPBC ACT					
<i>Hirundapus caudacutus</i>	White-throated Needletail	—	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas. Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather.	Unlikely
<i>Merops ornatus</i>	Rainbow Bee-eater	—	M	Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May. Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (ibid). Nest is a chamber at the end of a burrow, up to 1.6 m long, tunnelled in flat or sloping ground, sandy bank or cutting (ibid). The species would not occur within the study area.	No
<i>Monarcha melanopsis</i>	Black-faced Monarch	—	M	This migratory species is known to breed in damp forest types and forage in rainforest and eucalypt forest. The species would not occur within the study area.	No
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	—	M	This species inhabits lowland eucalypt forests. It is known to nest in dense gully vegetation. The species would not occur within the study area.	No
<i>Neophema chrysogaster</i>	Orange-bellied Parrot	E	E, M	SEE DIURNAL BIRDS ABOVE	No
<i>Rhipidura rufifrons</i>	Rufous Fantail	—	M	This migratory species forages by catching flying insects and is known to utilise the aerial foraging space above the dense understorey in damp forests or beside rivers. The species would not occur within the study area.	No
<i>Xanthomyza phrygia</i>	Regent Honeyeater	E	E, M	SEE DIURNAL BIRDS ABOVE	No
<i>Gallinago hardwickii</i>	Latham's Snipe	—	M	Resides in swamps, dams and nearby marshy areas that contain grasses, lignum, low scrub or open timber that provides cover. It is considered unlikely that the species would occur within the study area.	Unlikely

Scientific name	Common name	BC Act	EPBC Act	Habitat associations	Likelihood of occurrence
<i>Motacilla flava</i>	Yellow Wagtail	—	M	Frequents open wetlands along the bare shores of freshwater swamps, crops and bare bore drains, as well as short-grassed fields and rocky coasts. It is considered highly unlikely that the species would occur within the study area.	Unlikely

Disclaimer: Data extracted from the Atlas of NSW Wildlife and EPBC Act Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the DEW protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine and wetland habitats.

CE = Critically Endangered; E = Endangered; V = Vulnerable; M = Migratory

Appendix B: Flora list

Scientific name	Common name
<i>Acaena novae-zelandiae</i>	Bidgee-widgee
<i>Acetosella vulgaris</i> *	Sheep Sorrel
<i>Achillea millefolium</i> *	Yarrow
<i>Acrothamnus hookeri</i>	
<i>Anthoxanthum odoratum</i> *	Sweet Vernal Grass
<i>Agrostis capillaris</i> *	Browntop Bent
<i>Asperula gunnii</i>	Mountain Woodruff
<i>Baeckea utilis</i>	Mountain Baeckea
<i>Baeckea gunniana</i>	Alpine Baeckea
<i>Bossiaea foliosa</i>	Leafy Bossiaea
<i>Carex appressa</i>	Tall Sedge
<i>Carex breviculmis</i>	
<i>Cassinia monticola</i>	
<i>Coronidium scorpioides</i>	Button Everlasting
<i>Empodisma minus</i>	Spreading Rope Rush
<i>Epacris paludosa</i>	Swamp Heath
<i>Eucalyptus pauciflora</i>	Snow Gum
<i>Eucalyptus stellulata</i>	Black Sally
<i>Festuca rubra</i> *	Red Fescue
<i>Geranium antrosum</i>	
<i>Gratiola</i> sp.	
<i>Grevillea australis</i>	Alpine Grevillea
<i>Holcus lanatus</i> *	Yorkshire Fog
<i>Hovea montana</i>	Alpine Hovea
<i>Hypochaeris radicata</i> *	Flatweed
<i>Leptorhynchos squamatus</i>	Scaly Buttons
<i>Luzula novae-cambriae</i>	
<i>Microseris lanceolata</i>	Murrnong
<i>Olearia phlogopappa</i> subsp. <i>flavescens</i>	Dusty Daisy-bush
<i>Olearia phlogopappa</i> subsp. <i>serrata</i>	Dusty Daisy-bush

<i>Oreomyrrhis eriopoda</i>	Australian Carraway
<i>Oxylobium ellipticum</i>	Common Shaggy Pea
<i>Poa fawcettiae</i>	Smooth Blue Snowgrass
<i>Ranunculus lappaceus</i>	Common Buttercup
<i>Scleranthus biflorus</i>	Knawel
<i>Stellaria pungens</i>	Prickly Starwort
<i>Taraxacum officinale</i> *	Dandelion
<i>Trifolium repens</i> *	White Clover
<i>Veronica gracilis</i>	Slender Speedwell

* = denotes introduced species

Appendix C: Test of significance

Test of significance pursuant to section 7.3 of the BC Act: Five-part test

An assessment of the effects of the proposal on threatened species, populations and ecological communities which may be directly or indirectly affected by the proposal may be carried out by applying the five factors from Section 7.3 of the BC Act. Threatened species, populations and ecological communities which may be directly or indirectly affected by the proposal include:

- *Mastacomys fuscus* (Broad-toothed Rat)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Petroica phoenicea* (Flame Robin)
- *Pachycephala olivacea* (Olive Whistler)
- Montane Peatlands and Swamps EEC

(a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

Vulnerable Species

Fauna

Broad-toothed Rat *Mastacomys fuscus* (known occurrence).

The Broad-toothed Rat generally occurs in two widely separated areas in NSW, the Barrington Tops area and the wet alpine and subalpine heaths and woodlands of the Kosciuszko NP and adjacent areas. The species lives in a complex of runways through dense vegetation of wet grass, sedge or heath and under the snow in winter. Home range size is thought to range between approximately 0.1 ha and 0.27 ha. Individuals nest alone over summer but congregate in communal nests during winter. The species is thought to be locally common in the alpine and high subalpine tracts of the Snowy Mountains area (Green 2002), where suitable habitats are present.

The study area provides a small amount of potential foraging and sheltering habitat for the Broad-toothed Rat. Minor evidence of the species in the form of a few scats was observed within the study area.

The proposed development will affect some known and potential habitat for the species, however, it will affect only a very small amount of the potential habitat for the species in the Thredbo Resort area. The proposed development will not affect any key resources for the species, and the habitats immediately adjoining the study area will continue to be available to the species after the implementation of the proposed development. As such, the proposed development is unlikely to adversely affect a significant proportion of the home range of one or more Broad-toothed Rat individuals.

The proposed development will not result in habitat fragmentation which could isolate individuals or a population of the Broad-toothed Rat. Under these circumstances, the proposed development is considered unlikely to disrupt the life cycle of the Broad-toothed Rat such that a viable local population is likely to be placed at risk of extinction.

Gang-gang Cockatoo *Callocephalon fimbriatum* (potential occurrence).

In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the central and southern tablelands and south-west slopes. In summer, this species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, the Gang-gang Cockatoo may occur at lower altitudes in drier more open eucalypt forests and woodlands, and is often found in urban areas. It may also occur in sub-alpine Snow Gum woodland and occasionally in temperate rainforests (DECC 2005).

The species is regularly observed at Thredbo and in montane and subalpine areas in the region and was heard calling near the study area during the survey period. Whilst the species may forage within the study area, it would not breed there given the absence of suitable nesting habitat. Given the extensive forests within the locality, breeding and roosting habitat is likely to be relatively abundant.

The study area provides a very small area of suitable foraging resources for the species. The foraging resources (generally eucalypt trees) to be removed in association with the proposed development would not be important for the species, given the extent of foraging resources in the Thredbo Resort area.

Under these circumstances, the proposed development will not disrupt the life cycle of the Gang-gang Cockatoo such that a viable local population of the species is likely to be placed at risk of extinction.

Flame Robin *Petroica phoenicea* (likely occurrence).

The Flame Robin is found in south-eastern Australia (Queensland border to Tasmania, western Victoria and south-east South Australia). In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. There are numerous records of the species throughout the NSW Alps, and the species was observed in the study area during the survey period. It is well known from the Thredbo Resort area and is one of the most common birds of open habitats outside of the winter period.

The proposal will affect a very small amount of potential nesting and foraging habitat for the species. This is negligible in the context of the extensive areas of similar habitat within the Thredbo Resort area that will not be affected by the proposed development and which will continue to be available to the species. The species is not sedentary and undertakes substantial seasonal migrations, reducing the species dependence on any specific area of known or potential habitat.

Under these circumstances, the proposed development is unlikely to disrupt the life cycle of the Flame Robin such that a viable local population of the species is likely to be placed at risk of extinction.

Olive Whistler *Pachycephala olivacea* (potential occurrence).

The Olive Whistler is found in south-eastern Australia (Queensland border to Tasmania, western Victoria and south-east South Australia). In the NSW Alps, it is associated with areas of tall dense heath, particularly riparian Tea-tree scrubs. It breeds in the thick understorey of moist eucalypt forests and subalpine woodlands. It migrates in winter to lowland habitats. There are numerous records of the species throughout the NSW Alps including within the Thredbo Resort area where it is considered a common resident. The species was not recorded within the study area during the survey period however it is likely to occur there from time to time.

The proposed development will result in the loss of a very small amount of marginal potential foraging habitat for the Olive Whistler. Whilst this comprises an adverse impact on the species, the habitat to be removed is very small relative to the extensive areas of similar habitat which occurs within the Thredbo Resort area and elsewhere in the locality. Extensive areas of potential habitat for the species is

contiguous with the study area. The species is highly mobile and considered to be common within the Thredbo Valley and the Thredbo Valley population is considered to be contiguous with other populations to the north and south (MGP 1996).

Under these circumstances it is considered unlikely that the proposed development would affect the life cycle of the Olive Whistler such that a viable local population of the species is likely to be placed at risk of extinction.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Montane Peatlands and Swamps

i. Extent of Local Occurrence

The proposed development will result in a very minor reduction in the extent of the Montane Peatlands and Swamps EEC which occurs within the study area and surrounds. The community within the study area is in part heavily disturbed. The community is extensive in surrounding areas, particularly along the Thredbo River.

Under these circumstances, it is considered unlikely that the community would be adversely affected by the proposed development.

ii. Composition of Local Occurrence

The composition of the Montane Peatlands and Swamps EEC which occurs in the study area is unlikely to be significantly different to the composition in similar habitats within the locality. That is, it is unlikely that it supports a unique assemblage of the characteristic species of the community that does not occur elsewhere. In fact, the occurrence of the community within the study area is depauperate in comparison to elsewhere within the local occurrence where the community is more extensive and less disturbed. The proposed development will not adversely modify the composition of the community or otherwise adversely affect it such that its local occurrence is likely to be placed at risk of extinction.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

Mammals

The proposed development will impact on only a very small area of known or potential habitat for the Broad-toothed Rat.

Birds

The proposed development will result in the modification of a very small amount of potential habitat for the Flame Robin, Gang-gang Cockatoo and Olive Whistler.

Endangered Ecological Communities

The proposed development will result in only a very minor reduction in the extent of the local occurrence of the Montane Peatlands and Swamps EEC.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The proposed development will not fragment or isolated areas of habitat as the proposed clearing will occur on at the interface between remnant native vegetation and cleared areas.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

The habitats within the study area are not of particularly high quality and occur within an area which has already been modified by historic and ongoing impacts. They are also of very limited extent in comparison to the extensive areas of similar and superior habitats within the locality. As such, they are not considered to be critical to the long-term survival of any threatened species or the Montane Peatlands and Swamps EEC.

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The proposed development will not affect any area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposed development will remove 0.2 ha of remnant native vegetation. Whilst this constitutes the Key Threatening Process 'Clearing of native vegetation', the contribution to this key threatening process is relatively minor considering the extent of remnant native vegetation in the locality and the extant extent of the vegetation communities that will be affected.

EPBC ACT SIGNIFICANT IMPACT CRITERIA

The EPBC Act Administrative Guidelines on Significance 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; and
- 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.

Threatened and migratory species listed under the EPBC Act that are considered likely or potentially to occur within the study area are given in **Appendix A** of the Report. The only Commonwealth listed species which is considered to have the potential to occur within the study area is the Broad-toothed Rat.

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

Matters to be addressed	Impact
(a) any environmental impact on a World Heritage Property or National Heritage Places;	<p>No. The proposal does not impact on a World Heritage Property or a National Heritage Place as addressed in the SEE.</p> <p>(listed natural: Australian Alpine National Parks and Reserves; nominated historic: Snowy Mountains Scheme NSW).</p>
(b) any environmental impact on Wetlands of International Importance;	<p>No. The proposal will not affect any part of Ramsar wetland.</p>
(c) any impact on Commonwealth Listed Critically Endangered or Endangered Species;	<p>No. The proposal will not impact any Commonwealth listed endangered species.</p>
(d) any impact on Commonwealth Listed Vulnerable Species;	<p>Yes. The study area provides potential habitat for one Commonwealth listed vulnerable species: the Broad-toothed Rat.</p> <p>The significant impact criteria in terms of the vulnerable species are discussed below:</p> <p><i>a. lead to a long-term decrease in the size of an important population of a species.</i></p> <p>Whilst the proposed action will affect some potential habitat for the Broad-toothed Rat, it will affect only a very small amount of the potential habitat for the species. As such, the proposal is considered highly 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.</p> <p>The noise and vibration associated with the proposal 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 unintentionally killed during the implementation of the proposed action.</p> <p>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.</p> <p><i>b. reduce the area of occupancy of an important population</i></p> <p>It is highly likely that the Broad-toothed Rat will continue to occur in areas surrounding the study area 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</p>

Matters to be addressed	Impact
	<p>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, and will not reduce the areas of occupancy of an important population of the species.</p> <p><i>c. fragment an existing important population into two or more populations</i></p> <p>The proposed action will not fragment an existing important population of the Broad-toothed Rat into two or more populations.</p> <p><i>d. adversely affect habitat critical to the survival of a species</i></p> <p>No habitat within the study area is considered to be critical to the survival of the Broad-toothed Rat.</p> <p><i>e. disrupt the breeding cycle of an important population</i></p> <p>The proposed action and affected area is too small to disrupt the breeding cycle of an important population of the Broad-toothed Rat.</p> <p><i>f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</i></p> <p>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.</p> <p><i>g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</i></p> <p>The proposed action will not result in invasive species that are harmful becoming established in habitat for the Broad-toothed Rat.</p> <p><i>h. interferes substantially with the recovery of the species.</i></p> <p>Whilst there have been documented declines in some Broad-toothed Rat populations within the Snowy Mountains, these declines have been attributed to environmental factors such as major bushfire events and early snow thaws, and not impacts of the nature of those proposed. In any case, 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. The species continues to occur in suitable habitats within the Thredbo Resort Area, including within the village, and consistently along the Thredbo River. As such, it is considered highly unlikely that proposed action will substantially interfere with the recovery of the Broad-toothed Rat.</p>
(e) Any impact on a Commonwealth Endangered Ecological Community	No. The proposal will not have any adverse impacts on any listed Commonwealth Endangered Ecological Communities.
(f) any environmental impact on Commonwealth Listed Migratory Species;	No. The proposal will not have any adverse impacts on any listed migratory species.

Matters to be addressed	Impact
(g) does any part of the Proposal involve a Nuclear Action;	No. The project does not include a Nuclear Action.
(h) any environmental impact on a Commonwealth Marine Area;	No. There are no Commonwealth Marine Areas within the study area.
(i) In addition, any direct or indirect impact on Commonwealth lands	No. The project does not directly or indirectly affect Commonwealth land.



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