



Blue Cow, Kosciuszko National Park, NSW Biodiversity Development Assessment Report

FINAL REPORT

Prepared for Communications Planning Pty Ltd

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- Callan Wharfe (field work)
- Anne Murray (mapping)

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Glossary

APZ	Asset Protection Zone
BAM	NSW Biodiversity Assessment Method
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
Biosecurity Act	NSW <i>Biosecurity Act 2015</i>
BOS	Biodiversity Offsets Scheme
CEMP	Construction Environmental Management Plan
DA	Development Application
DBH	Diameter at Breast Height
DEE	Commonwealth Department of the Environment and Energy
DoIW	Directory of Important Wetlands
DPE	Department of Planning and Environment
Ecosystem credit species	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.
EEC	Endangered Ecological Community
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation of Australia
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
Locality	Area located within 10 kilometres radius from the study area
Matters of NES	Matters of National Environmental Significance protected by a provision of Part 3 of the EPBC Act
NPW Act	NSW <i>National Parks and Wildlife Act 1974</i>
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Type

SEPP 44	NSW State Environmental Planning Policy No. 44 – Koala Habitat Protection
Species credit species	Species that cannot be predicted by habitat surrogates that potentially occur within an area based on the PCTs present.
Study area	The broader area in which the subject land is located, including all direct and indirect impacts
Subject land	The area of direct impact for the proposed development
TEC	Threatened Ecological Community
TPZ	Tree Protection Zone

Summary

Biosis Pty Ltd was commissioned by Communications Planning Pty Ltd to provide a Biodiversity Development Assessment Report (BDAR) for the proposed construction of an Optus equipment shelter at Blue Cow, Kosciuszko National Park, NSW, approximately 20 metres to the south of Lot 525 DP1171975 (the subject land).

The project will be assessed under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Vegetation within the subject land is designated within the Biodiversity Values Map (OEH 2019) and as such the removal of vegetation triggers the Biodiversity Offsets Scheme (BOS), and an assessment is required in accordance with the NSW Biodiversity Assessment Method (BAM) (OEH 2017b) and the *Biodiversity Conservation Act 2016* (BC Act).

A development application for a new Telstra mobile base station within the study area (immediately adjacent to the subject land) has been granted approval from the Department of Planning and Environment. The new Optus equipment shelter is occurring within the vicinity of the approved Telstra facility and makes use of the Telstra conduit trenches being dug for power and optic fibre cables.

Field investigations, undertaken in accordance with the BAM, recorded 0.06 hectares of vegetation within the subject land that matched the scientific description of *Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion* (PCT 645). No threatened ecological communities (TECs) were located within the subject land. No threatened flora or fauna species were recorded during the investigation of the subject land.

In accordance with Section 10.3 of the BAM, offsets are required to be secured for the proposed development, as a result of impacts to 0.03 hectares of native vegetation and threatened fauna species habitat.

The required offsets include the retirement of biodiversity credits, or paying into the Biodiversity Conservation Trust's Offset Fund, for the following species and PCT:

- PCT 645 *Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion* – 1 credit
- *Burramys parvus* Mountain Pygmy-possum – 1 credit
- *Cyclodomorphus praealtus* Alpine She-oak Skink – 1 credit
- *Liopholis guthega* Guthega Skink – 1 credit
- *Mastacomys fuscus* Broad-toothed Rat – 1 credit

The project is not considered likely to result in a significant impact to species or communities listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and as such a referral to the Minister of the Environment and Energy is not required.

The total offset payment calculated by the BAM Calculator tool for the identified PCT and four species credits species is \$5,082.16 (incl. GST). The biodiversity payment summary report is included in section 7.

Stage 1 – Biodiversity assessment

1 Introduction

Biosis Pty Ltd was commissioned by Communications Planning Pty Ltd to provide a BDAR to support the proposed construction of an Optus equipment facility at Blue Cow, Kosciuszko National Park, NSW, approximately 20 metres to the south of Lot 525 DP1171975.

The purpose of this assessment is to apply the BAM (OEH 2017b) to the proposed development, and provide Communications Planning Pty Ltd with a BDAR, to be submitted to the Department of Planning and Environment (DPE) as part of a Development Application (DA) under Part 4 of the EP&A Act.

1.1 Project background

Communications Planning Pty Ltd proposes to install an equipment shelter on behalf of Optus at Blue Cow within Kosciuszko National Park. The proposed Optus facility will partially overlap the asset protection zone (APZ) of a Telstra mobile base station that has development approval immediately adjacent to the proposed equipment shelter. The Optus equipment shelter will also make use of the Telstra conduit trench being dug for power and optic fibre cabling.

The study area has been the subject of a previous flora and fauna assessment undertaken by Biosis in 2015 to support the development application for the Telstra facility. This was assessed under former legislation (NSW *Threatened Species Conservation Act 1995*, repealed in 2016), and due to legislative repeal, the site requires reassessment under the current NSW BC Act and the Commonwealth EPBC Act.

As the project involves the development of a telecommunication facility it falls under *State Environmental Planning Policy (Infrastructure) 2007* where it is defined as a *development permitted with consent* under Division 21, Clause 115 of the policy. Developments requiring consent fall under Part 4 (Development assessment and consent) of the EP&A Act, and all Part 4 developments require assessment under Part 7 of the BC Act to determine if they trigger the BOS. Part 7 of the *Biodiversity Conservation Regulation 2017* states that a proposed development exceeds the BOS threshold if it is or involves:

- The clearing of native vegetation on land included on the *Biodiversity Values Map*.
- The clearing of native vegetation that exceeds the BOS scheme threshold based on minimum lot size.

As the project is located within the Kosciuszko National Park within an area included on the Biodiversity Values Map, and it involves the removal of native vegetation, the BOS is triggered. The BC Act requires that the BAM be applied to all proposals that trigger the BOS, and that a BDAR is required to be submitted to the approval authority. Given the project is located within the Kosciuszko National Park ski resort area it falls under *State Environmental Planning Policy (Kosciuszko National Park – Alpine Resorts) 2007*. Part 1, Clause 7 of this policy state that the Minister is the consent authority for all development applications relating to the land in the ski resort area. Therefore approval authority in this case is the Department of Planning and Environment.

1.2 Purpose of this assessment

This BDAR will:

- Address the BAM and the BOS with respect to the proposed development.
- Identify how the proponent proposes to avoid and minimise impacts to biodiversity.

- Identify any potential impact that could be characterised as serious and irreversible.
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the proposed development.
- Consider and assess the proposal in accordance with other relevant legislation such as the Commonwealth EPBC Act.

All biodiversity assessments have been undertaken in accordance with the BAM, and this BDAR has been prepared and reviewed by Accredited BAM Assessor Callan Wharfe (BAAS18138).

1.3 The subject land

The subject land is defined as the total area of proposed disturbance, encompassing the proposed development footprint and all areas that could be disturbed during construction (e.g. plant laydown, APZ management, and access tracks) (Figure 1).

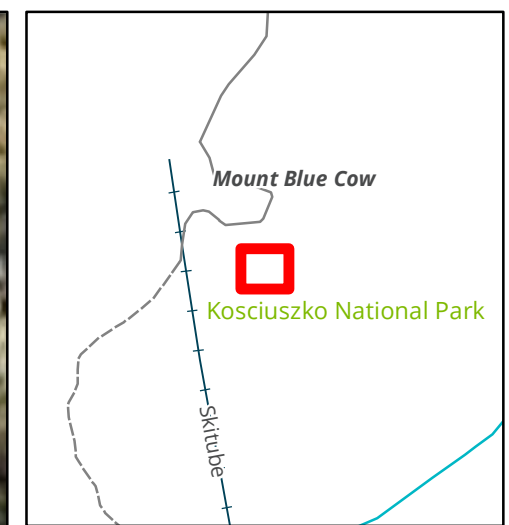
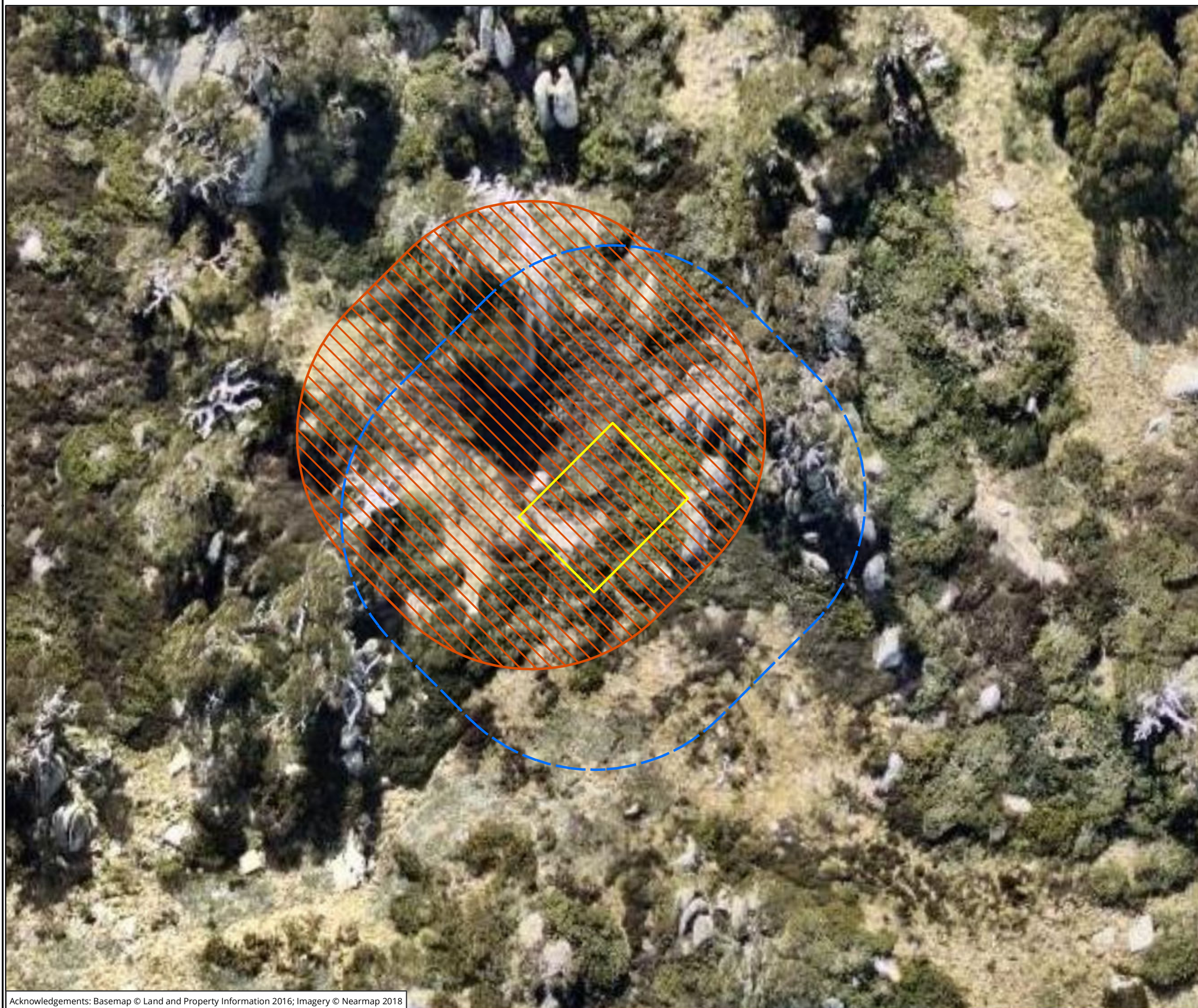
The subject land is approximately 0.06 hectares in area, and includes the area of vegetation removed for the construction of the equipment shelter and the associated APZ. The total area of vegetation clearing however, only equates to 0.03 hectares as a portion of the APZ is considered already established as a result of the approved Telstra tower (Figure 1).

The subject land is located approximately 20 metres to the south of Lot 525 DP1171975 at Blue Cow, Kosciuszko National Park, NSW. The land is located in the Snowy Monaro Regional Council Local Government Area (LGA) and the South East Local Land Services (LLS) Region. The subject land is located approximately 190 metres southeast of the Blue Cow Bistro and is currently zoned 'E1 – National Parks and Nature Reserves' pursuant to the *Snowy River Local Environmental Plan 2013* (Snowy River LEP).

Surrounding land consists of recreational ski resorts, slopes, and supporting infrastructure, and the Mount Kosciuszko National Park.

1.4 The study area

The study area encompasses the subject land and includes areas outside of the subject land that could be indirectly impacted by the proposal including adjacent areas downslope where there may be minor changes to hydrology through alteration to overland flow patterns.







- Legend**
-  Impact area
 -  Asset protection zone
 -  Already existing Telstra tower asset protection zone

Figure 1: Site map

0 2 4 6 8 10
 Metres
 Scale: 1:200 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



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 Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27710
 Date: 16 January 2019,
 Checked by: CW, Drawn by: AEDM, Last edited by: amurray
 Location: P:\27700s\27710\Mapping\27710_BDAR_F1_SiteMap

1.5 Sources of information

Sources of information used in this assessment included relevant databases, spatial data, literature and previous site reports.

In order to provide a context for the subject land, records of flora and fauna from within a 10 kilometres radius of the subject land (the 'locality') were collated from the following databases and reviewed:

- Commonwealth Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the EPBC Act.
- OEH BioNet Atlas of NSW Wildlife, for species, populations and ecological communities listed under the BC Act.
- PlantNET (Royal Botanic Gardens and Domain Trust).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015.

Other sources of biodiversity information relevant to the subject land were sourced from:

- The NSW PCTs, as held within the BioNet Vegetation Classification database (OEH 2017c).
- Biometric Vegetation Compilation for the South East Local Land Services Region (Eco Logical 2015).
- The BAM Calculator.

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

- Flora and fauna assessment: mobile base station, Blue Cow, Kosciuszko National Park (Biosis 2015)

Mapping was conducted using hand-held (uncorrected) GPS units (GDA94), mobile tablet computers running Collector for ArcGIS™ and aerial photo interpretation. The accuracy of this mapping is therefore subject to the accuracy of the GPS units (generally ± 5 metres) and dependent on the limitations of aerial photo rectification and registration.

Basemap data was obtained from NSW Land and property information 1:25,000 digital topographic databases, with cadastral data obtained from LPI digital cadastral database.

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

- Mitchell Landscapes Version 3.0
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7
- South East Local Land Services Biometric vegetation map (VIS ID 4211) (OEH 2018)

Mapping has been produced using a Geographic Information System (GIS). The following maps and data have been provided:

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

1.6 Legislative requirements

The proposed development has been assessed against relevant biodiversity legislation and government policy, including:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Planning and Assessment Act 1979*
- *Biodiversity Conservation Act 2016*
- *Biodiversity Conservation Regulation 2017*
- *Biosecurity Act 2015 (Biosecurity Act)*
- *State Environmental Planning Policy 44 Koala Habitat Protection*
- *State Environmental Planning Policy (Infrastructure) 2007*
- *State Environmental Planning Policy (Kosciuszko National Park – Alpine Resorts) 2007*
- *Snowy River Local Environmental Plan 2013.*

2 Landscape Context

This chapter describes the landscape and site context of the subject land, describing the landscape features present within the subject land and within a 1500 metre buffer, as required by the BAM (OEH 2017b). Figure 2 shows the location of the subject land and landscape features within the 1500 metre buffer.

2.1 Landscape features

2.1.1 Bioregions

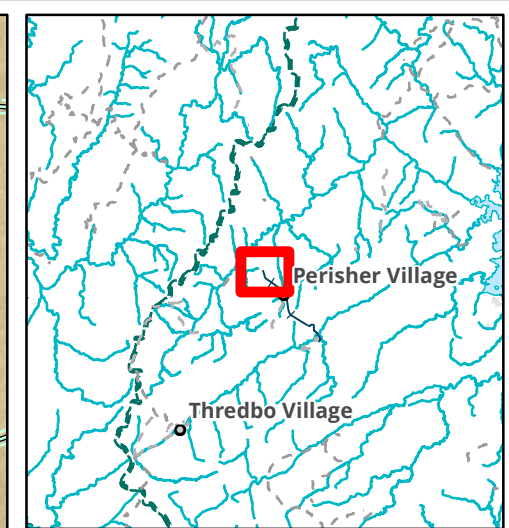
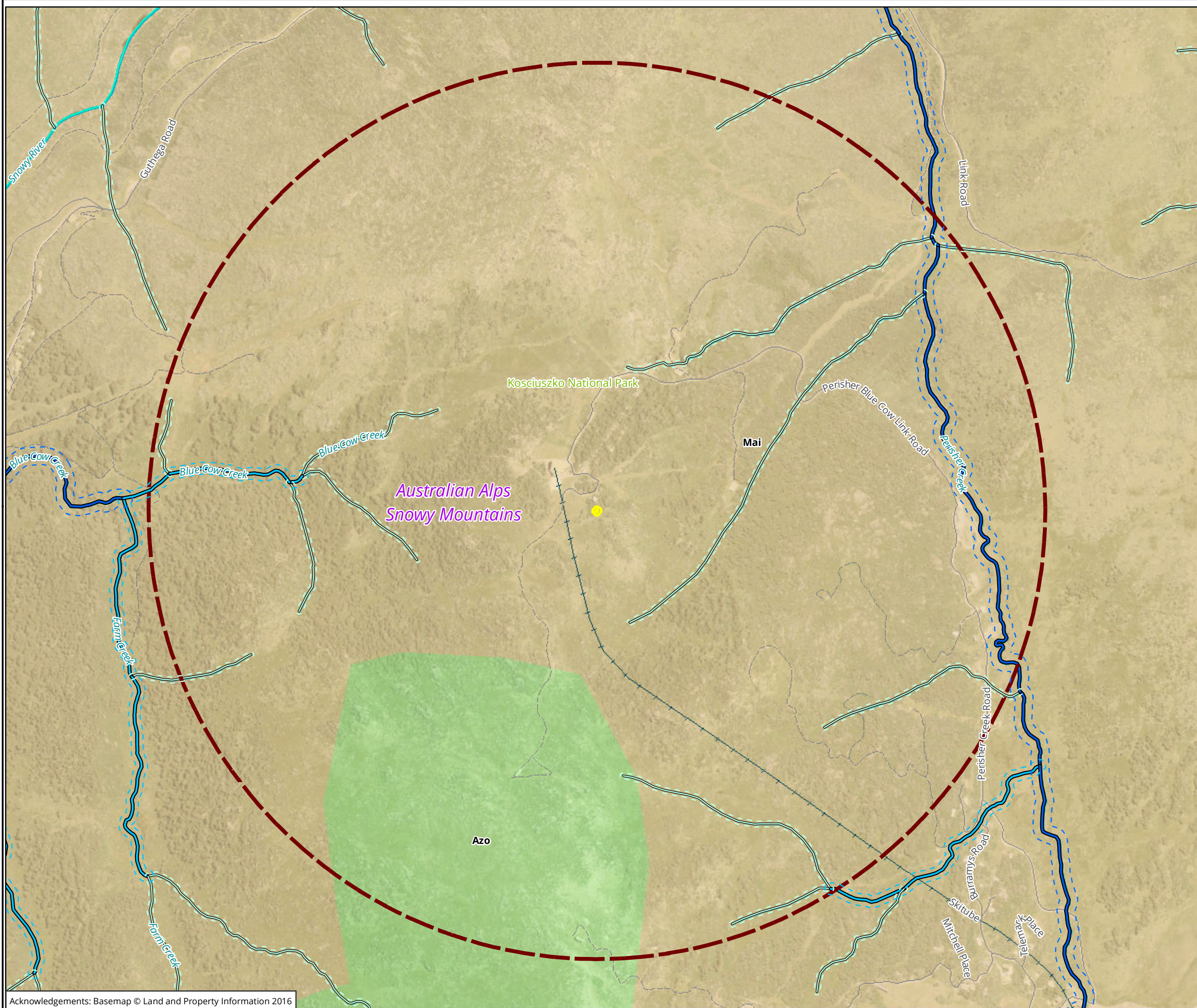
The subject land occurs within the Australian Alps Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the Snowy Mountains IBRA subregion. The Australian Alps Bioregion are located in south-eastern Australia, between eastern Victoria, south-eastern NSW, and south-western ACT. The region is one of the smallest bioregions in Australian covering an area of approximately 793,818 hectares, 54.02% (428,832 hectares) of which occurs in NSW. The bioregion is completely surrounded by the South Eastern Highlands bioregion. (OEH 2016a).

The characteristic landforms of the Australian Alps IBRA bioregion are low-relief high plains with steep margins and slopes and fault aligned river valley with deep gorges and waterfalls (OEH 2016b). The geology of the region consists of block-faulted granites and Palaeozoic metamorphic rocks, small areas of tertiary basalt with buried gravel and lake sediments, and quaternary glacial landforms and sediments above (OEH 2016b). There are four main physiographic elements that influence the plant communities found within the region, these being alpine, sub-alpine, montane, and tableland areas. These elements have resulted in about 30 exclusively alpine flora species and 21 locally endemic species (OEH 2016c).

2.1.2 NSW (Mitchell) Landscape

The subject land occurs on the Main Range Sub-alpine Mitchell Landscape (Mitchell 2002). This landscape is characterised by a high plateau and block faulted ranges on Silurian-Devonian gneissic granite and granites, with a linear unit of Ordovician greywacke, phyllite and schist below the tree line with general elevation from 1500 to 1800 metres. Mountain peaks and tor covered rounded hills stand above the plateau, extensive plains and valley swamps on a dendritic drainage network, local relief 300 metres. Limited area of Pleistocene block streams and slope deposits. Uniform textured alpine humus and transitional alpine humus soils and peat with abundant organic matter, steep slopes have stonier profiles over deeply weathered bedrock (Mitchell 2002)

Open to dense sub-alpine woodlands of Snow Gum *Eucalyptus pauciflora* with extensive open grasslands, fen, heath and bogs controlled by cold air drainage and soil moisture. Black Sallee *Eucalyptus stellulata* marginal to streams on the high plains. Typical shrubs and ground cover species include; Snow grasses *Poa* spp., Wallaby grasses *Austrodanthonia* and *Danthonia* spp., Silver Snow Daisy *Celmisia astelifolia*, Alpine Orites *Orites lancifolia*, Alpine Hovea *Hovea montana*, Mountain Shaggy-pea *Oxylobium alpestre*, Alpine Rice-flower *Pimelea alpina*, Speedwell *Veronica serpyllifolia*, Scaly Everlasting *Ozothamnus hookeri*, Tasman Flax-lily *Dianella tasmanica*, Mountain Gentian *Gentianella diemensis*, Variable Groundsel *Senecio lautus*, and Native Dandelion *Microseris lanceolata* (Mitchell 2002).



- Legend**
- Impact area
 - Impact area 1500m buffer
 - IBRA Sub-region
- Strahler stream order**
- Not calculated
 - 1st
 - 2nd
 - 3rd
- Strahler stream order buffers**
- 1st
 - 2nd
 - 3rd
- Mitchell landscape v3**
- Azo, Alpine Zone
 - Mai, Main Range Sub-alpine

Figure 2: Location map

0 110 220 330 440 550
Metres

Scale: 1:12,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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Location: P:\27700s\27710\Mapping\27710_BDAR_F2_LocationMap

2.1.3 Native vegetation extent

Native vegetation extent within the study area and within the 1500 metre buffer area was assessed and measured using aerial photographic interpretation, existing vegetation mapping and GIS. Figure 3 shows the extent of native vegetation within the study area and 1500 metre buffer. A total of 698 hectares of native vegetation was mapped as occurring within the 1500 metre buffer, or 987% of the buffer area. Figure 4 shows the extent of vegetation within the subject land.

2.1.4 Cleared areas

Surrounding cleared areas within the 1500 metre buffer comprise of roads and ski resort infrastructure. Within the subject land, the vegetation is intact with areas of cleared land occurring to the north and west (Figure 2).

2.1.5 Differences between mapped vegetation extent and aerial imagery

There were no significant differences between the mapped vegetation extent and that visible on the aerial imagery.

2.1.6 Rivers and streams

The subject land is located within the South East LLS Region and the Snowy River catchment. The Guthega Pondage connecting the Guthega and Snowy Rivers is approximately 2.3 kilometres to the north-west of the subject land.

Twelve unnamed first order tributaries are mapped within the 1500 metre impact buffer zone. The second order stream, Blue Cow Creek, occurs in the western portion of the 1,500 metre impact buffer zone whilst the third order stream, Perisher Creek, runs north to south in the eastern portion of the impact zone (Figure 2) None of these intersect with the study area.

There are no Key Fish Habitats as mapped by the NSW Department of Primary Industry within the study area.

2.1.7 Wetlands

One small ephemeral wetland is located approximately 80 metres south-west of the subject land and is approximately 20 metres by 40 metres in area. This wetland represents potential habitat for native frogs in the area.

The closest important wetland is Blue Lake, approximately 7.3 kilometres south west of the subject land. Blue Lake is listed as a permanent freshwater lake and is included in the Directory of Important Wetlands of Australia (DoIW 2004). Blue Lake is also listed as a Ramsar site. The lake has an area of 14 hectares and is listed for the following reasons:

- It is a good example of a wetland type occurring within a biogeographic region in Australia.
- The wetland supports 1% or more of the national populations of any native plant or animal taxa.
- The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level.

There are no other listed wetlands or Ramsar wetlands within the locality.

2.1.8 Connectivity features

The subject land occurs adjacent to disturbed areas consisting of access roads and ski resort infrastructure located directly to the north and west, however large areas of native vegetation occur in the broader landscape. To the east and south the subject land is connected to large tracts of intact native vegetation that are occasionally broken by ski routes, roads and resort infrastructure (Figure 3).

The Alpine Snow Gum *Eucalyptus niphophila* recorded within the subject land is likely to provide non-limiting seasonal foraging resources for mobile fauna species. The shrubs and tussock grasses that comprise the mid and lower vegetation strata provide foraging and sheltering habitat for small mammals and reptiles including the threatened Alpine She-Oak Skink *Cyclodomorphus praealtus* (Endangered BC Act and EPBC Act) and Guthega Skink *Liopholis Guthega* (Endangered BC Act and EPBC Act). These resources are non-limiting in the locality, with abundant resources available to fauna species within the Kosciuszko National Park.

2.1.9 Areas of geological significance

Geological sites of significance within the local area include Mount Kosciuszko, Australia's highest peak at 2,228 metres above sea level. The peak is located approximately 14 kilometres south-west of the subject land. Other noteworthy landforms include the mile-high drop from the summits of the Main Range through to the Geehi River, and the various glacial and periglacial features located along the Main Range (DECC 2006).

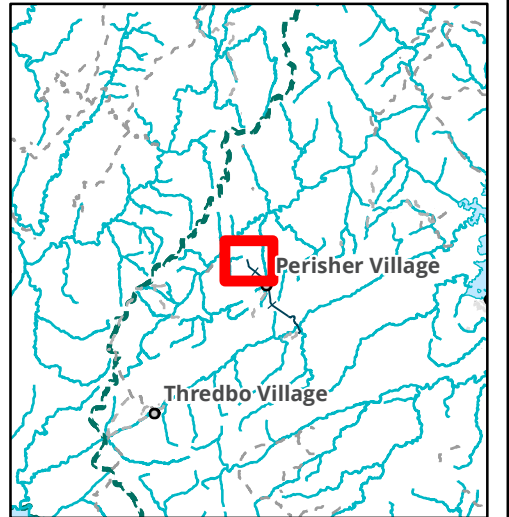
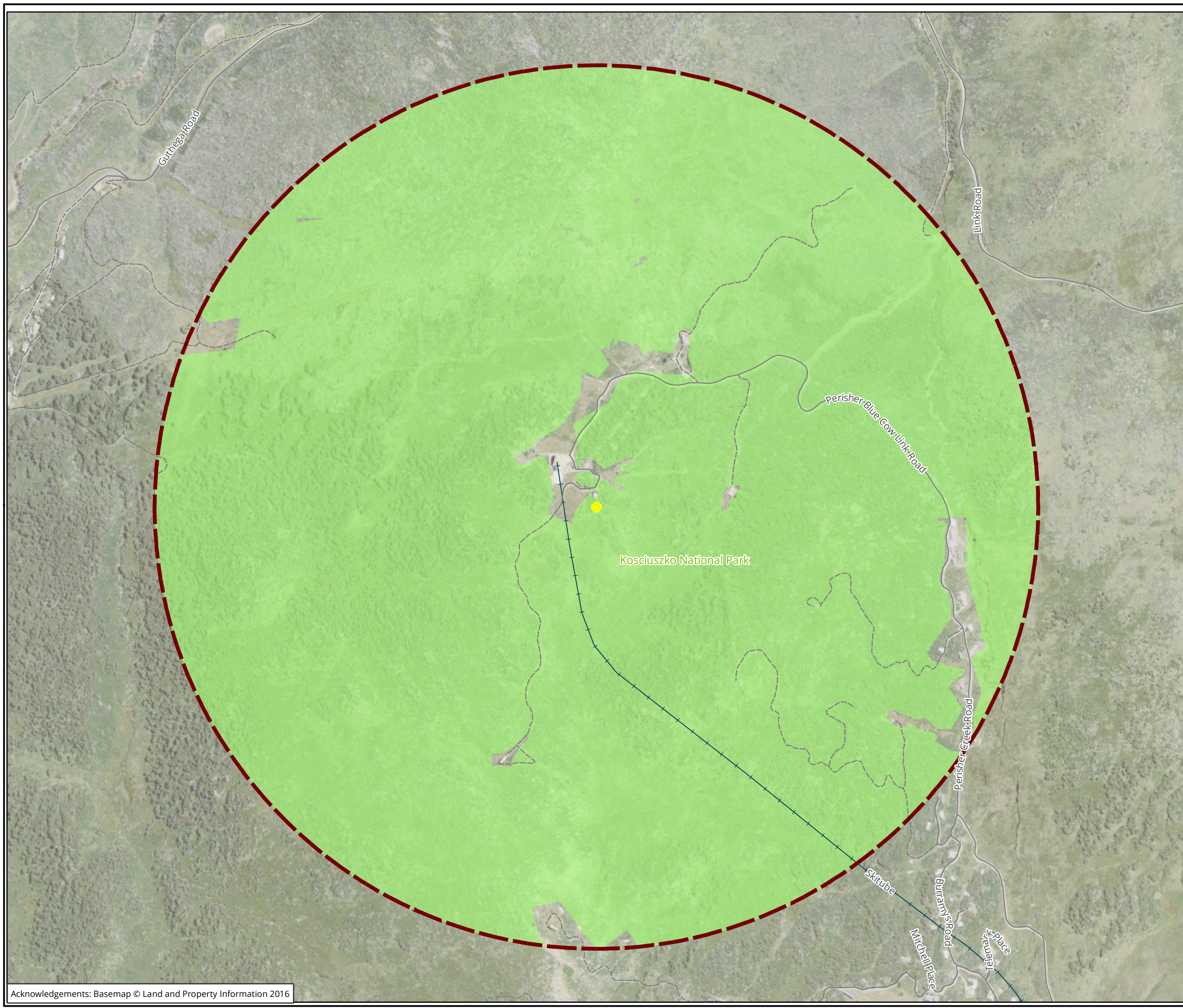
There were no recorded karst, caves, crevices, cliffs or other areas of geological significance within the subject land. No Karst or cave systems are located within the 1500 metre buffer area surrounding the study area. The closest significant karst or cave systems occur approximately 80 kilometres north within the Yarrangobilly and Coleman Plain areas. These two areas are especially significant for their aesthetic, geological, geomorphological, hydrological, and zoological values (DECC 2006).

2.1.10 Biodiversity Values Map

The subject land and study area are mapped within the Biodiversity Values Map (OEH 2019).

2.1.11 Soil hazard features

The soils within Kosciuszko National Park include a wide range of mountain soils that are still in relatively natural condition. These alpine and sub-alpine soils receive, store, process and supply a larger quantity of high quality water than any other soil groups within Australia (DECC 2006). Given the position in the landscape and previous land use history, it is unlikely there are any soil hazards within the subject land or study area.






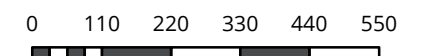
- Legend**
-  Impact area
 -  Impact area 1500m buffer
 -  Native vegetation

Figure 3: Native vegetation cover and connectivity

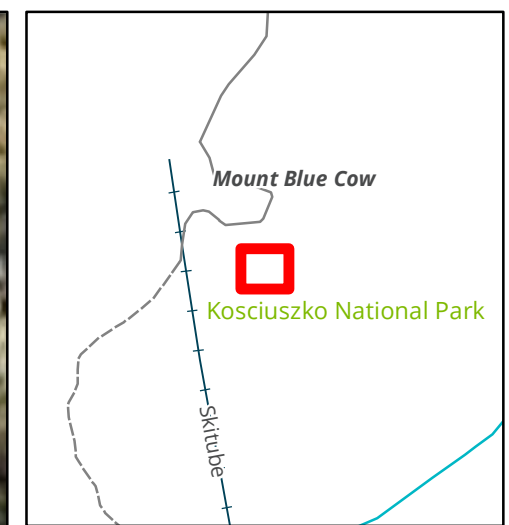
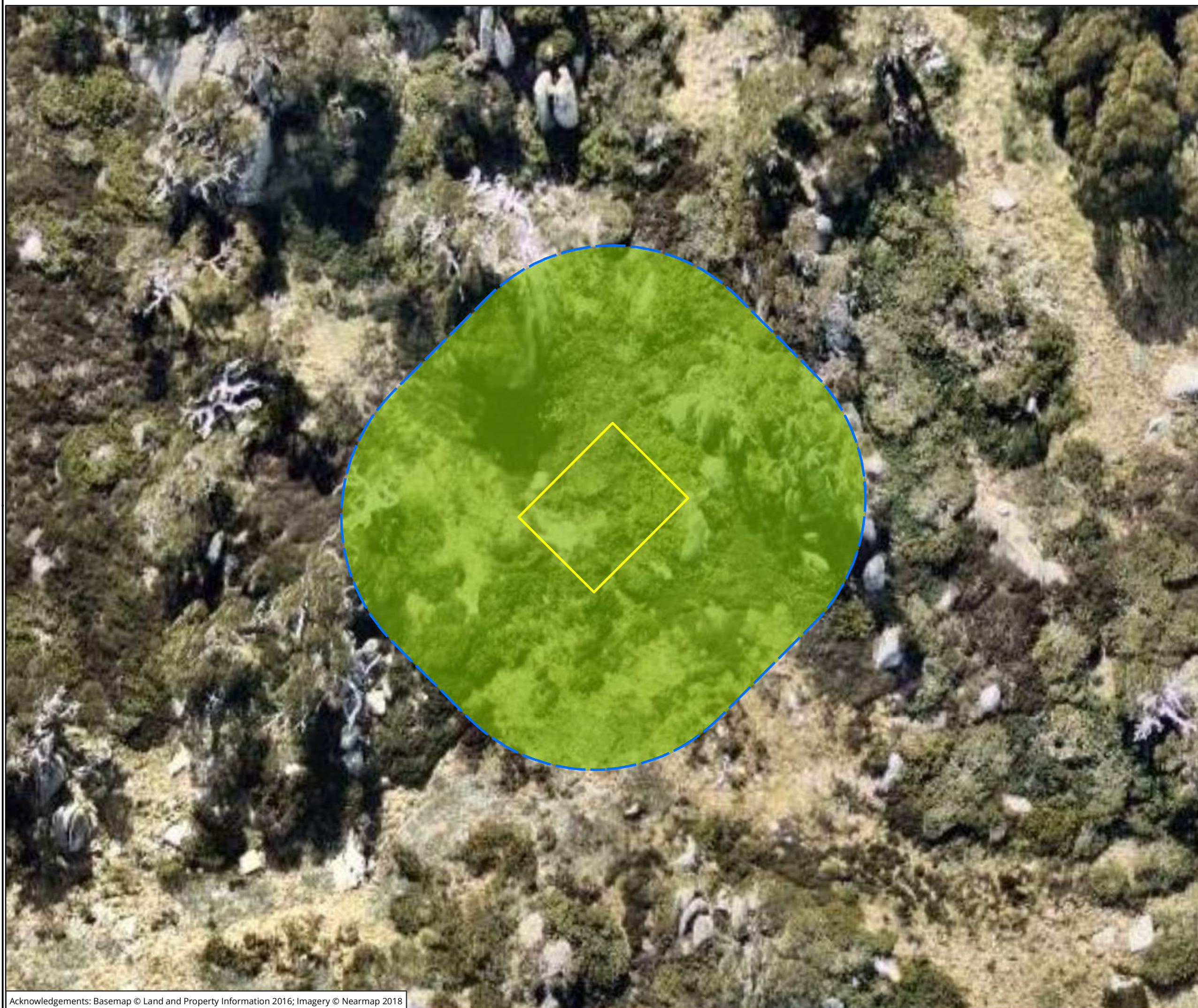


Metres
 Scale: 1:12,000 @ A3
 Coordinate System: GDA 1994 MGA Zone 55



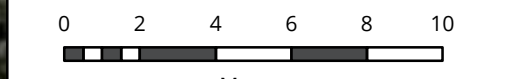
Albury, Ballarat, Melbourne,
 Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27710
 Date: 16 January 2019,
 Checked by: CW, Drawn by: AEDM, Last edited by: amurray
 Location: P:\27700s\27710\Mapping\27710_BDAR_E3_NativeVeg



- Legend**
- Impact area
 - Asset protection zone
- Vegetation communities**
- PCT645 - Alpine Snow
 - Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion

Figure 4: Vegetation of the subject land



Scale: 1:200 @ A3
Coordinate System: GDA 1994 MGA Zone 55

biosis
Biosis Pty Ltd
Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27710
Date: 16 January 2019
Checked by: CW, Drawn by: AEDM, Last edited by: amurray
Location: P:\27700s\27710\Mapping\27710_BDAR_F4_SubjectLandVeg

2.2 Site context

The site context of the subject land was assessed using a site-based method undertaken on 13 December 2018.

2.2.1 Native vegetation cover

Native vegetation cover was assessed using GIS based on the most suitable vegetation mapping, in this case South East Local Land Services Biometric vegetation mapping (VIS ID 4211) (OEH 2018).

Native vegetation cover within the subject land was measured as approximately 0.06 hectares, and within the 1500 metre buffer was found to be approximately 697 hectares (97%).

2.2.2 Patch size

Patch size was assessed as per the BAM (OEH 2017b) using a select process in ArcGIS. All native woody vegetation that has a gap of less than 100 metres from the next area of native vegetation, and all native non-woody vegetation separated by less than 30 metres, is considered to be of the same patch. Vegetation within the subject land meeting this criteria was mapped sequentially and it was found to form part of a large patch of connecting vegetation with a patch size class of greater than 100 hectares.

3 Native vegetation

The extent of native vegetation, threatened ecological communities, and vegetation integrity within the study area was determined using the results of field investigations, previous studies undertaken at the subject land (Biosis 2015), and Chapter 5 and Appendix 6 of the BAM (OEH 2017b).

3.1 Methods

3.1.1 Background review

Regional vegetation mapping and existing site reports as well as database searches (see Section 1.5) and BAM Calculator results were reviewed to inform the field investigations. Based on the results of the background review and the requirements of the BAM with respect to this BDAR, appropriate surveys were designed for the subject land.

3.1.2 Field investigation

Floristic and fauna habitat assessments of the study area and subject land were undertaken by Biosis on 13 December 2018 by qualified and experienced senior ecologist, Callan Wharfe, an accredited BAM assessor. The subject land was surveyed in accordance with the BAM (OEH 2017b), the *NSW Guide to Surveying Threatened Plants* (OEH 2016d), the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004), and random meander methods (Cropper 1993) (see Appendix 1). This involved:

- The identification and mapping of vegetation types and assignment of PCT.
- Undertaking one floristic plot survey in accordance with Section 5 of the BAM (OEH 2017b).
- The identification of native and exotic plant species, according to the Flora of NSW (Harden 1992, 1993, 2000, 2002), with reference to recent taxonomic changes.
- Targeted searches for plant species of conservation significance according to the *NSW Guide to surveying Threatened Plants* (OEH 2016d).
- Identification of fauna habitats, assessment of their condition and assessment of their potential value to threatened fauna species.
- Bird surveys according to *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004).
- Recording observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).
- Active fauna searches of tussock grasses, rocks and vegetative debris for mammals and reptiles, as well as searches of a nearby ephemeral wetland for frogs.
- Identification of previous and current factors threatening the ecological function and survival of native vegetation within and adjacent to the subject land.

The conservation significance was determined according to:

- BC Act for significance within NSW.
- EPBC Act for significance within Australia.

Detailed mapping of PCTs was conducted using hand-held (uncorrected) tablet units (Samsung Galaxy Tab 3) using the ArcGIS Collector application and aerial photo interpretation. Areas of native vegetation for which a PCT could validly be assigned were identified and delineated in the field, and their condition determined. Identification of PCTs within the subject land and study area was confirmed with reference to the community profile descriptors (and diagnostic species tests) held within the OEH mapping project and NSW BioNet Vegetation Classification database. Locations of floristic plots surveyed are shown on Figure 5.

3.2 Results

3.2.1 Vegetation description

The vegetation of the study area matched the scientific description of PCT 645: *Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko National Park, Australian Alps Bioregion* (Alpine Snow Gum shrubby open woodland). The subject land supports 0.06 hectares of this community which was recorded in high condition during the field investigation. Figure 4 shows the vegetation type and condition recorded during the field investigation. Alpine Snow Gum shrubby open woodland is not listed under the BC Act or EPBC Act.

3.2.2 Native vegetation extent

Figure 3 provides a map of the native vegetation extent recorded within the study area and subject land, as assessed during field investigations undertaken in December 2018. The figure includes all areas of native vegetation (native ground cover and areas with canopy). Areas not shown as native vegetation cover within Figure 3 are not included for further assessment in accordance with Section 5.1.1.5 of the BAM (OEH 2017a).


3.2.3 Plant community types

PCT 645 *Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion* was assessed as present within the subject land. No other PCTs were recorded within the subject land.

Table 1 provides detailed descriptions of this PCT recorded within the study area.

Table 1 Vegetation descriptions

PCT 645 Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion	
Common name	PCT 645: <i>Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion</i>
Vegetation formation	Grassy Woodlands
Vegetation class	Subalpine Woodlands
Extent within subject land	0.06 ha
Condition	This community at the subject land was recorded in a high condition state with native species dominating all strata.
Description	Alpine Snow Gum shrubby open woodland typically exists as a low open woodland with mixed understorey of shrubs and tussock grasses. The upper stratum is dominated by Alpine Snow Gum over a mid-storey of Alpine Hovea <i>Hovea montana</i> , Dusty Daisy-bush <i>Olearia phlogopappa</i> , Alpine Mint-bush <i>Prostanthera cuneata</i> , and Alpine Pepperbush <i>Tasmannia xerophila</i> . The understorey typically consists of Mountain Woodruff <i>Asperula gunnii</i> , Purple-sheathed Tussock-grass <i>Poa ensiformis</i> , Soft Snowgrass <i>Poa hiemata</i> , and Prickly Starwort <i>Stellaria pungens</i> (OEH 2017c). Within the subject land one eucalypt species was present within this PCT; Alpine Snow

PCT 645 Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion	
	<p>Gum. No other trees were present. Exotic species recorded were uncommon and included Sheep's Sorrel <i>Rumex acetosella</i> and Common Dandelion <i>Taraxacum officinale</i></p> <p>Alpine Snow Gum shrubby open woodland is associated with sub-alpine areas between 1600 and 1900 metres on slopes, ridges and spurs.</p>
Survey effort	One BAM plot/transect (Figure 5)
Justification of PCT	<ul style="list-style-type: none"> • The vegetation occurs as an open woodland. • Alpine Snow Gum was recorded within the vegetation at the subject land. • The subject land is within the Australian Alps IBRA bioregion • The community occurs at the subject land at approximately 1900 metres above sea level on a sloping gradient. • The BioNet PCT Identification tool identified PCT 645 from the species recorded at the subject land.
TEC Status	Not listed under State or Commonwealth legislation
Estimate of percent cleared value of PCT in the major catchment area	5 % (OEH 2017c).
PCT 645 – High condition	

3.2.4 Threatened ecological communities

No PCTs recorded within the subject land were representative of a TEC under the NSW BC Act or Commonwealth EPBC Act. PCT 645 is not associated with any TECs in the BioNet Vegetation Classification database (OEH 2019).

3.3 Vegetation integrity assessment

3.3.1 Vegetation zones

PCTs within the impact area were assessed and stratified, based on broad condition states, into vegetation zones. This resulted in one vegetation zone being delineated within the subject land (see Table 2, Figure 5). Vegetation zone area comprises the area of vegetation to be removed for equipment shelter footprint and APZ. As outlined above, part of the 0.06 hectare subject land has been considered cleared for the APZ of the approved Telstra tower (Figure 1), and as such the impacted vegetation for the current assessment is 0.03 hectares.

Table 2 Vegetation zones mapped within the impact area

Vegetation zone	Vegetation type	Condition	Area (ha)	Plots surveyed
VZ1	PCT 645 Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion	High	0.03	1

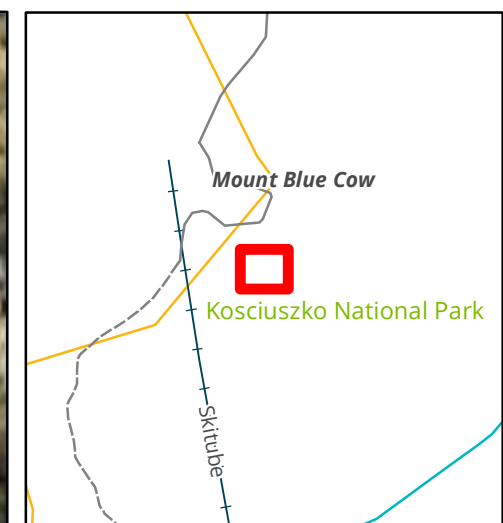
3.3.2 Vegetation integrity

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




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

The minimum number of BAM plots per vegetation zone was determined using Table 4 of the BAM (OEH 2017b) and surveyed (see Table 2). An assessment of vegetation integrity was undertaken using benchmark data collected as outlined in Subsection 5.3.3 of the BAM. No additional local data was used for this assessment.

A list of flora species was compiled, and records of all flora species will be submitted to OEH for incorporation into the Atlas of NSW Wildlife, and is included in Appendix 2.



Legend

-  Impact area
-  Asset protection zone
-  BAM plot

Vegetation zone


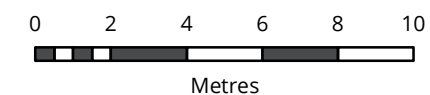
- PCT645 - Alpine Snow
-  Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion

Figure 5: Vegetation zones and survey effort



Scale: 1:200 @ A3
Coordinate System: GDA 1994 MGA Zone 55



Albury, Ballarat, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 27710
Date: 23 January 2019
Checked by: CW, Drawn by: AEDM, Last edited by: amurray
Location: P:\27700s\27710\Mapping\27710_BDAR_ES_VegZonesSurvey

3.3.3 Vegetation integrity score

Plot data was entered into the BAM Calculator to determine the vegetation integrity score for the vegetation zone. Plot data is presented in Appendix 2. Vegetation integrity scores for the vegetation zone within the subject land is provided in Table 3.

Table 3 Vegetation zone integrity scores

Vegetation zone	Vegetation	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score
VZ1	PCT 645 Alpine Snow Gum shrubby woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion	61.3	71.7	41.1	56.5

As outlined in Section 10.3.1 of the BAM, an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community.
- ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community.
- ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

As such, offsets are required for VZ1 for impacts from the proposal to this area of vegetation.

4 Threatened species

4.1 Predicted species

A list of predicted species (ecosystem credit species) expected to occur within the subject land was refined as per Section 6 of the BAM. Impacts to these species require assessment, however targeted survey is not required as these species are assumed to occur, based on the occurrence of the PCTs and patch sizes. Table 4 lists the ecosystem credit species that could not be discounted, based on geographical restrictions, from using the subject land, on occasion.

These species were considered when prescribing management and mitigation measures for the proposal.

Table 4 Threatened ecosystem credit species (predicted species) with potential to occur

Species name	Common name
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo (foraging)
<i>Daphoenositta chrysoptera</i>	Varied Sittella
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle
<i>Hieraetus morphnoides</i>	Little Eagle (foraging)
<i>Petroica boodang</i>	Scarlet Robin
<i>Petroica phoenicea</i>	Flame Robin

4.2 Species credit species

Appendix 3 provide the lists of species credit species predicted to occur within the subject land based on the presence of the PCT 645 within a patch greater than 100 hectares. The potential for a species to occur within the subject land was assessed in accordance with Sections 6.3 and 6.4 of the BAM and species with geographical or habitat restrictions not matching that within the subject land were not required to be surveyed. An assessment of the habitats present within the subject land and study area, and the potential occurrence, and potential for impact, for all species credit species is provided in Appendix 3 (Fauna). Fauna species credit species with moderate likelihood of occurrence or higher were assumed present within the subject land (in accordance with Section 6.5 of the BAM).

All species credit species assumed present at the subject land were considered with respect to their habitat requirements and potential to be impacted by the proposal. These assessments are included in Appendix 3. All of the 0.03 hectares of vegetation to be impacted by the proposed works was considered habitat for each species credit species assumed present, these species are listed in Table 5.

No flora species were listed as potential species credit species in the BAM calculator.

Table 5 Threatened species credit species (candidate species) assumed present

Species name	Common name
Fauna	
<i>Burramys parvus</i>	Mountain Pygmy-possum
<i>Cyclodomorphus praealtus</i>	Alpine She-oak Skink
<i>Liopholis guthega</i>	Guthega Skink
<i>Mastacomys fuscus</i>	Broad-toothed Rat

4.2.1 Biodiversity risk weighting

Biodiversity risk weightings of species credit species with assumed present at the subject land are shown in Table 6.

Table 6 Threatened species Biodiversity Risk Weighting

Scientific name	Common name	Biodiversity risk weighting
Fauna		
<i>Burramys parvus</i>	Mountain Pygmy-possum	2.0
<i>Cyclodomorphus praealtus</i>	Alpine She-oak Skink	2.0
<i>Liopholis guthega</i>	Guthega Skink	2.0
<i>Mastacomys fuscus</i>	Broad-toothed Rat	2.0

4.3 Threatened species surveys

Targeted flora survey and fauna habitat assessments at the subject land were undertaken from 13 December 2018 by senior ecologist Callan Wharfe. Weather observations for each survey date are shown in Table 7.

Table 7 Weather observations during flora and fauna surveys (Perisher Valley, NSW)

Survey undertaken	Survey date	Temperature (°C)		Humidity	wind	Rain (mm)
		Min.	Max.			
Habitat assessment and targeted flora	13/12/2018	8.8	16.6	100	7 km/h	19.8 (26.4 mm previous 7 days)

Information from the Australia Government Bureau of Meteorology website.

4.3.1 Threatened flora habitat and survey

The habitats for threatened flora species at the subject land and within the study area have been partially degraded through clearing for the alpine ski resort infrastructure. The habitats consist of high to moderate condition open woodland dominated by mid-storey shrubs. The understorey and ground cover layers are mostly intact.

Surveys were undertaken over one day, in accordance with the *NSW Guide to surveying Threatened Plants* (OEH 2016). Threatened flora species were considered with respect to their habitat requirements and potential to be impacted by the proposal.

No threatened flora species were recorded during the field survey as detailed above.

4.3.2 Fauna habitat assessment and field survey

Fauna habitat assessment was undertaken to determine whether the vegetation and other habitat features to be impacted by the proposed development contained microhabitats suitable to support the threatened fauna species listed in as predicted species in the BAM Calculator (Appendix 3). The habitat assessments focussed on the presence of the following features within the study area:

- hollow-bearing trees
- availability of flowering shrubs and feed tree species
- condition of native vegetation and the presence of exotic species
- condition of pools and waterways
- quantity and type of ground litter and logs
- searches for indirect evidence of fauna
- evidence of previous and ongoing disturbance.

The following species credit species were considered to have the potential to occur within the subject land and their presence was assumed in accordance with Section 6.5 of the BAM:

- Alpine She-oak Skink *Cyclodomorphus praealtus*
- Broad-tooted Rat *Mastacomys fuscus*
- Guthega Skink *Liopholis guthega*
- Mountain Pygmy-possum *Burramys parvus*

Habitats present within the subject land for fauna species included:

- Native trees providing shelter and foraging resources for birds, and arboreal mammals.
- Large rocks providing basking opportunities for reptiles.
- Dense middle and lower strata providing shelter and foraging resources for terrestrial mammals and reptiles.
- Open areas representing suitable foraging habitat for birds of prey.

Table 8 outlines the targeted fauna survey effort undertaken as part of the current assessment. A fauna species list is provided in Appendix 3.

Table 8 Targetd fauna survey effort details

Survey undertaken	Survey dates	Target species	Survey effort
Hollow-bearing tree and habitat assessment, active searches (mammal, reptiles and frogs), and diurnal bird surveys	13 December 2018	Mountain Pygmy-possum, Gang-gang Cockatoo (breeding), Alpine She-oak Skink, Little Eagle (breeding), Guthega Skink, Alpine Tree Frog, Broad-toothed Rat, Southern Corroboree Frog	Active fauna search of subject land and ephemeral wetland. Diurnal bird survey for 30 minutes.

Stage 2 – Impact assessment (biodiversity values)

5 Avoid and minimise impacts

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

5.1 Actions to avoid/minimise project impacts

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

Steps taken are broken down into site selection and planning, construction and operation.

Site selection and planning

The proposed development footprint is partially situated within the APZ of the approved Telstra mobile base station and makes use of the conduit trenches being dug for power and fibre optic cabling for this facility. The rest of the footprint occurs within vegetation mapped as PCT 645 Alpine Snow Gum shrubby open woodland. A small area of this will be removed as a result of the proposal, predominantly through the management of the APZ. The areas to the north and west of the proposed development are already disturbed by the construction of ski resort infrastructure and roads. The vegetation mapped within the subject land is part of a much larger vegetation patch that continues to the east (Figure 5). As the proposed equipment shelter is to be co-located with the approved Telstra tower there are little options available to the proponent for the further avoidance of impacts to native vegetation.

No threatened species were recorded within the subject land. However, given the good condition of the vegetation on site, its connectivity with large tracks of similar vegetation, and the moderate likelihood of occurrence of a number of threatened fauna species, mitigation measures to avoid impacts to threatened species are provided below. Habitats such as shrubs, bush rock, and tussock grasses should also be planned to be maintained within the APZ, wherever possible.

Construction

Mitigation measures recommended to avoid and minimise impacts to species and vegetation during the construction phase of the proposed development include:

- Installation of appropriate exclusion fencing around trees and vegetation to be retained in the subject land.
 - The radius of the tree protection zone (TPZ) is calculated for each tree by multiplying its diameter at breast height (DBH) by 12, in accordance with the Standards Australia Committee (2009).
 - A TPZ should not be less than 2 metres, or greater than 15 metres, except where crown protection is required (Standards Australia Committee 2009).
- Install signage on the boundary of the subject land stating 'No Go Zone' or 'Environmental Protection Area' to ensure no personnel or vehicles impact the area outside of the subject land.

- Identify the location of any 'No Go Zones' in site inductions and a Construction Environmental Management Plan (CEMP) and include site induction/toolbox talks.
- All material stockpiles, vehicle parking and machinery storage are to be located within previously cleared areas, areas proposed for clearing, and not in areas of native vegetation that are to be retained.
- Any vehicles entering the subject land or surrounding area are to be free of weed seeds and other propagules. These and other biosecurity management measures are to be included in the biosecurity management plan prepared as part of the CEMP.
- Where appropriate, native vegetation cleared from the study area should be mulched for re-use on the site, to stabilise bare ground.
- Wet down work areas to reduce dust generation during construction and cover any stockpiles when not being used.
- Implement temporary stormwater controls during construction to ensure no impacts to the ephemeral wetland located to the south-west and down slope drainage lines.
- Sediment and erosion control measures should be implemented prior to construction works commencing (e.g. silt fences, sediment traps). These should conform to relevant guidelines, should be maintained throughout the construction period and should be carefully removed following the completion of works.
- Vegetation pre-clearance surveys should be undertaken immediately prior to the commencement of vegetation removal to detect any nesting birds or other species residing in the area. A fauna relocation strategy should be in place prior to vegetation clearance being undertaken and should be included in the CEMP for the proposed development.
- If bush rock or boulders are to be removed for construction works, these should be moved into adjacent habitats such as the APZ or broader study area, and should not be removed from the site.
- Any rehabilitation required will be undertaken in line with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (DECC 2007).

Prescriptions for mitigation of potential impacts of construction activities on retained native vegetation and habitat should be addressed in a site-specific CEMP. The CEMP should include all measures outlined above.

Operation

The following recommendations are made to avoid impacts resulting from 'operation' of the proposed development:

- Any lighting required around the facility should point towards the development and not into surrounding vegetated areas.
- Stormwater controls maintain the pre-construction hydrology by directing water flowing from the equipment shelter overland through flow dissipaters, such as rip-raps.

5.2 Assessment of unavoidable impacts

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

5.2.1 Direct impacts

Direct impacts arising from the proposed development include:

- Removal of 0.03 hectares of native vegetation.
- Removal of 0.03 hectares of habitat for native fauna species.

These impacts will be permanent and will occur from the outset of the development. Mitigation measures outlined in Section 5.1 above will help to minimise the potential impacts to biodiversity values that remain present within the study area.

5.2.2 Indirect impacts

Potential indirect impacts to habitats of the APZ, study area and surrounding areas from the proposed development are outlined and addressed in Table 9 below.

Table 9 Assessment of indirect impacts

Indirect impact	Assessment / likelihood of occurrence
Inadvertent impacts on adjacent habitat or vegetation.	All contractors will be inducted and notified about the sensitivity of the adjacent vegetation (see Section 5.1 above)
Reduced viability of adjacent habitat due to edge effects.	The subject land currently exists at the top of a steep slope. Potential edge effects include increased water and nutrient loads from the development leading to modification of species composition in adjacent areas. Installation of measures to reduce the potential for this impact are provided in Section 5.1.
Reduced viability of adjacent habitat due to noise, dust or light spill.	Potential indirect impacts to adjacent habitats include increased light spill from facility lighting. Any lighting required should be placed facing the subject land, or suitably screened, to avoid light spill into habitats in surrounding areas. Increased levels of dust could be expected to result during the construction phase of the development. Dust suppression should be undertaken during all construction phases and all stockpiles should be covered at all times. Measures to reduce the potential for these impacts are provided in Section 5.1.
Transport of weeds and pathogens from the site to adjacent vegetation.	All vehicles will enter the subject land via existing roads and tracks, as well as access tracks that will be developed during the construction of Telstra mobile base station. Measures to ensure weeds do not enter surrounding areas are provided in Section 5.1 and include direction of surface water away from surrounding native vegetation and watercourses.
Increased risk of starvation, exposure and loss of shade or shelter.	This impact is not expected as a result of the proposal.
Loss of breeding habitats.	The removal of native trees, shrubs, and tussock grasses from the subject land could remove potential nest sites for bird and mammal species. Measures to mitigate potential impacts to native fauna species are provided in Section 5.1.
Trampling of threatened flora species.	This impact is not expected as a result of the proposal. Measures will be implemented to control for potential trampling of vegetation outside of the subject land (see Section 5.1).

Indirect impact	Assessment / likelihood of occurrence
Inhibition of nitrogen fixation and increased soil salinity.	This impact is not expected as a result of the proposal.
Fertiliser drift.	This impact is not expected as a result of the proposal.
Rubbish dumping.	The subject land is located adjacent to ski resort infrastructure and roads which already represent potential for rubbish dumping. The proposed development is unlikely to result in an increase in the potential for this impact.
Wood collection.	Wood collection from native vegetation areas is unlikely to increase as a result of the proposed development. It's location within the Kosciuszko National Park reduce the potential for people to undertake wood collection.
Bush rock removal and disturbance.	Bush rock will not be removed from the subject land. Where rock occurs in the construction footprint, it will be moved directly adjacent to the area.
Increase in predatory species populations.	The development is unlikely to result in an increase in predatory species in the locality.
Increase in pest animal populations.	The development is unlikely to result in an increase in predatory species in the locality.
Increased risk of fire.	The proposal will reduce the risk of fire by implementing a managed APZ.
Disturbance to specialist breeding and foraging habitat, e.g. Beach nesting for shorebirds.	This impact is not expected as a result of the proposal – there is no specialist habitat to be affected by the proposal.
Fragmentation of movement corridors.	The subject land occurs within directly adjacent to pre-existing ski resort infrastructure and roads. It also partially occurs within the APZ of an approved Telstra mobile base station. Whilst the development will result in a minor decrease in available habitat, its position on the edge of a large vegetation patch means that no fragmentation of habitat will occur as a result of this proposal (Figure 3).

5.2.3 Prescribed impacts

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

Table 10 Assessment of prescribed impacts

Prescribed impact	Assessment / likelihood of occurrence
Impacts of development on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance.	The proposal will not result in this impact.
Impacts of development on the habitat of threatened species or ecological communities associated with rocks.	Alpine She-oak Skink and Guthega Skink depend on rocky habitats for parts of their life cycle and a small area of rocky habitat will be removed as a result of the proposed works. This habitat feature is however very common in the locality including the immediate vicinity of the subject land, and impacts associated with the reduction of rocky habitat availability would be to a very small portion (<0.01%) supported in the locality.
Impacts of development on the habitat of threatened species or ecological communities associated with human made structures.	The proposal will not result in this impact.
Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation.	The proposal will not result in this impact.
Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The subject land occurs within directly adjacent to pre-existing ski resort infrastructure and roads. It also partially occurs within the APZ of an approved Telstra mobile base station. Whilst the development will result in a minor decrease in available habitat, its position on the edge of a large vegetation patch means that no fragmentation of habitat will occur as a result of this proposal (Figure 3).
Impacts of the development on movement of threatened species that maintains their life cycle	As above, the development will not substantially impact upon the movement of threatened species.
Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including subsidence or upsidence resulting from underground mining or other development)	The proposal will not result in this impact.
Impacts of wind turbine strikes on protected animals	The proposal will not result in this impact.

Prescribed impact	Assessment / likelihood of occurrence
Impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	The proposal will not result in this impact. The proposal could result in a slight increase in local vehicle traffic. However, being located of smaller tracks and gravel roads, it is unlikely the vehicle movements would be at a speed or number that would lead to an increased risk of vehicle strike on threatened species within the local area.

5.3 Impacts to groundwater dependent ecosystems

The subject land is located on top of a moderate incline and does not contain any groundwater dependent ecosystems (GDEs). Measures to reduce any potential indirect impacts to the mapped watercourses adjacent the study area include stormwater and runoff controls during construction and operation of the development (see Section 5.1). Therefore the proposal is unlikely to result in impacts to GDEs, within the subject land or surrounding habitats.

5.4 Adaptive management strategy

The proposed development will not result in impacts relating to karst, caves, crevices, cliffs and other geological features of significance, subsidence and upsidence, wind turbine strikes or vehicle strikes and as such as an Adaptive Management Strategy is not considered necessary.

6 Impact summary

6.1 Thresholds for assessment and offsetting

This section outlines the thresholds for assessment and offsetting in accordance with Section 10 of the BAM.

6.1.1 Serious and irreversible impacts on biodiversity values

All vegetation recorded within the study area conformed to PCT 645, Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion which is not listed as a TEC and is not identified in the BAM Calculator as a potential serious and irreversible impact entity. There was also no serious and irreversible impact species identified or assumed present within the subject land or study area.

6.2 Impacts requiring offsets

Impacts to native vegetation and threatened species

As outlined in Section 10.3.1 of the BAM, an offset is required for impacts on native vegetation where the vegetation integrity score is:

- ≥ 15 where the PCT is representative of an endangered or critically endangered ecological community
- ≥ 17 where the PCT is associated with threatened species habitat (as represented by ecosystem credits), or is representative of a vulnerable ecological community
- ≥ 20 where the PCT is not representative of a TEC or associated with threatened species habitat.

On this basis, offsets are required for Vegetation Zone 1 as it has a vegetation integrity score greater than 20.

As outlined in Section 10.3.2 of the BAM an offset is also required for the potential threatened species impacted by the development that require species credits, those being (following assumed presence in Section 4.3):

- Alpine She-oak Skink
- Broad-tooted Rat
- Guthega Skink
- Mountain Pygmy-possum

The offset requirement for the proposal was calculated using the BAM Calculator. Table 11 and Table 12 provide a summary of the offsets required for impacts from proposed development at the subject land.

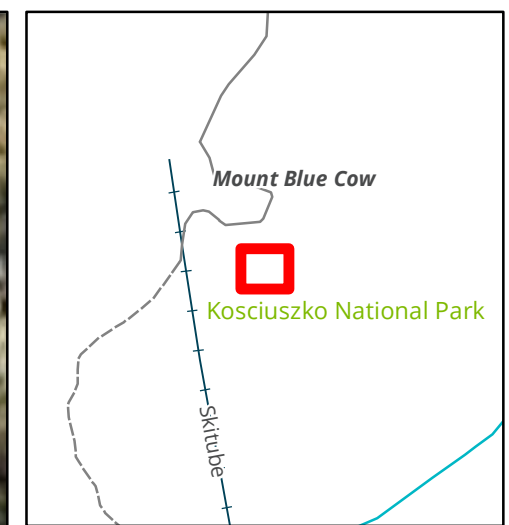
Table 11 Offsets required for the proposed development (ecosystem credits)

Vegetation zone	Vegetation	Area (ha)	Impact	Vegetation integrity score	Offset required?	Credit requirement
VZ1	PCT 645 - high	0.026	Clearance	56.5	Yes	1

Table 12 Offsets required for the proposed development (species credits)

Vegetation zone	Species	Habitat condition (vegetation integrity score) loss	Area (ha)	Biodiversity risk weighting	Credit requirement
VZ1	Alpine She-oak Skink	56.5	0.03	2	1
	Broad-tooted Rat	56.5	0.03	2	1
	Guthega Skink	56.5	0.03	2	1
	Mountain Pygmy-possum	56.5	0.03	2	1

Species polygons for the above four species credit species impacted by the project are illustrated in Figure 6 below.



- Legend**
- Impact area
 - Asset protection zone
- Habitat (species polygon) for:
- Mountain Pygmy-possum
 - Alpine She-oak Skink
 - Guthega Skink
 - Broad-tooted Rat

Figure 6: Species polygons

0 2 4 6 8 10
 Metres
 Scale: 1:200 @ A3
 Coordinate System: GDA 1994 MGA Zone 55

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 Newcastle, Sydney, Wangaratta & Wollongong

7 Biodiversity credits

Offsetting through the transfer and retirement of biodiversity credits, or paying into the BCT Offset Fund, is required for the current assessment for impacts to one vegetation zone at the subject land. A biodiversity credit report and credit payment report are provided on the following pages.

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00010821/BAAS18138/19/00013218	Blue Cow - Optus telecommunications facility	04/01/2019
Assessor Name	Report Created	BAM Data version *
Rebecca E. Dwyer	23/01/2019	6
Assessor Number	* 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.	
BAAS17067		

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAI	Ecosystem credits
Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion								
1	645_Moderate	56.5	0.0	0.25	High Sensitivity to Potential Gain	1.50		1
							Subtotal	1
							Total	1

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Candidate SAI	Species credits
<i>Burramys parvus / Mountain Pygmy-possum (Fauna)</i>						
645_Moderate	56.5	0.03	0.25	2	False	1
					Subtotal	1
<i>Cyclodomorphus praealtus / Alpine She-oak Skink (Fauna)</i>						
645_Moderate	56.5	0.03	0.25	2	False	1
					Subtotal	1
<i>Liopholis guthega / Guthega Skink (Fauna)</i>						
645_Moderate	56.5	0.03	0.25	2	False	1
					Subtotal	1
<i>Mastacomys fuscus / Broad-toothed Rat (Fauna)</i>						
645_Moderate	56.5	0.03	0.25	2	False	1
					Subtotal	1

Biodiversity payment summary report

Assessment Id	Payment data version	Revision number	Report created
00010821/BAAS18138/19/000132 18	41	0	13/02/2019

PCT list

Include	PCT common name	Credits
Yes	645 - Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion	1

Species list

Include	Species	Credits
Yes	<i>Burramys parvus</i> (Mountain Pygmy-possum)	1
Yes	<i>Mastacomys fuscus</i> (Broad-toothed Rat)	1
Yes	<i>Cyclodomorphus praealtus</i> (Alpine She-oak Skink)	1
Yes	<i>Liopholis guthega</i> (Guthega Skink)	1

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Biodiversity payment summary report

IBRA sub region	PCT common name	Baseline price	Dynamic coefficient	Market coefficient	Risk premium	Administrative cost	Methodology adjustment factor	Price per credit	No. of ecosystem credits	Final credits price
Snowy Mountains	645 - Alpine Snow Gum shrubby open woodland at high altitudes in Kosciuszko NP, Australian Alps Bioregion Warning: This PCT has NO trades recorded	\$1,998.31			24.87%	\$20.00	1.0000	\$2,515.29	1	\$2,515.29
Subtotal (excl. GST)										\$2,515.29
GST										\$251.53
Total ecosystem credits (incl. GST)										\$2,766.82

Species credits for threatened species

Species profile ID	Species	Threat status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
10114	Burramys parvus (Mountain Pygmy-possum)	Endangered	\$486.10	24.8700%	\$20.00	1	\$626.99
10510	Mastacomys fuscus (Broad-toothed Rat)	Vulnerable	\$163.27	24.8700%	\$20.00	1	\$223.88
20164	Cyclodomorphus praealtus (Alpine She-oak Skink)	Endangered	\$486.10	24.8700%	\$20.00	1	\$626.99



Biodiversity payment summary report

20251	<i>Liopholis guthega</i> (Guthega Skink)	Endangered	\$486.10	24.8700%	\$20.00	1	\$626.99	
							Subtotal (excl. GST)	\$2,104.85
							GST	\$210.48
							Total species credits (incl. GST)	\$2,315.34
							Grand total	\$5,082.16

8 Assessment against biodiversity legislation

8.1 Environment Protection and Biodiversity Conservation Act 1999

An assessment of the impacts of the proposed development on Matters of National Environmental Significance (MNES), against heads of consideration outlined in Commonwealth of Australia (2013) was prepared to determine whether referral of the proposed development to the Commonwealth Minister for the Environment is required. Matters of NES relevant to the proposed development are summarised in Table 13.

Table 13 Assessment of the proposed development against the EPBC Act

Matter of NES	Project specifics	Potential for significant impact
Threatened species	<p>EPBC listed threatened species previously recorded within the locality include 9 flora species and 16 fauna species. With the exception of the species listed in Table 5, these threatened species were considered to have a low likelihood of occurrence and were not detected during targeted survey. Mountain Pygmy-possum, Broad-toothed Rat, Alpine She-oak Skink, and Guthega Skink are all listed under the EPBC act and have a moderate likelihood of occurrence within the subject land (Appendix 3).</p> <p>The project will remove 0.03 hectares of habitat for the above listed four species and as such Significant Impact Criteria (SIC) assessments have been completed for each. SICs are provided in Appendix 4.</p>	The project will not result in a significant impact to any MNES.
Threatened ecological communities	There are no EPBC Act listed TECs within the subject land or study area.	No potential for impact.
Migratory species	Migratory species are considered to have the potential to occur within the subject land on a transient basis. Vegetation outside the study area provides higher quality foraging and breeding habitat for these species.	No direct impact is expected to any Migratory listed species. Mitigation measures will prevent indirect impacts from occurring during construction and during operation of the new facility.
National Heritage Place	The study area is located within Kosciusko National Park which is listed as the National Heritage Place Australian Alps National Parks and Reserves.	The proposed works will not results in the real possibility that any values associated with the national heritage place (Australian Alps National Parks and Reserve) will be lost, degraded, damaged, notably altered, modified, obscured or diminished. The proposed works will impact a small amount of vegetation within an

Matter of NES	Project specifics	Potential for significant impact
		extensive bushland patch.
Wetlands of international importance (Ramsar sites)	The closest wetland of international importance is Blue Lake which is approximately 7.3 kilometres south-west of the subject land.	No potential for impact.

On this basis, the EPBC Act is unlikely to be triggered and referral of the proposed development to the Australian Government Minister for the Environment and Energy will not be required.

8.2 Environmental Planning and Assessment Act 1979

8.2.1 Snowy River LEP (2013)

The subject land is zoned E1 National Parks and Nature Reserves under the Snowy River LEP. The objectives of this zone are:

- To enable the management and appropriate use of land that is reserved under the *National Parks and Wildlife Act 1974* (NPW Act) or that is acquired under Part 11 of that Act.
- To enable uses authorised under the NPW Act.
- To identify land that is to be reserved under the NPW Act and to protect the environmental significance of that land.

Under this zoning only developments authorised under the NPW Act are permissible within the subject land. This planning instrument is prevailed upon by Division 21, Clause 115 of SEPP (Infrastructure) outlined in the section below.

8.2.2 SEPP (Infrastructure) 2007

Under Division 21, Clause 115 of the infrastructure SEPP, the development of telecommunications and other communication facilities may be carried out by any person with consent on any land. Land to which this policy applies includes the entire state of NSW. This policy prevails over any other environmental planning instruments with the exception of *State Environmental Planning Policy (Coastal Management) 2018* and *State Environmental Planning Policy (State Significant Precincts) 2005* which do not apply in this area.

Therefore this policy allows the proposed development to be carried out with consent under the EP&A Act.

8.2.3 SEPP No 44 – Koala Habitat Protection

The subject land is located within the Snowy Monaro Regional Council LGA which includes the former Snowy River shire. The Snowy River shire is listed under Schedule 1 of SEPP 44 and is therefore subject to the requirements laid out by the policy. Specifically this means before a consent authority may grant consent to a development application, it must satisfy itself whether or not the land is a potential koala habitat. Clause 4 of the policy defines potential koala habitat as *areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.*

None of the feed tree species listed within Schedule 2 of the policy are present within the study area. Therefore the area is not considered potential koala habitat and no further action under the policy is required.

8.3 Biosecurity Act 2015

The Biosecurity Act provides for the identification, classification and control of Priority Weeds with the purpose of determining if a biosecurity risk is likely to occur. A biosecurity risk is defined as the risk of a biosecurity impact occurring, which for weeds includes the introduction, presence, spread or increase of a pest into or within the State or any part of the State. A pest plant has the potential to; harm or reduce biodiversity or out-compete other organisms for resources, including food, water, nutrients, habitat and sunlight.

No Priority Weeds for the South East Local Land Services Region were recorded in the subject land. A biosecurity management plan prepared as part of the project's CEMP is recommended and will prevent the spread of weeds and other biosecurity items into the subject land upon implementation.

8.4 Water Management Act 2000

Works are not proposed within 40 metres of the top of the bank along any watercourse. Thus, a controlled activity permit under the *Water Management Act 2000* is not required.

9 Conclusion

Avoidance of impacts to native vegetation, threatened ecological communities and fauna habitat have been undertaken to restrict proposed impacts associated with the project to the removal of 0.03 hectares of Alpine Snow Gum shrubby open woodland, and the habitat it supports from the subject land.

The vegetation integrity scores for vegetation at the subject land are such that one ecosystem credits is required to offset impacts to one vegetation zone identified at the subject land.

No threatened fauna species were recorded at the subject land however this assessment assumes the presence of four species credit species identified by the BAM calculator (Table 5). Based on the impact area and biodiversity risk weighting (Table 6) attributed to these species, four species credits are required to offset impacts to fauna habitat. Mitigation measures to avoid direct impacts and mitigate potential indirect impacts to native fauna are provided in Section 5.1 of this report.

There were no threatened flora species recorded within the subject land or listed as predicted species credit species in the BAM calculator.

Matters of NES are not likely to be significantly impacted by the proposed development and as such, a referral of the project to the Commonwealth is not required.

The project should proceed as planned whilst implementing the recommended mitigation measures listed herein.

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Appendices

Appendix 1 Survey methods

Appendix 1.1 Nomenclature

The flora taxonomy (classification) used in this report follows the most recent *Flora of NSW* (Harden 1992, Harden 1993, Harden 2002). All doubtful species names were verified with the on-line Australian Plant Name Index (Australian National Botanic Gardens 2007). Flora species, including threatened species and introduced flora species, are referred to by both their common and then scientific names when first mentioned. Subsequent references to flora species cite the common names only, unless there is no common name, for which scientific name will be used. Common names, where available, have been included in threatened species tables and the complete flora list in Appendix 2.

Names of vertebrates follow the Census of Australian Vertebrates (CAVs) maintained by the DEE (Commonwealth of Australia 2009). In the body of this report vertebrates are referred to by both their common and scientific names when first mentioned. Subsequent references to these species cite the common name only.

Appendix 1.2 Permits and licences

The flora and fauna assessment was conducted under the terms of Biosis' Scientific Licence issued by OEH (SL100758, expiry date 31 March 2019). The BAM Assessment and quality review of the BDAR was carried out by Accredited Assessors Callan Wharfe (BAAS18138).

Appendix 1.3 Limitations

Field surveys were undertaken in accordance with the BAM. Ecological surveys provide a sampling of flora and fauna at a given time and season. Factors influencing detectability of species during survey include species dormancy, seasonal conditions, ephemeral status of waterbodies, and migration and breeding behaviours of some fauna. In many cases, these factors do not present a significant limitation to assessing the overall biodiversity values of a site.

The field survey was conducted in December, which is a suitable time to determine the presence of most threatened species.

Surveys undertaken, combined with habitat assessments and desktop analysis are considered sufficient to reach the conclusions herein in regards to this and all other species' likelihood of occurrence within the study area.

Database searches, and associated conclusions on the likelihood of species to occur within the study area, are reliant upon external data sources and information managed by third parties.

Appendix 2 Flora

Flora species assessment

Notes to tables:

<p>Status – EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable</p>	<p>Status – BC Act: E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)</p>
<p>Status – Exotic # – Native species outside natural range * – priority weed species declared under the Biosecurity Act</p>	

Table A. 1 Flora species list- BAM plot data

Plot ID	Growth form	Species name	Establishment means	High threat weed	Frequency	Max cover
1		<i>Rumex acetosella</i>	Introduced		1	0.1
1		<i>Taraxacum officinale</i>	Introduced		1	0.5
1	Grass & grasslike (GG)	<i>Poa hiemata</i>	Alive in NSW, Native		1	10
1	Grass & grasslike (GG)	<i>Poa sieberiana</i> var. <i>sieberiana</i>	Alive in NSW, Native		1	30
1	Grass & grasslike (GG)	<i>Sphagnum cristatum</i>	Alive in NSW, Native		1	0.1
1	Grass & grasslike (GG)	<i>Carex breviculmis</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Acaena novae-zelandiae</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Asperula gunnii</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Cardamine robusta</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Celmisia costiniana</i>	Alive in NSW, Native		1	1
1	Forb (FG)	<i>Erigeron bellidioides</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Erigeron nitidus</i>	Alive in NSW, Native		1	0.1
1	Forb (FG)	<i>Stellaria pungens</i>	Alive in NSW, Native		1	1
1	Shrub (SG)	<i>Grevillea australis</i>	Alive in NSW, Native		1	1
1	Shrub (SG)	<i>Kunzea muelleri</i>	Alive in NSW, Native		1	20
1	Shrub (SG)	<i>Leucopogon montanus</i>	Alive in NSW, Native		1	0.5
1	Shrub (SG)	<i>Nematolepis ovatifolia</i>	Alive in NSW, Native		1	5
1	Shrub (SG)	<i>Olearia phlogopappa</i>	Alive in NSW, Native		1	1
1	Shrub (SG)	<i>Orites lancifolius</i>	Alive in NSW, Native		1	2
1	Shrub (SG)	<i>Oxylobium ellipticum</i>	Alive in NSW, Native		1	5

Plot ID	Growth form	Species name	Establishment means	High threat weed	Frequency	Max cover
1	Shrub (SG)	<i>Pimelea alpina</i>	Alive in NSW, Native		1	1
1	Shrub (SG)	<i>Pimelea ligustrina</i>	Alive in NSW, Native		1	0.5
1	Shrub (SG)	<i>Prostanthera cuneata</i>	Alive in NSW, Native		1	2
1	Tree (TG)	<i>Eucalyptus niphophila</i>	Alive in NSW, Native		1	5

Table A. 2 Function attribute data – BAM data

plot_id	lt_count	dbh0_79cm	dbh30_49cm	dbh20_29cm	dbh10_19cm	dbh5_9cm	dbhlt_5cm	no_hollows	log_length	litter_cover_a	litter_cover_b	litter_cover_c	litter_cover_d	litter_cover_e	litter_cover_avg	MAX_funHighThreatExotic
1	0	0	1	1	0	0	1	1	22	20	20	10	80	80	42	0

Table A. 3 Native richness and cover – BAM data

Plot ID	Growth form	High threat weed	Frequency	Sum max cover
1			1	0.1
1	Forb (FG)		7	2.5
1	Grass & grasslike (GG)		1	0.1
1	Shrub (SG)		10	38
1	Tree (TG)		1	5

Appendix 3 Fauna

Fauna species assessment

Below is a list of fauna species recorded from the study area during the present assessment and a list of threatened fauna species recorded or predicted to occur within 10 kilometres of the study area.

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

Notes to table:

Status – EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable	Status – BC Act: E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)
Status – FM Act: C1 – critically endangered E1 – endangered E2 – endangered E4 – presumed extinct V1 – vulnerable	Status – Non-indigenous species * pest species not native to the area

Table A. 4 Fauna species recorded at the subject land

Common name	Scientific name
Mammals	
Common Wombat	<i>Vombatus ursinus</i>
Birds	
Australian Raven	<i>Corvus coronoides</i>
Eurasian Skylark	<i>Alauda arvensis</i>
Jacky Winter	<i>Microeca fascinans</i>
Eastern Rosella	<i>Platycercus eximius</i>
Frogs	
Common Eastern Froglet	<i>Crinia signifera</i>

Table A. 5 Threatened fauna species assessment

Species	Conservation status		Potential occurrence in subject land	Survey required/undertaken	Potential for significant impact	BAM Candidate species	Rationale	Habitat description
	EPBC	BC						
<i>Burramys parvus</i> Mountain Pygmy-possum	EN	E1	Moderate	No (assumed present)	Low	Yes	The study area is located within the known habitat for the species and records exist for the species within 3 kilometres of the subject land.	Lives on the ground in rocky areas where boulders have accumulated below mountain peaks; frequently associated with alpine heathland shrubs dominated by the Mountain Plum-pine <i>Podocarpus lawrencei</i> . The only Australian mammal to be entirely restricted to the alpine zone in areas above the winter snowline; it is dependant on the insulation provided by snow for its survival (OEH 2018). In NSW the entire range of the species is within a 30 km by 8 km area of Kosciuszko National Park between Thredbo and Kerries Ridge. Two of the four main sub-populations are found within ski resorts (OEH 2017d).
<i>Callocephalon fimbriatum</i> Gang-Gang Cockatoo (breeding)	-	V, E2	Low	No	Low	No	No suitable hollows required for breeding were located within the subject land. Only one hollow was discovered during field investigations but this was too close to the ground to be utilised by the species.	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests

Species	Conservation status		Potential occurrence in subject land	Survey required/undertaken	Potential for significant impact	BAM Candidate species	Rationale	Habitat description
	EPBC	BC						
								and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum <i>Eucalyptus pauciflora</i> woodland and occasionally in temperate rainforests. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts (OEH 2018).
<i>Cyclodomorphus praealtus</i> Alpine She-oak Skink	EN	E1	Moderate	No (assumed present)	Low	Yes	Habitat within the subject land is considered suitable for species given the altitude, presence of tussock grasses, rocks, and logs, and the sparseness of trees within the area. Furthermore records exists for the species within 2 km of the subject land.	The Alpine She-oak Skink has specific habitat requirements, preferring tree-less or very lightly treed areas that contain tussock grasses, low heath or a combination of both. Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking on grass tussocks. In NSW, Alpine She-oak Skinks have been observed in alpine to sub-alpine grasslands in flat to gently sloping areas. Little is known about the breeding biology

Species	Conservation status		Potential occurrence in subject land	Survey required/undertaken	Potential for significant impact	BAM Candidate species	Rationale	Habitat description
	EPBC	BC						
								of the species as it is difficult to detect, spending much of its time sheltering within tussock clumps. As a result of its narrow altitudinal range and specific habitat requirements, the Alpine She-oak Skink is considered to have a limited capacity for dispersal (OEH 2018).
<i>Hieraetus morphnoides</i> Little Eagle (breeding)	-	V	Low	No	Low	No	Habitat was not considered suitable for breeding for this species given low form and habitat of the only tree species (Alpine Snow Gum) within the subject land. No stick nests were located during the habitat assessment.	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.
<i>Liopholis guthega</i> Guthega Skink	EN	E1	High	No (assumed present)	Low	Yes	Habitat was considered suitable for this species given the elevation of the subject land (approx. 1900 m a.s.l) and the presence of open Snow Gum woodland, a preferred vegetation community for this species. Multiple records also exist within 3 km of the subject land.	The Guthega Skink occurs between 1600 m and 2170 m – in the coldest (winter snow cover) and some of the wettest regions on mainland Australia. Preferred habitats are usually rocky or have sub-surface boulders hidden beneath soil or thick vegetation. The NSW distribution occurs where there is a granite substrate and decomposing granite soils. Individuals have been

Species	Conservation status		Potential occurrence in subject land	Survey required/undertaken	Potential for significant impact	BAM Candidate species	Rationale	Habitat description
	EPBC	BC						
								recorded in a range of vegetation types, including open Snow Gum <i>Eucalyptus pauciflora</i> woodland with grassy or shrubby understoreys, dry tussock grassland, and tall and short heath (OEH 2018).
<i>Litoria verreauxii alpina</i> Alpine Tree Frog	VU	E1	Low	No	Low	No	Lack of aquatic features within the subject land. Ephemeral wetland within 100 metres of the subject land, to the south-west, is immediately adjacent to a highly trafficked and disturbed ski run and is considered too small and degraded to support the species. No recent records in the vicinity of the subject land (most recent record is from 1986).	Found in a wide variety of habitats including woodland, heath, grassland and herb fields. Breeds in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing. It does not climb well, and spends most of its time on the ground. Non-breeding habitat and overwintering refuges are poorly known but are likely to include flat rocks, fallen logs, leaf litter and other ground debris (OEH 2018).
<i>Mastacomys fuscus</i> Broad-toothed Rat	VU	V	High	No (assumed present)	Low	Yes	There is a high likelihood of occurrence within the subject land given the dense alpine woodland understorey vegetation in the area that suits the preferred habitat for this species. Furthermore known records for the species exist within 2 km of the subject land, collected	The Broad-toothed Rat lives in a complex of runways through the dense vegetation of its wet grass, sedge or heath environment, and under the snow in winter. The species known distribution includes the wet alpine and subalpine heaths and woodlands of

Species	Conservation status		Potential occurrence in subject land	Survey required/undertaken	Potential for significant impact	BAM Candidate species	Rationale	Habitat description
	EPBC	BC						
							as recently as April 2018.	Kosciuszko National Park (OEH 2017e). This relatively warm under-snow space enables it to be active throughout winter. Sheltering nests of grass are built in the understorey or under logs, where two or three young are born in summer. In winter the rats huddle together in nests, for warmth (OEH 2018).
<i>Pseudophryne corroboree</i> Southern Corroboree Frog	CE	E4A	Low	No	Low	No	Lack of aquatic features within the subject land. Ephemeral wetland within 100 metres of the subject land, to the south-west, is immediately adjacent to a highly trafficked and disturbed ski run and is considered too small and degraded to support the species. No recent records in the vicinity of the subject land (most recent record was from 25 years ago.	Summer breeding habitat is pools and seepages in sphagnum bogs, wet tussock grasslands and wet heath. Outside the breeding season adults move away from the bogs into the surrounding heath and Snow Gum woodland to overwinter under litter, logs and dense groundcover (OEH 2018).

Appendix 4 EPBC Act Significant Impact Criteria assessments

Alpine She-oak Skink and Guthega Skink

Alpine She-oak Skink is listed as an endangered species under the EPBC Act. This species is endemic to NSW and Victoria, and in NSW has only been recorded within Kosciuszko National Park between Smiggins Holes and Kiandra, in areas above 1500 metres (Commonwealth of Australia 2019a).

The Guthega Skink listed as an endangered species under the EPBC Act, and is known from the Snowy Mountains in the vicinity of Mt Kosciuszko, NSW, and from the Bogong High Plains in Victoria. The Guthega Skink has not been recorded below 1600 metres above sea level, and has been observed as high as 1940 metres. It occurs in the coldest and one of the wettest regions on mainland Australia, and is one of Australia's highest living lizard species (Commonwealth of Australia 2019b).

Significant impact assessment

Based on a reasonable understanding of potential to impact the species, amount of potential habitat to be removed and mitigation measures to minimise impacts, it is concluded that project impacts are unlikely to lead to a significant impact to Alpine She-Oak Skink or Guthega Skink. An assessment and justification is provided below.

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of a population	Unlikely	The removal of 0.03ha of habitat will minimally decrease the availability of habitat within the locality. In light of this, it is proposed that a pre-disturbance survey will be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts. Due to the small amount of clearing proposed and the availability of habitat adjoining the subject land as well as the implementation of mitigation measures it is unlikely that the proposed works will lead to a long-term decrease in the size of a population of the Alpine She-oak Skink or Guthega Skink.
Reduce the area of occupancy of the species	Unlikely	The removal of up to 0.03ha of potential habitat will reduce the area of occupancy for the population. This habitat accounts for less than 0.01% of mapped habitat available for the Alpine She-oak Skink in the locality. In addition, a pre-disturbance survey will be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts. Due to the small amount of clearing proposed and the availability of habitat adjoining the subject land as well as the implementation of mitigation measures the proposed works will not significantly reduce the area of occupancy of the Alpine She-oak Skink or Guthega Skink.

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
Fragment an existing population into two or more populations	Unlikely	<p>The removal of 0.03ha of habitat within the subject land is located adjacent to an area previously disturbed by the Perisher Ski Resort.</p> <p>Fragmentation resulting from the removal of the vegetation for the current project will be minimal and will not reduce the continuity of the bushland within the locality.</p> <p>Therefore, it is unlikely that the proposed works will fragment an existing population into two or more populations.</p>
Adversely affect habitat critical to the survival of the species	Unlikely	<p>Critical habitat has not been declared for Alpine She-oak Skink or Guthega Skink.</p>
Disrupt the breeding cycle of a population	Unlikely	<p>Impacts likely to disrupt the breeding cycle of Alpine She-oak Skink or Guthega Skink include habitat loss and fragmentation, and direct mortality.</p> <p>The proposal will remove 0.03ha of potential habitat. The habitat to be removed is within a large patch (>100 hectares) of good quality bushland extending throughout the Kosciuszko National Park. This habitat accounts for 0.01% of habitat available to the Alpine She-oak Skink or Guthega Skink in the locality. Direct mortality of individuals will be avoided by implementing pre-clearance surveys. These mitigation measures will reduce the potential impact on any Alpine She-oak Skink or Guthega Skink.</p> <p>Therefore, the proposed action will not to disrupt the breeding cycle of an important population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	<p>The proposal will remove 0.03ha of potential habitat. This habitat accounts for less than 0.01% of habitat available for the Alpine She-oak Skink or Guthega Skink in the locality. In addition, a pre-disturbance survey would be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts.</p> <p>These mitigation measures will reduce the potential impact on any Alpine She-oak Skink or Guthega Skink. Therefore the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p>

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Unlikely</p>	<p>The proposed works will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of Alpine She-oak Skink or Guthega Skink. Invasive weed species have potential to reduce quality of habitat in the adjoining bushland and increase potential to harm the population of Alpine She-oak Skink or Guthega Skink. Construction activities will be managed through standard practices to avoid further spread of weeds.</p>
<p>Introduce disease that may cause the species to decline</p>	<p>Unlikely</p>	<p>The project will not result in the introduction of a disease that is harmful to Alpine She-oak Skink or Guthega Skink.</p>
<p>Interfere with the recovery of a species</p>	<p>Unlikely</p>	<p>There is no adopted or made recovery plan for the Alpine She-oak Skink or Guthega Skink. The approved conservation advices (Commonwealth of Australia 2009) and listing advice (Threatened Species scientific Committee 2009 and Commonwealth of Australia 2011) state the following as priority issues affecting the recovery of the two species.</p> <ol style="list-style-type: none"> 1. Habitat Loss, Disturbance and Modification 2. Invasive Weeds 3. Trampling, Browsing or Grazing 4. Animal Predation 5. Fire <p>None of these factor will be substantially increased by the proposed works.</p> <p>Considering the above factors, the project will not interfere substantially with the recovery of Alpine She-oak Skink or Guthega Skink</p>

Broad-toothed Rat

In NSW, this species is found in two widely separated areas: the wet alpine and subalpine heaths and woodlands of the Snowy Mountains and an endangered population on the Barrington Tops (OEH 2017a). Populations of the Broad-toothed Rat appear to be restricted to patches of optimum habitat characterised by areas with a moderate to dense groundcover of grasses, sedges and shrubs (NPWS 2000; Van Dyck & Strahan 2008). In the Snowy Mountains, they are often found near streams and steep banks where an abundance of grasses, rushes and shrubs provide dense understorey. The Broad-toothed Rat is the most specialised herbivore of all Australian rodents and has broad, specialised teeth adapted to a high-fibre diet (Breed & Ford 2007). They predominantly consume grasses, and to a lesser extent the leaves of shrubs, sedge stems, bark, seeds, and moss spore cases (NPWS 2000; Van Dyck & Strahan 2008).

Significant impact assessment

Based on a reasonable understanding of potential to impact the species, amount of potential habitat to be removed and mitigation measures to minimise impacts, it is concluded that project impacts are unlikely to lead to a significant impact to Broad-toothed Rat. An assessment and justification is provided below.

Significant impact criteria (vulnerable species)	Likelihood of significant impact	Justification
Lead to a long-term decrease in the size of an important population of a species	Unlikely	<p>Any Broad-toothed Rats that may potentially occur within the subject land are not considered to be part of an important population, as it is not considered to be a key source population either for breeding or dispersal, a populations necessary for maintaining genetic diversity, or a population near the limit of the species range.</p> <p>The removal of 0.03ha of habitat will minimally decrease the availability of habitat within the locality. However, the local population can safely be assumed to have access to the entire contiguous bushland patch which is greater than 1000 hectares. Hence, the proposed works will impact 0.01% of potential habitat within the locality and is not considered significant. Due to the small amount of clearing proposed and the availability of habitat adjoining the study area it is unlikely that the proposed works with lead to a long-term decrease in the size of an important population of the Broad-toothed Rat.</p>
Reduce the area of occupancy of an important population	Unlikely	<p>This is not an important population.</p> <p>The removal of 0.03ha of habitat will minimally decrease the availability of habitat within the locality. However, the local population can safely be assumed to have access to the entire bushland patch which is greater than 1000 hectares. Hence, the proposed works will impact 0.01% of potential habitat within the locality and is not considered significant.</p>
Fragment an existing important population into two or more populations	Unlikely	<p>This is not an important population.</p> <p>The vegetation to be removed and modified is located adjacent to an area previously disturbed by the Perisher Ski Resort, minor increase in the extent of this clearing is unlikely to further fragment the habitat available and therefore will not fragment an important population into two or more population.</p>

Significant impact criteria (vulnerable species)	Likelihood of significant impact	Justification
Adversely affect habitat critical to the survival of the species	Unlikely	Critical habitat has not been declared for Broad-toothed Rat.
Disrupt the breeding cycle of an important population	Unlikely	<p>This is not an important population.</p> <p>Impacts likely to disrupt the breeding cycle of Broad-toothed Rat include direct mortality, disturbance to breeding sites, loss of breeding and sheltering habitat, loss and fragmentation of foraging habitat and fragmentation of movement corridors.</p> <p>The proposal will remove 0.03ha of potential habitat. The habitat to be removed is within a large patch (>100 hectares) of good quality bushland extending throughout the Kosciuszko National Park. It is likely that if the species uses the study area for foraging and sheltering then the local population would use the entire patch of bushland. Direct mortality of individuals will be avoided by implementing preclearance surveys. These mitigation measures will reduce the potential impact on any Broad-nosed Rat.</p> <p>Therefore, the proposed action will not to disrupt the breeding cycle of an important population.</p>
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Unlikely	<p>The proposal will remove 0.03ha ha of potential habitat. The habitat to be removed is within a large patch (>1000 hectares) of good quality bushland extending throughout the Kosciuszko National Park. It is likely that if the species uses the study area for foraging and sheltering then the local population would use the entire patch of bushland. Direct mortality of individuals will be avoided by implementing preclearance surveys. These mitigation measures will reduce the potential impact on any Broad-nosed Rat.</p> <p>Therefore the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Unlikely	<p>The proposed works will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of Broad-toothed Rat. Invasive weed species have potential to reduce quality of habitat in the adjoining bushland and increase potential to harm the population of Broad-toothed Rat. Construction activities will be managed through standard practices to avoid further spread of weeds.</p>
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to the Broad-toothed Rat.
Interfere substantially with the recovery of a species	Unlikely	<p>There is no accepted or adopted recovery plan associated with Broad-nosed Rat.</p> <p>The conservation advice gives priority to the following conservation actions.</p>

Significant impact criteria (vulnerable species)	Likelihood of significant impact	Justification
		<p>1. Implement predator control programs.</p> <p>2. Maintain and protect habitat, including reducing the frequency of extensive and intense fires, and reducing the impacts of livestock and feral herbivores.</p> <p>The proposed actions will remove and modified a small amount of habitat within a large patch of potential habitat of the Broad-toothed Rat.</p> <p>Considering the above factors, the Project will not interfere substantially with the recovery of Broad-toothed Rat.</p>

Mountain Pygmy-possum

Mountain Pygmy-possum is listed as an endangered species under the EPBC Act. The Mountain Pygmy-possum is restricted to very high altitudes within the alps of NSW and Victoria (OEH 2017). It prefers areas of large boulderfields which have been deposited from past glacial event where the Bogong Moth are in highest numbers. Kosciuszko National Park is one of three known populations of the Mountain Pygmy-possum.

Mountain Pygmy-possum is threatened by a number of processes including loss and fragmentation habitat through land-clearing, mortality on roads through habitat and movement areas, predation from cats, dogs and foxes (Threatened Species Scientific Committee 2018).

Significant impact assessment

Based on a reasonable understanding of potential to impact the species, amount of potential habitat to be removed and mitigation measures to minimise impacts, it is concluded that project impacts are unlikely to lead to a significant impact to Mountain Pygmy-possum. An assessment and justification is provided below.

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
<p>Lead to a long-term decrease in the size of a population</p>	<p>Unlikely</p>	<p>The removal of 0.03ha of habitat will minimally decrease the availability of habitat within the locality. The habitat present within the study area is marginal and would most likely be used by the Mountain Pygmy-possum as a movement corridor. This habitat accounts for less than 0.01% of similar habitat available for the Mountain Pygmy-possum in the locality. In light of this, it is proposed that a pre-clearance survey will be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts.</p> <p>Due to the small amount of clearing proposed and the availability of habitat adjoining the subject land as well as the implementation of mitigation measures it is unlikely that the proposed works will lead to a long-term decrease in the size of a population of the Mountain Pygmy-possum.</p>

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
<p>Reduce the area of occupancy of the species</p>	<p>Unlikely</p>	<p>The removal of up to 0.03ha of potential habitat will reduce the potential area of occupancy for the population. The habitat present within the subject land would most likely be used by the Mountain Pygmy-possum as a movement corridor. This habitat accounts for less than 0.01% of similar habitat available for the Mountain Pygmy-possum in the locality. In addition, a pre-disturbance survey will be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts.</p> <p>Due to the small amount of clearing proposed and the availability of habitat adjoining the subject land as well as the implementation of mitigation measures the proposed works will not significantly reduce the area of occupancy of the Mountain Pygmy-possum.</p>
<p>Fragment an existing population into two or more populations</p>	<p>Unlikely</p>	<p>The removal of 0.03ha of habitat within the subject land is located adjacent to an area previously disturbed by the Perisher Ski Resort.</p> <p>Fragmentation resulting from the removal of this vegetation will be minimal and will not reduce the continuity of the bushland within the locality.</p> <p>Therefore, it is unlikely that the proposed works will fragment an existing population into two or more populations.</p>
<p>Adversely affect habitat critical to the survival of the species</p>	<p>Unlikely</p>	<p>All habitat that provides potential movement corridors for the Mountain Pygmy-possum is considered critical habitat (Department of Environment, Land, Water and Planning 2016). The proposed works are unlikely to adversely impact the use of the study area as a movement corridor due to the small scale of vegetation removal, and maintenance of connectivity through the landscape adjacent to the tower location.</p>

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
<p>Disrupt the breeding cycle of a population</p>	<p>Unlikely</p>	<p>Impacts likely to disrupt the breeding cycle of Mountain Pygmy-possum include direct mortality, disturbance to breeding sites, loss of breeding and sheltering habitat, loss and fragmentation of foraging habitat and fragmentation of movement corridors. The proposal will remove 0.03ha of potential habitat. The habitat to be removed is within a large patch (>100 hectares) of good quality bushland extending throughout the Kosciuszko National Park. It is likely that if the species uses the study area for foraging and as a movement corridor then the local population would use the entire patch of bushland. Direct mortality of individuals will be avoided by implementing preclearance surveys. These mitigation measures will reduce the potential impact on any Mountain Pygmy-possum. Therefore, the proposed action will not to disrupt the breeding cycle of a population.</p>
<p>Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>	<p>Unlikely</p>	<p>The proposal will remove 0.03ha of potential habitat. This habitat accounts for less than 0.01% of habitat available for the Mountain Pygmy-possum in the locality. The habitat available within the study area provides some habitat for foraging as the Mountain Pygmy-possum prefers large boulderfields. In addition, a pre-disturbance survey will be undertaken in areas of suitable habitat, and relevant safeguards implemented to prevent direct impacts. These mitigation measures will reduce the potential impact on any Mountain Pygmy-possum. Therefore the proposed action is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p>
<p>Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p>	<p>Unlikely</p>	<p>The proposed works will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of Mountain Pygmy-possum. Invasive weed species have potential to reduce quality of habitat in the adjoining bushland and increase potential to harm the population of Mountain Pygmy-possum. Construction activities will be managed through standard practices to avoid further spread of weeds.</p>

Significant impact criteria (critically endangered / endangered species)	Likelihood of significant impact	Justification
Introduce disease that may cause the species to decline	Unlikely	The project will not result in the introduction of a disease that is harmful to Mountain Pygmy-possum.
Interfere with the recovery of a species	Unlikely	<p>The National Recovery Plan for Mountain Pygmy-possum (Department of Environment, Land, Water and Planning 2016) identifies the following as threats to the recovery of the Mountain Pygmy-possum.</p> <ol style="list-style-type: none"> 1. Loss, degradation and fragmentation of habitat 2. Erosion and sedimentation 3. Predation by cats and foxes 4. Genetic loss and small populations 5. Winter impacts from ski resort operations and snowsports activity 6. Bushfire and planned fuel hazard reduction burns 7. Climate Change and indirect effects 8. Decline in Bogong Moths 9. Weed Invasion and competition from introduced species <p>The proposed actions will remove and modified a small amount of habitat within a large patch of potential habitat of the Mountain Pygmy-possum. Considering the above factors, the project will not interfere substantially with the recovery of Winged Pepper-cress.</p>