Prepared for Kosciusko Thredbo Pty Ltd

Statement of Environmental Effects

Sonnblick Lodge demolition

10 Bobuck Lane, Thredbo Alpine Village

November 2023

Project Number: 230203

Document verification

Project Title:	Sonnblick Lodge demolition
Project Number:	230203
Project File Name:	"\\10.0.18.1\Active\Projects\2023\230203 Sonnblick Demolition SEE\Report"

Revision	Date	Prepared by	Reviewed by	Approved by
Draft V1.0	14/08/2023	Johanna Duck	Lizzie Olesen – Jensen	Lizzie Olesen - Jensen
Final V1.0	29/11/2023	Johanna Duck	Stephanie Kurta	Stephanie Kurta

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1. Introduction

1.1. Background

This Statement of Environmental Effects (SEE) has been prepared by NGH on behalf of the applicant, Kosciusko Thredbo Pty Ltd. This report supports a Development Application (DA) seeking development consent for the demolition of an existing ski lodge known as Sonnblick Lodge, located at 10 Bobuck Lane, Thredbo.

Development consent is sought under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). This SEE has been prepared in accordance with the requirements of the EP&A Act, addresses the relevant environmental planning instruments and has considered the Kosciusko Plan of Management (KPOM) (DPIE 2006) and the specific provisions for Thredbo Village.

The purpose of this SEE is to describe the proposal and the likely impacts of the development on the environment and to detail the mitigation measures that would be implemented to minimise the potential impacts. This SEE should be read in conjunction with the accompanying plans and documentation, provided in the attached Appendices, listed in Table 1-1.

Table 1-1 List of supporting plans and documents

Appendix	Description/Title	Prepared by
A	Demolition Work Plan	ACT Geotechnical Engineers Pty Ltd
B	Geotechnical Investigation and Slope Stability Risk Assessment	ACT Geotechnical Engineers Pty Ltd
C	Biodiversity reporting	NGH
D	Aboriginal Heritage reporting	NGH
E	Erosion and Sediment Control Plan	NGH

1.2. Applicant and land ownership

The applicant for the proposed development is Kosciusko Thredbo Pty Ltd.

The subject land is leased to Kosciusko Thredbo Pty Ltd within the Thredbo alpine resort area. The land forms part of the Kosciusko National Park, managed by NSW National Parks and Wildlife Service (NPWS).

1.3. Subject land and locality

The subject land is described as 10 Bobuck Lane, Thredbo, as shown in Figure 1-1. The land is legally identified as Lot 802 DP1119757. The land is surrounded by lodge accommodation within the Thredbo Village, see Figure 1-2. The land slopes from south to north and has minimal vegetation present. The land is near the Thredbo Landslide Site Memorial.

Located on the land is the three-storey Sonnblick lodge, and associated structures including retaining walls, and concrete driveway. The driveway provides direct access onto Bobuck Lane. Bobuck Lane is a one-way road that is accessed via Alpine Way and Banjo Drive and connects onto Friday Drive. Bobuck Lane is a 40km/hr speed limited area and is a narrow road with some parking occurring partially on street at the front of some accommodation lodges.

Figure 1-1 Aerial image of the subject land (Source: NSW Planning Portal, 2023)

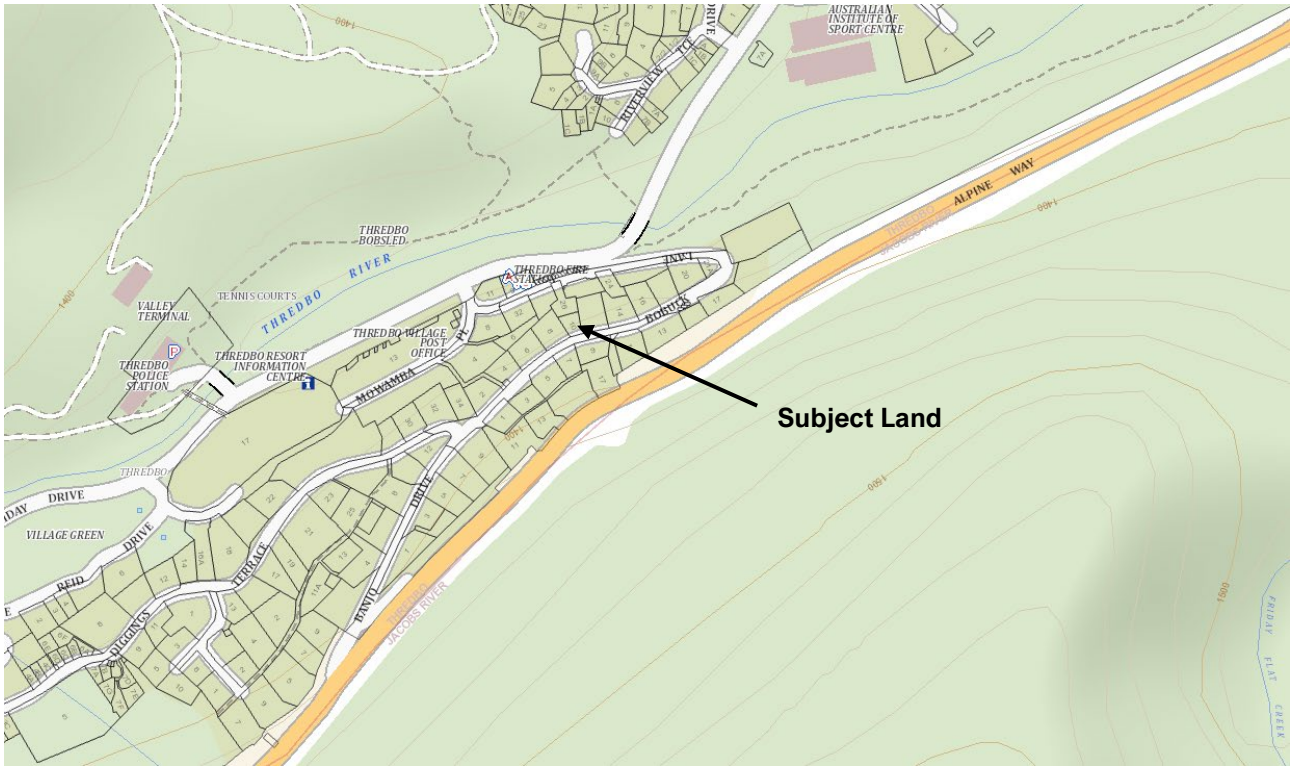

Figure 1-2 Subject land and surrounds (Source: NSW Planning Portal, 2023)

1.4. Pre-lodgement consultation

A meeting with the NSW Department of Planning and Environment (DPE) Alpine Planning team was held on 14 June 2023. The project was introduced, and feedback was sought on the SEE approach, potential matters of note and documentation requirements for the DA. The DPE team provided the following comments and advice:

- Supporting documents should include:
  - Consideration of asbestos and hazardous materials.
  - Details of demolition and any construction.
- The application would be referred to NPWS.

The included supporting assessments, and this SEE provide responses to the matters raised and address relevant legislation as needed.

2. Proposed development

2.1. Works summary

The proposed development would involve the demolition of Sonnblick lodge, a sixteen (16) bed, 5 apartment, three-storey staff accommodation building on Bobuck Lane in the eastern precinct of the Thredbo Village.

The proposed works would involve the demolition of the building and associated concrete paths, landings, and stairs. The land is subject to geotechnical plan requirements for site stability during and post demolition. Site stabilisation and revegetation works would be undertaken post-demolition.

The sections below provide further details for carrying out the proposed development.

2.2. Early works (site preparation)

Early works are required to prepare the site for the proposed demolition works, refer to Table 2-1 for details. The works plan identifies the likely early works:

1. Receive Handover of Site and sign off services.
2. Site induction.
3. Demarcate site and define Exclusion Zones.

Table 2-1 Early works proposed (Details)

Proposed works	Details
Making the site safe, e.g., Setting up no-go areas, fencing, etc.	The site would be made safe as per WHS/SafeWork NSW requirements including defining the boundaries of the site (fenced appropriately) prior to any demolition works commencing. The demolition plans have been prepared consistent with, and site management processes would comply with the Demolition Work Plan (included at Appendix A) and the SafeWork NSW Demolition Works Code of Practice (NSW Govt., 2019).
Works compound/laydown area and facilities.	A laydown area would be set up at Friday Flat in the area identified in Figure 2-1. Publicly accessible toilets are provided in Thredbo Village. Proposed reusable and/or recyclable building materials would be managed onsite where available space allows or within the Friday Flat laydown area. All waste would be transported direct to Jindabyne Landfill. No waste storage would occur within the laydown area.

Figure 2-1 Friday Flat Laydown Area (Source: KT 2023)

2.3. Demolition details

Sonnblick Lodge fronts onto Bobuck Lane and has redeveloped lodge sites to the side boundaries and an older lodge to the rear. The demolition involves the complete removal of the three- storey lodge.

Refer to the description of works in the Demolition Works Plan prepared by ACT Geotechnical Engineers Pty Ltd provided at Appendix A, and as summarised in Table 2-2.

Analysis of slope stability and proposed engineering details are provided in the Geotechnical Investigation & Slope Stability Risk Assessment prepared by ACT Geotechnical Engineers Pty Ltd provided at Appendix B.

The demolition sequence is set out in the works plan as:

1. Install environmental controls.
2. Practical removal of hazardous materials.
3. Create drop zones.
4. Soft strip structure.
5. Erect scaffold and protection.
6. Install man and material hoist.
7. Mechanical demolition.
8. Remove rubble and rubbish from site.

Figure 2-2 Sonnblick Lodge at 10 Bobuck Lane, Thredbo (Source: KT 2023)

Table 2-2 Demolition works summary (proposed details)

Proposed works/	Detail
Install erosion and sediment and dust controls	An Erosion and Sediment Control Plan has been included at Appendix E. Required controls would be in place prior to works commencing. The plan includes provisions for dust management. Additional measures are detailed in the Geotechnical Investigation & Slope Stability Risk Assessment (ACT Geotechnical Engineers Pty Ltd, 2023).
Demolition of buildings and associated structures	The proposed demolition would include removal of the entire building and associated footings, slabs, paths, landings, and stairs. The building is

	constructed of a mix of materials such as timber panelling, corrugated sheet metal, steel framing, blockwork, and concrete. The four existing rock and masonry retaining walls holding the site cut would be retained and repaired or replaced to ensure a stable slope as per engineering advice (Geotechnical Investigation & Slope Stability Risk Assessment at Appendix B). If required, earthworks may include shaping (creating a soil buttress) up against the retaining walls.   
Machinery and equipment	Machinery and equipment requirements would be subject to the geotechnical report but would likely include (but not limited to) hydraulic excavator/s, skid steer, trucks, mobile crane and mechanical vacuum type street sweeper.
Site management	A Site Environmental Management Plan (SEMP) would be finalised for the works prior to commencement.

Traffic management plan	A Traffic Management Plan would be prepared for the works prior to commencement. Vehicle and machinery access would be via the existing driveway.  
Recycling/waste disposal	Demolished material would be recycled where possible and if not possible would be transported to Jindabyne Landfill. A hazardous material assessment would be carried out to identify any asbestos or other hazardous materials within the building prior to the commencement of any works. Material would be disposed of at an appropriately licenced facility.

2.4. Demobilisation, rehabilitation, and slope stabilisation

The proposed demolition works would disturb the subject land and require stabilisation works prior to completion and inspections post completion. Refer to the approach for slope stabilisation and rehabilitation in Table 2-3. The final steps in the work plan would be handover and demobilisation.

Table 2-3 Slope stabilisation and rehabilitation approach

Proposed works	Detail
Slope stability risk mitigation measures.	Mitigation measures would be implemented as per the Slope Stability Risk Assessment (ACT Geotechnical Engineers, 2023), refer to Appendix B. To maintain and/or reduce the risk level of slope stability during and after the demolition of the building and associated structures, the following measures are recommended to be implemented: • Ensure the existing retaining walls would be properly designed and constructed, and positively drained. Alternatively, the retaining walls stabilisation may include placement of a soil buttress against the walls or by anchoring them back into bedrock. • Form stable permanent batters after the structure demolition. • Maintain adequate drainage of the site and ensure drains are free flowing. • Where possible, maintain the existing vegetation cover. After demolition works provide erosion protection for exposed soils. • Periodic inspection of the slope uphill for signs of erosion developing and remediate as necessary.
Compliance with rehabilitation guide.	All disturbed areas to be rehabilitated in accordance with the Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NGH 2007), or stabilised and revegetated to a state suitable for redevelopment as needed.

3. Environmental analysis

3.1. Subject land and site analysis

The subject land, Lot 802 DP1119757, is irregular in shape, with an area of approximately 336sqm. The land is located approximately 140m from the intersection of Banjo Drive and Diggings Terrace with Bobuck Lane. The frontage of the lot measures approximately 16m and the lot has a depth of approximately 21m.

The land slopes from Bobuck Lane at the south of the site down to the northern rear boundary, with an approximate 10-15m fall and has a crossfall from west to east of approximately 3-4m, refer to Figure 2-2. This slope has been considered for geotechnical and site management issues. The existing building is in the southern half of the lot. The rear yard vegetation includes lawn and one tree.

The driveway provides some off-street parking. Stair access is provided from the road to the driveway in the southwest corner of the land. Four rock retaining walls hold the site cut within the subject land.

Newer multi-storey accommodation buildings are located on the lots to the east and west. The setbacks from the neighbouring buildings are varied due to the irregular shape of the lot. Stair access is provided down both sides of the building providing access into the building.

3.2. Economic or social impacts

The potential for future improvement of the site may be seen as a positive outcome for adjoining sites due to the potential for a quality future building on the site to replace the dilapidated building.

The future rebuilding of new accommodation on site has the potential to improve the streetscape and site entry visual aspects. The new building may provide greater connection with the street and activation of the area.

The demolition would provide a stabilised site, that would be ready for the consideration of future development (subject to separate approvals). Increased accommodation options would come from redevelopment of the site and would provide economic flow on effects in the Thredbo Village and for the Lodge operator.

3.3. General demolition impacts

3.3.1. Contamination

Due to the age of the building asbestos may be present. The Demolition Work Plan sets out the process for identification and removal of asbestos and any other potentially hazardous waste. A hazardous material assessment would be completed prior to the commencement of work.

3.3.2. Dust

Dust control measures are set out in the Demolition Work Plan. This includes use of a mechanical vacuum type street sweeper wherever sediment or dust becomes an issue. The sweeper may be used on the external roadways and on the internal hardstand on site. Dust control could include wetting down of materials as needed. Water would be maintained at the face of demolition for dust suppression where required.

3.3.3. Noise

Noise associated with demolition would be temporary. Hours of work would be limited by the NSW Environmental Protection Authority (EPA) work hours, these are:

- Monday to Friday: 7am-6pm
- Saturday: 8am-1pm
- Sundays or public holidays: No work

The contractor would be responsible for ensuring the construction hours are adhered to. Noise control would be consistent with the NSW EPA Interim construction noise guidelines or as superseded. The contractor may choose to implement noise respite during demolition activities (for example concrete removal) or carry out the activity as quickly as possible to minimise the length of time of impacts on adjoining sites. Measures are included in the Demolition Work Plan to avoid disruptive vibrations from travelling beyond the site.

3.4. Geotechnical considerations

The subject land is within the mapped area subject to the Geotechnical Policy – Kosciuszko Alpine Resorts, as shown in Figure 3-1. A Geotechnical Investigation & Slope Stability Risk Assessment (ACT Geotechnical Engineers Pty Ltd, 2023) has been prepared for the proposed demolition consistent with the requirements of the policy, refer to Appendix B.

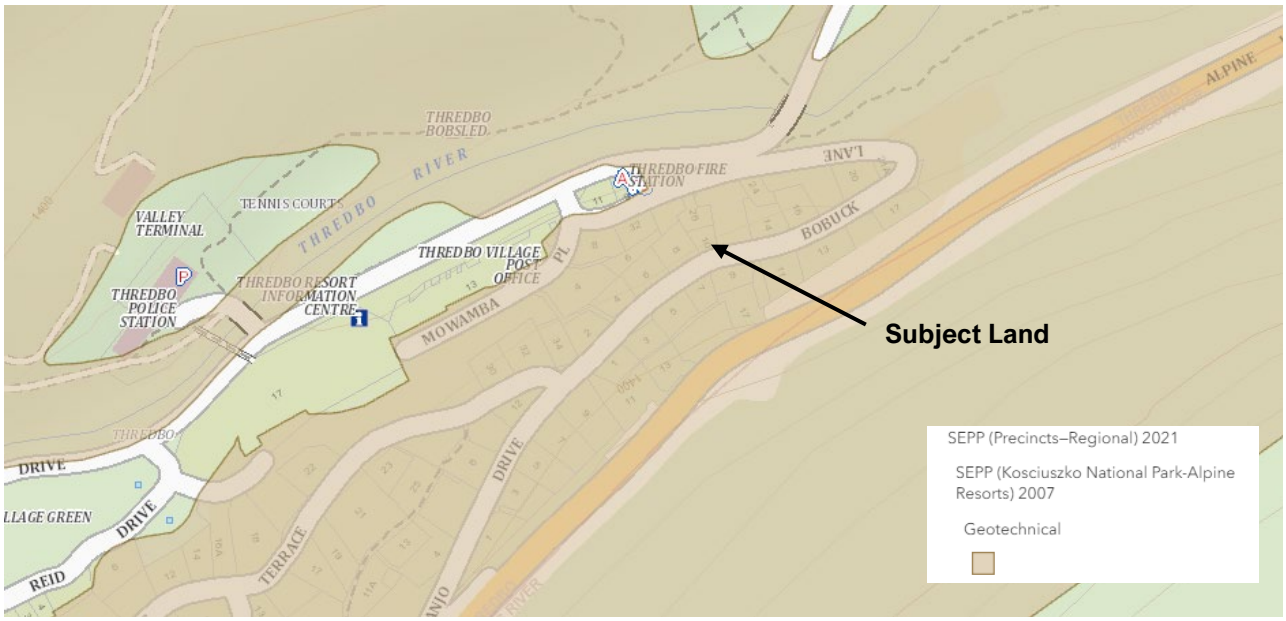

Figure 3-1 Geotechnical Policy – Kosciuszko NP Alpine Resorts SEPP (NSW Planning Portal, 2023)

3.5. Bushfire risk

The land is mapped as bushfire prone land (BPL) Vegetation Category 1, as shown in Figure 3-2.

As there is potential for fire risk, the provisions of the NSW Rural Fire Service Planning for Bushfire Protection 2019 (PBP) have been considered for the proposal and relevant matters addressed. As there is no construction proposed the provisions for 'other' development as defined by the PBP has been used as the development type.

Post approval mitigation commitments in the form of bushfire protection measures (BPMs) are included in Table 3-1 below. The SEMP would consider measures outlined in the Demolition Work Code of Practice (SafeWork NSW, 2019) as they relate to fire.

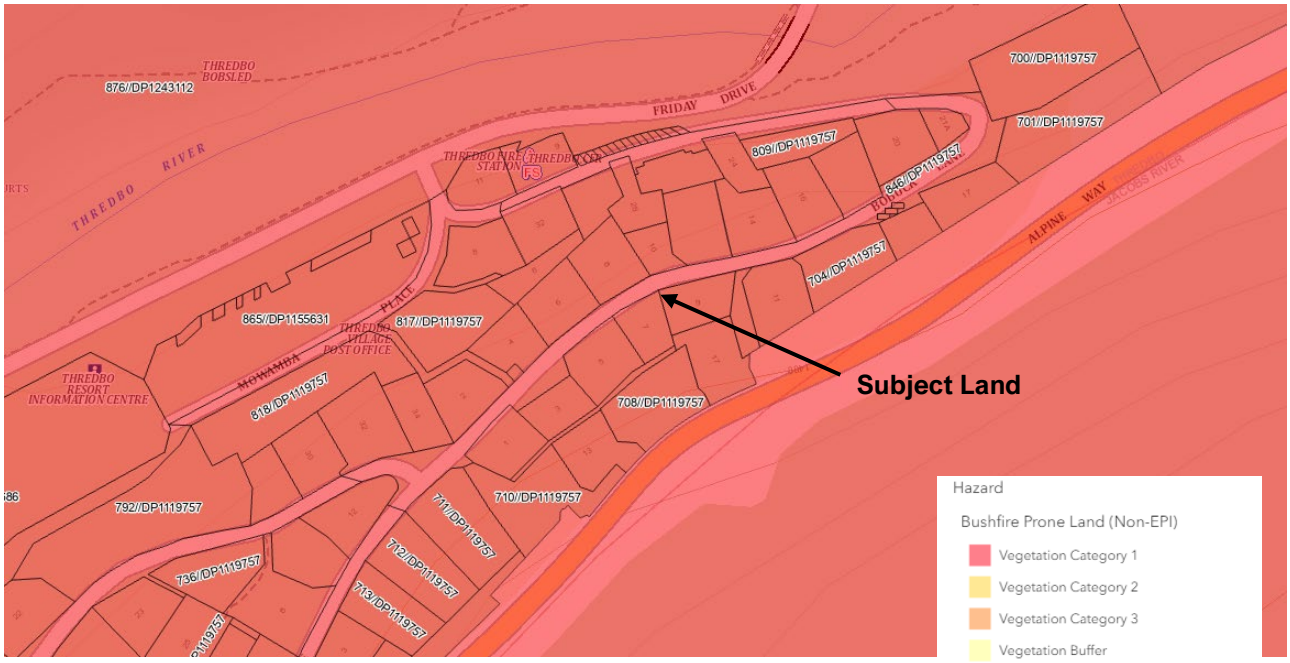

Figure 3-2 Bushfire prone land mapping (NSW Planning Portal, 2023)

Table 3-1 Planning for Bushfire Protection considerations for 'other' developments.

PBP consideration	Comment
Aims and objectives of the PBP	The aim of PBP is to provide for the protection of human life and minimise impacts on property from the threat of bushfire, while having due regard to development potential, site characteristics and protection of the environment. The objectives are to: • Afford buildings and their occupants protection from exposure to a bushfire. • Provide for a defendable space to be located around buildings. • Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings.

	• Ensure that appropriate operational access and egress for emergency service personnel and occupants is available. • Provide for ongoing management and maintenance of BPMs. • Ensure that utility services are adequate to meet the needs of firefighters. Accommodation buildings surround the site and are generally managed land however areas of native plantings and woodland are present near the site including on the opposite side of Bobuck Lane. The site and surrounding land is identified as Vegetation Category 1 BPL. This categorisation brings with it the need for designing for the protection of human life and minimised impacts on property from the threat of bushfire. The proposal would be consistent with the objectives of the PBP, specifically as the location of the works proposed provides for the protection and safety of workers. Existing access and public roads would provide for evacuation needs during a bushfire event. The proposed development would be carried out generally in existing cleared areas. The adjoining managed land, separation from near buildings and presence of Bobuck Lane provides for a defendable space during the works. The demolition contractor would be responsible for determining relevant bushfire management procedures for the site and ensuring staff are aware of bushfire avoidance, evacuation, and management measures. Water connection at the site would be maintained for the duration of the works.
BPM - Access	The existing public road has a carriageway width of the minimum requirement of 4m. Bobuck Lane is a loop road providing through access.
BPM - Water Storage	The subject land has a reticulated water connection.
BPM - Defendable Space	Bobuck Lane provides a defendable space.

3.6. Biodiversity

The potential impacts of the proposed demolition on biodiversity have been assessed by NGH ecologists as part the preparation of the SEE. A summary of the assessment of the proposal against the *Biodiversity Conservation Act 2016*, Biodiversity Offset Scheme (BOS) triggers are provided in Table 3-2. The assessment also considered the works against the provisions of the Environment Protection Biodiversity Conservation Act 1999.

Table 3-2 Impact assessment against the BC Act BOS provisions.

Threshold	Application to the Proposal	Trigger for BDAR
The development is likely to significantly affect threatened species, populations or ecological communities (clause 7.2(1)(a))	A significant impact to threatened entities considered unlikely.	No
The development exceeds the biodiversity offsets scheme threshold (clause 7.2(1)(b)) Note: there are two potential BOS thresholds, pursuant to clause 7.1(1) of the BC Regulation.		
Minimum lot size associated with the property / **Threshold for clearing of native vegetation** **Less than 1ha** / 0.25 ha or more	No minimum lot size is specified for the property and the minimum lot size becomes the size of the lot (0.034ha). 0.003ha of native vegetation would be potentially removed. This is below the 0.25ha threshold.	No
The clearing of native vegetation, or other action prescribed by clause 6.1, on land identified on the Biodiversity Values (BV) map;	The land is not identified on the Biodiversity Values map.	No
The development is in an area of Outstanding Biodiversity Value (clause 7.2(1)(c))	The land is not identified as an area of Outstanding Biodiversity Value.	No

A BOS assessment of the proposed demolition was carried out by NGH ecologists. NGH evaluated the proposed activities based on the BOS criteria and completed a field assessment of the subject land. The removal of one native tree, Eucalyptus pauciflora, and exotic vegetation in the rear yard would not exceed the threshold for clearing. There would be no impact on designated Biodiversity Values Mapped land or Areas of Outstanding Biodiversity.

The results of the Habitat Evaluation Table indicate that of the threatened entities assessed, only the BC Act listed Eastern False Pipistrelle has a high likelihood of being impacted by the proposed works through the removal of potential roost sites in the roof of the Lodge. A Test of Significance (ToS) was prepared to evaluate the potential impacts further. A pre-clearance inspection immediately prior to demolition and the presence of a fauna spotter catcher on site during works to remove and relocate any bats found during works is recommended, to avoid a significant impact on this threatened species.

It has been determined that the proposed activities would not trigger the BOS.

3.7. Heritage

Aboriginal Cultural heritage

The subject land is within an area considered by the Snowy Mountains Special Activation Precinct (SAP) Master Plan and supporting technical studies as being disturbed land, see section 0, for information. An Aboriginal cultural heritage due diligence desktop assessment has been completed for the site to consider potential for impacts. A summary of findings is provided below, refer to Appendix D for the full assessment report.

The assessment considered AHIMS search results and relevant archaeological reports to develop or refine a model of Aboriginal site prediction based on the type of activity proposed and the level of disturbance of the area. The desktop assessment has indicated that there are no unmodified landscapes present within the proposal area that have the potential to contain Aboriginal objects. The nature of the works being undertaken at the proposal area would involve a high level of ground disturbance and it is unlikely that it would impact on Aboriginal heritage objects.

The recommendations are as follows:

1. The proposed work can proceed with caution without further archaeological assessment.
2. Any activity proposed outside of the current proposal area should also be subject to an Aboriginal heritage assessment.
3. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and the NSW Environment Line (1300 361 967) notified. The find would need to be assessed and, if found to be an Aboriginal object, further detailed assessment, and an application for an Aboriginal Heritage Impact Permit (AHIP) may be required.
4. In the unlikely event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The proponent must contact the local NSW Police who would make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, Heritage NSW must be notified by ringing the Enviroline (131 555).

Historic built heritage

Kosciuszko National Park forms part of the Australian Alps National Parks and Reserves (AANP) which is a National Heritage Place listed National Landscape under the EPBC Act. Although the Kosciusko National Park is of National Landscape significance, Sonnblick Lodge is not heritage listed and no heritage listed sites are adjacent.

It is considered the proposed demolition would have no impact on the National Landscape significance, given its location within a developed and disturbed area of Thredbo village. The proposed demolition provides opportunity for redevelopment to occur and provide greater visual contribution to the public domain.

3.8. Infrastructure and service provisions

3.8.1. Haulage, traffic generation and impacts

The demolition works are not considered a traffic generating development due to the nature of the proposal and minimal construction vehicles that would be involved in the work. Between 2-10 workers would be required on site at any one time to complete the demolition works.

The site would be accessed via the Alpine Way, accessing Bobuck Lane directly; traffic leaving the site would need to exit via Friday Drive. As Bobuck Lane is a one-way street, construction traffic would be limited to minimise impacts on the street and adjoining streets.

Due to the constrained road width, a traffic management plan should be prepared. The following general measures are recommended for inclusion in the plan:

- Traffic and pedestrians would need to be actively controlled and managed at key stages of the demolition.
- The access driveway and hardstand car park at the top of the site would be used for set-down of machinery and collection of material for removal from site (by either truck or skip bin).
- The main demolition machinery would be stored within the site.
- During demolition of the top section of the building, there may be a need to divert traffic.
- Traffic would be diverted from Bobuck Lane at Bella's corner and actively managed by the Thredbo Village crew. Access would be retained to lodges to the west of Sonnblick. Lodges to the east of Sonnblick may be subject to short delays in accessing their premises. These delays would be managed by the Village crew and kept to a minimum.

Table 3-3 Traffic management plan measures

Recommended Traffic management measures	
Objectives	• Minimise potential impacts to Bobuck Lane access. • Ensure safety of workers, pedestrians, and road users.
Mitigation measures	• Traffic and construction vehicles access to be managed as per the project Traffic Management Plan. • Potential temporary traffic and pedestrian closure of Bobuck Lane during demolition works on the southern side of the building.
Performance criteria	• No significant impacts to road and pedestrian users. • No complaints in relation to traffic or pedestrian access.
Corrective actions	• Revise Traffic Management Plan if required.

3.8.2. Site access and parking

Between 2-10 workers would be required on site at any one time to complete the demolition works.

The site is accessed off Bobuck Lane, using an existing concrete driveway. Access along the road would be maintained during the demolition process, excepting any need to divert traffic to demolish the front section of the building adjacent to the road.

A stabilised access would be provided for the demolition (typically a gravel entry point) if the existing entry is deemed unsuitable for the proposed demolition.

To avoid parked vehicles blocking access along Bobuck Lane, parking for workers would be within/next to the site compound to be established at Friday Flat and workers would be ferried to/from the site in a light vehicle as needed.

3.8.3. Utilities and services

Services and utility connections to the site include electricity (Essential Energy – HV and LV underground cables), telecommunications (Telstra/Optus/Uecom NSW), gas (Elgas), water, sewage, and drainage infrastructure. Refer to the Demolition Work Plan at Appendix A for service disconnection details and use during the works. Services would be maintained to a suitable standard for future reconnection.

Mitigation measures for the work are recommended be as follows:

- Contractor responsible for carrying out relevant searches (Council, DBYD, etc) as needed to confirm accuracy of plans.
- Work would be carried out in accordance with the Demolition Work Plan, relevant management plans and/or Demolition work Code of Practice (SafeWork NSW, 2019), or as agreed with service providers/in accordance with relevant conditions/approvals.
- Services would be disconnected and made safe for reconnection with any future development. Any work on services would be carried out by a suitably qualified person.

4. Statutory framework

4.1. Commonwealth legislation

4.1.1. Environment Protection and Biodiversity Conservation Act 1999

The accompanying Biodiversity Assessment concluded the proposed development is unlikely to result in any significant impacts to listed threatened species or ecological communities under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Therefore, a referral to the Commonwealth Environment Minister is not recommended in this instance.

4.2. State planning legislation

4.2.1. Environmental Planning and Assessment Act 1979

Application is made for the proposed development in accordance with Part 4, Section 4.12 of the *Environmental Planning and Assessment Act 1979.*

Matters of consideration for the DA

This SEE has considered the relevant matters of Section 4.15 of the EP&A Act. Refer to consideration of the State Environmental Planning Policies in this section of SEE. This SEE has also considered the applicability of the provisions of any Local Environmental Plan and Development Control Plan as detailed in 4.3 below.

Section 4.15 of the EP&A Act also states that in determining a Development Application, a consent authority is to take into consideration other relevant matters. These matters are listed in Table 4-1.

Table 4-1 Relevant 4.15 matters

Other relevant 4.15 matters for consideration	
• ***any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority……:***	There are no known proposed instruments that are considered imminent and that are applicable to the proposal.
• ***any planning agreement……:***	There are no known planning agreements applicable to the development proposal.
• ***the suitability of the site for the development…:***	This report has found that the subject land is suitable for the development as follows:

	• The works are for demolition of a building to allow for redevelopment of the site, subject to future approvals. • Environmental impacts are minimised and managed through the recommended mitigation measures in the SEMP.
• ***any submissions…..:***	The Minister (as the determining authority) would undertake appropriate public notification and would consider any submissions made.
• ***the public interest…..:***	The proposal has been found to comply with the relevant legislated planning policies and guidelines. As such, approval of the demolition is not inconsistent with the public interest.

Integrated development

The proposed development is not integrated development under Section of the 4.46 EP&A Act as there are no relevant provisions under the following Acts:

- Roads Act 1993
- Coal Mine Subsidence Compensation Act 2017.
- Fisheries Management Act 1994.
- Heritage Act 1977.
- Mining Act 1992.
- National Parks and Wildlife Act 1974.
- Petroleum (Onshore) Act 1991.
- Protection of the Environment Operations Act 1997.
- Rural Fires Act 1997.
- Water Management Act 2000.

4.2.2. Biodiversity Conservation Act 2016

In accordance with the provisions of the *Biodiversity Conservation Act 2016* (BC Act), the consent authority is required to take the likely impacts to biodiversity into consideration when determining a development application. Refer to section 3.6 for the summary of the biodiversity assessment.

4.2.3. National Parks and Wildlife Act 1974

The Section 81A of the National Parks and Wildlife Act 1974 identifies that lease areas are subject to relevant plans of management. For the subject land, the Kosciuszko National Park Plan of Management applies.

81A Leases, licences and easements subject to plan of management

Without limiting the generality of this Part, this Part has effect in respect of any part of a national park, historic site, nature reserve, karst conservation reserve, state conservation area, regional park or Aboriginal area that is the subject of a lease, licence or easement granted under Part 12.

4.2.4. State Environmental Planning Policy (Precincts—Regional) 2021

The subject land is within the Kosciuszko National Park. The provisions of Chapter 4 Kosciuszko Alpine Region under the State Environmental Planning Policy (Precincts—Regional) 2021 apply.

Relevant provisions	Response
4.4 Consent authority	The Minister is the consent authority for the proposed development.
4.6 Relationship with other environmental planning instruments ***(2) The following environmental planning instruments do not apply to land to which this Chapter applies—*** ***(a) Snowy River Local Environmental Plan 2013.***	The SEPP applies to the subject land and the LEP does not.
4.9 Demolition ***The demolition of a building or work on land in the Alpine Region may be carried out only with development consent.***	The accompanying application seeks development consent for the proposed demolition of the lodge.
4.17 Classified roads ***(1) The objectives of this section are as follows—*** ***(a) to ensure that development does not compromise the effective and ongoing operation and function of classified roads,*** ***(b) to prevent or reduce the potential impact of traffic noise and vehicle emissions on development adjacent to classified roads.***	The site does not directly front a classified public road.
4.18 Bushfire hazard reduction ***Bushfire hazard reduction work authorised by the Rural Fires Act 1997 is permitted without development consent in the Alpine Region.*** ***Note—*** ***The Rural Fires Act 1997 also makes provision relating to the carrying out of development on bushfire prone land.***	There is no bushfire hazard reduction works proposed. This SEE has considered the undertaking of the works on bushfire prone land, refer to section 3.5.
4.19 Public utility infrastructure ***(1) Development consent must not be granted for development in the Alpine Region unless the consent authority is satisfied that—***	The lodge demolition includes the making safe of any connections and disconnections as required. Appropriate services would be available for any future development.

(a) the public utility infrastructure that is essential for the proposed development is available, or ***(b) adequate arrangements have been made to make that infrastructure available when required.***	
4.21 Heritage conservation ***(1) The objective of this section is to conserve—*** ***(a) the environmental heritage of the Alpine Region, and*** ***(b) the heritage significance of heritage items, including associated fabric, settings and views, and*** ***(c) Aboriginal heritage items and Aboriginal places.***	This SEE includes a supporting Aboriginal cultural heritage due diligence assessment, refer to section 3.7 for the summary of findings and full report at Appendix D. The proposed works are consistent with the objective of this clause because there are no expected impacts to Aboriginal heritage items and proper processes have been followed with recommendations made to avoid impacts.
4.25 Earthworks ***(1) The objective of this section is to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.*** ***(2) Development consent is required for earthworks in the Alpine Region unless—*** ***(a) the earthworks are exempt development under this Chapter or another environmental planning instrument, or*** ***(b) the earthworks are ancillary to—*** ***(i) development permitted without consent under this Chapter, or*** ***(ii) development for which development consent has been given.*** ***(3) In deciding whether to grant development consent for earthworks, or for development involving ancillary earthworks, the consent authority must consider the following matters—*** ***(a) the likely disruption of, or adverse impact on, drainage patterns and soil stability in the locality of the development,*** ***(b) the effect of the development on the likely future use or redevelopment of the land,*** ***(c) the quality of the fill or the soil to be excavated, or both,***	Earthworks are required as part of the removal of structures and stabilisation of the site. Details of the earthworks likely are described in the Geotechnical Investigation & Slope Stability Risk Assessment provided at Appendix B. Vegetation would be retained where possible, and any rehabilitation would comply with the Rehabilitation Guidelines for the Resorts Areas of Kosciuszko National Park (2007). Any soil stockpiling would occur on site or within approved stockpile areas and would be managed in accordance with the ESCP and Soil Stockpile Guidelines for the Resort Areas of Kosciuszko National Park (2017).

(d) the effect of the development on the existing and likely amenity of adjoining properties, ***(e) the source of any fill material and the destination of any excavated material,*** ***(f) the likelihood of disturbing relics,*** ***(g) the proximity to, and potential for adverse impacts on, a waterway, drinking water catchment or environmentally sensitive area,*** ***(h) appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.***	
4.26 Master plans ***(1) The Minister must prepare and approve a master plan that applies to the Alpine Region.*** ***(2) The master plan must contain the following information—*** ***(a) the strategic vision and general objectives for the Alpine Region,*** ***(b) a map showing existing and proposed types of development,*** ***(c) the performance criteria for development,*** ***(d) information about heritage items or places of heritage significance,*** ***(e) limitations on development on certain land, including environmentally sensitive areas, land prone to flooding and cultural heritage.***	Refer to section 4.2.4 which addresses the adopted Master Plan for the Alpine Region.
4.27 Consultation with National Parks and Wildlife Service ***(1) Development consent must not be granted to development in the Alpine Region unless the consent authority has—*** ***(a) consulted with the National Parks and Wildlife Service, and*** ***(b) considered submissions received from the National Parks and Wildlife Service within the relevant period.*** ***(2) In this section—*** ***relevant period means—*** ***(a) 28 days after notice of the development application is given to the National Parks and Wildlife Service, or*** ***(b) another period determined by the Planning Secretary.***	It is understood DPE staff would consult with NPWS about the proposed works. The KNP POM has been addressed in the following section of the SEE.

4.28 Consideration of master plans and other documents ***(1) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider the following—*** ***(a) the aim and objectives of this Chapter set out in section 4.1,*** ***(b) a draft development control plan that is intended to apply to the land and has been published on the NSW planning portal,*** ***(c) a conservation agreement under the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth that applies to the land,*** ***(d) the Geotechnical Policy —Kosciuszko Alpine Resorts published by the Department in November 2003,*** ***(2) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider—*** ***(a) a master plan approved by the Minister under section 4.26 that applies to the land, or*** ***(b) if a master plan has not been approved—a draft master plan prepared under section 4.26 that is intended to apply to the land and has been published on the NSW planning portal.***	The works are consistent with the aims of Section 4.1 the SEPP to protect and enhance the Alpine Region by proposing appropriately managed works specifically relating to biodiversity and the natural environment setting. The works are consistent with the objectives as the demolition of the lodge and future development (subject to separate approval) would better support tourism in the Alpine Region all year round. This SEE has considered the environmental, social, or economic impacts on the natural or cultural environment of the Alpine Region, including cumulative impacts on the environment. There are no likely adverse impacts. Works would be appropriately managed. The Geotechnical Investigation & Slope Stability Risk Assessment and Demolition Works Plan has addressed the Geotechnical Policy-Kosciuszko Alpine Resorts. The EPBC Act provisions have been addressed in the biodiversity assessment for the works. No referral to the Commonwealth Minister is considered necessary in this instance. The Master Plan has been addressed in the following section.
4.29 Consideration of environmental, geotechnical and other matters ***(1) In deciding whether to grant development consent to development in the Alpine Region, the consent authority must consider the following—*** ***(a) measures proposed to address geotechnical issues relating to the development,*** ***(b) the extent to which the development will achieve an appropriate balance between—*** ***(i) the conservation of the natural environment, and*** ***(ii) taking measures to mitigate environmental hazards, including geotechnical hazards, bushfires and flooding,*** ***(c) the visual impact of the proposed development, particularly when viewed from the land identified as the Main Range Management***	The supporting documents include the Geotechnical Investigation & Slope Stability Risk Assessment prepared by suitably qualified engineers addressing the development risk. The SEMP, Demolition Work Plan, Geotechnical Investigation & Slope Stability Risk Assessment and ESCP show how the works would be managed. The SEMP would include measures for the protection of biodiversity and appropriate fire management for the risks associated with demolition. The proposed demolition would improve visual impacts on the natural setting with the removal of the dilapidated building and structures. Minimal resources would be needed to complete the works and where possible materials would be recycled. Any disturbed areas would be rehabilitated as necessary to minimise erosion. No change of use is proposed, and cumulative impacts (for example vegetation removal, additional construction traffic, use of

Unit in the Kosciuszko National Park Plan of Management, ***(d) the cumulative impacts of development and resource use on the environment of the Alpine Subregion in which the development is carried out,*** ***(e) the capacity of existing infrastructure and services for transport to and within the Alpine Region to deal with additional usage generated by the development, including in peak periods,*** ***(f) the capacity of existing waste or resource management facilities to deal with additional waste generated by the development, including in peak periods.*** ***(2) For development involving earthworks or stormwater draining works, the consent authority must also consider measures to mitigate adverse impacts associated with the works.*** ***(3) For development the consent authority considers will significantly alter the character of an Alpine Subregion, the consent authority must also consider—*** ***(a) the existing character of the site and immediate surroundings, and*** ***(b) how the development will relate to the Alpine Subregion.***	accommodation by workers) are expected to be minimal.
4.30 Kosciuszko National Park Plan of Management ***(1) Development consent may be granted to development in the Alpine Region even if the application has not established that the development is consistent with the Kosciuszko National Park Plan of Management.*** ***(2) This section does not prevent the consent authority from refusing to grant consent to development on the basis that the development is not consistent with the Kosciuszko National Park Plan of Management.*** ***Note—*** ***Under the National Parks and Wildlife Act 1974, section 81(4), operations on land to which a plan of management under that Act applies may be undertaken only if they are undertaken in accordance with the plan of management, despite another Act or an instrument made under an Act.***	The proposal is consistent with the KPOM, as addressed in the following section of the SEE.

Snowy Mountains Special Activation Precinct Master Plan

The Snowy Mountains Special Activation Precinct Master Plan (Master Plan) applies to Thredbo. The criteria and controls from the Master Plan relevant to the proposal have been considered and are addressed in Table 4-2.

Table 4-2 Consideration of relevant Master Plan criteria and controls

Relevant section	Provisions and response
Section 9 Structure Plans	The proposed demolition of the lodge in preparation for future infill redevelopment is consistent with the structure plan for Thredbo. Specifically, the structure plan statement includes: *"Thredbo provides significant opportunities for infill development in the main village."*
Section 10 Alpine Precinct provisions	**10.1 Land Use** **Performance Criteria** ***A.*** *Development is to be permissible and consistent with the Master Plan, Precincts—Regional SEPP, Alpine Development Control Plan, Kosciuszko National Park Plan of Management, and the National Parks and Wildlife Act.* ***B.*** *In considering the suitability of the development, the consent authority must be satisfied that the development meets the performance criteria and development controls in this Master Plan and in the Alpine Development Control Plan.* The proposed demolition is permissible and consistent with relevant documents as described in this SEE. The development addresses the Master Plan, there is currently no Alpine Development Control Plan available to be addressed. **10.2 Alpine Resorts** **Performance Criteria** ***D.*** *Development should be designed to reduce on-site power consumption and improve environmental performance.* ***E.*** *Development should be designed to contribute to the alpine character of the Alpine Resorts and reflect the alpine landscape and natural environment.* *The proposed demolition would provide opportunity for future energy efficient development. The works would be carried out in a manner that appropriately responds to the unique sensitive natural environment and landscape.* **10.2 Alpine Resorts** **Performance Criteria** ***A.*** *Development should contribute to visitor attraction and village experience through:* *i. the prioritisation of infill development.*

	KT have proposed the demolition of the existing lodge to support and enable infill development.
Section 11 Environment and sustainability	**11.1 Biodiversity** **Performance Criteria** ***A.*** *All development is to apply the avoid, minimise and offset methodology.* ***B.*** *Development is to avoid threatened ecological communities and threatened species habitat; such vegetation should not be removed. Development may occur in these areas if it is for essential infrastructure.* ***D.*** *Development should be concentrated in and around already disturbed areas. Where possible, development should provide a buffer between areas of high ecological value and buildings and structures.* ***E.*** *Development should consider the biodiversity impacts of bushfire asset protection zones (APZ) and associated vegetation management.* ***F.*** *Development must offset any impacts to biodiversity through direct management measures within Kosciuszko National Park and should be related to the biodiversity impacted.* ***G.*** *Riparian corridors must be preserved while ensuring consistency with the proposed Flooding and Drainage Strategy for the Precinct.* ***H.*** *Any revegetation or planting within Kosciuszko National Park should follow the Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park.* A survey of the subject land has been completed for the works to avoid and minimise impacts to biodiversity. One tree would be removed. The potential for bushfire has been considered and no clearing for this purpose is proposed. No need for offsets has been identified. Any rehabilitation necessary would be carried out in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park.* **11.2 Geotechnical** **Performance Criteria** ***A.*** *Development must address the requirements of the Geotechnical Policy – Kosciuszko National Park (DPNIR, 2003). This includes:* *i. development on land covered by the geotechnical maps, under the above policy must ensure the requirements of the policy are met.* *ii. development on land not covered by the geotechnical maps under the above policy must ensure the requirements of the policy are met and should also use the risk susceptibility mapping to inform the requirements and design of development.* ***B.*** *Development must include an assessment of geotechnical risks.* ***C.*** *Buildings and structures must be designed to accommodate the specific geotechnical risks identified for the site.* The *Geotechnical Policy Kosciuszko Alpine Resorts* has been considered in the Geotechnical Investigation & Slope Stability Risk Assessment submitted with this SEE. **11.4 Water Quality**

	Performance Criteria ***F.*** *Erosion and sediment control should be managed during construction to ensure impacts to waterways are minimised in accordance with Managing Urban Stormwater Soils and Construction, also known as the Blue Book (current edition).* An Erosion and Sediment Control Plan (ESCP) complying with the Performance Criteria has been prepared for the proposed works and is included in the documents set submitted with this SEE. **11.5 Bushfire** **Performance Criteria** ***A.*** *Development is to:* *i. minimise perimeters exposed to the bushfire hazard.* *ii. minimise vegetated corridors that permit the passage of bushfire towards development.* *iii. provide for the siting of future development away from ridge-tops and steep slopes, within saddles and narrow ridge crests. iv. ensure capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development.* ***B.*** *Asset Protection Zones are to be provided and maintained between a bushfire hazard and future development and are designed to address the relevant bushfire attack mechanisms.* ***C.*** *Adequate access is to be provided from all properties to the wider road network for park users emergency services and to provide access to hazard vegetation to facilitate bushfire mitigation works and fire suppression.* The NSW Rural Fire Service' Planning for Bushfire Protection 2019 has been considered in the proposed approach to works, refer to Table 3-1 for the relevant proposed measures. **11.6 Sustainability and climate change** **Performance Criteria** **B.** *Development should preserve the Precincts landscape, cultural, heritage and biodiversity values by avoiding and minimising impact.* This SEE and supporting documents have considered the works impacts and included measures to minimise and avoid impacts to landscape, cultural, heritage and biodiversity values.
Section 12 Place and landscape	**12.1 Aboriginal Cultural Heritage** **Performance Criteria** ***A.*** *Areas of Aboriginal cultural heritage (included as part of the environmentally sensitive areas map) should not be developed. Development may occur in these areas if it is for essential infrastructure and where further Aboriginal cultural heritage assessment will be undertaken to appropriately mitigate and manage any impacts to Aboriginal cultural heritage items, places or areas.*

C. *Development in areas where surveys have not been undertaken require further Aboriginal cultural heritage assessment. These assessments must be carried out in accordance with Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (as modified from time to time) prior to any development on this land. These assessments must include a visual survey of the land. Once suitably assessed, any land identified as having Aboriginal cultural heritage significance should be included on the Environmentally Sensitive Areas (ESA) map.*

i. development within areas identified as 'disturbed land' do not require any further investigation beyond considering the potential for subsurface archaeological deposits. If current disturbances are considered to cover intact archaeological deposits, further investigation should take place that may include test excavation. Should development encounter any unexpected finds during construction, the procedures under the relevant unexpected finds protocol should be followed.

The subject land is within the mapped disturbed land zone. Due to the potential for ground disturbance a desktop due diligence assessment has been prepared to consider the potential for subsurface archaeological deposits, refer to Appendix D.

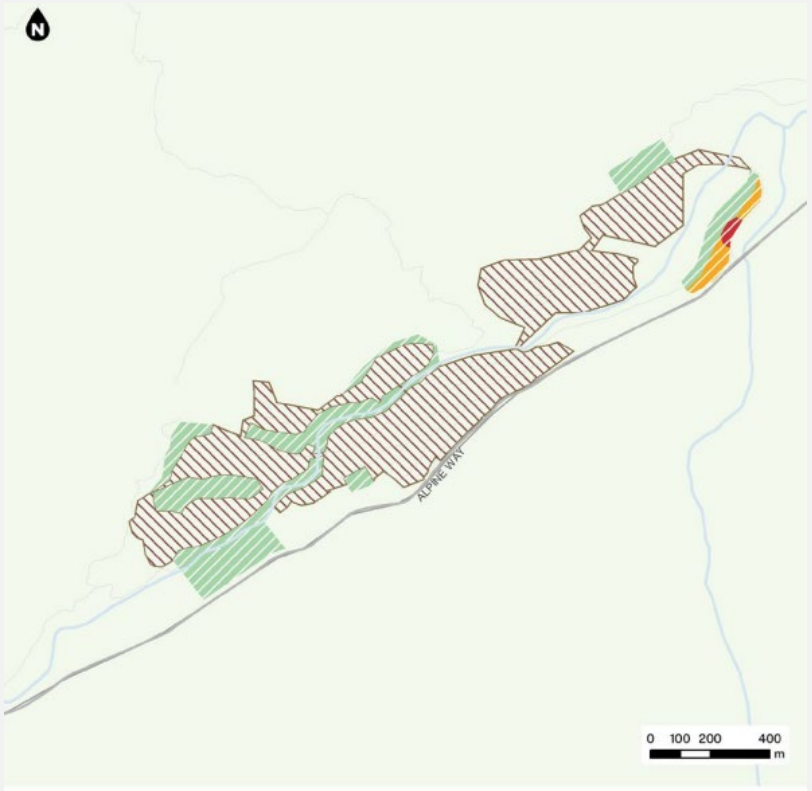

Figure 58: Aboriginal Cultural Heritage (ACH) potential - Thredbo

Road
Waterway
ACH high potential
ACH moderate potential
ACH low potential
Disturbed land

	12.2 Historic heritage The subject land is within areas identified as low risk and is not within any mapped heritage precincts. The land is approximately 20m from the 'East Precinct'. The subject land is within two infill sites and does not directly neighbour a heritage item. **12.3 Landscape, character and open space** **Performance Criteria** ***B.*** *Development should protect, conserve and enhance the Alpine Precinct's natural environment and create a green infrastructure network, where possible.* ***D.*** *Revegetation and new plantings should follow the Rehabilitation guidelines for the Resort Areas of Kosciuszko National Park.* The SEMP includes measures to protect and conserve the natural environment. All relevant disturbed areas would be rehabilitated in accordance with the Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NGH 2007).

Kosciuszko National Park Plan of Management

The KPOM provisions relevant to the proposal have been considered and are addressed in Table 4-3.

Table 4-3 Consideration of relevant KPOM provisions

Relevant section	Provisions and response
5.6 Visitor Services Zone	5.6.1 Management Objective *The Visitor Services Zone will be managed as a set of discrete development nodes within which appropriate recreational infrastructure, visitor accommodation and park depots are concentrated.* *These facilities will:* • *Provide interlinked opportunities for visitors to experience, enjoy and understand the values of the park. Within the alpine resorts these will primarily be directed at snow-based recreation; and* The proposed works would be consistent with the zoning provisions for the Thredbo resort, as the demolition of the existing building allows for future increased accommodation improving the currently underutilised land and would support winter and summer accommodation needs.
6.5 Soils	6.5.1 Management Objective *Soil features and processes are protected, and where necessary, managed within the bounds of acceptable limits of disturbance.* The proposed works would be consistent with this objective, minimal soil disturbance is proposed. Included in the supporting documents is an Erosion and Sediment Control Plan to avoid and minimise on and offsite soil impacts (refer to the ESCP at Appendix E).

6.6 Rivers and Lakes	6.6.1 Management Objective *The environmental condition of all watercourses and waterbodies is maintained or improved.* Included in the supporting documents is an ESCP to avoid and minimise impacts to surface water and potential inflow to the Thredbo River.
6.7 Native Plants	6.7.1 Management Objective *Native plant species and communities are maintained and/or rehabilitated and include a representative range of successional stages and age classes.* A Biodiversity Assessment has been completed for the works. Works would be carried out in disturbed areas to avoid vegetation removal as much as possible. Any required rehabilitation within the works area would be carried in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park.*
6.8 Native Animals	6.8.1 Management Objective *Viable populations of all native animal species that currently occur in the park are maintained or restored.* A Biodiversity Assessment has been completed for the works. A test of significance has been prepared and included in Appendix C. The works processes have been designed to avoid and minimise impacts to native fauna that may be present on site. A pre-clearance survey would be carried out as well as a fauna spotter catcher located on-site during the works.
7 People and the Landscape	7.1.1 Management Objective *The cultural heritage values of the park are protected and managed in a strategic, comprehensive and integrated way.* The cultural heritage values of the park have been addressed, this SEE is supported by a due diligence assessment, refer to Appendix D.
8.19 Visitor Accommodation	8.19.1 Management Objective *The provision of visitor accommodation outside of the Visitor Services Zone is limited.* The proposed demolition allows for re-use of the area for accommodation purposes, consistent with the POM allowances for the Alpine resorts. The future development would support ongoing use of the park. There is no proposed change to accommodation limits as part of this application.
10 Areas of Exceptional Recreational Significance	Thredbo alpine resort is identified in the POM as an area of exceptional recreational significance. Detailed provisions concerning the management of Thredbo is provided in Chapter 10. 10.2 Alpine Resorts Management Units 10.2.1 Management Objective

	The alpine resorts provide for a range of principally snow-based recreational opportunities that promote enjoyment, understanding and appreciation of the natural and cultural values of the park. 10.2.2 Management Objective *All activities, facilities and services provided in the alpine resort management units meet environmental health and safety obligations.* 10.4 Thredbo Management Unit 10.4.1 Management Objective *The Thredbo Management Unit is managed so as to provide opportunities for visitors to enjoy, understand and appreciate the values of the park in ways that minimise adverse impacts.* The proposed works are consistent with the relevant management unit provisions as the demolition of the existing lodge would be carried out to enable infill development with greater accommodation opportunities for visitors.

4.2.5. State Environmental Planning Policies

Other relevant SEPPs relevant to the proposal have been considered and are addressed in Table 4-4.

Table 4-4 Consideration of relevant SEPPs

Relevant SEPP	Provisions and response
State Environmental Planning Policy (Transport and Infrastructure) 2021	***2.48 Determination of development applications—other development*** *(1) This section applies to a development application (or an application for modification of a consent) for development comprising or involving any of the following—* *(a) the penetration of ground within 2m of an underground electricity power line or an electricity distribution pole or within 10m of any part of an electricity tower,* *(b) development carried out—* *(i) within or immediately adjacent to an easement for electricity purposes (whether or not the electricity infrastructure exists), or* *(ii) immediately adjacent to an electricity substation, or* *(iii) within 5m of an exposed overhead electricity power line,* *(2) Before determining a development application (or an application for modification of a consent) for development to which this section applies, the consent authority must—* *(a) give written notice to the electricity supply authority for the area in which the development is to be carried out, inviting comments about potential safety risks, and* *(b) take into consideration any response to the notice that is received within 21 days after the notice is given.*

	There are underground powerlines present (HV and LV) on the site. Removal of concrete driveway and/or retaining walls are likely to be near (potentially within 2m of HV lines, works in the side and rear of the lot may be near/directly impact LV lines). Referral to the electricity supply authority is likely needed to be undertaken by the determining authority. Kosciuszko Thredbo will liaise directly with Essential Energy to manage and potential impacts to HV infrastructure **2.119 Development with frontage to classified road** The site does not directly front a classified public road.

4.3. Local planning controls

4.3.1. Snowy River Local Environmental Plan 2013

The State Environmental Planning Policy (Precincts—Regional) 2021 confirms that the Snowy River Local Environmental Plan 2013 (LEP) no longer applies to the subject land.

4.3.2. Development Control Plans

The Snowy Mountains Special Activation Precinct Master Plan (DPE, 2022) identifies that an Alpine Development Control Plan would be developed. As this document is not yet complete, there is no DCP relevant to the works. It is noted that the State Environmental Planning Policy (Precincts—Regional) 2021 prevails over any Development Control Plan, refer to Table 4-4 for relevant SEPP provisions.

5. Environmental assessment summary

The recommended mitigation measures that can be incorporated in the Site Environmental Management Plan are summarised in Table 5-1.

Table 5-1 Summary of potential environmental effects and mitigation measures proposed

Primary Matters	Comment	Safeguards and Mitigation Measures
Context and setting	The inclusion of a site compound and parking area for workers at Friday Flat would minimise impacts to subject land and near accommodation sites.	The works would be carried out in accordance with the Demolition Work Plan to minimise impacts to the Thredbo Village and Bobuck Lane.
Visual effect	The proposed works would remove the buildings and structures on site. The site would be stabilised and left in a suitable state that would minimise adverse visual effects. Dust would be managed as per the requirements set out in the Demolition Work Plan.	Dust mitigation measures would be implemented during the works as per the Demolition Work Plan. Relevant management measures can be included in the SEMP for the site if needed.
Access and Traffic	Access would be required from Bobuck Lane, a one-way road.	A Traffic Management Plan would be prepared prior to construction to manage vehicle and pedestrian movement.
Heritage (Aboriginal Cultural heritage and historic built heritage)	The proposed activity is unlikely to harm Aboriginal objects and further archaeological assessment is not required. There is no historic heritage mapped within the works area.	The recommendations of the Aboriginal heritage due diligence assessment would be included in SEMP.
Biodiversity	There is a potential impact on threatened species, however none of them would be significantly impacted if mitigation measures are implemented. The biodiversity assessment concluded that the BOS is not triggered.	The recommended mitigation measures identified in the biodiversity assessment would be included in the SEMP.

Noise and Vibration	Noise impacts would be expected due to the proposed demolition approach. Measures are proposed to avoid offsite vibration impacts.	Noise from the works would be limited by the proposed construction hours. • Monday to Friday: 7am-6pm. • Saturday: 8am-1pm. Sundays or public holidays: No work The Demolition Work Plan includes measures for limiting noise and vibration to be implemented during the demolition process.
Social and Economic impacts	The works are consistent with the POM and provision of appropriate accommodation sites.	Measures included in the SEMP would address the potential amenity impacts associated with the demolition works.
Infrastructure	Services would be safely disconnected. Referral to Essential Energy would be undertaken by DPE as needed.	Works would be completed by appropriately licenced contractors. Any utility comments or conditions would be included in the SEMP as needed.
Construction	General construction impacts are expected and would be minimised and managed.	A SEMP would be prepared and implemented for the works generally addressing the construction and including specific measures as needed.
Soil and Water	Earthworks are also proposed that could result in erosion and sedimentation.	Soil and water management measures are included in the Demolition Work Plan, Geotechnical Investigation & Slope Stability Risk Assessment and ESCP.
Air quality	The demolition process can cause dust impacts that could impact air quality where not managed.	Measures for dust suppression and management are included in the Demolition Work Plan and ESCP.
Natural hazards	The subject land is bushfire prone.	The SEMP would include required bushfire protection measures addressing evacuation, water access for firefighting purposes and traffic management to provide for emergency services access.

Waste	Waste would be generated by the demolition. Materials would be recycled where possible or sent to appropriately licensed facilities.	Transfer of waste would comply with relevant waste facilities recycling or disposal standards.
Hazardous goods and materials	Asbestos and other hazardous materials may be present.	The Demolition Work Plan sets out the process for identification and removal of asbestos and any other potentially hazardous waste. A hazardous material assessment would be completed prior to the commencement of work.
Landscaping	Vegetation within the subject land would be retained where possible, however some disturbance is expected.	All required rehabilitation would be in accordance with the Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park (NGH 2007).

6. Conclusion

The proposed demolition of the Sonnblick Lodge meets the relevant requirements of Section 4.15 of the *Environmental Planning and Assessment Act 1979* and provisions of the State Environmental Planning Policy (Precincts—Regional) 2021. The proposed development and approach to construction works has taken into consideration relevant environmental and amenity factors relevant to the Thredbo alpine resort and National Park setting.

The development is considered consistent with the Kosciusko National Park Plan of Management and is expected to have minimal environmental and amenity impacts. The development specifically would:

- Manage the slope stability risk.
- Manage noise, dust, traffic, and waste to minimise impacts on adjoining accommodation sites.
- Not have any significant impacts on threatened entities.
- Be suitable for the bushfire risk of the area.
- Not have any expected impact to Aboriginal heritage.

The proposed demolition would result in a positive impact for the community and local economy by enabling future redevelopment (subject to separate future approvals) that contributes to the vision outlined in the Snowy Mountains Special Activation Precinct Master Plan.

This SEE and all supporting documents have shown that there are reasonable grounds for the Minister to grant consent for the proposed development. The safeguards and mitigation measures committed to by the applicant in this SEE would provide for development that is in the public interest.

Appendix A Demolition Work Plan

Geotechnical Engineers ACT

ACT Geotechnical Engineers Pty Ltd
ACN 063 673 530

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E: Jeremy.murray@actgeoeng.com.au

27 July 2023
Our ref: OB/C14191 v2

Kosciuszko Thredbo Pty Ltd
Via email: Andrew_Harrigan@evt.com

Attention: Mr Andrew Harrigan

Dear Sir

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

DEMOLITION WORK PLAN

We are pleased to forward our demolition Work Plan (DWP) for a proposed demolition and redevelopment of the Sonnblick Lodge in Thredbo, NSW.

The report outlines the methods of demolition to be adopted for proposed works and meet client/contractual/legal and other requirements.

Should you require any further information regarding this report, please do not hesitate to contact our office.

Yours faithfully,
ACT Geotechnical Engineers Pty Ltd

Olga Baruleva
Engineering Geologist
BSc (Geology) MPhil *MIEAust*

Reviewed by:

Jeremy Murray
Senior Geotechnical Engineer | Director
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KOSCIUSZKO THREDBO PTY LTD

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

DEMOLITION WORK PLAN

APRIL 2023

KOSCIUSZKO THREDBO PTY LTD

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

DEMOLITION WORK PLAN

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KOSCIUSZKO THREDBO PTY LTD

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

DEMOLITION WORK PLAN

1 INTRODUCTION

1.1 Project Description

At the request of the client, ACT Geotechnical Engineers Pty Ltd developed a demolition working plan for the existing Sonnblick Lodge, in Thredbo, NSW. The 340m2 site located on Lot 802 DP1119757, at 10 Bobuck Lane, in Thredbo, NSW.

It is understood the project involves the demolition of the existing lodge, in preparation for selling the vacant land for future redevelopment. The site could potentially be vacant for 12 to 24 months following demolition.

The type of work involved in this project is classified as unrestricted demolition work by SafeWork NSW. As such the company undertaking this demolition is required to carry an Unrestricted Demolition Licence and the Supervisor in charge of the works must carry an Unrestricted Demolitions Certificate.

1.2 Scope of Investigation

This DWP has been developed in accordance with AS 2601:2001 Demolition of Structures. The DWP is to be read in conjunction with the other plans and documents which accompany this application. The DWP will be developed with the SMP and EMP. These developed plans are considered to be the overarching documents to manage and control foreseeable work health and safety risks, environmental risks and meet legislative requirements for the project.

Other supporting documents that may be used during the project include:
- Quality Management Plan (QMP)
- Traffic Control Plan (TCP)
- Traffic Management Plan (TMP)
- Slope Instability Risk Assessment

The following key SWMS will be developed prior to staged works;

- Hand Strip Out and Enabling Works
- Operation of Excavator
- Operation of Skid-Steer Loader
- Operation of EWP
- Oxy Cutting Reo Bar on Live Edge
- Placing beams into building with crane
- Mechanical Strip Out
- Demolish Members Using Oxy LPG Equip
- Control of the Load Out Area

2 SITE INVESTIGATION

An investigation of the structures to be demolished and surrounding environment has been undertaken in accordance with the Code of Practice: Demolition Work (SafeWork, NSW) and AS2601: The demolition of structures. The observation from this investigation is broken up into three (3) sections 'Investigation of Structures', 'Investigation of Site', and 'Investigation of Services' and is recorded below.

2.1 Investigation of Structures

The main structure is the existing lodge (Sonnblick apartments building) is three-storey structure with a basement that will be fully demolished. The structure includes five flats with bathrooms and kitchens, external steel stairs, and masonry retaining walls. The structure is located below Bobuck Lane, ~4m north from the road carriage way, and 5-6m away from two neighbouring buildings, located to the east, west and south. Figure 1 shows the site locality, while Figure 2 is a recent aerial photograph showing the present site layout. Appendix A includes floor plans.

2.2 Investigation of Site

2.2.1 Description of Site

The site dips north at the angle of ~35° to 40° from ~RL1398 to ~RL1390 across the block. It does appear that some excavation spoil may have potentially been placed, assuming from cut-to-fill (~0.5m/1.0m) platform construction.

No heritage listed structures have been identified on site.

All neighbouring buildings are to remain operational throughout the demolition process. MDG works must not in any way hinder the operation of these surrounding buildings.

2.2.2 Underground Structures

The concrete pad and strip footings of the main structure`s and retaining walls` founded on colluvial soils at ~0.5/2m depth.

2.2.3 Adjoining Structures

The external basement walls to the building are retaining walls. There are also four retaining walls external to the building that support driveway and Bobuck Lane carriageway. The walls are from 0.5 to 2.5m heigh and comprise boulders and mortar.

2.2.4 Hazardous Chemicals / Dangerous Goods Storage or Dumps

No major hazardous chemicals or dangerous goods (e.g. munitions, chemical storage systems, underground storage tanks, compressed gas cylinders, fire retardant cylinders, medical gases, dumps of noxious or toxic or hazardous substances, etc.) have been identified on site or have been communicated by the Client.

Work involving removal of hazardous chemicals / dangerous goods is not in MDGs scope of works and is the responsibility of the Principal Contractor to remove unexpected findings of hazardous chemicals / dangerous goods on site. In the event of encountering any unexpected findings of

hazardous chemicals / dangerous goods, the following is to apply before work commences in the immediate area:

1. Work in the immediate area will stop
2. The Site Supervisor will be notified of the find
3. The Site Supervisor will notify the Project Manager
4. The Project Manager will notify the Principal Contractor
5. The Principal Contractor will organise the safe removal of the substance (which may necessitate the engagement of specialist contractors), work will not recommence in the area until the Principal Contractor has given approval.

2.2.5 Hazardous Chemicals / Dangerous Goods Storage or Dumps

The buildings, paths, roadways, and other items surrounding the site shows signs of deterioration and unsoundness of the main structure, such as external cracking. Retaining wall had cracking through the mortar. Site erosion removed the material below the basement rock façade.

A full Dilapidation Survey is to be undertaken by the Principal Contractor prior to demolition starting. MDG do not anticipate any physical impacts on the surrounding structures. Care will be taken to minimise impacts on adjoining sites and structures. Various methods will be employed to minimise the disruption to the surrounding buildings or adjoin sites and structures.

2.3 Investigation of Services

2.3.1 Services to be disconnected

All services shall be disconnected / made safe prior to commencement of demolition work. A sign-off on services will be received by the contractor prior to the commencement of any demolition works.

For early works prior to full disconnection of power, areas will be isolated and a sign off on the power in those areas received. For some minor demolition in localised areas where it is clearly evident that there is no power services going to be disturbed (e.g. removal or demolition of ceiling grids, furniture and fixings that do not contain power) the demolition may occur without a signoff.

For complex structures that involve many operational 'live' Client critical services (pressurised piping systems, other water/chemical/steam/air systems, electrical, communication, gas, etc.) requiring identification, relocation and decommissioning or isolation by the Client (and where MDG is the Principal Contractor). The following form may be used to assist MDG in obtaining required signoffs Request to Client for Service Id, Decommission & Approval to Remove form.

Where fire sprinkler systems are unable to be isolated due to Client operational needs, care shall be taken during works to prevent disruption to this service. Refer Service Disconnection Signoffs

2.3.2 Services to be maintained

Water and temporary power will be used during the course of demolition works. Some emergency access lighting will be installed and temporary power boards will be used to provide task lighting in the darker areas of the structures. Water will be used for dust suppression.

2.4 Hazard Investigation

The following key hazards associated with demolition work have been identified:

- Unplanned structural collapse

- Falls from one level to another
- Falling objects
- The location above and underground essential services, including the supply of gas, water,
- sewerage, telecommunications, electricity, chemicals, fuel and refrigerant in pipes or lines
- Exposure to hazardous chemicals – these may be present in demolished material or in the
- ground where demolition work is to be carried out (contaminated sites)
- Hazardous noise from plant
- The proximity of the building or structure being demolished to other buildings or structures

Each of the above risks has been investigated and control measures will be outlined in the Safe Work Method Statement (SWMS) developed for demolition and associated works.

2.5 Suspended Slabs and No-Go Areas for Machine's

The following areas are no-go areas for machinery unless an engineer's approval is sought first:

1. All suspended slabs
2. The high side of any retaining walls from the edge of the wall, back a distance equal to the height of the wall
3. On top of any underground structures including fuel tanks and the like. Note: where the walls of underground structures are retaining walls, they should be treated in accordance with the above point

All levels of the structures to be demolished with the exception of the basement slabs are suspended. No machines are to be placed on these slabs without first getting engineers approval. Certification will be sought as to the heaviest Skidsteer, EWP, truck and excavator types that can be places on area of the building prior to bringing any machines on site. Prior to heavier machines being brought onto site, temporary propping will be designed by a structural engineer, installed and finally certified by the design engineer for the areas the machine will be working in. A third party engineer will also check all temporary works including back propping and bracing.

Prior to installation of back propping a SWMS will be developed for the installation of the props. See Metropolitan Demolitions SWMS – Installation of Back Propping.

3 DEMOLITION EXCLUSION ZONE

The demolition Exclusion Zone will encompass the entire site with the exception of the site amenity areas (and access ways to and from), which will be deemed construction zones.

All personnel on the Principals contractor site have to be inducted into their system. In addition, all personnel not inducted by MDG will be required to visit the site office and not enter the demolition site until they have been inducted and signed on the Site Sign-In Register or brought on site with the permission of the MDG Site Supervisor under the supervision of an inducted person and have signed in the Site Visitors Register.

As well as the whole demolition site being a demolition zone, various area inside site will be demarcated with chain wire fencing and signs 'Warning Drop Zone, Do Not Enter', Jersey curbs, steel plates and other engineering barricades will also be used in the Drop Zones. The locations of these Drop Zones are also marked up on an Exclusion Zone Plan. The location of smaller temporary localised Drop Zones will be tool box talked daily and detailed in the demolition site sign on location.

All Exclusion Zones and Drop Zones will be properly demarcated. No unauthorised persons shall be permitted into the demolition work area. All personnel and visitors will follow Site Personnel and Visitor Registration Procedure.

5 DETAILS OF DEMOLITION

5.1 Sequence

Demolition

Work will follow the sequence below. Amended to this sequence may occur to suit. For more detail see separate Demolition Program.

1. Receive Handover of Site and sign off services
2. Site induction
3. Demarcate site and define Exclusion Zones
4. Install Environmental Controls
5. Practical Removal of Hazardous Materials
6. Create Drop Zones
7. Soft strip structure
8. Erect scaffold and protection
9. Mechanical Demolition
10. Install Man and Material Hoist
11. Mechanical Demolition
12. Remove rubble and rubbish from site
13. Handover
14. Demobilisation

More details on the sequence and flow of the work including durations will be provided in a separate Demolition Program and updated monthly programs.

Note: Where temporary works are necessary (propping, scaffolding needles and the like) the following sequence MUST be adhered to prior to the use of the temporary works item:

1. Design
2. Specialist Engineer Sign Off on Design
3. Tall Sign off on Design
4. Installation
5. Inspection and Certification (engaged specialist Engineer)
6. Use

Temporary Works

Note: Where temporary works are necessary (propping, scaffolding needles and the like) the following sequence MUST be adhered to prior to the use of the temporary works item:

1. Design
2. Specialist Engineer Sign Off on Design
3. Second engineer to check design
4. Installation
5. Inspection and Certification (engaged specialist Engineer)
6. Use of temporary works structure/item

5.2 Detailed Work Methodology

5.2.1 Receive Handover of Site and Sign-off on Services

Demolition will begin only when the site has been officially handed over and a sign off on services

- has been received by the appropriate service providers for appropriate areas.

5.2.2 Site Induction

A site induction is to be held before any work commences on site. The site induction includes the following:

- Induction into this DWP, other plans and SWMS
- Induction into the Principal Contractors Work Health and Safety Management Plan/system
- Induction into the Clients Work Health and Safety Management Plan/system (where
- required)

5.2.3 Demarcate Site and Define Exclusion Zones

The entire site will be fenced with 1.8m chain wire fencing. Other areas of site may be demarcated as hazard removal areas, exclusion or Drop Zones. The access gate will be closed during demolition works and manned during load out.

Site notices to be displayed in a prominent position are:

- Unauthorised entry prohibited
- Warning Demolition in Progress
- Mandatory PPE information signage
- MDG Site Supervisor in charge of works
- 24 hour site emergency contact number

5.2.4 Install Environmental Controls

A responsible demolition contractor should endeavour to ensure the unimpeded operation of the surrounding sites throughout our works. Importance will be placed on sensitive receivers and close proximity to adjacent buildings. The contractor should endeavour to do everything reasonably practicable to make what is by nature a noisy and disruptive process as quiet and dust free as possible.
A summary of the key environmental methods that will be used on site include:

Sediment Control

- Leaving all hardstands in place until the very end of the project. All truck movements will be on hardstand
- Installing sediment settling and filtration system in the sumps of building to collect and filter sediment prior to it being released into the storm water system. Prior to releasing any water into the storm water a testing system will be put in place
- A mechanical vacuum type street sweeper is to be employed wherever sediment or dust becomes an issue on the external roadways and on the internal hardstand on site. It is expected that initially there will be not much need for the sweeper however towards the peak load out period of the project the sweeper may need to return to site daily. The need for the sweeper will be assessed on a daily basis with input from interested parties and stakeholders.
- All drains will be covered in a Geotech material, with Geotech lined hay bales placed up stream of the flow to these drains. All fencing to the perimeter of site will be lined with shade cloth

Noise Management

Demolition is a noisy process; however many measures can be taken to minimise this noise.
The following noise reduction measures when implemented will minimise
noise disruption to the surrounding buildings:

- Demolition will be undertaken by as large as possible machines as they are far less obtrusive than the rapid crescendo of smaller machines.

- External walls of each floor will be left in place until the very last stage of each floors demolition. The walls act as a sound barrier shielding the neighbourhood buildings from much of the noise generated by machines on that floor.
- At least two decks of scaffolding will be lined with Metro Mesh to the full height of the perimeter of building providing a noise dampening measure.
- Drop Zones will be located to ensure minimum noise from their operation
- Material that generates a lot of noise when removed via Drop Zone (large steel members, etc.) will be craned off the structure)
- The base of drop zones will be covered with 500mm of rubble prior to their use
- A 3m high 'A Class' hoarding that will be erected to the perimeter of the demolition site will greatly reduce ground level noise from escaping the confines of site.

Dust Control

Demolition of brick and concrete can generate excessive amounts of dust however through the following dust suppression measures MDG anticipate the dust leaving the confines of the building being demolished will be kept below a level that adversely affects the surrounding billings and site:
Installing a minimum of 2 water points (with 3 outlets on each point) or as needed on every level of the building with booster pumps used to achieve sufficient water pressure at the top levels of the building (as required).

- Each machine used in the demolition process will be accompanied by a labourer with a water hose to ensure water is available on each separate demolition face and provide adequate dust suppression. Water runoff will be minimised.
- All scaffolding will be lined with Metro Mesh which reduces the wind over the active demolition faces and the possibility of dust permeating through the scaffolding screen
- Material will be saturated prior to being removed via the Drop Zone
- During load out of material, material will be wet down to minimise dust being generated
- The 3m high 'A Class' hoarding will be erected reducing ground level dust from escaping the confines of the site

Vibration Management

Vibration on this site will emanate from the excavator mounted hydraulic hammers used in the process of breaking down the concrete and brick structure into rubble and also from items reaching the base of the Drop Zone. The following measures will ensure that disruptive vibration will not travel beyond or site:

- Physical links from structure being demolished to adjoining buildings and structures will be demolished (e.g. overhead walkway etc.)
- Physical separation will be done by saw cutting a slice of the slab
- Breakup of slabs, beams and columns into smaller pieces of rubble to reduce vibrations being felt from Drop Zone operation
- Structural steel and large heavy objects will be craned off site
- Covering of the base of Drop Zone with 500mm of rubble prior to use.

Truck Movements

- Providing traffic controllers to control pedestrian and vehicular traffic
- Ensure trucks are covered prior to leaving site
- Providing drivers information on access, routes and site conditions and sensitive
- receivers
- Space allocated for trucks within hoardings

5.2.5 Soft Strip Structures

The structures will be stripped-out by hand and appropriate hand tolls where required, prior to mechanical stripping in appropriate areas. No heavy machines will be placed in the areas highlighted in the Demolition Exclusion Zones.

Bounded material such as non-loading bearing walls, partitions, and doors that may not be removed by machines will be removed by a combination of hand, picks, crow bars, and other associated tools, and stockpiled in the building or a secure area of site for load out by machines.

5.2.6 Asbestos & Hazardous Removal Methodology

A hazardous material assessment must be carried out to identify any asbestos or other hazardous materials within the building. An Asbestos Removal Control Plan must then be developed to outline the removal methodologies and management practices to allow for the safe removal. A SWMS must also be developed for the removal of asbestos material.

5.2.7 Slope Stability Risk Assessment

A slope stability risk assessment has been conducted by ACT Geotechnical Engineers 9Report C14191 of 26 April 2023). The risk mitigation measures advised in that report must be followed so that the risk of slope instability is not increased by demolition activities, as well as ensuring the site remains stable both during and after demolition works.

5.2.8 Excavation Works

Only minor excavation works are anticipated – primarily for removal of the footings of the existing building. All excavations will be immediately backfilled using on-site soils.

5.2.9 Quantity of Waste Removal & Disposal Site

All waste from the demolition activities will be taken to the Jindabyne Landfill. Based on a floor area of 200m^2 of the existing building, it is estimated that the total quantity of waste will be about 300 tonnes.

5.2.10 Mechanical Demolition

Mechanical demolition will be by hydraulic excavator. 5, 12 and 20 tonne hydraulic excavators with shear, pulveriser, hammer and bucket attachments. These machines will be on suspended slabs and transported from one level to the next via ramps. An engineer's approval will be sought regarding the size of machine that can be put on any particular slab.

Hydraulic excavators with shear attachments will cut down steel elements of structure in sections. Hydraulic excavators with hammer / pulveriser attachments will break up brick walls and concrete slabs of the structures in sections and removed via the Drop Zone. Only material of a suitable size will be placed into the Drop Zone to avoid blockages.

A watcher will work with plant and equipment operators at all times.

Water will be maintained at the face of demolition for dust suppression where required.

During demolition the floor area under the excavators and the bay area's being demolished will be closed off with warnings signs, ATF fence panels and existing wall's. No plant or personnel will be allowed in these areas.

Shear wall that is on the perimeter of the building will be demolished in the following sequence:

1. Excavator will punch a vertical line in the wall, leaving steel reinforcement intact
2. The excavator will then make a horizontal line at the base of the wall keeping the steel reinforcement intact. Leaving 300mm concrete between the vertical cut and the start of the horizontal cut
3. A worker will then cut the back steel reinforcement in the horizontal line and all the steel reinforcement in the vertical line
4. The machine will then fold the wall inside the building

The pulling in of perimeter beams will be done in the following sequence:

1. An excavator will hammer both ends of the beam leaving steel reinforcing intact
2. Chains will be attached to the beam at one end
3. All steel reinforcement will be oxy cut at the chained end and the only top reinforcement will be cut on the other end
4. The chained end will be towed in and placed on the slab
5. The remaining bottom steel will be oxy cut
6. The remaining end will fall onto some rubble or steel to cushion the impact on the slab
7. The beam can then be safely dragged in by the excavator

Mechanical demolition of lower structure from ground level will be by hydraulic excavator. 20, 30 and 40 tonne hydraulic excavators with shear, pulveriser hammer and bucket attachments. All buildings and structure can be reached from the ground.

5.2.11 Remove Rubbish and Rubble from Site

Demolished material will be separated and stock piled ready for load out. A combination of hydraulic excavator with grapple attachments or bucket and/or Skidsteer with grapple attachments will load out demolished material into appropriate bins for transportation to an EPA approved tipping or recycling facility.

Care shall be taken to watch for pedestrians when entering and leaving site.

Approved Traffic Control Plan will be adhered to at all times. All trucks will follow the truck route and guidelines on entering and exiting the site. A MDG RTA tickets traffic controller will assist trucks for site access and egress when required.

5.2.12 Handover Site to Client Representative

Demolished material will be separated and stock piled ready for load out. A combination of hydraulic excavator with grapple attachments or bucket and/or Skidsteer with grapple attachments will load out demolished material into appropriate bins for transportation to an EPA approved tipping or recycling facility.

5.2.13 Demobilise from Site

The site demobilisation will take place following the site handover to Clients representative. Truck floats will take plat off site, the mobile amenities (where used) will be towed off site and the site fencing dismantled and carted off site.

6 PERMITS BY AUTHORITIES

All relevant permits required by authorities will be sought and displayed on-site at all times. These permits include but are not limited to:

- SafeWork NSW Permit for demolition
- Council approval for temporary footpath closures (if necessary)

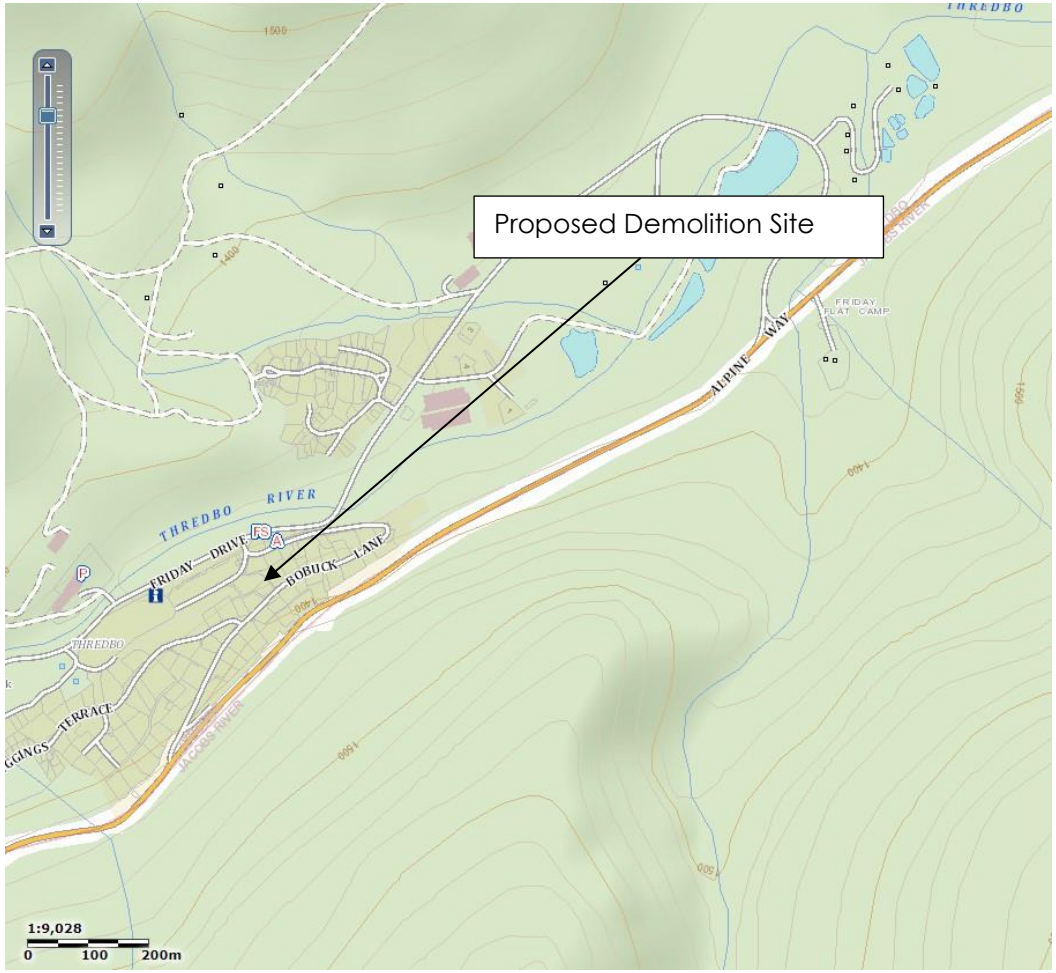
- Council approval for Hoardings and laybacks (if necessary)

6 PERSONNEL QUALIFICATIIONS

All personnel onsite shall hold a General Construction Induction Card (White Card).

The Site Supervisor shall be a SafeWork NSW recognised Demolition Class A (unrestricted) Competent Person with considerable expertise in the demolition of similar structures.
All plant will be operated by SafeWork NSW ticketed and experienced personnel.

N



KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE LOCALITY

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 1**

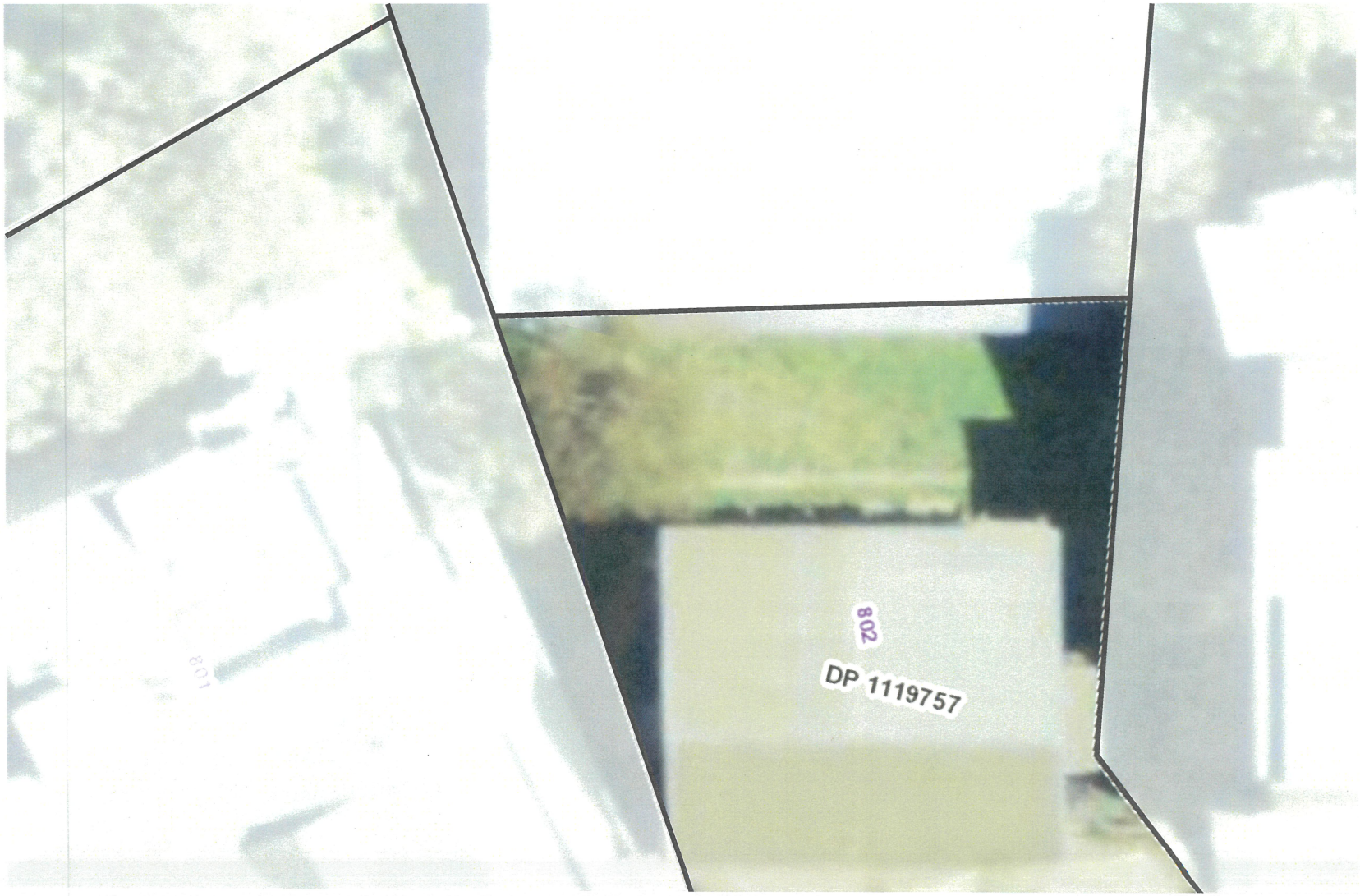
KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
RECENT AERIAL PHOTOGRAPH

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 2**

APPENDIX A
SONNBLICK LODGE FLOOR PLANS

Sonnblick Lodge

Date: November 7, 2019

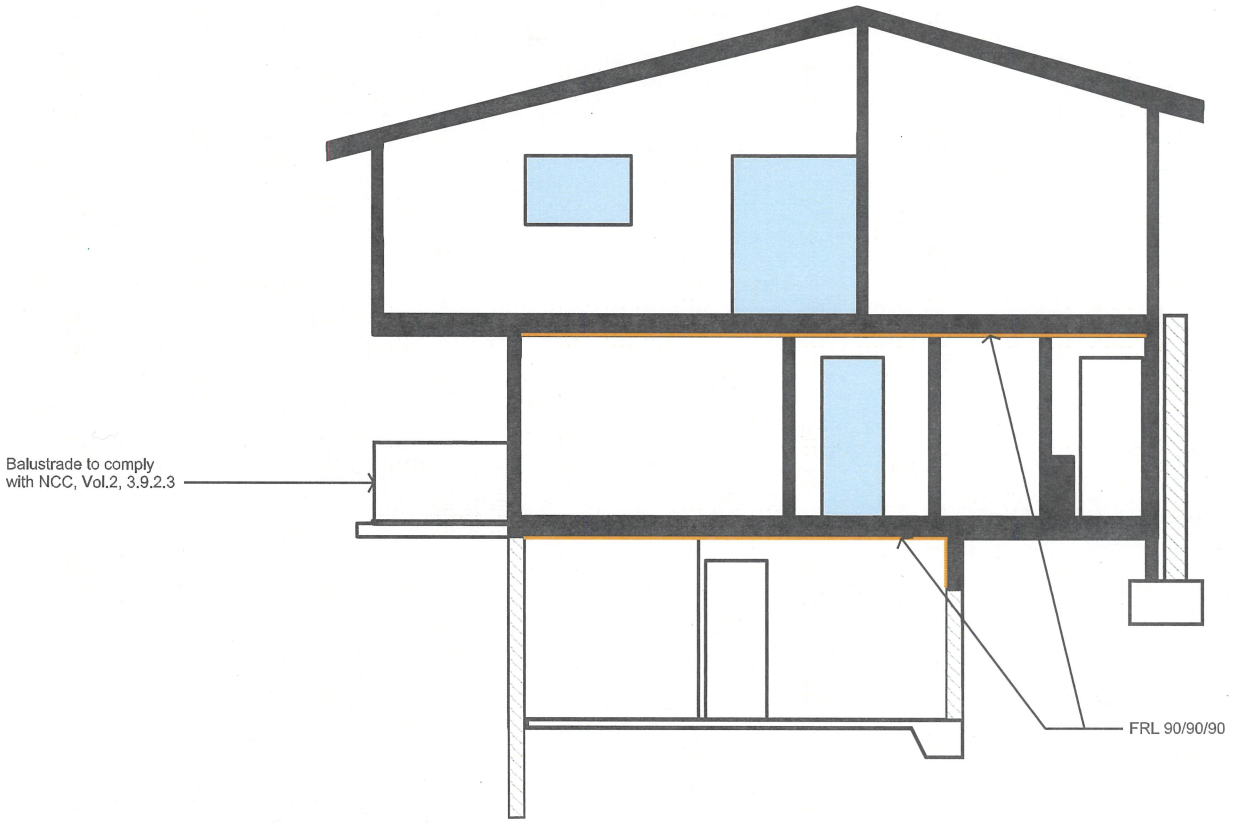


CONTENTS

TYPE LEGEND

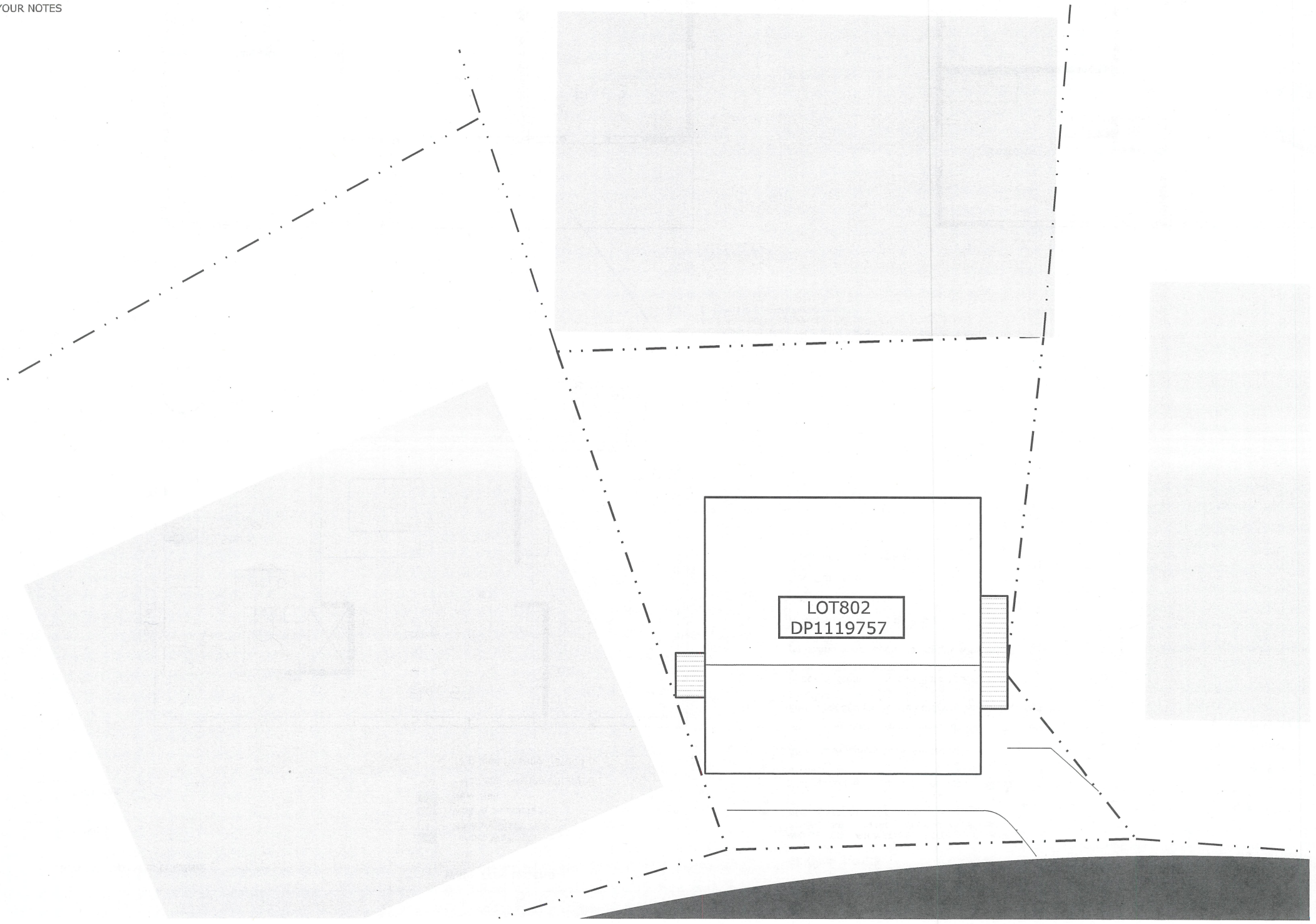
- Timber
- Masonry Block
- Concrete
- FRL: Load Bearing 90/90/90

  Non-load Bearing -/60/60



GENERAL NOTES

ADD YOUR NOTES



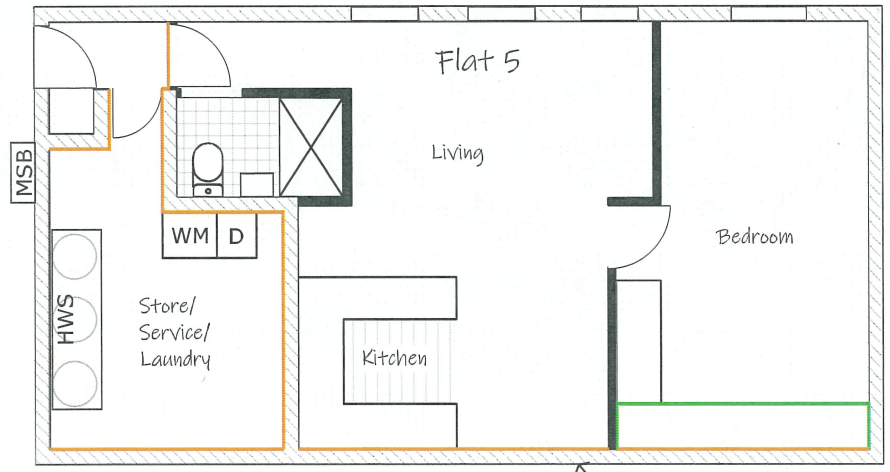
FLOOR FINISHES LEGEND

- Decking
- Wet areas

WALL TYPE LEGEND

- Timber Wall
- Masonry Block Wall
- Wall to be deleted
- New Wall
- FRL: Load Bearing 90/90/90

Non-load Bearing -/60/60



1 / A102 Level 1

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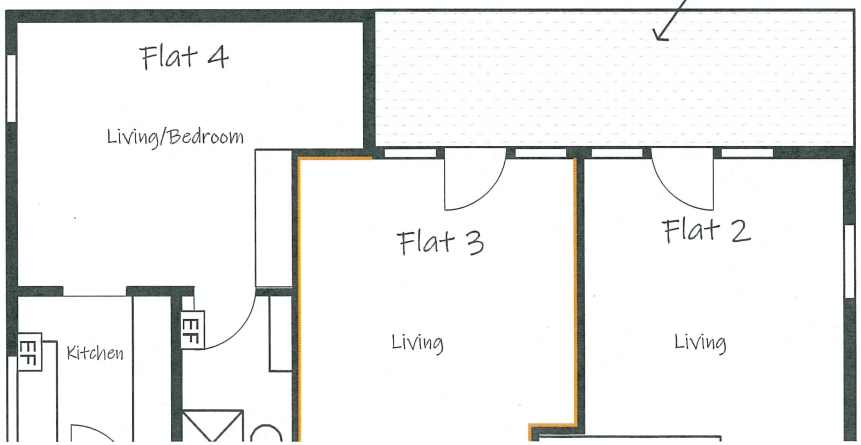
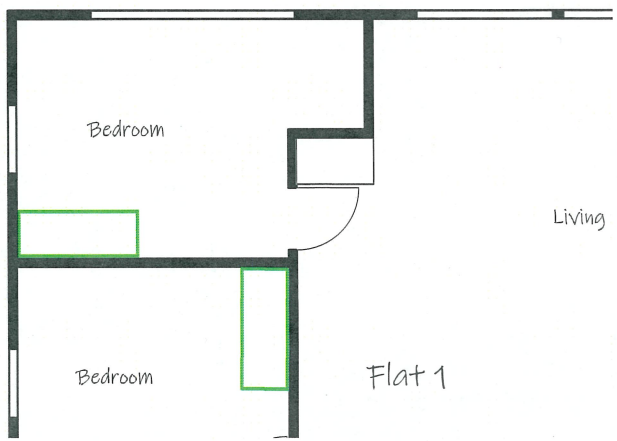
Decking to be replaced and Balustrade to comply with NCC, Vol.2, 3.9.2.3 and AS 3959—2009 "Construction Of Buildings in Bushfire Prone areas"





GENERAL NOTES

WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. CONTRACTORS SHALL VERIFY ALL DIMENSIONS ON SITE

Waterproofing needs to be replaced in all Wet areas

All Kitchen joinery to be Replaced

All existing joinery to be replaced

Fire Panel and smoke detectors to be serviced and certified

Exposed Beam ceilings in Flats 2, 3, 4, 5, to Achieve FRL 90/90/90

All ceiling penetrations to comply with FRL 90/90/90

All Internal Doors to be Replaced

New Floor Coverings

New Light Fittings

Site may contain Asbestos

ABBREVIATIONS

WM - Washing Machir

D - Dryer

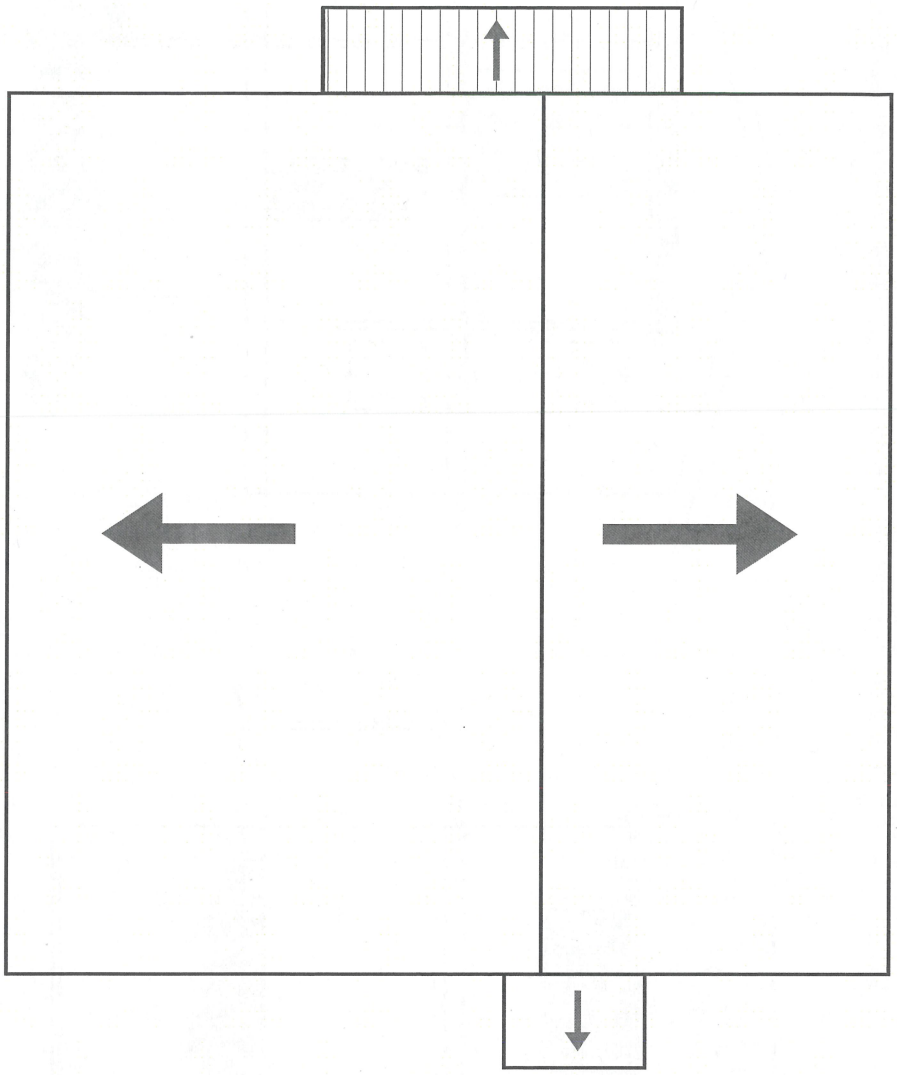
EF - Exhaust Fan

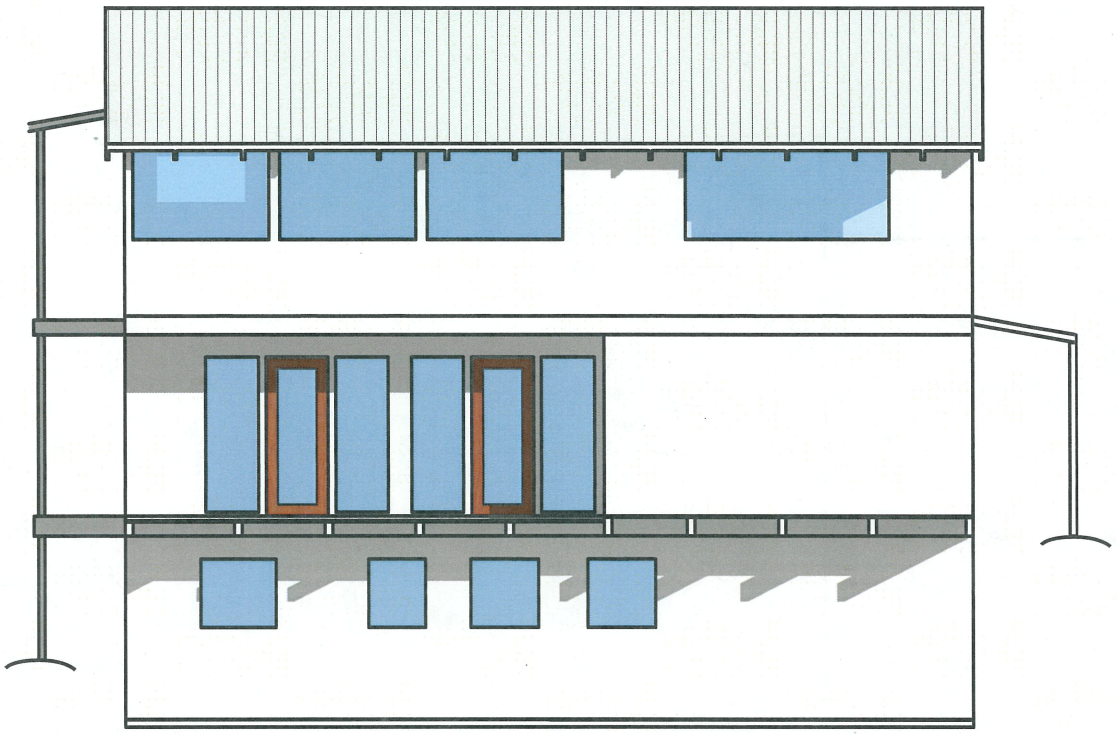
SB - Switch Board

MSB - Main Switch Bc

FHR - Fire Hose Reel

HWS - Hot Water Sys





EN / A201 North Elevation
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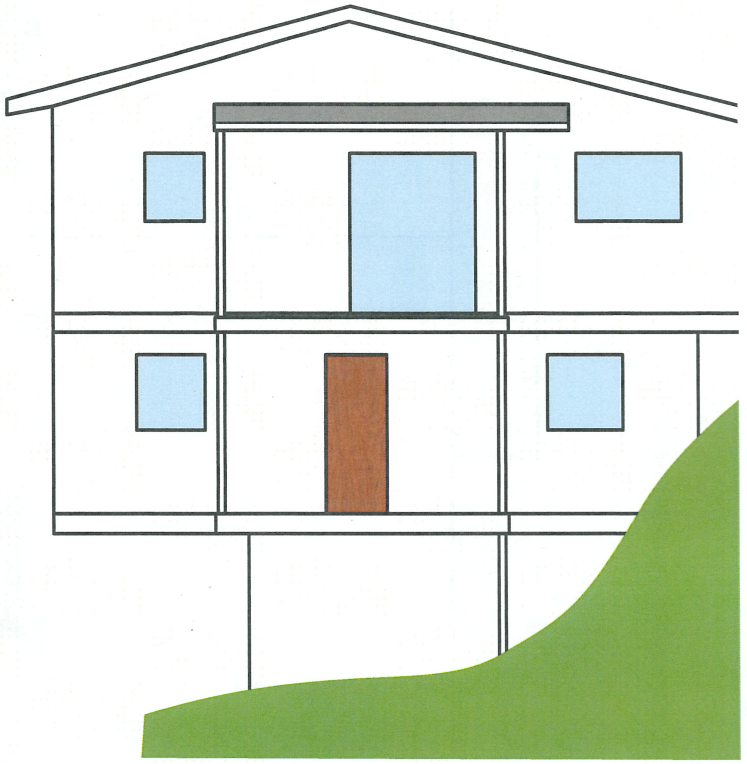

EN / A201 East Elevation
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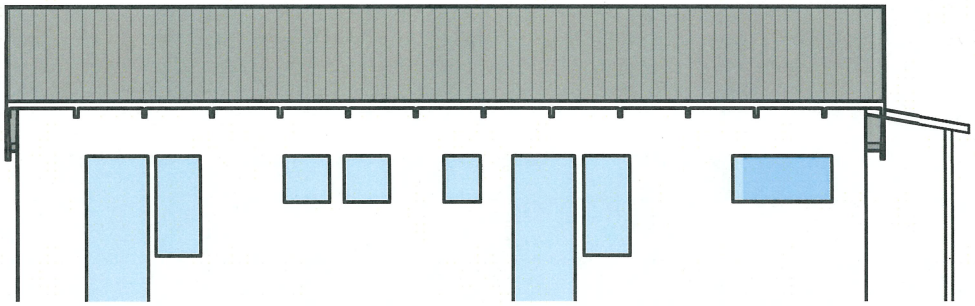

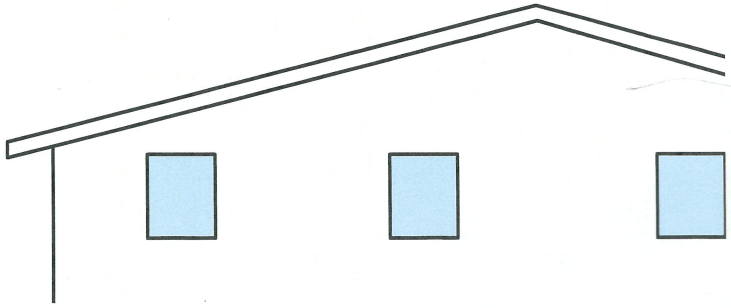

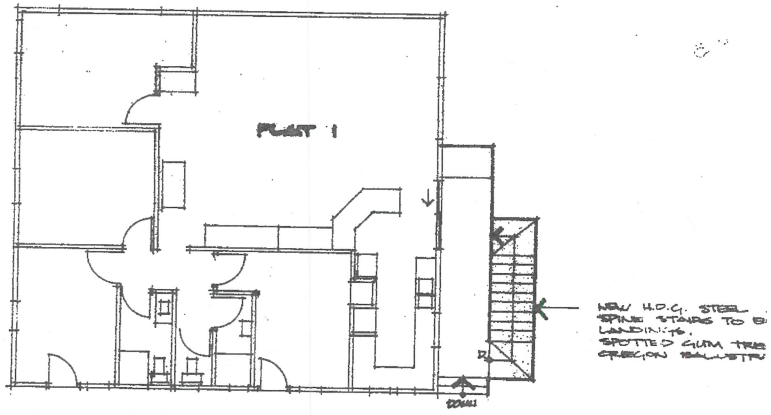

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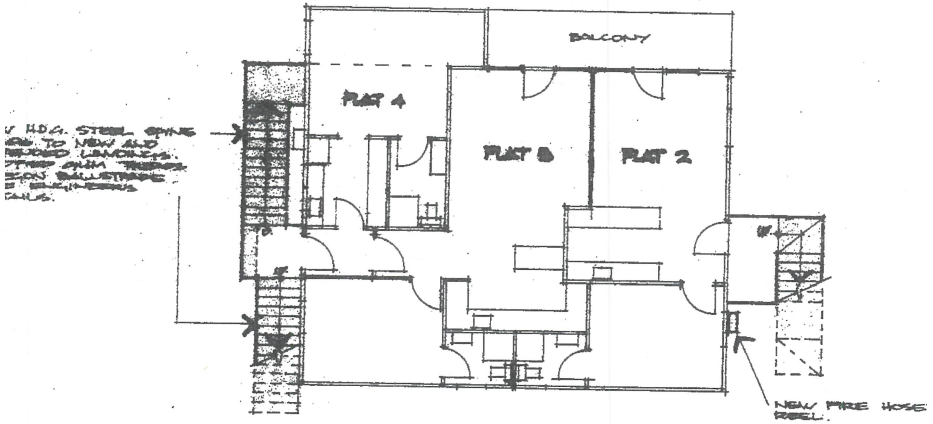
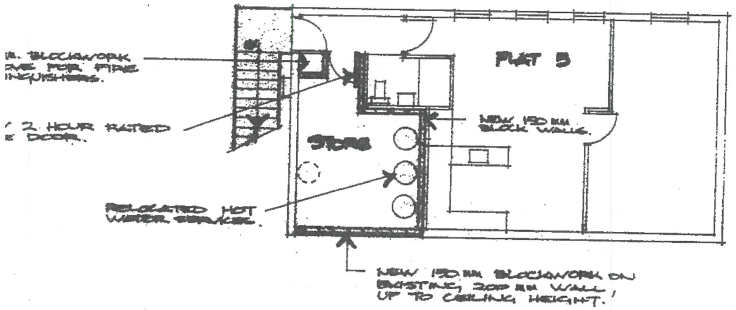


LEVEL 2 1:100



LEVEL 1 1:100

NOTES:

- PROVIDE FIRE ALARM SYSTEM IN ACCORDANCE WITH AS 1670 TO FLATS 1,2,3,4,5, PLANT ROOM AND STORE.
'AS EXECUTED' DWG. WILL BE SUBMITTED.
PROVISION HAS BEEN MADE FOR CONNECTION TO FIRE'S [illegible]

Appendix B Geotechnical Investigation and Slope Stability Risk Assessment

Geotechnical Engineers ACT

ACT Geotechnical Engineers Pty Ltd
ACN 063 673 530

5/9 Beaconsfield Street, Fyshwick, ACT, 2609
PO Box 9225, Deakin, ACT, 2600
P: (02) 6285 1547 or 0404 064 858
E: Jeremy.murray@actgeoeng.com.au

26 April 2022
Our ref: OB/C14191

Kosciuszko Thredbo Pty Ltd
Via email: Andrew_Harrigan@evt.com

Attention: Mr Andrew Harrigan

Dear Sir

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

GEOTECHNICAL INVESTIGATION & SLOPE STABILITY RISK ASSESSMENT

We are pleased to forward our geotechnical investigation and slope stability risk assessment for the proposed demolition and redevelopment of the Sonnblick Lodge in Thredbo, NSW.

The report outlines the methods and results of field investigations and results of a qualitative slope instability risk assessment.

The slope instability risk assessment is based on the landslide risk management concepts and guidelines issued by the Australian Geomechanics Journal Vol 35 March 2007 "Practice Note Guidelines for Landslide Risk Management 2007". By these criteria, it was established that the level of risk to be proposed and neighbouring dwellings and to people is "Very Low to Very High" and is no higher than normally acceptable for residential development.

Should you require any further information regarding this report, please do not hesitate to contact our office.

Yours faithfully,
ACT Geotechnical Engineers Pty Ltd

Olga Baruleva
Engineering Geologist
BSc (Geology) MPhil *MIEAust*

Reviewed by:

Jeremy Murray
Senior Geotechnical Engineer | Director
FIEAust CPEng Eng Exec NER RPEQ APEC Engineer IntPE(Aust)
Registered Professional Engineer of Queensland (RPEQ) #19719
NSW Professional Engineer Registration #PRE0001487

KOSCIUSZKO THREDBO PTY LTD

PROPOSED DEMOLITION & REDEVELOPMENT
SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW

GEOTECHNICAL INVESTIGATION & SLOPE STABILITY RISK ASSESSMENT

APRIL 2023

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1 INTRODUCTION

1.1 Project Description

At the request of the client, ACT Geotechnical Engineers Pty Ltd carried out a geotechnical investigation and a qualitative slope instability risk assessment for the proposed demolition and redevelopment of Sonnblick Lodge, in Thredbo, NSW.

It is understood the project involves the demolition of the existing lodge, in preparation for selling the vacant land for future redevelopment. The site could potentially be vacant for 12 to 24 months following demolition. The site is within "Zone G" of the Kosciusko National Parks Alpine Resorts, so under the NSW Department of Planning Geotechnical policy, a geotechnical investigation and slope instability risk assessment is required.

1.2 Scope of Investigation

The slope stability risk assessment required the development of a qualitative matrix risk assessment to people and property, in accordance with the guidelines of "Landslide Risk Management Concepts and Guidelines", Australian Geomechanics Journal, 2007. In this instance, the present residents of the lodge and workers on the site during and after demolition are considered as "people" and the existing structure, as well as the surrounding houses were considered as "property".

The slope stability assessment is qualitative, based on the guidelines on landslide risk management published by the Australian Geomechanics Society. Risk assessment involves the following components: (i) Hazard identification, (ii) Likelihood of Hazards Occurring, (iii) Consequences of Hazards, and (iv) Significance of Risks. This uses a matrix approach to determine the risk level of each hazard based on the likelihood and consequences of each hazard occurrence.

1.3 Geotechnical Policy – Kosciuszko Alpine Resorts

Section 4 of "Geotechnical Policy – Kosciuszko Alpine Resorts" by the NSW Department of Infrastructure, Planning and National Resources details the requirements that must be included in a geotechnical report for developments within the designated "G" areas of the Kosciuszko Alpine Resorts. The table below summarises the requirements and the sections within this report that covers those requirements.

Table 1 - Summary of "Geotechnical Policy – Kosciuszko Alpine Resorts" requirements.

Policy Section	Policy Requirement for Inclusion in Geotechnical Report	Section in This Report Covering the Requirement
4.1 (a)	An assessment of the risk posed by all reasonably identifiable geotechnical hazards which have the potential to either individually or cumulatively impact upon people or property upon the site or related land to the proposed development in accordance with the guidelines set out in 'Landslide Risk Management Concepts and Guidelines" published in the Australian Geomechanics Journal, Volume 35 No. 1 of March 2000.	See Section 5 "Slope Instability Risk Assessment".
4.1 (b)	Plans and sections of the site and related land form from survey and field measurements with contours and key features identified, including the locations of the proposed development, buildings/structures on both the subject site and adjoining site, stormwater drainage, sub-surface drainage, water supply and sewerage pipelines, trees, and other identifiable geotechnical hazards.	See Figure 2 "Aerial Photograph" and Figure 3 "Contour Plan".
4.1 (c)	Details of all site inspections and site investigations and any other information used in preparation of the geotechnical report. A site inspection is required in all cases. Site investigation may require sub-surface investigation; appropriate investigation may involve boreholes and/or test pit excavations or other methods to adequately assess the geotechnical/geological model for the site.	See Section 2 "Site Description & Geology" and Section 3 "Investigation Methods".
4.1 (d)	Photographs and/or drawings of the site and related land adequately illustrating all geotechnical features referred to in the geotechnical report, as well as the locations of the proposed development.	See Figures 5 - 6 "Site Photograph", Figure 2 "Arial Photograph" and Figure 3 "Contour Plan".
4.1 (e)	Presentation of the geological model of the site and related land showing the proposed development, including an analysis of sub-surface conditions, taking into account thickness of the topsoil, colluvium and residual soil layers, depth to underlying bedrock, and the location and depth of groundwater.	See Section 4.1 "Subsurface Conditions", Section 4.2 "Groundwater", and Figure 4 "Subsurface Section"
4.1 (f)	A conclusion as to whether the site is suitable for the development proposed to be carried out either conditionally or unconditionally. This must be in the form of a specific statement that the site is suitable for the development to be carried out, subject to the following conditions: (i) Conditions to be provided to establish the design parameters, including, but not limited to; footing levels and supporting rock quality, degree of earth and rock cut and fill, recommendations for excavation batters, bearing capacities for use in the design of all structural works including footings, retaining walls, and drainage, signing of Form 2 as the mechanism to check that these parameters have been used and interpreted correctly.	See Section 5.8 "Suitability of the Proposed Development". See Section 6 "Discussion & Recommendations".

	(ii) Conditions applying to the detailed design to be undertaken for the construction certificate, including, but not limited to; any structural design relating to the geotechnical aspects of the proposal is to be checked and certified by a suitably qualified and experienced geotechnical engineer, any other design conditions the geotechnical engineer preparing the geotechnical report believes are required in the design phase in order to ensure the design will achieve the "acceptable risk management" level as defined in the policy for potential loss of both property and life, signing of Form 2 as the mechanism to check that these parameters have been used and interpreted correctly.	See Section 6 "Discussion & Recommendations".
	(iii) Conditions applying to the construction phase, including but not limited to; constructed works which require inspection and/or sign off by a suitably qualified and experienced geotechnical engineer. The report must highlight and detail the inspection regime to provide the builder with adequate notification of all necessary inspections, any other construction conditions including works methodology and temporary works that the geotechnical engineer preparing the geotechnical reportbelieves are required in the construction phase to ensure the design will achieve "acceptable risk management" level as defined by the policy for potential loss of both property and life, and signing of Form 3 as the mechanism to check that these parameters have been used and interpreted correctly.	See Section 6.9 "Hold Points for Geotechnical Inspections".
	(iv) Conditions regarding ongoing management of the site/structure, including but not limited to; any conditions that may be required for the ongoing mitigation and maintenance of the site and the proposal, from a geotechnical viewpoint. (v)	See Section 6.5 "Stable Cut/Fill Battered Slopes" and Section 6.8 "Drainage".
4.1 (g)	A copy of Form 1 bearing the original signature of the geotechnical engineer as defined by this policy, who has either prepared or technically verified the geotechnical report.	See Appendix F "Form 1 – Declaration by geotechnical engineer".

2 SITE DESCRIPTION & GEOLOGY

The 340m^2 site located on Lot 802 DP1119757, at 10 Bobuck Lane, in Thredbo, NSW. The site is currently occupied by the Sonnblick Lodge on the southern two-thirds of the lot, with a grassed area on the northern third. The existing lodge is three-storey structure, partly cut into the steeply sloping site on the low side of Bobuck Lane.

The site dips north at the angle of ~35° to 40° from ~RL1398 to ~RL1390 across the block. It does appear that some excavation spoil may have potentially been placed on the downslope portion of the site, assuming from cut-to-fill (~0.5m/1.0m) platform construction. Figure 1 shows the site locality, while Figure 2 is a recent aerial photograph showing the present site layout and the location of the proposed development. Figure 3 is a survey plan of the site, showing the surface

contours and topographical features. Figures 5 to 8 are the site photographs, taken at the time of investigation.

The Minview Geology map indicate the site to be underlain by Silurian age Bullenbalong Supersuite bedrock, part of the Mowambah Granodiorite, which includes granodiorite and granite. Striking north-easts, the Crackenback Fault is located on the northern edge of the site. The Crackenback Fault is a major fault that developed in the granitic rock which became areas of weakness that were more easily eroded than the stronger unaltered rock.

3 INVESTIGATION METHODS

3.1 Previous Investigations

Arup Geotechnics previously conducted a geotechnical landslide risk management assessment of the Sonnblick Lodge in May 1998 (Reference 10664/04). That investigation identified the possible hazards with significant assessed risks for the site, as follows:

- Deep seated slip beneath existing retaining walls at cut face and fill below Bobuck Lane.
- Erosion and undermining of the slope at the rear of the site.

Coffey Partners International previously conducted a geotechnical investigation of the site in November-March 1999 (Reference S10803/15-AE). That investigation comprised three boreholes and two test pits with excavation depths up to 4.6m. SPT testing was also performed.

Geotechnical investigation data of previous report has been considered in the analysis of the present investigation and all the previous information was compiled in the current report.

3.2 Current Investigation

The field investigation was carried out on 12 April 2023. The investigation comprised one (1) borehole, designated BH1, using 50mm push-tube equipment. The borehole location is shown on Figure 2, and the borehole log is presented in Appendix A.

The borehole was excavated to 1.5m depth, terminating at refusal in granitic gravel/cobbles/bedrock. The soil profiles were visually logged in accordance with the Unified Soil Classification System (USCS). Definitions of terms used on the logs and in this report, including a copy of the USCS chart, are provided in Appendix B. The stability assessment is a qualitative slope instability assessment, in line with the requirements of the NSW DIPNR, and is based on the guidelines on the AGS "Landslide Risk Management Concepts and Guidelines 2007". (Reference 2).

4 INVESTIGATION RESULTS

4.1 Subsurface Conditions

Bore holes BH1 found the following subsurface profile:

Geological Profile	Depth Interval	Description
FILL	0m to 0.2m	Sandy Silty CLAY; fine to coarse sand, low plasticity, some fine angular gravel, pale brown, some brick/ceramic pipes fragments, moist, soft.
TOPSOIL	0.2m to 0.5m	Silty SAND with clay; fine to coarse sand, low platicity, dark grey, black, moist, loose.
COLLUVIAL SOIL	Below 0.5m/>1.5m	Silty Clayey SAND; fine to coarse sand, low plasticity, brown. grey, some fine to moderate angular granite gravel, moist, loose to medium dense.

Borehole BH1 refused on likely a cobble/gravel material. Based on the previous investigations mentioned in Section 3.1, granite bedrock is expected at 2m/4m depth. It appears that the footings of the existing lodge and retaining wall are founded on colluvial soils, rather than weathered granite bedrock.

Figure 4 is a subsurface section through the site, showing the geotechnical model of the site as found by the investigation borehole and basing on the previous studies.

4.2 Groundwater

Permanent groundwater is not expected within at least 3m of the surface, however, temporary, perched seepages could occur at shallower depth following rainfall, particularly within pervious colluvial soils and sections of fractured bedrock.

The general surface and subsurface drainage of the Thredbo Village hillside has been upgraded since the 1997 Thredbo Landslide with major drainage being installed along the Alpine Way. Noted drainage includes a subsoil drain ~2m deep, with slotted agricultural pipe and backfilled with gravel.

5 SLOPE INSTABILITY RISK ASSESSMENT

5.1 Method of Risk Assessment

The following sections of the report outline the slope instability risk assessment carried out for the site. The assessment is qualitative, based on the guidelines provided in the Australian Geomechanics Journal Vol 42 March 2007, and has been adopted by the NSW Department of Infrastructure, Planning and Natural Resources. This uses a matrix approach to determine the risk level of each hazard based on the likelihood and consequences of each hazard occurring.

Risk assessment involves the following components:

(i) Identification on the potential site slope hazards that may damage property and/or cause loss of life (Hazard Identification).

(ii) Estimation of the likelihood of each hazard occurring (Likelihood of Hazards Occurring).

(iii) Assessment of the potential consequences to property and people of these hazards occurring (Consequences of Hazards).

(iv) Evaluation of the significance of the assessed risks against criteria of acceptability (Significance of Risks).

Following the risk assessment, options for the treatment of the risk are provided as a guide to the owner, administrator and regulatory authorities who will need to decide whether to avoid or accept the risk, or to treat the site to reduce the likelihood and/or consequences of the hazards.

A flowchart, included in the Australian Geomechanics Journal, Vol 42, March 2007, paper on "Landslide Risk Management Concept & Guidelines" 2007 (Reference 3), which shows the processes of risk assessment/risk management is copied here in Appendix D. Appendix E provides guidelines for hillside construction.

5.2 Hazard Identification

The potential hazards to slope stability at this site were considered, and include:

- Large Scale Transitional Slide
- Shallow Soil Creep in the Soil Profile
- Failure of a Retaining Wall
- Surface Erosion
- Failure of Cut Batters
- Large Rockfall from Upslope

5.3 Likelihood of Hazards Occurring

5.3.1 Large Scale Translational Slide

The Thredbo Alpine Resort is located in an area where landslips have occurred. There is a history of severe embankment instability, rock fall, debris slide and debris flow problems in the Thredbo valley.

There are several landslides recorded in the immediate vicinity to the site. A catastrophic landslide occurred just ~50m away from the site in July 1997. This landslide occurred below Alpine Way and resulted in major damage. The remediation works has been completed along the Alpine Way to reduced the risk of a major landslide.

The Arup Geotechnics report states the presence of another large landslide located above the Bobuck Lane. The report map shows a ~2m high and ~30m long concave scarp approximately 25m south the Sonnblick Lodge. This can indicate a past major landslide and a possible deep seated slip surface beneath existing road fill embankment, retaining wall and possibly the Sonnblick Lodge.

The slope above Bobuck Lane is currently supported by retaining walls and covered with mature Snow Gum Trees. There are signs of soil movements below Bobuck Lane, including:

- Multiple tension crack on the asphalt road pavement on the outer lane of Bobuck Lane. The cracks are to 10mm wide and running to 6m long. One tension crack in front of the driveway to 2.5m long.
- Cracking of the concrete pavement of the driveway.
- Signs of the distress of the masonry retaining wall below the Bobuck Lane.
- Moist soils behind the masonry driveway retaining wall and at the toe of level 1 retaining wall.
- Multiple cracks on the existing structure, indicating foundation settlement.

Figures 5-6 show the features of this hazard.

The landslides that have previously occurred in the Thredbo area have generally been triggered by changes in the slope (cut or fill) or changes in the drainage, combined with heavy rainfall. The combination of a soil mantle, a relatively shallow soil profile (2m/4m) and good surface drainage, reduces the possibility of a major landslip occurring.

For such a large-scale slide to happen there would need to be an extreme combination of unfavourable triggering conditions such as earthquakes, extreme rainfall, saturated soils, mass clearance of vegetation, unsupported excavations etc. The site is located in an area designated as having a Landslide Susceptibility rating of "Possible". In accordance with the AGS ratings (Appendix C), such an event is considered to be "Possible".

5.3.2 Shallow Soil Creep

The rear of the site slopes at the relatively steep angle of ~35°. The site is grass-covered and there was a mature tree cut recently. The existing ground surface exposed small-cale soil heaving and rupturing. The soil horizontal movements was estimated to be 0.05 to 0.1m and assessed by exposed soil (Figure 5).

Under adverse site conditions, such as when site soils are saturated, small slumping failures of the soils could conceivably occur. The existing ground surface is 'lumpy', indicating that slumps may have occurred in the past, so such an event is "Possible".

5.3.3 Failure of Retaining Walls

The site has been cut into a slope and four masonry retaining walls support the cut batters. The retaining walls comprises stone and mortar, and are possibly not properly engineered. It is also not known if they have proper footings and drainage. The four walls are:

(1) RW1 is located at the rear of the building and is up to 0.5m height. The soil has been washed out beneath the retaining wall rock facade. Cracking through mortar are to 0.5cm wide.

(2) RW2 supports the basement and was not inspected during the site visit.

(3) RW3 supports Level 1 cut, driveway part of the upper slope. Some cracking through mortar and soft soils were noted. Ceramic stormwater pipes outlets are located at the toe of the retaining wall.

(4) RW4 is from 1m to 1.4m high and is located below Bobuck Lane, but above the driveway and entrance to the Sonnblick Lodge. The retaining wall comprises angular granite boulders boded by mortar. This retaining wall shows signs of deterioration, including cracks through masonry to 1-2cm wide, fallen out boulder. In the gap between the fallen boulders, its possible to see that some material behind the wall has been washed out. There is also a steel stormwater pipe outlet beneath the road.

The existing retaining walls, especially adjacent to Bobuck Lane RW4, have defects that may indicate failure onset. If left in the current state, the deterioration may progress further until the retaining wall failure occurs. Generally, the cuts to be constructed on the block should be supported by well-drained, properly designed and constructed engineered retaining walls.

Considering signs of retaining wall failure observed, the likelihood of retaining wall failure is judged to be "Likely".

5.3.4 Surface Erosion

There are presently minor signs of surface scouring and erosion on the block, particularly along the paths and the along the rear of the building. Adjacent to the building erosion has resulted in undermining retaining walls and a slope. Most of the area is grass-covered with no signs of erosion. However, when the building is demolished, uncovered exposed soils would be prone for erosion. In addition, the upper soils are quite silty, so if the vegetation is removed and surface water flow-paths were allowed to develop, surface erosion is "Likely".

5.3.5 Large Rockfall from Upslope

Large rockfalls from up the slope occurred in the past in the area, as evidence by debris deposits on the lower slopes of the valley. Provided the existing structures, retaining walls and mature vegetation uphill of the site, the risk is reduced. Therefore, this event is "Rare".

5.3.6 Failure of a Cut Batter

The proposed demolition may require excavations to ~1-3m depth. Since the cuts may stay exposed for an extended time, from 12 to 24 months, the cuts should be permanently supported by properly designed and constructed engineered retaining walls, however, temporary site cuts will be

exposed during construction until the retaining walls can be constructed. The likelihood of failure of a temporary site cut during construction is judged to be "Possible".

5.4 Consequences of Hazards Occurring

5.4.1 Large-Scale Translational Slide

Theoretically, a large-scale slide would occur with little or no warning, and the consequences to property and people would depend on the volume of the slide material, its velocity, and whether or not people are present, or in the downslope dwelling at the time. Using the AGS table of qualitative measures of vulnerability and consequences in Appendix C, we consider the consequences of such a rare event to be "Major", i.e Theoretically, there is the possibility of a fatality in the dwelling and/or the imposition of major damage to some of the structure in the rare even of this occurring.

5.4.2 Shallow Soil Creep

The existing structure will be demolished, therefore the consequence to its damage is not applicable. The consequence to the dwelling and associated structures of a small-scale slump occurring in the soil if case the new footings have been founded in bedrock is believed to be "Minor". The soil creep is a very slow process; therefore, the risk to people's health or loss of life is very low and the consequences for persons can be rated as "Insignificant".

5.4.3 Failure of a Retaining Wall

If a retaining wall failed, damage may well result to the neighboring dwellings and Bobuck Lane, depending on many factors. Stabilization works would require in case RW4 below Bobuck Lane is failed. if In general, the consequences can be rated as "Medium" to "Major". The chance of persons being injured or of loss of life is low and the consequences to persons are therefore also rated as "Minor".

5.4.4 Surface Erosion

If such an event develops and occurs, small cobbles/boulders may wash out of erosion gully slides and rolled downhill. The consequential damage to a structure would be "Insignificant".

5.4.5 Large Rockfall from Upslope

The top of the escarpment is approximately >1.5km north of the property, with at least 330m of tree-dense bushland within the immediate vacinity of the property. Therefore, any large rockfalls that do occur will have slowed in velocity and magnitude by the time it reaches the property, or be protected by the properties immediately uphill. Therefore, the consequences to people and property are considered as "Minor" to "Insignificant".

5.4.5 Failure of Cut Batter

The chance of persons being injured or of loss of life is low and the consequences to persons and property are therefore also rated as "Minor".

5.5 Risk Estimation

A summary of estimated risk to property and life for each of the potential hazards identified in the previous sections is provided in Table 1a. This risk assessment in Table 1a is based on the present conditions, prior to any mitigation measures being implemented. The resulting risk level was derived using the AGS risk analysis matrix presented in Appendix C.

TABLE 2a - Risk Analysis Summary – Prior to Any Mitigation Measures Being Implemented

Potential Hazard	Assessed Likelihood	Assessed Consequences	Risk Level
Large-Scale Translational Slide	Possible	To Dwelling - Major	High
		To People in/adjacent to dwelling - Medium	High
Shallow Soil Creep	Possible	To Dwelling - Minor	Moderate
		To People in/adjacent to dwelling - Insignificant	Very Low
Failure of Retaining Wall	Rare	To Dwelling – Minor	Moderate
		To People in/adjacent to dwelling – Major to Medium	Very High to High
Surface Erosion	Possible	To Dwelling - Insignificant	Very Low
		To People in/adjacent to dwelling - Insignificant	Very Low
Rockfalls	Possible	Minor/Insignificant	Very Low to Medium
Failure of Cut Batter	Possible	Minor	Moderate

5.6 Risk Treatment

To maintain and/or reduce the risk level of slope stability during and after the demolition of the dwelling and associated structures, the following measures are recommended to be implemented:

- Ensure the existing retaining walls should be properly designed and constructed, and positively drained. Alternatively, the retaining walls stabilisation may include placing a soil buttress against the walls or by anchoring them back into bedrock.

- Form stable permanent batters after the structure demolition. Section 6.3 provides further details on temporary and permanent batters. Section 6.2 provides instructions on construction controlled fill platform if that required.
- Maintain adequate drainage of the site and ensure drains are free flowing.
- Where possible, maintain the existing vegetation cover. After demolition works provide erosion protection for exposed soils.
- Periodic inspection of the slope uphill for signs of erosion developing and remediate as necessary.

Some useful guidelines on hillside construction, prepared by the Australian Geomechanics Society (Reference 3), are presented in Appendix E.

A summary of estimated risk to property and life for each of the potential hazards identified in the previous sections is provided in Table 2b. This risk assessment in Table 2b is based on the proposed future conditions, assuming that all recommended mitigation measures are implemented. For this risk assessment to be valid, a suitably qualified geotechnical engineer must sign Form 2 and Form 3 as the mechanism to check that these mitigation measures have been correctly incorporated into the design and constructed correctly. The resulting risk level was derived using the AGS risk analysis matrix presented in Appendix C.

TABLE 2b - Risk Analysis Summary – After Recommended Mitigation Measures Are Implemented

Potential Hazard	Assessed Likelihood	Assessed Consequences	Risk Level
Large-Scale Translational Slide	Unlikely	To Dwelling - Medium	Low
		To People in/adjacent to dwelling - Minor	Low
Shallow Soil Creep	Rare	To Dwelling - Minor	Very Low
		To People in/adjacent to dwelling - Insignificant	Low
Failure of Retaining Wall	Rare	To Dwelling – Minor to Medium	Low
		To People in/adjacent to dwelling - Minor	Very Low
Surface Erosion	Rare	To Dwelling - Insignificant	Very Low
		To People in/adjacent to dwelling - Insignificant	Low
Rockfalls	Unlikely	Minor/Insignificant	Very Low to Low
Failure of Cut Batter	Rare	Minor	Very Low

Note: This risk assessment in Table 1b is based on the assumed future conditions, assuming that all recommended mitigation measures are implemented. For this risk assessment to be valid, a suitably qualified geotechnical engineer must sign Form 2 and Form 3 as the mechanism to check that these mitigation measures have been correctly incorporated into the design and constructed correctly.

5.7 Significance of Risks (Risk Evaluation)

Risk evaluation is the process by which owners, administrators and relevant regulatory authorities can decide whether the potential risks (See Table 1a and Table 1b) are acceptable, and/or whether these can be feasibly eliminated or reduced by remedial treatment. Implications of each level of risk are described in Appendix C.

In the present conditions, the overall risk to property and people is assessed to be "Very Low" to "Very High" (See Table 1a). Provided the demolition and earthworks are undertaken in accordance with accepted procedures for hillside construction, and treatments and mitigation measures are carried out to reduce the potential hazards (as recommended in Section 5.6 and Section 6), the risk is assessed to be "Very Low" to "Low" (See Table 1b).

5.8 Suitability of the Proposed Demolition

Provided that the demolition and earthworks are undertaken in accordance with accepted procedures for hillside construction, and treatments and mitigation measures are carried out to

reduce the potential hazards (as recommended in Section 5.6 and Section 6), the risk is assessed to be "Very Low" to "Low" (See Table 2b). Therefore, it is assessed that the site is suitable for the proposed demolition (provided all the recommendations in our report are followed).

6 DISCUSSION & RECOMMENDATIONS

Geotechnical recommendations for the works that can associate with the proposed demolition are provided in the following sections. After the demolition works are complete, a suitably qualified geotechnical engineer must inspect the site and sign Form 2 as the mechanism to check that these design recommendations and slope stability mitigation measures have been correctly incorporated.

6.1 Excavation Conditions & Use of Excavated Material

Proposed excavation depths have not been indicated but excavations to ~1.5m depth would be through topsoil and colluvial/residual soils. The soils and any weak rock (EW/HW) are readily diggable by backhoe and medium sized excavator.

The low and medium plasticity colluvial/residual soils can be used in controlled fill construction of building platforms. The weathered granodiorite bedrock is also suitable for fill material, although rock particles should be broken down to <75mm size. The silty topsoil and slopewash material and any high plasticity clay should not be used in controlled fill construction, but could be used in non-structural applications such as landscaping.

If imported fill is required, a suitable select fill material would include a low or medium plasticity soil such as clayey sand or gravelly clayey sand, containing between 25% and 50% fines less than 0.075mm size (silt and clay), and no particles greater than 75mm size.

6.2 Controlled Fill Construction

For construction of any new controlled fill platforms and road subgrades, it is recommended that:

- Areas be fully stripped of all silty topsoil and any uncontrolled fill. A stripping depth of up to ~0.5m/1m may be required. Stripped foundations should be proof-rolled by a vibratory pad-foot roller of not less than 9 tonne static mass to check for any weak or wet areas that would require replacement. No fill should be placed until a geotechnical engineer has confirmed the suitability of the foundation.

- Controlled fill comprising suitable site excavated or imported materials of not greater than 75mm maximum particle size (Section 6.1), be compacted in not greater than 150mm layers to not less than 95%ModMDD at about OMC.

- Fill placement and control testing be overviewed and certified by a geotechnical engineer at Level 1 or 2 involvement of AS3798 – 1996 "Guidelines on Earthworks for Commercial & Residential Developments" (Reference 3).

6.3 Stable Cut/Fill Batter Slopes

6.3.1 Temporary Batters (During Demolition)

Temporary site excavations to 1.5m depth should be cut back at no steeper than 1(H):1(V). If required and space allows, deeper temporary cuts can be formed at 1(H):1(V) in soils and at 0.5(H):1(V) in weathered granite bedrock. Where there are existing cuts steeper than 1(H):1(V), it is recommended that they are stabilized using reinforced shotcrete, or with soil buttress. A geotechnical engineer should inspect all cut batters during construction to confirm stability. Exposed temporary batters should be protected from the weather by black plastic pinned to the face with link-wire mesh, or similar.

During construction, the following recommendations must be followed to maintain stability of all temporary unsupported excavations:

- All equipment/machinery/stockpiles/site sheds and containers are located 1(H):1(V) from the toe of the batters. Trucks and heavy construction plant/equipment and large soil stockpiles must not be located close to the top edge of the batters, especially with the motor idling. Trucks and heavy construction plant/equipment must be located outside the zone of influence (1(H):1(V)) of the excavation batter.

- A bund or dish drain must be constructed along the top edge of all cuts to intercept and divert surface water away from the batters.

- All batter faces must be trimmed when erosion occurs, and loose material cleaned from the face regularly. Therefore, it is recommended that the batter faces are monitored on a daily basis and cleaned of loose material when present.

- Regular inspections by a geotechnical engineer of the batters would be required. As a guide, these inspections by a geotechnical engineer must be conducted on a monthly basis, while a competent person representing the contractor should do daily checks.

- No work must be conducted close to the toe of the batters during rain and 24 hours after. The batters must be re-inspected by a geotechnical engineer following rainfall (about 20mm of rain, or enough rain that the batter faces become wet).

- If deterioration or significant weathering of the batter face occurs, stabilisation/remediation of the batter must be applied. A geotechnical engineer will confirm this recommendation.

6.3.2 Permanent Batters (Post-Construction)

Permanent cut and fill soil batters should be formed at no steeper than 2(H): 1(V). All soil cut and fill surfaces should be protected against erosion by topsoiling and grassing, or other suitable means. Steeper permanent cuts should be supported by structural retaining walls. It is advisable that permanent batters are inspected during excavation by an experienced geotechnical engineer to confirm stability. To reduce the risk of future slope instability, all surface slopes around the development must be maintained to prevent erosion, and regular maintenance and inspections will be required to ensure on-going stability.

6.4 Low Retaining Walls

Retaining walls constructed in open excavation, with the gap between the excavation face and the wall backfilled later, can be designed for an earth pressure distribution given by:

$$\sigma_h = (K\gamma' h) + Kq$$

where,

σ_h is the horizontal earth pressure acting on the back of the wall, in kPa

K is the dimensionless coefficient of earth pressure; this can be assumed to be 0.4 when the top of the wall is unrestrained horizontally, and 0.6 when the top of the wall is restrained (i.e. by building slabs etc.)

γ' is the effective unit weight of the backfill, and can be assumed to be 20kN/m^3 for a lightly compacted soil backfill

h is the height of the backfill, in metres

q is any uniform distributed vertical surcharge acting on the top of the backfill, in kPa

Apart from structural restraints such as floor slabs, resistance to overturning and sliding of retaining walls is provided by frictional and adhesive resistance on the base, and by passive resistance at the toe of the wall. For a natural soil or controlled fill foundation, an ultimate base friction factor (tanδ) of 0.4, base adhesion (c) of 30kPa, and allowable passive earth pressure coefficient Kp=2.5 can be used for calculation of sliding resistance. For a weathered bedrock foundation an ultimate base friction factor (tanδ) of 0.55, base adhesion (c) of 100kPa, and an allowable passive earth pressure coefficient Kp=3.5 can be used for calculation of sliding resistance.

Free-draining granular backfill or synthetic fabric drains should be installed behind all walls. These should connect to weep holes and/or a collector drain, and ultimately to the stormwater system. Granular backfill should be wrapped in a suitable filter fabric to minimise infiltration of silt/clay fines.

6.4 Earthquake Site Factor

Table 2.3 of AS1170.4 "Minimum Design Loads on Structures - Part 4: Earthquake Loads" (Reference 5) lists the earthquake acceleration coefficients for major centres to be considered in structural design. The Thredbo area has an acceleration coefficient of 0.08.

Section 4 of AS1170.4 summarises the Site Subsoil Class which depends on the subsurface conditions at the site in question. A Site Subsoil Class C_e is applicable for this development.

6.5 Drainage

Suitable surface drainage should be provided to ensure rainfall run-off or other surface water cannot pond against buildings or pavements. Suitable drainage must be provided behind retaining walls.

It may be advisable to install a subsoil drain along the upslope side of the property to intercept any subsoil seepages. The drain should extend to at least 1m depth and should be directed past the building and into the stormwater system. If overland flow is an issue, a swale or bund drain could be constructed upslope to divert water away.

6.6 Hold Points for Geotechnical Inspections

Upon demolition completion, a suitably qualified geotechnical engineer must inspect the site and certain structural and civil elements, and sign Form 3 as the mechanism to check that these design recommendations and slope stability mitigation measures have been correctly constructed. The following is a list of hold points that require geotechnical inspection and sign off:

1) Inspect all temporary and permanent cut and fill batters to check stability and advise on remediation/treatment measures.

2) Inspection and certification of all controlled fill construction (where it is specified to be controlled fill in accordance with AS3798).

3) Inspect all surface and subsurface drainage measures to check that they are adequate, and to advise for additional measures if required.

ACT Geotechnical Engineers Pty Ltd

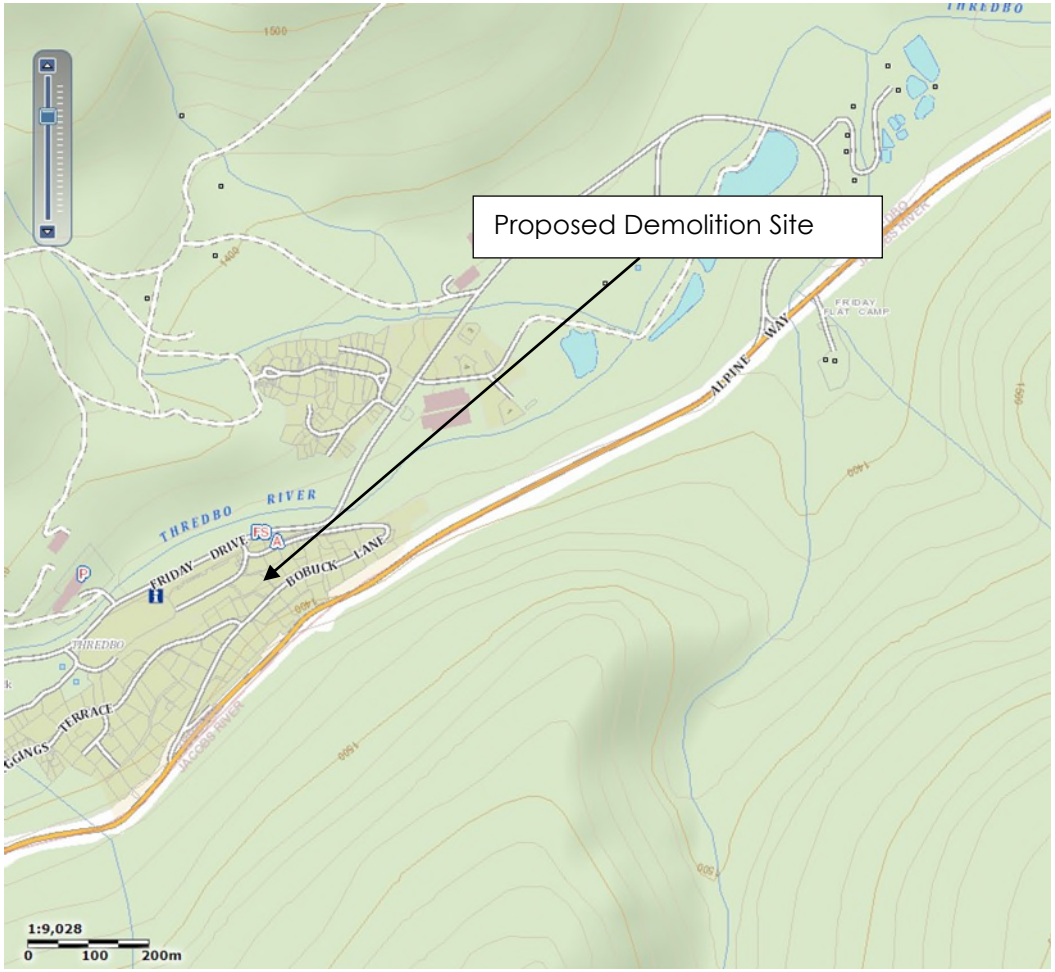
REFERENCES

1 Bureau of Mineral Resources, Commonwealth of Australia, "Wollongong 1:250 000 Engineering Geology Series", 1985.

2 Standards Australia, "AS2870 - 1996 - Residential Slabs & Footings - Construction".

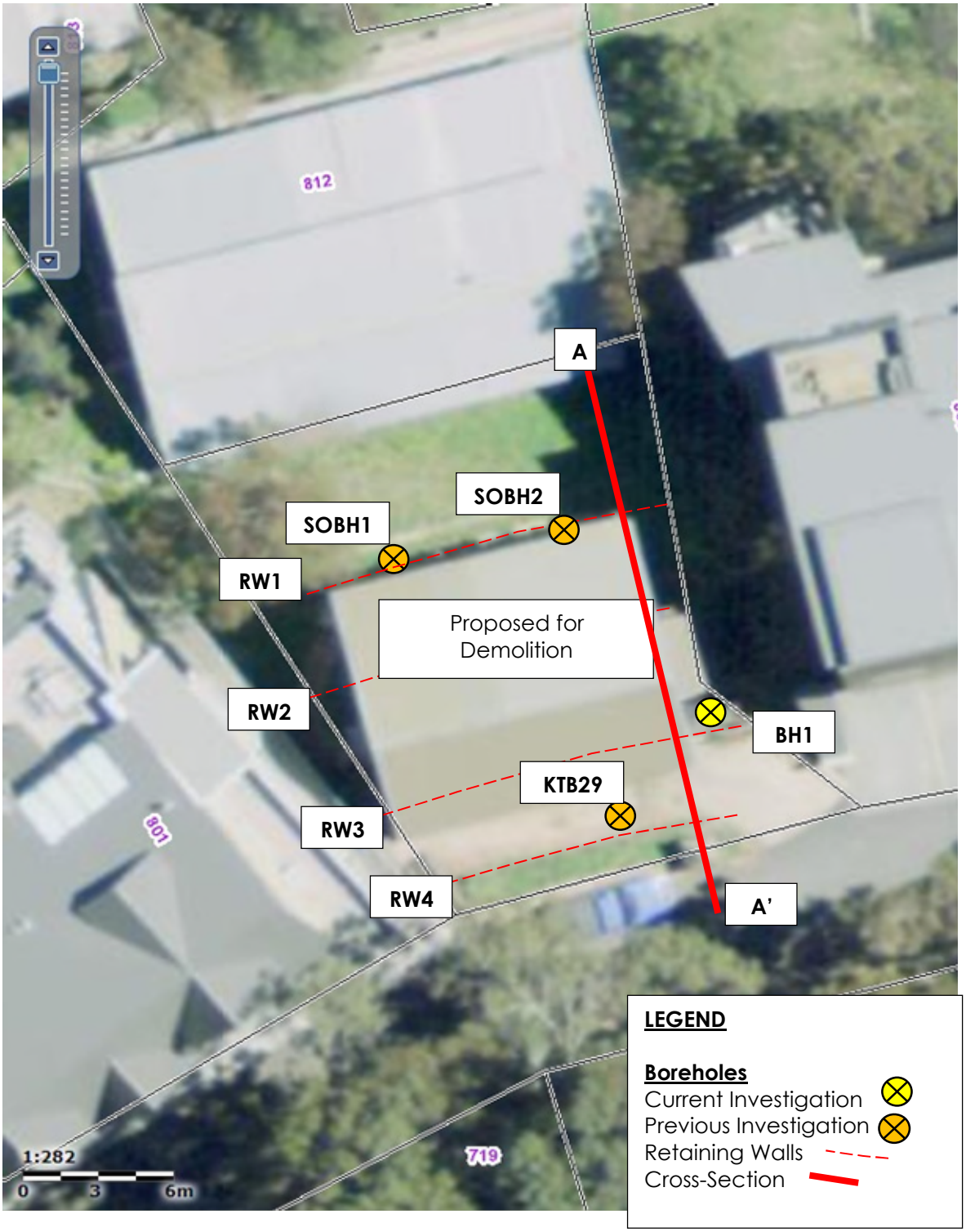
3 Standards Australia, "AS1170.4 - 1993 - Minimum Design Loads on Structures - Part 4: Earthquake Loads".

N



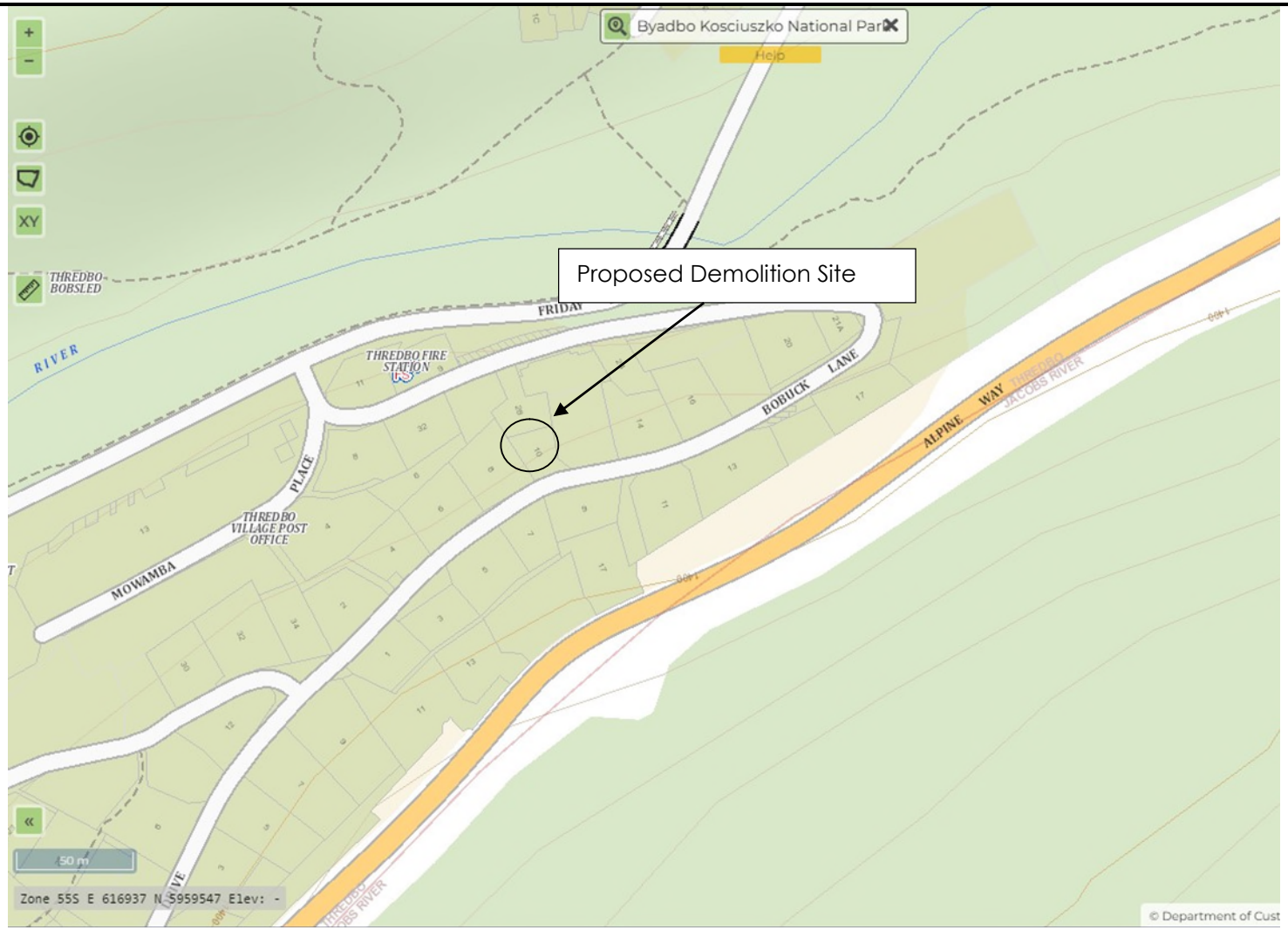
KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE LOCALITY

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 1**



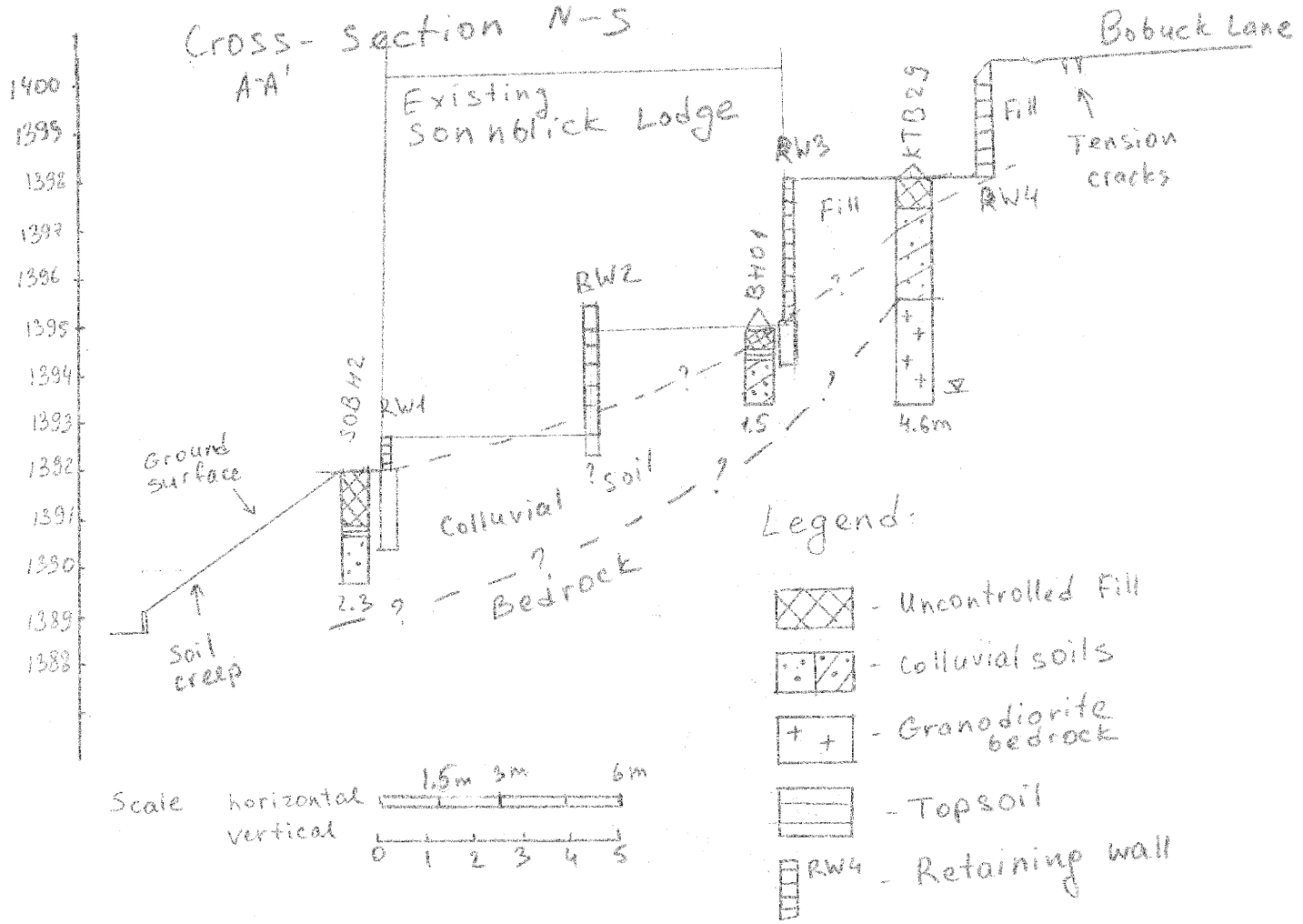
KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
AERIAL PHOTOGRAPH & BOREHOLES LOCATIONS

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 2**



KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
CONTOUR PLAN

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 3**



KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SUBSURFACE SECTION

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 4**

KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE PHOTOGRAPHS – TENSION CRACKS ON THE ROAD PAVEMENT

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 5**

KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE PHOTOGRAPHS – RW4 (BELOW BOBUCK LANE)

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 6**

KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE PHOTOGRAPH – RW3

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 7**

KOSCIUSZKO THREDBO PTY LTD
PROPOSED DEMOLITION & REDEVELOPMENT - SONNBLICK LODGE – 10 BOBUCK LANE, THREDBO, NSW
SITE PHOTOGRAPHS

ACT Geotechnical Engineers Pty Ltd	**C14191**	**FIGURE 8**

Appendix A
Borehole Log BH1

Borehole Log

Borehole No.	**BH1**
Sheet	1 of 1
Job No.	C14191

CLIENT: Kosciuszko Thredbo Pty Ltd

PROJECT: PROPOSED DEMOLITION AND REDEVELOPMENT - SONNBLICK LODGE -10 BOBUCK 10 BOBUCK LANE, THREDBO, NSW

Location : See Figure 1

Equipment Type : Pushtube
Hole Diameter : 50mm

Collar Level : Not Known
Angle From Vertical : 0°
Bearing : N.A.

Samples		Casing	Depth Metres	Graphic Log	U.S.C.S.	Material Description, Structure Soil Type: Plasticity or Particle Characteristics, Colour, Secondary and Minor Components, Moisture, Structure	Consistency or Relative Density	Field Test Results	Geological Profile
					CL	Sandy Silty CLAY; fine to coarse sand, low plasticity, some fine angular gravel, pale brown, some brick/ceramic pipes fragments, moist.	SOFT		FILL
			0.2		SM	Silty SAND with clay; fine to coarse sand, low platicity, dark grey, black, moist.	LOOSE		TOPSOIL
			0.5		SC-SM	Silty Clayey SAND; fine to coarse sand, low plasticity, brown. grey, some fine to moderate angular granite gravel, moist.	LOOSE TO MEDIUM DENSITY		COLLUVIAL SOIL
			1.0						
			1.5			BOREHOLE TERMINATED AT 1.5m			
			2.0						

Logged By : OB Date : 6/4/22 Checked By : JM Date : 30/4/22

ACT Geotechnical Engineers

aaaaa

BOREHOLE/EXCAVATION LOG THREDBO.GPJ ACT GEO.GDT 17/4/23

APPENDIX B
Definitions of Geotechnical Engineering Terms

DESCRIPTION AND CLASSIFICATION OF SOILS

The methods of description and classification of soils used in this report are based on the Australian Standard 1726 – 1993, Geotechnical site investigations. In general, descriptions cover the following properties – soil type, colour, secondary grain size, structure, inclusions, strength or density and geological description.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (e.g. sandy clay) on the following basis:

Classification	**Particle Size**
Clay	Less than 0.002mm
Silt	0.002mm to 0.06mm
Sand	0.06mm to 2.00mm
Gravel	2.00mm to 60.00mm
Cobbles	60mm (63mm) to 200mm
Boulders	>200mm

Soils are also classified according to the Unified Soil Classifications System which is included in this Appendix. Rock types are classified by their geological names.

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The terms are defined as follows:

Consistency	**Shear Strength su(kPa) (Representative Undrained Shear)**	
Very soft	< 12	<2 (~SPT "N")
Soft	12 - 25	2-4
Firm	25 - 50	4-8
Stiff	50 – 100	8-15
Very Stiff	100 – 200	15-30
Hard	> 200	>30

Non-cohesive soils are classified on the basis of relative density, generally from the results of in-situ standard penetration tests as below:

Term	**Relative Density (%)**	**SPT Blows/300mm 'N'**
Very loose	< 15	<4
Loose	15-35	4-10
Medium dense	35-65	10-30
Dense	65-85	30-50
Very Dense	>85	>50

SAMPLING

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are generally taken by one of two methods:

1. Driving or pushing a thin walled sample tube into the soil and withdrawing with a sample of soil in a relatively undisturbed state.

2. Core drilling using a retractable inner tube (R.I.T.) core barrel.

Such samples yield information on structure and strength in additions to that obtained from disturbed samples and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

PENETRATION TESTING

The relative density of non-cohesive soils is generally assessed by in-situ penetration tests, the most common of which is the standard penetration test. The test procedure is described in Australian Standard 1289 “Testing Soils for Engineering Purposes” Testing Soils for Engineering Purposes” – Test No. F3.1.

The standard penetration test is carried out by driving a 50mm diameter split tube penetrometer of standard dimensions under the impact of a 63 kg hammer having a free fall of 750mm.

The “N” value is determined as the number of blows to achieve 300mm of penetration (generally after disregarding the first 150mm penetration through possibly disturbed material). The results of these tests can be related empirically to the engineering properties of the soil.

The test is also used to provide useful information in cohesive soils under certain conditions, a good quality disturbed sample being recovered with each test. Other forms of in situ testing are used under certain conditions and where this occurs, details are given in the report.

DEFINITIONS OF ROCK, SOIL, AND DEGREES OF CHEMICAL WEATHERING

GENERAL DEFINITIONS – ROCK AND SOIL

ROCK In engineering usage, rock is a natural aggregate of minerals connected by strong and permanent cohesive forces.

Note: Since "strong" and "permanent" are subject to different interpretations, the boundary between rock and soil is necessarily an arbitrary one.

SOIL In engineering usage, soil is a natural aggregate of mineral grains which can be separated by such gentle mechanical means as agitation in water, can be remoulded and can be classified according to the Unified Soil Classification System. Three principal classes of soil recognized are:

Residual soils: soils which have been formed in-situ by the chemical weathering of parent rock. Residual soil may retain evidence of the original rock texture or fabric or, when mature, the original rock texture may be destroyed.

Transported soils: soils which have been moved from their places of origin and deposited elsewhere. The principal agents of erosion, transport and deposition are water, wind and gravity. Two important types of transported soil in engineering geology and materials investigations are:

Colluvium – a soil, often including angular rock fragments and boulders, which has been transported downslope predominantly under the action of gravity assisted by water. The principle forming process is that of soil creep in which the soil moves after it has been weakened by saturation. It may be water borne for short distances.

Alluvium – a soil which has been transported and deposited by running water. The larger particles (sand and gravel size) are water worn.

Lateritic soils: soils which have formed in situ under the effects of tropical weathering include all reddish residual and non residual soils which genetically form a chain of material ranging from decomposed rock through clay to sesqui-oxide rich crusts. The term does not necessarily imply any compositional, textural or morphological definition; all distinctions useful for engineering purposes are based on the differences in geotechnical characteristics.

ROCK WEATHERING DEFINITIONS

Extremely Weathered (EW)	Rock substance affected by weathering to the extent that the rock exhibits soil properties, i.e. it can be remoulded and can be classified according to the Unified Classification System, but the texture of the original rock is still evident.
Highly Weathered (HW)	Rock substance affected by weathering to the extent that limonite staining or bleaching affects the whole of the rock substance and other signs of the chemical or physical decomposition are evident. Porosity and strength may be increased or decreased compared to the fresh rock usually as a result of iron leaching or deposition. The colour and strength of the original fresh rock substance is no longer recognisable.
Moderately Weathered (MW)	Rock substance affected by weathering to the extent that staining extends throughout the whole of the rock substance and the original colour of the fresh rock is no longer recognisable.
Slightly Weathered (SW)	Rock substance affected by weathering to the extent that partial staining or discolouration of the rock substance, usually by limonite, has taken place. The colour and texture of the fresh rock is recognisable.
Fresh (Fr)	Rock substance unaffected by weathering.

The degrees of rock weathering may be gradational. Intermediate stages are described by dual symbols with the prominent degree of weathering first (e.g. EW-HW).

The various degrees of weathering do not necessarily define strength parameters as some rocks are weak, even when fresh, to the extent that they can be broken by hand across the fabric, and some rocks may increase in strength during the weathering process.

Fresh drill cores of some rock types, such as basalt and shale may disintegrate after exposure to the atmosphere due to slaking, desiccation, expansion or contraction, stress relief or a combination of any of these factors.

AN ENGINEERING CLASSIFICATION OF SEDIMENTARY ROCKS

This classification system provides a standardised terminology for the engineering description of the sandstone and shales in the Sydney area, but the terms and definitions may be used elsewhere when applicable. Where other rock types are encountered, such as in dykes, standard geological descriptions are used for rock types and the same descriptions as below are used for strength, fracturing and weathering.

Under this system rocks are classified by Rock Type, Strength, Stratification Spacing, Degree of Fracturing and Degree of Weathering. These terms do not cover the full range of engineering properties. Descriptions of rock may also need to refer to other properties (e.g. durability, abrasiveness, etc) where these are relevant.

ROCK TYPE DEFINITIONS

ROCK TYPE	DEFINITION
Conglomerate:	More than 50% of the rock consists of gravel sized (greater than 2mm) fragments.
Sandstone:	More than 50% of the rock consists of sand sized (0.06 to 2mm) grains.
Siltstone:	More than 50% of the rock consists of silt-sized (less than 0.06mm) granular particles and the rock is not laminated.
Claystone:	More than 50% of the rock consists of silt or clay sized particles and the rock is not laminated.
Shale:	More than 50% of the rock consists of silt or clay sized particles and the rock is laminated.

Rocks possessing characteristics of two groups are described by their predominant particle size with reference also to the minor constituents, e.g. clayey sandstone, sandy shale.

STRATIFICATION SPACING

Term	Separation of Stratification Planes
Thinly Laminated	< 6mm
Laminated	6mm to 20mm
Very thinly bedded	20mm to 60mm
Thinly bedded	60mm to 0.2m
Medium bedded	0.2m to 0.6m
Thickly bedded	0.6m to 2m
Very thickly bedded	> 2m

DEGREE OF FRACTURING

This classification applies to diamond drill cores and refers to the spacing of all types of natural fractures along which the core is discontinuous. These include bedding plane partings, joints and other rock defects, but exclude known artificial fractures such as drilling breaks.

Term	Description
Fragmented:	The core is comprised primarily of fragments of length less than 20mm, and mostly of width less than the core diameter
Highly Fractured:	Core lengths are generally less than 20mm – 40mm with occasional fragments.
Fractured:	Core lengths are mainly 30mm – 100mm with occasional shorter and longer section.
Slightly Fractured:	Core lengths are generally 300mm – 1000mm with occasional longer sections and occasional sections of 100mm – 300mm.
Unbroken:	The core does not contain any fracture.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Society of Rock Mechanics.

Term	Point Load Index Is(50) MPa	Field Guide	Approx qu MPa*
Extremely Weak:	0.03	Easily remoulded by hand to a material with soil properties.	0.7
Very Weak:	0.1	May be crumbled in the hand. Sandstone is “sugary” and friable.	2.4
Weak:	0.3	A piece of core 150mm long x 50mm dia. May be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.	7
Medium Strong:	1	A piece of core 150mm long x 50mm dia. can be broken by hand with considerable difficulty. Readily scored with knife.	24
Strong: (SW)	3	A piece of core 150mm long x 50mm dia. core cannot be broken by unaided hands, can be slightly scratched or scored with knife.	70
Very Strong (SW)	10	A piece of core 150mm long x 50mm dia. may be broken readily with hand held hammer. Cannot be scratched with pen knife.	240
Extremely Strong (Fr)	>10	A piece of core 150mm long x 50mm dia. is difficult to break with hand held hammer. Rings when struck with a hammer.	>240

The approximate unconfined compressive strength (qu) shown in the table is based on an assumed ration to the point load index of 24:1. This ratio may vary widely.

Unified Soil Classification System (Metricated)
Data for Description Indentification and Classification of Soils

MAJOR DIVISIONS				DESCRIPTION				FIELD IDENTIFICATION						LABORATORY CLASSIFICATION					
				Group Symbol	Graphic Symbol	TYPICAL NAME	DESCRIPTIVE DATA			GRAVELS AND SANDS			Group Symbol		% [2] < 0.06mm	PLASTICITY OF FINE FRACTION			NOTES
										GRADATIONS		NATURE OF FINES	DRY STRENGTH						
COARSE GRAINED SOILS	More than 50% by dry mass, less than 60mm is greater than 0.06mm.	GRAVELS	More than 50% of coarse grains are greater than 2.0mm	GW		Well graded gravels and gravel-sand mixtures, little or no fines	Give typical name, indicate approximate percentages of sand and gravel, maximum size, angularity, surface condition and hardness of the coarse grains, local or geological name and other perfinent descriptive information, symbols in parenthesis. For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. EXAMPLE: Silty Sand, gravelly, about 20% hard, angular gravel particles, 10mm maximum size, rounded and sub angular sand grains coarse to fine, about 15% non-plastic fines with low dry strength, well compacted and moist in place, light brown alluvial sand, (SM)			GOOD	Wide range in grain size	"Clean" materials (not enough fines to band coarse grains)	None	GW		0-5	-	>4	Between 1 and 3	1. Identify Fines by the method given for fine grained soils. 2. Borderline classifications occur when the percentage of fines (fraction smaller than 0.06mm size) is greater than 5% and less than 12%. Borderline classifications require the use of dual symbols eg SP-SM GW-GC
				GP		Poorly graded gravels and gravel-sand mixtures, little or no fines				POOR	Predominantly one size or range of sizes			GP		0-5	-	Fails to comply with above	
		GRAVELLY SOILS		GM		Silty gravels, gravel-sand-silt mixtures				GOOD TO FAIR	"Dirty" materials (Excess of fines)	Fines are non-plastic (1)	None to medium	GM		12-50	Below 'A' line and Ip >7	-	-
				GC		Clayey gravels gravel-sand-clay mixtures						Fines are plastic (1)		GC		12-50	Above 'A' line and Ip > 7	-	-
		SANDS	More than 50% of coarse grains are greater than 2.0mm	SW		Well graded sands and gravelly sands, little or no fines				GOOD	Wide range in grain size	"Clean" materials (not enough fines to band coarse grains)	None	SW		0-5	-	>6	between 1 and 3
				SP		Poorly graded sands and gravelly sands, little or no fines				POOR	Predominantly one size or range of sizes			SP		0-5	-	Fails to comply with above	
		SANDY SOILS		SM		Silty sand, sand-silt mixtures				GOOD TO FAIR	"Dirty" materials (Excess of fines)	Fines are non-plastic (1)	None to medium	SM		12-50	Below 'A' line or Ip < 4	-	-
				SC		Clayey sands, sand-clay mixtures						Fines are plastic (1)		SC		12-50	Above 'A' line and Ip > 7	-	-
FINE GRAINED SOILS	More than 50% by dry mass, less than 60mm is less than 0.06mm	Liquid Limit less than 50%		ML		Inorganic silts, very fine sands, rock flour, silty or clayey fine sands.	Give typical name, indicate degree and character of plasticity, amount and maximum size of coarse grains, colour in wet condition, odour if any, local or geological name and r pertinent descriptive information, symbols in parenthesis. For undisturbed soil add information on structure, stratification, consistancy in undisturbed and remoulded states, moisture and drainage conditions. EXAMPLE Clayey Silt, brown, low plasticity, small percentage of fine sand, numerous vertical root-holes, firm and dry in place, fill, (ML).			SILT AND CLAY FRACTION								
										Fraction smaller than 0 20mm AS sieve size									
										DRY STRENGTH	DILATANCY	TOUGHNESS							
				CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.				None to low	Quick to slow	None		ML		Below 'A' line			
				OL		Organic silts and organic silty clays of low plasticity				Medium to high	None to very slow	Medium		CL		Above 'A' line			
		Liquid Limit more than 50%		MH		Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts.				Low to medium	Slow	Low		OL		Below 'A' line			
				CH		Inorganic clays of high plasticity, fat clays.				Low to medium	Slow to none	Low to medium		MH		Below 'A' line			
				OH		Organic clays of medium to high plasticity.				High to very high	None	High		CH		Above 'A' line			
										Medium to high	None to very slow	Low to medium		OH		Below 'A' line			
				Pt		Peat muck and other highly organic soils.				Readily identified by colour, odour, spongy feel and generally by fibrous texture				Pt*					

Determine approximate percentages of material over 60mm size, maximum size, shape, surface texture, hardness of material, geological description identify on estimated percentage mass of the various fractions.

COARSE GRAINED SOILS — More than half of the material less than 60mm is larger than 0.06mm

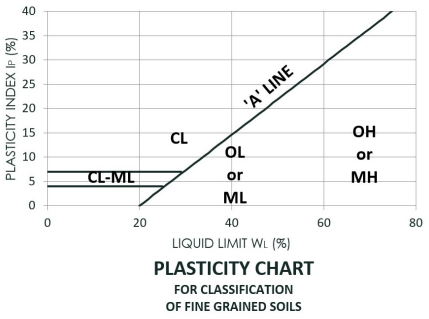
FINE GRAINED SOILS — More than half of the material less than 50mm is less than 0.06mm

0.06mm is about the smallest particle visible to the naked eye

Use the gradation curve of material passing 60mm for classification of fractions according to criteria given under 'Major Division'.

More than 50% passing 0.06mm

*Effervescence with H2O2



PLASTICITY CHART
FOR CLASSIFICATION OF FINE GRAINED SOILS

ACT Geotechnical Engineers

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PO Box 9225, Deakin ACT 2600
Ph: (02) 6285 1547

Limitations in the Use and Interpretation of this Geotechnical Report

Our Professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

The geotechnical report was prepared for the use of the Owner in the design of the subject development and should be made available to potential contractors and/or the Contractor for information on factual data only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the interpretive borehole and test pit logs, cross- sections, or discussion of subsurface conditions contained herein.

The analyses, conclusions and recommendations contained in the report are based on site conditions as they presently exist and assume that the exploratory bore holes, test pits, and/or probes are representative of the subsurface conditions of the site. If, during construction, subsurface conditions are found which are significantly different from those observed in the exploratory bore holes and test pits, or assumed to exist in the excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between conducting this investigation and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, this report should be reviewed to determine the applicability of the conclusions and the recommendations considering the changed conditions and time lapse.

The summary bore hole and test pit logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the test holes progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

The bore hole and test pit logs and related information depict subsurface conditions only at the specific locations and at the particular time designated on the logs. Soil conditions at the other locations may differ from conditions occurring at these bore hole and test pit locations. Also, the passage of time may result in a change in the soil conditions at these test locations.

Groundwater levels often vary seasonally. Groundwater levels reported on the boring logs or in the body of the report are factual data only for the dates shown.

Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, bore holes or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended that the Owner consider providing a contingency fund to accommodate such potential extra costs.

This firm cannot be responsible for any deviation from the intent of this report including, but not restricted to, any changes to the scheduled time of construction, the nature of the project or the specific construction methods or means indicated in this report: nor can our company be responsible for any construction activity on sites other than the specific site referred to in this report.

APPENDIX C
Qualitative Terminology & Risk Matrix

Attachment 1 – Risk Assessment Matrix

E – Extreme risk – detailed action plan required
H - High risk – needs senior management attention
M – Medium risk – specify management responsibility
L – Low risk – manage by routine procedures

High or **Extreme** risks must be reported to Senior Management and require detailed treatment plans to reduce the risk to **Low** or **Medium**.

	Consequence →				
People	Injuries or ailments not requiring medical treatment.	Minor injury or First Aid Treatment Case.	Serious injury causing hospitalisation or multiple medical treatment cases.	Life threatening injury or multiple serious injuries causing hospitalisation.	Death or multiple life threatening injuries.
Reputation	Internal Review	Scrutiny required by internal committees or internal audit to prevent escalation.	Scrutiny required by external committees or ACT Auditor General's Office, or inquest, etc.	Intense public, political and media scrutiny. Eg: front page headlines, TV, etc.	Assembly inquiry or Commission of inquiry or adverse national media.
Business Process & Systems	Minor errors in systems or processes requiring corrective action, or minor delay without impact on overall schedule.	Policy procedural rule occasionally not met or services do not fully meet needs.	One or more key accountability requirements not met. Inconvenient but not client welfare threatening.	Strategies not consistent with Government's agenda. Trends show service is degraded.	Critical system failure, bad policy advice or ongoing non-compliance. Business severely affected.
Financial	1% of Budget or <$5K	2.5% of Budget or <$50K	> 5% of Budget or <$500K	> 10% of Budget or <$5M	>25% of Budget or >$5M
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
	1	2	3	4	5

Likelihood ↑	Probability:	Historical:						
	>1 in 10	Is expected to occur in most circumstances	5	**Almost Certain**	**M**	**H**	**H**	**E**	**E**
	1 in 10 - 100	Will probably occur	4	**Likely**	**M**	**M**	**H**	**H**	**E**
	1 in 100 – 1,000	Might occur at some time in the future	3	**Possible**	**L**	**M**	**M**	**H**	**E**
	1 in 1,000 – 10,000	Could occur but doubtful	2	**Unlikely**	**L**	**M**	**M**	**H**	**H**
	1 in 10,000 – 100,000	May occur but only in exceptional circumstances	1	**Rare**	**L**	**L**	**M**	**M**	**H**

Adapted from Standards Australia Risk Management AS/NZS 4360: 2004

APPENDIX D
Flowchart of Landslide Risk Management

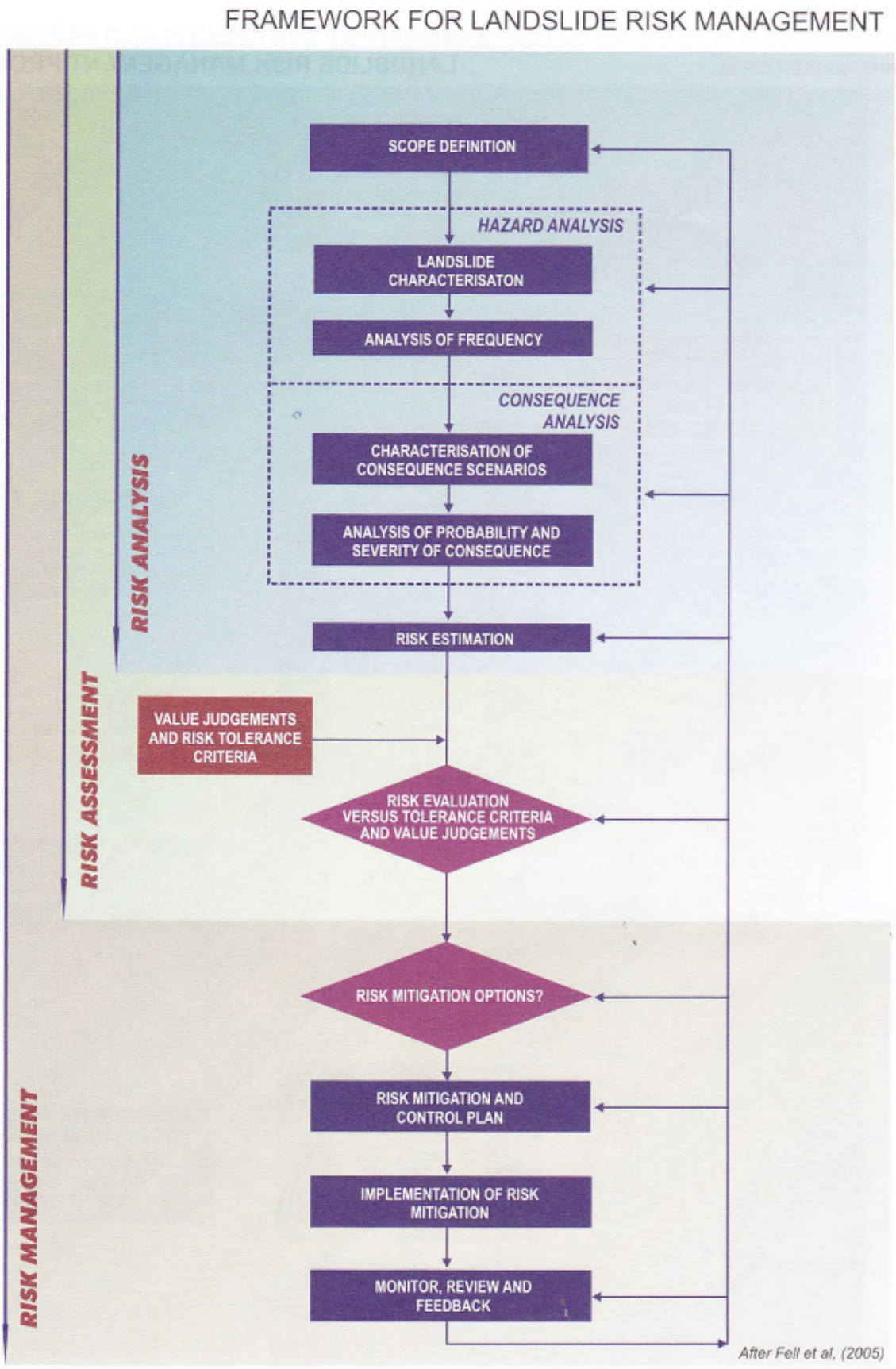
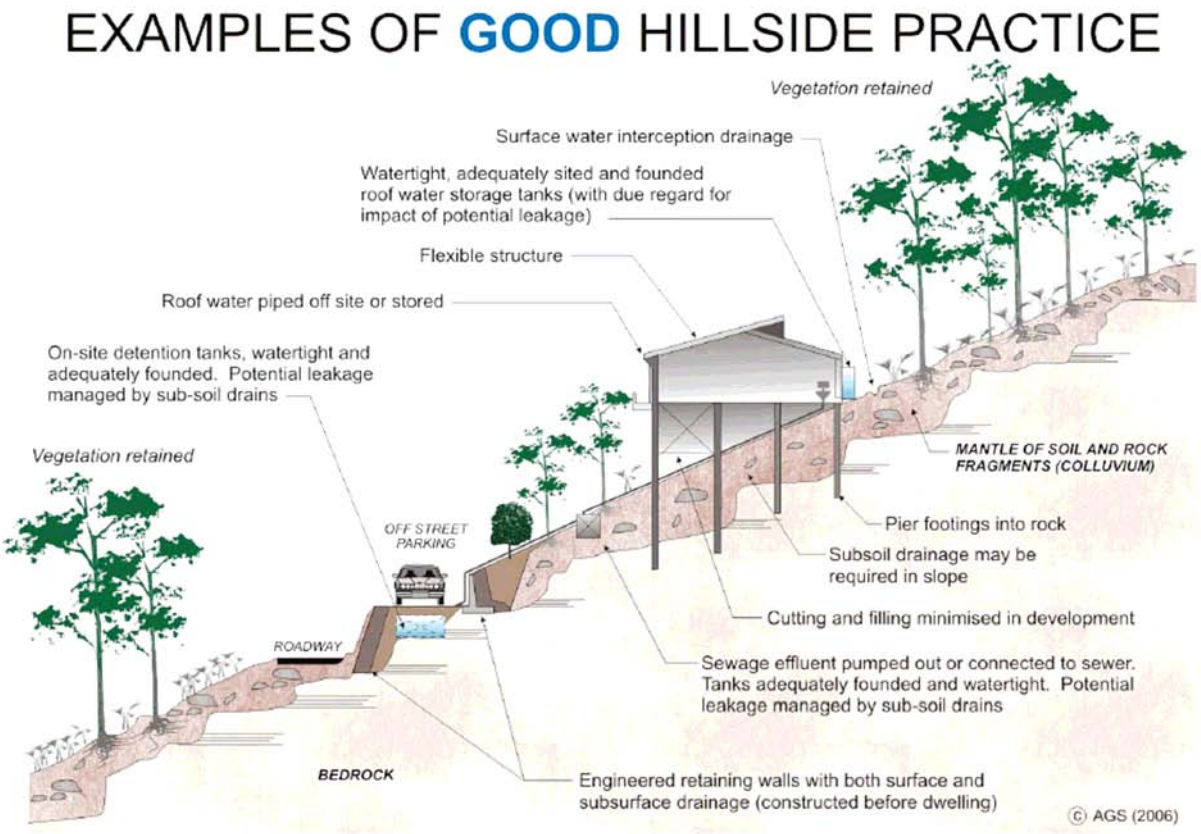


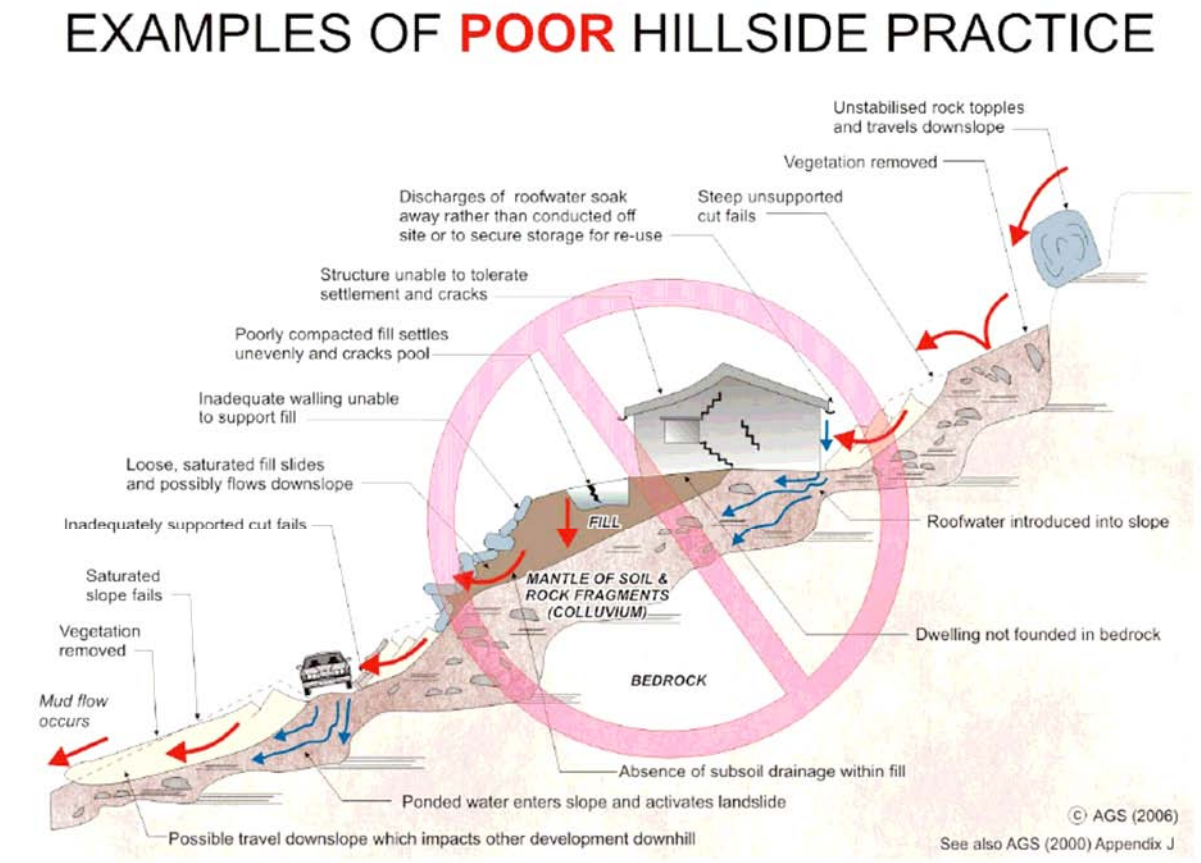
Figure 2: Abbreviated flowchart for Landslide Risk Management.
Ref: AGS (2007a, 2007c)

APPENDIX E
Hillside Construction Guideline

APPENDIX G - SOME GUIDELINES FOR HILLSIDE CONSTRUCTION

	GOOD ENGINEERING PRACTICE	*POOR ENGINEERING PRACTICE*
ADVICE		
GEOTECHNICAL ASSESSMENT	Obtain advice from a qualified, experienced geotechnical practitioner at early stage of planning and before site works.	Prepare detailed plan and start site works before geotechnical advice.
PLANNING		
SITE PLANNING	Having obtained geotechnical advice, plan the development with the risk arising from the identified hazards and consequences in mind.	Plan development without regard for the Risk.
DESIGN AND CONSTRUCTION		
HOUSE DESIGN	Use flexible structures which incorporate properly designed brickwork, timber or steel frames, timber or panel cladding. Consider use of split levels. Use decks for recreational areas where appropriate.	Floor plans which require extensive cutting and filling. Movement intolerant structures.
SITE CLEARING	Retain natural vegetation wherever practicable.	Indiscriminately clear the site.
ACCESS & DRIVEWAYS	Satisfy requirements below for cuts, fills, retaining walls and drainage. Council specifications for grades may need to be modified. Driveways and parking areas may need to be fully supported on piers.	Excavate and fill for site access before geotechnical advice.
EARTHWORKS	Retain natural contours wherever possible.	Indiscriminatory bulk earthworks.
CUTS	Minimise depth. Support with engineered retaining walls or batter to appropriate slope. Provide drainage measures and erosion control.	Large scale cuts and benching. Unsupported cuts. Ignore drainage requirements
FILLS	Minimise height. Strip vegetation and topsoil and key into natural slopes prior to filling. Use clean fill materials and compact to engineering standards. Batter to appropriate slope or support with engineered retaining wall. Provide surface drainage and appropriate subsurface drainage.	Loose or poorly compacted fill, which if it fails, may flow a considerable distance including onto property below. Block natural drainage lines. Fill over existing vegetation and topsoil. Include stumps, trees, vegetation, topsoil, boulders, building rubble etc in fill.
ROCK OUTCROPS & BOULDERS	Remove or stabilise boulders which may have unacceptable risk. Support rock faces where necessary.	Disturb or undercut detached blocks or boulders.
RETAINING WALLS	Engineer design to resist applied soil and water forces. Found on rock where practicable. Provide subsurface drainage within wall backfill and surface drainage on slope above. Construct wall as soon as possible after cut/fill operation.	Construct a structurally inadequate wall such as sandstone flagging, brick or unreinforced blockwork. Lack of subsurface drains and weepholes.
FOOTINGS	Found within rock where practicable. Use rows of piers or strip footings oriented up and down slope. Design for lateral creep pressures if necessary. Backfill footing excavations to exclude ingress of surface water.	Found on topsoil, loose fill, detached boulders or undercut cliffs.
SWIMMING POOLS	Engineer designed. Support on piers to rock where practicable. Provide with under-drainage and gravity drain outlet where practicable. Design for high soil pressures which may develop on uphill side whilst there may be little or no lateral support on downhill side.	
DRAINAGE		
SURFACE	Provide at tops of cut and fill slopes. Discharge to street drainage or natural water courses. Provide general falls to prevent blockage by siltation and incorporate silt traps. Line to minimise infiltration and make flexible where possible. Special structures to dissipate energy at changes of slope and/or direction.	Discharge at top of fills and cuts. Allow water to pond on bench areas.
SUBSURFACE	Provide filter around subsurface drain. Provide drain behind retaining walls. Use flexible pipelines with access for maintenance. Prevent inflow of surface water.	Discharge roof runoff into absorption trenches.
SEPTIC & SULLAGE	Usually requires pump-out or mains sewer systems; absorption trenches may be possible in some areas if risk is acceptable. Storage tanks should be water-tight and adequately founded.	Discharge sullage directly onto and into slopes. Use absorption trenches without consideration of landslide risk.
EROSION CONTROL & LANDSCAPING	Control erosion as this may lead to instability. Revegetate cleared area.	Failure to observe earthworks and drainage recommendations when landscaping.
DRAWINGS AND SITE VISITS DURING CONSTRUCTION		
DRAWINGS	Building Application drawings should be viewed by geotechnical consultant	
SITE VISITS	Site Visits by consultant may be appropriate during construction/	
INSPECTION AND MAINTENANCE BY OWNER		
OWNER'S RESPONSIBILITY	Clean drainage systems; repair broken joints in drains and leaks in supply pipes. Where structural distress is evident see advice. If seepage observed, determine causes or seek advice on consequences.	


EXAMPLES OF GOOD HILLSIDE PRACTICE
Vegetation retained
Surface water interception drainage
Watertight, adequately sited and founded roof water storage tanks (with due regard for impact of potential leakage)
Flexible structure
Roof water piped off site or stored
On-site detention tanks, watertight and adequately founded. Potential leakage managed by sub-soil drains
Vegetation retained
OFF STREET PARKING
ROADWAY
BEDROCK
MANTLE OF SOIL AND ROCK FRAGMENTS (COLLUVIUM)
Pier footings into rock
Subsoil drainage may be required in slope
Cutting and filling minimised in development
Sewage effluent pumped out or connected to sewer. Tanks adequately founded and watertight. Potential leakage managed by sub-soil drains
Engineered retaining walls with both surface and subsurface drainage (constructed before dwelling)
© AGS (2006)


EXAMPLES OF POOR HILLSIDE PRACTICE
Unstabilised rock topples and travels downslope
Vegetation removed
Discharges of roofwater soak away rather than conducted off site or to secure storage for re-use
Steep unsupported cut fails
Structure unable to tolerate settlement and cracks
Poorly compacted fill settles unevenly and cracks pool
Inadequate walling unable to support fill
Loose, saturated fill slides and possibly flows downslope
Inadequately supported cut fails
FILL
Roofwater introduced into slope
Saturated slope fails
MANTLE OF SOIL & ROCK FRAGMENTS (COLLUVIUM)
Vegetation removed
Dwelling not founded in bedrock
BEDROCK
Mud flow occurs
Absence of subsoil drainage within fill
Ponded water enters slope and activates landslide
Possible travel downslope which impacts other development downhill
© AGS (2006)
See also AGS (2000) Appendix J

Appendix F
Kosciuszko Alpine Resorts – Geotechnical Policy – Form 1

NSW GOVERNMENT Planning & Environment

Geotechnical Policy
Kosciuszko Alpine Resorts

Form 1 – Declaration and certification made by geotechnical engineer or engineering geologist in a geotechnical report.

DA Number: _____

To be submitted with a development application

You can use Form 1 to verify that the author of a geotechnical report is a geotechnical engineer or engineering geologist as defined by the Department of Planning & Environment (DP&E) Geotechnical Policy. Alternatively, where a geotechnical report has been prepared by a professional person not recognised by DP&E Geotechnical Policy, then Form 1 may be used as technical verification of the geotechnical report if signed by a geotechnical engineer or engineering geologist as defined by the DP&E Geotechnical Policy.

Please contact the Alpine Resorts Team in Jindabyne for further information - phone 02 6456 1733.

To complete this form, please place a cross in the appropriate boxes ☐ and complete all sections.

1. Declaration made by geotechnical engineer or engineering geologist as part of a geotechnical report

I,

Mr ☑ Ms ☐ Mrs ☐ Dr ☐ Other ☐

First Name: Jeremy

Family Name: Murray

OF

Company/organisation: ACT Geotechnical Engineers

on this the 2nd day of May 2023

certify that I am a geotechnical engineer or engineering geologist as defined by the "Policy" and I (tick appropriate box)

☑ prepared the geotechnical report referenced below in accordance with the AGS 2000 and DP&E Geotechnical Policy – Kosciuszko Alpine Resorts.

☑ am willing to technically verify that the Geotechnical Report referenced below has been prepared in accordance the AGS 2000 and DP&E Geotechnical Policy – Kosciuszko Alpine Resorts.

2. Geotechnical Report Details

Report Title: Proposed Demolition & Redevelopment - Sawblick Lodge - 10 Bobuck Lane, Thredbo

Author: Jeremy Murray

Dated: 26/4/2023

DA Site Address: 10 Bobuck Lane, Thredbo, NSW

DA Applicant:

I am aware that the Geotechnical Report I have either prepared or am technically verifying, (referenced above) is to be submitted in support of a development application for the proposed development site (referenced above), and it's findings will be relied upon by the Consent Authority in determining the development application.

3. Checklist of essential requirements to be contained in a geotechnical risk assessment report to be submitted with a development application

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Report. This checklist is to accompany the report.

Please tick appropriate box

- ☑ Risk assessment of all identifiable geotechnical hazards in accordance with AGS 2000, as per 6.1 (a) of the policy.
- ☑ Site plans with key hazards identified and other information as per 6.1 (b)
- ☑ Details of site investigation and inspections as per 6.1 (c)
- ☑ Photographs and/or drawings of the site as per 6.1 (d)
- ☑ Presentation of geotechnical model as per 6.1 (e)
- ☑ A specific conclusion as to whether the site is suitable for the development proposed on the above site, if applicable, subject to the following conditions;
  - ☑ Conditions to be provided to establish design parameters,
  - ☑ Conditions to be incorporated into the detailed design to be submitted for the construction certificate,
  - ☑ Conditions applying to the construction phase,
  - ☑ Conditions relating to ongoing management of the site/structure.

4. Signatures

Signature

Chartered professional status

CP Eng # 2122247

Name

Jeremy Murray

Date

2/5/23

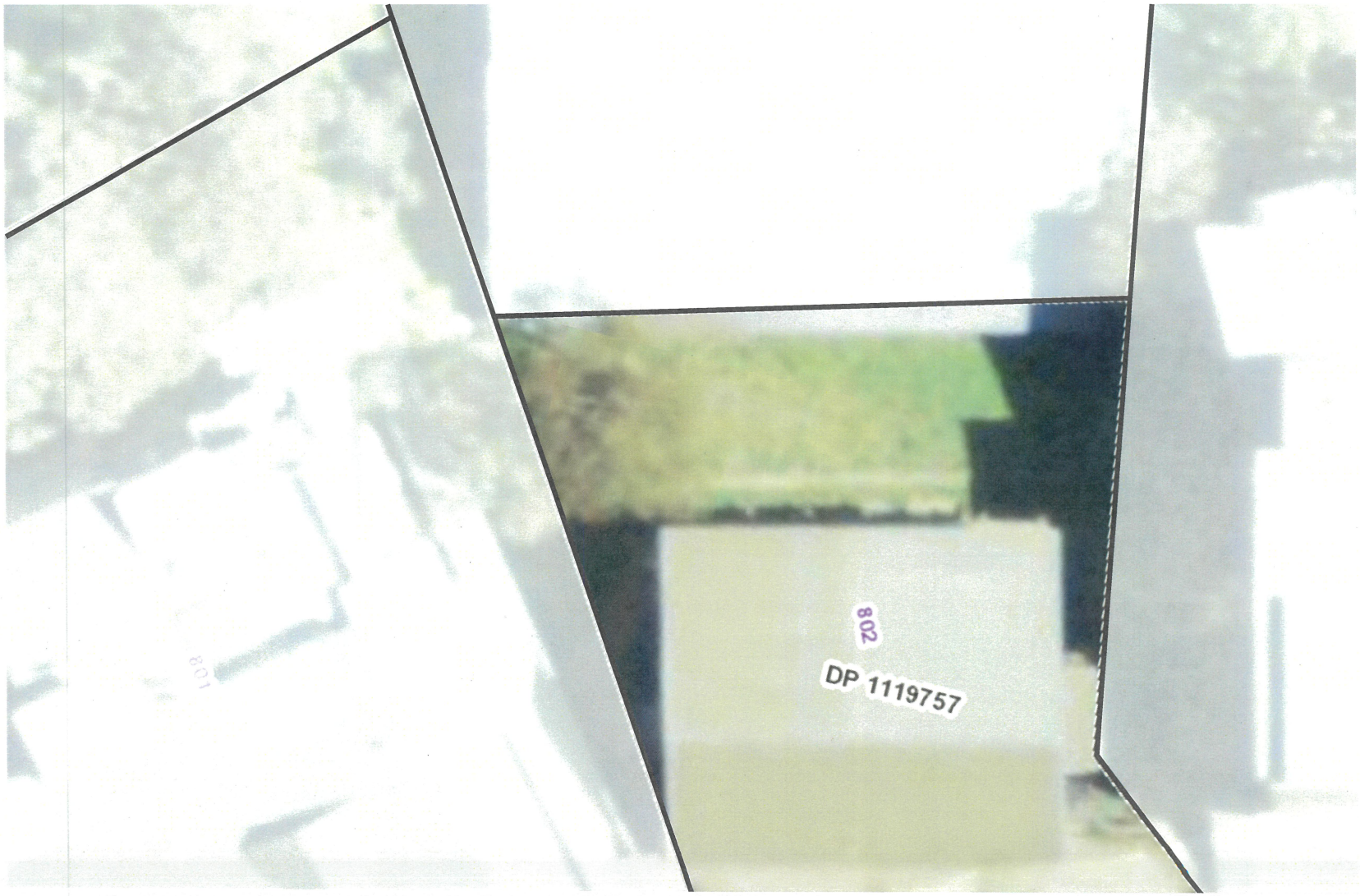
5. Contact details

Department of Planning & Environment
Alpine Resorts Team
Shop 5A, 19 Snowy River Avenue
PO Box 36, JINDABYNE 2627
Telephone: 02 6456 1733
Facsimile: 02 6456 1736
Email: alpineresorts@planning.nsw.gov.au

Appendix G
Architectural Plans

Sonnblick Lodge

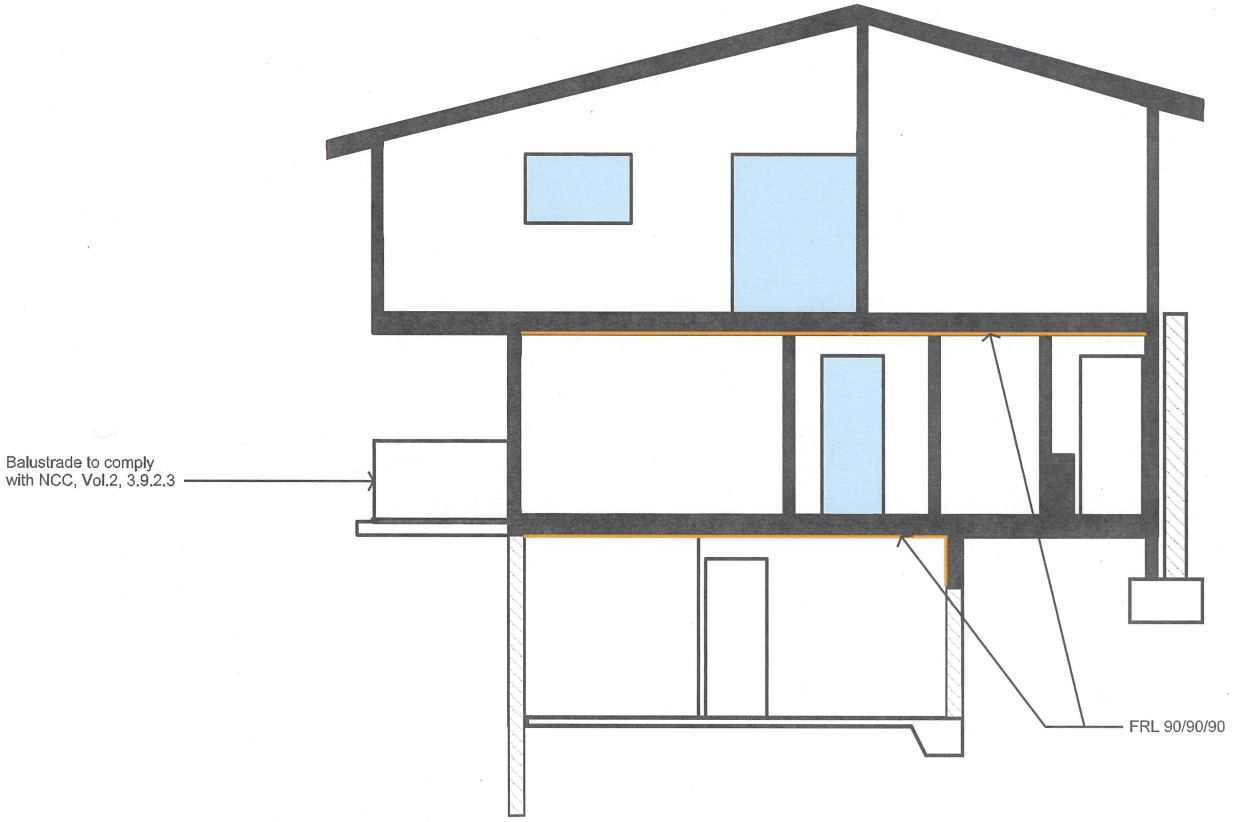
Date: November 7, 2019



CONTENTS

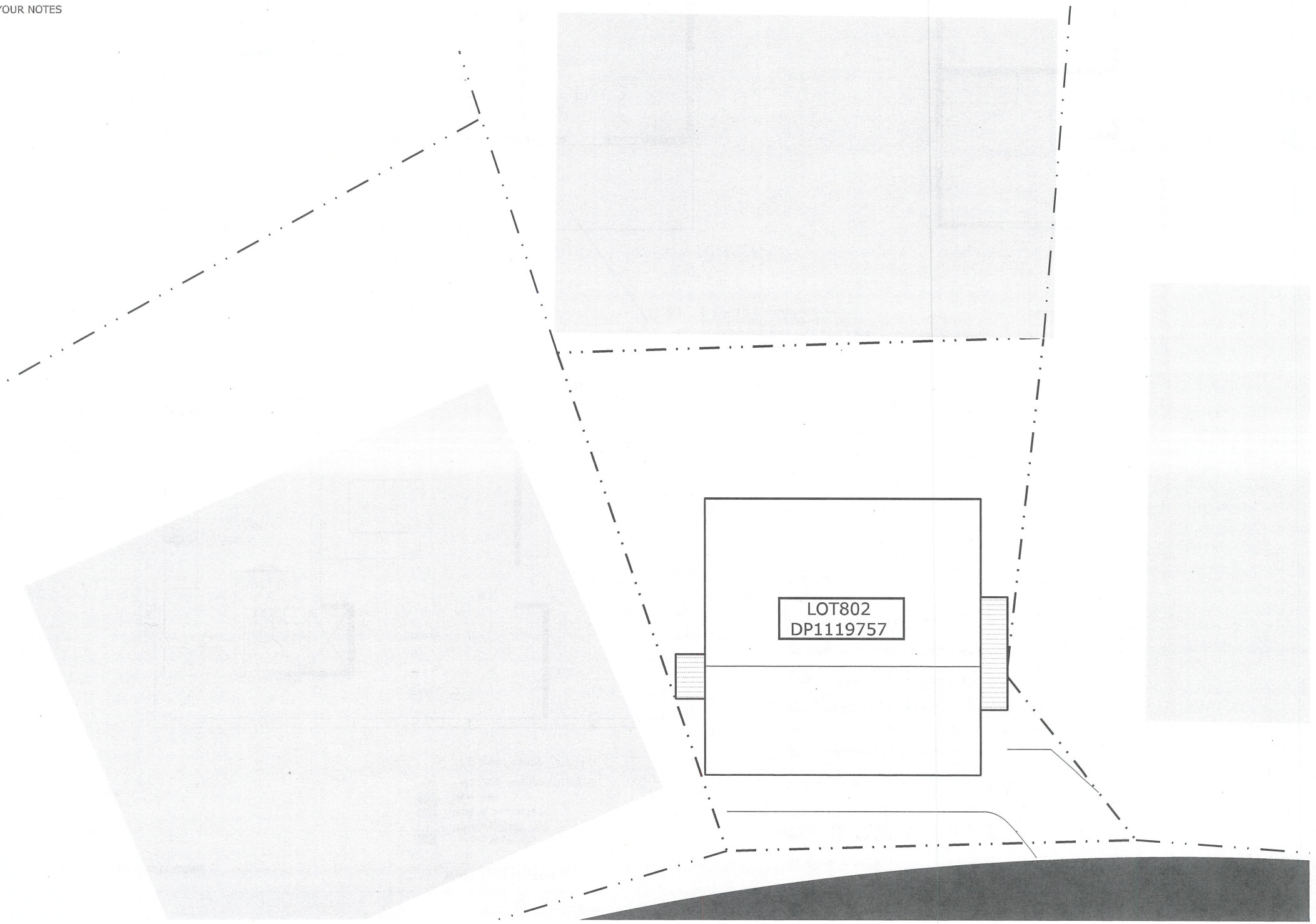
TYPE LEGEND

- Timber
- Masonry Block
- Concrete
- FRL: Load Bearing 90/90/90
  Non-load Bearing -/60/60



GENERAL NOTES

ADD YOUR NOTES



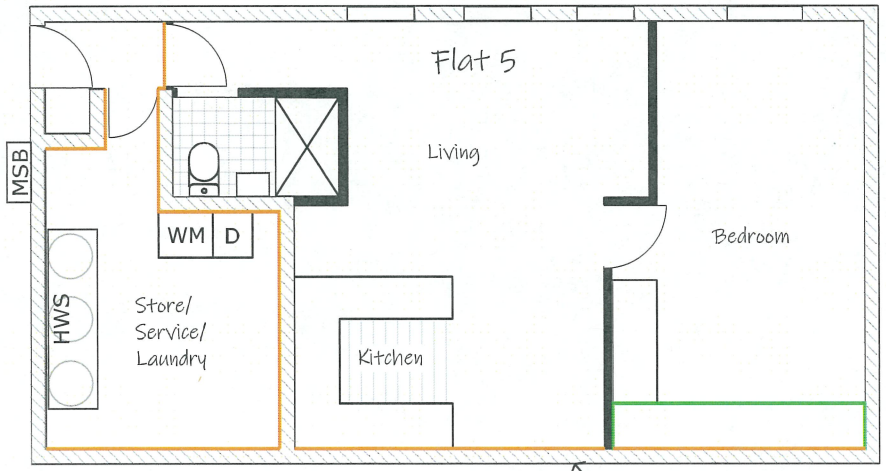
FLOOR FINISHES LEGEND

- Decking
- Wet areas

WALL TYPE LEGEND

- Timber Wall
- Masonry Block Wall
- Wall to be deleted
- New Wall
- FRL: Load Bearing 90/90/90

Non-load Bearing -/60/60



1 / A102 Level 1

Scale: 1 : 100

GENERAL NOTES

WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. CONTRACTORS SHALL VERIFY ALL DIMENSIONS ON SITE

Waterproofing needs to be replaced in all Wet areas

All Kitchen joinery to be Replaced

All existing joinery to be replaced

Fire Panel and smoke detectors to be serviced and certified

Exposed Beam ceilings in Flats 2, 3, 4, 5, to Achieve FRL 90/90/90

All ceiling penetrations to comply with FRL 90/90/90

All Internal Doors to be Replaced

New Floor Coverings

New Light Fittings

Site may contain Asbestos

ABBREVIATIONS

WM - Washing Machir

D - Dryer

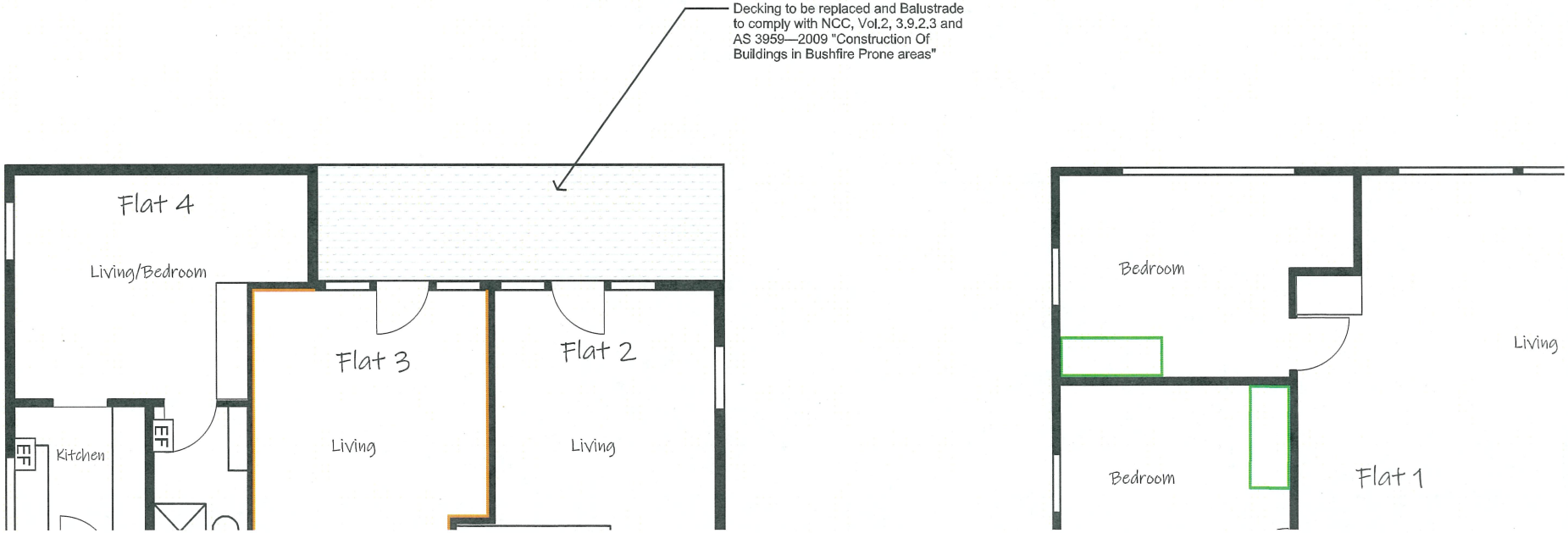
EF - Exhaust Fan

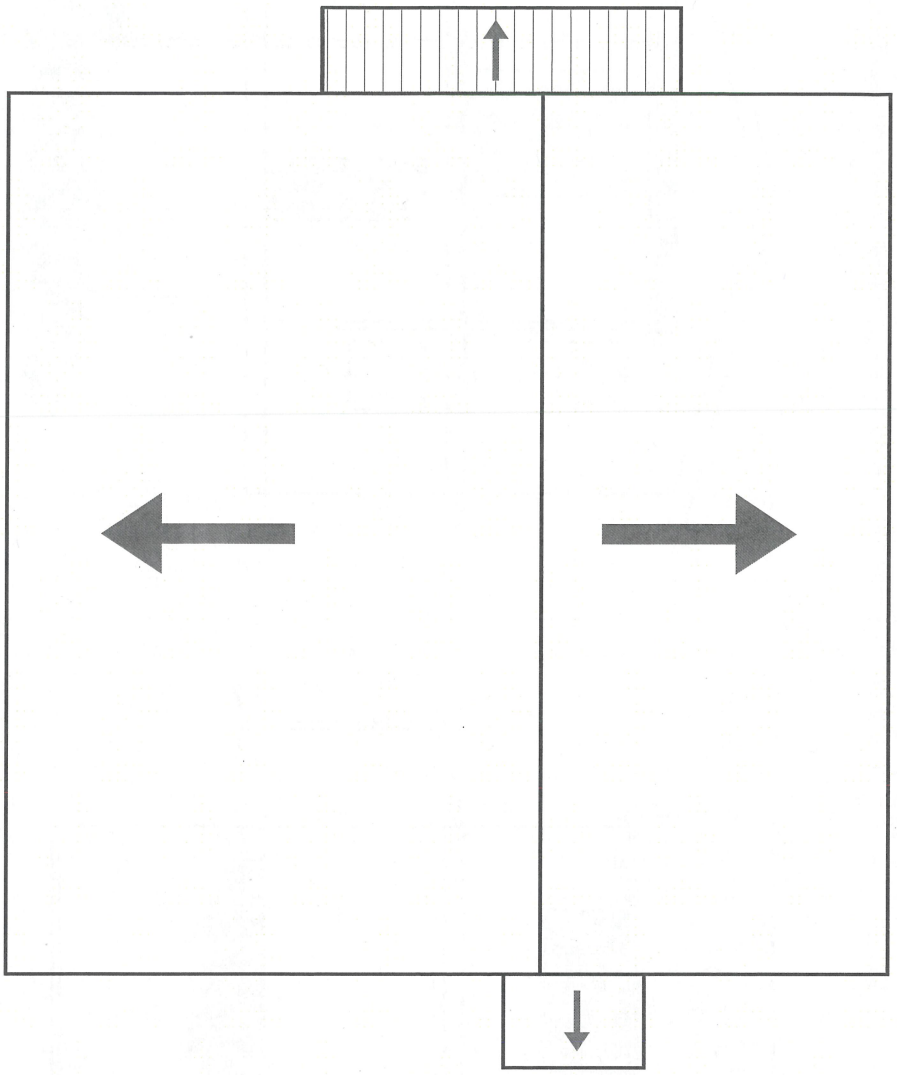
SB - Switch Board

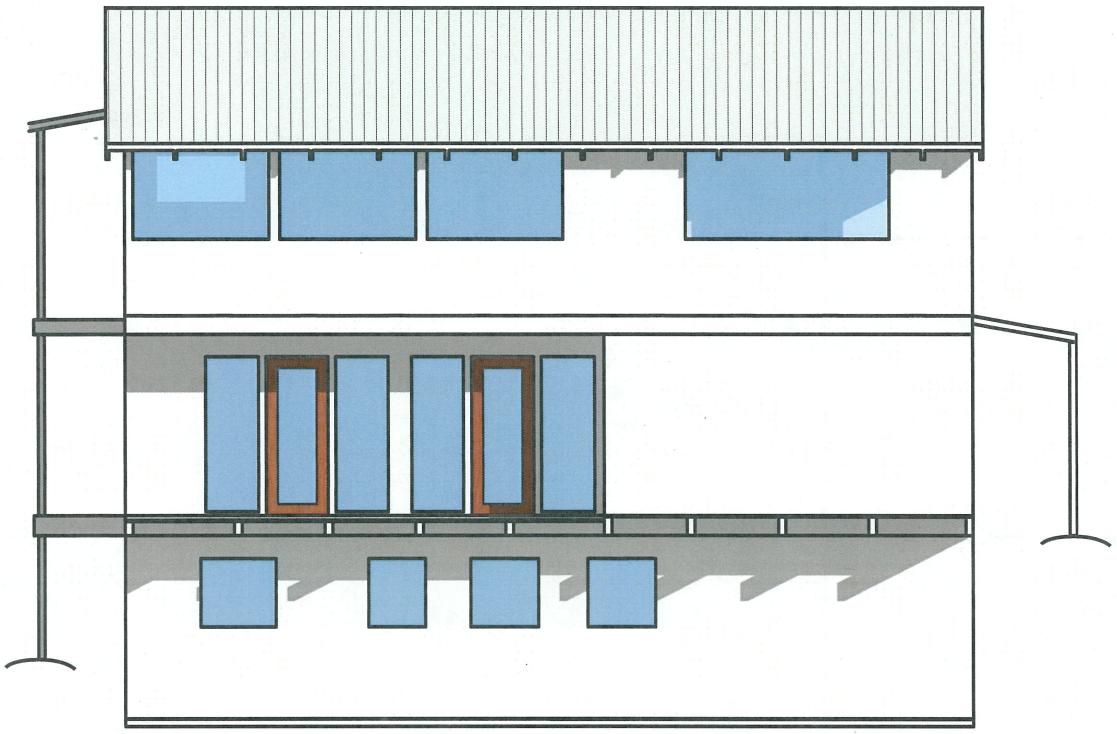
MSB - Main Switch Bc

FHR - Fire Hose Reel

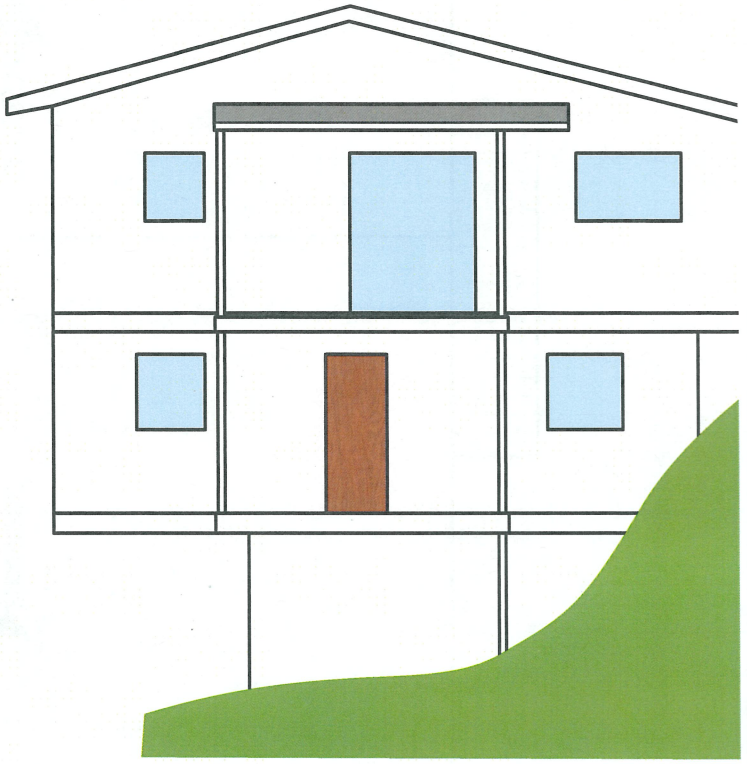
HWS - Hot Water Sys



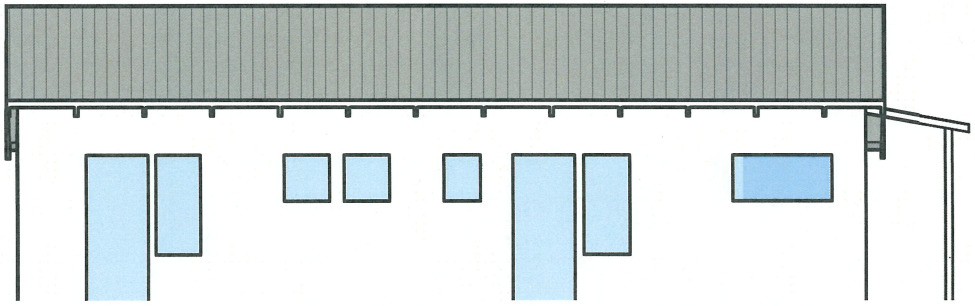


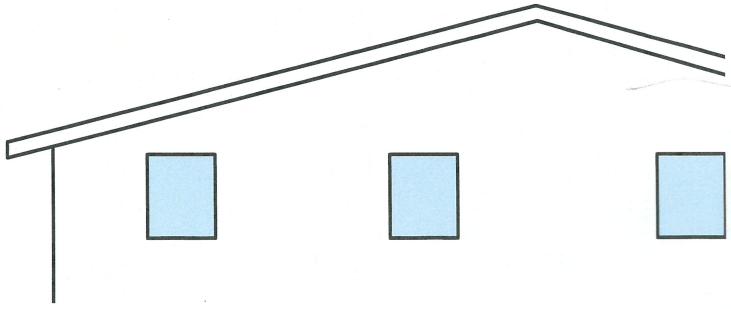


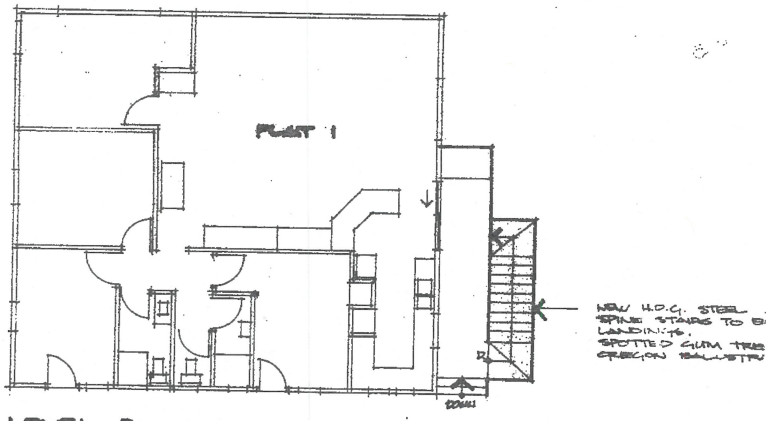
EN / A201 North Elevation
Scale: 1 : 100



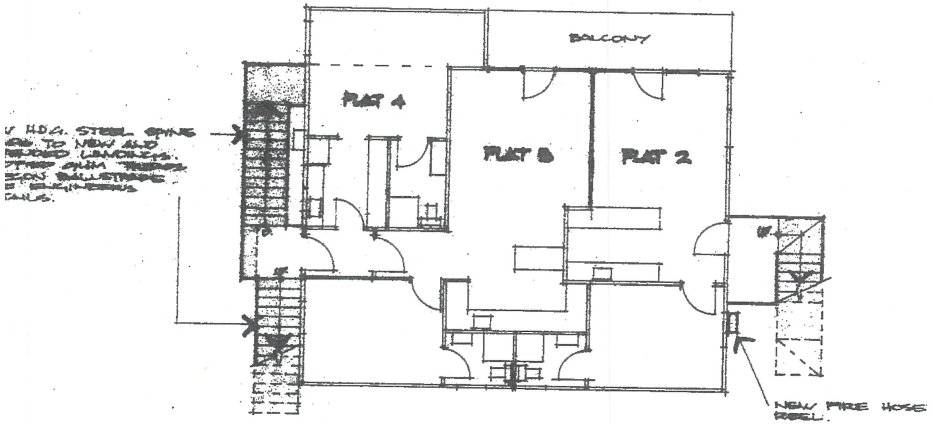
EN / A201 East Elevation
Scale: 1 : 100







LEVEL 3 1:100



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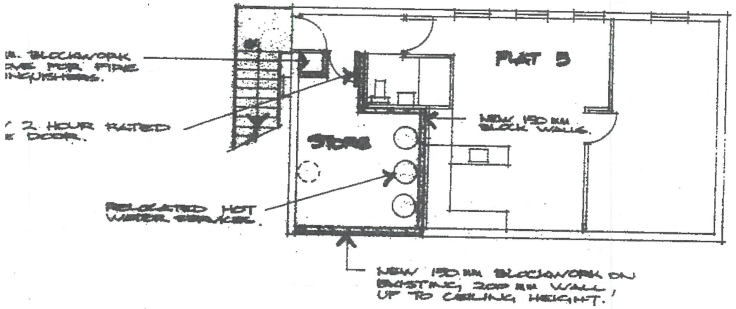


LEVEL 1 1:100

NOTES:

- PROVIDE FIRE ALARM SYSTEM IN ACCORDANCE WITH AS 1670 TO FLATS 1,2,3,4,5, PLANT ROOM AND STORE.
'AS EXECUTED' DWG. WILL BE SUBMITTED.
PROVISION HAS BEEN MADE FOR CONNECTION TO FIRE'S [illegible]

Appendix C Biodiversity reporting

28 November 2023

Andrew Harrigan
Property and Development Manager
Kosciuszko Thredbo Pty Ltd
PO Box 92 Thredbo NSW 2625

Andrew_Harrigan@evt.com
cc: euan_diver@evt.com
chloe_chalk@evt.com

Dear Andrew Harrigan,

Re: 230203 – Sonnblick Lodge Demolition BOS Evaluation Report

It is understood that development approval is required from the NSW Department of Planning and Environment (DPE) to proceed with demolition of the building and associated concrete paths, landings, and stairs of Sonnblick Lodge located 10 Bobuck Lane Thredbo, NSW 2625. The site is located within Lot 802 DP1119757, which is 339m^2 in size. The Statement of Environmental Effects (SEE) is to be submitted to DPE accompanying a Development Application and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) which requires the evaluation of the Biodiversity Offset Scheme (BOS) triggers.

This letter report aims to evaluate the proposed Sonnblick Lodge demolition works against the BOS triggers. NGH completed a site visit and desktop assessment to validate biodiversity values within the subject land. The results of this assessment are outlined within this letter.

The proposed demolition is located on 10 Bobuck Lane Thredbo. The site consists of a 58-year-old building (RP Data Pty Ltd, 2023) with exotic grasses and planted natives around the dwelling. The development footprint is 0.0145 ha. This is displayed in the Sonnblick Site layout Map (Appendix E).

This assessment is based on a provisional demolition design explained in the demolition projects fee proposal provided to NGH on the 9th of March 2023 (Appendix G), which may change in the future, and as such, impacts and advice provided in this report may also require updating.

The following key terms prescribed by the BOS are used to describe the proposal:

- **development footprint** – refers to the entirety of the area, which is subject to direct impact via proposed demolition, known as the proposal area in the SEE.
- **Subject land** – an area around the development footprint which may be subject to indirect impacts.

Context

Provided that the vegetation being cleared is native, then the BC Reg sets out threshold levels for when the BOS will be triggered. Triggering the BOS requires the preparation of Biodiversity Development Assessment Report (BDAR). The threshold has two criteria:

- Clearing of native vegetation exceeds an area threshold. The area threshold varies depending on the minimum lot size (as determined by the relevant Local Environmental Plan (LEP)), or actual lot size (where there is no minimum lot size provided for the relevant land under the LEP).
- Whether the impacts occur within areas mapped on the Biodiversity Values Map (BV Map) published by the Environment Agency Head.

If the area of native vegetation clearing does not meet the above thresholds:

- The impacts to threatened flora, fauna, populations and communities must be assessed against a Test of Significance (ToS) as per Section 7.3 of the BC Act. If a significant impact is considered likely, then the BOS applies to the proposed development.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as matters of national environmental significance (MNES). The EPBC Act requires an evaluation of the potential for impact upon MNES due to the proposal. The significance of MNES impacts must then be assessed in accordance with the *Significance impact guidelines 1.1 – matters of national environmental significance* (DoE, 2013) via an Assessment of Significance (AoS). Where a proposal is likely to have a significant impact on a matter of national environmental significance, the proposal is referred to the Federal Environment Minister.

Clearing thresholds

Methodology

To ascertain whether the proposal exceeds the native vegetation clearing thresholds, the minimum lot size must be determined along with the quantity of native vegetation to be cleared. This was undertaken by desktop assessment to determine minimum lot size, a field assessment to determine native vegetation extent and GIS analysis to determine area of native vegetation proposed to be cleared.

Results

Desktop assessment

There is no minimum lot size for Lot 802 DP1119757 according to the BV Map and Threshold Tool (NSW Government, 2023). Hence, the minimum lot size is equal to the entire lot size which is less than one hectare (0.03ha). As shown in Table 1, the native vegetation clearing threshold for the subject land is 0.25ha or more.

Table 1 Native vegetation area clearing thresholds (bold indicates the threshold that applies to the subject site)

Minimum lot size associated with the property	Threshold for clearing, above which the BAM and offsets scheme apply
Less than 1 ha	**0.25 ha or more**
1 ha to less than 40 ha	0.5 ha or more
40 ha to less than 1000 ha	1 ha or more
1000 ha or more	2 ha or more

Field survey

A field assessment was conducted on the 12th of May 2023 with two NGH ecologist assessing the subject land. The surrounding vegetation was classified as largely 'exotic'. Most of the vegetation surrounding the building was exotic grasses with no native grasses being recorded (as seen in Appendix). It was noted that there are planted native trees and shrubs including one, *Eucalyptus pauciflora* and one *Leptospermum grandifolium*, between the building and the adjacent lodges. One mature *E.pauciflora* tree will be impacted by the demolition as it is within the lot boundary. This is the only native vegetation being impacted by the proposed works and is calculated as around 30m^2 in area, or 0.003 ha.

GIS impact calculations

As shown in Table 2, 0.003 ha (~30m^2) of native vegetation is expected to require clearing. This falls under the BOS threshold; the proposal will not trigger the BOS on the basis of native vegetation clearing quantity.

Table 2 Native and exotic vegetation extent in subject land and development footprint

Location	Development footprint
Native vegetation	30m^2 (0.003ha)
Exotic vegetation*	27.84
Total	**339m^2 (0.03ha)**

Biodiversity Values mapping

Methodology

The Biodiversity Values Map (BV Map) identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing and was accessed through the online portal (Department of Planning and Environment, 2018). The BV Map is one of the triggers for determining whether the BOS applies to a clearing or development proposal.

Results

BV Mapping occurs around 50m north of the subject land along the Thredbo River. There is no BV Mapped land in the subject land or development footprint; the proposal will not trigger the BOS on the basis of BV Mapped land.

Test of Significance

Methods to undertake Tests of Significance involved desktop assessment and field inspection.

Desktop assessment

A desktop Investigation was undertaken for the subject land in May 2023. The following searches were conducted:

- BioNet species sightings search of threatened flora, fauna and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act). The search was conducted on the 11th of May 2023.
- Protected Matters Search Tool (PMST) for threatened species and populations listed under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999*. The search was conducted on the 11th of May 2023.
- Review of NSW Weedwise to identify priority weeds within the subject land. The search was conducted on the 15th of May 2023.

Field Assessment

The site inspection of the subject land was conducted by an accredited BAM assessor and an ecologist for approximately 1-hour on the 12th of May 2023. The site visit involved a walkover of subject land to determine the extent of impacts to native vegetation and threatened species. The external parts of the building were assessed for potential threatened fauna habitat. Vegetation surrounding the building was assessed and the vegetation cover was classified as 'native' or 'exotic'. The Sonnblick building was not inspected internally.

Results

The BioNet Atlas search returned 43 threatened entities with existing records within 10 km of the development footprint. These entities included 13 TECs, five (5) mammals, nine (9) flora species, nine (9) non-migratory birds, two (2) amphibians and two (2) reptile and three (3) migratory birds (Appendix A). The Commonwealth Protected Matters Search (MNES) returned 3 threatened ecological communities (TECs), 50 threatened species (15 flora species, 13 non-migratory birds, six (6) fish, three (3) amphibians, eight (8) mammals and five (5) reptiles) and 11 migratory species with potential to occur within the subject land (Appendix B). 114 priority weeds were identified for the local council areas of the Snowy Monaro Regional. All priority weeds are listed in Appendix F.

Threatened species and communities were evaluated for their potential to occur in the subject land and be impacted by the proposal. This evaluation is presented in Appendix C and has been informed by results of field work and vegetation associations listed in species profiles. Further discussion on the potential for threatened species to occur is given in the following sections.

Following assessment of each threatened entity, if entities are determined to have a moderate or high likelihood of impact, a test of significance (BC Act) and/or assessment of significance (EPBC Act) (depending on their listing) is required to be undertaken to determine the likely significance. If the assessment determines a significant impact, then the BOS is triggered. These assessments are provided in Appendix A.

Plant Community Types and Threatened Ecological Communities

A field assessment was conducted on the 12th of May 2023 with two NGH ecologist assessing the subject land. As already discussed, the subject land is dominated by exotic vegetation (and buildings) with three individual native plants. A Plant Community Type (PCT) is not present in the subject land and therefore there are no threatened ecological communities present either.

Terrestrial habitat and threatened species

The outside of the building and surrounding grounds was assessed for potential microbat and other threatened species habitat. Minimal suitable habitat was identified on the outside of the building, although an entry hole was seen in the roof which may act as an entry point for microbats. The roof cavity is limited as the internal ceilings are raked; however, it cannot be assumed that microbats are absent. Microbats are an adaptable species which can roost in various habitats, including buildings and roof cavities. The building in question has documented records of the NSW vulnerable Eastern False Pipistrelle within a 10km radius.

Assessment of impacts

The proposal involves building demolition, clearing of exotic grassland and a native tree in a total clearing area of 0.03ha. The likelihood of impacts of the proposed works was assessed for each NSW and Commonwealth threatened entity in a Habitat Evaluation Table, which can be found in Appendix C. The results of the Habitat Evaluation Table indicate that of all the entities assessed, only the BC Act listed Eastern False Pipistrelle has a high likelihood of being impacted by the proposed works through the removal of potential roost sites in the roof of the Lodge. A Test of Significance (ToS) was conducted for the Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) which can be found in Appendix D.

It is unknown whether Sonnblick Lodge is an active roost site for Eastern False Pipistrelle. Destruction of an active roost has potential to affect a colony of bats (the species roosts in colonies of three to 36 individuals); this would be a higher number across multiple generations if the roost were a maternity colony. However, the magnitude of impact would be sufficiently low that the proposal is unlikely to significantly impact the local population.

Notwithstanding, it is desirable to avoid any death of Eastern False Pipistrelles during the demolition. Following consultation with microbat expert Rodney Armistead, it was initially advised that works should be completed in autumn (March-May), preferably late autumn (April-May), with preclearance surveys to be conducted by an ecologist prior to demolition. However, we understand it is preferable to undertake works in the spring/summer season in preparation for the busy winter ski season. Therefore, we recommend pre-clearance inspection to be undertaken the morning demolition is scheduled and a fauna spotter catcher on site during works to remove and relocate any bats found during works. Greater detail can be found below.

In summary, the proposal is unlikely to cause a significant impact upon threatened entities listed under the BC Act or EPBC Act and would not trigger the BOS by this threshold.

Mitigation measures

A pre-clearance survey and fauna spotter catcher during demolition are recommended to prevent harm to Eastern False Pipistrelle Table 3. Pre-clearance survey can be undertaken by the fauna spotter catcher; and it would be helpful to have someone from the demolition crew present also to assist with removal of external ceiling panelling. The fauna spotter catcher would need to be vaccinated for Australian Bat Lyssavirus (rabies vaccine).

Table 3 Mitigation measures recommended for Sonnblick Lodge demolition to protect biodiversity values

Purpose	Mitigation measure	Timing
Prevent harm to Eastern False Pipistrelle in potential roost	Pre-clearance: Careful inspection of internal raked ceilings and other visible nooks that may provide habitat. Removal of external ceiling panelling near identified entry hole to inspect cavity for signs of microbats.	Morning of demolition, prior to works commencing
Prevent harm to Eastern False Pipistrelle in potential roost	Fauna spotter catcher: Present during roof removal, which is to be undertaken in stages, to intermittently inspect sections of roof and retrieve/relocate any bats found.	During demolition
Document outcome for future assessments	A brief (1 page) letter to be provided to DPE outlining steps taken to prevent harm and any outcomes.	Within 2 weeks following demolition.

Conclusion

The proposal was evaluation against the BOS triggers set out in the NSW Biodiversity Conservation Regulation 2017 and in accordance with the Commonwealth *Significance impact guidelines 1.1 – matters of national environmental significance* for threatened entities. Methods included desktop assessment, field survey, habitat evaluation and GIS calculations.

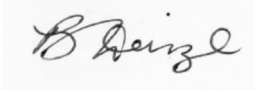
As there is no mapped minimum lot size for Lot 802 DP1119757, the entire lot size is used. For the 0.03ha lot, the threshold for native vegetation clearing is 0.25ha. The proposal clearing of native vegetation is approximately 0.003ha (one tree). Therefore the BOS is not triggered based on this criterion. There is no BV Mapped land in the subject land; therefore the proposal will not trigger the BOS based on this criterion. Following a habitat evaluation for species and communities returned from BioNet and PMST database searches, a Test of Significance was undertaken for Eastern False Pipistrelle. A significant impact is not considered likely to the population as a result of the population, and the proposal does not trigger the BOS on the basis of this criterion. However it was noted that there is potential for harm for a colony of the species should the roof space of the lodge host an active colony. Therefore it is recommended that a pre-clearance survey be undertaken along with a fauna spotter catcher present during demolition to retrieve and relocate any bats if present. A summary of the evaluation outcome is provided in Table 4.

Table 4 Summary of BOS evaluation outcome

	Question	Answer	Result
1	Does the clearing area exceed the offset scheme threshold?	Clearing threshold 0.25ha, proposed native vegetation clearing 0.003ha. Native vegetation clearing will not exceed clearing threshold.	BOS not triggered.
2	Is there any Biodiversity Values Mapping (BVM) over the subject land?	No BVM is found within the subject land. Additionally, no AOBV are present within the subject land.	BOS not triggered.
3	Are threatened entities likely to be significantly impacted by the proposed works	Significant impact to threatened entities considered unlikely.	BOS not triggered.

If you have any questions, please contact me or Leo Mangini on 07 3129 7633 . We would be pleased to discuss any aspect of this project with you further.

Yours sincerely,



Bianca Heinze
Technical Lead
02 6492 8351

Appendix A BioNet Atlas Search

Appendix A Bionet Atlas Records

V = Vulnerable, E = Endangered, CE = Critically Endangered as listed under the Biodiversity Conservation Act 2016 and Environmental Protection and Biodiversity Conservation Act 1999.

Scientific Name	Common Name	NSW Status	Commonwealth Status	Number of records (10km)
Argyrotegium nitidulum	Shining Cudweed	V	V	26
Calotis pubescens	Max Mueller's Burr-daisy	E	Not listed	7
Carex archeri	Archer's Carex	E	Not listed	3
Carex raleighii	Raleigh Sedge	E	Not listed	3
Pimelea bracteate	Pimelea bracteate	CE	Not listed	1
Pterostylis oreophila	Blue-tongued Greenhood	CE	CE	1
Ranunculus anemoneus	Anemone Buttercup	V	V	869
Rytidosperma pumilum	Feldmark Grass	V	V	69
Rytidosperma vickeryae	Perisher Wallaby-grass	E	Not listed	4
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	E	Not listed	N/A
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Not listed	N/A
Lowland Grassy Woodland in the South East Corner Bioregion	Lowland Grassy Woodland in the South East Corner Bioregion	E	Not listed	N/A
Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern	Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern	CE	Not listed	N/A

Highlands Bioregion Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Highlands Bioregion Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	E	Not listed	N/A
Natural Temperate Grassland of the South Eastern Highlands	Natural Temperate Grassland of the South Eastern Highlands	Not listed	CE	N/A
Snowpatch Feldmark in the Australian Alps Bioregion	Snowpatch Feldmark in the Australian Alps Bioregion	CE	Not listed	N/A
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	Not listed	N/A
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	E	Not listed	N/A
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	CE	Not listed	N/A
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	CE	N/A
Windswept Feldmark in the Australian Alps Bioregion	Windswept Feldmark in the	CE	Not listed	N/A

	Australian Alps Bioregion			
Litoria verreauxii alpina	Alpine Tree Frog	E	V	4
Pseudophryne corroboree	Southern Corroboree Frog	CE	CE	1
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	Not listed	2
Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	60
Daphoenositta chrysoptera	Varied Sittella	V	Not listed	1
Neophema chrysogaster	Orange-bellied Parrot	CE	CE	1
Pachycephala olivacea	Olive Whistler	V	Not listed	86
Petroica boodang	Scarlet Robin	V	Not listed	8
Petroica phoenicea	Flame Robin	V	Not listed	176
Petroica rodinogaster	Pink Robin	V	Not listed	36
Pycnoptilus floccosus	Pilotbird	Not listed	V	8
Apus pacificus	Fork-tailed Swift	Not listed	M	1
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Not listed	M	12
Hirundapus caudacutus	White-throated Needletail	Not listed	V M	8
Burramys parvus	Mountain Pygmy-possum	E	E	148
Dasyurus maculatus	Spotted-tailed Quoll	V	E	2

Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	Not listed	3
Mastacomys fuscus mordicus	Broad-toothed Rat (mainland), Tooarrana	V	V	83
Phascolarctos cinereus	Koala	E	E	1
Cyclodomorphus praealtus	Alpine She-oak Skink	E	E	57
Liopholis guthega	Guthega Skink	Not listed	E	403
Total records within 10km				**2084**

Appendix B Commonwealth Protected Matters Search (MNES)

EPBC Act Protected Matters Report

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

Report created: 11-May-2023

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	2
Wetlands of International Importance (Ramsar	8
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	52
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places			[Resource Information]
Name	State	Legal Status	Buffer Status
Historic			
Snowy Mountains Scheme	NSW	Listed place	In feature area
Natural			
Australian Alps National Parks and Reserves	ACT	Listed place	In feature area

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In buffer area only
Barmah forest	200 - 300km upstream from Ramsar site	In buffer area only
Blue lake	Within Ramsar site	In feature area
Gunbower forest	300 - 400km upstream from Ramsar site	In buffer area only
Hattah-kulkyne lakes	500 - 600km upstream from Ramsar site	In buffer area only
Nsw central murray state forests	200 - 300km upstream from Ramsar site	In buffer area only
Riverland	700 - 800km upstream from Ramsar site	In buffer area only
The coorong, and lakes alexandrina and albert wetland	700 - 800km upstream from Ramsar site	In buffer area only

Listed Threatened Ecological Communities			[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status

Community Name	Threatened Category	Presence Text	Buffer Status
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community known to occur within area	In feature area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community may occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In buffer area only
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat known to occur within area	In feature area
FISH			
Galaxias supremus Kosciuszko Galaxias [87878]	Critically Endangered	Species or species habitat known to occur within area	In buffer area only
Galaxias terenasus Roundsnout Galaxias [87175]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Maccullochella macquariensis Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In buffer area only
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FROG			
Litoria spenceri Spotted Tree Frog [25959]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Litoria verreauxii alpina Alpine Tree Frog, Verreaux's Alpine Tree Frog [66669]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Pseudophryne corroboree Southern Corroboree Frog [1915]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
MAMMAL			
Burramys parvus Mountain Pygmy-possum [267]	Endangered	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Mastacomys fuscus mordicus Broad-toothed Rat (mainland), Tooarrana [87617]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pseudomys fumeus](#) Smoky Mouse, Konoom [88]	Endangered	Species or species habitat known to occur within area	In feature area
[Pteropus poliocephalus](#) Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
PLANT			
[Argyrotegium nitidulum](#) Shining Cudweed [82043]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Calotis glandulosa](#) Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area	In feature area
[Colobanthus curtisiae](#) Curtis' Colobanth [23961]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Glycine latrobeana](#) Clover Glycine, Purple Clover [13910]	Vulnerable	Species or species habitat may occur within area	In feature area
[Haloragis exalata subsp. exalata](#) Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Leucochrysum albicans subsp. tricolor](#) Hoary Sunray, Grassland Paper-daisy [89104]	Endangered	Species or species habitat may occur within area	In feature area
[Pimelea bracteata](#) [8125]	Critically Endangered	Species or species habitat may occur within area	In feature area
[Pomaderris pallida](#) Pale Pomaderris [13684]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Prasophyllum bagoense](#) Bago Leek-orchid [84276]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prasophyllum petilum Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area	In feature area
Pterostylis oreophila Blue-tongued Orchid, Kiandra Greenhood [22903]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Ranunculus anemoneus Anemone Buttercup [14889]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rytidosperma pumilum Feldmark Grass [66716]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Cyclodomorphus praealtus Alpine She-oak Skink [64721]	Endangered	Species or species habitat known to occur within area	In feature area
Liopholis guthega Guthega Skink [83079]	Endangered	Species or species habitat known to occur within area	In feature area
Liopholis montana Mountain Skink [87162]	Endangered	Species or species habitat likely to occur within area	In feature area
Pseudemoia cryodroma Alpine Bog Skink, Alpine Bog-skink [84408]	Endangered	Species or species habitat known to occur within area	In feature area
Listed Migratory Species			[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves [Resource Information]

Protected Area Name	Reserve Type	State	Buffer Status
Kosciuszko	National Park	NSW	In feature area

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
Southern RFA	New South Wales	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Blue Lake (Kosciuszko)	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Snowies Iconic Walk	2019/8558	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Aerial dog baiting	2006/2791	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action (particular manner)				

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix C Habitat Evaluation Table

Habitat Evaluation Table

The tables in this appendix present the habitat evaluation for threatened species, ecological communities, and endangered populations listed within 10 km of the proposal area in the Atlas of NSW Wildlife[1] and those identified as potentially occurring in the area according to the Commonwealth EPBC Protected Matters Search Tool (PMST).[2]

The likelihood of occurrence is based on presence of habitat, proximity of nearest records, and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species, and its likelihood of occurrence. The following classifications are used:

Presence of Habitat

Present:	Potential or known foraging, roosting, nesting, refuge, movement corridor (including movement of genetic material) or other habitat is present within the study area.
Marginal:	Limited habitat with some features that may be used by species within the study area.
Absent:	No potential foraging, roosting, nesting, or other habitat is present within the study area.

Likelihood of Occurrence

Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10 km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10 km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Recorded	Species was recorded during the field investigations or has recorded previously.

Potential to be Impacted

Low	The proposal would not impact this species or its habitats. No Test of Significance (ToS) or Assessment of Significance (AoS) is necessary for this species.
Moderate	The proposal could impact this species or its habitats however the impacts are considered manageable such that no direct or indirect impacts are likely. Test of Significance (ToS) or Assessment of Significance (AoS) may be required for this species.
High	The proposal is likely to impact this species or its habitats. A ToS has been applied to these entities.

Key: V = Vulnerable, E = Endangered, CE = Critically Endangered, M = Migratory

[1] The NSW Bionet Atlas is administered by the Department of Planning and Environment (DPE) and is an online database of fauna and flora records that contains over four million recorded sightings.

[2] This online tool is designed for the public to search for matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is managed by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

A.1 Flora and Threatened Ecological Communities

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Flora (18)								
Argyrotegium nitidulum **Shining Cudweed**	V	V	The shining cudweed appears to be dependent on damp bare ground for recruitment and persistence. Usually found in herbfield or open heathland, above or close to the treeline. Flowers appear from December to March.	26 (1949-2022)	Absent	Low	Low	No suitable habitat will be impacted.
Calotis pubescens **Max Mueller's Burr-daisy**	E	-	Grows in subalpine treeless plains in herb-rich grassland (often dominated by *Poa hookeri*); not subject to periodic inundation. Its response to disturbance is largely unknown.	7 (2013-2022)	Absent	Low	Low	No suitable habitat will be impacted. Closest record over 9 km away
Carex archeri **Archer's Carex**	E	-	*Carex archeri* occurs in the headwaters of streams within the alpine zone of the Kosciuszko area of the southern tablelands of NSW, and in Victoria and Tasmania. Additionally occurs in damp alpine herbfields.	3 (1951-1980)	Absent	Low	Low	No suitable habitat will be impacted. Closest record over 3 km away
Carex raleighii **Raleigh Sedge**	E	-	Grows in sphagnum bogs and high mountain wetlands, as well as damp grasslands and stream-edges of sub-alpine plains.	3 (1997)	Absent	Low	Low	No suitable habitat will be impacted. Closest record over 7.5 km away
Colobanthus curtisiae **Curtis' Colobanth**	-	V	Rainfall varies from 530 mm in the Midlands area to 1400 mm on Ben Lomond. The species is most commonly found on soils derived from sandstone as well as clay loams derived from dolerite and basalt. Chiefly in the mountainous and southern regions of South America, New Zealand, & Australia. Australia.	PMST	Marginal	Low	Low	No suitable habitat will be impacted. Not associated with PCT.
Glycine latrobeana **Clover Glycine, Purple Clover**	CE	V	The Clover Glycine occurs mainly in grassland and grassy woodland habitats, less often in dry forests, and only rarely in heathland. Populations occur from sea level to c. 1,200 m altitude. Soils are usually clay but may also have high loam content.	PMST	Marginal	Low	Low	No suitable habitat will be impacted. Not associated with PCT.
Haloragis exalata subsp. exalata **Wingless Raspwort, Square Raspwort**	V	V	Square Raspwort appears to require protected and shaded damp situations in riparian habitats. Haloragis exalata subsp. exalata is presently known from a range of vegetation types, all of which appear to have a history of recurrent disturbance. It appears to be a post-disturbance coloniser, based on observations of large numbers of plants on disturbed roadsides, cleared power-line easements, and recently burnt or flooded areas. Habitat critical for survival has not been accurately defined for this species Flowering specimens in NSW are recorded from November to January.	PMST	Absent	Low	Low	No suitable habitat will be impacted. Not a riparian zone.
Leucochrysum albicans subsp. tricolor	E	E	Occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Can occur in modified habitats such as semi-urban areas	PMST	Present	Moderate	Moderate	The site is highly disturbed and contains bare ground. Although

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Hoary Sunray, Grassland Paper-daisy			and roadsides. Highly dependent on the presence of bare ground for germination. In some areas, disturbance is required for successful establishment.					no evidence of the species was found during site visit. As such no ToS will be required.
Pimelea bracteata	CE	-	*Pimelea bracteata* occurs in wetlands and along waterways and stream edges in high altitude treeless subalpine valleys. It can also occur in wet heathland and closed heath.	1 (2022)	Absent	Low	Low	No suitable habitat will be impacted. Not a wetland area.
Pale Pomaderris **Pomaderris pallida**	V	V	This species usually grows in shrub communities surrounded by Brittle Gum (*Eucalyptus mannifera*) and Red Stringybark (*E. macrorhyncha*) or *Callitris* spp. Woodland.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Prasophyllum bagoense **Bago Leek-orchid**	CE	CE	Bago Leek Orchid is a tuberous ground orchid with leaves that normally regenerate from underground tubers each year in spring. Found in grassy, low heathland dominated by *Poa clivicola, Epacris gunnii* and *E. celata* on a subalpine plain bordered by Snow Gum and Mountain Gum.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Prasophyllum petilum **Tarengo Leek Orchid**	E	E	Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. also grows in grassy woodland in association with River Tussock *Poa labillardieri*, Black Gum *Eucalyptus aggregata* and tea-trees *Leptospermum* spp. near Queanbeyan and within the grassy groundlayer dominated by Kangaroo Grass under Box-Gum Woodland at Ilford	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Pterostylis oreophila **Blue-tongued Greenhood**	CE	CE	Grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. Less commonly grows in peaty soils and sphagnum mounds. While more frequently found in low-light conditions it appears to also be able to tolerate full sun.	1 (2013)	Absent	Low	Low	No suitable habitat will be impacted.
Ranunculus anemoneus **Anemone Buttercup**	V	V	The Anemone Buttercup generally occurs in environments with late melting snow; on south to east facing, steep grassy slopes, or rocky crevices, or short alpine herbfields. The species has also been collected along watercourses, in grassland, heathland (below snowpatches) and on roadside batters. Soils at Anemone Buttercup sites include loams (alpine humus soils), peats and decomposing granite.	869 (1890-2021)	Absent	Low	Low	Despite the high number of records in the area no suitable habitat will be impacted. The closest record is over 2kms away from site.
Rytidosperma pumilum **Feldmark Grass**	V	V	Feldmark Grass is limited to a tiny area - about 3ha - of the Main Range of Kosciuszko National Park between Mt Northcote and Mt Lee. Feldmark Grass is found only in the feldmark - the sparse low vegetation of the bare rocky alpine slopes and ridges, one of the harshest environments in Australia	69 (1949-2021)	Absent	Low	Low	Despite the high number of records in the area no suitable habitat will be impacted. The closest record is over 5 km away from site.
Rytidosperma vickeryae	E	-	*Rytidosperma vickeryae* occurs in subalpine treeless vegetation, and is mainly recorded from stream-sides,	4	Absent	Low	Low	No suitable habitat will be impacted. The closest

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Perisher Wallaby-grass			the edges of tarns, and in and around bogs; within bogs, it is often found growing in mounds of *Sphagnum cristatum*. The species appears to be naturally rare and of restricted range and habitat, and is inconspicuous. Commonly grows in Sphagnum moss in montane peatland communities or along stream edges.	(2019-2022)				record is over 5 km away from site.
Thesium australe **Austral Toadflax**	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass.	PMST	Absent	Low	Low	No suitable habitat will be impacted. No kangaroo grass present on site.
Xerochrysum palustre **Swamp Everlasting, Swamp Paper Daisy**	-	V	Grows in swamps and bogs which are often dominated by heaths. Also grows at the edges of bog margins on peaty soils with a cover of shrubs or grasses. Re-sprouts after fires. Sometimes grows in bogs with *Sphagnum*.	PMST	Absent	Low	Low	No suitable habitat will be impacted. No records in the locality.
Threatened Ecological Communities (13)								
Alpine Sphagnum Bogs and Associated Fens	-	E	A common definition of a 'Sphagnum bog' ecological community is one where Sphagnum spp. cover more than thirty per cent of the ground (Kirkpatrick, 1997). However, there are some sites in the Alpine Sphagnum Bogs and Associated Fens ecological community that are dominated by shrubs or *Restionaceae spp*., a peat substratum is evident. The key to bog formation is a good supply of groundwater and an impeded drainage system that keeps the water table at or near the surface. The ecological community is known to exist at 1200 m asl in Victoria and as low as 1000 m asl in parts of the Australian Capital Territory (ACT) and New South Wales (NSW).	PMST	Absent	Low	Low	No associated PCTs
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	E	-	The most common tree species include Bangalay (*Eucalyptus botryoides*) and Coast Banksia (*Banksia integrifolia* subsp. *integrifolia*), while Blackbutt (*Eucalyptus pilularis*) and Lilly Pilly (*Acmena smithii*) may occur in more sheltered situations, and Swamp Oak (*Casuarina glauca*) may occur on dunes exposed to salt-bearing sea breezes or where Bangalay Sand Forest adjoins Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	Bionet	Absent	Low	Low	No associated PCTs
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	Species composition varies with elevation and latitude, with Saltmarsh in southern NSW being generally more species-rich than further north. The sediment surface may support a diversity of seaweed species. Species restricted to coastal saltmarshes include *Distichlis distichophylla* (Endangered), *Halosarcia pergranulata* subsp. *pergranulata*, *Wilsonia backhousei* (Vulnerable) and *Wilsonia*	Bionet	Absent	Low	Low	No associated PCTs

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
			rotundifolia (Endangered).					
Lowland Grassy Woodland in the South East Corner Bioregion	E	-	Lowland Grassy Woodland communities in the South East Corner bioregion are located in rainshadow areas receiving less rainfall than more elevated terrain that partially surrounds them, with mean annual rainfall typically in the range of 700-1100 mm. The community typically occurs in undulating terrain up to 500 m in elevation on granitic substrates (e.g. adamellites, granites, granodiorites, gabbros, etc.) but may also occur on locally steep sites and on acid volcanic, alluvial and fine-grained sedimentary substrates. Contemporary tree-dominated stands of the community are largely relics or regrowth of originally taller forests and woodlands, which are likely to have had scattered shrubs and a largely continuous grassy groundcover. At some sites, mature trees may exceed 40 m, although regrowth stands may be shorter than 10	Bionet	Absent	Low	Low	No associated PCTs
Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	CE	-	The trees may occur as pure stands dominated by Snow Gum, or with other characteristic trees as co-dominant to sub-dominant. Non-characteristic trees may occur as subdominant. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include kangaroo grass (*Themeda australis*) and common snow-grass (*Poa sieberiana*), with others including river tussock (*Poa labillardierei*), weeping grass (*Microlaena stipoides*), tall wheatgrass (*Anthosachne scabra*) and a variety of forbs. Shrubs are generally sparse or absent, though they may be locally common. Sub-shrubs (woody species <0.5 m tall) may be common. The most common shrubs and sub-shrubs include silver wattle (*Acacia dealbata*), red-stemmed wattle (*Acacia rubida*) and poison rice-flower (*Pimelea pauciflora*).	Bionet	Absent	Low	Low	No associated PCTs
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	E	-	The Montane Peatlands community is associated with accumulated peaty or organic-mineral sediments on poorly drained flats in the headwaters of streams. It occurs on undulating tablelands and plateaux, above 400-500 m elevation, generally in catchments with basic volcanic or fine-grained sedimentary substrates or, occasionally, granite.	PMST / Bionet	Absent	Low	Low	No associated PCTs
Natural Temperate Grassland of the South Eastern Highlands	-	CE	r1 (Sub-montane moist tussock grassland of the South Eastern Highlands bioregion) is a dense moist tussock grassland dominated by Snow Grass and/or Kangaroo grass in the upper stratum with a variety of forbs. Found in cool, moist, high-altitude sites that rim the Monaro regionr2 (Poa labillardierei – Themeda australis – Juncus sp. wet tussock grassland of footslopes, drainage lines and flats of the South Eastern Highlands bioregion) is a tall, dense or mid-dense wet tussock grassland dominated by River	Bionet	Absent	Low	Low	No associated PCTs

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
			Tussock usually with Kangaroo Grass, the sedge Tall Sedge and rushes in the upper stratum and a variety of grasses and forbs in the intertussock spaces. Occurs in damp flats and drainage lines. r3 (Rytidosperma sp. – Themeda australis – Juncus sp. tussock grassland of occasionally wet sites of the South Eastern Highlands bioregion) is a dense to mid-dense, low to mid-high tussock grassland dominated by wallaby-grasses and/or Kangaroo Grass, with rushes in the upper stratum and a variety of smaller grasses, sedges and forbs. Like r2 it is also found in damp areas but has less River Tussock and a co-occurrence of other grass, rush and forb species. r4 (Lacustrine grass-forbland of the South Eastern Highlands bioregion) is a variable lake-margin and dry lake-bed vegetation type with structure and composition varying in response to lake wetting and drying cycles, with dominant species including Blown Grass, Notched Sedge, rushes and lakebed forbs. Largely confined to the lake beds of Lake George and Lake Bathurst during long droughts (in wet years it transforms to a wetland community). r5 (Rytidosperma sp. – Austrostipa bigeniculata – Chrysocephalum apiculatum tussock grassland of the South Eastern Highlands bioregion) is a mid-dense to dense low to tall tussock grassland dominated by various Wallaby Grasses, Red-leg Grass, Tall Speargrass and Kangaroo Grass along with a variety of forbs including Chrysocephalum apiculatum and Lomandra bracteata. A widespread community found in the moister lowland parts of the outer Monaro region, and also in the upper Shoalhaven River valley and areas around Canberra (ACT).r6 (Dry tussock grassland of the Monaro in the South Eastern Highlands bioregion) is an open to dense, mid-high to tall tussock grassland dominated by one or more of the following in the upper stratum: Snow Grass, Wallaby Grasses, Kangaroo grass, Rough Speargrass, Tall Speargrass and a variety of forbs. It occurs in cold, dry, rainshadow parts of the Monaro. r7 (Themeda australis – Rytidosperma sp. – Poa sieberiana moist tussock grassland of the South Eastern Highlands bioregion) is an open to dense, mid-high to tall tussock grassland with the upper stratum dominated by Kangaroo Grass and with a sub-dominance of Wallaby Grasses, Snow Grass and several palatable forbs. Often occurs in a mosaic with r5. r8 (Themeda australis – Lomandra filiformis – Aristida ramosa dry tussock grassland in the South Eastern Highlands bioregion) is an open to dense, mid to tall tussock grassland with the upper stratum dominated by Kangaroo grass, Purple Wiregrass, Wattle Mat-rush and Brush-tail Speargrass and a range of forbs. Its sampled range is relatively restricted and found on steep, exposed sites in the mid-Murrumbidgee catchment and in the upper Shoalhaven and Goulburn districts.					

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Snowpatch Feldmark in the Australian Alps Bioregion	CE	-	Snowpatch Feldmark is restricted to steep, sheltered slopes at high elevation that receive abundant snow in winter. The snow in this situation is the last to melt, resulting in a very short growing season for the few species that characterize this community.	Bionet	Absent	Low	Low	No associated PCTs
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	-	Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Generally occurs below 20 m (though sometimes up to 50 m) elevation. The composition of the community is primarily determined by the frequency and duration of waterlogging and the texture, salinity nutrient and moisture content of the soil, and latitude. The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic grasses, vines and forbs.	Bionet	Absent	Low	Low	The site altitude it too high.
Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	E	-	Tableland Basalt Forest typically occurs on loam or clay soils associated with basalt or, less commonly, alluvium, fine-grained sedimentary rocks, granites and similar substrates that produce relatively fertile soils. The species composition of Tableland Basalt Forest varies with average annual rainfall. On basalt or plutonic substrates east of Mittagong and Moss Vale, at the eastern edge of its distribution where average rainfall exceeds 1000-1100 mm per year, the community is replaced by Robertson Basalt Tall Open-forest and Mount Gibraltar Forest. Its distribution spans altitudes from approximately 600 m to 900 m above sea level, usually on undulating or hilly terrain. Mean annual rainfall varies from approximately 750 mm up to 1100 mm across the distribution of the community.	Bionet	Absent	Low	Low	No associated PCTs
Werriwa Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands and South East Corner Bioregions	CE	-	The trees may occur as pure stands dominated by snow Gum, or with candlebark as co-dominant to sub-dominant. Non-characteristic trees may occur as subdominant. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include kangaroo grass (*Themeda australis*) and common snow-grass (*Poa sieberiana*) with others including weeping grass (*Microlaena stipoides*), purple wiregrass (*Aristida ramosa*), tall speargrass (*Austrostipa bigeniculata*), tall wheatgrass (*Anthosachne scabra*) and a variety of forbs. Shrubs are generally sparse or absent, though they may be locally common. Sub-shrubs (woody species <0.5 m tall) may be common. The most common shrubs and sub-shrubs include *Pimelia curviflora*, native cranberry (*Astroloma humifusum*) and hoary guinea-flower (*Hibbertia obtusifolia*).	Bionet	Absent	Low	Low	No associated PCTs

Species	Listing		Habitat	No. of Records within 10 km	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland / ***White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner***	CE	CE	Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum and a generally grassy understorey. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include Apple Box (*E. bridgesiana*), Red Box (*E. polyanthemos*), E. macrorhyncha), Coastal Grey Box (*E. moluccana*), Candlebark (*E. rubida*), Bundy (*E. goniocalyx*), Broad-leaved Stringybark (*E. goniocalyx*), Youman's Stringybark (*E. youmanii*) and others. The understorey in intact sites is characterised by native grasses and a high diversity of herbs; the most commonly encountered include Kangaroo Grass (*Themeda australis*), Poa Tussock (*Poa sieberiana*), wallaby grasses (*Rytidosperma* spp.), spear-grasses (*Austrostipa* spp.), Common Everlasting (*Chrysocephalum apiculatum*), Scrambled Eggs (*Goodenia pinnatifida*), Small St John's Wort (*Hypericum gramineum*), Narrow-leafed New Holland Daisy (*Vittadinia muelleri*) and blue-bells (*Wahlenbergia* spp.)	PMST / Bionet	Absent	Low	Low	No associated PCTs
Windswept Feldmark in the Australian Alps Bioregion	CE	-	Windswept Feldmark occurs on high ridges of the Kosciuszko Main Range from 2010–2150 m a.s.l. The shallow soils and strong winds in this environment result in vegetation cover in Windswept Feldmark being relatively sparse with low plant diversity. The dominant shrub (*Epacris microphylla*) grows in discrete 'halo-like' patches typically less than 1 m^2 in area and accounts for 25–50% cover of this community. It is thought to be important in facilitating regeneration and growth of several species restricted to this community, which include *Euphrasia collina* subsp. *lapidosa*, *Kelleria dieffenbachia, Luzula australasica* subsp. *dura, Ranunculus acrophilus, Rytidosperma pumilum* and *Veronica densifolia.*	Bionet	Absent	Low	Low	No associated PCTs

A.2 Fauna

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Amphibians (3)								
Litoria spenceri **Spotted Tree Frog**	CE	E	Occur among boulders or debris along naturally vegetated, rocky fast flowing upland streams and rivers. In summer, during the breeding season, adults bask on large in-stream boulders while juveniles occupy shingle banks. In winter animals are thought to hibernate in vegetation outside of the main stream environment.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Litoria verreauxii alpina **Alpine Tree Frog**	E	V	Found in a wide variety of habitats including woodland, heath, grassland and herb fields. Breed in natural and artificial wetlands including ponds, bogs, fens, streamside pools, stock dams and drainage channels that are still or slow flowing.	4 (1982-1994)	Absent	Low	Low	No suitable habitat will be impacted.
Pseudophryne corroboree **Southern Corroboree Frog**	CE	CE	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 snowgum woodland to overwinter under litter, logs and dense groundcover.	1 (1900)	Absent	Low	Low	No suitable habitat will be impacted.
Aves (24)								
Anthochaera phrygia **Regent Honeyeater**	CE	CE	The Regent Honeyeater is a flagship threatened woodland bird whose conservation will benefit a large suite of other threatened and declining woodland fauna. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Aphelocephala leucopsis **Southern Whiteface**	-	V	Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Artamus cyanopterus cyanopterus **Dusky Woodswallow**	V	-	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	2 (1972-2014)	Absent	High	Low	The species has been recorded in 2014 within 500 metres of the proposed works. The habitat impacted does not contain a sparse or open understory making it unlikely for the species to use the habitat.
Callocephalon fimbriatum **Gang-gang Cockatoo**	V	E	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 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 (Eucalyptus pauciflora) woodland and occasionally in temperate rainforests. Favours old growth forest and woodland	60 (1980-2018)	Absent	Low	Low	Limited vegetation no suitable habitat will be impacted.

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
			attributes for nesting and roosting. Nests are located in hollows that are 7 cm in diameter or larger in eucalypts and 3 metres or more above the ground.					
Climacteris picumnus victoriae **Brown Treecreeper (eastern subspecies)**	V	V	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Daphoenositta chrysoptera **Varied Sittella**	V	-	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland.	1 (1972)	Absent	Low	Low	No suitable habitat will be impacted. No current records in the area.
Falco hypoleucos **Grey Falcon**	V	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Grantiella picta **Painted Honeyeater**	V	V	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	PMST	Absent	Low	Low	No suitable habitat will be impacted. No recent records of species in the area.
Lathamus discolor **Swift Parrot**	E	CE	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*	PMST	Marginal	Moderate	Moderate	No suitable habitat will be impacted. No records of species in the area.
Melanodryas cucullata cucullata **Hooded Robin (south-eastern form)**	V	E	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Neophema chrysogaster **Orange-bellied Parrot**	CE	CE	On the mainland, the Orange-bellied Parrot spends winter mostly within 3 km of the coast in sheltered coastal habitats including bays, lagoons, estuaries, coastal dunes and saltmarshes. The species also inhabits small islands and peninsulas and occasionally saltworks and golf courses. Birds forage in low samphire herbland or taller coastal shrubland.	1 (1917)	Absent	Low	Low	No suitable habitat will be impacted. No current records within the locality.
Neophema chrysostoma **Blue-winged Parrot**		V	Foraging and staging habitats found from coastal, sub-coastal and inland areas, right through to semi-arid zones including grasslands, grassy woodlands, and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs. Wetlands both near the coast and in semi-arid zones used for foraging and staging. Eucalypt forests and woodlands within the eastern South Australia and southern Victoria.	PMST	Absent	Low	Low	No suitable habitat will be impacted.

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Pachycephala olivacea **Olive Whistler**	V	-	Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes. Forage in trees and shrubs and on the ground, feeding on berries and insects.	86 (1982-2018)	Present	High	High	Despite a large number of records within the locality and recorded within 500 metres of the proposal area. No Suitable habitat present within the proposal area.
Petroica boodang **Scarlet Robin**	V	-	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	8 (1972-2018)	Absent	Low	Low	No suitable habitat will be impacted. Understory may be too dense for the species. Closest record is 2.3 km away from the proposal area.
Petroica phoenicea **Flame Robin**	V	-	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes.	176 (1942-2020)	Present	High	High	Despite a large number of records within the locality and recorded within 500 metres of the proposal area. No Suitable habitat present within the proposal area.
Petroica rodinogaster **Pink Robin**	V	-	Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies.	36 (1972-2017)	Absent	Low	Low	Despite a large number of records within the locality and recorded within 500 metres of the proposal area. No suitable habitat present within the proposal area.
Pycnoptilus floccosus **Pilotbird**	-	V	wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth). dry sclerophyll forests and woodlands occupying dry slopes and ridges	8 (1972-2017)	Absent	Low	Low	No suitable habitat will be impacted.
Rostratula australis **Australian Painted Snipe**	E	E	The species inhabits shallow freshwater wetlands, vegetated ephemeral and permanent lakes and swamps, and inundated grasslands. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	PMST	Absent	Low	Low	The impact area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted.
Stagonopleura guttata **Diamond Firetail**	V	-	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	PMST	Absent	Low	Low	No suitable habitat is present in the proposal area. No records within the locality.
Fish (6)								
Galaxias supremus **Kosciuszko Galaxias**	-	CE	Galaxias supremus have been collected from permanent, cold and clear water in small flowing creeks (0.6–1.1 m average width, 0.1–0.2 m average depth, 0.5–0.6 m max depth) and from Blue Lake (a 16 hectare, 28 m deep cirque lake. The substrate is cobble, pebble, gravel and silt, with fish collected from amongst small cobbles and from within 2 m of the shoreline; fish location and habitat in deeper water is unknown. All sites lack emergent or submerged aquatic vegetation or overhead shading	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.
Galaxias terenasus **Roundsnout Galaxias**	-	E	The roundsnout galaxias is found in clear and slow-moderate flowing freshwater creeks and rivers (0.1–0.6 m in depth and 10–12 m in width) at elevations between 250–785 m above sea level (ASL). Habitat includes pools, glides, riffles, and areas of still backwaters with varying degrees of riparian shading. Adults are solitary, preferring deeper pools, while juveniles are found	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
			in shoals, congregating in shallower water near waterway banks. During periods of no or low flow, fish can be found in remnant pools or in the areas between rocks and cobbles which retain water. Species in the mountain galaxias complex are highly susceptible to changes in water quality, with an upper thermal tolerance of approximately 33 °C, which lowers as dissolved oxygen levels fall. During periods of declining water level and surface water loss, it is suspected that these galaxias species seek refuge by burrowing into the substrate. Instream habitat cover is provided by rock, timber debris, and/or vegetation overhang.					
Maccullochella macquariensis **Trout Cod**	-	E	In the Murray River below Yarrawonga Weir, Trout Cod inhabit a large (60—100 m wide), deep (>3 m) flowing river section with a sand, silt and clay substrate that contains abundant snags and woody debris. Trout Cod are often angled from within, under or adjacent to snags, branch piles, and steep clay banks, usually in areas of relatively fast current .Trout Cod were only found in snag piles that were typically opposite sandy beaches or on outside bends. There is a degree of overlap with the habitat requirements of Murray Cod and therefore competition between these two species is likely As a large proportion of the streams that the Trout Cod originally inhabited are now degraded, it is difficult to accurately determine the habitat requirements of the species.	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.
Maccullochella peelii **Murray Cod**	-	V	Murray Cod are frequently found in the main channels of rivers and larger tributaries. The species is, therefore, considered a main-channel specialist. Murray Cod tend to occur in floodplain channels and anabranches when they are inundated but the species' use of these floodplain habitats appears limited. Juveniles less than one year old have been found in main river channels where it appears they settle at a late larval (newly born) stage.	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.
Macquaria australasica **Macquarie Perch**	FM listed	E	In the Murray-Darling Basin, the species was once typically found in the cool, upper reaches of drainage systems located in southern New South Wales, the Australian Capital Territory and northern Victoria. In east coast drainage systems, the species has been recorded naturally occurring in the Hawkesbury/Nepean, Georges and Shoalhaven rivers in New South Wales.	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.
Prototroctes maraena **Australian Grayling**	FM listed	V	The Australian Grayling is endemic to south-eastern Australia, including Victoria, Tasmania and New South Wales. Larvae migrate out to sea for the first 4 – 6 months before migrating back to freshwater. In their freshwater phase they are found in moderate to fast flowing waters, such as glides or runs, during the day and slow-flowing waters at night.	PMST	Absent	Low	Low	No waterways will be impacted by the proposed works.
Migratory (9)								
Actitis hypoleucos **Common Sandpiper**	-	M	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflat	PMST	Absent	Low	Low	The impact area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted.
Apus pacificus **Fork-tailed Swift**	-	M	In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They often occur over cliffs and beaches and also over islands and sometimes well out to sea. They also occur over settled areas, including towns, urban areas and cities. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-	1 (2002)	Absent	Low	Low	No suitable habitat will be impacted.

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
			dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pine					
Calidris acuminata **Sharp-tailed Sandpiper**	-	M	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland. They also occur in saltworks and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry.	PMST	Absent	Low	Low	The impact area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted.
Calidris ferruginea **Curlew Sandpiper**	E	CE M	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	PMST	Absent	Low	Low	The proposal site area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted.
Calidris melanotos **Pectoral Sandpiper**	-	M	In Australasia, the Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	PMST	Absent	Low	Low	The proposal site area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted.
Gallinago hardwickii **Latham's Snipe, Japanese Snipe**	-	M	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open, freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies)	12 (1946-2001)	Marginal	Low	Low	The impact area does not contain any waterbodies or wetland areas. Hence, no suitable habitat will be impacted. Older records over 5 km away from the proposal area. May fly over but unlikely to be dependent on habitat in the proposal area.
Hirundapus caudacutus **White-throated Needletail**	-	V M	In Australia, they mostly occur above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamp. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes	8 (1970-1998)	Absent	Low	Low	May fly over but unlikely to be dependent on habitat in the proposal site.
Motacilla flava **Yellow Wagtail**	-	M	Various landscapes such as lowlands, where forests are located or forest-steppe belts, and it is also attracted by swampy meadows or river valleys. Marshland with grass and rare shrubs is also suitable for it as a habitat.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Myiagra cyanoleuca **Satin Flycatcher**	-	E M	Satin Flycatchers are mainly recorded in eucalypt forests, especially wet sclerophyll forest, often dominated by eucalypts such as Brown Barrel, *Eucalypt fastigata*, Mountain Gum, *E. dalrympleana*, Mountain Grey Gum, Narrow-leaved Peppermint, Messmate or Manna Gum, or occasionally Mountain Ash, *E. regnans*.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Numenius madagascariensis **Eastern Curlew, Far Eastern Curlew**	-	CE M	It generally occupies coastal lakes, inlets, bays and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts.	PMST	Absent	Low	Low	No suitable habitat will be impacted.

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Rhipidura rufifrons **Rufous Fantail**	-	M	In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, subtropical and temperate rainforests, and drier sclerophyll forests and woodlands.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Mammals (10)								
Burramys parvus **Mountain Pygmy-possum**	E	E	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 (*Podocarpus lawencei*).	148 (1997-2017)	Absent	Low	Low	Despite a large number of records within the locality and recorded within 2k of the proposal area. No Suitable habitat present within the proposal area.
Dasyurus maculatus **Spotted-tailed Quoll**	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline	2 (1998-2020)	Absent	Low	Low	No suitable habitat will be impacted.
Falsistrellus tasmaniensis **Eastern False Pipistrelle**	V	-	Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. Which include areas of high productivity foraging habitat around creeks, rivers and wetlands.	3 (1970-1997)	Marginal	Low	Low	There are no hollows or fissures in the native trees to be removed and. The roof of the Lodge may be used as suitable microbat habitat Hence, a ToS is required.
Mastacomys fuscus mordicus **Broad-toothed Rat (mainland), Tooarrana**	V	V	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. 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. In NSW the Broad-toothed Rat occurs in two widely separated areas: the wet alpine and subalpine heaths and woodlands in Kosciuszko National Park	83 (1969-2021)	Absent	Low	Low	Despite a large number of records in the area with records within 2 km of the proposal area. No suitable habitat will be impacted
Petauroides Volans **Southern Greater Glider**	E	E	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up to 18 hollows in their home range.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Petaurus australis **Yellow-bellied Glider**	V	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south.	PMST	Absent	Low	Low	No suitable habitat will be impacted.
Phascolarctos cinereus **Koala**	E	E	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	1 (1900)	Absent	Low	Low	No suitable habitat present. No current records in the area.
Pseudomys fumeus **Smoky Mouse, Konoom**	CE	E	The Smoky Mouse appears to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies. In NSW there are 3 records from Kosciuszko National Park and 2 records adjacent to the park in Bondo and Ingbyra State Forests; the remainder are centred around Mt Poole, Nullica State Forest and the adjoining South East Forests National Park.	PMST	Absent	Low	Low	No suitable habitat present. No records in the area.
Pteropus poliocephalus	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit	PMST	Marginal	Moderate	Low	Limited bat habitat present in the area. No records in the locality. Pre

Species	Listing		Habitat	No. of Records Within 10 km Locality	Presence of Habitat	Likelihood of Occurrence	Possible Impact	Justification
	BC Act	EPBC						
Grey-headed Flying-fox			crops.					screen of house required.
Reptiles (5)								
Aprasia parapulchella **Pink-tailed Worm-lizard, Pink-tailed Legless Lizard**	V	V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially buried rocks.	PMST	Marginal	Moderate	Low	The habitat is highly treed with limited rocks. The stockpile areas may impact minimal suitable habitat.
Cyclodomorphus praealtus **Alpine She-oak Skink**	E	E	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.	57 (1981-2022)	Marginal	Low	Low	Despite a large number records within the area, the habitat is highly treed with limited rocks. The closest record is 4 km away from the proposal area. The stockpile areas may impact minimal suitable habitat.
Liopholis guthega **Guthega Skink**	-	E	The preferred habitats for the Guthega Skink are usually rocky or have sub-surface boulders hidden beneath soil or thick vegetation. The species utilizes burrows often opening from under boulders or shrubs. The skink is also known to use fallen timber and surface rocks for shelter. Sites are generally covered with snow from approximately June to October and have mild temperatures in summer. During the colder periods, the species is insulated by living in soil burrows combined with deep snow cover. Individuals have been recorded in a range of vegetation types, including open Snow Gum (Eucalyptus pauciflora) woodland with grassy or shrubby understoreys, dry tussock grassland, and tall and short heath (Donnellan et al. 2002). The Guthega Skink usually occurs in areas where the topography ranges from flat plains to rolling alpine hills. The geology in known areas of occurrence is often granitic.	403 (2006-2023)	Marginal	Moderate	Moderate	All records are outside of the township and the species is more likely to use native vegetation. Due to this an AoS will not be required.
Liopholis montana **Mountain Skink**	-	E	The mountain skink occupies habitats with granite and basalt boulders, rocks, slabs, rock screes or tors and large logs in tall open-forest, woodland, and heathland vegetation in montane and subalpine areas of south-east Australia from 600–1700m above sea level. In the north of its range, the mountain skink occupies montane and subalpine conditions above 1400 m; however, in more southern locations it occupies taller eucalypt forest down to 900 m and down to 630 m in the west of its range.	PMST	Marginal	Low	Low	Potentially suitable habitat may be impacted, although no species records in the locality. Unlikely to be found within the proposal area.
Pseudemoia cryodroma **Alpine Bog Skink, Alpine Bog-skink**	-	E	The alpine bog skink occurs primarily in alpine bog, riparian and wet heath areas above 1100 m elevation, and less commonly in alpine and subalpine grassland and dry treeless heath, drainage lines in subalpine meadows, and in snow gum woodland. These areas provide the alpine bog skink with all the resources it requires for its life cycle (i.e. food, water, shelter, and breeding sites). The alpine bog skink usually occurs in wetter areas than the tussock skink and more open areas than the southern grass skink	PMST	Absent	Low	Low	No suitable habitat will be impacted. Not a riparian zone.

Appendix D ToS – Eastern False Pippstrelle

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats

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

Habitat Availability and Dispersal

This Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) is known to prefer moist sclerophyll forests with trees taller than 20m (Blackthorn, 2013; DPE, 2017). Roost sites are generally hollow tree trunks of eucalypt trees but have also been found under loose bark and in buildings (Blackthorn, 2013; DPE, 2017). The proposed works aim to demolish a building within Thredbo Village. The species has been noted within the area three times between 1970-1997. Additionally, the species is known to fly up to 12kms from roosting site for foraging (Blackthorn, 2013; DPE, 2017). Saving Our Species guidelines for the Eastern False Pipistrelle does not outline the need to conserve building as suitable roosting habitat (NSW Government, 2017). It does however state to ensure roosting bats are not present before removing or disturbing the habitats (NSW Government, 2017). Hence, the removal of this habitat is unlikely to place the local species at risk of extinction.

Reproduction and life stages

The Eastern False Pipistrelle species undergoes torpor in winter, becomes pregnant in spring and early summer, and gives birth to a single offspring in December (Blackthorn, 2013; DPE, 2017). The young bat continues to nurse until the end of February (Blackthorn, 2013). It is crucial that these bats are not disturbed from roosting habitats during their hibernation period. The proposed construction plans will remove such suitable roosting habitats in the form of roof cavities and raked ceiling ledges for this bat species, which could affect their life cycle. Demolition is planned for spring which is close to the breeding period and could negatively impact the bats' ability to reproduce. The impact to the breeding ability of the species would be heightened if the species had a strong roost fidelity. However, despite many bats maintaining familiarity with multiple roost sites within an area, the species is not restricted to an individual roost (DSE, 2003). This is further expressed in Hourigan et al. (2010) study which found no evidence of roost fidelity in urban Townsville (Blackthorn, 2013). Colonies typically range from three to 36 individuals but and the presence of colonies or individual Eastern Freetail Bats has not been recorded in the locality for over 20 years (Blackthorn, 2013). Therefore, since the likelihood of an active colony being affected is low and only one potential roost is to be destroyed, the impact to the local Eastern False Pipistrelle population is unlikely to be significant.

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

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

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

N/A

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats
c) In relation to the habitat of a threatened species or ecological community: i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,
The proposed works will remove potential roosting habitat for the Eastern False Pipistrelle, a lodge at Thredbo. The proposed demolition is located on 10 Bobuck Lane Thredbo. The site consists of an old building with exotic grasses and planted natives around the dwelling. The proposal area is 0.0145ha. The proposed works will remove one building within the Thredbo Village, there are multiple buildings in the village and the village is surrounded by high quality suitable forest habitat. These other buildings and suitable habitat are likely to provide roosting habitat for the species. Hence, the removal of one building is not likely to fragment or isolate an area of habitat for the species. The mobile nature of the species allows the Eastern False Pipistrelle to occupy roosting habitats outside of the proposal area. The species is not reliant on critical habitat features such as maternity cave, like other species of bats. Therefore, the single roost habitat removed by the proposed works would not be considered critical to the survival of the species.
d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),
No Areas of Outstanding Biodiversity will be impacted either directly or indirectly by the proposed works.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.
The proposed works will not increase the impact of any key threatening processes.
Recommended mitigation measures and safeguards for threatened entities:
Mitigation Measure and Safeguards for threatened entities include: • Threatened species find protocol; In the event a threatened species is identified breeding on site, works would cease, and further assessment and consultation would be conducted. • Pre-clearance surveys must be conducted through every stage of the demolition. • .

The following is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats
Conclusion
The proposal is unlikely to lead to a significant impact to the local Eastern False Pipistrelle population. However, steps are recommended to minimise the risk of harming a colony should the potential roost be active. This would involve a pre-clearance survey and presence of a fauna spotter catcher during demolition.

Appendix E Sonnblick Site Layout Map

Exotic Grasses

Eucalyptus pauciflora

Planted Native

Exotic Grasses

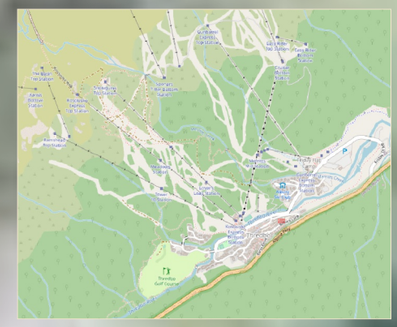
LEGEND

- Proposal Area
- Native Trees

Vegetation Mapping

- Exotic Grasses
- Planted Native

0 5 10 m



NGH

230203 Sonnblick Demolition

Sonnblick Site Layout

Appendix F NSW WeedWise

Priority weeds for the South East

Note: this region includes the local council areas of Bega Valley, Eurobodalla, Goulburn Mulwaree, Hilltops (eastern), Kiama, Queanbeyan-Palerang Regional, Shellharbour, Shoalhaven, Snowy Monaro Regional, Upper Lachlan, Wingecarribee, Wollongong and Yass Valley.

Select another region

Weed	Duty
All plants	**General Biosecurity Duty** *All pest plants are regulated with a **general biosecurity duty** to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.*
Aaron's beard prickly pear *Opuntia leucotricha*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
African boxthorn *Lycium ferocissimum*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Alligator weed *Alternanthera philoxeroides*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Alligator weed *Alternanthera philoxeroides*	**Biosecurity Zone** The Alligator Weed Biosecurity Zone is established for all land within the state except land in the following regions: Greater Sydney; Hunter (but only in the local government areas of City of Lake Macquarie, City of Maitland, City of Newcastle or Port Stephens). *Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone*

Anchored water hyacinth *Eichhornia azurea*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Athel pine *Tamarix aphylla*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Bellyache bush *Jatropha gossypiifolia*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Bitou bush *Chrysanthemoides monilifera* subsp. *rotundata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Bitou bush *Chrysanthemoides monilifera* subsp. *rotundata*	**Biosecurity Zone** The Bitou Bush Biosecurity Zone is established for all land within the State except land within 10 kilometres of the mean high water mark of the Pacific Ocean between Cape Byron in the north and Point Perpendicular in the south. *Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone*
Black knapweed *Centaurea* x *moncktonii*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Black willow *Salix nigra*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Blackberry *Rubus fruticosus* species aggregate	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Rubus fruticosus species aggregate have this requirement, except for the varietals Black Satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smooth Stem, and Thornfree**
Blind cactus *Opuntia rufida*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Boneseed *Chrysanthemoides monilifera* subsp. *monilifera*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Boneseed *Chrysanthemoides monilifera* subsp. *monilifera*	**Control Order** Boneseed Control Zone: Whole of NSW *Boneseed Control Zone (Whole of NSW): Owners and occupiers of land on which there is boneseed must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of boneseed must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.*
Boxing glove cactus *Cylindropuntia fulgida* var. *mamillata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Bridal creeper *Asparagus asparagoides*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* ***this requirement also applies to the Western Cape form of bridal creeper**
Bridal veil creeper *Asparagus declinatus*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*

Broomrapes *Orobanche* species	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species of Orobanche are Prohibited Matter in NSW, except Clover broomrape, Orobanche minor and Australian broomrape, Orobanche cernua var. australiana.**
Bunny ears cactus *Opuntia microdasys*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Cabomba *Cabomba caroliniana*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Cane cactus *Austrocylindropuntia cylindrica*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Austrocylindropuntia genus have this requirement**
Cape broom *Genista monspessulana*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Cat's claw creeper *Dolichandra unguis-cati*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Cat's claw creeper *Dolichandra unguis-cati*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Chicken dance cactus *Opuntia schickendantzii*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Chilean needle grass *Nassella neesiana*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Chinese violet *Asystasia gangetica* subsp. *micrantha*	**Control Order** *Owners and occupiers of land on which there is Chinese violet must notify the local control authority for the area if the Chinese violet is part of a new infestation on the land, destroy all Chinese violet on the land ensuring that subsequent generations of Chinese violet are destroyed; and keep the land free of Chinese violet. A person who deals with a carrier of Chinese violet must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on the land, or on or in a carrier.*
Climbing asparagus *Asparagus africanus*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Climbing asparagus fern *Asparagus plumosus*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Common pear *Opuntia stricta*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Coolatai grass *Hyparrhenia hirta*	**Regional Recommended Measure** Containment zone: Goulburn Mulwaree, Shoalhaven, Snowy Monaro, Wingecarribee, Upper Lachlan, Wollongong and Shellharbour Local Government Areas. Exclusion zone: Whole of region except containment zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*

Coral creeper *Barleria repens*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Eurasian water milfoil *Myriophyllum spicatum*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Eve's needle cactus *Austrocylindropuntia subulata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Austrocylindropuntia genus have this requirement**
Fireweed *Senecio madagascariensis*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Flax-leaf broom *Genista linifolia*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Foxtail fern *Asparagus densiflorus*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Frogbit *Limnobium laevigatum*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species of Limnobium are Prohibited Matter**

Gamba grass *Andropogon gayanus*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Giant devil's fig *Solanum chrysotrichum*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Gorse *Ulex europaeus*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Gorse *Ulex europaeus*	**Regional Recommended Measure** Containment zone: Goulburn Mulwaree, Queanbeyan-Palerang, Snowy Monaro, Wingecarribee and Yass Valley Local Government Areas. Exclusion zone: Whole of region except containment zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*
Grey sallow *Salix cinerea*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Ground asparagus *Asparagus aethiopicus*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Groundsel bush *Baccharis halimifolia*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Hawkweeds *Pilosella* species	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species in the genera *Pilosella* and *Hieracium* are Prohibited Matter except for *Hieracium murorum*.**
Holly leaved senecio *Senecio glastifolius*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Horsetails *Equisetum* species	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Hudson pear *Cylindropuntia pallida*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Hydrocotyl *Hydrocotyle ranunculoides*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Hymenachne *Hymenachne amplexicaulis* and hybrids	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Karoo acacia *Vachellia karroo*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Kei apple *Dovyalis caffra*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Kidney-leaf mud plantain *Heteranthera reniformis*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Kochia *Bassia scoparia*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **Excluding the subspecies *trichophylla***

Koster's curse *Clidemia hirta*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Kudzu *Pueraria lobata*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Lagarosiphon *Lagarosiphon major*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Lantana *Lantana camara*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Lantana *Lantana camara*	**Regional Recommended Measure** Containment zone: Eurobodalla, Shoalhaven, Wollongong, Shellharbour and Kiama Local Government Areas. Exclusion zone: Whole of region except containment zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*

Long-leaf willow primrose *Ludwigia longifolia*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Ludwigia *Ludwigia peruviana*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Madeira vine *Anredera cordifolia*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Mesquite *Prosopis* species	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the genus *Prosopis* have this requirement**
Mexican feather grass *Nassella tenuissima*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Miconia *Miconia* species	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species of *Miconia* are Prohibited Matter in NSW**

Mikania vine *Mikania micrantha*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* ***all species in the genus *Mikania* are Prohibited Matter in NSW**
Mimosa *Mimosa pigra*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Ming asparagus fern *Asparagus macowanii*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Mysore thorn *Caesalpinia decapetala*	**Regional Recommended Measure** Containment zone: Wollongong Local Government Area. Exclusion zone: Whole of region except containment zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*
Parkinsonia *Parkinsonia aculeata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Parkinsonia *Parkinsonia aculeata*	**Control Order** Parkinsonia Control Zone: Whole of NSW *Parkinsonia Control Zone (Whole of NSW): Owners and occupiers of land on which there is parkinsonia must notify the local control authority of new infestations; immediately destroy the plants; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of parkinsonia must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant.*
Parthenium weed *Parthenium hysterophorus*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Parthenium weed *Parthenium hysterophorus*	**Prohibition on certain dealings** *The following equipment must not be imported into NSW from Queensland: grain harvesters (including the comb or front), comb trailers (including the comb or front), bins used for holding grain during harvest operations, augers or similar for moving grain, vehicles used to transport grain harvesters, support vehicles driven in paddocks during harvest operations, mineral exploration drilling rigs and vehicles used to transport those rigs, unless set out as an exception in Division 5, Part 2 of the Biosecurity Order (Permitted Activities) 2017*
Pond apple *Annona glabra*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Prickly acacia *Vachellia nilotica*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*

Prickly pears - Austrocylindropuntias *Austrocylindropuntia* species	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Austrocylindropuntia genus have this requirement**
Prickly pears - Cylindropuntias *Cylindropuntia* species	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Cylindropuntia genus have this requirement**
Prickly pears - Opuntias *Opuntia* species	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **For all Opuntia species except for *Opuntia ficus-indica* (Indian fig).**
Riverina pear *Opuntia elata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Rope pear *Cylindropuntia imbricata*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the Cylindropuntia genus have this requirement**
Rubber vine *Cryptostegia grandiflora*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Sagittaria *Sagittaria platyphylla*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Salvinia *Salvinia molesta*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Salvinia *Salvinia molesta*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Scotch broom *Cytisus scoparius* subsp. *scoparius*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Sea spurge *Euphorbia paralias*	**Regional Recommended Measure** Exclusion zone: Wollongong, Shellharbour and Kiama Local Government Areas. Containment zone: Whole of region except Exclusion zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*
Senegal tea plant *Gymnocoronis spilanthoides*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Serrated tussock *Nassella trichotoma*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Siam weed *Chromolaena odorata*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Sicklethorn *Asparagus falcatus*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Silverleaf nightshade *Solanum elaeagnifolium*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Silverleaf nightshade *Solanum elaeagnifolium*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Smooth tree pear *Opuntia monacantha*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Snakefeather *Asparagus scandens*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Spanish heath *Erica lusitanica*	**Regional Recommended Measure** Containment zone: Queanbeyan-Palerang, Snowy Monaro and Wingecarribee Local Government Areas. Exclusion zone: Whole of region except containment zone. *Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.*
Spongeplant *Limnobium spongia*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species of *Limnobium* are Prohibited Matter**
Spotted knapweed *Centaurea stoebe* subsp. *micranthos*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Sticky nightshade *Solanum sisymbriifolium* *Regional recommended measure for Central Tablelands from February 2020*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Tiger pear *Opuntia aurantiaca*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*

Tropical soda apple *Solanum viarum*	**Control Order** Tropical Soda Apple Control Zone: Whole of NSW *Tropical Soda Apple Control Zone (Whole of NSW): Owners and occupiers of land on which there is tropical soda apple must notify the local control authority of new infestations; destroy the plants including the fruit; ensure subsequent generations are destroyed; and ensure the land is kept free of the plant. A person who deals with a carrier of tropical soda apple must ensure the plant (and any seed and propagules) is not moved from the land; and immediately notify the local control authority of the presence of the plant on the land, or on or in a carrier.*
Velvety tree pear *Opuntia tomentosa*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Water caltrop *Trapa* species	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species in the *Trapa* genus are Prohibited Matter in NSW**
Water hyacinth *Eichhornia crassipes*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Water hyacinth *Eichhornia crassipes*	**Biosecurity Zone** The Water Hyacinth Biosecurity Zone applies to all land within the State, except for the following regions: Greater Sydney or North Coast, North West (but only the local government area of Moree Plains), Hunter (but only in the local government areas of City of Cessnock, City of Lake Macquarie, MidCoast, City of Maitland, City of Newcastle or Port Stephens), South East (but only in the local government areas of Eurobodalla, Kiama, City of Shellharbour, City of Shoalhaven or City of Wollongong). *Within the Biosecurity Zone this weed must be eradicated where practicable, or as much of the weed destroyed as practicable, and any remaining weed suppressed. The local control authority must be notified of any new infestations of this weed within the Biosecurity Zone*

Water lettuce *Pistia stratiotes*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Water poppy *Hydrocleys nymphoides*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Water soldier *Stratiotes aloides*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*
Water star grass *Heteranthera zosterifolia*	**Regional Recommended Measure** *Land managers should mitigate the risk of the plant being introduced to their land. Land managers should eradicate the plant from the land and keep the land free of the plant. A person should not deal with the plant, where dealings include but are not limited to buying, selling, growing, moving, carrying or releasing the plant. Notify local control authority if found.*
Wheel cactus *Opuntia robusta*	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.*
Willows *Salix* species	**Prohibition on certain dealings** *Must not be imported into the state, sold, bartered, exchanged or offered for sale.* **All species in the *Salix* genus have this requirement, except *Salix babylonica* (weeping willows), *Salix x calodendron* (pussy willow) and *Salix x reichardtii* (sterile pussy willow)**

Witchweeds *Striga* species	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries* **All species in the *Striga* genus are Prohibited Matter in NSW, except the native *Striga parviflora***
Yellow burrhead *Limnocharis flava*	**Prohibited Matter** *A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries*

The content provided here is for information purposes only and is taken from the *Biosecurity Act 2015* and its subordinate legislation, and the Regional Strategic Weed Management Plans (published by each Local Land Services region in NSW). It describes the state and regional priorities for weeds in New South Wales, Australia.

Appendix G Provisional Demolition Plan

Project 2: Sonnblick Lodge demolition

Sonnblick is a sixteen (16) bed three apartment staff accommodation building on Bobuck Lane in the Eastern precinct of the Thredbo Village. Site photos are provided in **Attachment 2**.

The proposal is for the demolition of the building and associated concrete paths, landings and stairs subject to geotechnical plan requirements for site stability post demolition. Kosciuszko Thredbo (KT) would then advertise the site as a development opportunity with the likely time frame between demolition and activation of any new development being eighteen to thirty months.

A brief summary of the proposal is provided below.

Geotechnical Investigation/report and demolition plan

KT will separately engage a geotechnical engineer to prepare a geotechnical report and recommendation for site stability post demolition. KT will also separately engage an appropriate engineering consult to prepare a demolition plan in accordance with *AS 2601-2001 The demolition of structures* .

Machinery and equipment

Machinery and equipment requirements will be subject to the geotechnical report but will likely include: large excavator, large trucks, mobile crane and standard hand tools.

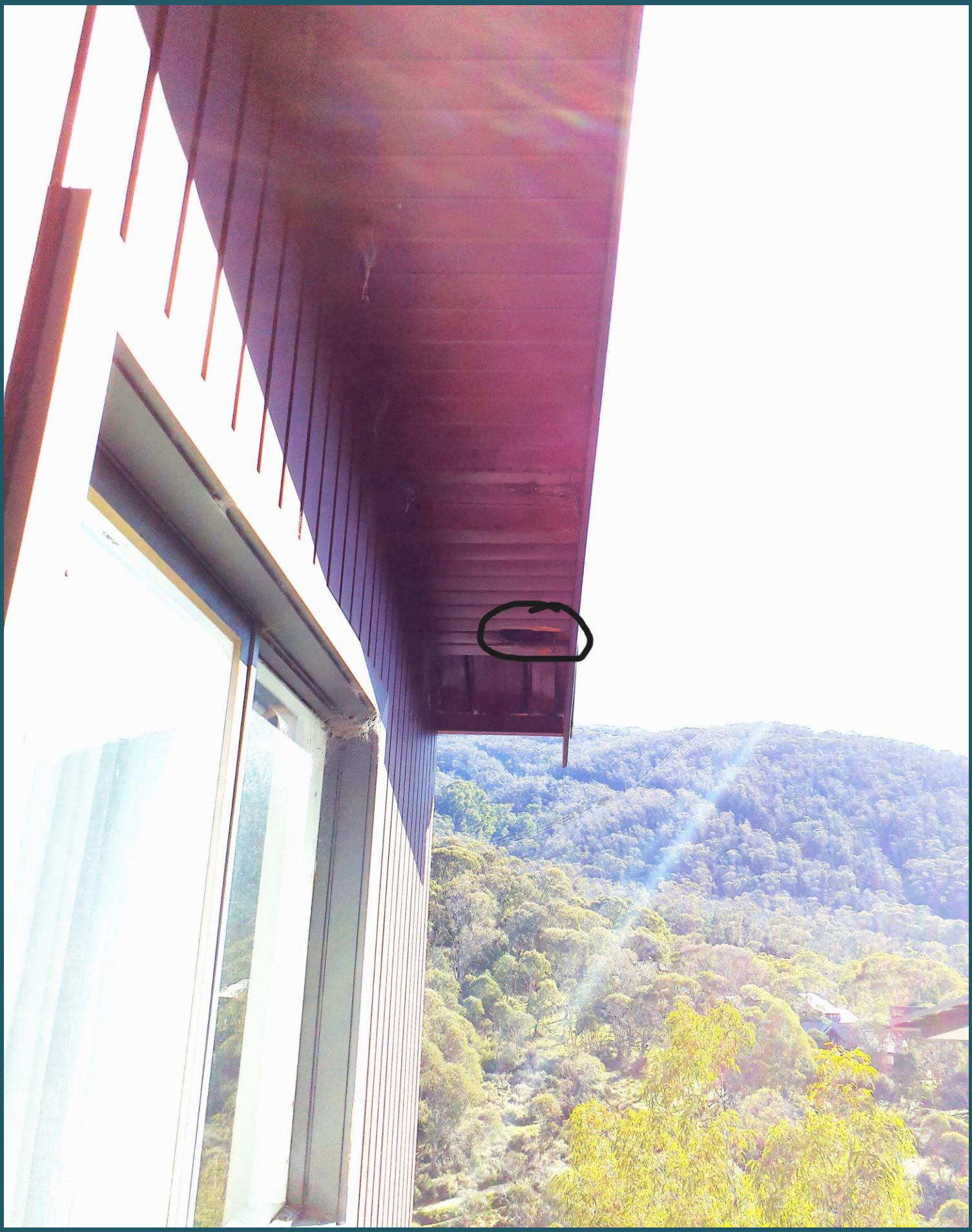
Site management

Demolition equipment and materials may be located on site but must not affect the single lane (one way) traffic of Bobuck Lane. Contractors will also likely be provided a secured compound area at Friday Flat (contractor to provide fencing etc).

Waste

Demolished material will be recycled where possible and if not will be transported to Jindabyne Landfill.

Appendix H Bobsled BatHole



Appendix D Aboriginal heritage due diligence

Prepared for Kosciuszko Thredbo Pty Ltd

Aboriginal Heritage Due Diligence Assessment

Sonnblick Lodge Demolition

July 2023

Project Number: 230203

Document verification

Project Title:	Sonnblick Lodge Demolition
Project Number:	230203
Project File Name:	230203 Sonnblick Demolition Aboriginal DD Report Final v1.0

Revision	Date	Prepared by	Reviewed by	Approved by
Draft v1.0	30/06/2023	Petra Balanzategui	Ingrid Cook	Matthew Barber
Final v1.0	3/07/2023	Petra Balanzategui	Matthew Barber	Matthew Barber
	[Enter the date]			
	[Enter the date]			

NGH Pty Ltd is committed to environmentally sustainable practices, including fostering a digital culture and minimising printing. Where printing is unavoidable, NGH prints on 100% recycled paper.

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Acronyms and abbreviations

ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BP	Before Present
DA	Development Application
DECCW	(Former) Department of Environment, Climate Change and Water (formerly responsible for heritage, now superseded by Heritage NSW)
DPE	Department of Planning and Environment
Due Diligence Code	*Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*
EP&A	*Environmental Planning and Assessment Act 1979*
Heritage Act	*Heritage Act 1977* (NSW)
Heritage NSW	Heritage NSW, within the Department of Premier and Cabinet (formerly part of OEH)
IBRA	Interim Biogeographic Regionalisation for Australia
Km	Kilometre/s
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
M	Metre/s
MGA	Map Grid of Australia
NGH	Ngh Pty Ltd
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NPW Regulation	National Parks and Wildlife Regulation 2019 (NSW)
NSW	New South Wales
OEH	(Former) Office of Environment and Heritage (NSW) (now Heritage NSW)
PAD	Potential Archaeological Deposit
SEE	Statement of Environmental Effects

Executive summary

NGH Pty Ltd (NGH) was commissioned by Kosciuszko Thredbo Pty Ltd (the Proponent) to undertake an Aboriginal Heritage Due Diligence Assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) (Due Diligence Code) for the proposed demolition of the Sonnblick Lodge, located within Lot 802 DP1119757 at 10 Bobuck Lane, Thredbo (the Proposal Area).

The proposed works will involve the demolition of the Sonnblick lodge building and associated concrete paths, landings and stairs (the Proposal). The Proposal will be subject to geotechnical investigations which will provide recommendations for site stability post demolition. The Due Diligence assessment is undertaken to evaluate whether Aboriginal objects are present, or likely to be present, within the proposed impact area of the development activity, and if those objects would be harmed by the activity. The Due Diligence assessment will be incorporated into a Statement of Environmental Effects (SEE), to support a Development Application (DA) to be lodged with the Department of Planning and Environment (DPE).

Background and desktop assessment

An extensive AHIMS search of the Aboriginal Heritage Information Management System (AHIMS) database revealed 22 Aboriginal objects and no declared Aboriginal Places recorded within the search area measuring approximately 7km in length and 3km in width, centred on the Proposal Area. The most common site type previously recorded in the local area was artefact (isolated artefact and artefact scatter), and the nearest, site #61-6-0082 is an artefact scatter located 130m north.

Based on the initial desktop assessment, using satellite imagery and topographic data, it was deemed unlikely for Aboriginal objects to occur within the Proposal Area given previous impacts associated with vegetation clearing, and modification of the natural landform for the construction of the lodge and associated infrastructure. As per the Heritage NSW Due Diligence Code of Practice, lands can be considered disturbed "if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable" (DECCW 2010:7). Examples of disturbance that have impacted the Proposal Area provided by the Code include the "clearing of vegetation, and the construction of buildings and associated earthworks" (DECCW 2010:7-8).

Prior to land clearing and modification, the Proposal Area encompassed a forested steep slope, which would have been an unfavourable position for Aboriginal activity or occupation. Previous archaeological research within the region suggested that elevated flats and relatively level and well-drained ground were the focus of Aboriginal activity while moderate slopes were targeted to a lesser degree. Previously recorded AHIMS sites in the local area have been commonly recorded on well-drained spurs and spurlines near waterways. Archaeological excavations in the local area have suggested that steep slopes and alluvial flat landforms were not utilised for activities that left an archaeological record.

The desktop assessment therefore, indicated that there were no unmodified landscapes present within the Proposal Area that had the potential to contain Aboriginal objects. The nature of the works being undertaken at the Proposal Area will involve a high level of ground disturbance and it is unlikely that it would impact on Aboriginal heritage objects.

The desktop assessment therefore concluded that a visual inspection was not warranted as it was unlikely that Aboriginal objects would be impacted by the proposed works.

Impact assessment conclusion

This Due Diligence assessment concludes that due to the levels of disturbance to the Proposal Area and lack of potential for the existence of Aboriginal heritage objects or areas of archaeological potential to be present,

the proposed works, as assessed in this report, will not require any further heritage investigation and works can proceed with caution.

Recommendations

The following recommendations are based on a number of considerations including:

- Background Aboriginal heritage research into the area;
- Assessment of Landscape;
- Land use and disturbance assessment;
- Consideration of the impact of the proposed works; and
- Legislative context for the development proposal.

1. The proposed work can proceed with caution without further archaeological assessment.
2. Any activity proposed outside of the current Proposal Area should also be subject to an Aboriginal heritage assessment.
3. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and the NSW Environment Line (1300 361 967) notified. The find will need to be assessed and, if found to be an Aboriginal object, further detailed assessment and an application for an Aboriginal Heritage Impact Permit (AHIP) may be required.
4. In the unlikely event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The Proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, Heritage NSW must be notified by ringing the Enviroline (131 555).

The Proponent is reminded that it is an offence under the *National Parks and Wildlife Act 1974* to disturb, damage or destroy an Aboriginal object without a valid AHIP.

1. Introduction

NGH Pty Ltd (NGH) was commissioned by Kosciuszko Thredbo Pty Ltd (the Proponent) to undertake an Aboriginal Heritage Due Diligence Assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW, 2010) (Due Diligence Code) for the proposed demolition of the Sonnblick Lodge, located at 10 Bobuck Lane, Thredbo.

The proposed works will involve the demolition of the Sonnblick lodge building and associated concrete paths, landings and stairs (the Proposal). The Proposal will be subject to geotechnical investigations which will provide recommendations for site stability post demolition. The Due Diligence assessment is undertaken to evaluate whether Aboriginal objects are present, or likely to be present, within the proposed impact area of the development activity, and if those objects would be harmed by the activity. The Due Diligence assessment will be incorporated into a Statement of Environmental Effects (SEE), to support a Development Application (DA) to be lodged with the Department of Planning and Environment (DPE).

1.1 Subject site

The subject site is located within Lot 802 DP1119757, at 10 Bobuck Lane, Thredbo (the Proposal Area) (Figure 1-1, Figure 1-2). It is within the Snowy Monaro Regional Council Local Government Area (LGA) and is situated in the eastern precinct of the Thredbo Village. The lodge has been used for staff accommodation and comprises three apartments with 16 beds in total.

1.2 Project personnel

The Due Diligence assessment was carried out by Senior Heritage Consultant Petra Balanzategui of NGH including background research and the completion of this report. Regional Manager of Heritage Ingrid Cook reviewed the report for quality assurance purposes.

1.3 Aboriginal consultation

The Proposal Area is within the boundaries of the Eden Local Aboriginal Land Council (LALC). The Due Diligence process does not formally require consultation with Aboriginal community groups. No Aboriginal groups were contacted for this Due Diligence level assessment.

1.4 Approach and format of this report

This report has been drafted in keeping with the sequence of steps identified in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (Due Diligence Code) (DECCW, 2010). The Due Diligence Code outlines a five-step approach (Table 1-1) to determine if an activity is likely to cause harm to an Aboriginal object, as defined by the NSW *National Parks and Wildlife Act 1974* (NPW Act). The steps follow a logical sequence of questions, and the answer to each question determines the need for the next step in the process in order to:

- Identify whether Aboriginal objects are, or are likely to be, present in the Proposal Area;
- Determine whether or not the proposed activities are likely to harm Aboriginal objects (if present) in the Proposal Area; and
- Determine whether an Aboriginal Heritage Impact Permit (AHIP) application is required.

Table 1-1 Due Diligence steps

	Due Diligence steps
Step 1.	Will the activity disturb the ground surface?
Step 2a.	Search the AHIMS database and use any other sources of information of which you are already aware.
Step 2b.	Are activities proposed in areas where landscape features indicate the presence of Aboriginal objects?
Step 3.	Can you avoid harm to the object or disturbance of the landscape feature?
Step 4.	Undertake a desktop assessment and visual inspection. Is it likely that Aboriginal objects will be impacted by the proposed works?
Step 5.	Further investigations and impact assessment.

If the proposed activities are not 'low impact activities' (a defence for which is provided under the NPW Regulation), the considerations result in a determination of whether or not:

- Further approval under the NPW Act is required, in the form of an AHIP; or
- Due Diligence obligations for the protection of Aboriginal objects are discharged by the process under the Code.

For the purposes of the Due Diligence assessment, disturbed land is defined in the Due Diligence Code. Land is disturbed if it has been the subject of a human activity that has changed the land's surface, with the changes remaining clear and observable.

The defence against prosecution offered by following the Due Diligence Code process does not apply to situations where it is known there is an Aboriginal object present. The defence does not authorise harm to Aboriginal objects.

Each section within this report follows the relevant step outlined in the Due Diligence Code (DECCW, 2010). Reference is also made, where relevant, to the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011) and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010).

Figure 1-1 General Proposal location

Figure 1-2 The Proposal Area

2. Legislation

In NSW, Aboriginal heritage is principally protected by two legislative acts:

- *National Parks and Wildlife Act 1974* (NSW) (NPW Act) and its subordinate legislation, the National Parks and Wildlife Regulation 2019; and
- *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

2.1 National Parks and Wildlife Act 1974

Part 6 of the NPW Act concerns Aboriginal objects and places and various sections describe the offences, defences and requirements to harm an Aboriginal object or place. All Aboriginal material receives blanket protection under the NPW Act. The main offences under section 86 of the NPW Act are:

- A person must not harm or desecrate an object that the person knows is an Aboriginal object.
- A person must not harm an Aboriginal object.
- For the purposes of this section, "circumstances of aggravation" are:
    - that the offence was committed in the course of carrying out a commercial activity; or
    - that the offence was the second or subsequent occasion on which the offender was convicted of an offence under this section.
- A person must not harm or desecrate an Aboriginal place.

An Aboriginal object is defined as:

- Any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with the occupation of that area by persons on non-Aboriginal extraction and includes Aboriginal remains.

Section 87 sets out defences that are available to a person who is prosecuted for a particular harm offence under section 86. For example, it will be a defence in certain circumstances if the person who is being prosecuted can show that:

- the harm or desecration was authorised through an Aboriginal Heritage Impact Permit (AHIP) and conditions of the AHIP were not contravened;
- the person exercised due diligence to determine whether the act/omission constituted the offence would harm an Aboriginal object and reasonably determined no harm would occur;
- the person complied with requirements or a code of practice, as prescribed in in the *National Parks and Wildlife Regulation* (2019); or
- was a low impact act or omission.

Section 89A of the NPW Act also requires that a person who is aware of an Aboriginal object, must notify the Director-General in a prescribed manner. In effect, this section requires the completion of AHIMS site cards for all sites located during heritage surveys.

2.2 Environmental Planning and Assessment Act 1979

The EP&A Act regulates development in NSW. It sets up a planning structure that requires developers (individuals or companies) to consider impact of the project on the environment and to promote the sustainable manage of built and cultural heritage (which includes Aboriginal cultural heritage). The EP&A Act requires that Aboriginal cultural heritage, and the possible impacts that development may have to Aboriginal heritage be considered, as part of the environmental impact assessment process under the EP&A Act. For

most projects requiring assessment under Part 4 and 5 of the EP&A Act, the NPW Act will apply and an AHIP may be required.

It also provides for the identification, protection, and management of heritage items through inclusion of these items into schedules off planning instruments, such as Local Environmental Plans (LEPs).

3. Ground disturbance

Step 1. Will the activity disturb the ground surface or any culturally modified trees?

The proposed work to be undertaken by Kosciuszko Thredbo will result in a high level of ground disturbance and will involve the demolition of the Sonnblick lodge (Plate 3-1) and associated concrete paths, landings and stairs (Plate 3-2). These works will be subject to geotechnical investigations which will provide recommendations for site stability post demolition. A brief summary of the Proposal is provided below:

- **Geotechnical Investigation/report and demolition plan:** Kosciuszko Thredbo will separately engage a geotechnical engineer to prepare a geotechnical report and recommendation for site stability post demolition. Kosciuszko Thredbo will also separately engage an appropriate engineering consultant to prepare a demolition plan in accordance with *AS 2601-2001 The demolition of structures*.
- **Machinery and equipment:** Machinery and equipment requirements will be subject to the geotechnical report but will likely include a large excavator, large trucks, mobile crane and standard hand tools.
- **Site management:** Demolition equipment and materials may be located on site but must not affect the single lane (one way) traffic of Bobuck Lane. Contractors will also likely be provided a secured compound area at Friday Flat (contractor to provide fencing etc).
- **Waste:** Demolished material will be recycled where possible and if not will be transported to Jindabyne Landfill.

These activities are likely to require a high level of ground disturbance and any Aboriginal sites within the disturbance footprint could therefore be subject to harm. As the Proposal will include ground disturbance, the next step in the due diligence process will be completed.

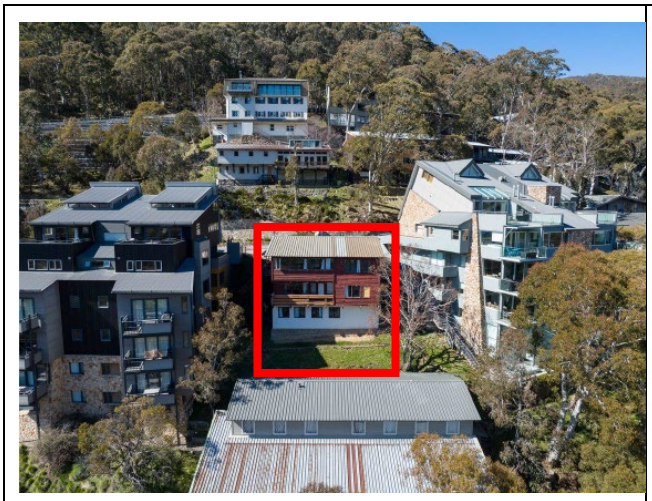

Plate 3-1 The Sonnblick lodge for demolition, with a red outline showing an approximate boundary of the Proposal Area. View to south (Source: Kosciuszko Thredbo).

Plate 3-2 Lodge and associated infrastructure for demolition with a red outline showing an approximate boundary of the Proposal Area. View to north-west. (Source: Kosciuszko Thredbo).

4. Register search and landscape assessment

Step 2a. Search the AHIMS Database and other information sources

A search of relevant heritage registers for Aboriginal sites and places provides an indication of the presence of previously recorded sites. A register search is not conclusive, however, as it requires that an area has been subject to archaeological survey, and information about any sites identified has been submitted for registration. However, as a starting point, the search will indicate whether any sites are known within or adjacent to the investigation area and provide oversight regarding the site types most commonly recorded within the locality. The Aboriginal Heritage Information Management System (AHIMS) provides a database of previously recorded Aboriginal heritage sites. A search provides basic information about any sites previously identified within a search area. The results of the search are valid for 12 months for the purposes of a due diligence level assessment.

On 08 June 2023 a search of the AHIMS database was undertaken over an area measuring approximately 7km in length and 3km in width, centred on the Proposal Area, as follows:

- Client Service ID: 789811
- MGA Zone: 55
- Lat/Long From: -36.5196, 148.2785
- Lat/Long To: -36.4851, 148.3403.
- Aboriginal objects:
    - 22
- Aboriginal Places:
    - nil

There were 22 Aboriginal objects recorded within this search area and no declared Aboriginal Places. Table 4-1 below shows the breakdown of site types and Figure 4-1 and Figure 4-2 show the location of the AHIMS sites in relation to the Proposal Area.

Table 4-1 Breakdown of previously recorded Aboriginal sites in the region

Site type	Number	Percentage
Artefact	21	95.45
Artefact; Potential Archaeological Deposit (PAD)	1	4.55
Total	22	100

None of the archaeological sites currently recorded on AHIMS are located within or directly adjacent to the Proposal Area however, five sites occur within 600m. These sites are summarised in in Table 4-2 below.

Table 4-2 Sites within 600m of the Proposal Area

Site number	Site name	Site type	Distance to project (m)	Site status on AHIMS
61-6-0082	Merritts Park Nature Trail;Site 1;	Artefact	130m north	Valid
61-6-0121	Merrits Creek 1	Artefact	315m north	Valid

61-6-0103	EDI 1	Artefact	420m north	Valid
61-6-0083	Merritts Park, Site 1;	Artefact	355m north	Valid
61-3-0065	Friday Flat IF-1;?;	Artefact	585m east	Valid

The five AHIMS sites located within 600m of the Proposal Area are described below:

- AHIMS site #61-6-0082 is an artefact scatter recorded by Nicole Fuller in 1988, during an assessment for an extension to a golf course. The site comprises one broken hammerstone made from a river pebble, one silcrete geometric microlith, four silcrete flaked pieces, one silcrete flake, and one tiny chert flake. These artefacts were identified 30m along the Merritts Park Nature Trail, on a gentle hillslope, back from Thredbo River. The site had been disturbed by the clearing of land and the site was exposed by bulldozer tracks.
- AHIMS site #61-6-0121 is a low density artefact scatter recorded by Alistair Grinbergs in 1997 during a site inspection for the proposed development of additional ski slope facilities. The site is located on a level to gently sloping saddle on a spur adjacent to Merritts Creek. No further information about the site is provided on the site card.
- AHIMS site #61-6-0103 is an artefact scatter recorded by C.D Dearling in 1997 during an archaeological survey of the proposed extension of the 'Easy Does It' ski run. The site consisted of four quartz flakes and one quartz core fragment, located on a spur above Merritts Creek. The site's location had been impacted by wombat digging.
- AHIMS site #61-6-0083 is an artefact scatter recorded by Nicole Fuller in 1988, during an assessment for an extension to a golf course. The site comprises one silcrete flake, one volcanic flake, one silcrete blade, one silcrete fragment, and eight possible quartz chips and flakes. The site was recorded on a patch of exposed ground measuring 10m by 10m, between a small gravel parking bay and a barbecue. The site is also located on a slight slope, approximately 30m from a creek. Vegetation surrounding the site consists of grasses with the occasional small bush. The site had been impacted by the use of the barbecue area.
- AHIMS site #61-3-0065 is an isolated artefact recorded by P. Saunders (Archaeological Heritage Surveys) in 1998 during an archaeological survey for a proposed carpark extension at the Thredbo Alpine Village. The site was identified on a former gravel pit, immediately west of the northern bank of Thredbo River. The site contained one quartz flake measuring 18mm (length), 12mm (width) and 1mm (thickness). The site's location had been highly disturbed by works associated with gravel extraction in the 1950s-1960s.

The sites described below are those located in the wider area:

- AHIMS site #61-6-0139 is an artefact scatter recorded by Past Traces in 2022, during an Aboriginal heritage due diligence assessment for the Thredbo golf course development. The site comprises nine quartz flakes and two quartz cores, found within three surface exposures.
- AHIMS site #61-6-0104 is an artefact scatter recorded by Navin Officer in 1996 during an archaeological survey for an underground electricity cable easement. The site consisted of seven artefacts (one grey silcrete flaked piece, one grey silcrete flake, two quartz flaked pieces, one quartz core fragment and two quartz flakes) in three exposures. The site was recorded on an upper slope along a small spurline and spurline shoulder adjacent to the Thredbo River flats to the northwest and Friday Flat Creek to the southeast. The site's condition was described as good, with minor impacts being from rabbit and wombat activity.
- AHIMS site #61-6-0081 is a low density artefact scatter recorded by Nicole Fuller in 1988, during an assessment for an extension to a golf course. The site comprises one retouched silcrete scraper and

one quartz flaked piece, located on a narrow track running parallel to the Thredbo River. The site was surrounded by woodland with dense undergrowth.

- AHIMS site #61-3-0062 and AHIMS site #61-3-0063 were recorded by Navin Officer in 1992 during an archaeological survey for roads works on Alpine Way:
    - AHIMS site #61-3-0062 is an artefact scatter identified in two exposures, with the first exposure containing 84 artefacts in an area measuring 40m by 2.5m-3m and the second exposure containing 14 artefacts in an area measuring 7m by 1m. The artefacts included quartz cores, blades, flaked pieces, flakes and chips and one silcrete flake. The site was recorded as being partially disturbed due to its location in a works depot.
    - AHIMS site #61-3-0063 is an artefact scatter that was identified on a well-drained spur adjacent to a transmission line service track. The site contained 16 artefacts of silcrete blades and quartz flaked pieces, flakes and chips. At the time of the recording, the site was described as being partially disturbed.
- AHIMS site #61-6-0099 and AHIMS site #61-6-0100 were recorded by Navin Officer in 1994 during an archaeological survey for the Crackenback Ridge at Thredbo Village:
    - AHIMS site #61-6-0099 comprises 16 artefacts, five of which are silcrete and the remainder are quartz. Forty three percent were flakes, 31% were flakes with secondary flaking, 12% were cores, and 12% were flaked pieces. The artefacts were located on a broad and low spurline adjacent to Ramshead Creek. It was considered likely that the site extended beyond the known extent, particularly upslope and adjacent to Ramshead Creek.
    - AHIMS site #61-6-0100 comprises four quartz artefacts (two quartz cores, one quartz flake and one quartz broken flake) located in an area measuring 75m by 15m. The artefacts were located on a low gradient slope adjacent to a small drainage line, sloping to Ramshead Creek. A Consent to Destroy (now AHIP) was issued for the site on 10 November 1994, “for consent to destroy those relics in the course of construction of accommodation buildings and associated infrastructure”.
- AHIMS site #61-3-0137 and AHIMS site #61-3-0138 were recorded by Grinbergs Heritage Solutions in 2008, during a preliminary ACHA for the proposed Thredbo to Bullocks Flat multi use track:
    - AHIMS site #61-3-0137 was described as a sparse scatter of four quartz artefacts (two flakes and two chips) located on a level to very gently sloping bench/termination above the eastern banks of the Thredbo River. The artefacts were identified over an area of approximately 40m by 40m. The artefacts were found in a disturbed context; however, it was concluded that there may be additional artefacts in the immediate area.
    - AHIMS site #61-3-0138 was described as a single quartz flake identified on a gentle slope above the Thredbo River. The artefact was found in an exposure made by extensive wombat diggings over an area of approximately 5m by 5m.

Figure 4-1 AHIMS sites surrounding the Proposal Area

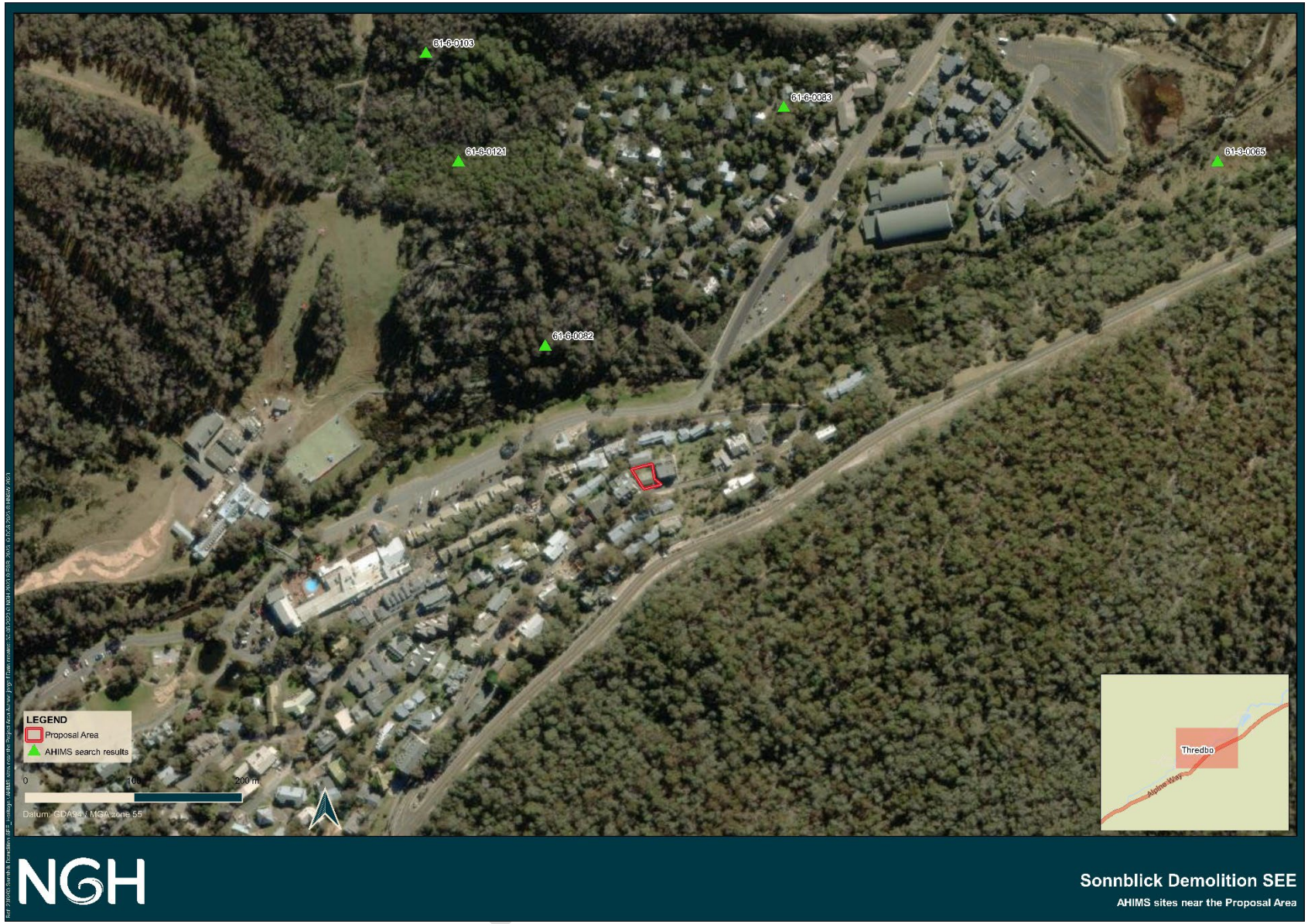

Figure 4-2 AHIMS sites near Proposal Area

4.1 Archaeological context

4.1.1 Regional context

Aboriginal people have occupied what we now know as the Australian continent for at least 40,000 years and perhaps 60,000 years and beyond (Bowler et al. 2003; Mulvaney and Kamminga 1999; Hiscock 2007). All major environmental zones in Australia are known to have been occupied for the last 35,000 years (Mulvaney and Kamminga 1999:114). The earliest archaeological dates for occupation in the Australian Alps bioregion dates back to 21,000 years ago from a rock shelter at Birrigai, near Canberra. However, there is physical evidence of Aboriginal use across the region in the form of surface artefacts, scarred trees, stone quarries, ceremonial grounds, stone arrangements, rock art, and rock shelters with cultural deposits (Flood 1980; Grinbergs 1992; Freslov et al. 2004).

In the south-eastern Australian highlands, there has been limited evidence of Pleistocene occupation with most sites dating to approximately 4,000 before present (BP), which is well within the Holocene (Flood et al. 1987). Only three Pleistocene sites have been recorded and excavated in the region. The oldest of these sites, Birrigai rock shelter near Canberra, has been dated to 21,000 BP and was thought to have been above the tree line during this period (Flood et al. 1987). Another regional site is New Guinea II on the Snowy River, which was recorded by Ossa et al. (1995) with a similar basal date of approximately 21,000 BP. The third site, Cloggs Cave, located in the lead up to the Victorian highlands was dated to approximately 18,000 BP (Flood 1973). The archaeological evidence from these sites – mostly faunal remains and lithics – suggests limited non-intensive use of the sites during the Pleistocene before a more intensive Holocene occupation. This model of occupation contrasts strongly with previously recorded sites in Southwest Tasmania, which is climatically and temporally similar, where it appears that Pleistocene highland occupation was intensive, and evidence of subsistence specialisation is recorded (Ossa et al. 1995; Cosgrove 1999).

While there are not enough sites currently identified in this region to clearly inform upon patterns of Pleistocene highland usage it is suggested by Ossa et al. (1995) that the drivers of highland occupation in south-eastern Australia were very different between the Pleistocene and Holocene. Holocene occupation of these areas has been strongly associated with ethnographic evidence of Bogong moth hunting as part of feasts and ceremonies (Flood 1973:1980). It is important to note however, that bogong moths could not have been a highland resource prior to the present climatic conditions of the Holocene. Consequently, present models of site identification proposed by Flood (1980) are only appropriate for Holocene Aboriginal cultural sites.

Through her work, Flood (1973, 1980) proposed that five archaeological site types typify the Southern Uplands:

- Large lowland base camps – open artefact scatters containing over 1,500 artefacts that may extend over several kilometres;
- Medium sized lowland camps;
- Valley camps at altitudes between 745m– 1,160m;
- High summer camps at elevations of 1,160m – 1,525m; and
- Camp sites above 1,525m (the snow line).

This model revolved around both seasonal resource availability (e.g. Bogong moths) and seasonal movement through the landscape, with lowland areas occupied during the winter months and the alpine areas occupied during summer (Flood 1980). Flood recognised that three main resource zones were exploited by Aboriginal communities. These resource areas were:

1. The riverine plains on the tablelands, where the great variety of riverine foods would have been easily exploited.

2. The mountain slopes and wet sclerophyll forests where mammals and vegetable foods were obtained.
3. Sub-alpine and alpine areas with the Bogong moths and daisy yams (Flood 1980:159).

Flood (1980) also suggested that camp sites would be located:

- Within access to water (all sites within one kilometre of a water source and most sites within 100m);
- Not directly along water courses, with Flood (1980) suggesting that poor drainage, risk of flash flooding and mosquitoes would have deterred long term camps immediately adjacent to rivers and creeks;
- With an aspect that allows people to sight game and/or the approach of strangers;
- In close proximity to shelter or materials from which to construct shelters; and
- In close proximity to food and other resources.

Flood concluded that "no traces of Aboriginal presence have yet been found in the dense bush of the Thredbo Valley, which would have been a much more difficult route to the moth peaks than the open Perisher Valley" (Flood 1980:192-3). However, archaeological investigations undertaken since, have challenged Flood's theory, providing an archaeological record of Aboriginal occupation and movement through the valley. Feary and Niemoeller (2015:30) have suggested that large numbers of sites along the Thredbo River, "may be associated with seasonal activities such as ceremonial gatherings prior to movement to the mountains, or they may have nothing at all to do with moth feasts, being more a reflection of a riverine based economy, relying on the resources of the river rather than on the resource poor treeless plains". Navin Officer (1987:4) noted that "at the time of Flood's investigations, no archaeological sites had been found in the Thredbo River Valley" and that "archaeological investigations undertaken in the region since the 1970s has led to the discovery of a number of campsites in and around the Thredbo River Valley".

Kamminga (1993) determined that the Thredbo River Valley is a "continuous archaeological site, comprising many activity areas" and that the "flaking of quartz pebbles at locations along the valley floor and lower slopes over millennia has produced a high background count of flaking debitage" (Kamminga cited in Feary and Niemoeller 2015:39). Feary and Niemoeller (2015:39) propose that Kamminga's findings may contribute to a "refining of the model, by suggesting that rather than an even distribution of archaeological material along the valley, traditional use was concentrated at the lower end of the valley around Bullocks Flat and the Little Thredbo River, where people gathered and/or lived". Further indicating Little Thredbo River as an area of Aboriginal occupation, R.F Payten (1949) described three Aboriginal burials as "mounds of earth covered in stones, about 3 feet high", "on the Thredbo River, a few miles above the confluence of the Little Thredbo and Thredbo Rivers" (Payten cited in Young 2005:79). Paton (1984) undertook archaeological investigations at Bullocks Flat and determined that "the comparatively large number of isolated finds and scatters of stone artefacts now known from the Thredbo Valley would seem to indicate a relatively intensive occupation of areas below 1,200m" (Paton 1984:8).

Consistent with geology of the Main Range Montane soil landscape, quartz has been recorded as the predominant material for artefact manufacture in the region. Kamminga (1992) undertook archaeological test excavation at the now Lake Crackenback Resort, which recovered a total of 661 artefacts with quartz flakes representing the majority of the assemblage (95%). Radiocarbon dating of charcoal samples obtained from stratified deposits indicated an Aboriginal occupation date of 4,000 years BP, thus "providing the first dated cultural sequence within the NSW section of the Australian Alps" (Kamminga 1992, Feary and Niemoeller 2015:38).

Paton and Macfarlane (1988a, 1988b) conducted preliminary salvage excavations for the proposed resort complex at the Little Thredbo Homestead near the Thredbo Skitube terminal, located approximately 14.8 km north-west of the current Proposal Area. During this assessment, Paton and Macfarlane classified the landforms between one of four categories: alluvial flats (low lying, generally shaded, and poorly drained), moderate slopes (3° - 5° slopes, generally well drained), steep slopes (greater than 6° slope, well drained),

and elevated flats (less than 3° slope and at least 20m above alluvial flats on well drained shoulders, crests, or knolls); all landforms were noted to contain varying aspects. The results of this salvage work – which included excavation of test pits and controlled bulldozer scrapes – were that a total of 246 subsurface stone artefacts were recorded:

- Within the alluvial flats, 16 test pits were excavated but only two artefacts were recorded.
- Within the moderate slopes, 10 test pits were excavated with 62 artefacts recorded (from only two pits).
- Within the steep slopes, nine test pits were excavated but no artefacts were recorded.
- Within the elevated flats, 15 test pits were excavated with 181 artefacts recorded. Only a single bulldozer scrape contained an artefact.

A total of 224 of the recorded artefacts were quartz, the majority of which were 'small chips' (flaked pieces) at 54.4%, while flakes represented 37%. The remainder of the quartz assemblage comprised of multiplatform and bipolar cores. The remaining 22 artefacts were identified as grey silcrete (n=21, 8.5%) and a volcanic pebble (n=1, 0.4%). Silcrete geometric microliths and broken backed blades were identified while the single volcanic pebble was recorded as a ground-edged axe with pitting on one of its surfaces indicating its potential use as a hammerstone. Paton and Macfarlane argued that the quartz assemblage recorded during the salvage was consistent with the results of other excavations on the Far South Coast (Hiscock 1982 as cited in Paton and Macfarlane 1988) and the Southern Tablelands (Flood 1980). They also noted that Flood (1980:217 as cited in Paton and Macfarlane 1988:5) argued that geometric microliths were more common within assemblages in the region while backed blades were rare. Paton and Macfarlane argued that the presence of these typologies suggested that the site could be dated between 2,000 and 5,000 years BP, however this was solely based on the stone artefacts present as no dateable material was recovered. More generally, the results of the assessment by Paton and Macfarlane conform to the predictive models developed by Flood (1980) for montane valley camps. Elevated flats were clearly the focus of previous human activity in this area while moderate slopes were targeted to a lesser degree (especially when elevated 20m above alluvial flats and with an easterly or north-easterly aspect). The results of these excavations also suggest that steep slopes and alluvial flat landforms were not utilised for activities that left an archaeological record. Despite largely conforming to previous predictive models, Paton and Macfarlane argue that the size of the recorded assemblage suggests that the Aboriginal occupation of the Thredbo valley was more intensive that had been previously understood.

4.1.2 Local context

Anutech (1987) was commissioned by Monaro Electricity Commission to undertake an archaeological survey of a 33kV transmission line, measuring approximately 13km in length from Bullocks Flat to Thredbo Village, approximately 980m east of the current Proposal Area. The proposed transmission line covered flat to gently sloping ground, in proximity to the Thredbo River and was therefore considered to be suited to Aboriginal occupation and have high archaeological sensitivity. Anutech and Eden LALC undertook an archaeological survey of the proposed transmission line and identified 11 artefact scatters and two isolated artefacts, all exposed in areas of ground disturbance from land clearing, animal burrowing and erosion. The artefact scatters had low densities and it was determined that they likely formed a general background scatter of artefacts along the Thredbo River. In line with regional trends, the artefacts were mostly manufactured from quartz. Anutch concluded that due to disturbance, "all artefacts had been displaced from their original discard position and the integrity of the sites and their ability to answer questions of occupation and spatial organisation had been further reduced" (Anutech 1987:18). Seven of the 11 sites were to be threatened by the proposed development. For five of these sites, it was recommended that the developer apply for a Consent to Destroy (now AHIP). The remaining two sites were considered to be archaeologically sensitive due to containing a large number of artefacts and having a "greater potential to answer questions about Aboriginal occupation" (Anutech 1987:18). As such, it was recommended that the proposed development

avoid these sites and that temporary fencing be erected to restrict the movement of heavy vehicles through this area.

Navin Officer Heritage Consultants (Navin Officer) (1992) was commissioned by NSW National Parks and Wildlife Services to undertake an archaeological survey of part of the Alpine Way in the Kosciusko National Park, including the Friday Flats Work Depot, which is approximately 900m east of the current Proposal Area. Based on background research of the local area, it was determined that the site types most likely to be found in the study area were artefact scatters, scarred trees and isolated artefacts. The study area had been previously disturbed by road construction, modifications and maintenance and as such the potential for Aboriginal sites was considered to be moderate to low. Archaeological survey was undertaken by Navin Officer and the Eden LALC, which identified one possible scarred tree, eight artefact scatters, five isolated artefacts and eight possible historic sites/features. The majority of these sites were located outside of the study area and would therefore not be impacted by the proposed works. One artefact scatter (AHIMS site #61-3-0062, previously described in Section 4) was recorded at the Friday Flat Works Depot, closest to the current Proposal Area. A total of 98 artefacts were identified, and Navin Officer determined the potential for further sub-surface artefacts to remain in undisturbed portions of the site. It was therefore considered to have moderate to high archaeological potential in a local context. It was recommended that a Consent to Destroy (now AHIP) be applied to for part of the site that had already been disturbed, and which were located in areas to be impacted by the proposed works. It was also recommended that the final design for the depot incorporate a permanent barrier to protect undisturbed portions of the site.

Navin Officer (1997) was commissioned by Kosciusko Thredbo to prepare an Aboriginal heritage study for the extension and improvement of the 'Easy Does It' ski run at Thredbo, approximately 450m north-east of the current Proposal Area. An analysis of land-use history found that a large amount of fill had been introduced to form a slope for the ski trail. This fill had a large amount of introduced stone including fragments of quartz and granite pebbles. Based on other archaeological studies conducted in the Thredbo Valley, Navin Officer determined the site types most likely to be encountered in the study area were artefact scatters and isolated finds made of quartz material and located on level or low gradient, well drained ground. Archaeological survey undertaken by Navin Officer identified one low density artefact scatter, located on top of a spur, with a steep slope falling to Merritts Creek. The site consisted of five artefacts including one quartz core fragment and four quartz flakes. Navin Officer determined that the site represented a single occupation event or reflected the transitory movement of Aboriginal people through the landscape. It was concluded that "due to its size, contents, and location which is fairly typical for those found in the region, the artefact scatter site was considered to have low scientific or archaeological significance in a local context". It was recommended that the proponent apply for a Consent to Destroy (now AHIP), and that a copy of the report be forwarded to the Eden LALC.

HLA-Envirosciences (HLA) (2005) was commissioned by the Roads and Traffic Authority to undertake archaeological test excavation at Friday Flats Work Depot, approximately 900m east of the current Proposal Area. Navin Officer (1992) had previously identified an artefact scatter at the Depot during a survey of part of the Alpine Way. Archaeological test excavation recovered a total of 99 stone artefacts, with the most common tool type being flaked pieces (68%), and the most common material type being quartz (47%). The distribution of artefacts recovered from each test pit reflected a ow density assemblage. Majority of the assemblage (67%) was recovered from fill or mixed fill material, and it was concluded that the area had been heavily impacted by the construction of the work depot. HLA described the overall assemblage as "a series of overlapping knapping events, separated in time but which through post-depositional processes, have become incorporated within similar stratigraphic units" (HLA 2005:34). According to HLA, the excavations revealed that "natural and human environmental change had destroyed or modified *in situ* archaeological deposits within the study area" and as such, the assemblage was considered to be of low to nil archaeological significance because of their "condition, low density and lack of any stratigraphic integrity". HLA recommended that a Consent to Destroy (now AHIP) be sought prior to the commencement of proposed works.

Alistair Grinbergs Heritage Solutions (2008) was commissioned by the Department of Environment and Climate Change to prepare an ACHA for the proposed Thredbo to Bullocks Flat 16km multi-use track, located approximately 1.6km east of the current Proposal Area, at its nearest point. It was determined that the study area would have provided a range of montane and riparian resources beneficial to Aboriginal people. Based on previous research carried out in the Thredbo Valley, the most common sites to be expected in the study area were artefact scatters and isolated artefacts, and they were likely to be close to permanent water sources, on ridges or spur crests, spur terminations and basal slopes or on level to gently sloping landform elements. Archaeological survey identified a total of 23 Aboriginal sites, including 11 artefact scatters, nine isolated artefacts, one grinding groove and two PADs. The artefact sites were dominated by quartz flakes, and small quantity of chert and silcrete flakes were identified. The PAD sites were recorded in associated with two artefact sites located banks of the Thredbo River. The grinding groove was described as a uniform shallow depression on a large flat outcrop of granite with a pebble bed on the banks of the Thredbo River. This site was considered to be a rare example of this site type, especially being on a granite based rock. Based on the results of the survey, it was recommended that additional archaeological investigation in the form of text excavation be undertaken at all 23 sites.

On Site Cultural Heritage Management (On Site CHM) (2011) were commissioned by NSW National Parks and Wildlife Services to undertake archaeological excavation of bridge footings along the Thredbo to Bullocks Flat shared use track, approximately 1.6km east of the current Proposal Area, at its nearest point. The three bridge locations were located along a 1.1km stretch of the Thredbo River. Previous archaeological investigations of the shared use track undertaken by Alistair Grinbergs Heritage Solutions (2008) had identified 23 Aboriginal sites, and as such the bridge footing locations were determined to have high archaeological potential. A total of three test pits were excavated and five auger holes were hand drilled at the locations of the bridge footings. No Aboriginal objects were identified and due to the close proximity of the river, it was determined that periodic flooding may have washed artefacts away or Aboriginal people may not have used these locations as they were flood prone. Based on the results of the excavations, it was recommended that the proposed works could proceed with due caution.

Ironbark Heritage and Environment (IHE) (2013) was commissioned by Dabyne Planning on behalf of Kosciuszko Thredbo to prepare an Aboriginal Heritage Due Diligence Assessment for Stage 1 of the Thredbo Mountain Bike Trails, located approximately 95m north of the current Proposal Area, at its nearest point. An extensive AHIMS search of an area approximately 4km by 5km centred on the study area identified 23 Aboriginal sites, with four sites within 100m of the mountain bike trails. The most common site type in the local area and the most likely to be found in the study area were artefact scatters and isolated artefacts. An analysis of landscape features of the study area determined the potential for Aboriginal sites to remain, particularly in areas of relatively level and well-drained ground. Site inspection of the mountain bike trails did not identify any Aboriginal stone artefacts, however a number of areas that had the potential to contain artefacts were noted, based on their ideal terrain and limited ground disturbance. It was recommended that the project avoid certain landforms and where it could not, a layer of geo-fabric be installed. It was also recommended that Trail 1 and Trail 3 be placed along areas that had already been disturbed.

NGH (2022) was commissioned by Le Hunte Properties to prepare an Aboriginal Heritage Due Diligence Assessment for the proposed construction of tourist accommodation at 5 Diggings Terrace, Thredbo, approximately 580m south-west of the current Proposal Area. Desktop assessment of the study area found that due to the proximity of a major waterway and the presence of a spur, there was potential for isolated artefacts to be present. Visual inspection did not identify any Aboriginal objects or areas of PAD within the study area. Shallow soils and steep landforms were encountered, both of which had been shown by previous archaeological investigations in the local area to contain little potential for archaeological deposits. It was determined to be highly unlikely that Aboriginal objects or archaeological deposits would be impacted by the proposed works, and it was recommended that the proposed works could proceed with due caution.

4.2 Landscape assessment

Step 2b. Are there landscape features present likely to contain Aboriginal objects?

The Due Diligence Code outlines a range of general landscape features that are more likely to contain Aboriginal objects. These include land that is:

- Within 200m of water;
- Located within a sand dune system;
- Located on a ridge top, ridge line or headland;
- Located within 200m below or above a cliff face; or
- Within 20m of a cave, rock shelter or cave mouth.

It is also necessary to consider whether any sensitive landscape features present have been disturbed or modified which would reduce the potential for Aboriginal objects to occur.

4.2.1 Soils

The formation and nature of soils within the Proposal Area can provide insight into the types of sites which may be present, in addition to the likelihood for intact archaeological deposits to be present.

The Proposal Area is located within the Australian Alps Bioregion which is the smallest bioregion in NSW and is NSW's only true alpine environment. The soils of this region reflect the extreme climatic gradient across the ranges (NPWS 2003: 218). The lowlands consist of texture contrast soils, grading to uniform, organic soils and peats at the highest elevations.

The Proposal Area is located within the Main Range Montane (Mam) soil landscape of the Australian Alps Bioregion which is characterised by gritty clay loams on granites and pedal red to yellow clay subsoils on eta-sediments. Soils are intermediate in character between low elevation texture contrast profiles and higher elevation organic uniform profiles (Mitchell 2002:8).

As shown in Figure 4-3, the soil type of the Proposal Area is alluvial rudosols, which is associated with high exposed ridges and elevated stony slopes (EMM Consulting 2017:21). Soils are often shallow, with bedrock being located near the surface (EMM Consulting 2017:22). Shallow soils such as alluvial rudosols have implications for the potential and survivability of Aboriginal objects and are unlikely to contain deep and/or stratified archaeological deposits. In addition, it is likely that soil has been moved and possibly introduced for stability of the lodge and construction of the driveway and retaining walls.

Figure 4-3 Soil landscape of the Proposal Area and near vicinity

4.2.2 Geology

The landscape context of the Proposal Area is based on Mitchell soil landscapes and Interim Biogeographic Regionalisation for Australia (IBRA) data, and the combination of these differing resolutions of landform data provides a comprehensive and multi scaled understanding of the landscape within the Proposal Area and its immediate surroundings. Archaeologically, the geology of any location is important as it informs as to whether there any potential for *in-situ* deposits of stone material traditionally used for the manufacture of stone tools or whether these materials would have to have been sourced from further afield or even traded with other groups of people.

The Australia Alps Bioregion comprises granites that have formed faulted, stepped ranges at the point where the South Eastern Highlands in NSW turn west into Victoria. The upper surface of granite locks contain low relief. Geology of the Main Range Montane soil landscape comprises Silurian-Devonian gneissic granite, granite and granodiorite and Ordovician slate, chert, quartzite and phyllite (Mitchell 2002:8). These raw materials, particularly quartz and chert were utilised by Aboriginal people for the manufacture of stone tools and evidence of this has been recorded in the local area (see Section 4.1.2).

4.2.3 Topography and hydrology

The general elevation of the Main Range Montane soil landscape is 100m to 1,500m and Thredbo Village is located at 1,365m (Mitchell 2002:8). The Proposal Area is located on a steep slope, that has been modified for the construction of the lodge, driveway and associated infrastructure (see Plate 4-2).

Thredbo River is located 85m north and is a perennial river within the Snowy River catchment. The Thredbo River is impacted by seasonal climate changes, with high flows during the spring snow melt and snow and ice during the winter season (Envirokey 2015:31). Friday Flat Creek is located 870m south-east and Bullock Yard Creek is located 3.077km east. The Thredbo River and its tributaries would have provided freshwater and food resources for Aboriginal people. Past Aboriginal activity along the Thredbo River is evidenced by the previously recorded AHIMS sites, see Figure 4-1.

4.2.4 Flora and fauna resources

The information provided herein is intended as a generalised summary of the endemic flora and fauna present within the Proposal Area and local area and is not to be used as a substitute for detailed ecological studies and assessments. However, it may be inferred that prior to human disturbance the local area would have been heavily vegetated and would have supported a wide variety of resources to any people living there.

Plant foods were important in the Aboriginal diet, and tubers of the daisy yam (*Microseris scapigera*) would have been a “more reliable staple food with Bogong moth harvesting restricted to special and infrequent ceremonial occasions” (Bowdler 1981). Flood noted that “the root of the native orchid and lilies, and the starchy rhizomes of various waterplants, grew in the mountains and are likely to have been eaten in large quantities” (Flood 1980). The Thredbo River would have provided fish, crayfish and waterbirds and game such as kangaroos, wallabies and possums would have also been locally available (Flood 1980).

The Proposal Area has been cleared of vegetation and contains grass (Plate 4-1). The Proposal Area is void of trees and therefore does not have potential for modified trees (scarred or carved) to exist. The NGH (2023:3) *Sonnblick Demolition BOS Evaluation* has identified the vegetation within the Proposal Area as exotic grasses (see Plate 4-1 and Plate 4-2).

Prior to clearing, the Proposal Area is like to have contained vegetation typical of the Main Range Montane soil landscape which includes tall forests in moist, high rainfall environments with alpine ash (*Eucalyptus delegatensis*), mountain gum (*Eucalyptus dalrympleana*), narrow-leaved peppermint (*Eucalyptus radiata*), manna gum (*Eucalyptus viminalis*), brown barrel (*Eucalyptus fastigata*), snow gum (*Eucalyptus pauciflora*),

mountain hickory wattle (*Acacia obliquinervia*) and silver wattle (*Acacia dealbata ssp. alpina*). Moist gullies support soft tree fern (*Dicksonia antarctica*), with blackwood (*Acacia melanoxylon*), southern sassafras (*Atherosperma moschatum*) and hazel pomaderris (*Pomaderris aspera*). Sphagnum bogs (*Sphagnum cristatum*) with candle heath (*Richea continentis*) and swamp heath (*Epacris paludosa*) occur at the head of most creeks (Mitchell 2002:8).

Plate 4-1 Exotic grasses in the Proposal Area.

Plate 4-2 Photograph of exotic grasses at rear of property, and topography considerably cut into for retaining wall.

4.2.5 Historic land use

The traditional lifestyle of the Ngarigo people was disrupted from the late 1820s when graziers brought stock into the Thredbo Valley, attracted by the benefits of the grasslands and permanent water supply (Thredbonet Marketing 2015). Grazing leases occurred in the area from the 1820s until the mid-1900s, when they ceased due to increasing environmental concerns. Scientist Richard Helms first raised the alarm in 1893, about the "environmental impacts of regular burning and grazing and consequent soil erosion in the Alpine area" (Pickering and Worboys 2002:8). However, it was during the 1930s that the "first real stirrings of opposition to this land-use gained momentum as erosion had become severe in many areas" (Pickering and Worboys 2002:8). It was the establishment of the Kosciuszko State Park by Act of Parliament on 19 April 1944, which resulted in the removal of grazing from the Alpine area (Pickering and Worboys 2002:9).

In 1949, the Snowy Mountains Hydro Electricity Scheme commenced, bringing an influx of workers to the region. One of these workers, Tony Sponar, set up a downhill skiing course at an area known as George Chisholm course, located near the current Thredbo village. The Kosciuszko Chairlift and Thredbo Hotel Syndicate was formed in 1955 and included Sponar, Charles Anton, Eric Nicholls and Geoffrey Hughes and it aimed to establish Thredbo as a major ski resort. In 1957, the syndicate was incorporated as Kosciuszko Thredbo Limited, and the company was granted a lease by the NSW Minister for Lands which gave it various rights to developing Thredbo (Thredbonet Marketing 2015). An article in the Canberra Times from Wednesday 30 January 1957 details:

> *The Premier, Mr Cahill announced today that Cabinet had given approval to the Department of Lands to enter into an agreement with a private syndicate authorising it to occupy 75 acres in the Thredbo Valley in Kosciuszko State Park. Mr Cahill said the Kosciuszko Chairlift and Thredbo Hotel Syndicate had agreed to carry out the following improvements if granted the lease:*
>
> - *Construction of a chairlift*
> - *Construction of an hotel to accommodate not fewer than 40 guests*
> - *Construction of an access road from the Alpine Highway to the hotel site*

- *Construction of a petrol station*

New Hotel And Ski-lift Possible For Kosciusko

SYDNEY, Tuesday. — An 80-guest hotel with an ultra-modern ski-lift may be built in the Kosciusko area.

The Premier, Mr. Cahill, announced to-day that Cabinet had given approval to the Department of Lands to enter into an agreement with a private syndicate authorising it to occupy 75 acres in the Thredbo Valley in Kosciusko State Park.

Mr. Cahill said the Kosciusko Chairlift Thredbo Hotel Syndicate had agreed to carry out the following improvements if granted a lease:

- Construction of a chairlift at the 4,550ft. altitude to the 6,000ft. mark on Crackenback Peak, with a capacity of 150 passengers an hour.
- Construction of an hotel to accommodate not fewer than 40 guests, with the necessary appointments and accommodation for 40 more guests in the hotel or in Norwegian huts to be purchased from the Snowy Mountains Hydro-Electric Authority.
- Construction of an access road from the Alpine Highway to the hotel site.
- Construction of a petrol service station on the hotel site.

Mr. Cahill said that if the syndicate completed these improvements within five years it would be granted a 99-year lease.

The syndicate would be charged only a rental of £1 a year during the five-year option period of the lease.

Later rentals would be based on the annual receipts of the hotel, with a maximum rental of 1¼ per cent. of gross annual receipts.

Figure 4-4 (Canberra Times, Wednesday 30 January 1957, Page 3).

Historical aerial imagery from 1964 (Figure 4-5) shows that by this year the Proposal Area had been mostly cleared of vegetation. Thredbo village at this time remained largely undeveloped, compared to the image from 1992 (Figure 4-6). The image from 1992 (Figure 4-6) shows that the lodge had been constructed by this year and all vegetation had been cleared. Development surrounding the Proposal Area has increased significantly and all roads had been formalised.

Summary

Prior to modification, the Proposal Area would have comprised a steep landform with Eucalyptus species typical of the Main Range Montane soil landscape. The Thredbo River located 85m north would have provided freshwater and food resources for Aboriginal people. Raw materials available in the local area, such as quartz and chert would have been utilised by Aboriginal people for the manufacture of stone tools. The Proposal Area is void of trees and therefore does not have potential for modified trees (scarred or carved) to exist. The only vegetation remaining is that of exotic grasses. The natural topography of the Proposal Area has been cut into and modified (Plate 4-2) for the construction of the lodge, driveway and associated infrastructure, and this is likely to have resulted in the movement of soil and introduction of imported soil. Historical aerial imagery has revealed that the Proposal Area was cleared of vegetation as early as the 1960s and that the lodge was built before 1992. The Proposal Area has experienced a high level of disturbance, therefore significantly limiting the potential for Aboriginal objects to remain.

Figure 4-5 Historic aerial imagery from 1964

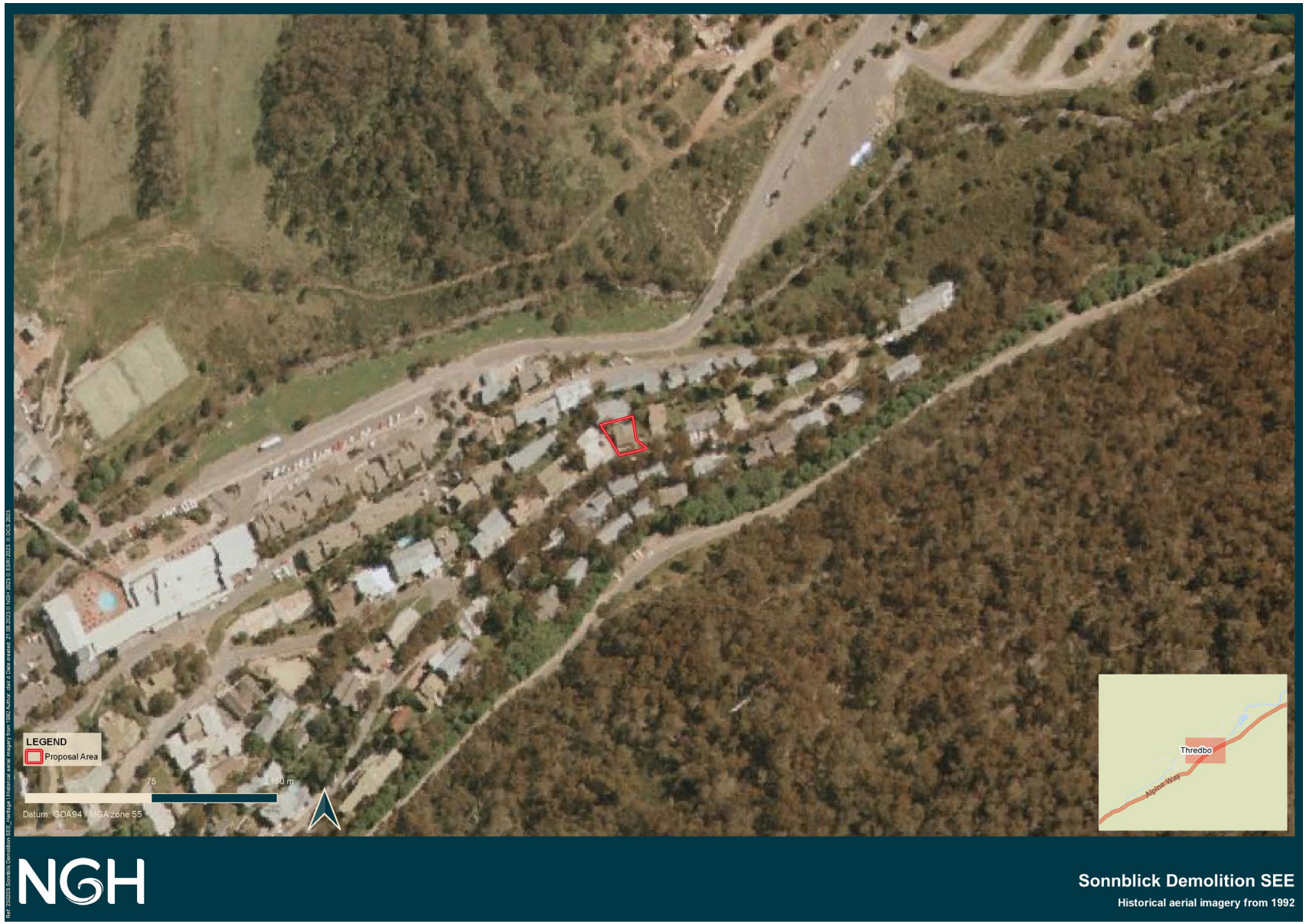

Figure 4-6 Historic aerial imagery from 1992

4.3 Aboriginal site prediction

Based upon the initial desktop assessment, using satellite imagery and topographic data, it appears that there is low potential for Aboriginal objects to occur within the Proposal Area given previous impacts associated with vegetation clearing, and modification of the natural landform for the construction of the lodge, driveway and associated infrastructure. As per the Heritage NSW Due Diligence Code of Practice, lands can be considered disturbed "if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable" (DECCW 2010:7). Examples of disturbance that have impacted the Proposal Area provided by the Code include the "clearing of vegetation, and the construction of buildings and associated earthworks" (DECCW 2010:7-8).

Prior to land clearing and modification, the Proposal Area encompassed a forested steep slope, which would have been an unfavourable position for Aboriginal activity or occupation. Previous archaeological research within the region suggests that elevated flats and relatively level and well-drained ground were the focus of Aboriginal activity while moderate slopes were targeted to a lesser degree. Previously recorded AHIMS sites in the local area have been commonly recorded on well-drained spurs and spurlines near waterways. Excavations in the local area have suggested that steep slopes and alluvial flat landforms were not utilised for activities that left an archaeological record.

The Proposal Area is void of trees, and therefore does not have potential for modified trees (scarred or carved) to exist. Site types such as burials, stone quarries, grinding grooves, and stone arrangements are present in the region but are unlikely to occur due to their rarity and the unsuitable landforms present within the Proposal Area. The most common site types in the local area are artefact scatters and isolated artefacts. The Proposal Area has negligible potential to contain these types of sites due to past disturbance from vegetation clearing, and modification of the natural landform for the construction of the lodge, driveway and associated infrastructure. It is unlikely for substantial sub-surface deposits to exist within the Proposal Area due to the presence of shallow soils and high clay content typical of alluvia rudosols. In addition, it is likely that soil has been moved and possibly introduced for stability of the lodge and construction of the driveway and retaining walls.

The desktop assessment, therefore, indicates that there are no landscapes present within the Proposal Area that have the potential to contain Aboriginal objects. The nature of the works being undertaken at this site will involve a high level of ground disturbance and it is unlikely that it would impact on Aboriginal heritage objects.

5. Impact avoidance

Step 3. Can any AHIMS listed objects, or landscape features be avoided?

No AHIMS sites have been previously recorded within the Proposal Area and the nearest, site #61-6-0082 is an artefact scatter located 130m north. The Proposal Area is unlikely to contain Aboriginal sites due to past disturbance associated with vegetation clearing and modification of the landform for the construction of the lodge and associated infrastructure. Due to this high level of disturbance, there no unmodified landscapes present within the Proposal Area that have the potential to contain Aboriginal objects. The nature of the works being undertaken within the Proposal Area will involve a high level of ground disturbance and it is unlikely that it would impact on Aboriginal heritage objects.

6. Desktop assessment and visual inspection

Step 4. Does the desktop assessment confirm that there are likely to be Aboriginal objects present or below the ground surface?

The assessment process is primarily a desktop exercise, using available information such as the AHIMS search results and relevant archaeological reports to develop or refine a model of Aboriginal site prediction based on the type of activity proposed and the level of disturbance of the area. A visual inspection is also required where landscape features are present that may contain Aboriginal objects that cannot be avoided by the activity.

The desktop assessment has indicated that there are no unmodified landscapes present within the Proposal Area that have the potential to contain Aboriginal objects. The nature of the works being undertaken at the Proposal Area will involve a high level of ground disturbance and it is unlikely that it would impact on Aboriginal heritage objects.

The desktop assessment has therefore concluded that a visual inspection is not warranted as it is unlikely that Aboriginal objects will be impacted by the proposed works.

7. Further assessment

Step 5. Is further investigation or impact assessment required?

The construction of the lodge and associated infrastructure has characterised the Proposal Area as having a high level of disturbance.

The Due Diligence Code states that if, after the research and desktop assessment is completed, it is evident that harm will occur to Aboriginal objects or heritage places then further and more detailed assessment is required. However, if the research and desktop assessment conclude that the proposed activity is unlikely to harm Aboriginal objects then the activity can proceed with caution. The desktop assessment and research has concluded that the proposed activity is unlikely to harm Aboriginal objects and further archaeological assessment is not required.

8. Recommendations

The following recommendations are based on a number of considerations including:

- Background Aboriginal heritage research into the area;
- Assessment of Landscape;
- Land use and disturbance assessment;
- Consideration of the impact of the proposed works; and
- Legislative context for the development proposal.

1. The proposed work can proceed with caution without further archaeological assessment.
2. Any activity proposed outside of the current Proposal Area should also be subject to an Aboriginal heritage assessment.
3. If any items suspected of being Aboriginal in origin are discovered during the work, all work in the immediate vicinity must stop and the NSW Environment Line (1300 361 967) notified. The find will need to be assessed and, if found to be an Aboriginal object, further detailed assessment and an application for an Aboriginal Heritage Impact Permit (AHIP) may be required.
4. In the unlikely event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The Proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, Heritage NSW must be notified by ringing the Enviroline (131 555).

The Proponent is reminded that it is an offence under the *National Parks and Wildlife Act 1974* to disturb, damage or destroy an Aboriginal object without a valid AHIP.

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Appendix E Erosion and Sediment Control Plan

Erosion and Sediment Control Plan

Sonnblick Lodge Demolition

PURPOSE

The purpose of this Erosion and Sediment Control Plan is to outline the intentions and fundamental principles that will be followed in the planning and implementation of erosion and sediment control (ESC) measures for the duration of the project.

OBJECTIVES

To minimise potential impacts from construction works to receiving waters.

To reduce the potential for erosion and sediment moving offsite.

SCOPE OF THIS PLAN

This document identifies appropriate controls specific to project activities to prevent sedimentation and pollution of receiving waters, and minimise potential impacts on vegetation communities with and adjacent to the site.

GUIDELINES

- Managing Urban Stormwater: Soils and Construction, Volume 1, 4th Edition (Landcom 2004)
- Best Practice Erosion and Sediment Control Guidelines (IECA, 2008)
- Erosion and Sediment Control: A field Guide for Construction Site Managers (Catchments & Creeks Pty Ltd, 2012)

EROSION AND SEDIMENT CONTROLS

Implementation of appropriate controls and locations will be the responsibility of the construction contractor. Controls to be installed prior to any construction work (where required) and retained in place until exposed areas of soil or vegetation are stabilised/rehabilitated.

SITE ESTABLISHMENT

- Implement sediment control measures prior to any construction work and retain in place until exposed areas of soil or vegetation are stabilised/rehabilitated.

STOCKPILES AND STORAGE OF MATERIALS

- Soil stockpiles to be managed in accordance with the Soil Stockpile Guidelines.
- Refer **Attachment A** for recommended controls, including installation notes and examples.
- Refer to **Figure 1** and **Figure 2** for the location of the nominated stockpile and compound sites.

GENERAL

- Additional erosion and sediment control measures must be implemented and a revised ESCP must be prepared in the event that site conditions or project design change significantly from those considered within this plan.
- In the event that serious or material environmental harm may occur as a result of sediment leaving site, appropriate additional erosion and sediment control measures must be implemented such that all reasonable and practicable measures are being taken to prevent or minimise such harm.
- The construction schedule must aim to minimise the duration that all areas of soil are exposed to the erosive effects of wind, rain and surface water. Where possible, works will be undertaken during periods of no rainfall.
- Land-disturbing activities must not cause unnecessary soil disturbance if an alternative construction process is available that achieves the same or equivalent outcomes at an equivalent cost.
- Refer **Attachment A** for recommended controls, including installation notes and examples.

SITE ACCESS

- The site entry / exit point along Bobuck Lane will be monitored for sedimentation, particularly after rainfall. Any sedimentation on sealed, public roads must be removed in a timely manner via sweeping or washing back into the project site.
- Refer **Attachment A** for recommended controls, including installation notes and examples.

VEGETATION REMOVAL

- Vegetation removal will be limited to the smallest extent possible to complete the works
- Any clearing required is to be delayed as long as possible prior to the commencement of works, particularly within proximity to watercourses.
- All reasonable and practicable efforts must be taken to delay the removal of, or disturbance to, existing groundcover (organic or inorganic) prior to the commencement of works.
- Sedimentation controls must be installed prior to the commencement of works.

EROSION CONTROL

- Prevention of erosion will be prioritised above sediment control wherever practicable during the work.
- Dust suppression will occur when visible dust is sighted. Sediment-laden runoff from dust suppression must not run off site, cause a traffic hazard or environmental issues.
- All temporary earth bunds and flow diversion systems must be machine-compacted and stabilised with polymer or landscaping techniques (seeding, hydromulch etc.).

REHABILITATION AND STABILISATION

- All exposed areas shall be progressively stabilised/rehabilitated as soon as possible.
- As soon as demolition works are completed, a sterile cover crop will be applied using a hydroseed / hydromulching mix.
- Only weed-free or natural thatch/litter should be used in sediment control activities.
- All ESCs will remain in place until all exposed areas of soil are stabilised and/or revegetated.
- All landscaping and rehabilitation should be undertaken in accordance with the *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (NGH 2007).

MONITORING

During construction, all ESCs are to be checked regularly to ensure they remain in good working order at all times (e.g. prior to forecast rain, daily during extended periods of rainfall and after significant rainfall events). Regular monitoring and maintenance will be the responsibility of construction personnel. The Environmental Officer will undertake weekly inspections of controls for the duration of the works.

PERFORMANCE INDICATOR

No sediment deposition observed leaving the site.

CORRECTIVE ACTIONS

If sediment is observed leaving the site, identify the source and amend the ESCs on-site to ensure appropriate controls are in place. If required, additional ESCs to be installed.

ATTACHMENT A – CONTROL INSTALLATION AND CONSTRUCTION NOTES

Control	Project Activity	Location	Purpose	Timing	Standard Drawing Reference[1]
Stabilised site access	Demolition	At the site entry / exit point (driveway).	To prevent mud tracking onto Bobuck Lane.	Prior to commencement of works. Retain in place until exposed areas of soil are stabilised.	Stabilised Site Access (SD 6-14)
Flow control berms (earthen bunds)	Demolition of Sonnblick Lodge	Along the northern boundary (downgradient) of the development footprint.	To prevent dirty water from leaving the site and entering the adjacent, downgradient property.	Prior to commencement of works. Retain in place until exposed areas of soil are stabilised.	Flow Control Berms (CB-01)
Coir logs (fibre rolls) and/or sediment fencing	Demolition of Sonnblick Lodge	Upgradient of the development footprint. These measures should also be applied to the driveway areas.	To divert clean water from the works area.	Prior to commencement of works. Must be installed prior to periods of forecast rainfall, as well as on weekends and during site closures.	Coir logs (FR-01) or sediment fencing (SD 6-8)
Rock check	Following demolition of Sonnblick Lodge	Offset throughout the development footprint, targeting steeply sloping areas.	To slow dirty water movement within the development footprint.	Following completion of demolition works.	Rock Check Dam (SD 5-4)

[1]Landcom 2004; NSW DECC 2008 & IECA Best Practice Erosion and Sediment Control (BPESC) document

Erosion and Sediment Control Plan
Map 1 of 2

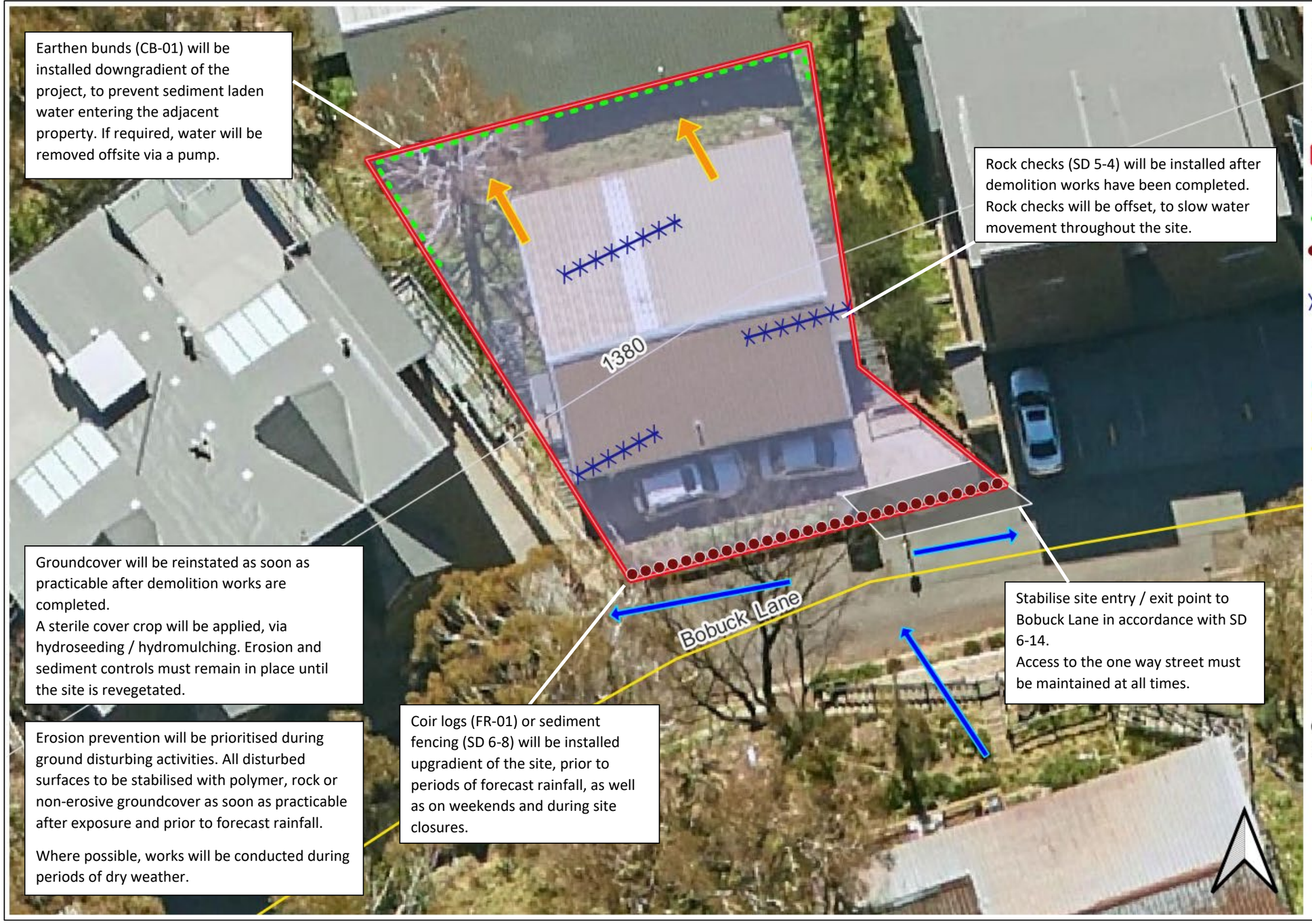
Legend

- Subject land
- Roads
- Contours (AHD, 20 m interval)

Ref: 230203 Sonnblick Demolition ESCP 20230628 \ Erosion and Sediment Control Plan
Author: alyce.g
Date created: 05.07.2023
Datum: GDA94 / MGA zone 55

0 10 20 30 m

NGH



Erosion and Sediment Control Plan
Map 2 of 2

Legend

- Subject land
- Development footprint
- Earthen bund (CB-01)
- Coir logs (FR-01) or sediment fencing (SD 6-8)
- Rock check dam (SD 5-4)
- Stabilised site access (SD 6-14)
- Clean water flow
- Dirty water flow
- Roads
- Contours (AHD, 20 m interval)

Ref: 230203 Sonnblick Demolition ESCP 20230628 \ ESCP Map 2
Author: alyce.g
Date created: 05.07.2023
Datum: GDA94 / MGA zone 55

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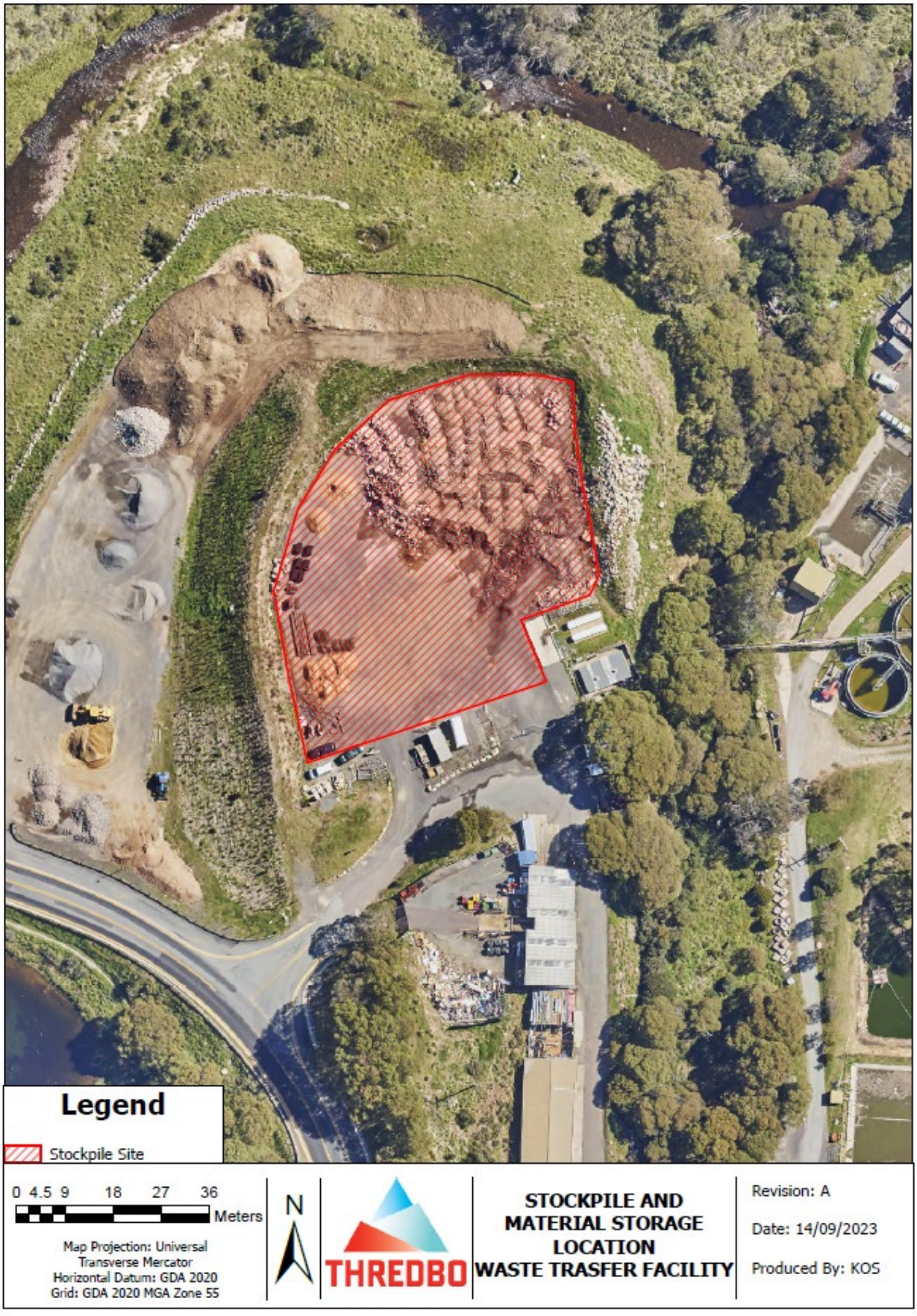


Figure 1 Stockpile location

Figure 2 Compound location

Sediment fence

Flow diversion bank

Rock check dam

Figure 3 Erosion and sediment controls (Source: Catchments & Creeks Pty Ltd, 2012)

CONTROL INSTALLATION NOTES

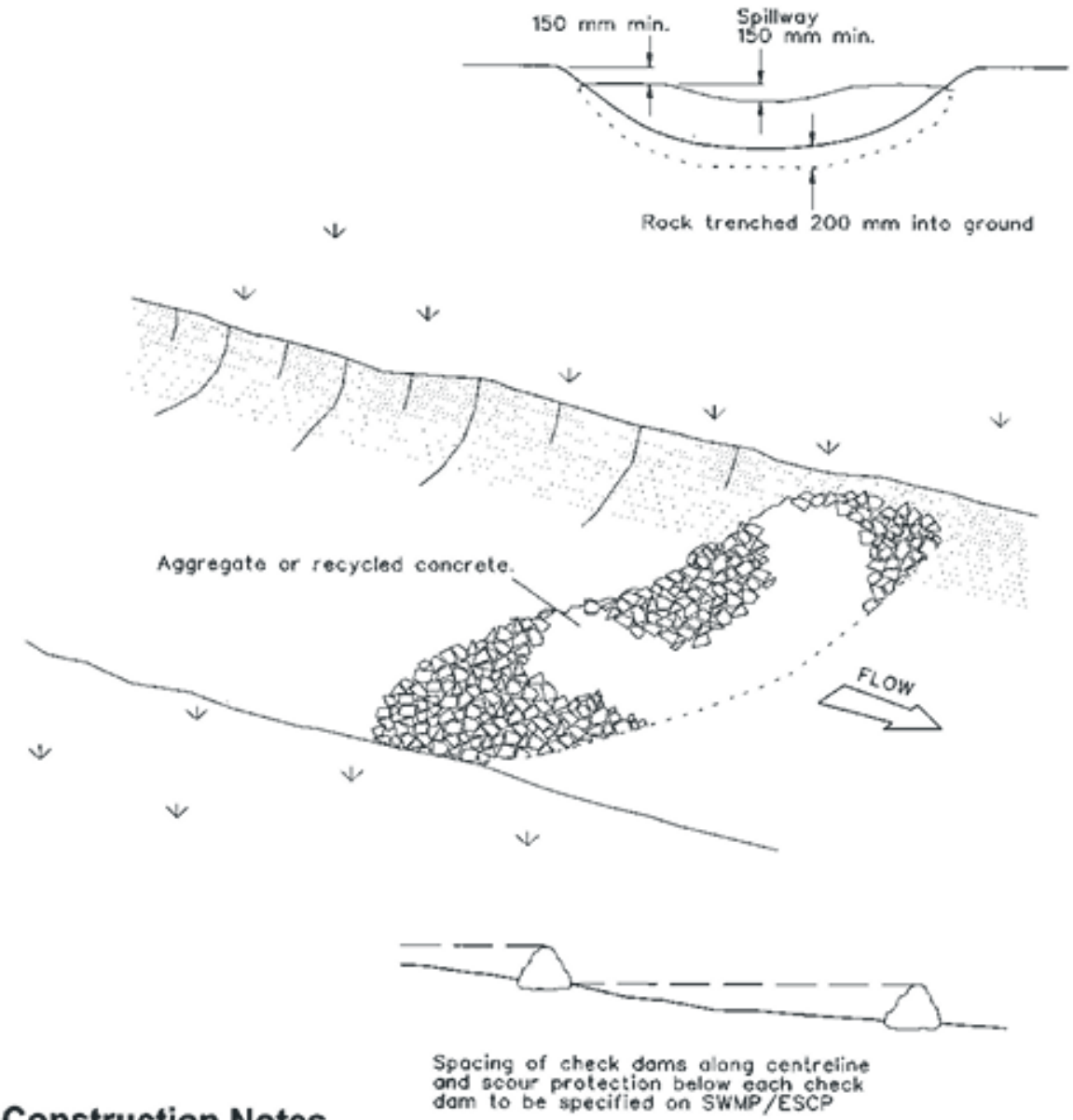
Cross Drainage and Sediment Barriers

The recommended spacing for cross drainage and sediment barriers is provided below:

Slope Grade (%)	Cross Drain / Sediment Barrier (m)
5-10	15-20
10-15	10-15
15-25	8-10
>25	5-8

Source: NPWS 2007; Parr-Smith and Polley (1998)

Note: To calculate the grade of a slope: (rise/run) x 100 = slope grade



Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.

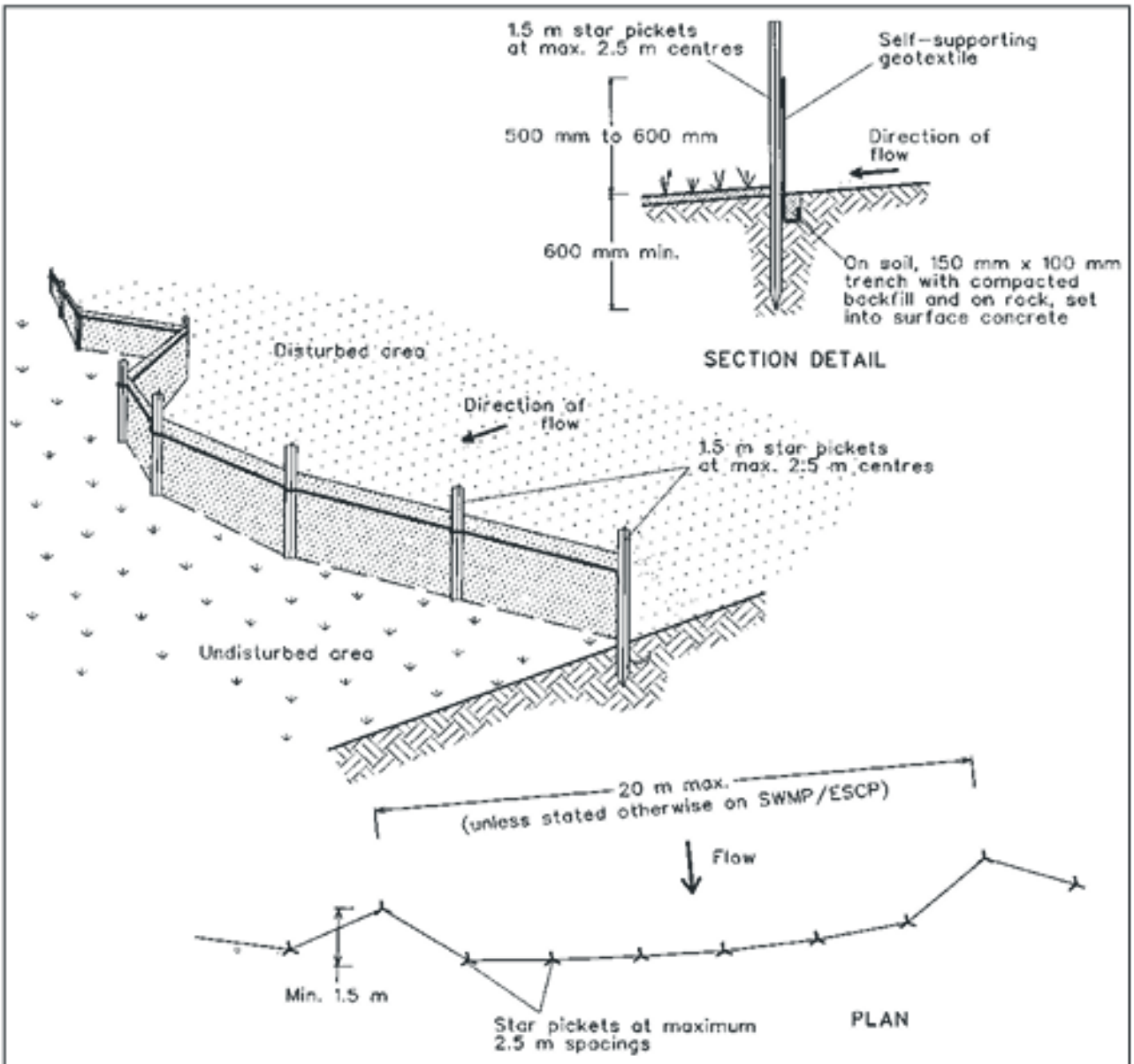
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.

3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.

4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM

SD 5-4



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE **SD 6-8**

MATERIALS

FIBRE ROLLS: TYPICALLY 200 TO 250mm JUTE, COIR OR STRAW ROLL TIED WITH SYNTHETIC OR BIODEGRADABLE MESH.

STAKES: MINIMUM 25 x 25mm TIMBER STAKES.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. WHEN PLACED ACROSS NON-VEGETATED OR NEWLY SEEDED SLOPES, THE ROLLS MUST BE PLACED ALONG THE CONTOUR.

3. IF PLACED ON OPEN OR LOOSE SOIL, ENSURE THE FIBRE ROLLS ARE TRENCHED 75 TO 125mm IN SANDY SOILS AND 50 TO 75mm IN CLAYEY SOILS.

4. ENSURE THE OUTER MOST ENDS OF THE FIBRE ROLL ARE TURNED UP THE SLOPE TO ALLOW WATER TO ADEQUATELY POND UP-SLOPE OF THE ROLL, AND TO MINIMISE FLOW BYPASSING.

5. WHEN PLACED ACROSS THE INVERT OF MINOR DRAINS, ENSURE THE SOCKS ARE PLACED SUCH THAT:

(i) THE CREST OF THE DOWNSTREAM ROLL IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM SOCK (IF ANY);

(ii) EACH ROLL EXTENDS UP THE CHANNEL BANKS SUCH THAT THE CREST OF THE FIBRE ROLL AT ITS LOWEST POINT IS LOWER THAN THE GROUND LEVEL AT EITHER END OF THE ROLL.

6. ENSURE THE ANCHORING STAKES ARE DRIVEN INTO THE END OF EACH ROLL AND ALONG THE LENGTH OF EACH ROLL AT A SPACING NOT EXCEEDING 1.2m OR SIX TIMES THE ROLL DIAMETER, WHICHEVER IS THE LESSER. A MAXIMUM STAKE SPACING OF 0.3m APPLIES WHEN USED TO FORM CHECK DAMS.

7. ADJOINING ROLL MUST BE OVERLAP AT LEAST 450mm, NOT ABUTTED.

MAINTENANCE

1. INSPECT ALL FIBRE ROLLS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.

2. REPAIR OR REPLACE DAMAGED FIBRE ROLLS.

3. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. ALL EXCESSIVE SEDIMENT TRAPPED BY THE ROLLS MUST BE REMOVED FROM THE DRAIN OR SLOPE IF SUCH SEDIMENT IS LIKELY TO BE WASHED AWAY BY EXPECTED FLOWS.

2. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. THE BIODEGRADABLE CONTENT OF THE STRAW ROLLS MAY NOT NECESSARILY NEED TO BE REMOVED FROM THE SITE.

4. ALL SYNTHETIC (PLASTIC) MESH OR OTHER NON READILY BIODEGRADABLE MATERIAL MUST BE REMOVED FROM THE SITE ONCE THE SLOPE OR DRAIN IS STABILISED, OR THE ROLLS HAVE DETERIORATED TO A POINT WHERE THEY ARE NO LONGER PROVIDING THEIR INTENDED DRAINAGE OR SEDIMENT CONTROL FUNCTION.

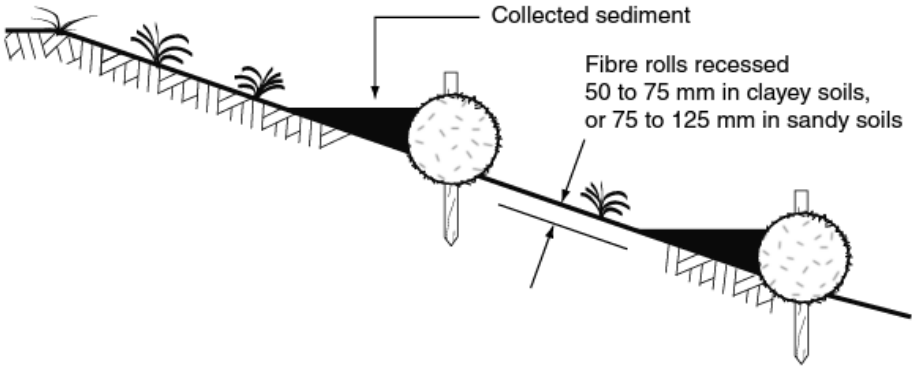


Figure 1 - Typical installation of fibre rolls

Drawn:	Date:		
GMW	Apr-10	Fibre Rolls	FR-01

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INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BERM, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY.

4. FORM THE BERM FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

6. CHECK THE ALIGNMENT OF THE BERM TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

7. ENSURE THE BERM DISCHARGES TO A STABLE OUTLET.

8. ENSURE THE BERM DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW CONTROL BERMS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BERM FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BERM THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW CONTROL BERM SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED IN THE APPROVED PLAN.

Table 1 - Recommended dimensions of flow control berms

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn:	Date:		
GMW	Dec-09	Flow Control Berms	CB-01

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