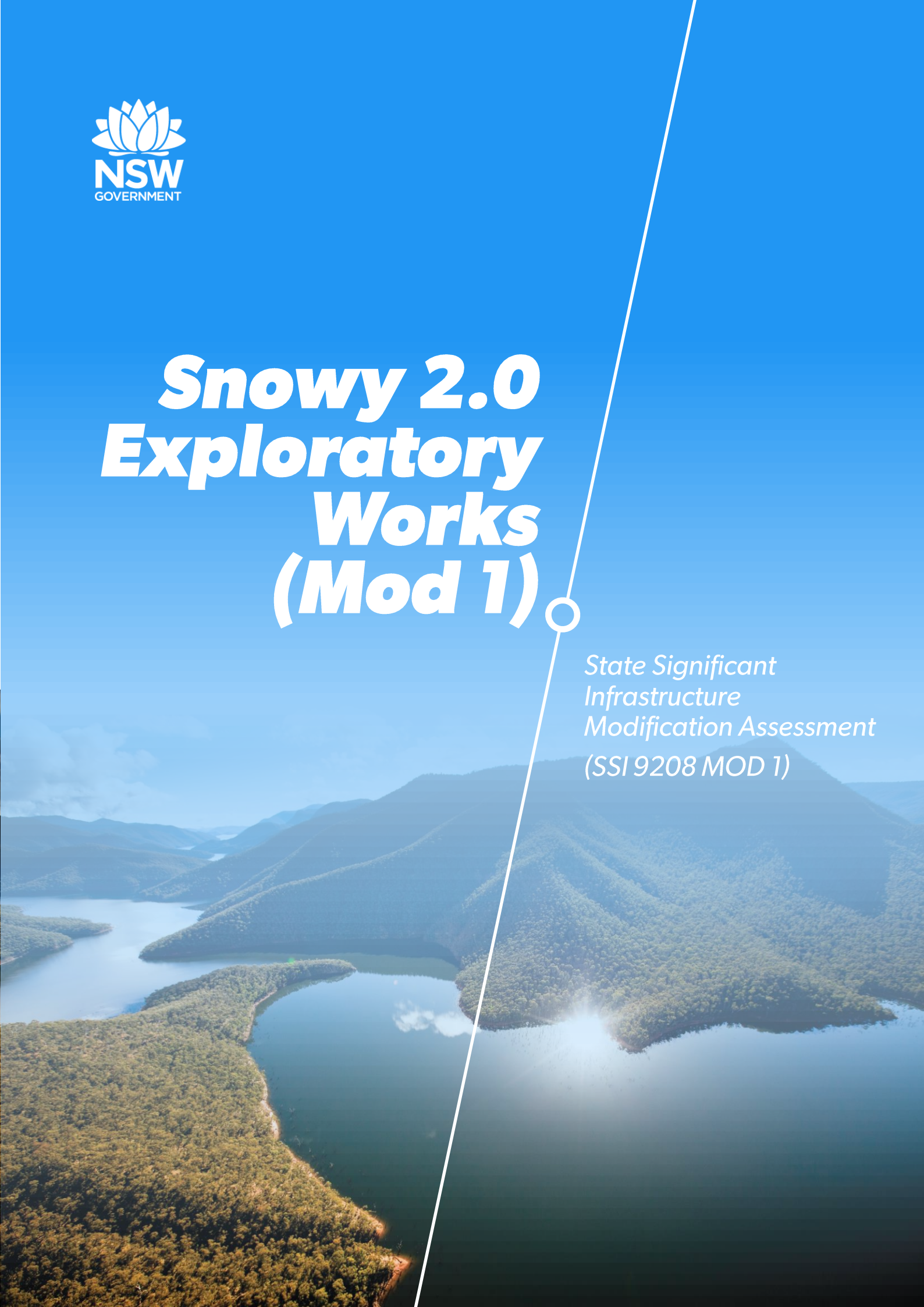
NSW GOVERNMENT

Snowy 2.0 Exploratory Works (Mod 1)

State Significant Infrastructure Modification Assessment

(SSI 9208 MOD 1)



November 2019

Cover photo

Talbingo Reservoir – Snowy Hydro Limited

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Glossary

Abbreviation	Definition
AHD	Australian Height Datum
Approval	Infrastructure Approval
BCA	Building Code of Australia
BCD	Biodiversity and Conservation Division
CIV	Capital Investment Value
Councils	Snowy Monaro Council and Snowy Valleys Council
Department	Department of Planning, Industry and Environment
DPI	Department of Primary Industries
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPI	Environmental Planning Instrument
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FRNSW	Fire and Rescue NSW
LEP	Local Environmental Plan
Minister	Minister for Planning and Public Spaces
RMS	Roads and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
Secretary	Secretary of the Department of Planning, Industry and Environment
SEPP	State Environmental Planning Policy
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSI	State Significant Infrastructure

Executive Summary

Background

Snowy Hydro Limited (Snowy Hydro) is proposing to expand the existing Snowy Hydro-electric Scheme in the Kosciuszko National Park to generate an additional 2,000 megawatts of electricity and 350 gigawatt hours of energy storage for the National Electricity Market.

The project has been classified as Critical State Significant Infrastructure because it would significantly increase energy security and reliability, put downward pressure on electricity costs and facilitate the development of renewable energy.

In February 2019, the then Minister for Planning approved an application for Exploratory Works for the project, principally around Lobs Hole and the Talbingo Reservoir.

This approval allows Snowy Hydro to carry out a range of works to get a better understanding of the geological conditions for the project, including drilling a 3.1 kilometre long tunnel to the proposed location of the new underground power station.

Snowy Hydro started these works in March 2019 and is now seeking to modify the approval to allow additional geotechnical investigations to be carried out.

Proposed Modification

There are five components to the proposed modification:

1. Drill another 17 boreholes across the project area;
2. Develop a new electricity substation next to an existing transmission line to provide power for the Exploratory Works;
3. Upgrade the road network to accommodate additional trucks;
4. Allow the continued use of several boreholes and ancillary infrastructure that were established prior to the approval of the Exploratory Works; and
5. Establish four new laydown areas across the site.

Engagement

The Department exhibited the Modification Report from 26 June 2019 until 9 July 2019 and received 10 submissions, including 6 from government agencies, 2 objections from interest groups and 2 objections from the community.

While none of the agencies objected to the project, they raised concerns about several aspects of the proposed modification, including:

- the assessment of the biodiversity impacts of the project and calculations of offset liabilities;
- the impacts of the proposed road upgrades on the boulder streams, which have high geodiversity values; and
- the visual impacts of the new substation.

The public submissions objected to the project, reiterating concerns raised during the assessment of the original application that a single environmental assessment should be carried out for the project as a whole instead of incrementally for discrete components such as the Exploratory Works.

They raised concerns about:

- the limited consultation undertaken by Snowy Hydro prior to lodging the application;
- the short duration of the exhibition (2 weeks); and

- the additional impacts on the Kosciuszko National Park, and in particular the increase in impacts on the:
  - Smoky Mouse, a critically endangered species; and
  - the boulder streams.

Snowy Hydro provided a detailed response to these issues and the Department has considered all these issues including Snowy Hydro's responses in its detailed assessment of the merits of the proposed modification.

Assessment

The key matters for assessment relate to the impacts on the biodiversity and natural heritage values of the KNP.

The proposed modification would result in the clearing of an additional 16.2 hectares of native vegetation with most of this clearing occurring in the Lobs Hole area. While this would not affect any threatened ecological communities, it would result in the removal of 10.83 ha habitat for five threatened species including the critically endangered Smoky Mouse.

The removal of the habitat is unlikely to have a significant impact on any of these species, mainly because it represents a very small proportion of the total habitat available to these species within this section of the KNP.

Consistent with the biodiversity offset approach used in the Exploratory Works approval, the Department has recommended that Snowy Hydro be required to pay $2,639,697 to the National Parks and Wildlife Service to enable suitable works to be carried out within KNP to offset the biodiversity impacts of the modification.

Along sections of Lobs Hole Ravine Road, several features with natural heritage values including a fossil bed and boulder streams are present. The modification would involve cutting further into these features for road upgrades.

The Department accepts that these road upgrades are essential to ensure road safety, and that there are no feasible alternatives to widening the road without having further impacts on the fossil beds and boulder streams. It considers that these works can be carried out without having a significant impact on these features, which cover a much broader area, or compromising the geotechnical stability of the boulder stream.

Notwithstanding these conclusions, the Department notes that the road design is still at the conceptual stage and that there is likely to be significant scope to further reduce the impacts of the road works, particularly on the boulder streams during detailed design.

The Department has recommended conditions of approval that would ensure detailed plans are prepared in consultation with NPWS, a detailed record of the boulder streams before it is affected by the road works is kept, and the information generated by the research would be used to improve the public's understanding of these important natural features within the KNP.

The Department accepts that these visual impacts are unavoidable, given the need to locate the new substation near the existing transmission line in the KNP and the construction portal. Under the existing conditions, Snowy Hydro would need to remove the substation and associated infrastructure and rehabilitate the land if the Main Works are not approved.

Evaluation

Although the proposed modification would increase impacts to the biodiversity and natural heritage values of the KNP, the Department considers these can be managed subject to the implementation of strict conditions.

The proposed changes would allow further geotechnical investigations to be carried out to inform the detailed design of an underground hydro-electric power station. The project is critical to the State as it would bolster the energy security and reliability of the grid by providing up to 350,000 megawatt hours of dispatchable energy to the grid and would contribute significantly to the State's transition to renewable energy.

Consequently, the Department is satisfied that the modification is in the public interest and recommends that it is approved, subject to the proposed changes in the recommended notice of modification.

Contents

1. Introduction

Snowy Hydro Limited (Snowy Hydro) is proposing to expand the existing Snowy Hydro-electric Scheme (Snowy Scheme) in the Kosciuszko National Park (KNP) to generate an additional 2,000 megawatts of electricity and 350 gigawatt hours of energy storage for the National Electricity Market (NEM).

Snowy 2.0 was declared Critical State Significant Infrastructure (CSSI) in March 2018 because it would significantly increase energy security and reliability, put downward pressure on electricity costs and facilitate the development of renewable energy.

In February 2019, the then Minister for Planning approved an application for Exploratory Works for the project, principally located around Lobs Hole and the Talbingo Reservoir (see **Figure 1**).

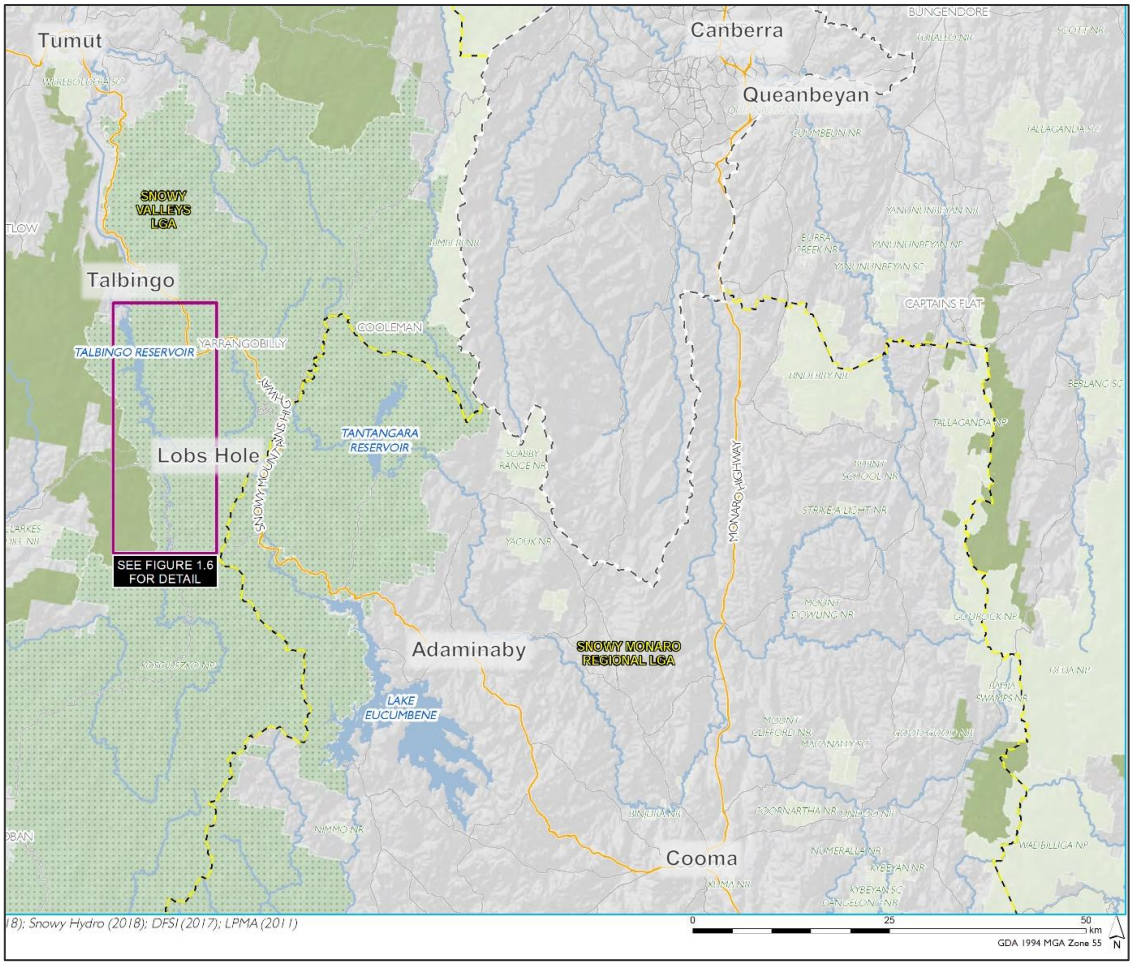

Figure 1 | Site Location

This approval allows Snowy Hydro to carry out a range of works to get a better understanding of the geological conditions for the project, and involves:

- creating an exploratory tunnel about 3.1 km in length to the likely location of the underground power station;
- undertaking a program of geotechnical investigations, including geophysical surveys, test pitting, and borehole drilling, within a defined disturbance footprint; and
- developing supporting infrastructure including a portal construction pad, excavated material management, temporary accommodation camp, roadworks and barge infrastructure within Talbingo Reservoir.

2. Proposed Modification

Snowy Hydro started Exploratory Works in March 2019 and is now seeking to modify the approval to allow geotechnical investigations to be carried out and improve worker safety.

There are five components to the proposed modification (see below), two of which involve extending the project area beyond the Lobs Hole/Talbingo Reservoir to include minor works at Marica and Tantangara Road.

The modification application is summarised in **Table 1**, shown in **Figures 2** to **5** and described in detail in the Modification Report (see **Appendix B**) and the Submissions Report (**Appendix C**).

Geotechnical investigations

Additional geotechnical investigations are required to inform the detailed design of the intake structures at Talbingo and Tantangara Reservoirs, and to provide geological information at the revised location of the underground power station at Marica which has been shifted 1 km west. This requires geophysics surveys, drilling at 17 additional borehole sites, establishing access tracks to service these areas and using existing boat ramps for barge access to both reservoirs.

Lobs Hole substation

Power supply from the grid is preferred over diesel generators as it provides a more reliable power source for ventilation, lights and pumps to ensure the safety of workers during exploratory tunnelling. The development of a new 330/33 kilovolt (kV) substation, grid connection and feeder network to supply construction power is proposed in place of using diesel generators. Diesel generators would be used while the substation is being built and would remain on site as back-up supply.

Road works and operations

Snowy Hydro proposes to deliver all plant and equipment required to construct Lobs Hole substation via Link Road and Lobs Hole Ravine Road rather than by barge along Talbingo Reservoir. Sections of Lobs Hole Ravine Road and Middle Bay Road would need to be widened to accommodate this.

A larger footprint at the waterway crossings of the Yarrangobilly River and Wallaces Creek is proposed to improve constructability and Snowy Hydro have also requested changes to the operating hours on Upper Lobs Hole Ravine Road from October until March.

Incorporating existing assets

Snowy Hydro proposes to incorporate the continued use of existing infrastructure established as part of the earlier geotechnical investigations program approved by the National Parks and Wildlife Service (NPWS) under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2017. This includes two communication towers, access tracks and boreholes which would be converted into monitoring bores.

Other works

To facilitate the construction of the communications cable linking the Exploratory Works with Talbingo, Snowy Hydro is also proposing four new laydown areas. These are proposed on existing hardstand areas along the northern foreshore of Talbingo Reservoir outside of the KNP and within Snowy Hydro owned land. Further widening of Spillway Road for accessibility is also proposed.

Table 1 | Main Components of the Modification Application

Aspect	Description
Project area	Talbingo Reservoir, Lobs Hole, Marica, Tantangara Reservoir and Talbingo (outside KNP)
Disturbance footprint	Increased disturbance footprint from 114 ha to 136.8 ha
Geotechnical investigations	• Geophysics surveys and the mobilisation, demobilisation and rehabilitation for 17 additional drilling sites with boreholes ranging in depths from 10 metres (m) to 1,100 m: – 3 at Lobs Hole, with one in-reservoir borehole to inform the design of the intake structure at Talbingo Reservoir; – 6 at Tantangara Reservoir, with two in-reservoir boreholes to inform the design of the intake structure at Tantangara Reservoir, two on the western shore of the reservoir and two at Nungar Creek crossing approximately 7 km south of the reservoir; – 8 at Marica above the proposed location of the underground power station;
Lobs Hole substation	• 330/33 kV substation with a 7 ha footprint sited adjacent to TransGrid's Upper Tumut to Yass 330 kV transmission line; • Replacing an existing transmission support tower with a new 50 m steel lattice tower; • Overhead grid connection to TransGrid network approximately 100 m in length; • 33 kV feeder network between the substation and Exploratory Works facilities; • Ancillary infrastructure, including access tracks, site compounds and laydown areas.
Road Works	• 1.8 km of new access tracks to provide access to additional borehole sites; • Widening of Lobs Hole Ravine Road and Middle Bay Road; • Partial or complete removal of 91 trees posing a safety risk to construction workers and road users along Lobs Hole Ravine Road and Mine Trail Road; and • Increasing the crossing footprints at Yarrangobilly River and Wallaces Creek by 0.5 ha.
Access	• Lobs Hole – new access tracks connected to Middle Bay Road; • Marica – Snowy Mountains Highway, Coppermine Trail, Wallaces Creek Trail, Marica Trail and new access tracks; • Tantangara – Snowy Mountains Highway, Tantangara Road, Quarry Trail and new access tracks. • Talbingo Reservoir – floating barge via Elliot Way and boat ramp at Sue City; and • Tantangara Reservoir – floating barge via Tantangara Road and boat ramp at southern end of the reservoir. • Changing operating hour limits at Upper Lobs Hole Ravine Road from 7 am to 6pm to: – 7 am to 7 pm in October; and – 6 am to 8 pm from 1 November to 1 March.
Traffic	• Increase in peak-hour traffic volumes accessing Lobs Hole from 44 heavy vehicles to 150 heavy vehicles during construction of Lobs Hole substation; • Up to 8 light vehicles and 5 heavy vehicles per day for drilling at Tantangara; and • Up to 20 light vehicles and 44 heavy vehicles per day for drilling at Marica.
Construction timeframes	9 months for Lobs Hole substation and up to 4 months for geotechnical investigations
Jobs	70 additional workers to construct Lobs Hole Substation

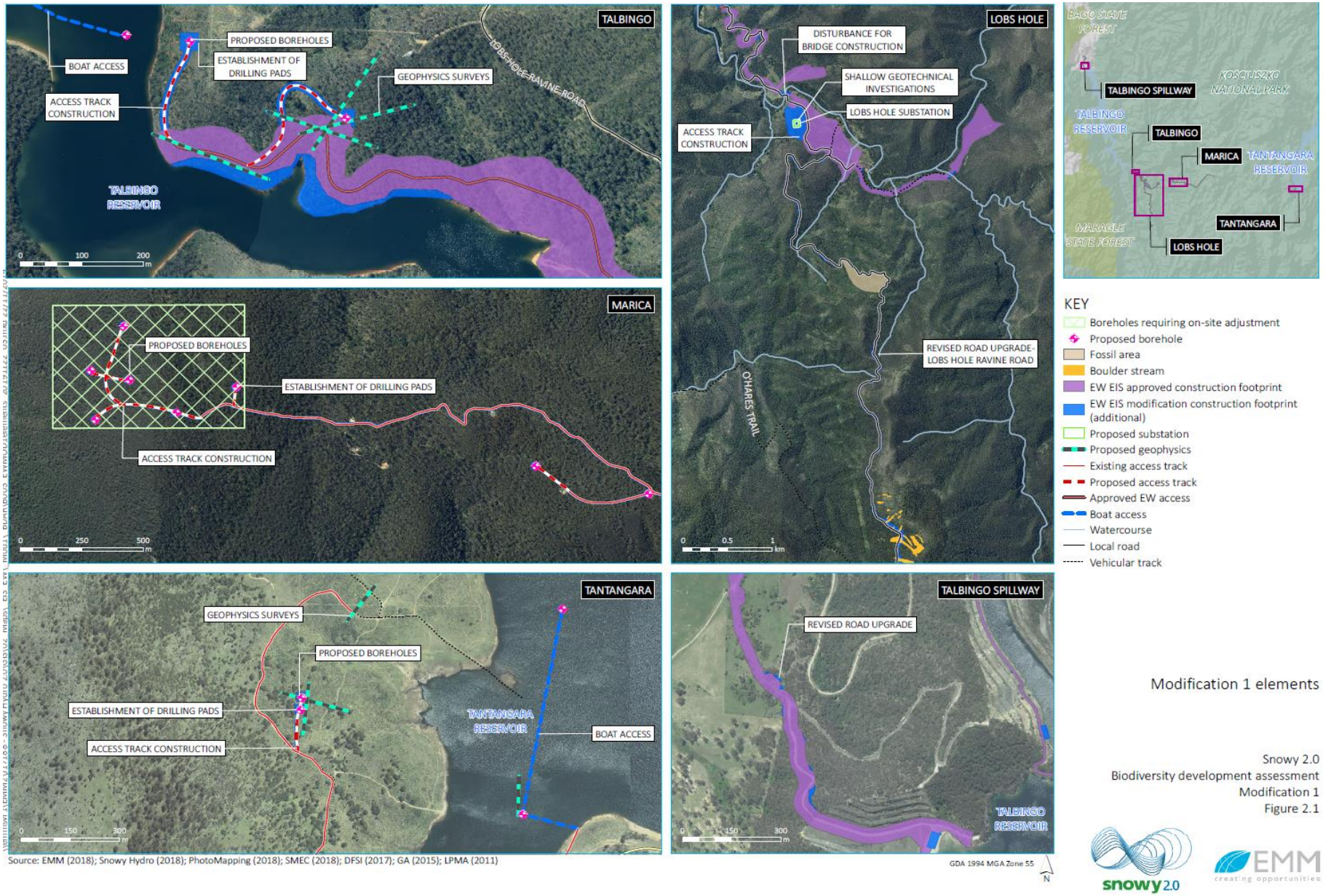

Figure 2 | Proposed modification at Talbingo, Lobs Hole, Marica and Tantangara Reservoir

Figure 3 | Tantangara Road and Nungar Creek crossing borehole sites

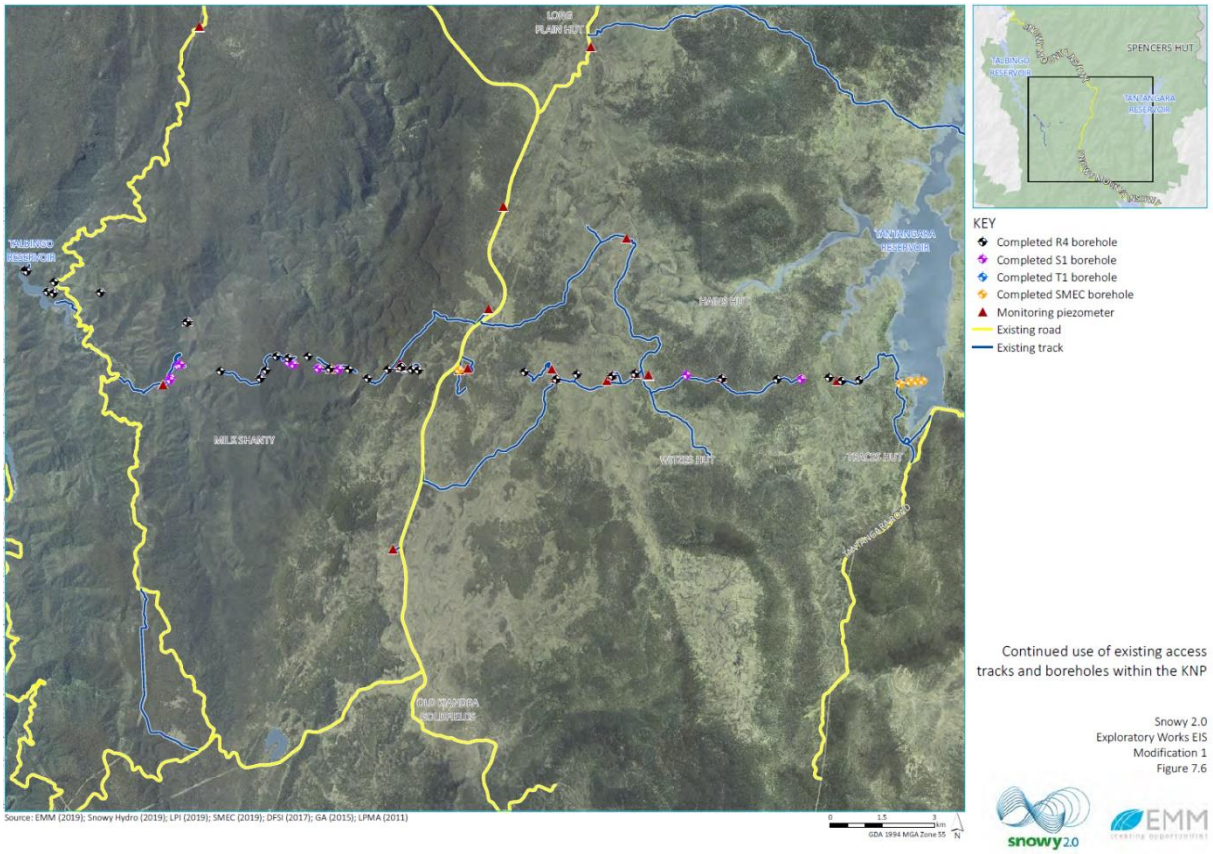

Figure 4 | Existing borehole and access track network

Figure 5 | Talbingo Reservoir hardstand areas

3. Strategic Context

3.1 Project Setting

The Exploratory Works are largely located within the Lobs Hole area of KNP, with road upgrades and access arrangements approved at the northern end of Talbingo Reservoir. The proposed borehole drilling sites would extend the project area into Marica and the Tantangara Reservoir within the plateau region of KNP.

Lobs Hole

Lobs Hole is located in a relatively remote section of Kosciuszko National Park which provided camping facilities and access to Talbingo Reservoir. A large proportion of the approved Exploratory Works have been positioned in historically disturbed sections of the park associated with the former town, agriculture and mining works. Traces of these past activities can be found on site and the former copper mine is also considered a geoheritage site.

Since the commencement of the Exploratory Works and as part of the approval, access to the Lobs Hole campground has been closed to the public for safety reasons.

The proposed substation would be located south of the Yarrangobilly River crossing and adjacent to TransGrid's transmission line easement. The proposed substation and additional borehole drilling sites are outside of the approved disturbance footprint in an area covered with shrubby open montane forests in moderate/good condition.

The Yarrangobilly River is a major regional watercourse that flows into the Talbingo Reservoir with stream flows all year round and stream baseflows provided by groundwater. The river is an ecologically sensitive area with habitat for Booroolong Frog and Murray Crayfish. It also contains areas of high archaeological potential for Aboriginal cultural heritage.

Natural heritage features including the Ravine Fossil Beds and periglacial boulder streams are present along Lobs Hole Ravine Road. The fossil beds are exposed in the road cutting and are known to contain several fossil species from the Devonian age. Similarly, existing road cuttings occur into the boulder streams which are remnants of rock glaciers dating back to about 20,000 years ago. The proposed road widening works would interact with these features of natural heritage value.

Talbingo

The township of Talbingo is located immediately north of Talbingo Reservoir and was established as a construction camp for the original Snowy Scheme workers. The town provides tourist accommodation, other services and a public school. The existing Exploratory Works approval allows Snowy Hydro to undertake road works on Spillway Road and to establish barge access infrastructure at the Talbingo Spillway which is located on Snowy Hydro land.

The four additional hardstand areas proposed to facilitate the construction of the approved communications cable between Lobs Hole and Talbingo are located along the northern foreshore of the reservoir between the spillway and boat ramp on Snowy Hydro land.

Marica

Marica is accessible off the Snowy Mountains Highway via Coppermine Trail and an existing access track established as part of the earlier geotechnical drilling campaign. The proposed borehole sites are located in areas with shrubby open montane forests in moderate/good condition in an isolated section of the park. Bullocks Hill is the nearest campground located approximately 4.7 km to the east on the other side of the Snowy Mountains Highway and the Yarrangobilly Caves are located 7 km to the north.

Tantangara Reservoir

Tantangara Reservoir is located in the High Plains plateau area of KNP, a popular horse riding and fishing destination. Vehicular access for riders intending to visit the area is principally provided via the Snowy Mountains Highway and Tantangara Road.

Tantangara Road is an unsealed gravel road approximately 3 km east of Tantangara Reservoir and access to the dam wall remains open all year. Access beyond the dam wall to a number of cottages and homesteads in Currango are available to guests between October and May. Similarly, the Wares Yards campground located along Tantangara Road approximately 10 km south of the reservoir offers basic facilities and room for horses, carparking and toilets is also open to the public between October and May.

A boat ramp is located to the south of the reservoir and camping along the reservoir's foreshore is also permitted.

3.2 Existing Snowy Scheme

The Department notes that Snowy Hydro has a number of arrangements with NPWS for the existing Snowy Scheme that have been in place since 2002. These arrangements allow Snowy Hydro to occupy and operate the Snowy Scheme within the KNP, and include the Snowy Park Lease, a Roads Maintenance Agreement and the Snowy Management Plan.

The new surface infrastructure activities within KNP proposed as part of the modification application are not covered by the existing Snowy Park Lease. The lease area would need to be amended to accommodate these areas.

4. Statutory Context

4.1 Scope of Modifications

Snowy Hydro has made a request to the Minister to modify the Exploratory Works approval under Section 5.25 of the EP&A Act.

The Department is satisfied that the application can be characterised as a modification to the existing approval as the proposed modification is seeking incremental changes which would not significantly alter the nature or scale of the approved project.

Consequently, the Minister for Planning and Public Spaces is the consent authority for the modification. However, under the Minister's delegation of 11 October 2017, the Executive Director, Special Projects, may determine the modification application as the Council did not object, there were less than 25 objections from the general public and a political donations disclosure statement has not been made.

Other than the *State Environmental Planning Policy (State and Regional Development) 2011* identifying the project as CSSI, no environmental planning instruments substantially govern the carrying out of the project by virtue of the project being CSSI. Notwithstanding, consideration was given to Environmental Planning Instruments (EPIs) that would have applied:

- State Environmental Planning Policy No. 33: Hazardous and Offensive Development (SEPP 33): consideration of a project's potential to cause hazards or be offensive. The modification report includes an assessment of the potential hazards and proposed measures for storage, handling and transport of dangerous goods.
- SEPP No. 55 – Remediation of Land (SEPP 55): remediation of land for the purpose of minimising the risk to human health and the environment. The proposed modification avoids all known contaminated areas including the former Lobs Hole copper mine and naturally occurring asbestos on Lobs Hole Ravine Road.

5. Engagement

5.1 Department's Engagement

Upon receiving the Modification Application, the Department:

- advertised the public exhibition in the Tumbarumba Times, Tumut & Adelong Times and the Monaro Post;
- publicly exhibited the Modification Report from 26 June 2019 until 9 July 2019 (14 days);
  - on its major projects website;
  - at Snowy Valleys Council (Tumut office);
  - at Snowy Monaro Regional Council (Cooma office);
- notified relevant State government authorities in writing of the exhibition;
- notified each party who made a submission in relation to the original Exploratory Works application; and
- met with the National Parks Association of NSW on 25 July 2019.

5.2 Summary of Submissions

During the exhibition period of the Modification Report, the Department received a total of 10 submissions, including 6 from government agencies, 2 objections from interest groups and 2 objections from the community.

5.3 Key Issues – Government Agencies

The Department of Planning, Industry and Environment (DPIE) **Biodiversity and Conservation Division** (BCD) and **National Parks and Wildlife Services** (NPWS) provided a joint submission. A key matter raised was the need to avoid damage to the fossil beds and boulder streams at Lobs Hole Ravine Road. Impacts to geodiversity features are discussed in **Section 6.3**.

They also sought clarity on the biodiversity offset liability calculations and details on how speed limits at Marica would be enforced to reduce the likelihood of vehicle collisions with the Smoky Mouse. Biodiversity impacts and mitigation measures are considered in detail in **Section 6.2**. Additional assessment on the amenity of Bullocks Hill campground and the impacts to Aboriginal heritage items located within the proposed Lobs Hole substation footprint was also requested and these are covered in **Section 6.4**.

The BCD and NPWS submission also requested a visual impact assessment of the Lobs Hole substation be undertaken and that the 33 kV feeder connection between the substation and the exploratory works construction power network be buried underground. A consideration of visual impacts is detailed in **Section 6.4**.

Roads and Maritime Services (RMS) advised that an assessment of safe sight intersection distances and vehicle movements accessing Marica off the Snowy Mountains Highway was required. Snowy Hydro provided these details in its Submissions Report. RMS had no objections to the proposed modification, noting that Snowy Hydro must apply for a Speed Zone Authorisation to reduce speed limits at the Coppermine Trail and Snowy Mountains Highway, and Tantangara Road Snowy Mountains Highway intersections. This is discussed in **Section 6.4**.

DPIE – Lands, Water and DPI support the conversion of boreholes for additional groundwater monitoring and advised that Snowy Hydro would need to ensure the construction water supply requirements remain within current licensed entitlements. The division emphasised the importance of minimising disturbance and rehabilitation for impacts to riparian areas.

The **Environment Protection Authority**, **Heritage Council of NSW**, **NSW Maritime Division of Transport for NSW**, **Snowy Valleys Council** and **Snowy Monaro Regional Council** did not raise any concerns about the proposed modification.

5.4 Key Issues – Community and Interest Groups

The community and interest group submissions raised concerns about the incremental impacts to KNP and questioned why the modification application and Exploratory Works are not being assessed together with the broader Snowy 2.0 Main Works and Transmission project.

While the Department acknowledges these concerns, they were addressed in the original assessment. The planning legislation allows proponents to stage the assessments of complex projects and the Exploratory Works are a stand-alone stage that does not rely on subsequent stages progressing. Subsequent stages of Snowy 2.0 must assess the cumulative impacts of the project.

The **National Parks Association of NSW (NPA)** maintain the position that feasible alternatives to Snowy 2.0 located outside of National Parks have not been adequately considered in the assessment in accordance with legislative requirements. In that regard, the Department notes that the focus of the assessment is on the development that is the subject of the application. While an assessment is required of alternatives to elements of a development, this must have regard to its objectives being exploratory in nature.

The NPA also criticised Snowy Hydro over the lack of consultation leading up to the lodgement of the modification application and the short duration of the exhibition period. In response, the Department provided the NPA with additional time to submit supplementary information outside the exhibition period for Snowy Hydro to respond to and for consideration in this assessment.

NPA also sought clarification on how the 70 additional workers would be accommodated and the visual impacts associated with the Lobs Hole substation and transmission tower.

The Colong Foundation for Wilderness (Foundation) also raised concerns around the difficulties of achieving successful rehabilitation in a timely manner in alpine environments, the additional encroachment into the riparian buffer established around Yarrangobilly River and the increase in vehicle movements. The Foundation considers that Snowy Hydro should design the project within the existing constraints set out in the project approval and that the proposed modification does not improve the environmental outcomes of KNP.

Issues raised in the two objections from the community were consistent with those listed in the interest group submissions. Additional concerns provided in the community submissions include:

- the additional impacts on geodiversity features along Lobs Hole Ravine Road;
- impacts to the Smoky Mouse;
- how sewage would be managed at Lobs Hole substation following completion of the works; and
- difficulties with combating uncontrolled fires within the Lobs Hole area.

5.5 Submissions Report

Snowy Hydro provided its response to the issues raised in submissions in September 2019 (see **Appendix D**).

6. Assessment

6.1 Introduction

The Department has considered the merits of the modification application. The key matters for assessment relate to the impacts on the biodiversity (discussed in **section 6.2**) and natural heritage values (see **section 6.3**) of the KNP.

A summary of the Department's consideration of other potential impacts is provided in **Table 4** (see **section 0**).

6.2 Biodiversity

Under the Exploratory Works approval, Snowy Hydro may clear up to 95 ha of native vegetation and is required to:

- prepare a Biodiversity Management Plan to minimise the impacts of this clearing on threatened species; and
- pay $5,548,222 to the NPWS to enable it to carry out a range of activities within the KNP to offset the biodiversity impacts of the Exploratory Works.

The proposed modification would result in the clearing of an additional 16.2 ha of native vegetation, with most of this clearing occurring in the Lobs Hole area (substation – 7 ha, road upgrades – 4.6 ha, geotechnical drilling – 1.9 ha, waterway crossings – 0.5 ha) and the remaining clearing occurring at Marica (1.5 ha), Tantangara Reservoir (0.4 ha) and Spillway Road at Talbingo Reservoir (0.1 ha).

The submissions from the community and interest groups objected to the increased disturbance and vegetation clearing saying it would result in unacceptable cumulative impacts on the biodiversity values of the KNP, and increase the impacts on the critically endangered Smoky Mouse and the riparian corridor of the Yarrangobilly River.

The Department has considered these concerns and the detailed Biodiversity Offset Report that was submitted with the modification application and subsequently updated to address criticisms raised by BCD.

Ecosystems

While the proposed clearing would not affect any threatened ecological communities, it would result in the clearing of 11.9 ha of high quality vegetation and 2.1 ha of derived native grasslands which should be offset in accordance with the requirements under the current offset strategy (see **Table 2**)

Table 2 | Vegetation clearing and credit liability

Species	PCT	Additional area (ha)	Ecosystem credits (approved project)	Additional ecosystem credits
Broad-leaved Sally grass - sedge woodland on valley flats and swamps in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	285	-	182	-
Brittle Gum - peppermint open forest of the Woomargama to Tumut region, NSW South Western Slopes Bioregion	296	0.11	925	3
Ribbon Gum - Narrow-leaved (Robertsons) Peppermint montane fern - grass tall open forest on deep clay loam soils in the upper NSW South Western Slopes Bioregion and western Kosciuszko escarpment	300	3.64	164	48
Riparian Blakely's Red Gum - Broad-leaved Sally woodland - tea-tree - bottlebrush - wattle shrubland wetland of the NSW South Western Slopes Bioregion and South Eastern Highlands Bioregion	302	1.29	112	21
Red Stringybark - Broad-leaved Peppermint - Nortons Box heath open forest of the upper slopes subregion in the NSW South Western Slopes Bioregion and adjoining South Eastern Highlands Bioregion	311	0.09	62	2
Alpine shrubland on scree, blockstreams and rocky sites of high altitude areas of Kosciuszko National Park, Australian Alps bioregion	643	0.20	-	-
Broad-leaved Peppermint - Candlebark shrubby open forest of montane areas, southern South Eastern Highlands Bioregion and South East Corner Bioregion	729	6.62	364	148
Mountain Gum – Snow Gum – Broad- leaved Peppermint shrubby open forest of montane ranges, South Eastern Highlands Bioregion and Australian Alps Bioregion	953	1.11	-	31

Species	PCT	Additional area (ha)	Ecosystem credits (approved project)	Additional ecosystem credits
Norton's Box - Broad-leaved Peppermint open forest on footslopes, central and southern South Eastern Highlands Bioregion	999	0.64	13	15
Snowy Gum – Candle Bark woodland on broad valley flats of the tablelands and slopes, South Easter Highlands Bioregion	1191	0.47	-	14
Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion	1196	1.59	43	33
Sub alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion	1224	0.15	-	2
Total		16.22	1,865	+325

Threatened Fauna and Flora

The Modification would result in the removal of 10.83 ha of flora and fauna habitat, affecting four species (see **Table 3**).

The removal of this habitat is unlikely to have a significant impact on any of these species, mainly because it represents a very small portion of the total habitat available to these species within this section of the KNP.

Nevertheless, these impacts should be offset in accordance with the requirements under the current biodiversity offset policy (see **Table 3**).

Table 3 | Threatened species liability

Species	BC Act status	Approved Species Credit requirement	Additional credit liability
Birds			
Gang-gang Cockatoo	Vulnerable	24	-
Masked Owl	Vulnerable	24	-
Mammals			
Eastern Pygmy-possum	Vulnerable	1,961	+257
Smoky Mouse	Critically Endangered	6	+79
Amphibians			
Booroolong Frog	Endangered	45	+12
Plants			
Slender Greenhood	Vulnerable	-	+8
Total		2,060	+356

Under the existing conditions of approval, Snowy Hydro is required to update the Biodiversity Management Plan prior to carrying out the proposed modifications. This will ensure there are suitable measures in place to minimise any potential impacts on these species associated with the additional removal of habitat.

Snowy Hydro is seeking to change the current restrictions on the use of Upper Lobs Hole Ravine Road, which were imposed to minimise potential collisions with the critically endangered Smoky Mouse.

In support of this change, Snowy Hydro provided additional camera survey data confirming that the Smoky Mouse is generally only active in the area at night.

On the basis of this data, the Department, BCD and NPWS accept that some relaxation of the current restriction is warranted. However, the Department notes that the revised hours requested by Snowy Hydro do not always align with daylight hours. Consequently, it has not accepted the hours proposed by Snowy Hydro, and has instead recommended that the condition be changed to restrict vehicle movements to between sunrise and sunset as observed at the nearest Bureau of Meteorology weather station.

The modification would result in traffic using the Coppermine Trail, Wallaces Creek Trail and additional access tracks to get to Marica. This traffic would pass through Smoky Mouse habitat, and could result in collisions with Smoky Mouse at night.

Due to the low number of vehicles, Snowy Hydro is proposing to mitigate vehicle collision risks by restricting vehicle speed limits to 20 km/hr between sunrise and sunset on access tracks within Marica.

While the Department considers this to be reasonable, it has recommended that the speed limit be extended to Wallaces Creek Trail which also includes Smoky Mouse habitat.

Finally, the modification involves drilling one borehole in Talbingo Reservoir and two boreholes in Tantangara Reservoir. These works are unlikely to result in any noticeable impacts on threatened aquatic species or their habitats, and the existing Aquatic Habitat Management Plan will be updated prior to carrying out these works to include measures to minimise the impacts associated with these works.

Biodiversity Offsets

Snowy Hydro has committed to offset the biodiversity impacts associated with the modification.

Under the Biodiversity Offsets Payment Calculator, the additional ecosystem and species credits generated by the modification have an equivalent value to conservation actions worth $2,639,697.

Consistent with the approach used in the Exploratory Works approval, the Department has recommended that Snowy Hydro be required to pay these funds to the NPWS to enable suitable works to be carried out within KNP to offset the impacts of the modification.

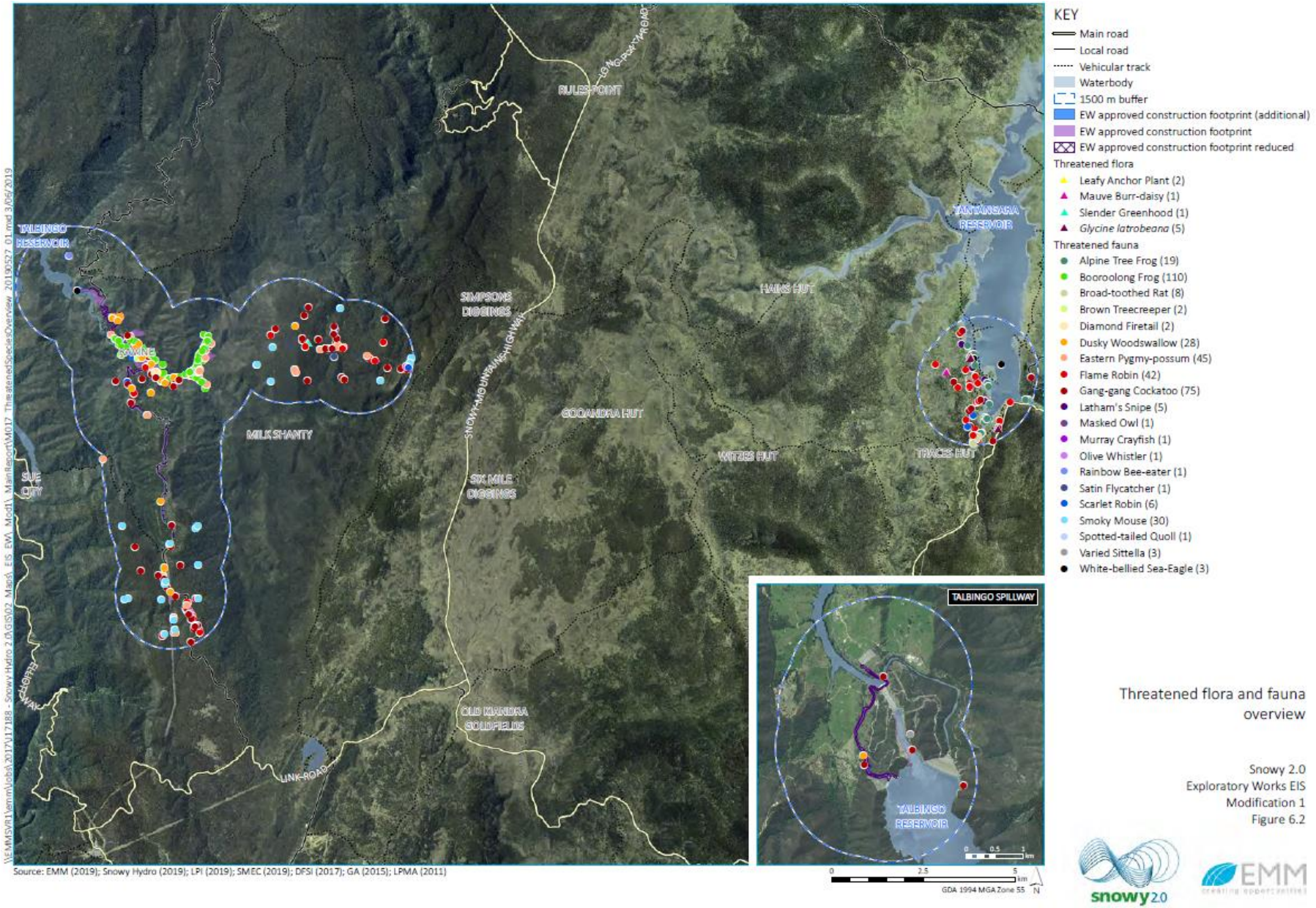

Figure 6 | Threatened flora and fauna sightings

6.3 Geodiversity

Along sections of lower Lobs Hole Road, there are several natural features with geodiversity values including a fossil bed and boulder stream (see **Plates 1** and **2**).

Plate 1 | Fossiliferous exposure of the Lick Hole Formation along Lobs Hole Ravine Road

Plate 2 | Block stream immediately upslope of Lobs Hole Ravine Road

Fossil bed

The fossil bed is located approximately 1 km south of the main construction portal and extends well into the ridge line (see **Figure 7**) and some 500 metres beneath the road surface. It is comprised of fossiliferous limestone interbedded with siltstones and shales.

The existing Exploratory Works approval allows Snowy Hydro to cut into the exsiting fosil beds to widen the road by up to 2.5 metres as there were no feasible alternatives given the topography of the area.

The modification requires further widening of the road and would involve cutting a further 4 metres into the fossil beds.

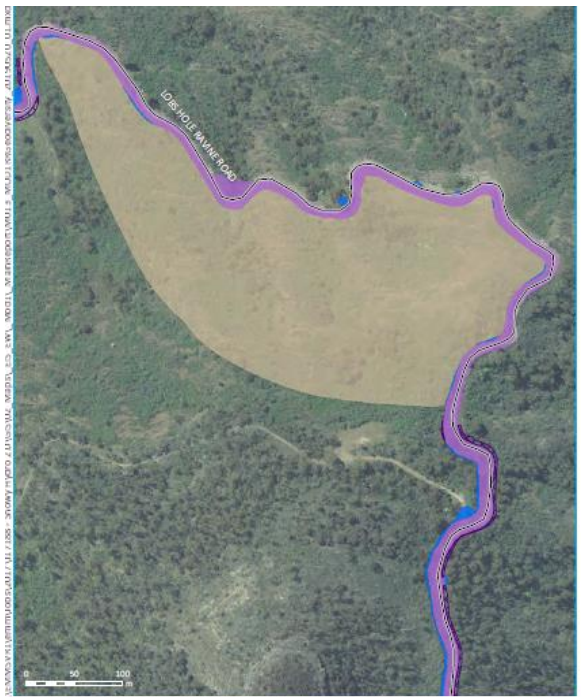

Figure 7 | Fossil bed at Lower Lobs Hole Ravine Road

Dr Ian Percival carried out a detailed assessment of the likely impacts of the increased cutting and concluded that it would have a minor impact on the fossil beds due to the extent of the fossiliferous strata in the area. He also concluded that the works would create an opportunity to improve the public's understanding of such feastures within the KNP, and recommended measures to:

- carry out futher research on the material in the fossil beds;
- improve the visibility of the fossil beds through the design of the road works by removing weathered and crumbling strata; and
- increase the public awareness of the fossil beds.

The Department agrees with this assessment, and notes that the existing conditions already require Snowy Hydro to improve the public's understanding of the fossil beds.

Boulder stream

To the north of the O'Hares Trail and Lobs Hole Ravine Road intersection, there is a boulder stream (see **Figure 8**) that includes remnaants of rock glaciers that date

between 22,000 and 16,000 years ago.The boulder stream is identified in the KNP Plan of Management as a significant natural and cultural feature of the KNP.

The modification involves widening Lobs Hole Ravine Road, which would result in further impacts on the boulder stream.

The Department accepts that these road upgrades are essential to ensure road safety, and that there are no feasible alternatives to widening the road without having futher impacts on the boulder stream.

Snowy Hydro has investigated several options for widening the road and minimising the impacts of these road works on the boulder streams, and concluded that the best option is to move away from the approved retaining wall and elevated roadway option to a wide cut design that involves additional upslope excavations into the boulder stream and the use of anchors and wiring (see **Figure 9**) to improve the geotechnical stability of the boulder stream.

The Department has considered all of these options closely and agrees that the wide cut design is the best option available, largely due to the topographic constraints of the site, but also because it would have less visual impacts compared to the approved road works which would raise the road surface and involve the construction of a retaining wall in the boulder stream downslope.

It also agrees that these works can be carried out without having a significant impact on the boulder streams, which cover a much broader area, or compromising the geotechnical stability of the boulder stream.

Nothwithstanding these conclusions, the Department notes that the road design is still at the conceptual stage and that there is likely to be significant scope to further reduce the impacts of the road works on the boulder stream during detailed design.

Consequently, the Department has recommended a condition of approval requiring Snowy Hydro to:

- prepare detailed plans in consultation with NPWS and the satisfaction of the Secretary with measures that would be implemented to:
  - avoid impacts on the downslope section of Block Stream B;
  - minimise the extent of excavation into the upslope block streams;
  - minimise moving or damaging blocks beyond the excavation zone;
  - minimise the use of outside materials onto the block streams; and
  - include a program to monitor the implementation of the plans; and if necessary, undertake corrective action to maintain the stability of the block streams; and
  - make the boulders removed available to NPWS for rehabilitation projects in KNP.

It has also recommended that Snowy Hydro be required to:

- undertake detailed mapping of the block stream extents and morphology; and
- prepare a detailed archival record of the block streams and publicly report on the findings of this research.

This would ensure there is a detailed record of the boulder stream before it is affected by the road works, and the information generated by the research could be used to improve the public's understanding of these important natural features within the KNP.

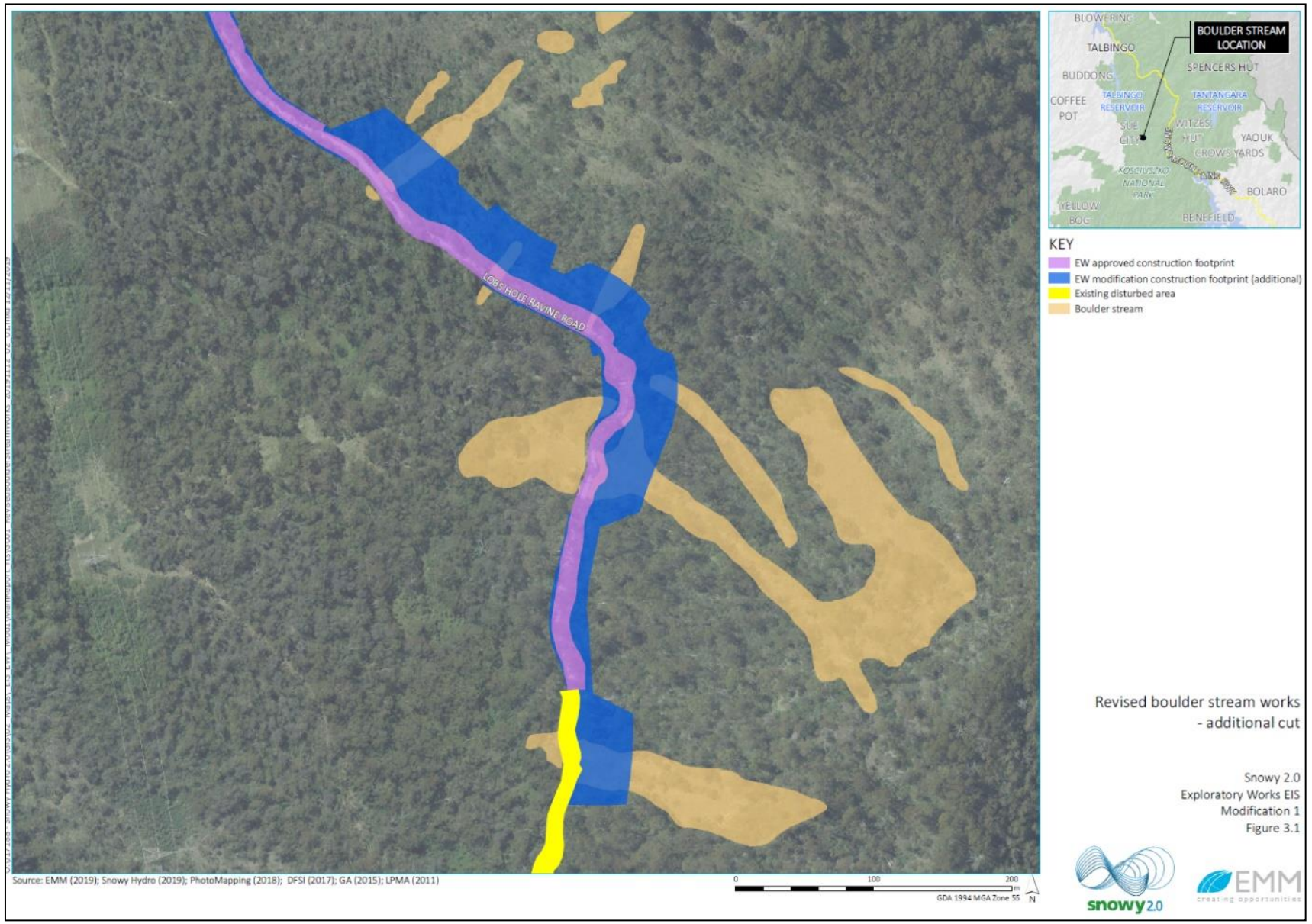

Figure 7 | Lobs Hole Ravine Road and Boulder Stream

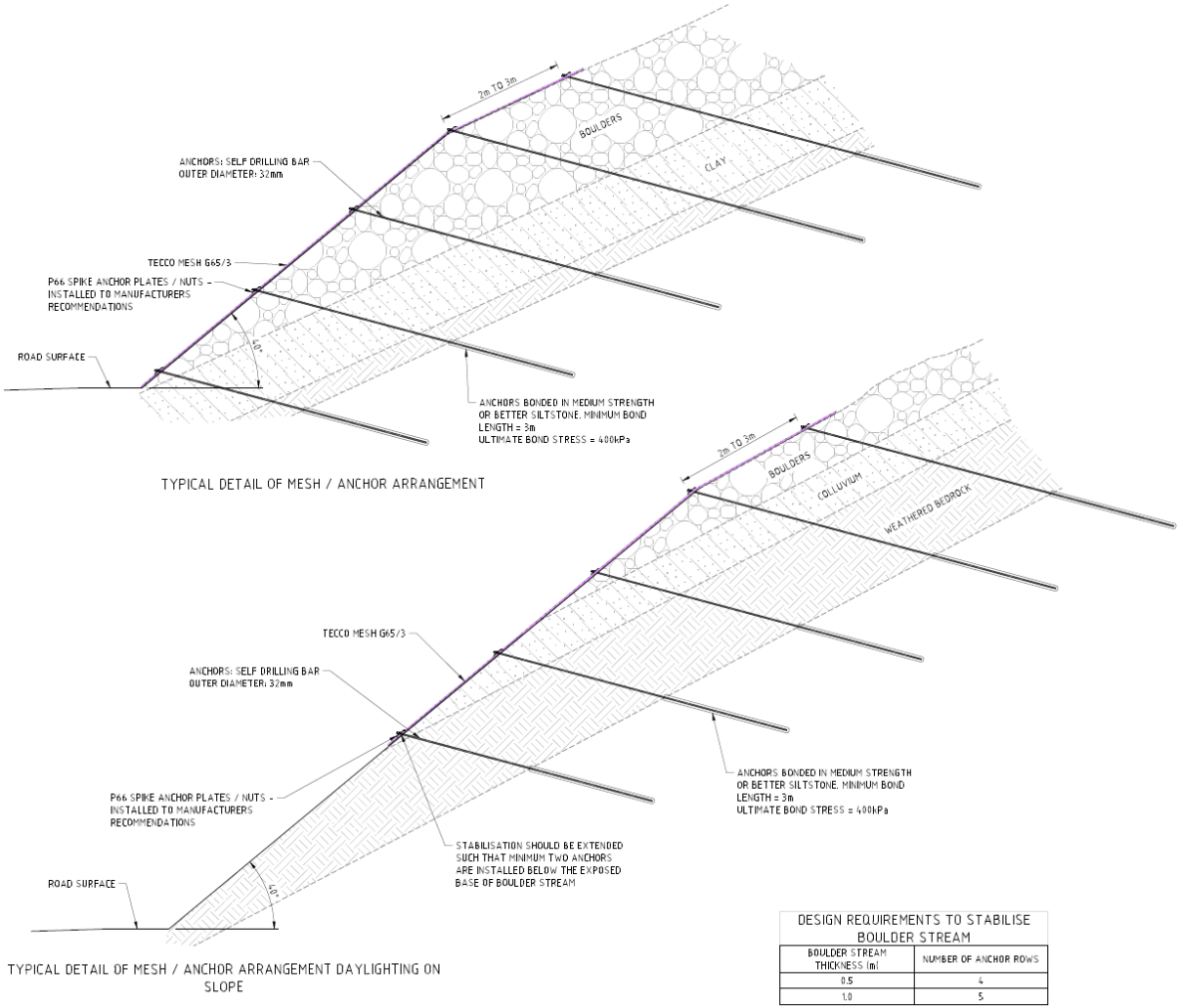

Figure 8 | Lobs Hole Ravine Road boulder stream section road design

6.4 Other matters

The Department's assessment of other issues raised in submissions from agencies and the public are summarised in **Table 4**.

Table 4 | Summary of other issues raised

Consideration	Recommendation
Traffic	
• Peak heavy vehicles travelling to Lobs Hole would increase from 44 to 150 heavy vehicles a day. This increase can be safely accommodated with some minor upgrades to Lobs Hole Ravine Road. • The use of Lobs Hole Ravine Road would still be restricted to daytime hours to protect the Smoky Mouse, however the restrictions would run from sunrise to sunset instead of from 7 am to 6 pm to account for seasonal variations in daylight hours. • The borehole works at Marica and Tantangara would generate up to 20 light and 44 heavy vehicles a day over a three month period. Access to these works would be via the Snowy Mountain Highway and Coppermine Trail or Tantangara Road. • Snowy will apply to RMS to reduce the speed limit along the Snowy Mountains Highway at these access points from 100 to 80 km to maintain safe sight distances.	• Upgrade Lobs Hole Ravine Road • Update the existing Traffic Management Plan to accommodate the changes, including the traffic management measures that would be implemented to ensure safe access off the Snowy Mountains Highway to the Marica and Tantangara borehole sites.
Visual	
• NPWS and public submissions raised concerns about the visual impacts of the Lobs Hole substation, which includes the replacement of an existing transmission tower with a taller tower (50 metres high). • The Department accepts that these visual impacts are unavoidable, given the need to locate the new substation near the existing transmission line in the KNP and the construction portal. • It is also satisfied that Snowy Hydro has done everything it can to minimise the impacts of the substation by placing it in a valley in a remote section of KNP. This means the taller tower would still be lower in height than the adjacent towers which are located on higher ground.	• Under the existing conditions, Snowy Hydro would need to remove the substation and associated infrastructure and rehabilitate the land if the Main Works are not approved.
Heritage	
• The increased disturbance would not affect any known heritage items, however it would reduce the buffer from heritage item R79 to less than 20 metres. • Snowy Hydro has committed to implementing additional measures to ensure heritage item R79 is protected.	• Update the existing Heritage Management Plans to incorporate the changes and document the measures that would be implemented to protect heritage item R79.
Noise	
• There would be no material change to the noise levels of the Exploratory Works, and predicted noise levels would continue to comply with the relevant noise levels in the Interim Construction Noise Guidelines.	• Comply with existing conditions.

Consideration	Recommendation
Water	
• Snowy Hydro has committed to using standard measures to control the potential: – erosion and sediment impacts associated with the increases to the approved disturbance area; and – groundwater impacts associated with drilling the new boreholes.	• Update the existing Water Management Plan to incorporate the changes.
Bushfire	
• The new substation would include a suitable asset protection zone in accordance with the relevant requirements of the Rural Fire Service and NPWS.	• Update the existing Emergency Plan to incorporate the changes.
Workforce	
• The modification would require 70 additional short term workers to construct the substation. • With careful scheduling of the Exploratory Works, these workers can be accommodated in the approved workers accommodation on site.	• No change to the existing conditions.

7. Evaluation

The Department has assessed the merits of the modification application in accordance with the relevant requirements of the EP&A Act.

Submissions from the community and interest groups objected to the increased disturbance footprint and vegetation clearing, saying it would result in unacceptable cumulative impacts on the biodiversity and natural heritage values of the KNP.

While the Department considers the removal of this habitat is unlikely to significantly impact on any of these species, these impacts should be offset in accordance with the requirements under the current biodiversity offset policy.

As such, the Department has recommended that Snowy Hydro be required to pay $2,639,697 to the National Parks and Wildlife Service to enable suitable works to be carried out within KNP to offset the impacts of the modification.

The Department accepts that the additional road upgrades on Lobs Hole Ravine Road are essential to ensure road safety, and that there are no feasible alternatives to widening the road without having further impacts on the fossil beds and boulder streams. It has examined the design options closely and agrees that the wide cut design is the best option available.

The Department notes that the road design is still at the conceptual stage and that there is likely to be significant scope to further reduce the impacts of the road works, particularly on the boulder streams during detailed design.

Consequently, the Department has recommended conditions of approval that would ensure the detailed design is undertaken in consultation with NPWS, and that a detailed record of the boulder streams before it is affected by the road works is kept. The information generated by the research could be used to improve the public's understanding of these important natural features within the KNP.

Although the proposed modification would increase impacts to the biodiversity and natural heritage values of the KNP, the Department considers these can be managed subject to the implementation of strict conditions.

The proposed changes would allow further geotechnical investigations to be carried out to inform the detailed design of an underground hydro-electric power station. The project is critical to the State as it would bolster the energy security and reliability of the grid by providing up to 350,000 megawatt hours of dispatchable energy to the grid and would contribute significantly to the State's transition to renewable energy.

Consequently, the Department is satisfied that the modification is in the public interest and recommends that it is approved, subject to the proposed changes in the recommended notice of modification.

8. Recommendation

It is recommended that the Executive Director, Special Projects, as delegate for the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report; and
- **determines** that the request SSI 9208 MOD1 falls within the scope of section 5.25 of the EP&A Act
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to grant approval to the request;
- **agrees** with the key reasons for approval listed in the draft notice of decision;
- **modify** the approval (SSI 9208);
- **signs** the attached Notice of Modification (**Attachment E**).

Recommended by:

29/11/19

Anthony Ko
Team Leader
Energy Assessments

Recommended by:

29/11/19

Nicole Brewer
Director
Energy Assessments

9. Determination

The recommendation is: **Adopted** / **Not adopted by:**

2/12/2019

David Kitto
Executive Director
Special Projects

Appendices

Appendix A – List of Documents

Modification Report for the Snowy 2.0 Exploratory Works dated 6 June 2019

Response to Submissions – Exploratory Works Modification dated 2 September 2019

Letter to the Department titled *Amendment to the hours of operation on upper Lobs Hole Ravine Road* dated 4 October 2019

Letter to the Department titled *Amendment to disturbance footprint, heritage mitigation and project boundary figures* dated 19 November 2019

Appendix B – Environmental Assessment

See the Department's website at
https://www.planningportal.nsw.gov.au/major-projects/project/13601

Appendix C – Submissions

See the Department's website at
https://www.planningportal.nsw.gov.au/major-projects/project/13601

Appendix D – Submissions Report

See the Department's website at
https://www.planningportal.nsw.gov.au/major-projects/project/13601

Appendix E – Consolidated Approval

See the Department's website at
https://www.planningportal.nsw.gov.au/major-projects/project/13601

Appendix F – Notice of Modification

See the Department's website at
https://www.planningportal.nsw.gov.au/major-projects/project/13601