



EXECUTIVE SUMMARY



Executive summary

This section provides a summary of the Environmental Impact Statement (EIS) prepared for the Exploratory Works for Snowy 2.0. A digital EIS portal has also been set up to bring all the information together in one place and provide the community with information on key findings through video and digital media formats. The EIS portal can be viewed by going to the following website: <https://v2.communityanalytics.com.au/snowy/eis>.

ES1 Introduction

The New South Wales (NSW) energy system and broader National Electricity Market (NEM) is facing major and unprecedented challenges through rising energy costs, deterioration in energy system security and reliability, and a transition in the generation mix away from coal-fired, dispatchable, base-load power to intermittent renewable wind and solar power.

For the most part, the NEM's current energy mix has been able to cope with the increasing level and uncertain variations in the delivery of the intermittent renewable wind and solar power. However, this will change as these intermittent sources become a larger proportion of the total generation as the NEM energy mix transition continues. As the amount of the variable renewable energy increases in response to economics and retiring coal-fired power stations, energy storage and dispatchable generation will play an increasingly vital role in ensuring the continued provision of reliable and cost efficient energy generation. At the same time, accommodating the intermittency of variable renewable energy generation and having energy generation capacity available when needed.

Snowy Hydro Limited (Snowy Hydro) is pursuing the Snowy 2.0 project which is a pumped hydro-electric storage and generation project to help address the abovementioned challenges. Snowy 2.0 involves linking Talbingo and Tantangara reservoirs within the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme), and building an underground power station between the two reservoirs. This will increase the current Snowy Scheme generation capacity by almost 50%. The increased quick-start generation and large-scale storage capacity provided by Snowy 2.0 will increase the security and reliability of the NEM. As with most of the existing Snowy Scheme, the majority of Snowy 2.0 is in the Kosciuszko National Park (KNP). Snowy Hydro has been working with NSW National Parks and Wildlife Service (NPWS) since the announcement of Snowy 2.0 to ensure long term management objectives for KNP are considered in project development.

On 7 March 2018 the NSW Minister for Planning declared Snowy 2.0 to be State Significant Infrastructure and Critical State Significant Infrastructure (CSSI) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on the basis that it is critical to the State for environmental, economic or social reasons. As Snowy 2.0 is declared CSSI, applications for the different phases of the project are required to be submitted under Part 5, Division 5.2 of the EP&A Act.

The power station, almost 1 kilometre (km) underground, is one of the most challenging aspects for the final design of Snowy 2.0. This is because of the size of the power station and the depth below ground at which it will be built. The power station is deeper than any of the other existing Snowy Scheme power stations, and in a geological unit (Ravine Beds) not previously intersected by the Snowy Scheme. For this reason, there is a lack of information available about the geological conditions of the underground power station site. It is extremely important to understand factors such as excavation conditions, water seepage, rock bedding and faulting conditions to confirm the orientation and construction method of the underground power station prior to its detailed design and construction. To date the geological investigation program has only drilled down vertically from the surface and at large intervals apart. Exploratory Works involves extensive horizontal drilling in situ at the required depths, enabling much more detailed geological data to be collected.

Accordingly, Snowy Hydro is seeking approval to carry out Exploratory Works for Snowy 2.0. The primary purpose of Exploratory Works is to gain a greater understanding of the rock conditions at the proposed location of the underground power station for Snowy 2.0. An exploratory tunnel is the key element proposed to gain this critical information.

Exploratory tunnels are used as a subsurface investigation method and are common in hydro-electric projects internationally. Exploratory tunnels were excavated during the 1960s for both the Tumut 1 and Tumut 2 power stations in the Snowy Scheme. If Exploratory Works are not undertaken, risks to the design and construction of the power station cavern are significantly increased. These design risks include safety, environmental, cost, and schedule risks.

Exploratory Works will predominantly be in the Lobs Hole area of KNP and Talbingo Reservoir, and are entirely within NSW. Lobs Hole is between Talbingo Reservoir to the north-west and the Snowy Mountains Highway to the east. Aboriginal occupation of the Snowy Mountains dates back to the early Holocene (around 9,000 years ago). The Lobs Hole area would have likely provided respite to Aboriginal people throughout the year from weather from the surrounding high country. Lobs Hole was first used by European settlers in the early 1800s for the movement of stock. It has subsequently been the site of prospecting, grazing, settlement, gardening, agriculture, and mining. Lobs Hole was subsequently used by surveyors and recreationally during the construction of the Snowy Scheme.

Lobs Hole is currently used as a remote campground (known as Ravine campground) within KNP and provides space for recreational activities. The nearest towns to Exploratory Works are Tumbarumba, Adaminaby, Cooma, Talbingo and Tumut. The area in which Exploratory Works will be undertaken is referred to as the project area. The project area is shown on Figure ES1.

ES2 Exploratory Works for Snowy 2.0

ES2.1 Key elements

The Exploratory Works will involve construction of an exploratory tunnel to enable exploratory drilling and provide a greater understanding of the underground conditions at the power station cavern. Several supporting elements will also be required to facilitate the construction of the exploratory tunnel. The Exploratory Works elements are shown on Figure ES2 and include:

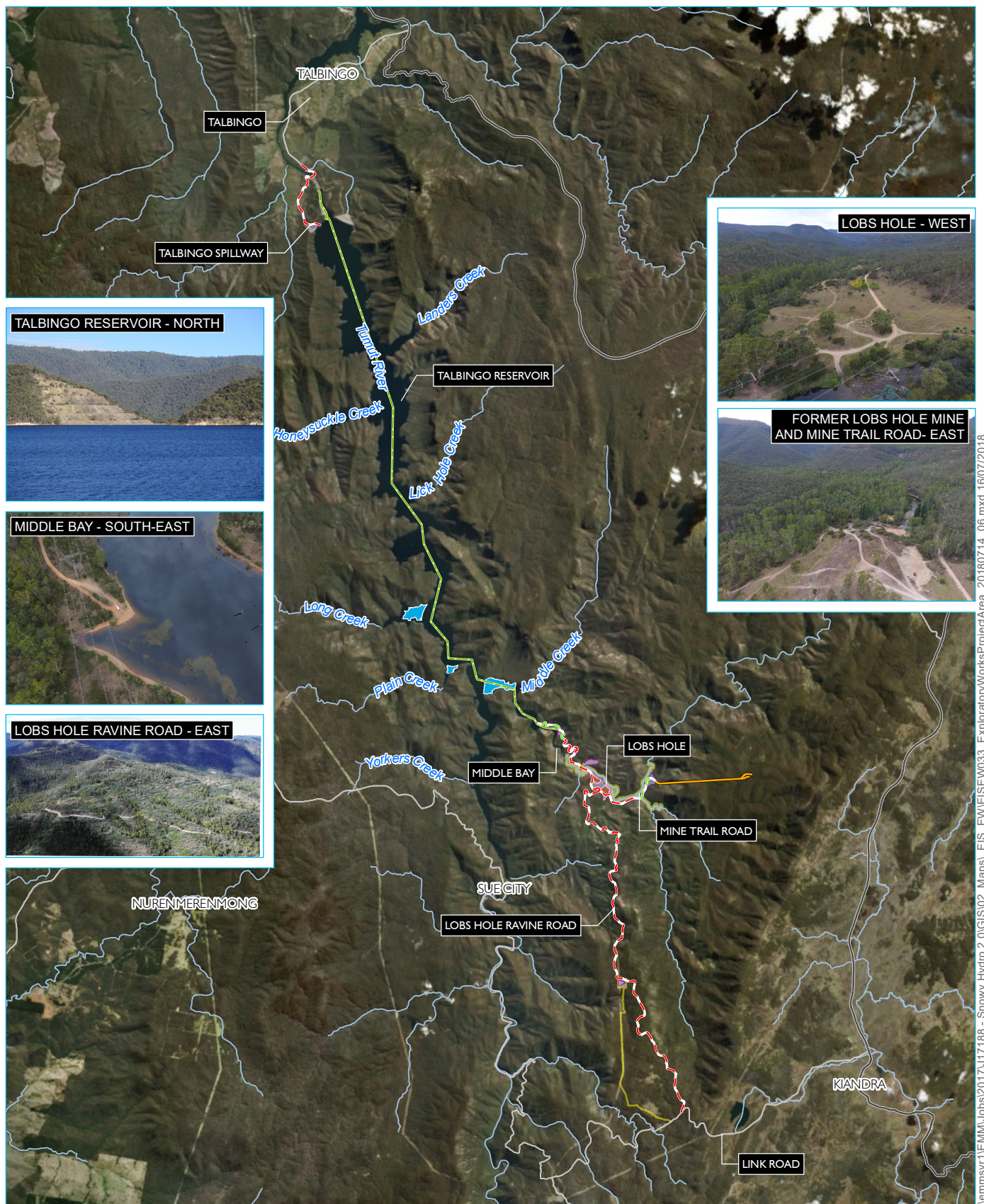
- an exploratory tunnel about 3.1 km long to the site of the underground power station;
- a portal construction pad for the exploratory tunnel. This will provide the entrance structure to the tunnel and an area for infrastructure and equipment needed to support tunnelling activities;
- an accommodation camp for the Exploratory Works construction workforce;

- road works and upgrades to enable access and haulage routes during Exploratory Works. This includes upgrades to 26 km of existing roads and creating about 2 km of new roads;
- barge access infrastructure to enable access and transport by barge on Talbingo Reservoir. This includes one new barge ramp at Talbingo Spillway in the northern part of Talbingo Reservoir and one new barge ramp at Middle Bay near Lobs Hole at the southern part of Talbingo Reservoir;
- excavated rock management, including subaqueous placement within Talbingo Reservoir. Up to 750,000 m³ of excavated rock will need to be tested for its geochemical properties (ie whether the rock is reactive or non-reactive) before being managed by a combination of the following options:
 - re-use – suitable material can be used as construction materials for roads or similar. Some materials will be provided to NPWS for use in road maintenance and upgrades in other areas of KNP;
 - on land placement – material will be placed in one of two on land emplacement areas. The eastern emplacement area has been designed to safely treat reactive material and to ultimately remain as a permanent landform suitable for recreational activities such as camping. The western emplacement area will be used for temporary storage of materials for re-use;
 - subaqueous placement within Talbingo Reservoir – suitable material will be placed at a suitable location within Talbingo Reservoir, subject to a number of water quality controls and monitoring; and
- services infrastructure such as diesel-generated power, water and communication.

Horizontal and other test drilling, investigations and analysis is also proposed for the above elements to inform their detailed design.

Exploratory Works is anticipated to start at the end of 2018, with road works the first construction activity to be carried out. Once safe access is established, the rest of Exploratory Works construction will progress. Exploratory Works is estimated to take around 34 months to complete.

All Exploratory Works align with components of the proposed main works for Snowy 2.0. However, if Snowy 2.0 is not approved or does not progress, then impacted areas will be rehabilitated, and project elements decommissioned in consultation with NPWS.



Source: EMM (2018); Snowy Hydro (2018); SMEC (2018); Robert Bird (2018); DFSI (2017); LPMA (2011)

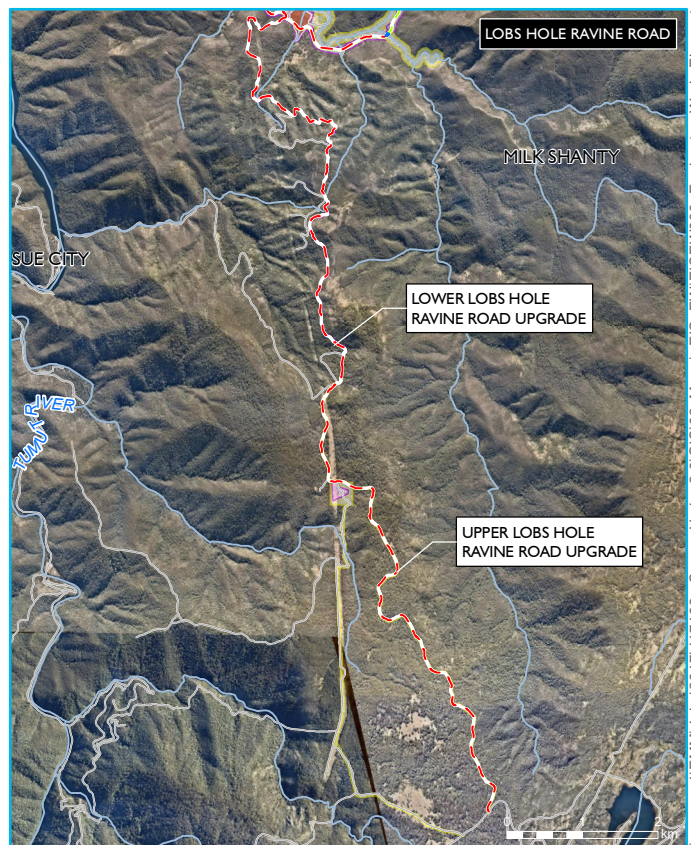
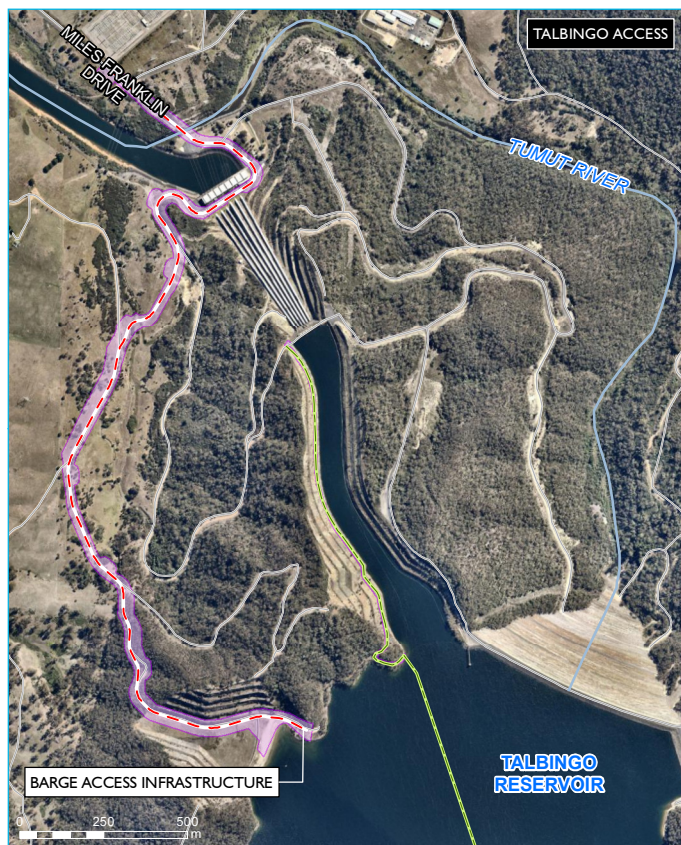
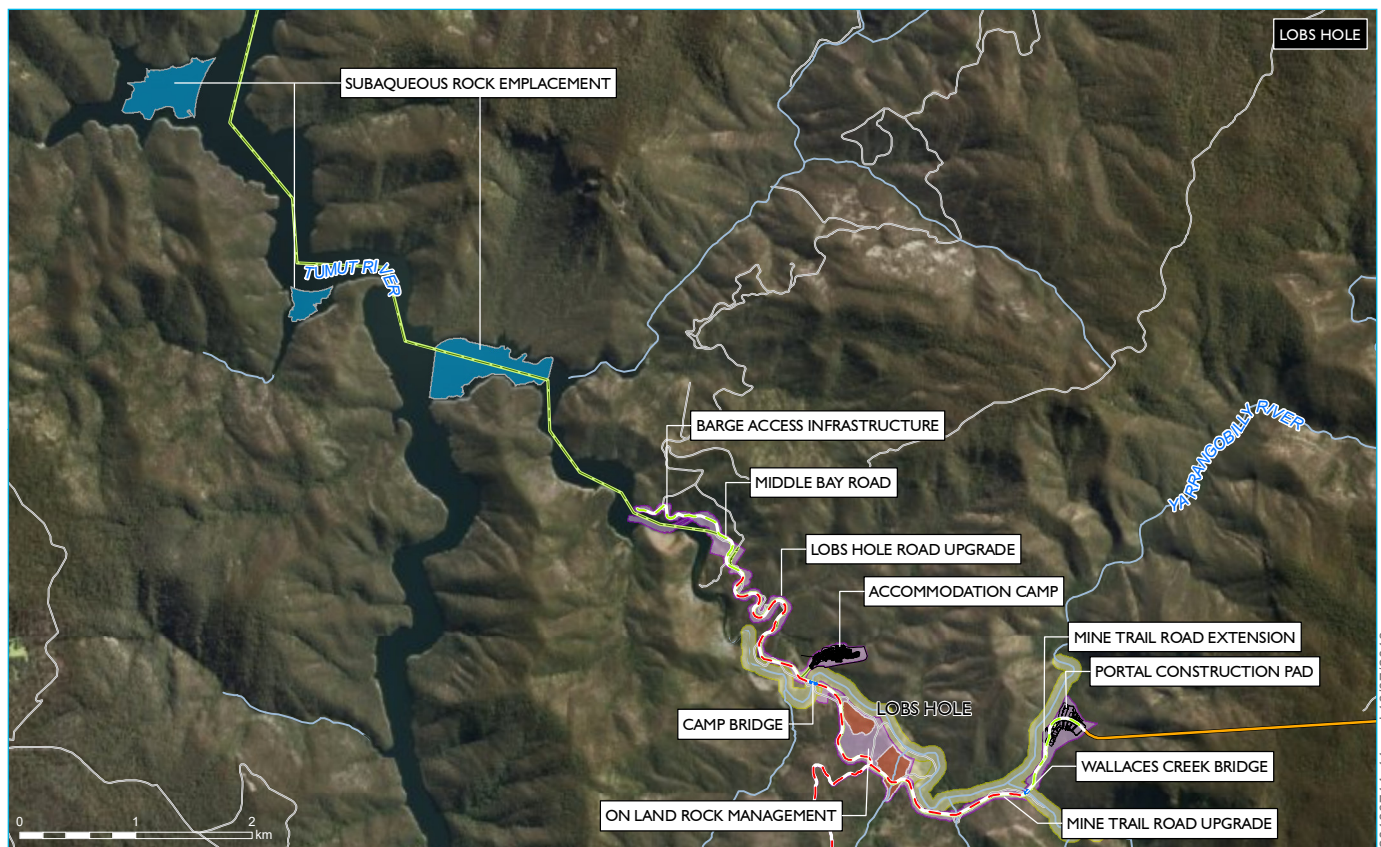
KEY

- Exploratory tunnel
- - Access road upgrade
- - Access road extension
- Communications cable
- Main road
- Local road
- Major watercourse
- On land rock management
- Subaqueous excavated rock placement
- Disturbance footprint
- Avoidance footprint

0 2.5 5 km
GDA 1994 MGA Zone 55

Exploratory Works project area

Snowy 2.0
Environmental Impact Statement
Exploratory Works
Figure ES1



Source: EMM (2018); Snowy Hydro (2018); NearMap (2018); SMEC (2018); Robert Bird (2018); DFSI (2017); LPMA (2011)

GDA 1994 MGA Zone 55



KEY

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — Exploratory tunnel | — Local road or track |
| - - Access road upgrade | — Watercourse |
| - - Access road extension | On land rock management |
| — Permanent bridge | Subaqueous excavated rock placement |
| Portal construction pad and accommodation camp conceptual layout | Disturbance footprint |
| — Communications cable | Avoidance footprint |

Exploratory Works elements

Snowy 2.0
Environmental Impact Statement
Exploratory Works
Figure ES2

ES2.2 Avoidance and minimisation

An avoidance footprint has been defined for Exploratory Works and consists of all areas excluded from clearing and ground disturbance due to sensitive environmental and heritage constraints. These areas are shown in Figure ES2, and were developed as part of the iterative design and environmental assessment process carried out for Exploratory Works. This iterative process included the need to develop solutions that balance the need for ensuring a safe working environment for the construction of Exploratory Works with the need to preserve and protect the values of the KNP.

Throughout the Exploratory Works design process, the objective was to identify and avoid sensitive locations, to minimise the disturbance footprint and maintain as much of the existing natural environment as is feasible.

Key considerations of during the design of Exploratory Works include avoiding and minimising impacts to the environment by:

- using existing disturbed areas or areas of low value revegetation wherever possible, including at Lobs Hole for access roads, the accommodation camp and rock emplacement areas, and the Middle Bay unformed launching area and Talbingo Spillway for barge access infrastructure;
- protecting the long term water quality of the Yarrangobilly River by developing a design for the eastern rock emplacement area that will treat potential acid forming rock and manage surface water flows from Lick Hole Gully;
- selecting suitable placement locations, methods, and environmental controls that minimise water quality impacts in Talbingo Reservoir from subaqueous placement of excavated material;
- applying an avoidance footprint to:
 - provide a 50 m setback from the Yarrangobilly River to prevent the location of any infrastructure or vegetation clearance within sensitive riparian areas, and minimise indirect impacts to, Booroolong Frog, Murray Crayfish and Macquarie Perch (threatened species) habitat, and areas of high archaeological potential for Aboriginal cultural heritage;
 - provide a 20 m setback from the former Washington Hotel at Lobs Hole and prevent harm to the heritage item;
 - limit clearing and disturbance, in particular to avoid clearing identified Smoky Mouse (threatened species) habitat along Upper Lobs Hole Ravine Road; and
- minimising ground disturbance and vegetation clearing by using diesel-generated power instead of new or augmented transmission supply connections.

ES2.3 Construction and disturbance

The disturbance footprint defined for Exploratory Works consists of all areas subject to clearing and ground disturbance. The extent of the disturbance footprint is shown on Figure ES2 and shows the area required for construction, including the buildings and structures, portal construction pad, road widenings and bridges, laydown areas, and rock emplacement areas.

Typical construction activities that will occur within the disturbance footprint include:

- road works including minor surface upgrades of existing tracks (where no widening is needed), and extension or widening of existing tracks;
- bridge works including establishing temporary bridges and environmental controls to facilitate permanent bridge construction;
- geophysical and geotechnical investigation such as seismic survey and borehole drilling;
- site establishment at the portal construction pad, accommodation camp and rock emplacement areas including set up of environmental controls, clearing of vegetation, earthworks, installing site drainage and stabilising the site, and installing and commissioning services infrastructure;
- barge access works including excavating and dredging works and installing precast concrete planks and bollards; and
- revegetation, rehabilitation, management and monitoring.

Exploratory tunnelling will be carried out by a traditional drill and blast method. There is no surface disturbance associated with the exploratory tunnel except at the tunnel portal. The disturbance footprint therefore excludes the exploratory tunnel alignment.

ES3 Strategic context

Exploratory Works for Snowy 2.0 is proposed in a context of growing commitment to renewable energy at the Commonwealth, State and local level and the subsequent forecasted changes to the NEM, as evidenced by:

- the Commonwealth's commitment to investment in renewable energy sources for electricity generation as supported by the *Commonwealth Renewable Energy (Electricity) Act 2000* and signing the Paris Agreement;
- the support for energy storage and renewable generation projects by the NSW government through the provisions of the Renewable Energy Action Plan (2014) and consideration for the establishment of the Energy Zones; and
- the goals of improving energy security and reliability as Australia transitions away from coal-fired, dispatchable, baseload power to renewable wind and solar power characterised by intermittency.

In addition to the context set by strategic energy plans and the need to increase renewable energy available to the NEM, there is also a need to consider and balance the strategic plans and policies relevant to conserving the values of KNP.

Snowy Hydro has current working arrangements with NPWS for the Snowy Scheme that provide rights to occupy and operate within KNP. The arrangements also include carrying out of works in line with the NSW *Snowy Hydro Corporatisation Act 1997*, the Snowy Park Lease, Roads Maintenance Agreement, Schedule of Existing Developments, the Snowy Management Plan and provisions of the *National Parks and Wildlife Regulation 2009*.

This EIS has been prepared with consideration of the KNP Plan of Management (PoM) to ensure the values and sites identified in the PoM are recognised, assessed, and where required, managed to avoid or minimise impacts as far as possible. Exploratory Works has been developed in consultation with NPWS from the outset and consultation is ongoing.

ES4 Engagement

Snowy Hydro has consulted with government agencies, industry and environment groups, business and the community. As Exploratory Works are within the KNP, a primary focus of engagement activities has been to better understand and increase knowledge of:

- recreational values and impacts in consultation with NPWS and recreational users;
- conservation values and impacts in consultation with NPWS, NSW Office of Environment and Heritage (OEH) and Commonwealth Department of Environment and Energy;
- land management objectives and opportunities that can benefit both recreational and conservational values of KNP; and
- perceptions of local communities towards the project, including concerns and expectations, to identify key issues and opportunities for residents, local government, businesses and stakeholders in the region.

Snowy Hydro has been working closely with NPWS to ensure the development of Exploratory Works avoids and minimises impacts as far as possible, and provides an opportunity for long term management benefits after works are completed.

Feedback from the community and general public received before and during the preparation of this EIS was very positive. Matters raised relating to local town benefits (employment, business), recreation and tourism, environment and heritage impacts, road use and other issues are responded to and addressed throughout this EIS.

ES5 Key findings

ES5.1 Biodiversity

The project area supports a variety of natural settings and landscape features that provide habitat for native flora and fauna including escarpments, ravines, rivers, creeks and reservoirs. There has been significant effort to identify the biodiversity values within the Exploratory Works survey area, and design the works to avoid and minimise impacts to the identified values.

Desktop assessments, mapping and field surveys have been used to assess the biodiversity values and threatened species in line with State and Commonwealth legislation and guidelines. Native vegetation condition within the project area reflects evidence of past land use, including clearing and ground disturbance, and also contains areas of undisturbed land and important habitat. Where possible, works have been limited to previously disturbed land.

Field surveys suggest that Exploratory Works will impact the habitat of some threatened fauna including the Gang-gang Cockatoo, Eastern Pygmy-possum, Booroolong Frog (within and along Yarrangobilly River), Smoky Mouse and Masked Owl. Talbingo Reservoir and the Yarrangobilly River were identified as potential habitat for threatened aquatic species including Murray Crayfish (found during surveys), and Trout Cod and Macquarie Perch (not found during surveys). There are no threatened plant species identified in the project area.

Impacts to biodiversity are likely to arise in two ways; from direct impacts by clearing of vegetation or habitat during construction, and by indirect impacts to habitat such as erosion, sedimentation and changes to water quality, as well as noise and light affecting adjacent natural areas during construction.

The impacts on Smoky Mouse habitat (a critically endangered species in NSW) is potentially the most serious and therefore the works have been designed to ensure that impacts are minimal. No road widening will be carried out in the area of identified habitat, which is primarily limited to the upper section of Lobs Hole Ravine Road. In addition and to avoid and minimise impacts to the Booroolong Frog, Murray Crayfish and potential Macquarie Perch habitat, a 50 m exclusion area has been placed around the Yarrangobilly River. This exclusion area was developed in consultation with recognised government species experts, including from NPWS and OEH, as it was determined that if works can be avoided within this buffer, direct impacts to Booroolong Frog and their habitat can be avoided, along with most indirect impacts. The two bridges that cross the Yarrangobilly River and Wallaces Creek will also be designed to avoid impacts to fish passage.

The placement of excavated material in Talbingo Reservoir will be below the minimum operating level and at depths that generally avoids high quality aquatic habitat associated with shallower environments. Displacement of aquatic habitat in Talbingo Reservoir due to dredging and construction of barge access infrastructure and placement of dredged sediment and material excavated from the tunnel would largely be minimised and restricted to soft sediments. This type of habitat is abundant throughout the reservoir and the loss of a very small area is expected to have negligible impacts to aquatic ecology at this scale. Some habitat, such as wood debris, would be relocated to other areas of the reservoir to ensure there is no net-loss of this type of habitat.

Impacts to biodiversity will be avoided and minimised as much as possible, but there will still be some residual impacts and these will need to be offset in line with legislation and through agreement with NPWS and OEH. This includes species and habitat offsets, land, weed and pathogen management, and rehabilitation works. Snowy Hydro has agreed an in-principle approach to offsets with NPWS and OEH, with a key principle of the offsets being of direct benefit to KNP – an approach local stakeholders are very supportive of.

ES5.2 Kosciuszko National Park

Exploratory Works is predominantly within a small section of the northern region of KNP and the design and planning for Exploratory Works has acknowledged the need to minimise the impact on the values of KNP.

The management of KNP is guided by a range of legislation, strategies and international agreements. These are reflected in the PoM for KNP. NPWS has been, and will continue to be, engaged in all aspects of the development of Exploratory Works. This will build on Snowy Hydro's existing environmental management of assets already well established within KNP (originally since 1949, and under the current regulatory regime since 2002).

Exploratory Works is predominantly in the Ravine region of KNP, which is relatively isolated at the north-western extremity of KNP and generally used for low-key recreational pursuits. The PoM classifies the project area as a back country zone. The more popular visitor areas, including the main skiing and resort areas, are to the south. The Ravine area is not within the Jagungal Wilderness Area and is not noted as an area of exceptional significance under the PoM. However, the Ravine area includes other important landscapes. A number of studies have been completed as part of this EIS to understand and assess potential impacts on the natural and cultural values of the KNP, including biodiversity, heritage, land, water and recreation.

Exploratory Works have been designed in a way that avoids and minimises impacts to KNP where possible. This has included the planning of road access and construction areas to avoid impacting the heritage listed Washington Hotel ruins at Lobs Hole, and Smoky Mouse habitat along Upper Lobs Hole Ravine Road. It also includes designing road upgrades to minimise impacts to geodiversity features including a block stream and a fossil outcrop along Lower Lobs Hole Ravine Road. The former copper mine at Lobs Hole is also considered a geoheritage site, however it is also a source of known contamination and has therefore been avoided as much as possible to prevent disturbance.

The amenity values of KNP will be impacted by project activities such as vegetation clearing, construction, earthworks and access restrictions, but these are temporary impacts and will be rehabilitated at the completion of construction works, in consultation with NPWS. The visibility of these impacts is limited due to the remoteness of the site and distance from sensitive receivers. There are separate sections of this EIS that describe in more detail the relevant KNP values such as biodiversity, geodiversity, cultural heritage, and recreational users.

Where there are some impacts that can't be avoided, Snowy Hydro will work with NPWS to ensure that offsets and contributions can be made to improving recreational facilities at some sites, and improving habitat and catchment health in other parts of KNP.

ES5.3 Land

The nature of Exploratory Works means that impacts on landform and soil characteristics are an important consideration. There are some isolated areas of existing contamination, mostly near Lobs Hole, but these are not health risks and are generally avoided by Exploratory Works.

An assessment of impacts to land has been carried out, which broadly includes: soils and land capability; landforms (including geotechnical stability and land use compatibility of new landforms); seismic and subsidence impacts; soil contamination (existing contamination and potential for contamination from excavated rock); naturally occurring asbestos; and impacts to karst systems.

The overall impact of Exploratory Works on soil and land capability is expected to be low. While sites will be rehabilitated, there will be some permanent loss of soil and land capability in some selected locations such as along roads and at the rock emplacement sites. Most landforms, other than the eastern rock emplacement area which will become a permanent landform, will be rehabilitated to a pre-existing state or to conditions agreed with NPWS. The potential for seismic and subsidence impacts from Exploratory Works is expected to be minimal due to the method of excavation and structural support maintained in the tunnel.

The Kosciuszko region supports a number of karst areas, one of which is within the project area and referred to as the Ravine Karst Area. It is about 1 km south of the tunnel portal and the existing Lobs Hole Ravine Road passes through it. There are two sites along this road that support important geological features; one is a periglacial block stream (or a boulder stream) and the other is a fossil outcrop. Both sites are already disturbed by the existing road, however the design of road upgrades for Exploratory Works through this area has aimed to minimise further impacts where possible. Another karst area near the project area is the Yarrangobilly Caves, approximately 8 km north, however the caves will not be impacted.

Contamination risk has also been investigated, with particular interest in the Lobs Hole area where the copper mine once operated. Other areas of environmental concern are the site of the former settlement of Ravine and the local campsites where shallow contamination may be present due to past waste disposal, fuel leaks and agricultural activity. Early soil sampling indicates no health risk. There is low potential for naturally occurring asbestos to occur within an area along Upper Lobs Hole Ravine Road. Impacts in this area will be limited as it is within identified Smoky Mouse habitat, meaning road upgrades in this area will be kept to a minimum.

A range of mitigation and risk management measures will be implemented including erosion and sediment controls, contaminated land procedures, surface rehabilitation and groundwater monitoring.

ES5.4 Water

Exploratory Works will include management systems to minimise disturbance to water resources by avoiding discharge to or extraction from the Yarrangobilly River, and by on-site controls for sediment and erosion, water re-use and for safe storage of chemical compounds. The works will have minimal influence on flood water behaviour and infrastructure will, as far as possible, be above the flood plain.

An assessment has been prepared to determine the impacts of Exploratory Works on surface water and groundwater. Surface waters within the project area include Yarrangobilly River, Wallaces Creek and Talbingo Reservoir. The impacts on aquifers, groundwater and flood behaviour were also considered. Separate assessments have also been prepared to determine the impacts of dredging and construction of barge access infrastructure and subaqueous placement of excavated material in Talbingo Reservoir.

Key elements of Exploratory Works such as tunnelling, dredging, excavation and rock emplacement will impact surface and groundwater systems. The potential issues include fine sediment in runoff, accidental spills, disturbance of reservoir bed sediments, seepage at rock emplacement sites and changes to flow regimes from new infrastructure such as bridges. These impacts will, however, be minimised through a number of design and control measures.

Erosion and sediment controls will be an important management measure to prevent sediment laden and process water from being uncontrollably released to the environment. A water treatment plant will be built at the portal construction pad and a wastewater (sewage) treatment plant built at the accommodation camp, to ensure water quality objectives for discharge water to Talbingo Reservoir are met. To minimise water taken from Talbingo Reservoir, water captured while tunnelling can be reused as water for construction works.

Sites where excavated materials are placed on land (ie rock emplacement areas) will be designed to be physically and chemically stable landforms. Monitoring of surface and groundwater will be designed to detect potential changes in water quality resulting from these areas.

The initial phase of subaqueous placement in Talbingo Reservoir has been designed to minimise impacts by selecting suitable placement locations, methods, and environmental controls. Adverse impacts at the reservoir bed are considered to be low and localised provided these measures are put in place. The strategy for managing and monitoring subaqueous placement will be confirmed in consultation with Environment Protection Authority (EPA) before starting subaqueous placement activities.

There will be some localised drawdown of groundwater due to tunnelling but this will not adversely impact local ecosystems or vegetation potentially dependent on groundwater.

ES5.5 Heritage

There has been a long history of Aboriginal presence in the Snowy Mountains and the Walgalu people continue to have a cultural association with the region. The high country also has a rich history from early exploration, pastoralism and settlement, as well as the construction of the Snowy Scheme. The assessment of heritage impacts for Exploratory Works has considered both Aboriginal cultural heritage and historic heritage in the project area.

To identify Aboriginal archaeological significance, the assessment used survey areas which were representative of various local landforms. Some survey areas revealed moderate to high archaeological heritage values, however Exploratory Works has been designed to avoid disturbance in these areas (such as within 50 m of the Yarrangobilly River). In locations that would be disturbed by Exploratory Works, most of the land has been previously disturbed and considered to be of low significance for Aboriginal archaeology. Apart from archaeology, the current Aboriginal community connects to these areas when they provide direct physical and symbolic linkages to the ancestral past and to the landscape.

There are no heritage items within the project area listed on the World Heritage List, Commonwealth Heritage List, State Heritage Register, or local government heritage schedules. The 'Australian Alps National Parks and Reserves' and the 'Snowy Mountains Scheme' are two listed places on the National Heritage List and are relevant to Exploratory Works. An assessment of these places was completed as part of the referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. No significant impacts to national heritage are expected.

A number of local historic heritage items were identified in the project area that are listed on the Historic Heritage Information Management System (HHIMS) (relating to land managed by NPWS). The historic heritage research for Exploratory Works also identified over a hundred additional potential heritage items which were then assessed for their heritage significance. Most were of negligible significance, although 16 were classified as locally significant. None were of State significance. Of the items considered to be locally significant, five are within the disturbance footprint with potential to be directly impacted. Four of these are related to the former copper mine and will be subject to archival recording before being impacted. One site (Ravine cemetery) will be recommended to be avoided by Exploratory Works activities.

The area of Lobs Hole is recognised as being a location of value and interest to the community, given its long occupation by Aboriginal people and its role for recreation, prospecting, infrastructure development and as a settlement. The ruins of the former Washington Hotel, which operated for a few years when the copper mine was at its peak, will be protected with a 20 m buffer zone during construction.

ES5.6 Transport

Traffic surveys were conducted to evaluate current traffic and transport movement. The impact of Exploratory Works on the road network, public and private transport, cycling and walking was considered through a traffic and transport assessment.

During Exploratory Works, there will be multiple vehicles accessing the site from the external road network as well as circulating within the internal road network. The majority of these vehicles will be delivering materials associated with the construction of Exploratory Works elements.

The main local roads that are likely to experience additional demand due to Exploratory Works are the Snowy Mountains Highway, Link Road and Miles Franklin Drive based on the identified haulage and transport route to Lobs Hole. The existing roadway levels of service were compared against the predicted levels of service with the addition of traffic generated by Exploratory Works. The assessment showed that the additional vehicles on these roads are not expected to result in any reduction on the level of service.

Within the project area, roads include Lobs Hole Ravine Road, Lobs Hole Road, Mine Trail Road, Middle Bay Road and Spillway Road. These roads within the construction area will be closed to the public during Exploratory Works. Upgrades to these roads will also be required to allow safe access for trucks.

ES5.7 Social and economic

Exploratory Works has potential to impact service level providers, such as community services, facilities and infrastructure particularly in Cooma and Tumut, via the small influx of workers to the local area. Recreational users will also be impacted as a result of temporary closure of parts of KNP at Lobs Hole and at Talbingo Spillway.

Around 200 workers would be employed at the peak of Exploratory Works with the workforce staying within the accommodation camp while rostered-on. While some of the workforce will be sourced from the local area and region, it is expected that the majority of the workforce would fly in and out and drive in and out. It has been assumed that some workers are likely to relocate their families to live in the local area. Analysis of long term rental housing availability in the main local towns show that there is sufficient capacity to cater for the demand generated by workers that may choose to relocate to the local area. Some employees will likely spend time in the local area for recreational purposes when not rostered-on. Data for tourist accommodation suggests that there is sufficient capacity to meet this small additional demand during Exploratory Works.

Potential impacts to recreational users resulting from Exploratory Works include:

- the closure of Lobs Hole Ravine Road and the Ravine campground for the duration of Exploratory Works;
- barge access infrastructure and operations on Talbingo Reservoir and associated changes and temporary restrictions to recreational uses such as swimming, water skiing, fishing and boating and other water activities on the reservoir; and
- increased traffic along the primary transport routes.

The residual impact on recreational users is likely to be low given that:

- direct impacts will be temporary and will affect a relatively low number of users of KNP;
- most long term impacts, once mitigation strategies are implemented, will be low;
- some long term impacts will be positive such as improved access and facilities to/at Lobs Hole and at Talbingo Reservoir; and

- displacement, both temporary and long term, is not expected to occur at high levels and will be to sites that generally have the capacity to absorb some extra visitation.

ES5.8 Other matters

The project area is generally remote from built up areas. Nonetheless, assessments of noise, air quality and public safety have been carried out as part of this EIS and in line with the Secretary's Environmental Assessment Requirements.

The construction associated with Exploratory Works will have potential to cause minor noise and vibration impacts, impacts to local air quality and public safety risks. However, due to the isolated and remote location many of these impacts are not perceptible to identified sensitive receivers.

Perceptible noise impacts are primarily anticipated at Talbingo, for about six weeks during the upgrade of Spillway Road. Consultation with affected residents will be undertaken to determine appropriate management measures. There are safe distances between construction activities and people or buildings so that any vibration impacts will be sufficiently mitigated.

The air quality assessment showed that particulate matter such as dust and suspended particles would not exceed relevant health thresholds. Air quality impacts can be managed using standard environmental management measures including watering of haul roads and reducing vehicle speeds as needed.

Other public safety risks are bushfire, the protection of essential services such as water supply, the transport and handling of dangerous goods, and emergency access and evacuation. These risks will be mitigated through design of buildings, construction areas and other assets to include appropriate bushfire protection standards, and emergency access and evacuation protocols.

ES6 Environmental management and mitigation

Snowy Hydro will be responsible for overseeing the construction of Exploratory Works to ensure they are delivered in line with the conditions of approval. Snowy Hydro will appoint a construction contractor to carry out Exploratory Works in compliance with this EIS, the conditions of any approval granted and any environment protection licence granted by the NSW EPA. This includes the implementation of a Construction Environmental Management Plan (CEMP) and all other activities relevant to managing construction impacts.

As with most of the existing Snowy Scheme, Exploratory Works will take place primarily within KNP. Snowy Hydro's existing occupation within KNP is carefully managed and it is recognised that additional long term strategies are needed to plan for residual impacts associated with Exploratory Works. Snowy Hydro has been consulting with NPWS on these matters since the announcement of Snowy 2.0.

Several long term management strategies will be prepared including a site rehabilitation strategy, biodiversity offset strategy, and a suite of specific management actions for KNP which are the subject of ongoing consultation with NPWS. Snowy Hydro also plans to enter into a heads of agreement with NPWS which will form the basis of an agreement setting out the broad measures proposed to mitigate impacts to recreational users of KNP, and nominate the monetary contributions required to fund these measures.

ES7 Conclusion

The development of Snowy 2.0 will help meet the future needs of the changing NEM and is consistent with Commonwealth and NSW strategic planning and policy objectives, including the NSW Renewable Action Plan. With the planned retirement of coal-fired generation and new renewable coming online, the development of Snowy 2.0 will underpin the stability and reliability of the NSW and the broader NEM and ensure an orderly transition in a cost-effective way.

Exploratory Works has been proposed and is needed to ensure important information is obtained to finalise the design and construction method of the underground power station cavern needed for Snowy 2.0, should it proceed. No existing Snowy Scheme tunnel or excavation currently intersects the Ravine Beds geological unit, and therefore it is extremely important to understand the underground conditions in the area of the power station cavern.

Consistent with the principles of ecologically sustainable development, Exploratory Works has been designed to avoid and minimise impacts where possible. This has included consideration of site suitability based on design and construction needs, existing assets and infrastructure (such as road access), and environmental conditions (such as identified threatened species habitats). Suitable management measures have been identified to mitigate any residual impacts.

Snowy Hydro's consultation with key stakeholders and the community commenced in mid-2017 and is ongoing. Working together with NPWS is fundamental to achieving long term management objectives, and has been key in the development of Exploratory Works.

While there are some unavoidable impacts during the construction period, Exploratory Works will allow for a number of longer term benefits and contributions to KNP through the offset program, improved access roads and recreational facility upgrades. The completion of Exploratory Works will also allow for the greater benefits of Snowy 2.0 to be realised.