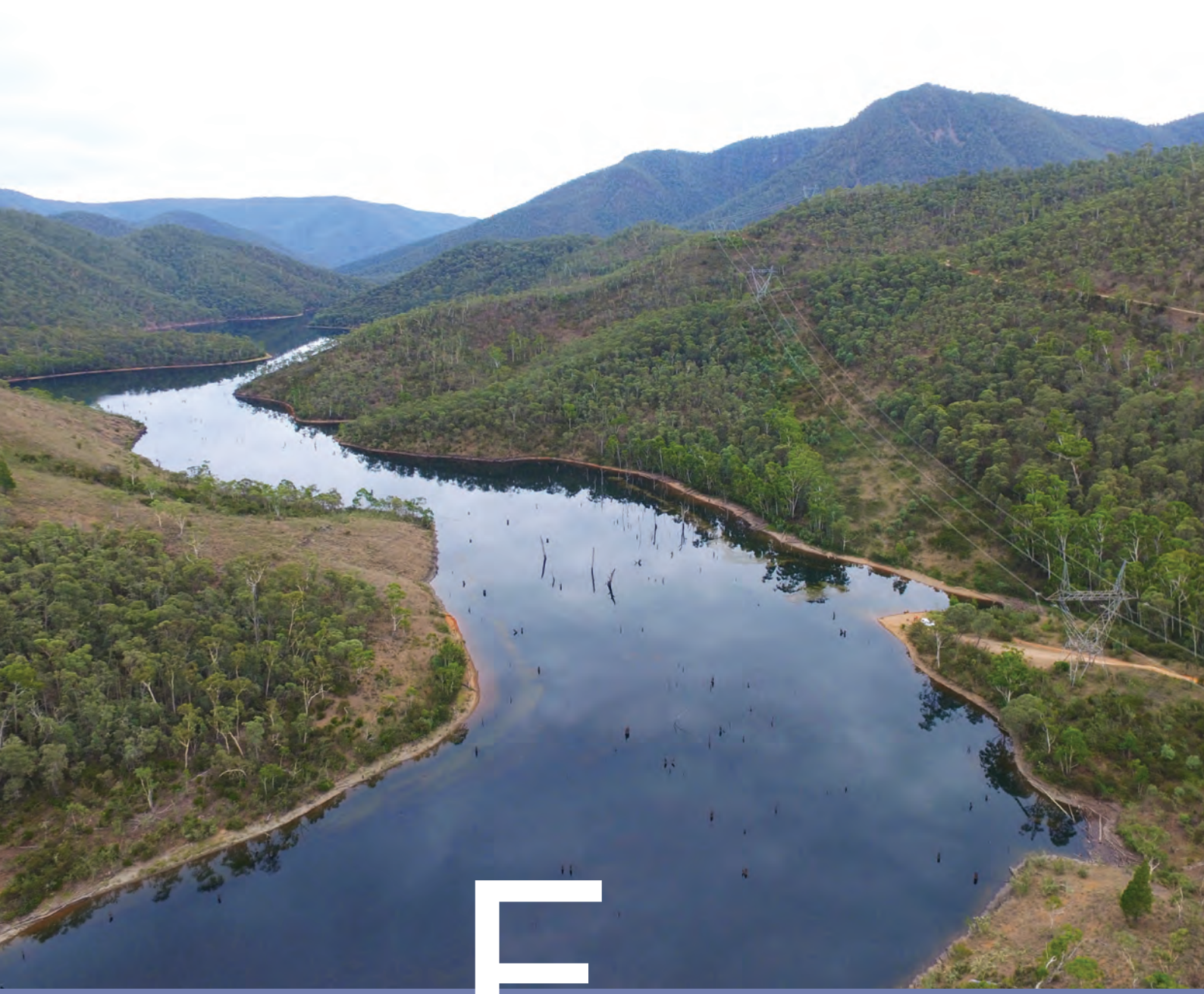
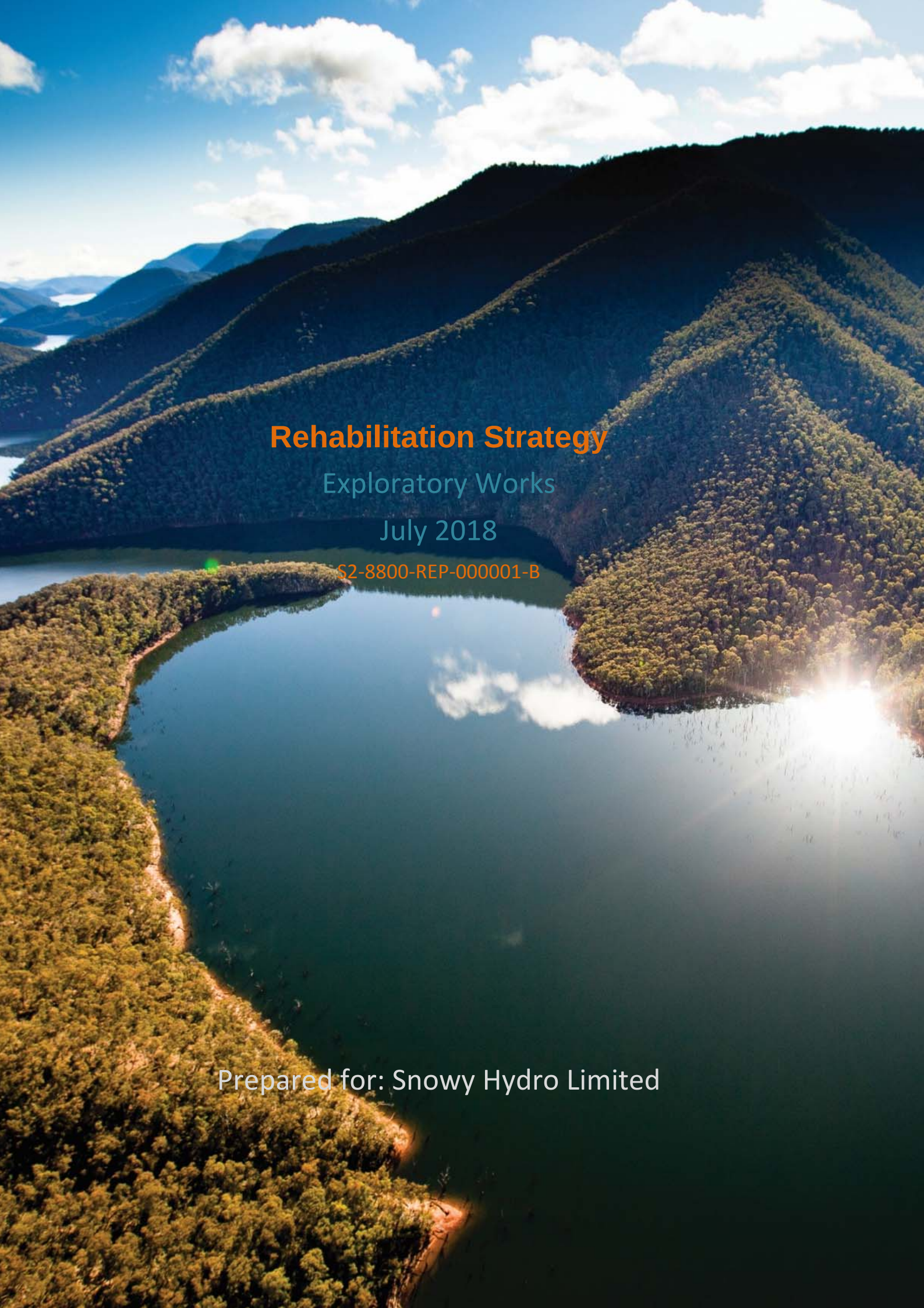


APPENDIX E

REHABILITATION STRATEGY



Rehabilitation Strategy

Exploratory Works

July 2018

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IMPORTANT NOTICE

Table of Contents

1. Introduction

1.1. The project

Snowy Hydro Limited (Snowy Hydro) proposes to develop Snowy 2.0, a large scale pumped hydro-electric storage and generation project which would increase hydro-electric capacity within the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme). This would be achieved by establishing a new underground hydro-electric power station that would increase the generation capacity of the Snowy Scheme by almost 50%, providing an additional 2,000 megawatts (MW) generating capacity, and providing approximately 350,000 megawatt hours (MWh) of storage available to the National Electricity Market (NEM) at any one time, which is critical to ensuring system security as Australia transitions to a decarbonised NEM. Snowy 2.0 will link the existing Tantangara and Talbingo reservoirs within the Snowy Scheme through a series of underground tunnels and hydro-electric power station.

Snowy 2.0 has been declared to be State significant infrastructure and critical State significant infrastructure (CSSI) by the NSW Minister for Planning under the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and is defined in Clause 9 of Schedule 5 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Separate applications and environmental impact statements (EIS) for different phases of Snowy 2.0 are being submitted under Part 5, Division 5.2 of the EP&A Act. This technical assessment has been prepared to support an EIS for Exploratory Works to undertake investigative works to gather important technical and environmental information for the main Snowy 2.0 project. The main project will be subject of a separate application and EIS next year.

The purpose of Exploratory Works for Snowy 2.0 is primarily to gain a greater understanding of the conditions at the proposed location of the power station, approximately 850 metres (m) below ground level. Understanding factors such as rock conditions (such as stress conditions) and ground temperature is essential to inform decisions about the precise location of the power station cavern and confirm the cavern construction methods.

Exploratory Works comprises:

- an exploratory tunnel to the site of the underground power station for Snowy 2.0;
- horizontal and other test drilling, investigations and analysis in situ at the proposed cavern location and associated areas, and around the portal construction pad, access roads and excavated rock management areas all within the disturbance footprint;
- a portal construction pad for the exploratory tunnel;
- an accommodation camp for the Exploratory Works construction workforce;
- road works and upgrades providing access and haulage routes during Exploratory Works;
- barge access infrastructure, to enable access and transport by barge on Talbingo reservoir;
- excavated rock management, including subaqueous placement within Talbingo Reservoir;
- services infrastructure such as diesel-generated power, water and communications; and
- post-construction revegetation and rehabilitation, management and monitoring.

1.2. Location of Exploratory Works

Snowy 2.0 and Exploratory Works are within the Australian Alps, in southern NSW. The regional location of Exploratory Works is shown on Figure 1.1. Snowy 2.0 is within both the Snowy Valleys and Snowy Monaro Regional local government areas (LGAs), however Exploratory Works is entirely within the Snowy Valleys LGA. The majority of Snowy 2.0 and Exploratory Works are within Kosciuszko National Park (KNP).

The area in which Exploratory Works will be undertaken is referred to herein as the project area, and includes all of the surface and subsurface elements further discussed in Section 2.1.

Exploratory Works is predominantly in the Ravine region of the KNP. This region is between Talbingo Reservoir to the north-west and the Snowy Mountains Highway to the east, which connects Adaminaby and Cooma in the south-east to Talbingo and Tumut to the north-west of the KNP. Talbingo Reservoir is an existing reservoir that forms part of the Snowy Scheme. The reservoir, approximately 50 kilometres (km) north-west of Adaminaby and approximately 30 km east-north-east of Tumbarumba, is popular for recreational activities such as boating, fishing, water skiing and canoeing.

The nearest large towns to Exploratory Works are Cooma and Tumut. Cooma is approximately one hour and forty five minutes drive (95 km) south-east of Lobs Hole. Tumut is approximately half an hour (45 km) north of Talbingo. There are several communities and townships near the project area including Talbingo, Tumbarumba, Batlow, Cabramurra and Adaminaby. Talbingo and Cabramurra were built for the original Snowy Scheme workers and their families. Adaminaby was relocated to alongside the Snowy Mountains Highway from its original location (now known as Old Adaminaby) in 1957 due to the construction of Lake Eucumbene. Talbingo and Adaminaby provide a base for users of the Selwyn Snow Resort in winter. Cabramurra was modernised and rebuilt in the early 1970s and is owned and operated by Snowy Hydro. It is still used to accommodate Snowy Scheme employees and contractors. Properties within Talbingo are now predominantly privately owned. Snowy Hydro now only owns 21 properties within the town.

Other attractions and places of interest in the vicinity of the project area include Selwyn Snow Resort, the Yarrangobilly Caves complex and Kiandra. Kiandra has special significance as the first place in Australia where recreational skiing was undertaken and is also an old gold rush town.

The project area is shown on Figure 1.2 and comprises:

- **Lobs Hole:** Lobs Hole will accommodate the excavated rock emplacement areas, an accommodation camp as well as associated infrastructure, roads and laydown areas close to the portal of the exploratory tunnel and portal construction pad at a site east of the Yarrangobilly River;

- **Talbingo Reservoir:** installation of barge access infrastructure near the existing Talbingo Spillway, at the northern end of the Talbingo Reservoir, and also at Middle Bay, at the southern end of the reservoir, near the Lobs Hole facilities, and installation of a submarine cable from the Tumut 3 power station to Middle Bay, providing communications to the portal construction pad and accommodation camp. A program of subaqueous rock placement is also proposed;

- **Mine Trail Road** will be upgraded and extended to allow the transport of excavated rock from the exploratory tunnel to sites at Lobs Hole that will be used to manage excavated material, as well as for the transport of machinery and construction equipment and for the use of general construction traffic; and

- several sections of **Lobs Hole Ravine Road** will be upgraded in a manner that protects the identified environmental constraints present near the current alignment.

The project is described in more detail in Chapter 2.

1.3. Proponent

Snowy Hydro is the proponent for Exploratory Works. Snowy Hydro is an integrated energy business – generating energy, providing price risk management products for wholesale customers and delivering energy to homes and businesses. Snowy Hydro is the fourth largest energy retailer in the NEM and is Australia's leading provider of peak, renewable energy.

1.4. Assessment guidelines and requirements

This Rehabilitation Strategy has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for Exploratory Works, issued first on 17 May 2018 and revised on 20 June 2018, as well as relevant governmental assessment requirements, guidelines and policies, and in consultation with the relevant government agencies.

To inform preparation of the SEARs, the Department of Planning and Environment (DPE) invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were taken into account by the Secretary for DPE when preparing the SEARs.

The SEARs must be addressed in the Exploratory Works EIS. Table 1.1 lists the matters described in the SEARs relevant to this assessment and where they are addressed in this report.

Table 1.1 Relevant matters raised in SEARs

Requirement	Section addressed
In particular, the EIS must include, but not necessarily be limited to, the following:	
a full description of the project, including:	
- a strategy for the design, management, and rehabilitation of the excavated material stockpiles in the short, medium and long term, including removal, re-use and disposal;	Section 8

To inform preparation of the SEARs, the Department of Planning and Environment (DPE) invited relevant government agencies to advise on matters to be addressed in the EIS. These matters were taken into account by the Secretary for DPE when preparing the SEARs.

Figure 1-1 Regional location of Snowy 2.0 and Exploratory Works

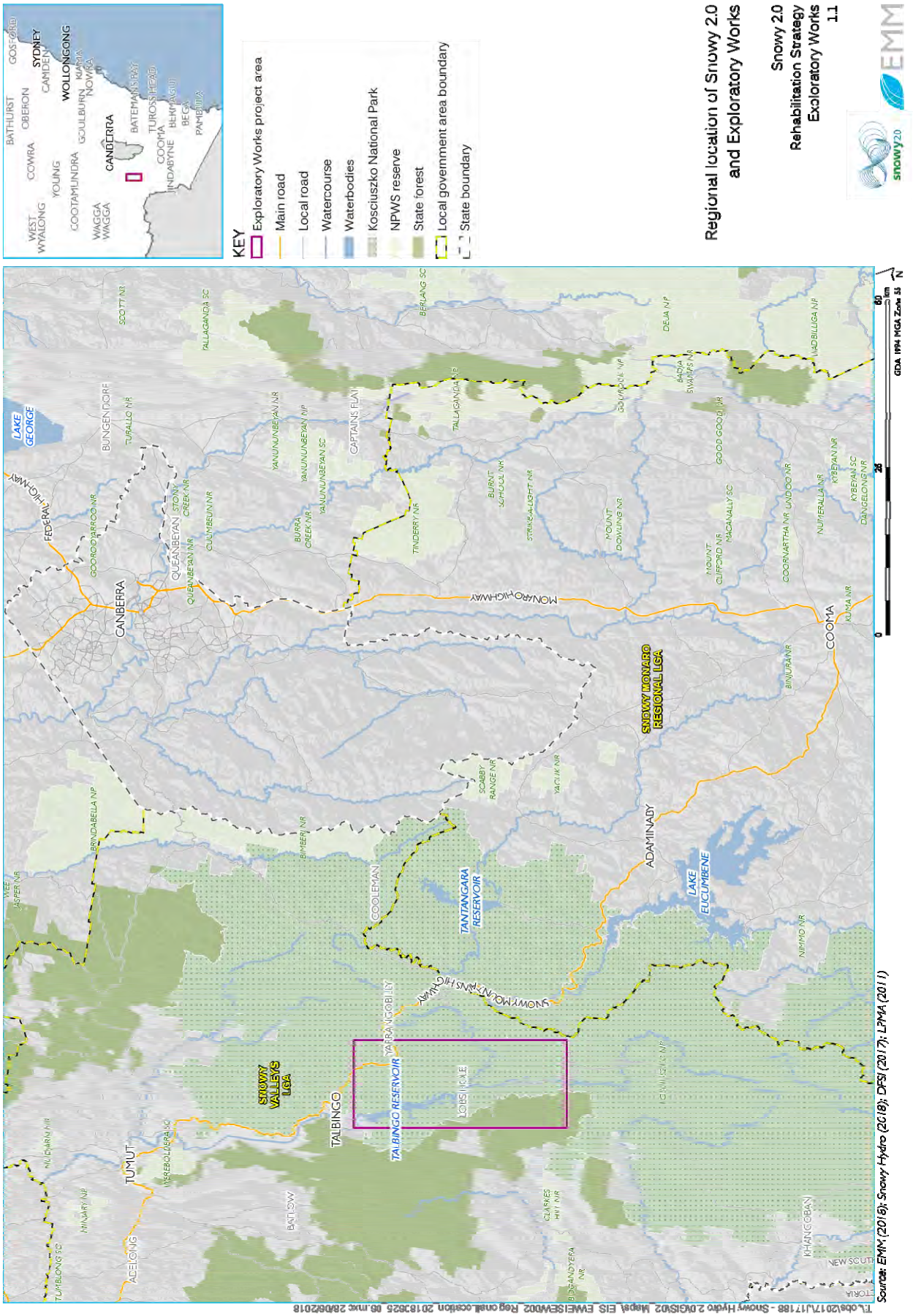


Figure 1-2 Exploratory Works project area

2. Project description

2.1. Overview

Exploratory Works comprises construction associated with geotechnical exploration for the underground power station for Snowy 2.0. The Exploratory Works elements are shown on Figure 2.1 and involve:

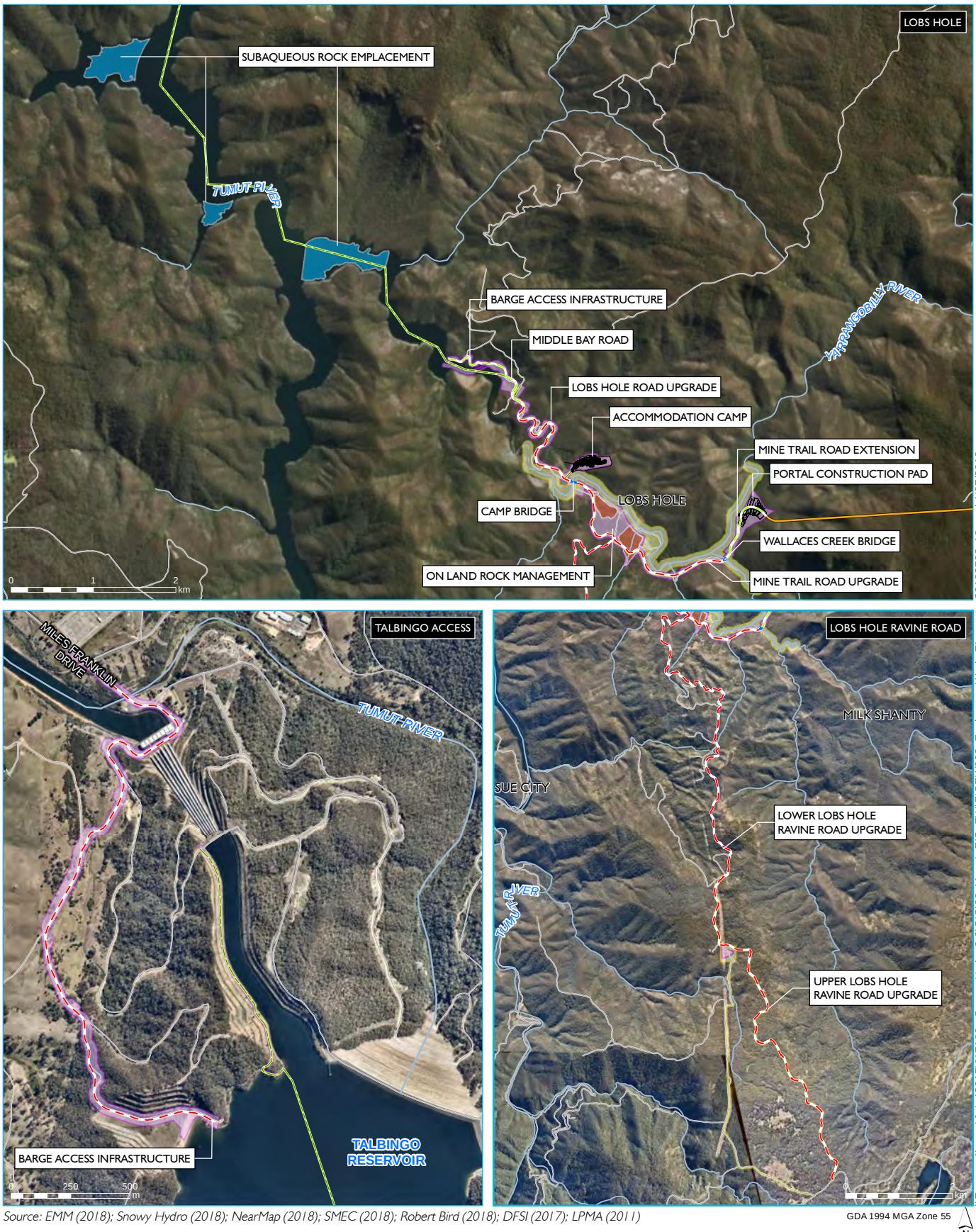
- establishment of an exploratory tunnel to the site of the underground power station for Snowy 2.0;
- horizontal and other test drilling, investigations and analysis in situ at the proposed cavern location and associated areas, and around the portal construction pad, access roads and excavated rock management areas all within the disturbance footprint;
- establishment of a portal construction pad for the exploratory tunnel;
- establishment of an accommodation camp for the Exploratory Works construction workforce;
- road works and upgrades providing access and haulage routes during Exploratory Works;
- establishment of barge access infrastructure, to enable access and transport by barge on Talbingo reservoir;
- excavated rock management, including subaqueous placement within Talbingo Reservoir;
- establishment of services infrastructure such as diesel-generated power, water and communications; and
- post-construction revegetation and rehabilitation, management and monitoring.

2.2. Exploratory tunnel

An exploratory tunnel of approximately 3.1 km is proposed to provide early access to the location of the largest cavern for the underground power station. This will enable exploratory drilling and help optimise the location of the cavern which, in turn, will optimise the design of Snowy 2.0.

The exploratory tunnel is proposed in the north-east section of Lobs Hole and will extend in an east-west direction with the portal construction pad to be outside the western end of the tunnel at a site east of the Yarrangobilly River, as shown on Figure 2.2.

The location of the proposed exploratory tunnel and portal construction pad is shown in Figure 2.2. The exploratory tunnel will be excavated by drill and blast methods and have an 8 x 8 m D-Shaped cross section, as shown on Figure 2.3.



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

GDA 1994 MGA Zone 55

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KEY

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

Exploratory Works elements

Snowy 2.0

Exploratory Works
Figure 2.1

snowy 2.0 EMM

The drill and blast excavation process will be repeated cyclically throughout the tunnelling works, involving:

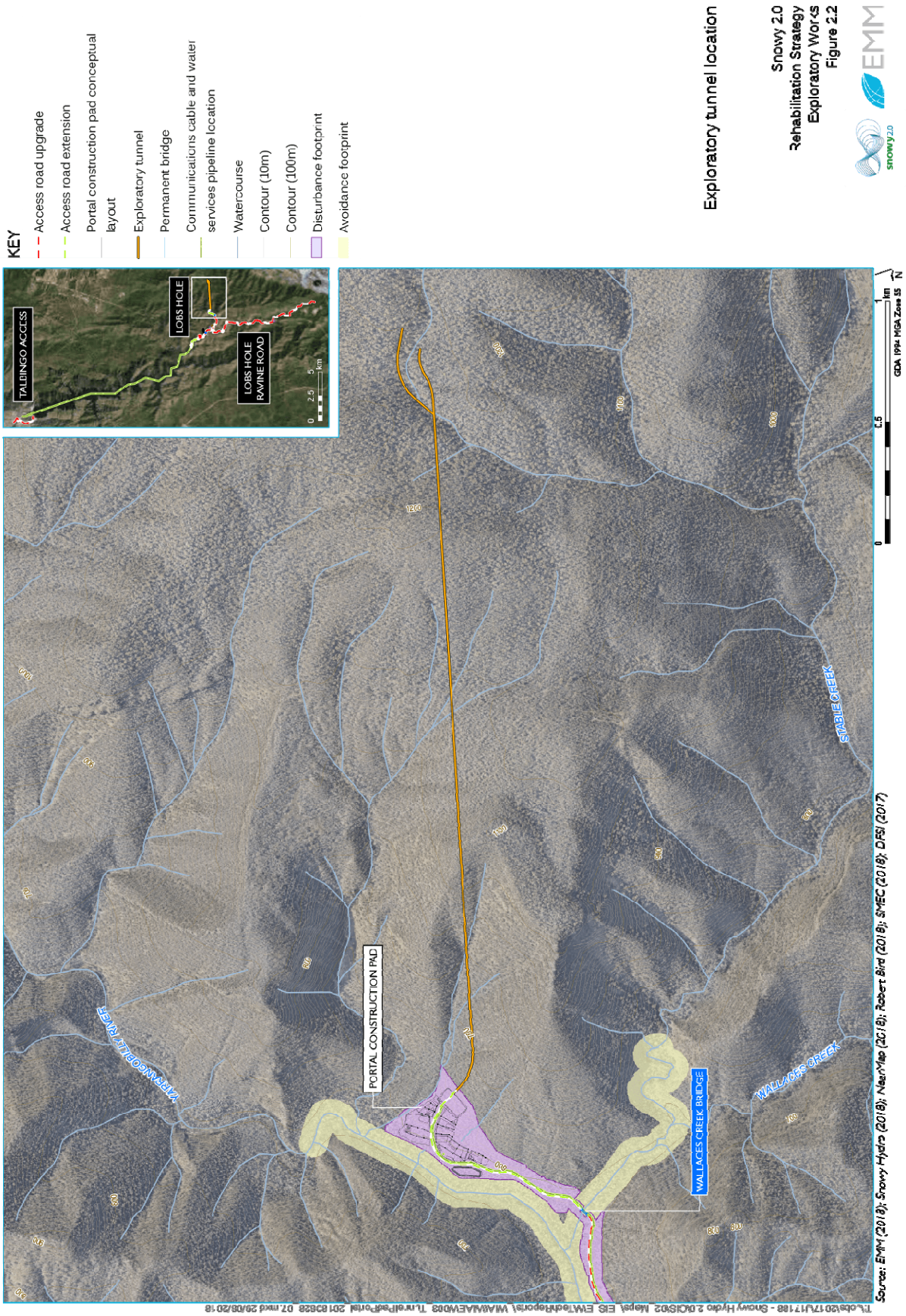
- marking up and drilling blast holes in a predetermined pattern in the working face of the tunnel;
- loading the blast holes with explosives, attaching detonators and connecting the holes into a blast sequence, and detonating the blast;
- ventilating the tunnel to remove blast fumes and dust;
- removing blasted rock;
- scaling and wash down of the tunnel roof and walls to remove loosened pieces of rock;
- geological mapping of the exposed rock faces and classification of the conditions to determine suitable ground support systems for installation;
- installing ground support; and
- advancing construction ventilation ducting and other utilities including power, water, compressed air and communications.

The exploratory tunnel will be shotcrete-lined with permanent anchor support, and incorporate a groundwater management system. The exploratory tunnel shape and dimensions are designed to allow two-lane traffic for the removal of excavated material, along with additional space for ventilation and drainage of groundwater inflows. Groundwater intersected during tunnelling will be contained and transferred to the portal for treatment and management. Areas identified during forward probing with the potential for high groundwater flows may require management through a detailed grouting program or similar.

The tunnel portal will be established at the western end of the exploratory tunnel and provide access and utilities to the exploratory tunnel during construction. The portal will house power, communications, ventilation and water infrastructure. The portal will also provide a safe and stable entrance to the exploratory tunnel.

It is anticipated that the exploratory tunnel will be adapted for multiple functions during construction of the subsequent stages of the Snowy 2.0 project. The exploratory tunnel will also eventually be utilized to form the main access tunnel (MAT) to the underground power station during the operational phase of Snowy 2.0, should it proceed.

Figure 2-2 Exploratory tunnel location



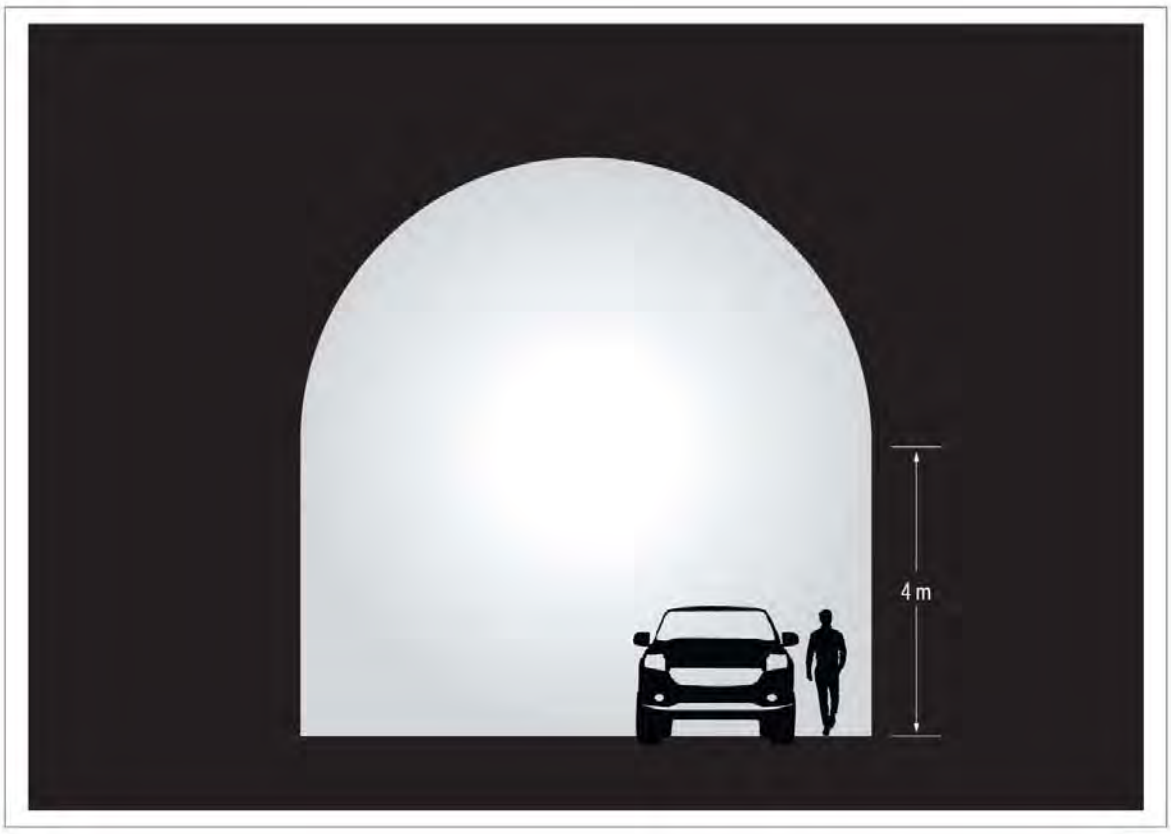


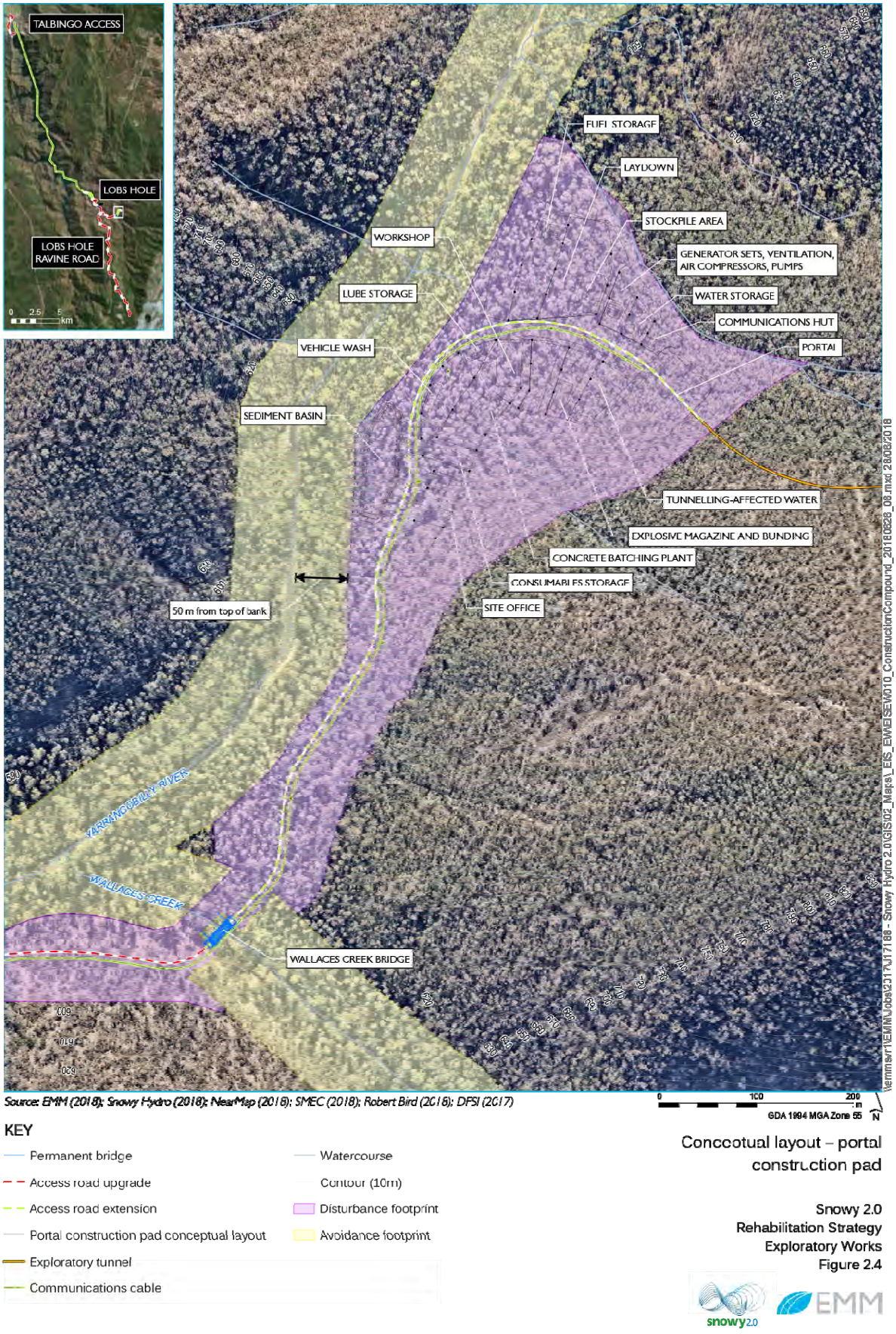
Figure 2-3 Exploratory tunnel indicative cross section

2.3. Portal construction pad

A portal construction pad for the exploratory tunnel will provide a secure area for construction activities. Infrastructure at the portal construction pad, shown in Figure 2.4, will primarily support tunnelling activities and include a concrete batching plant and associated stockpiles, site offices, maintenance workshops, construction support infrastructure, car parking, equipment laydown areas. Stockpile areas will allow for around two to three months' supply of concrete aggregate and sand for the concrete batching plant to ensure that the construction schedule for the proposed access road works do not interfere with the exploratory tunnel excavation schedule. A temporary excavated rock stockpile area is also required to stockpile material excavated during tunnel construction prior to its transfer to the larger excavated material emplacement areas.

The portal construction pad will be at the western end of the exploratory tunnel. The portal construction pad will be excavated to provide a level construction area with a near vertical face for the construction of the portal and tunnelling. The area required for the portal construction pad is approximately 100,000 m^2.

Figure 2-4 Conceptual layout – portal construction pad



2.4. Excavated rock management

It is estimated that approximately 750,000 m^3 of bulked materials will be excavated, mostly from the exploratory tunnel and portal construction pad with additional quantities from road upgrade works. Subject to geochemical testing of the rock material, excavated rock will be placed either on land or subaqueously within Talbingo Reservoir.

2.4.1. On land placement

Excavated materials will be placed in one of two rock emplacement areas at Lobs Hole as shown on Figure 2.5.

The strategy for excavated rock management is for excavated material to be emplaced at two areas with the final placement of excavated material to be determined at a later date.

Consultation with NPWS throughout the design process has identified an opportunity for the eastern emplacement area to form a permanent landform that enables greater recreational use of Lobs Hole following the completion of Snowy 2.0's construction. It is envisaged that the excavated rock emplacement area will provide, in the long-term, a relatively flat final landform suitable for camping and basic recreational facilities to be confirmed in consultation with NPWS.

The eastern emplacement area has a capacity of up to 600,000 m^3 of material. It will be approximately 25 m maximum depth and will be benched down to the northern edge of the emplacement which is setback 50 m from the Yarrangobilly River.

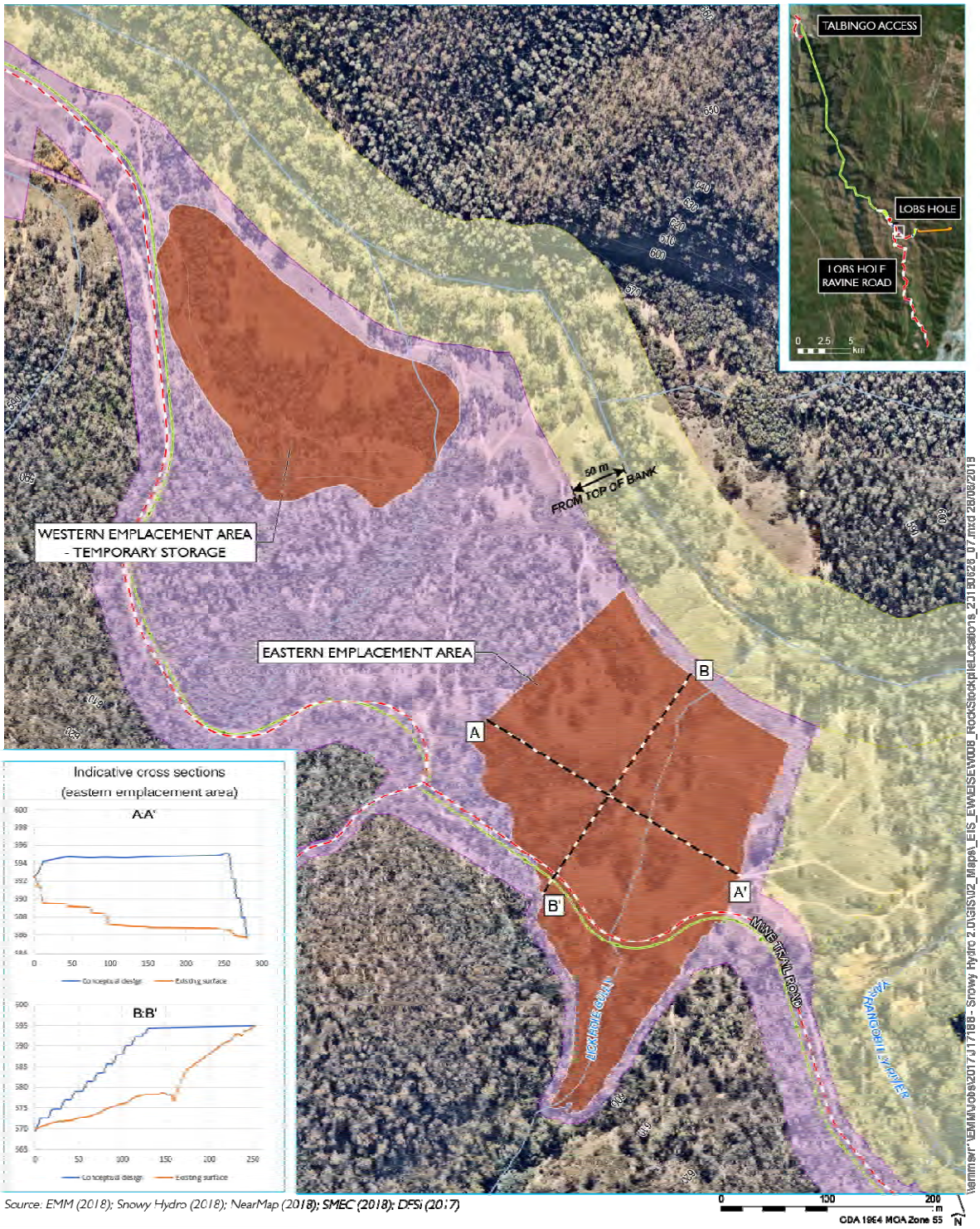
The western emplacement area will be used to store excavated material should it not be able to be placed within the eastern emplacement area. It is envisaged this emplacement area will be used to store excavated materials suitable for re-use within the construction of Exploratory Works or for use by NPWS in KNP maintenance activities. All remaining material placed in this emplacement area will be removed following the completion of Exploratory Works.

The guiding principles for the design, construction method and management of emplacement areas undertaken for Exploratory Works have been as follows:

- reducing potential for acid rock drainage from the excavated rock emplacement area entering the Yarrangobilly River or forming groundwater recharge;
- avoid known environmental constraints; and
- manage existing surface water flows from Lick Hole Gully.

The design and management of the emplacement areas have not yet been finalised due to the need for further investigations to determine the likely geochemical characteristics of the excavated material. Following further investigation and prior to construction of Exploratory Works a management plan will be prepared and implemented.

Figure 2-5 Conceptual layout – excavated rock emplacement areas



Source: EMM (2018); Snowy Hydro (2018); NearMap (2018); SMEC (2018); DFSI (2017)

KEY

- Cross-section
- Access road upgrade
- Communications cable and water services pipeline location
- Watercourse
- Contour (10m)
- On land rock management
- Disturbance footprint
- Avoidance footprint

Conceptual layout – excavated material emplacement areas

Snowy 2.0
Rehabilitation Strategy
Exploratory Works
Figure 2.5

2.4.2. Subaqueous placement

An initial program for the placement of excavated rock within Talbingo Reservoir also forms part of Exploratory Works. The program will be implemented in an appropriate section of Talbingo Reservoir in accordance with a detailed management plan based on an engineering method informed through the materials' geochemistry and reservoir's characteristics. The purpose of the program is to confirm the suitability of the emplacement method for future excavated rock material from the construction of Snowy 2.0, should it proceed.

The rock for subaqueous placement will be taken from the excavated rock emplacement areas as described above. Testing of the rock would be conducted during excavation to assess geochemical properties. Any rock assessed as unsuitable for subaqueous placement based on the prior geochemical and leachability testing would be separately stockpiled and not used in the program. Suitable (ie non-reactive material) would be transported and loaded to barge, for placement at the deposition area. Suitable placement locations have been identified for Exploratory Works and are shown indicatively on Figure 2.6.

All placement within the reservoir would occur within silt curtains and would be subject to a detailed monitoring regime including survey monitoring of pre-placement and post-placement bathymetry, local and remote background water quality monitoring during placement with a structured management response to monitoring results in the event of an exceedance of established triggers. The management, mitigation and monitoring measures would be refined following the ongoing investigations.

2.5. Accommodation camp

An accommodation camp is proposed to provide accommodation and supporting services for workers in close proximity to the exploratory tunnel. The accommodation camp layout is shown on Figure 2.7 and includes ensuite rooms surrounding central facilities including a kitchen, tavern, gym, admin office, laundry, maintenance building, sewage and water treatment plants and parking that will service the Exploratory Works workforce. The accommodation camp access road will connect to the north side of Lobs Hole Road at Lobs Hole. The conceptual layout of the accommodation camp is shown on Figure 2.7.

2.6. Road and access provisions

Existing road and access will need to be upgraded to a suitable standard to:

- provide for the transport of excavated rock material between the exploratory tunnel and the excavated rock emplacement areas;
- accommodate the transport of oversized loads as required; and
- facilitate the safe movement of plant, equipment, materials and construction staff to the portal construction pad.

Given the topographic constraints of the area, the standard of the existing roads and the environmental values associated with KNP, the option of barging larger and oversized loads to the site is available. This is discussed further at Section 2.7.

Figure 2-6 Indicative location for subaqueous rock placement in Talbingo Reservoir

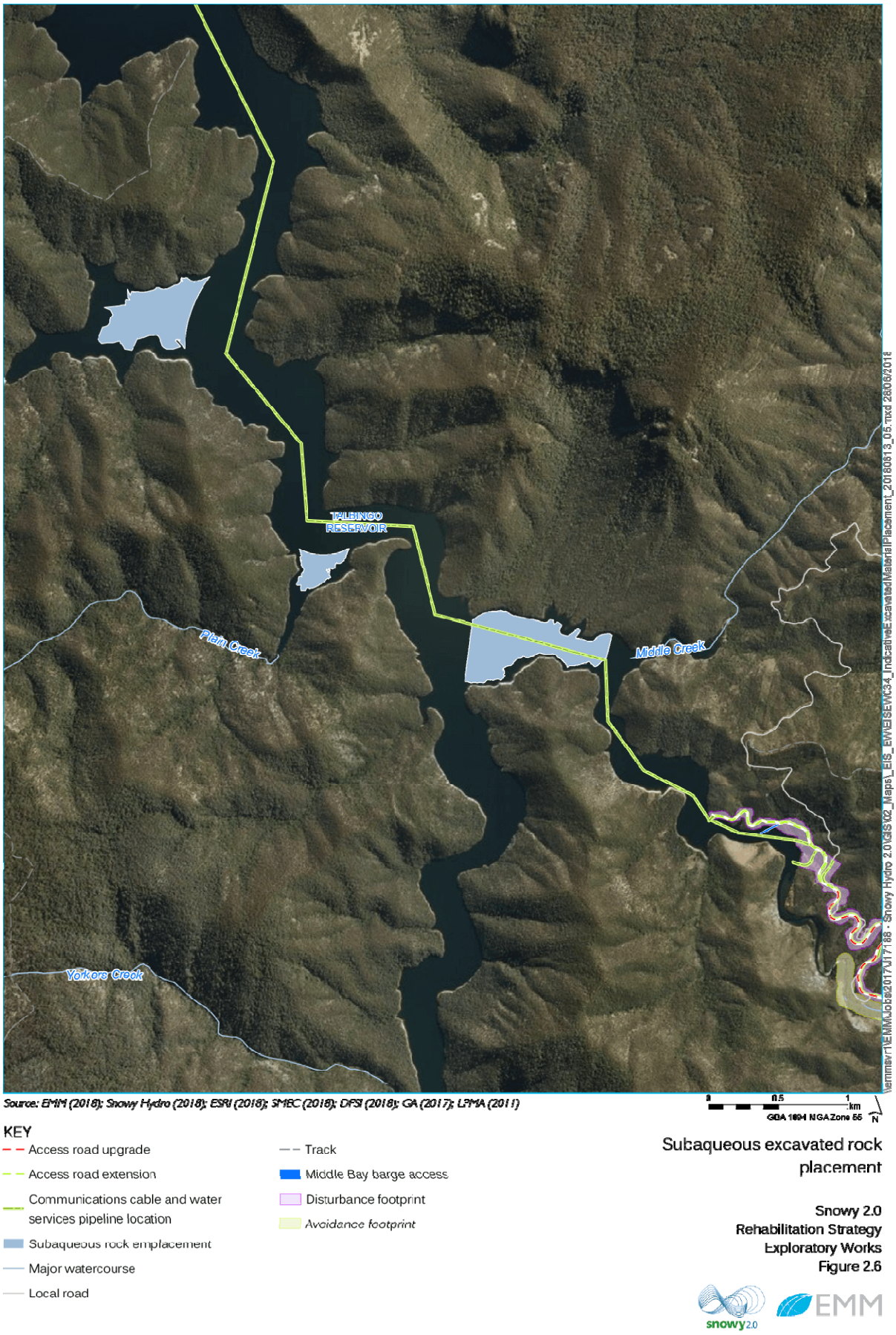
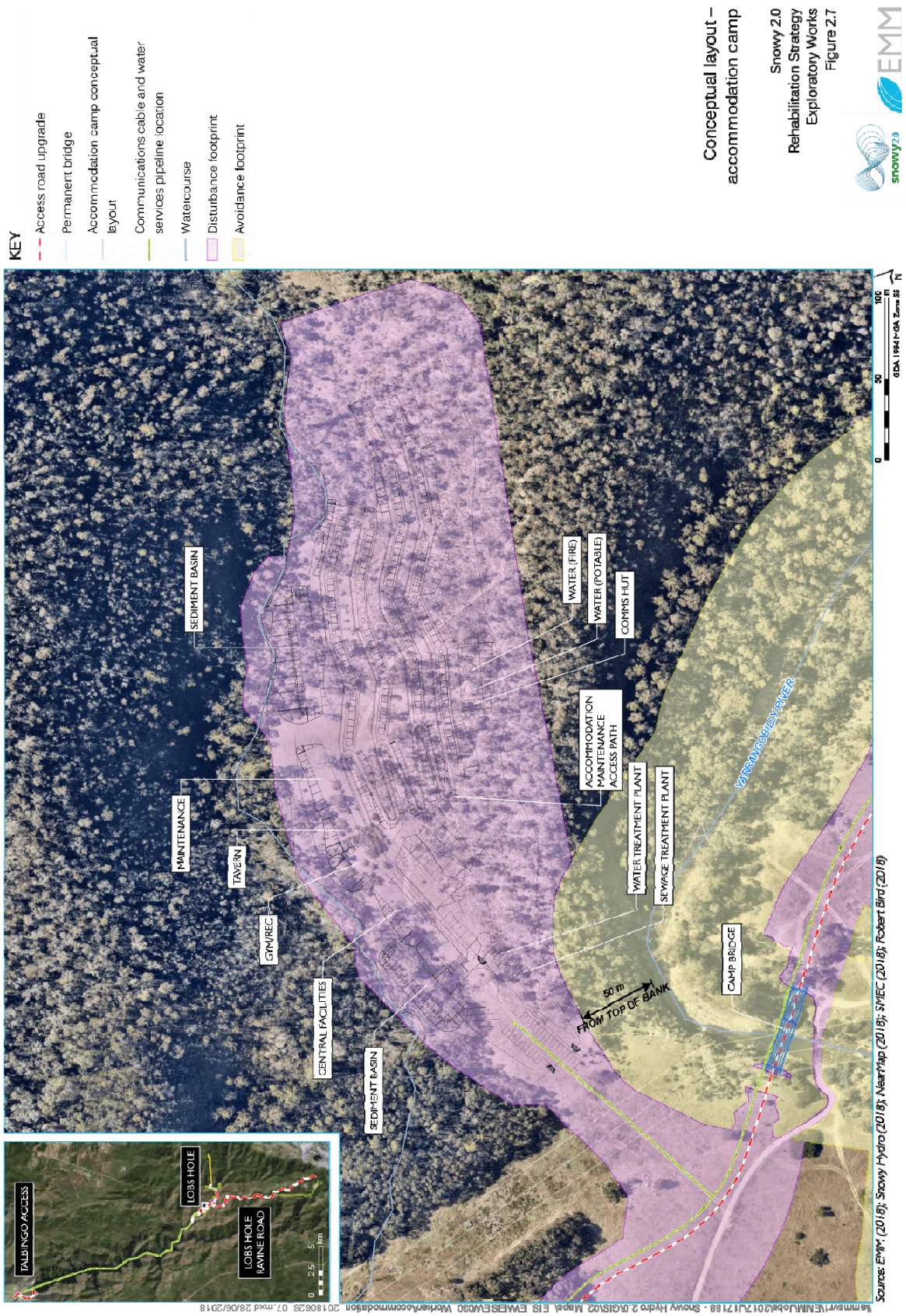


Figure 2-7 Conceptual layout – accommodation camp



2.6.1. Access road works

The access road upgrades will be designed based on access for a truck and dog trailer. The proposed road works are shown in Figure 2.8 and described in Table 2.1. It is expected that the majority of materials and equipment will travel along the Snowy Mountains Highway, Link Road and Lobs Hole Ravine Road, with some required to travel on Miles Franklin Drive via Talbingo to Talbingo Dam Wall and be transferred via a barge to site. The primary haul routes for construction material on site are provided in Figure 2.9. Where existing roads are replaced by new access roads or road upgrades, the existing roads will be removed and rehabilitated in line with the rehabilitation strategy for Exploratory Works.

Table 2.1 Access road works summary

Roadwork area	Overview
Upper Lobs Hole Ravine Road upgrade	Minor upgrades to 7.5 km section of existing road. Only single lane access will be provided. No cut and fill earthworks or vegetation clearing will be undertaken.
Lower Lobs Hole Ravine Road upgrade	Upgrades to 6 km section of existing road involving cut and fill earthworks in some sections. Only single lane access will be provided.
Lobs Hole Road upgrade	Upgrade to 7.3 km section of existing road providing two-way access.
Mine Trail Road upgrade	Upgrade to 2.2 km section of existing track to two-way access.
Mine Trail Road extension	Establishment of a new two-way road providing access to the exploratory tunnel portal.
Middle Bay Road	Establishment of a new two-way road to the proposed Middle Bay barge ramp.
Spillway Road	Upgrade of a 3 km section of existing road to provide two-way access to the proposed Spillway barge ramp.

While no cut and fill earthworks or vegetation clearing is proposed along Upper Lobs Hole Ravine Road, a laydown area is proposed within and adjacent to the existing transmission line easement. This area will be used to store materials required for the road works to the lower section of Lobs Hole Ravine Road.

2.6.2. Watercourse crossings

Bridge construction will be required at two locations as described in Table 2.2. The locations of these bridge works are shown in Figure 2.9.

Table 2.2 Watercourse crossing summary

Bridge works area	Overview
Camp bridge	An existing crossing on Yarrangobilly River will be used as a temporary crossing while a new permanent bridge is built as part of Lobs Hole Road upgrade. The existing crossing will require the crossing level to be raised with rocks to facilitate vehicle passage. The rocks used to raise the crossing level will be removed and the crossing no longer used once the permanent bridge has been constructed. The new bridge (Camp Bridge) will be a permanent crossing and used for both Exploratory Works and Snowy 2.0 main works, should it proceed.
Wallaces Creek bridge	Establishment of a new permanent bridge at Wallaces Creek as part of the Mine Trail Road extension. Establishment of this bridge will require an initial temporary pre-fabricated 'Bailey bridge' to be constructed, which will be removed before the end of Exploratory Works.

Figure 2-8 Access road upgrades and establishment

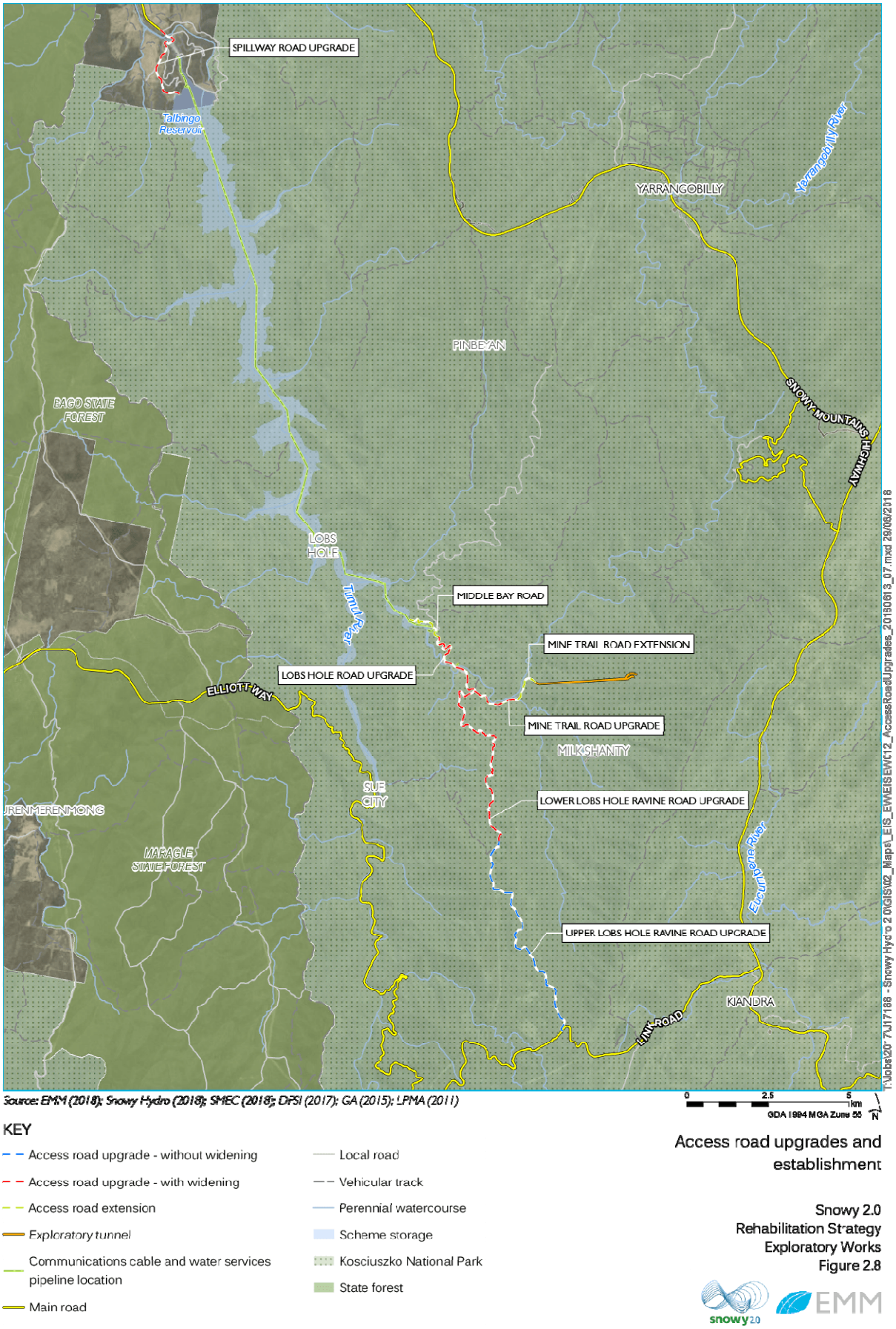
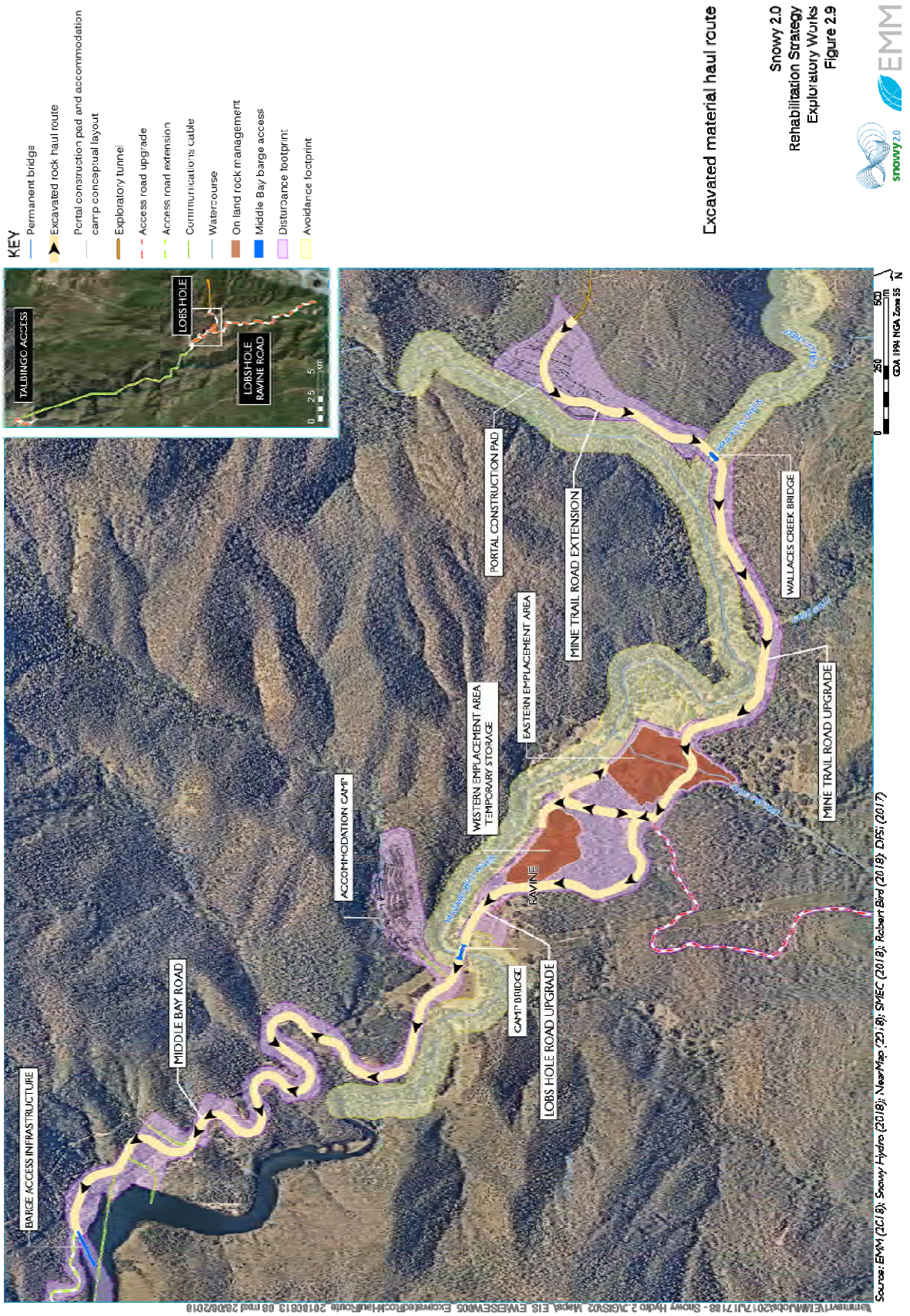


Figure 2-9 Excavated material haul route



The design for permanent bridges at both crossings will consist of steel girders with a composite deck. This is the most common type of permanent bridge constructed in and around the existing Snowy Scheme. Lightweight steel girders are easy to transport and will therefore allow for efficiencies in the construction schedule and permit the use of smaller-scale lifting equipment at the construction site.

2.7. Barge access infrastructure

To provide an alternative to road access, a barge option is proposed, not only for bulky and heavy equipments but for materials and also in case of emergency. During Exploratory Works, barges will be loaded at the northern barge ramp (Talbingo barge ramp), travel about 18 km along Talbingo Reservoir and be unloaded at the southern barge ramp (Middle Bay barge ramp) before returning to the north. Some loads may also be transported in the reverse direction.

Barge access infrastructure will comprise two dedicated barge ramps at Middle Bay and Talbingo Spillway, with a slope of approximately 1 vertical to 10 horizontal (1V: 10H) at each location. A navigation channel is also required adjacent to the Middle Bay barge ramp. Construction will involve:

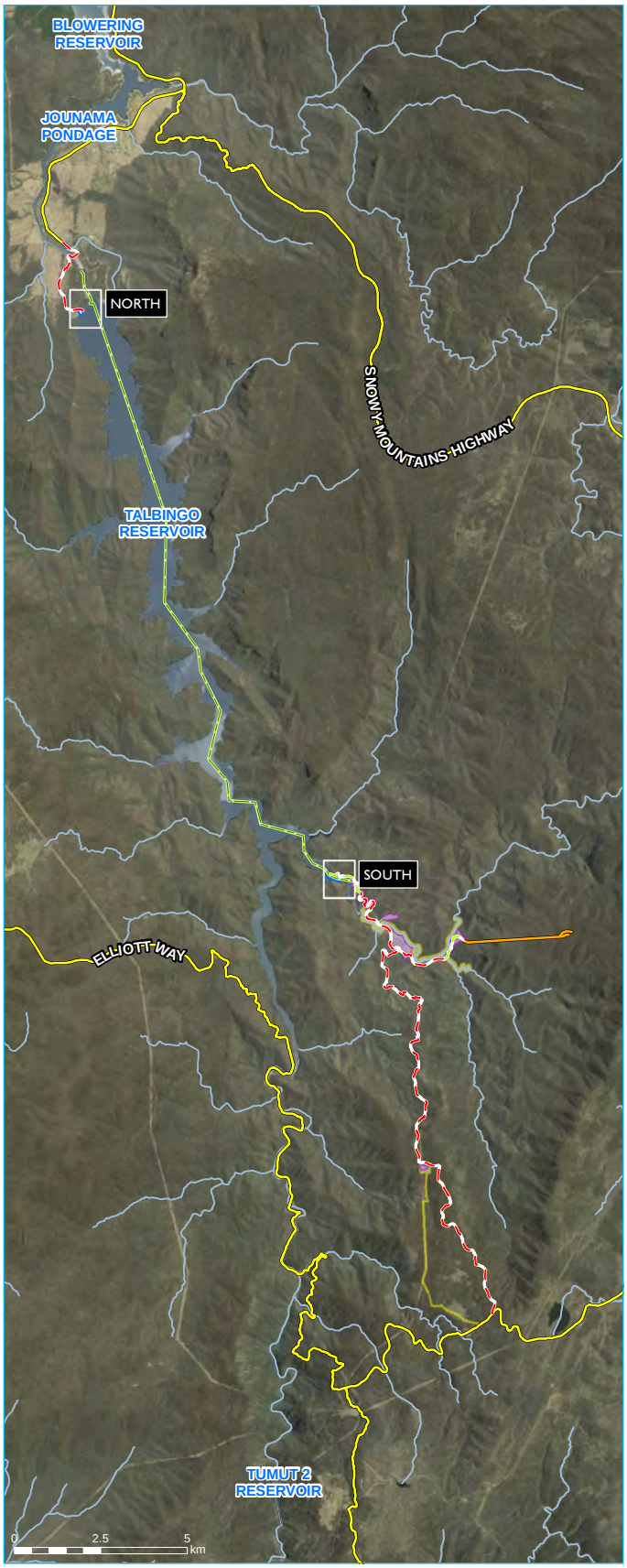
- geophysical and geotechnical investigation of the barge access area to inform detailed design;
- site establishment and excavation of barge access area;
- installation of precast concrete panels at the ramp location;
- installation of bollards for mooring lines;
- removal of trees and debris to establish a navigation channel allowing barge access; and
- minor dredging to allow barge access at the reservoir minimum operating level.

To facilitate construction, laydown areas are proposed adjacent to the Middle Bay barge ramp and adjacent to the water inlet pipeline. Laydown will also be used within the footprint of the Talbingo barge ramp.

Dredged material will be placed as part of the subaqueous placement program or within one of the designated on land rock emplacement areas. The infrastructure proposed for the Talbingo Spillway barge ramp and Middle Bay barge ramp is provided in Figure 2.10.

2.8. Services and infrastructure

Exploratory Works will require additional power and communication infrastructure. Water services are also needed and include a water services pipeline and water and waste water (sewage) treatment facilities. A summary of services required is provided at Table 2.3.



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

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KEY

- Exploratory tunnel
- Access road upgrade
- Access road extension
- Communications cable
- Main road
- Local road or track
- Perennial watercourse
- Middle Bay barge access
- Disturbance area - barge infrastructure
- Disturbance footprint
- Avoidance footprint

Barge access locations

Snowy 2.0
Rehabilitation Strategy
Exploratory Works
Figure 2.10

Table 2.3 Summary of services and infrastructure

Services infrastructure	Description
Power	Power will be provided at the portal construction pad and accommodation camp by diesel generators, with fuel storage provided at the portal construction pad.
Communication	Communication will be provided via fibre optic link. The fibre optic service has been designed to incorporate a submarine cable from Tumut 3 power station across Talbingo Reservoir to Middle Bay, and then via a buried conduit within the access roads to the accommodation camp and the portal construction pad.
Water and waste water (sewage)	A water services pipeline is proposed for the supply and discharge of water for Exploratory Works which will pump water between Talbingo Reservoir and the exploratory tunnel portal, portal construction pad and accommodation camp.
	A package water treatment plant is proposed at the accommodation camp to provide potable water to the accommodation camp and portal construction pad facilities and will be treated to a standard that complies with the Australian Drinking Water Guidelines. The accommodation camp water supply will be pumped via the water pipeline from Talbingo Reservoir at Middle Bay.
	A package waste water (sewage) treatment plant (STP) is proposed at the accommodation camp for Exploratory Works waste water. The STP will produce effluent quality comparable to standard for inland treatment facilities in the region (eg Cabramurra). Following treatment waste water will be discharged to Talbingo reservoir via the water services pipeline connecting the accommodation camp to Talbingo Reservoir.
	Waste water from the exploratory tunnel and concrete batching plant will be either re-used on site or sent to the waste water treatment plant for treatment prior to discharge.

2.9. Construction and schedule

2.9.1. Geotechnical investigation

To assist the design development for the portal construction pad, accommodation camp, Middle Bay Road, Spillway Road, and Lobs Hole Ravine Road, further survey of ground conditions is required. A program of geotechnical investigations including geophysical survey, construction of test pits, and borehole drilling within the disturbance footprint, will be undertaken as part of construction activities. Excavation of test pits in areas where information on relatively shallow subsurface profiles is required, or where bulk sampling is required for laboratory testing. Borehole drilling is required to facilitate the detailed design of cuttings, bridge foundations, retaining wall foundations, and drainage structures.

2.9.2. Construction activities

A disturbance footprint has been identified for the Exploratory Works. The extent of the disturbance footprint is shown on Figure 2.1 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 footprint are summarised in Table 2.4.

Table 2.4 Construction activities

Activity	Typical method
Geophysical and geotechnical investigation	Geophysical surveys will generally involve: • laying a geophone cable at the required location and establishing seismic holes; • blasting of explosives within seismic holes; and • in-reservoir geophysics surveys will use an air gun as the seismic source. Geotechnical surveys will generally involve: • establishing a drill pad including clearing and setup of environmental controls where required; • drilling a borehole to required depth using a tracked or truck mounted drill rig; and • installing piezometers where required for future monitoring program. Geophysical and geotechnical investigation within Talbingo Reservoir will be carried out using barges and subject to environmental controls.
Site establishment for portal construction pad, accommodation camp, rock placement areas and laydown areas	Site establishment will generally involve: • identifying and flagging areas that are to be avoided during the Exploratory Works period; • clearing of vegetation within the disturbance footprint, typically using chainsaws, bulldozers and excavators; • civil earthworks to create a stable and level area suitable for establishment. This will involve a cut and fill approach where required to minimise the requirement for imported material; • installing site drainage, soil erosion and other permanent environmental controls where required; • surface finishing, compacting only existing material where possible, or importing additional material. Where suitable, this material will be sourced locally (eg from upgrade works to Lobs Hole Ravine Road); and • set up and commissioning of supporting infrastructure, including survey marks.
Road works	Upgrades of existing tracks (no widening) will generally involve: • identifying and flagging areas that are to be avoided during the Exploratory Works period; and • removing high points, infilling scours, levelling of rutting, and compacting surfaces. Extension or widening of existing tracks will generally involve: • identifying and flagging areas that are to be avoided during the Exploratory Works period; • installing site drainage, soil erosion and other permanent environmental controls where required; • clearing and earthworks within the disturbance footprint; and • placing road pavement material on the roadway.
Bridge works	Establishment of permanent bridges will generally involve: • installing erosion and sedimentation controls around watercourses and installing scour protection as required; • establishing temporary diversions within the watercourse where required, including work to maintain fish passage; • establishing temporary bridges to facilitate permanent bridge construction; • constructing permanent bridges including piling, establishment of abutments and piers; and • removal and rehabilitation of temporary bridges and diversions.
Barge access works	Establishment of barge access infrastructure will generally involve: • installing sediment controls; • excavating and dredging of barge ramp area and navigation channel; • installing precast concrete planks and bollards; and • set up and commissioning of supporting infrastructure.

Table 2.4 Construction activities

Activity	Typical method
Exploratory tunnel construction	The drill and blast excavation process will be repeated cyclically throughout the tunnelling works, involving: • marking up and drilling blast holes in a predetermined pattern in the working face of the tunnel; • loading the blast holes with explosives, attaching detonators and connecting the holes into a blast sequence, and detonating the blast; • ventilating the tunnel to remove blast fumes and dust; • removing blasted rock; • scaling and wash down of the tunnel roof and walls to remove loosened pieces of rock; • geological mapping of the exposed rock faces and classification of the conditions to determine suitable ground support systems for installation; • installing ground support; and • advancing construction ventilation ducting and other utilities including power, water, compressed air and communications.

2.9.3. Ancillary construction areas

Ancillary facilities and laydown areas have been identified within the conceptual layout for the portal construction pad and accommodation camp. A number of other indicative construction and laydown areas have also been identified to support Exploratory Works. A summary of these sites are:

- Upper Lobs Hole Ravine Road laydown area;
- rock emplacement area laydown, storage and ancillary uses;
- barge access infrastructure laydown areas at Talbingo and Middle Bay; and
- other minor laydown areas as needed during site establishment of watercourse crossings.

All laydown areas are within the disturbance footprint identified for Exploratory Works.

In addition, an area near Camp Bridge has been identified to be used for a plant nursery and organic stockpile area.

2.9.4. Construction workforce requirements

2.9.4.1. *Staffing levels*

It is currently expected that workforce for Exploratory Works will be approximately 200 people in total at peak construction. Workers are anticipated to work a 'swing' shift, for example two weeks on and one week off. These workers will be accommodated within the accommodation camp at Lobs Hole when rostered on.

The majority of the workforce will work on a fly-in fly-out and drive-in drive-out basis. It is expected that the majority of workers will fly in and out of either Cooma Airport or Canberra Airport and then travel to site via bus.

During construction of the accommodation camp, workers will be accommodated at Cabramurra. Some workers may also be accommodated at Snowy Hydro existing accommodation units at Talbingo during construction of the Talbingo barge ramp. No accommodation will be required outside of Cabramurra, the construction accommodation camp or Talbingo for the Exploratory Works workforce.

2.9.4.2. *Hours of operation*

It is expected that construction of the exploratory tunnel and haulage of rock material between the tunnel and excavated rock stockpile locations at Lobs Hole will be 24 hours a day, seven days a week for the duration of the tunnel drilling and blasting operation. Other construction activities, including the establishment works, road and infrastructure works, will normally work a 12 hour day, seven days a week.

The transport of materials along the haul route from Snowy Mountains Highway, Link Road and Upper Lobs Hole Ravine Road will only occur during day time hours (except during emergency), to avoid impacts to threatened species (Smoky Mouse). Transport by barge will be 24 hours a day, seven days a week.

2.9.5. Timing and staging

Exploratory Works are expected to occur over approximately 34 months, with the exploratory tunnel expected to be completed by late 2021.

It is expected that the construction works will be completed largely in parallel. However, road and access works are expected to be completed within the first six months from commencement. The proposed staging of construction activities is highlighted in Table 2.5.

Table 2.5 Indicative staging of construction

Construction works	2018	2019	2020	2021
Access roads				
Portal construction pad				
Accommodation camp				
Services infrastructure				
Barge access infrastructure				
Tunnelling				
Excavated rock management				

2.10. Site rehabilitation

All Exploratory Works align with components of the main works for Snowy 2.0. However, should Snowy 2.0 not progress, the project area will need to be rehabilitated, and project elements decommissioned in consultation with NPWS. Anticipated rehabilitation activities are summarised in Table 2.6.

Table 2.6 Planned Exploratory Works rehabilitation activities

Exploratory Works element	Indicative rehabilitation activities
Exploratory tunnel	Tunnel to remain open, and allowed to flood in lower portion provided groundwater impacts are negated.
Exploratory tunnel portal area	Permanent portal facade to be constructed, portal to be sealed from entry.
Portal construction pad and associated infrastructure	To be demobilised and all infrastructure removed. Site to be revegetated and returned to “original state”.
Excavated rock emplacement areas	Emplaced excavated rock in the western emplacement area to be removed offsite and area to be revegetated and returned to “original state”. The eastern emplacement area could remain in-situ and the landform rehabilitated as agreed with NPWS.
Accommodation camp	To be demobilised and all infrastructure removed. Site to be revegetated and returned to “original state”.
Road access works	No remediation required as works are to be designed to be permanent.
Barge access infrastructure	No remediation works required as wharf and loading ramps are designed as permanent. Wharf can be removed if desired.
Services and infrastructure	To be demobilised and all infrastructure removed. Site to be revegetated and returned to “original state”.

2.11. Decommissioning

Should Snowy 2.0 not proceed following the commencement or completion of Exploratory Works, elements constructed are able to be decommissioned and areas rehabilitated. Given works are within KNP, Snow Hydro will liaise closely with NPWS to determine the extent of decommissioning and types of rehabilitation to be undertaken. This approach will be taken to ensure that decommissioning allows for integration with future planned recreational use of these areas and to maintain the values of KNP.

3. Rehabilitation Strategy

3.1. Overview

The Rehabilitation Strategy) forms part of the overarching management framework for Exploratory Works. The strategy provides the framework and high-level objectives of rehabilitation for Exploratory Works through the sharing of a body of knowledge generated from best practice, experience and preceding strategies to effectively plan and manage rehabilitation performance.

The strategy provides guiding principles and typical solutions to environmental issues requiring management and as prescribed by relevant authorities, stakeholders and internal risk management processes.

Importantly the strategy does not provide the level of detail to prescribe all treatments for rehabilitation within Exploratory Works. Its purpose is to provide guidance to the contractor and should be read in conjunction with more specialised references covering: flora and fauna, revegetation, restoration ecology, soil assessment and survey and monitoring program design that will be required under the conditions of consent for Exploratory Works.

It is to be read in conjunction with the 'Australian Alps Rehabilitation Manual' (NSW DECC for NPWS, 2007) and 'Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park' (Good, R. [Australian Alps Liaison Committee], 2006), to ensure that an ecological approach to rehabilitation is applied consistently across the Australian Alps. (Refer to section 7.1 Landscape Management Plan and related Sub-plans, Figure 3-1).

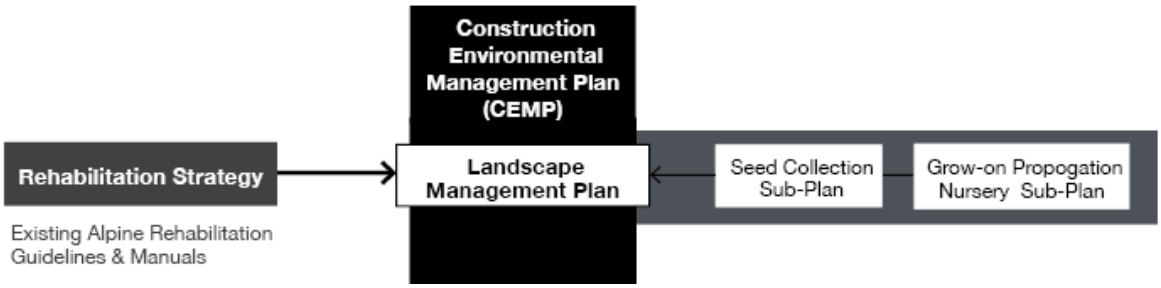


Figure 3-1 Position of Rehabilitation Strategy within Management Plans

3.2. Aims

The Exploratory Works comprises a large and complex re-vegetation and rehabilitation project undertaken within a sensitive National Park. All new landscape rehabilitation works will require site specific and focused design, construction and maintenance requirements.

All phases of Exploratory Works will aim to establish and execute a rehabilitation methodology that sets an example for rehabilitation practice within large infrastructure projects.

The landscape and rehabilitation works within this Project are to leave a project legacy that enables Exploratory Works to co-exist within KNP and maintains its values.

3.3. Rehabilitation Principles

The Exploratory Works is a large infrastructure project in the KNP, an environment diverse with flora and fauna and also fragile. Key rehabilitation principles have been established to rehabilitate disturbed areas from impacts of Exploratory Works and its potential changes to the park's character and habitats. These include:

- Preserve the KNP's natural assets and values;
- Agree on future land use and consider long-term site management;
- Minimise construction impacts wherever possible through planning of access areas and no-go zones;
- Establish processes prior to construction works to enable organic matter to be used in revegetation and ongoing rehabilitation during the construction works phase;
- Establish appropriate treatments for minimisation of runoff into waterways;
- Protect existing native fauna and their habitats including the Smoky Mouse and Booroolong Frog, critically endangered and endangered under Commonwealth legislation, respectively;
- Rehabilitate disturbed areas to their pre-existing state at completion of construction activity in consultation with NPWS; and
- Minimise visual impact of construction works from significant public viewpoints.

3.4. Rehabilitation Method

There are four rehabilitation phases (refer to Figure 3-2 below), to be implemented during works, rather than attempting to rehabilitate a site once construction has ceased. These are:

- Pre-development planning and design;
- Site preparation;
- Rehabilitation; and
- Maintenance.

Rehabilitation is to be considered during all project construction phases from design and site preparation, through to stabilisation and revegetation. Slopes must be stabilised to mitigate erosion or sedimentation runoff within weeks of construction works, which would present far larger works if left to degrade.

Planning of rehabilitation prior to 'first dig' is imperative to utilise organic resources within the site, disturbed by construction works. This phase will also incorporate propagation periods for particular species as this will inform timing for when seeds or cuttings can be taken. Consideration of weather conditions within the sub-Alpine environment will also be carried out as this will inform the timing for establishment of plants. Some areas of Exploratory Works experience snow cover or experience freezing conditions during winter months.

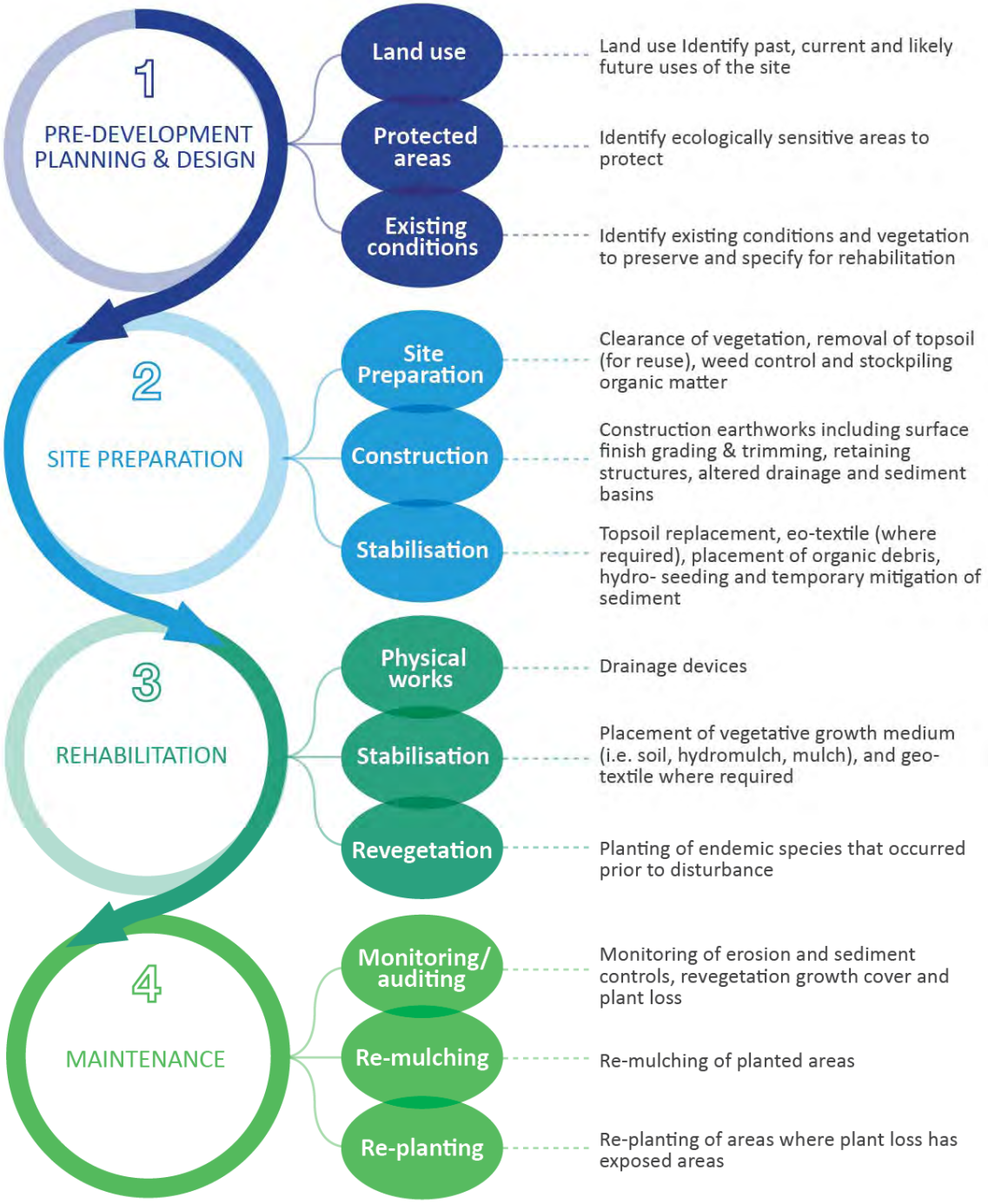


Figure 3-2 Rehabilitation methodology diagram

Source: *adapted from 'Indicative timing for rehabilitation' in: Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park by Department of Environment and Climate Change NSW*

4. Pre-development planning and design

Given the complexities of the Exploratory Works, the design and construction methods were planned with the underpinning principles of avoiding and minimising environmental impacts and ground disturbance where possible. The challenges for the design team included the need to develop solutions that balanced the need for ensuring a safe working environment for the construction of the Exploratory Works and the safe movement of plant, equipment, materials and workforce across the site with the need to preserve and protect the values of the KNP and the environmental constraints of the location.

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

The core elements of the pre-development planning and design stage are:

- identify past, current and potential future land uses for the Exploratory Works area;
- identify ecologically sensitive areas to protect (for example, the riparian zone of the Yarrangobilly River); and
- identify existing conditions and vegetation to preserve and specify for rehabilitation.

5. Site preparation

5.1. Pre-construction rehabilitation works

Prior to, or during the initial phases of construction, the construction sites will be assessed on their condition. Sites free of weeds or contaminated materials (i.e. metals) will be cleared of organic material for reuse in rehabilitation. Weeds will be eradicated where possible to stop their spread. It is preferable to leave any other pre-existing contaminated material in place or buried. Treatment of contaminated material will be covered in a Contamination Land Management Plan prepared as a requirement of the conditions of approval for Exploratory Works.

Pre-construction rehabilitation works for the Exploratory Works will include:

- Collection of indigenous/native seed and alpine sods1 for propagation (required timing Jan-April);
- Establish an indigenous/native plant nursery within Lobs Hole (needs to be similar climatic conditions), to establish tube stock for revegetation; and
- Collect and stockpile organic matter from construction cuts and clearances (within Lobs Hole or closer to clearance/cut location), including topsoil, woodchip (from removed vegetation [not including weedy species]) and organic matter for use in rehabilitation (i.e. tree canopy branches).
- To minimise the extent of the impact of the works, access routes for vehicles and machinery should be clearly defined.

5.1.1. Yarrangobilly River buffer zone

The Yarrangobilly River environs is sensitive as it contains the endangered Booroolong Frog as well as is likely to contain sub-surface Aboriginal heritage items. The Yarrangobilly River 50 m buffer zone within Lobs Hole is already a degraded area due to historic and regular camping use, causing compaction and the presence of weeds(including Blackberry and St Johns Wort). This buffer zone is to be protected during construction

5.2. Clearance and collection of organic material

Organic Material

Prior to undertaking vegetation clearing, the extent of reusable woody organic material in any given area (vegetation type suitability dependant) will be identified. The consideration of topsoil retention and avoidance of soil compaction in areas to undergo vegetation removal is a vital factor in rehabilitation.

Cleared organic material to be retained for reuse in any approved landscape treatment includes, but are not limited to:

- Any large tree trunks or woody branches (>50-100 min dia.) in lengths appropriate for use in landscape benching, wind row and general landscape habitat placement;
- Organic woody material suitable for site-sourced mulch; and
- Tree canopies (branches and leaves [native species only]).

[1] Sods of surface soil and intact vegetation bound by roots.

Organic materials will be stockpiled within a designated area (either within Lobs Hole or closer to clearance/cut locations);

Topsoil

The most important source of organic materials and plants for rehabilitation is the site's topsoil. For rehabilitation of large areas to succeed, topsoil must be protected and reused to re-establish vegetation cover over large areas.

Topsoil will be stripped progressively in a staged manner that follows construction of the camp, access road, portal area and other areas disturbed by construction activity. Topsoil will be stripped to a depth of 200mm or as directed on site by the Superintendent to ensure all topsoil is removed and stockpiled for reuse.

All available and tested suitable topsoil shall be stripped to the requirements as per the overarching Construction Environmental Management Plan (CEMP) for re-use to landscape planting and rehabilitation areas. Suitable topsoil should be identified through the following steps:

- Identify soil resources and stripping guidelines;
- Before use for vegetation, screen or sort the topsoil to remove stumps, roots, clay lumps or stones greater than 50 mm in size;
- Basic soil tests should be conducted to indicate suitability for plant growth on site as well as likelihood of erosion.

Stockpiling vegetative materials

Stockpiling of organic material and topsoil for Exploratory Works will occur within a nominated location within the north-western portion of Lobs Hole south of Lobs Hole Road, or an area closer to clearance/cut locations deemed appropriate for temporary stockpiling by the site superintendent.

Considerations for stockpiles are:

- Take appropriate measures to protect existing surfaces from scouring prior to placement of stockpiles;
- Separate topsoil by its geological characteristics or area it was sourced from;
- Stockpiles should be temporary and reused as soon as possible for rehabilitation and revegetation areas;
- Securely cover stockpiles that are likely to be untouched for a period of time to reduce dust emissions, movement of materials and run-off;
- Stabilised and protect stockpiles from being blown away through soil bunds around the base of stockpile areas;
- Put sediment and run-off control measures in place of stockpile run-off;
- Contaminated soil or soil located within weedy areas shall not be stripped and stockpiled;
- Stockpiles must be a maximum height of 2.5 m; and
- Test internal temperature of mulch stockpiles to ensure that it does not reach above 60° C. Reduce risk of combustion by placing holes throughout stockpiles to allow air flow.

5.3. Collection and propagation of plant species

The Snowy region[2] contains more than half the area of Australia's alpine habitat. The sub-Alpine and Alpine zones support highly significant vegetation communities, flora and fauna species and geological features. Rehabilitation works must consider and protect these existing values.

Plant species appropriate for use in any rehabilitation area are those relevant to the Plant Community Type (PCT) mapped for the area. A variety of species are to be used and monocultures avoided. Non-native, exotic or weedy species are not to be used in any areas of KNP. In some instances, a sterile, fast-colonising grass may be used to stabilise slopes quickly if insufficient tubestock and organic material is available when rehabilitation is required, or in areas such as Asset Protection Zones (APZ's), or maintenance buffers. The species selected for rehabilitation of an area need to be easily propagated locally and able to establish with minimal maintenance.

5.3.1. Seed collection

Seed may be collected from within KNP. There is a limited time period in which seeds can be collected. Refer to Table 6-1 for an indicative timeline for rehabilitation timing.

A Plant Schedule listing appropriate species for use in rehabilitation has been developed and is attached in Appendix A. This has been sorted by PCT and by areas requiring specific plant species (i.e. ephemeral plants for swales or sediment basins).

- Seeds, sods or cuttings are to be collected; and
- Colonising species 3are preferred.

5.3.2. Site nursery

To supply the plant material sufficient for rehabilitation, a grow-on indigenous/native plant nursery/s and a holding nursery/s (for hardening-off tubestock) will be established and appropriately managed in an area of similar climatic conditions to where tubestock will be planted.

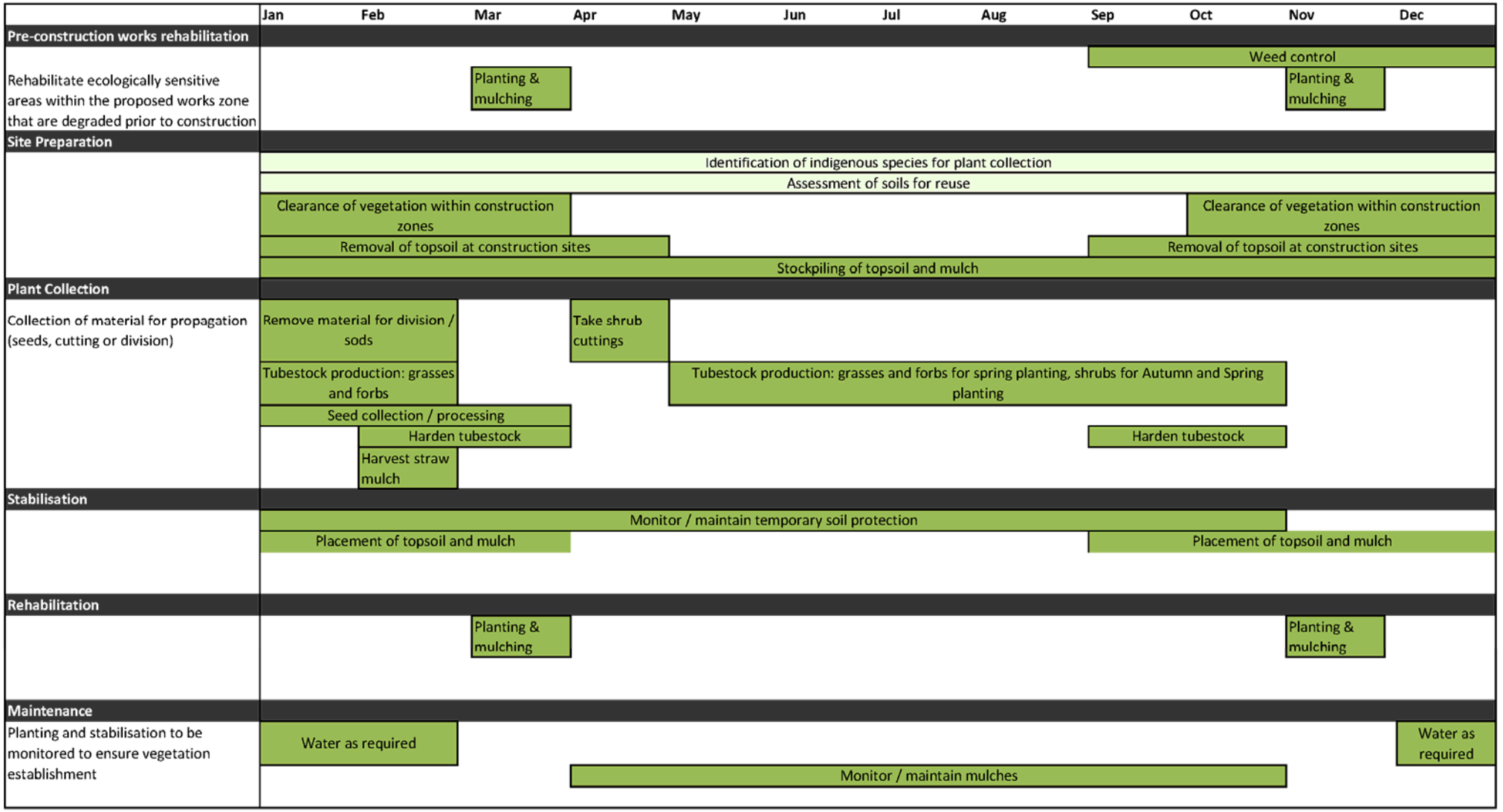
An on-site hardening-off nursery and associated infrastructure is to be set up within the nominated area within Lobs Hole.

Appropriate care and maintenance is required within the nurseries to maximise the propagation of seeds and cuttings.

[2] Interim Biogeographical Regionalisation for Australia (IBRA): Australian Alps sub-region refer https://environment.gov.au/land/nrs/science/ibra/ibra7-codes

[3] Plant species that establish quickly, shelter other plants and will spread to other areas (typically by seed dispersal).

Table 5-1 Indicative Rehabilitation timeline



6. Stabilisation

Slope stabilisation and replacement of organic matter to support revegetation will be undertaken within a short time period (weeks) of construction works occurring (refer Table 6-1).

As construction cuts are occurring, a geological engineer or engineering geologist shall determine the stability of the rock material and the best technique of stabilising this at the proposed finished batter grades, to avoid erosion. Techniques for batter stabilisation are described in sections 6.2.1 to 6.2.4.

Batters at lower risk of erosion can be left to regenerate naturally with the assistance of replacement organic matter where required.

The rehabilitation works required alongside construction works include:

- Rolling rehabilitation during construction to stabilise slopes, and preparation of sites for revegetation (placement of organic matter and jute matting if required);
- Mitigation of sediment runoff from spoil stockpiles and construction works including planting within swales and use of coir logs for sediment traps;
- Hydroseeding soil slopes to assist stabilisation; and
- Planting of higher risk slopes (only in spring or early autumn where plants have better chance of survival).

Complete work progressively within the following time frames:

Table 6-1 Rehabilitation Timing

Revegetate after excavation	**Slopes / Condition**	
Within 14 days	Slopes 5H:1V or Flatter	Where earthworks requiring revegetation have been completed over an area exceeding one hectare
Within 7 days	Slopes steeper than 5H:1V	Where earthworks requiring revegetation have been completed over an area exceeding one hectare
Within 7 days	Open Drains	Revegetation

Soil erosion and sediment control measures for any area will remain in place and be maintained at least until the newly planted vegetation provides sufficient ground coverage.

6.1. Erosion control

Design of erosion and sediment controls within the Exploratory Works will be consistent with relevant standards and guidelines, as well as taking into account local alpine conditions (climate and geology) requirements. Erosion and sediment control shall be in accordance and consistent with the following standards and guidelines where applicable.

- NSW Roads and Maritime Service (RMS) standards;
- NSW Office of Environment and Heritage, Soil Conservation, Managing Urban Stormwater “Blue Book”;
- NSW Office of Environment and Heritage, Erosion and Sediment Control on unsealed roads: a field guide;

- Best Practise Erosion and Sediment Control, Appendix B, International Erosion Control Association, Australasia (2016 revision); and
- Australian Alps National Parks Rehabilitation Field Guide.

More natural erosion controls incorporating organic materials, micro water capture, and contour shaping shall be used in preference to engineered materials and controls. This is consistent with practices currently being used elsewhere within KNP.

Erosion control will be required in steeper slopes when cut and re-shaped for construction works.

Methods for stabilising slopes include:

- Revegetating to hold soils as soon as possible;
- Using a jute mesh to be attached and secured over organic rehabilitation matter (refer Figure 6-5);
- Retaining structures where slopes are steeper than 1H:1.5V and to use drainage devices to the tops of the structure to divert water flows.

6.2. Slope Design

The design of all batters within Exploratory Works must consider long-term stabilisation, with minimum maintenance and monitoring. Due to the topography of the area, it is sometimes necessary to cut steep batters. The alternative shallower cuts require a larger clearance and construction zone.

For the retention of soil to slopes as a vegetation medium, it is desired for slopes to be at a grade of 3H:1V or shallower. This should be designed into any slopes requiring cut or fill, where there is the available space. It is possible to rehabilitate steeper slopes, however temporary stabilisation measures would be required.

The following techniques are proposed for the stabilisation based on the grade of the batter.

6.2.1. *Structural stabilisation*

On a batter cut steeper than 1H:2V (refer Figure 6-1), structural reinforcement is required to stabilised the slope if the rock material is not sufficiently stable. Drainage devices must also be installed at the top and toe of these batters so that water does not undermine the structure.

Techniques may include:

- Terramesh;
- Gabion Walls;
- Shot-creting; and
- Rock-bolting.

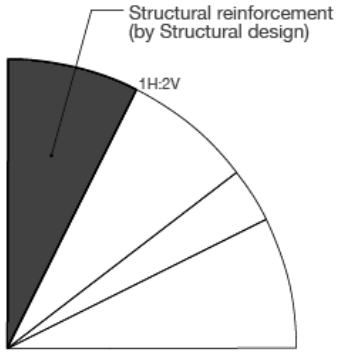
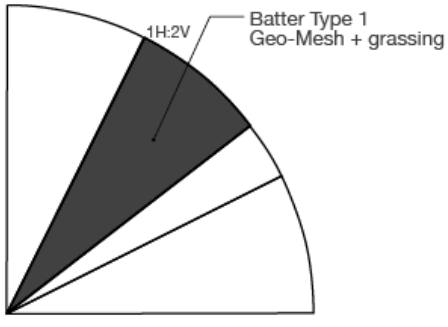


Figure 6-1 Batters steeper than 1H:2V

6.2.2. *Geo-mat stabilisation*

Where rock material is not sufficiently stable on a batter cut steeper than 1H:1.3V and shallower than 1H:2V (refer Figure 6-2), a type of geo-matting is required to (permanently) hold soil and provide a planting medium. The geo-matting (i.e. Macmat-R), is a wire mesh and plastic sheet that is regularly secured to the slope with rock dowels, retaining a soil medium containing seed.



At this grade revegetation of native grass or sterile-grass species can occur. Drainage devices are to be installed at the top and toe of these batters so that water does not undermine the structure.

Figure 6-2 Batters between 1H:2V and 1H:1.3V

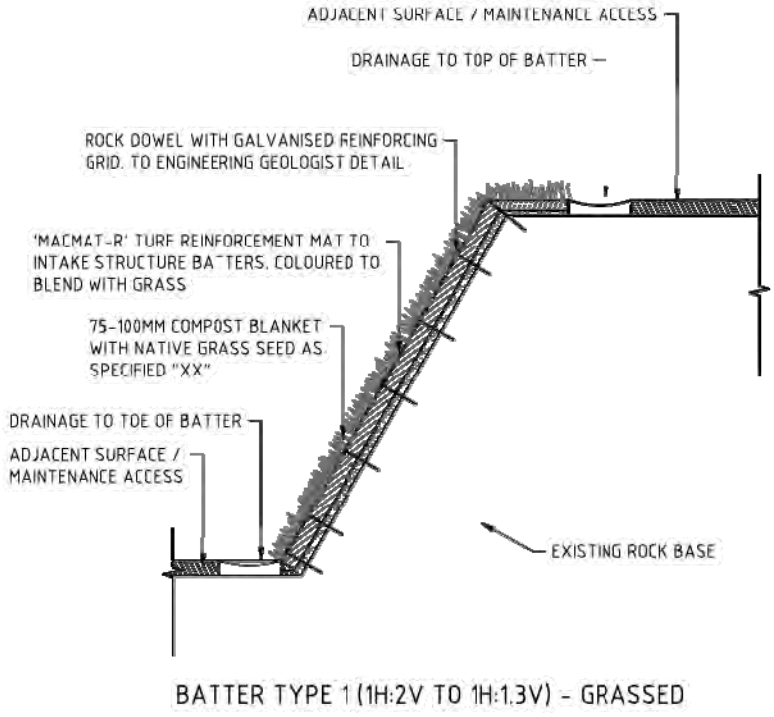


Figure 6-3 Batter type 1: Stabilised with Geo-mat and grassed

6.2.3. *Jute-mesh stabilisation*

On a batter cut steeper than 2H:1V and shallower than 1H:1.3V (refer Figure 6-4), a geotextile is required to temporarily hold soil while vegetation is established. At this grade, revegetation of native trees, shrubs and grasses can occur where there is sufficient organic material to assist in re-establishing the vegetation cover.

In areas where grassing can occur, a native or sterile species (as per landscape specifications), of grass seed can be spread in topsoil beneath the geotextile. This may be a practical solution for efficient and temporary stabilisation (in the right season for growing conditions).

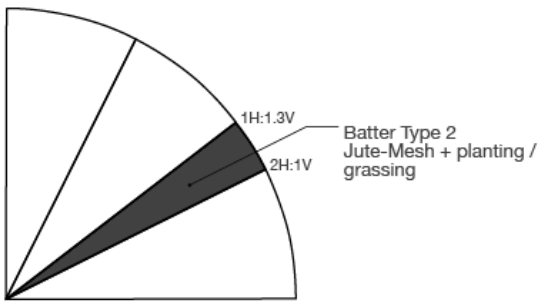


Figure 6-4 Batters between 1H:1.3V and 2H:1V

Figure 6-5 Anchoring of jute mesh to stabilise organic matter on a slope

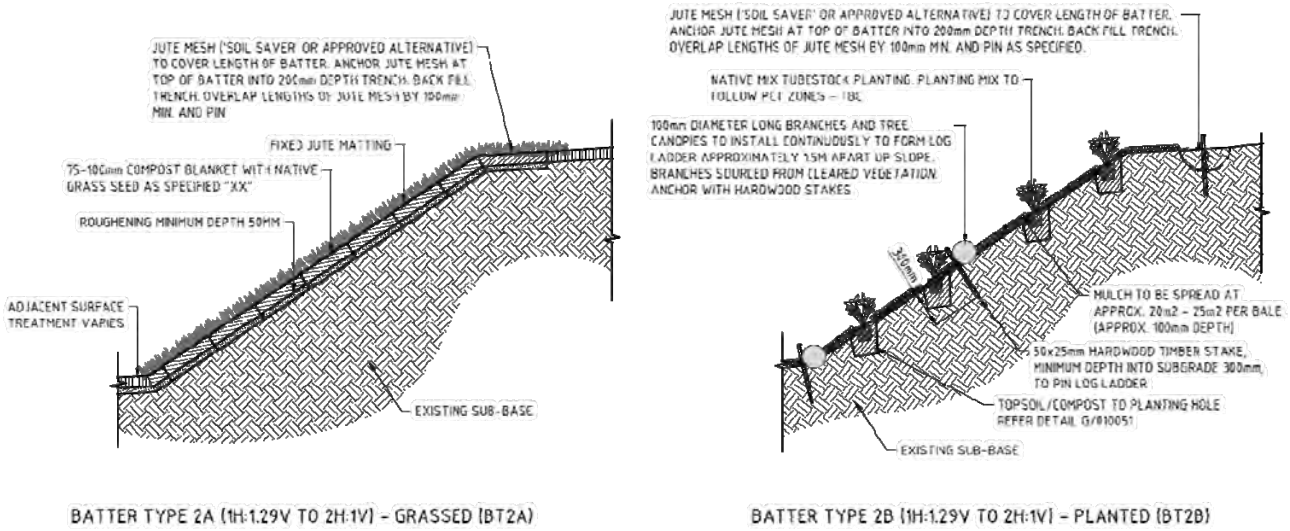


Figure 6-6 Batter type 2: Stabilised batter with jute mesh (grassed or planted)

6.2.4. *Revegetation*

On a batter cut shallower than 2H:1V (refer Figure 6-7), i.e. those with a low risk of erosion, organic materials should be placed on the slope. At this grade revegetation of native trees, shrubs and grass species can occur naturally, where there is sufficient organic material to assist in re-establishing the vegetation cover.

Alternatively, the slope can be hydromulched with a native grass seed and mulch mix which can help in establishing grass cover for stabilisation. This may be a practical solution for efficient and temporary stabilisation (in the right season for growing conditions).

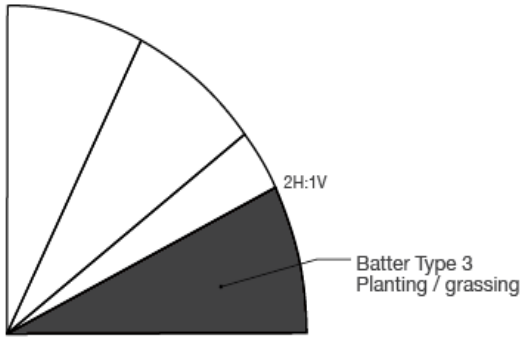


Figure 6-7 Batters shallower than 2H:1V

As a general rule for any revegetation program it is very important that the surface of the ground has a degree of 'soil surface roughness'. This basically means that there are lots of small 'catch' areas where any seed or sediment moving across a slope via wind or water is caught in the soils surface. This facilitates water infiltration into a soil profile, collects any mobile sediment and seed and supports the germination of seed.

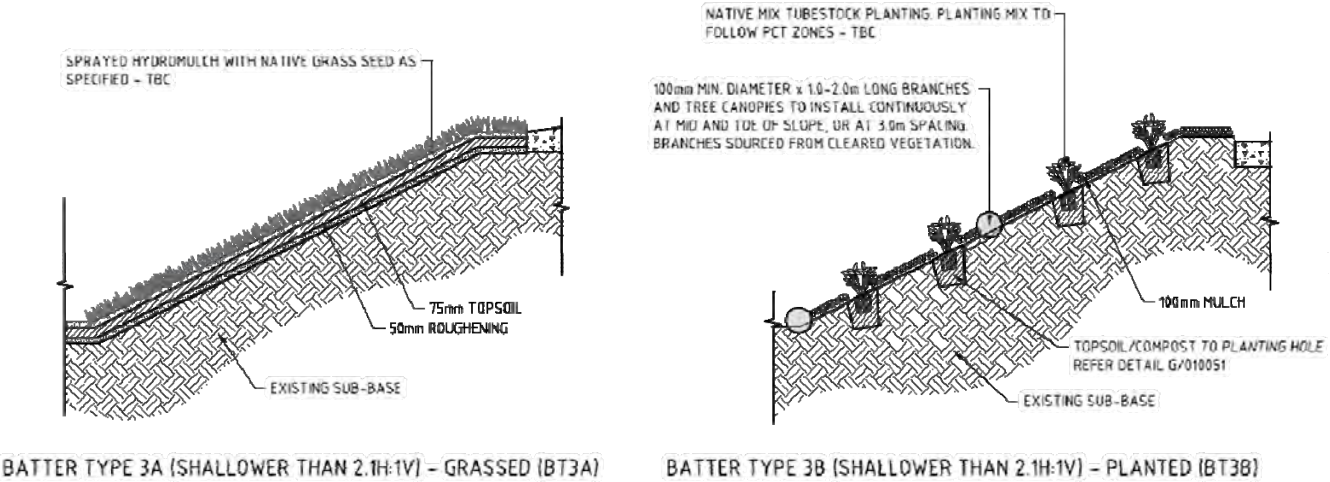


Figure 6-8 Batter type 3: Grassed or planted batter

6.3. Sediment control

Sediment control will be required where runoff could come into contact with and input sediment into existing waterways, thus contaminating them and affecting habitat for threatened species. This is especially important to mitigate in the catchment area of the Yarrangobilly River where the Booroolong Frog has been recorded. Sediment in the creek is likely to fill between rocks and pebbles where the frog lays its eggs, and thus have a detrimental impact on breeding cycles. Several areas have been flagged as being at risk of being intercepted by sediment runoff including:

- Excavation sites;
- Access roads;
- Portal construction pad;
- Excavated rock emplacement areas;
- Organic material stockpiles;
- Construction to creeks including bridge piling;
- Spills and fire water;
- Stormwater run-off;
- Tunnel portal;
- Waste water; and
- Concrete batching plant.

Methods for mitigating sediment include the construction of:

- Swales: a small channel that conveys water from one point to another. When planted with grasses or native vegetation, swales can be positioned to collect stormwater and run-off and filter out the nutrients in water (see Figure 6-11);
- Sediment ponds: temporary open water ponds that capture coarse sediment and litter carried by stormwater. They intercept stormwater before it reaches the waterway, and slow it down to allow the coarse sediment to fall to the bottom;
- Coir/ jute logs: placement in swales to capture run-off from excavation or used on the lower side of works where water flows collect, to gravity filter larger particles of sediment;
- Coir logs or sediment bunds for use in containing sediment to close proximity of bridge pile construction zone; and
- Hay bales: placed down slope of water flows to help capture spills.

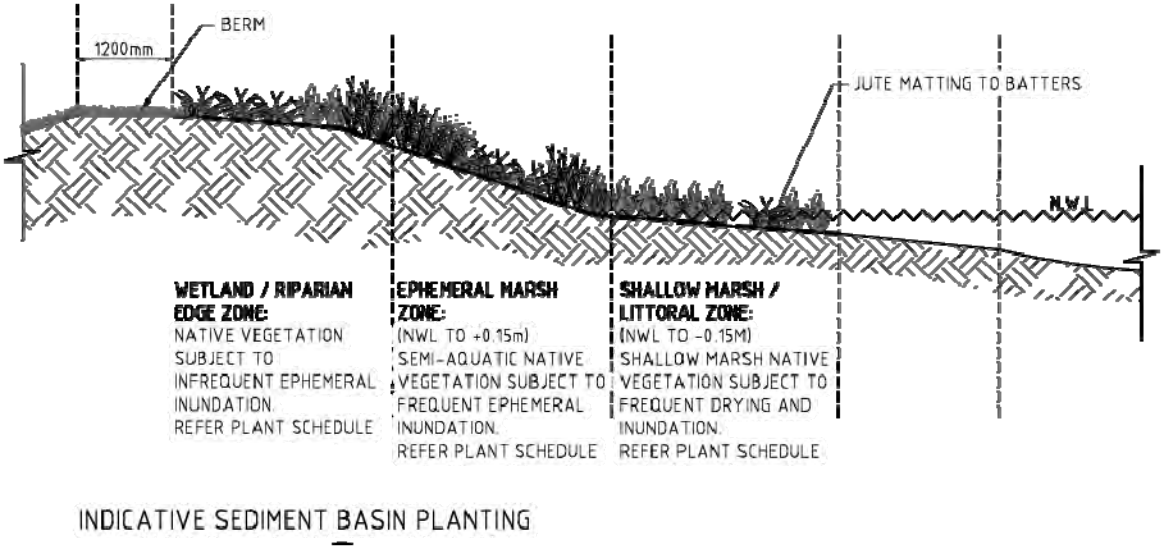


Figure 6-11 Typical section: sediment basin planting

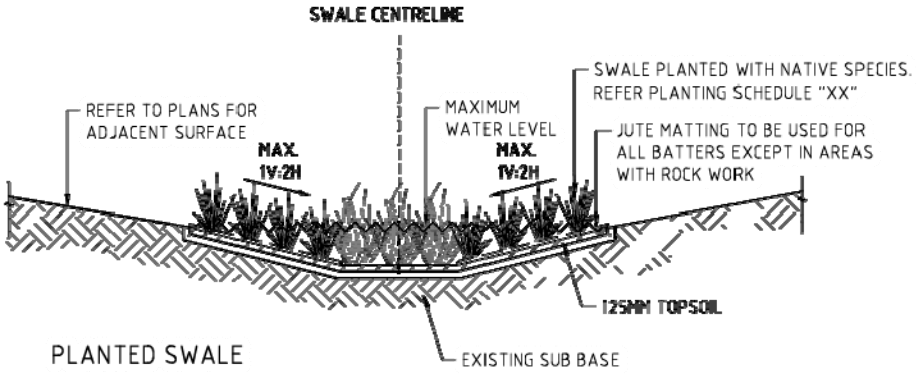


Figure 6-10 Typical section: planted swale

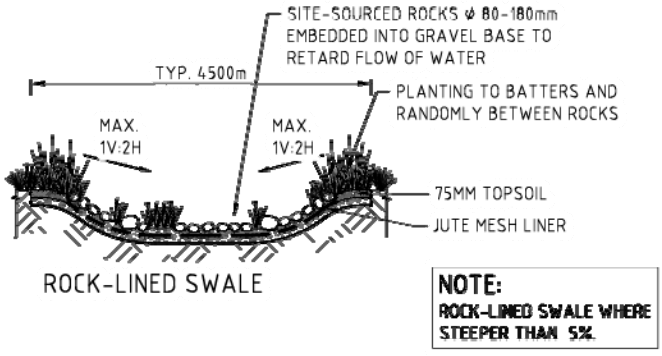


Figure 6-9 Typical section: rock-lined swale

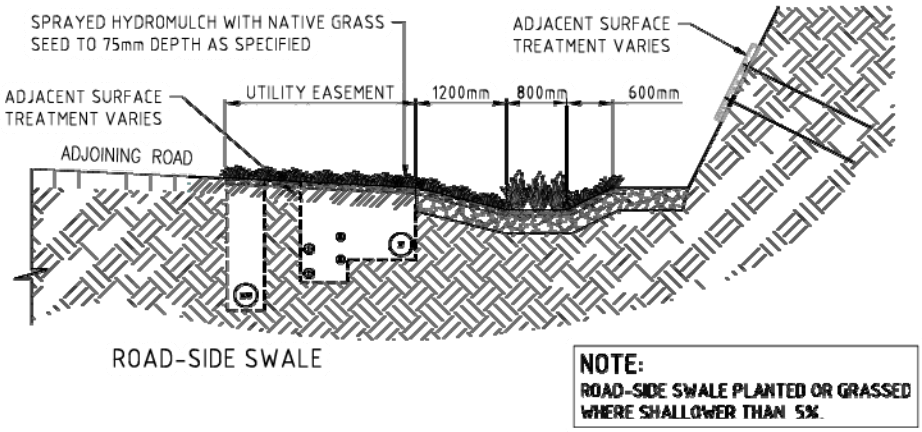


Figure 6-12 Typical road-side swale

6.4. 'Make Good'

Where a surface has been disturbed by works i.e. due to temporary stockpiling or access, this area will be rehabilitated or 'made good'. This includes the following measures:

- Remove all construction materials;
- Remove stones above 50mm diameter;
- Rip soil to depth of 200mm;
- Rehabilitate surface including placement of organic material, stabilising slopes where required, planting with native/indigenous species to match PCT zone, and maintaining to establish vegetation cover.

A rehabilitation site will be assessed as "Good" when the following criteria have been achieved:

- The landscape is stable and there are no significant losses during or after a heavy rain/high wind event;
- No Bare Ground;
- At least 70% of planted seedlings are established and are in healthy condition;
- When shade and canopy closure is occurring at least in part of a rehabilitation site. This is relevant to trees, shrubs and grasses;
- When there is 'natural' litter on the ground, i.e. leaves, bark, seed provided by the planted seedlings or from the surrounding environment;
- Recruitment of native species – either from planted seedlings or from vegetation outside of the rehabilitation area; and
- Evidence of invertebrate use and activity such as ants, saw fly, wasps etc.

7. Maintenance

To ensure that the rehabilitation works are successful, ongoing management and monitoring of sites is required. Ongoing maintenance should be in line with NPWS existing management regimes. Within the exploratory works rehabilitated sites these would include:

- Monitoring of slope stabilisation and revegetation;
- Sedimentation ponds monitoring and maintenance;
- Weed control;
- Maintaining perimeter fencing to rehabilitation areas;
- Replacement planting for seedlings that have not survived; and
- Remulching of revegetation sites (annually), until plants have sufficient mass to create their own biomass.

7.1. Landscape Management Plan and related Sub-plans

A Landscape Management Plan (LMP) will be prepared and approved prior to construction. The LMP must address as a minimum, the overall general ongoing maintenance requirements for all of the Landscape & Rehabilitation Work (L&RW) areas, a Seed Collection Sub-Plan and a Grow-On Propagation Nursery Sub-Plan.

7.1.1. General On-going Landscape Maintenance Sub-Plan

The LMP will include the particular maintenance requirements of the landscaped and rehabilitation areas during the Landscaping Maintenance Period and the organisation and maintenance methodologies to ensure compliance with the requirements of the Design & Construction Deed (D&C).

This will include and address the following:

- details on all landscape maintenance activities and actions for the Landscaping Maintenance;
- a maintenance organisation structure and responsibilities, including those of any Subcontractors;
- details on key maintenance personnel and expertise;
- details on the location of maintenance depot(s) and stockpile sites, if any;
- details on plant and equipment that is required for the maintenance activities;
- a maintenance risk management assessment;
- details on safe methods of work;
- details on handover acceptance criteria;
- inspection methods and an inspection schedule / program;
- traffic control procedures; and
- details on other key procedures, including annual maintenance planning.

7.1.2. Seed Collection Sub-Plan

Viable native propagative material (seed and cuttings) will be collected from areas within the disturbance footprint and KNP for use as tubestock propagation within the on-site Grow-On Nursery and or for external nursery use. The Seed Collection Sub-Plan must be submitted and approved as part of the LMP and address the collection intent, methodology, target species schedules, timing and storage of seed.

7.1.3. On-site Grow-On Propagation Nursery Sub-Plan

An on-site tubestock propagation and hardening off nursery and associated infrastructure will be established, operated and maintained. A Grow-On Propagation Nursery Sub-Plan will be prepared that addresses the following:

- Nursery layout and associated infrastructure that provides siting in relation to plant hardening off (that is having exposure to wind, full sun, lowered watering and other similar weather conditions that occur naturally) and propagation;
- Watering methodology and regime;
- Maintenance regime; and
- Fencing.

7.2. Tree Preservation

Any trees identified for retention during construction will be protected in accordance with the Conservation Management Plan. Any retained trees that are conflicting with L&RW areas must be identified and the Employers Representative notified of intended treatment prior to any works being undertaken.

8. Decommissioning

Exploratory Works are construction works associated with further investigations to gather technical and environmental information for Snowy 2.0. Should Snowy 2.0 not proceed following the commencement or completion of Exploratory Works, elements constructed are able to be decommissioned and areas rehabilitated. Given works are within KNP, Snow Hydro will liaise closely with NPWS to determine the extent of decommissioning and types of rehabilitation to be undertaken. This approach will be taken to ensure that decommissioning allows for integration with future planned recreational use of these areas and to maintain the values of KNP.

These activities would be documented in a Decommissioning Plan, prepared in consultation with NPWS, and would be implemented should Snowy 2.0 not proceed. Decommissioning will meet the land use objectives as determined in consultation with NPWS. Likely rehabilitation and decommissioning activities for Exploratory Works are detailed in the sections below.

8.1. Accommodation Camp

For Lobs Hole, it is intended and agreed with NPWS that future land use will remain a remote campsite, however it is acknowledged that the inclusion of access road upgrades, the accommodation camp and the excavated rock emplacement area (revegetated) within the vicinity, will change the character of the area. Rehabilitation works are to mitigate the impacts of project works and where possible, enhance native vegetation.

The proposed location of the accommodation camp will require clearance of vegetation, and cut and fill to shape the embankment for placement and access of accommodation cabins and facilities. Swales and sediment basins will be built to assist with water quality treatment.

Decommissioning of the accommodation camp and rehabilitation works required post exploratory works construction are likely to include:

- Removal of all accommodation facilities and associated infrastructure;
- Re-shaping of landform including fill to near pre-construction landform, this will focus specifically on recreating a stable and free draining landform;
- Rehabilitation of slopes through placement of organic matter and revegetation;
- Fencing and tree guards of revegetation areas to protect from grazing fauna; and
- Outlining ongoing maintenance and inspection programs to achieve the above outcomes.

Figure 8-1 (over page) indicates the typical treatment of the accommodation camp during works and rehabilitation to batters, once the camp is decommissioned in Figure 8-2.

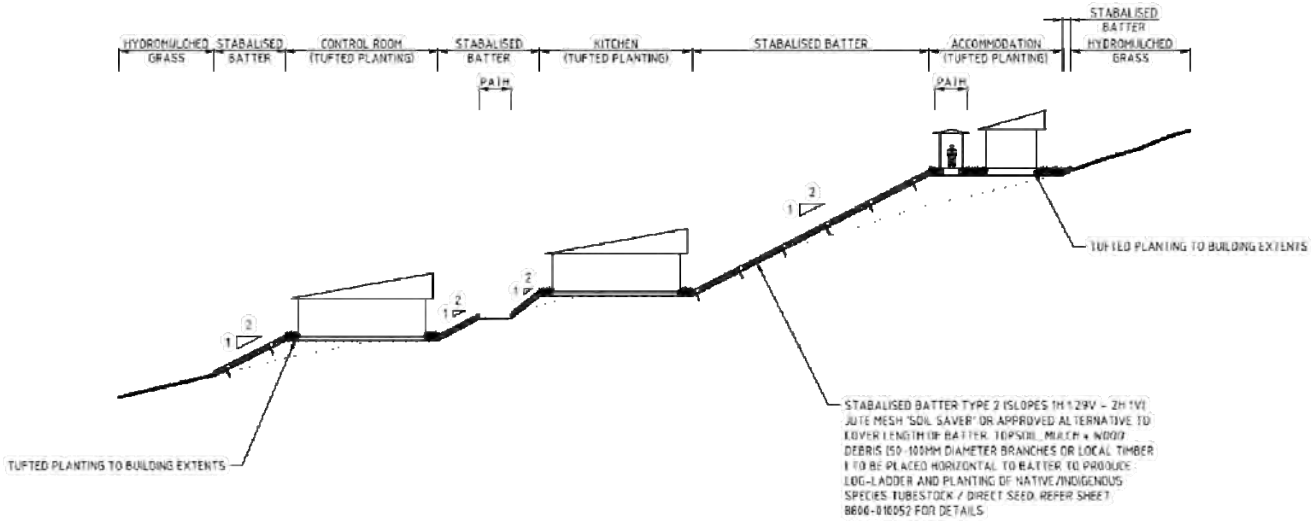


Figure 8-1 Typical sections for the accommodation camp facilities

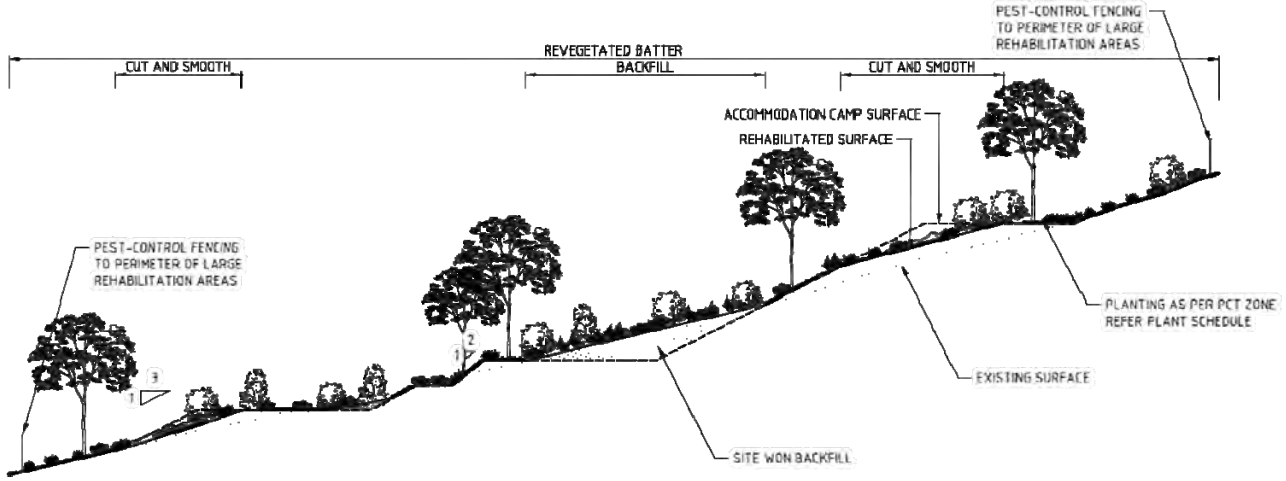


Figure 8-2 Typical section for the accommodation camp, rehabilitated when decommissioned

8.2. Construction Portal (Exploratory tunnel)

On completion of exploratory works, should the main project not proceed, the tunnel will be decommissioned and closed. Required rehabilitation measures are to return (or as near to as possible), the construction portal site to its pre-construction state.

In this area, there is a large amount of vegetation clearance and cutting into slopes required to construct the portal working platforms. Whilst the extent is large, this area is not expected to be visible from within Lobs Hole due to its location down Mine Trail and within a gully.

The rehabilitation works required post exploratory works include:

- Removal of all construction infrastructure and materials;
- Re-shaping of batters by site-sourced fill material, with batters at 3H:1V with berms (4 m min.), between each batter and to reshape to near pre-construction landform;
- Rehabilitation of fill and cleared areas through addition of organic matter and revegetation;
- Planted swales and sediment basins at the base of slope to assist in ongoing water quality treatment;
- Fencing and tree guards of revegetation areas to protect from grazing fauna; and
- Outlining ongoing maintenance and inspection programs to achieve the above outcomes.

Figure 8-3, indicates the typical treatment of the accommodation camp during works and rehabilitation to batters, once the camp is decommissioned.

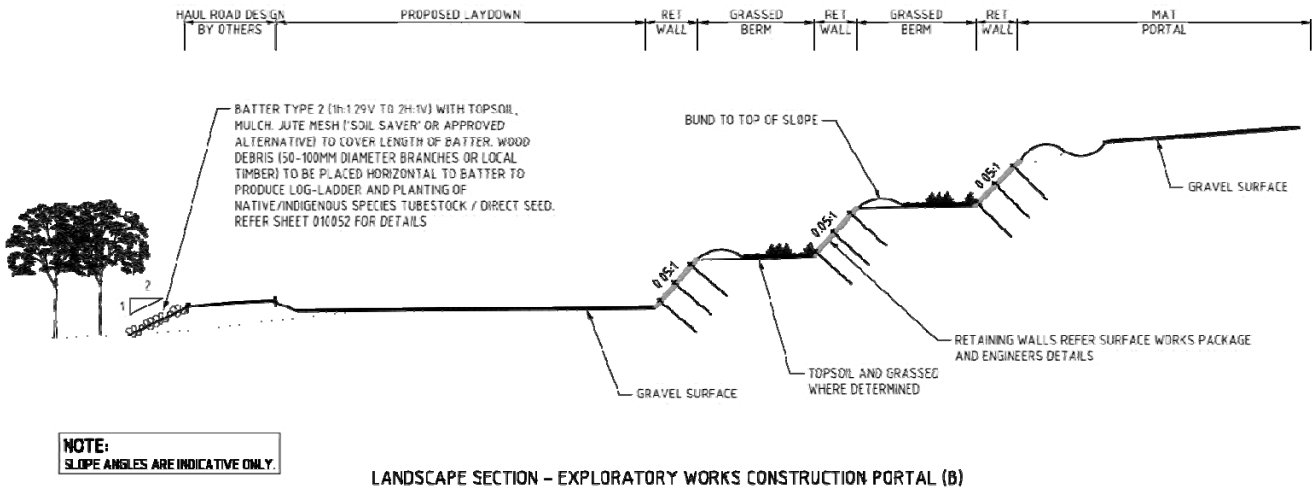


Figure 8-3 Typical section of the construction portal

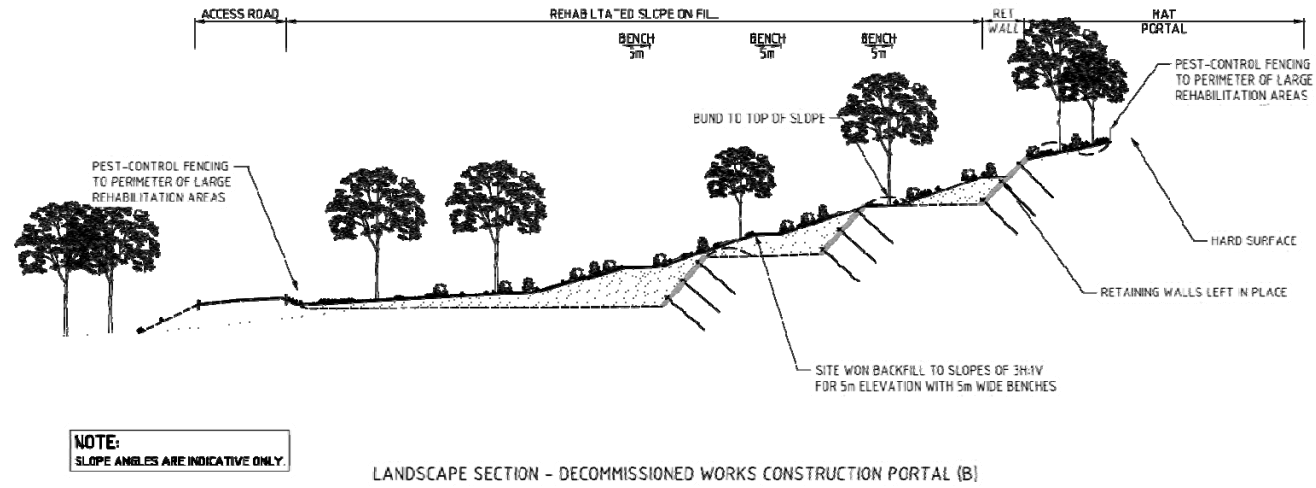


Figure 8-4 Typical section of the construction portal, rehabilitated once decommissioned

8.3. Excavated rock emplacement areas

The eastern emplacement area will remain permanently and will be shaped and revegetated to fit into the existing landform. It is possible for this to be used as a camping area, however final form and access routes will need to be designed to maintain the stability of the stockpile and its content.

The rehabilitation works required post Exploratory Works include:

- Removal of all construction infrastructure;
- Final shaping of emplacement areas including finishing surfaces;
- Rehabilitation of emplacement areas through placement of jute mesh (where required), organic matter and revegetation; and
- Fencing and tree guards of revegetation areas to protect from grazing fauna.

The design and progressive rehabilitation of the emplacement areas are detailed further in the Excavated Rock Emplacement Areas Assessment (SGME 2018).

The material from the temporary western emplacement area will be removed from Lobs Hole and disposed of as per the excavated rock management process detailed in the Exploratory Works EIS. The ground where the stockpile was placed is to be 'made good' (refer to Section 6.4).

All other temporary stockpile areas should protect the surface prior to placement, through laying of a geotextile. Once stockpiles are removed, the ground is to be 'made good'.

8.4. Access Roads

Several of the roads will be upgraded as part of Exploratory Works. Roadside vegetation planted as part of rehabilitation works, should be commensurate with existing adjacent vegetation to preserve the experience and character of driving through this unique alpine area.

Table 8-1 below lists the rehabilitation methods proposed for Exploratory Works road construction.

Table 8-1 List of Exploratory Roads and their required works

Road	Rehabilitation requirement
Lobs Hole Ravine Road	Batter stabilisation where required, revegetation of cleared areas, drainage swales & sedimentation control planting
Lobs Hole Road	
Mine Trail Road	
Middle Bay Road	
Spillway Road	

There are no 'rehabilitation' works proposed to the access roads at the end of Exploratory Works as all rehabilitation requirements are to occur within the construction phase, to stabilise slopes as soon as possible (refer Table 6-1 Rehabilitation Timing). Landscape and rehabilitation design considerations which do need to occur for access roads include:

- Minimise clearance of vegetation;
- Reuse and stockpiling of cleared organic materials;
- Stabilise cuts (refer section 6); and

- Water capture and treatment of run-off and sedimentation control (refer section 6.3);

Appendix A Plant Community Types

PLANT SCHEDULE				
PCT NO.	**STRATUM**	**SPECIES**		
P01		**Botanical name**	**Common name**	**Propagule**
Ephemeral species for swales and sediment basins		*Carex appressa*	Tall Sedge	seed/divison
		Carex fascicularis	Tassel Sedge	seed
		Carex gaudichaudiana	Fen Sedge	seed
		Lomandra confertifolia subsp. Rubifinosa	Mat Rush	seed/divison
		Lomandra filiformis subsp. Filliformis	Wattle Mat-rush	seed/divison
		Lomandra longifolia	Spiny-headed Mat-rush	seed/divison
		Phragmites australis	Common Reed	division
PCT 285		**Botanical name**	**Common name**	**Propagule**
Areas; Lobs Hole - low-lying areas (not creek line) and Ravine Road	Upper stratum	*Eucalyptus bridgesiana*	Apple Box	Seed
		Eucalyptus stellulata	Black Sally	Seed
		Eucalyptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	Seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	Seed
		Acacia melanoxylon	Blackwood	Seed
		Acacia kettlewelliae	Buffalo Wattle	Seed
		Leptospermum continentale	Prickly Teatree	Seed
		Hibbertia obtusifolia	Hoary Guinea Flower	Seed
		Cassinia aculeata	Dolly Bush	Seed
	Ground Stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Bothriochloa macra	Red Grass	seed
		Carex appressa	Tall Sedge	seed/division
		Carex fasciularis	Tassel Sedge	seed/division
		Elymus scaber var. scaber	Common Wheatgrass	seed
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Hydrocotyle laxiflora	Stinking Pennywort	seed
		Lomandra longifolia	Spiny-headed mat-rush	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Pteridium esculentum	Bracken	division
		Rubus parvifolius	Native Raspberry	cutting/layering
		Stellaria pungens	Prickly Starwort	division
		Themeda australis	Kangaroo Grass	seed
PCT 296		**Botanical name**	**Common name**	**Propagule**
Areas: Talbingo intake, Lobs Hole, MAT portal, Mine Trail, Wharf Road, Talbingo intake road, Camp Road and Marica West Trail	Upper stratum	*Eucalyptus mannifera subsp. mannifera*	Brittle Gum	Seed
		Eucalyptus dives	Broad-leaved Peppermint	Seed
		Eucalyptus macrorhyncha	Red Stringybark	Seed
		Eucalyptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	Seed
		Eucalyptus goniocalyx	Bundy	Seed
		Eucalyptus nortonii	large-flowered Bundy	Seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	Seed
		Bursaria spinosa subsp. Lasiophyulla	Native Blackthorn	seed/cutting
		Cassinia longifolia	Dolly Bush	Seed
		Correa reflexa var. reflexa	Native Fuschia	cutting
		Hibbertia obtusifolia	Hoary Guinea Flower	Seed
	Lower stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Dianella revoluta var. revoluta	Blue Flax Lily	seed/division
		Elymus scaber var. scaber	Common Wheatgrass	seed
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Joycea pallida	Silvertop Wallaby Grass	seed
		Lomandra filiformis subsp. Filliformis	Wattle Mat-rush	seed
		Luzula flaccida	Woodrush	seed
		Poa sieberiana var. sieberiana	Snowgrass	seed
		Stylidium graminfolium	Grass Triggerplant	seed

PCT 299		Botanical name	Common name	Propagule
	Upper stratum	*Eucalyptus viminalis*	Ribbon Gum	Seed
		Eucalayptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	Seed
		Eucalyptus bridgesiana	Apple Box	Seed
		Eucalyptus macrorhyncha	Red Stringybark	Seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	Seed
		Acacia melanoxylon	Blackwood	Seed
		Cassinia aculeata	Dolly Bush	Seed
	Lower stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
: Mine Trail & MAT p		*Carex appressa*	Tall Sedge	seed/division
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Hydrocotyle laxiflora	Stinking Pennywort	seed
		Luzula flaccida	Pale Wood-rush	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Pteridium esculentum	Bracken	division
		Stellaria pungens	Prickly Starwort	division
		Viola betonicifolia	Native Violet	seed

PCT 300		Botanical name	Common name	Propagule
	Upper stratum	*Eucalyptus viminalis*	Ribbon Gum	seed
		Eucalayptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	seed
		Eucalyptus dives	Broad-leaved Peppermint	seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	seed
		Acacia melanoxylon	Blackwood	seed
		Cassinia aculeata	Dolly Bush	seed
Areas: Talbingo intake reservoir shores and creeklines, Lobs Hole Ravine Road, Camp Road, Talbingo intake Road		*Comprosma hirtella*	Coffee-berry	cutting
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Asperula scoparia	Prickly Woodruff	seed
		Dianella tasmanica	Flax-lily	seed/division
		Dianella revoluta var. revoluta	Blue Flax Lily	seed/division
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Luzula flaccida	Woodrush	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Pteridium esculentum	Bracken	division
		Stellaria pungens	Prickly Starwort	division
		Viola betonicifolia	Native Violet	seed
		Wahlenbergia stricta subsp. Stricta	Tall Bluebell	seed

PCT 302		Botanical name	Common name	Propagule
	Upper stratum	*Eucalyptus viminalis*	Ribbon Gum	seed
		Eucalyptus nortonii	Large-flowered Bundy	seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	seed
		Acacia melanoxylon	Blackwood	seed
		Bursaria spinosa subsp. Lasiophylla	Native Blackthorn	seed/cutting
		Callistemon sieberi	River Bottlebrush	seed
		Dodonea viscosa subsp. Spatulata	Broad-leaved Hopbush	seed
		Hakea microcarpa	Small-fruited Hakea	seed/cutting
		Leptospermum obovatum	Starry Night' Teatree	seed
Areas: Mine Road		*Leptospermum grandifolium*	Woolly Teatree	seed
	Ground stratum	*Lomandra longifolia*	Spiny-headed Mat-rush	seed
		Carex appressa	Tall Sedge	seed/division
		Carex fascicularis	Tassel Sedge	seed/division
		Carex gaudichaudiana	Fen Sedge	seed/division
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Poa ensiformis	Purple-sheathed Tussock-grass	seed
		Pteridium esculentum	Bracken	division
		Themeda australis	Kangaroo Grass	seed

PCT 303		Botanical name	Common name	Propagule
	Upper stratum	*Eucalyptus stellulata*	Black Sally	seed
	Middle stratum	*Acacia melanoxylon*	Blackwood	seed
		Acacia dealbata	Silver Wattle	seed
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Bothriochloa macra	Red Grass	seed
Areas: Tantangara adit		*Elymus scaber var. scaber*	Common Wheatgrass	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Hydrocotyle laxiflora	Stinking Pennywort	seed
		Stellaria pungens	Prickly Starwort	division
		Themeda australis	Kangaroo Grass	seed

PCT 311		Botanical name	Common name	Propagule
Areas: Ravine Road, Spillway Road	Upper stratum	*Eucalyptus macrorhyncha*	Red Stringybark	seed
		Eucalyptus dives	Broad-leaved Peppermint	seed
		Eucalyptus nortonii	Large-flowered Bundy	seed
	Middle stratum	*Cassinia longifolia*	Long-leaved Cassinia	seed
		Hibbertia obtusifolia	Hoary Guinea-flower	seed
	Ground stratum	*Dianella longifolia var. longifolia*	Blue Flax Lily	seed/division
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Hardenbergia violacea	False Sarsaparilla	seed
		Hydrocotyle laxiflora	Stinking Pennywort	seed
		Joycea pallida	Silvertop Wallaby Grass	seed
		Lomandra filiformis subsp. filliformis	Wattle Mat-rush	seed
		Lomandra longifolia	Spiny-headed Mat-rush	seed
		Styllidium graminfolium	Grass Triggerplant	seed
		Wahlenbergia stricta subsp. Stricta	Tall Bluebell	seed
PCT 335		**Botanical name**	**Common name**	**Propagule**
	Upper stratum	*Eucalyptus melliodora*	Yellow Box	seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	seed
	Ground stratum	*Bothriochloa macra*	Red Grass	seed
		Carex appressa	Tall Sedge	seed/division
		Microlaena stipoides var. stipoides	Weeping Grass	seed
PCT 637		**Botanical name**	**Common name**	**Propagule**
	Middle stratus	*Baeckea gunniana*	Alpine Baeckea	cutting
	Ground stratum	*Brachyscome obovata*	Native Daisy	seed
		Carex gaudichaudiana	Tufted Sedge	seed/division
PCT 638		**Botanical name**	**Common name**	**Propagule**
Areas: Ravine Road	Upper stratum	*Eucalyptus dalrympleana subsp. Dalrympleana*	Mountain White Gum	seed
		Eucalyptus delegatensis	Alpine Ash	seed
	Middle stratum	*Acacia obliquinervia*	Mountain Hickory	seed
		Coprosma hirtella	Coffee-Berry	cutting
		Stellaria pungens	Prickly Starwort	division
		Viola betonicifolia	Native Violet	seed
PCT 639		**Botanical name**	**Common name**	**Propagule**
Areas: Ravine Road/Link Roads	Upper stratum	*Eucalyptus delegatensis*	Alpine Ash	seed
		Eucalyptus dalrympleana subsp. dalrympleana	Mountain White Gum	seed
		Eucalyptus pauciflora	White Sally	seed
		Eucalyptus stellulata	Black Sally	seed
	Middle stratum	*Bossiaea foliosa*	Leafy Bossiaea	seed
		Coprosma hirtella	Coffee-Berry	cutting
		Olearia megalophylla	large-leaf Daisy-Bush	seed
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Asperula scoparia	Prickly Woodruff	seed
		Derwentia derwentiana subsp. Derwentiana	Veronica derwentiana	seed
		Stellaria pungens	Prickly Starwort	seed
		Styllidium graminfolium	Grass Triggerplant	seed
		Viola betonicifolia	Native Violet	seed
PCT 643		**Botanical name**	**Common name**	**Propagule**
Areas: Lobs Hole Ravine Road	Middle stratum	*Grevillea australis*	Alpine Grevillea	cutting
		Olearia phlogopappa var. flavescens	Dusty Daisy-bush	seed
		Prostanthera cuneata	Alpine Mint-bush	cutting
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/ layering
		Asperula gunnii	Mountain Woodruff	seed
		Austrodanthonia alpicola	Alpine Grass	seed
		Poa fawcettiae	Smooth Blue Snowgrass	seed
		Viola betonicifolia	Native Violet	seed
PCT 644		**Botanical name**	**Common name**	**Propagule**
Areas: Marica Track	Upper stratum	*Eucalyptus niphophila*	Alpine Snow Gum	seed
		Eucalyptus pauciflora	White Sally	seed
	Middle stratum	*Bossiaea foliosa*	Leafy Bossiaea	seed
	Ground stratum	*Helichrysum scorpiodes*	Button Everlasting	seed
		Poa spp	Common Tussock	seed
		Stellaria pungens	Prickly Starwort	seed

PCT 679		Botanical name	Common name	Propagule
	Upper stratum	*Eucalyptus pauciflora*	White Sally	seed
		Eucalyptus rubida subsp. Rubida	Candlebark	seed
		Eucalyptus dalrympleana subsp. Dalrympleana	Mountain White Gum	seed
		Eucalyptus stellulata	Black Sally	seed
	Middle stratum	*Hakea microcarpa*	Small-fruited Hakea	seed/cutting
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/ layering
		Asperula scoparia	Prickly Woodruff	seed
		Carex appressa	Tall Sedge	seed
		Poa labillardierei var. labillardierei	Tussock	seed
		Poa sieberiana var. sieberiana	Snowgrass	seed
		Hydrocotyle peduncularis	Pennywort	seed
PCT 729		**Botanical name**	**Common name**	**Propagule**
Areas: Lobs Hole ridges, Ravine Road, Mine Road, Camp Road	Upper stratum	*Eucalyptus dives*	Broad-leaved Peppermint	seed
		Eucalyptus rubida subsp. Rubida	Candlebark	seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	seed
		Cassinia longifolia	Long-leaved Cassinia	seed
	Ground stratum	*Dianella revoluta var. revoluta*	Blue Flax Lily	seed
		Joycea pallida	Silvertop Wallaby Grass	seed
		Lomandra longifolia	Spiny-headed Mat-rush	seed
		Poa sieberiana var. sieberiana	Snowgrass	seed
PCT 765		**Botanical name**	**Common name**	**Propagule**
	Upper stratum	*Eucalyptus pauciflora*	White Sally	seed
	Middle stratum	*Hakea microcarpa*	Small-fruited Hakea	seed/cutting
		Craspedia variabilis	Common Billy-buttons	seed
		Leptospermum continentale	Prickly Teatree	seed
	Ground stratum	*Carex appressa*	Tall Sedge	seed/division
		Leptospermum lanigerum	Woolly tea-tree	seed
		Gonocarpus micranthus	Creeping Raspwort	seed
PCT 939		**Botanical name**	**Common name**	**Propagule**
	Upper stratum	*Eucalyptus pauciflora*	White Sally	seed
		Eucalyptus stellulata	Black Sally	seed
	Middle stratum	*Baeckea utilis*	Mountain Baeckea	cutting
		Hakea microcarpa	Small-fruited Hakea	seed/cutting
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/ layering
		Asperula gunnii	Mountain Woodruff	seed
		Carex appressa	Tall Sedge	seed
		Gonocarpus micranthus	Creeping Raspwort	seed
PCT 952		**Botanical name**	**Common name**	**Propagule**
	Upper stratum	*Eucalyptus dalrympleana subsp. Dalrympleana*	Mountain White Gum	seed
		Eucalyptus radiata subsp. Radiata	Narrow-leaved Peppermint	seed
		Eucalyptus pauciflora	White Sally	seed
		Eucalyptus dives	Broad-leaved Peppermint	seed
	Middle stratum	*Bossiaea foliosa*	Leafy Bossiaea	seed
		Hibbertia obtusifolia	Hoary Guinea Flower	seed
	Ground stratum	*Dianella tasmanica*	Tasman Flax Lily	seed/division
		Gonocarpus tetragynus	Poverty Raspwort	seed
		Lomandra longifolia	Mat Rush	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Stylidium graminfolium	Grass Triggerplant	seed
PCT 953		**Botanical name**	**Common name**	**Propagule**
Area: Ravine Road	Upper stratum	*Eucalyptus dalrympleana subsp. Dalrympleana*	Mountain White Gum	seed
		Eucalyptus pauciflora	White Sally	seed
		Eucalyptus dives	Broad-leaved Peppermint	seed
		Eucalyptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	seed
		Cassinia longifolia	Long-leaved Cassinia	seed
		Cassinia uncata	Sticky Cassinia	seed
		Olearia erubescens	Pink-tip daisy-bush	seed
	Ground stratum	*Asperula scoparia*	Prickly Woodruff	seed
		Lomandra longifolia	Mat Rush	seed
		Pteridium esculentum	Bracken	seed
		Stylidium graminfolium	Grass Triggerplant	seed
		Viola betonicifolia	Native Violet	seed

PCT 999		Botanical name	Common name	Propagule
Areas: Lobs Hole foot slopes, Ravine Road	Upper stratum	*Eucalyptus nortonii*	Large-flowered Bundy	seed
		Eucalyptus dives	Broad-leaved Peppermint	seed
		Callitris endlicheri	Black Cypress Pine	seed
	Middle stratum	*Cassinia longifolia*	Long-leaved Cassinia	seed
	Ground stratum	*Dianella revoluta var. revoluta*	Blue Flax Lily	seed/division
		Elymus scaber var. scaber	Common Wheatgrass	seed
		Joycea pallida	Silvertop Wallaby Grass	seed
		Poa sieberiana var. sieberiana	Snowgrass	seed
		Themeda australis	Kangaroo Grass	seed
PCT 1191		**Botanical name**	**Common name**	**Propagule**
s: Lobs Hole, Wharf R	Upper stratum	*Eucalyptus bridgesiana*	Apple Box	Seed
		Eucalyptus stellulata	Black Sally	Seed
		Eucalyptus viminalis	Ribbon Gum	Seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	Seed
		Acacia melanoxylon	Blackwood	Seed
	Ground stratum	*Elymus scaber var. scaber*	Common Wheatgrass	Seed
		Gonocarpus tetragynus	Poverty Raspwort	Seed
		Hydrocotyle laxiflora	Stinking Pennywort	Seed
		Microlaena stipoides var. stipoides	Weeping Grass	Seed
		Themeda Australis	Kangaroo Grass	Seed
PCT 1196		**Botanical name**	**Common name**	**Propagule**
Areas: Lobs Hole Ravine Road, Talbingo intake	Upper stratum	*Eucalyptus pauciflora*	White Sally	Seed
		Eucalyptus dalrympleana subsp. Dalrympleana	Mountain White Gum	Seed
		Eucalyptus delegatensis	Alpine Ash	Seed
		Eucalayptus robertsonii subsp. Robertsonii	Narrow-leaved (Robertsons) Peppermint	Seed
	Middle stratum	*Acacia dealbata*	Silver Wattle	Seed
		Coprosma hirtella	Coffee-berry	cutting
		Olearia erubescens	Pink-tip Daisy Bush	Seed
		Helichrysum scorpioides	Button Everlasting	Seed
	Ground stratum	*Acaena novae-zelandiae*	Bidgee-widgee	seed/layering
		Asperula scoparia	Prickly Woodruff	seed
		Brachycome spathulata	Blue Daisy	seed
		Dianella tasmanica	Flax-lily	seed/division
		Lomandra longifolia	Spiny-headed Mat-rush	seed
		Luzula flaccida	Woodrush	seed
		Microlaena stipoides var. stipoides	Weeping Grass	seed
		Poa sieberiana var. sieberiana	Snowgrass	seed
		Stellaria pungens	Prickly Starwort	division
		Styllidium graminfolium	Grass Triggerplant	seed
		Viola betonicifolia	Native Violet	seed
PCT 1224		**Botanical name**	**Common name**	**Propagule**
Areas: Lobs Hole near creek line	Middle stratum	*Hakea microcarpa*	Small-fruited Hakea	seed/cutting
	Ground stratum	*Asperula gunnii*	Mountain Woodruff	seed
		Luzula flaccida	Woodrush	seed
		Poa clivicola	Fine-leaved Snowgrass	seed
PCT 1225		**Botanical name**	**Common name**	**Propagule**
	Ground stratum	*Asperula gunnii*	Mountain Woodruff	seed
		Carex gaudichaudiana	Fen Sedge	seed/division
		Luzula modesta	Southern Woodrush	seed
		Poa costiniana	Bog Snowgrass	seed

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