



Snowy 2.0 Rehabilitation Management Plan – Stage 1



Version: S2-SHL-ENV-PLN-0010 - Rev 3.3

Date: 16 May 2024

Certificate of Approval

Title: Snowy 2.0 Main works rehabilitation management plan

Version: S2-SHL-ENV-PLN-0010 - Rev 3.3

Date of issue: 16 May 2024

○ Approval Record

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○ Document Revision Table

Rev.	Date	Description of modifications
630.30128.00000 -R01-v1.0	21 April 2022	Draft version
630.30128.00000 -R01-v2.0	23 November 2022	Updated with comments from NPWS
630.30128.00000 -R01-v3.0	23 April 2023	Updated with comments from NPWS
Rev AV 3.1	17 July 2023	Reformatted into SHL template, responses to NPWS /BCD comments tracked.
V 3.1	21 August 2023	Resolve comments on previous versions
V3.2	5 October 2023	Resolve comments from revision 3.1 primarily section 8 monitoring and reporting
V3.3	16 May 2024	Update of TARP responses to include bogs and fens and address update timing, addition of Acronyms and definitions

Acronyms and Definitions

Acronym	Definition
AfL	Agreement for lease
AHD	Australian Height Datum
Approval	Infrastructure Approval for Snowy 2.0 Main Works issued under Section 5.19 of the <i>Environmental Planning and Assessment Act 1979</i> (Dated: 20th May 2020) (SSI 9687)
ALARP	As low as reasonably practicable
APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BC Act	Biodiversity Conversation Act
BMP	Biodiversity Management Plan
Completion criteria	Agreed standard or level of performance that indicate the success of rehabilitation and enable an operator to determine when its liability for an area will cease
Contractor	Reference to contractor in this Rehabilitation Management Plan refers to any organisation including sub-contractors conducting work for Snowy Hydro
Construction Envelope	The envelope within which the disturbance area of the development may be located.
CSSI	Critical State significant infrastructure
DAWE	The Commonwealth Department of Agriculture, Water and the Environment which is responsible for administering the Environment Protection and Biodiversity Conservation Act 1999.
DBH	Diameter at Breast Height
DEC	Department of Environment and Conservation
Development	The development of the Exploratory Works and Main Works as modified by the conditions of this approval
Disturbance area	The area within the construction envelope where the development may be carried out.
Domain	Land management units characterised by similar final land use objectives
DPHI or Department	Department of Planning, Housing and Infrastructure
DPI Fisheries	Department of Primary Industries – Fisheries
Drone	Type of unmanned aerial vehicle
ECVT	Emergency egress Cable Ventilation Tunnel
EIS	Snowy 2.0 Main Works - Environmental Impact Statement
EMS	Environmental Management Strategy
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
Exploratory Works	The development of an exploratory tunnel and associated infrastructure described in the Environmental Impact Statement for the Snowy 2.0 Exploratory Works (CSSI 9208) dated July 2018,
FSL	Full Supply Level
FGJV	Future Generation Joint Venture
GIS	Geographic Information Systems
HDD	Horizontal Directional Drilling
Hydromulching	A process involving spraying a slurry of water, cellulosic mulch , seed, and a binder . tackifier on soil to provide cover and aid in revegetation
KNP	Kosciuszko National Park
LEM	Landform Evolution Modelling
LGA	Local Government Area
LTRS	Long Term Road Strategy

Main Works	The development of an underground power station and associated infrastructure described in the Environmental Impact Statement for the Snowy 2.0 Main Works (CSSI 9687) dated September 2019,
Main Works EIS	Snowy 2.0 Main Works - Environmental Impact Statement
MAT	Main Access Tunnel
MOL	Minimum Operating Level
NATA	National Association of Testing Authorities
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
PoM	KNP Plan of Management
Planning Secretary	Planning Secretary under the EP&A Act, or nominee
RMP	Rehabilitation Management Plan
RQAP	Rehabilitation Quality Assurance Process
SHL	Snowy Hydro Limited
Snowy 2.0	A pumped hydro-electric expansion of the Snowy Scheme that will link the two existing reservoirs of Tantangara and Talbingo through underground tunnels, and include a new underground power station with pumping capabilities
Snowy Hydro	Snowy Hydro Limited
SSI	State significant infrastructure
SMP	Spoil Management Plan
SPAs	Seed Production Areas
TARP	Trigger Action Response Plan
TEC	Threatened Ecological Community
Tubestock	Young plants grown to a point ready for planting in small pots
WAL	Works Access Licence
UAV	Unmanned Aerial Vehicle
VIMP	Visual Impact Management Plan

Contents

○	Approval Record	1
○	Document Revision Table	1
1.	Introduction.....	6
1.1.	Background	6
1.2.	Project Overview	7
1.3.	Development Consents, Leases and Licences and EPBC Approval	8
1.4.	Land Ownership and Land Use	17
1.5.	Preparation of the Plan	19
1.6.	Integration with Other Plans	19
1.7.	Consultation	19
2.	Final Land Use.....	21
2.1.	Regulatory Requirements for Rehabilitation	21
2.2.	Final Land Use Statement	25
2.3.	Final Land Use	26
3.	Rehabilitation Risk Assessment	29
3.1.	Rehabilitation Risk Assessment Workshop	29
4.	Rehabilitation Objectives and Rehabilitation Completion Criteria	34
4.1.	Rehabilitation Objectives and Rehabilitation Completion Criteria	34
4.2.	Rehabilitation Completion Criteria	38
5.	Final Landform and Rehabilitation Plan	52
5.1.	Final Landform and Rehabilitation Plan – electronic copy	52
6.	Rehabilitation Implementation	53
6.1.	Progressive Rehabilitation	53
6.2.	Proposed Rehabilitation Schedule	53
6.3.	Phases of Rehabilitation and General Methodologies	55
7.	Rehabilitation Quality Assurance Process	72
8.	Rehabilitation Monitoring Program	74
8.1.	Reference Site Selection & Monitoring Methodology	74
8.2.	Rehabilitation Monitoring Methodology	78
8.3.	Reporting	80
9.	Rehabilitation Research	82
9.1.	Current Rehabilitation Research	82
9.2.	Future Rehabilitation Research	82

10.	Intervention and Adaptive Management	83
10.1.	Threats to Rehabilitation	83
10.2.	Trigger Action Response Plan	84
11.	Review, Revision and Implementation	90
11.1.	Review and Revision of the RMP	90
11.2.	Implementation	90

Tables

Table 1-1	RMP - Site specific plan staging	6
Table 1-2.	CSSI 9687 Requirements for the Preparation of an RMP	9
Table 1-3	Revised Environmental Management Measures	12
Table 1-4	Key Project Team Members and Technical Specialists	19
Table 1-5	Summary of Consultation	20
Table 2-1	Regulatory Requirements for Decommissioning and Rehabilitation	21
Table 2-2	Final Land Use Domains	27
Table 2-3	Active Domains	28
Table 3-1	Risk Assessment Participants	29
Table 3-2	Rehabilitation Management Plan Specialist Workshops	30
Table 3-3	Summary of High and Extreme Risks	31
Table 4-1	Rehabilitation Objectives – Kosciuszko National Park	35
Table 4-2	Ecological rehabilitation objectives, including indicative completion criteria and performance indicator	36
Table 4-3	Rehabilitation Objectives – Rock Forest Site	38
Table 4-4	Rehabilitation completion criteria for Snowy 2.0 Main Works	40
Table 6-1	Rehabilitation Program (as of May 2024)	53
Table 6-2	Rehabilitation Phases	55
Table 6-3	Soil Testing Results	65
Table 7-1	Rehab Phase monitoring requirements	72
Table 8-1	Year 1 (November / December 2024 baseline) reference sites	75
Table 8-2	Monitoring methods for reference sites	76
Table 8-3	UAV Annual rehabilitation monitoring	79
Table 8-4	Rehabilitation monitoring frequency	80
Table 10-1	Key Threats to Rehabilitation	83
Table 10-2	Trigger Action Response Plan	85
Table 11-1	Roles and Responsibility	90

1. Introduction

1.1. Background

Snowy Hydro Limited (Snowy Hydro) is constructing a pumped hydro-electric expansion of the Snowy Mountains Hydro-electric Scheme (Snowy Scheme), called Snowy 2.0. .

This Rehabilitation Management Plan (RMP, the Plan) has been prepared to describe the proposed rehabilitation activities associated with the construction and operation of the Snowy 2.0 Main Works Project (the project). Upon finalisation this plan supersedes the Exploratory Works RMP (FGJV, 2020).

The RMP has been prepared to satisfy the relevant requirements for a Rehabilitation Management Plan in accordance with Schedule 3 Condition 10 of Development Consent CSSI-9687 and Conditions 24 and 25 of EPBC Approval 2018/8322.

The structure of this Plan has been guided by the NSW Department of Regional NSW Mining Exploration and Geoscience – Resources Regulator’s (RR) Form and Way: Rehabilitation Management Plan for Large Mines (RR, 2021) and associated guidelines (refer Section 1.3.6). Whilst it is noted that these guidelines have been developed by the RR for mining operations, they are considered applicable to a project of the extractive nature, scale, and significance of Snowy 2.0.

This RMP has been prepared to provide the overarching rehabilitation strategy and methodologies to be implemented across the entire Main Works project. As per Schedule 4 Condition 3 of CSSI-9687, this RMP will be prepared and updated on a staged basis to include rehabilitation requirements as the project progresses and additional areas become available for rehabilitation. Staging is also required to ensure consistency with the Recreation management plan, Long Term Road Strategy and the Spoil management plan. As per Schedule 3 condition 10(g), site specific rehabilitation management plans will be prepared. Table 1.1 details the site specific rehabilitation management plans by location and the appropriate staging.

Table 1-1 RMP - Site specific plan staging

Area	Stage	Staging comments	Location in the RMP
Talbingo Reservoir	Stage 2	Updated Plan to be provided following spoil management plan , Long term Road Strategy and recreation management plan approval,	Appendix L
Lobs Hole	Stage 2	Plan to be provided following Spoil Management plan, recreation management plan and long term roads strategy approval	Appendix M
Marica	Stage 1	Plan included in this version	Appendix N
Plateau	Stage 1	Plan included in this version	Appendix K
Tantangara	Stage 2	Plan to be provided following spoil management ,recreation management plan and long term roads strategy approval	Appendix O
Rock Forest	Stage 2	Plan to be included after finalisation of landform design in spoil management plan	Appendix P

Additional site-specific management plans will be prepared for other areas as the required details for completion become available. Site specific rehabilitation management plans will be appended to this RMP as they are

completed. Consultation will be conducted for each of the site-specific plans, due to incomplete works or potential design changes.

1.2. Project Overview

1.2.1. History of Operations

The Snowy Scheme was designed to collect and store water, divert it through trans-mountain tunnels and power stations and then release it west of the Snowy Mountains into the catchments of the Murray and Murrumbidgee rivers. This long-term water regulation was designed to counteract the effects of severe drought sequences and increase agricultural productivity in the Murray Darling Basin (Snowy Hydro 2017). While the diversion of water for irrigation was always part of the original vision of the Snowy Scheme, the engineers were well aware of the potential for the generation of hydroelectricity.

The Snowy Scheme plays a critical role in the National Electricity Market (NEM) today and has been modernised and well maintained over the decades since its construction. Its quick-start dispatchable generation provides energy security and reliability across the NEM in times of high energy demand. It is expected that as the economy continues to decarbonise, the demand for the energy products that Snowy Hydro produce today (such as energy storage, capacity, firming and ancillary services) will increase.

The Snowy Scheme operates predominantly within the Kosciuszko National Park (KNP) under a lease (the Snowy Park Lease) from the NSW Minister for the Environment. The Snowy Scheme consists of:

- sixteen major reservoirs with a total storage capacity of 7,000 gigalitres (GL);
- nine power stations;
- one pumping station and one pump storage capability at Tumut 3 power station; and
- 145 km of tunnels and pipelines and 80 km of aqueducts.

The Snowy Scheme has 4,100 megawatts (MW) of existing hydro-electric generating capacity and produces 4,000 (gigawatt hours (GWh) on average each year for households and businesses across the NEM. The Snowy Scheme comprises two major developments: the northern Snowy-Tumut Development and the southern Snowy-Murray Development.

The existing Snowy Scheme operates within the KNP in accordance with the NSW Snowy Hydro Corporatisation Act 1997 (SHC Act). Part 6, Section 37(2) of the SHC Act entitles Snowy Hydro to the grant of a lease, licence, easement or right of way over KNP, for the purposes of the existing Snowy Scheme development. The Snowy Park Lease was granted to Snowy Hydro by the NSW Minister for Environment in 2002 and has a term of 75 years. Snowy Hydro operates the Snowy Scheme under a stringent water licence administered by the NSW Department of Industry - Lands & Water (DoI Water) that allows for water collection, storage, diversion and release in order to generate electricity.

Tantangara and Talbingo reservoirs are water storages within the northern Snowy-Tumut Development of the Snowy Scheme. Snowy Hydro controls the water levels within these reservoirs. The maximum and minimum water levels for reservoirs within the Snowy Scheme are stated in the Snowy Water Licence and referred to as Full Supply Level (FSL) and Minimum Operating Level (MOL), respectively.

1.2.2. Snowy 2.0

Snowy 2.0 is a pumped hydro-electric project that will link the existing Tantangara and Talbingo reservoirs through a series of new underground tunnels and a hydro-electric power station. Most of the project's facilities will be built underground, with approximately 27 kilometres of concrete-lined tunnels constructed to link the two reservoirs and a further 20 kilometres of tunnels required to support the facility. Intake and outlet structures will be built at both Tantangara and Talbingo Reservoirs.

Snowy 2.0 will increase the generation capacity of the Snowy Scheme by an additional 2,000 MW, and at full capacity will provide approximately 350,000 MWh of large-scale energy storage to the NEM. This will be enough to ensure the stability and reliability of the NEM, even during prolonged periods of adverse weather conditions.

The pumped hydro-electric scheme elements of Snowy 2.0 Main Works are mostly underground between the southern ends of Tantangara and Talbingo reservoirs, a straight-line distance of 27 km. Surface works will also occur at locations on and between the two reservoirs. Key locations for surface works include:

- **Tantangara Reservoir** - at an FSL of about 1,229 metres (m) to Australian Height Datum (AHD), Tantangara Reservoir will be the upper reservoir for Snowy 2.0 and includes the headrace tunnel and

intake structure. The site will also be used for a temporary construction compound, accommodation camp and other temporary ancillary activities as well as an emplacement area for excavated rock and surplus cut materials;

- **Marica** - this site will be used primarily for construction including construction of vertical shafts to the underground power station (ventilation shaft) and headrace tunnel (surge shaft), and a small accommodation camp;
- **Plateau** - the area (predominantly within an existing track) will be used for construction and operation of buried communications and power supply cables to operational infrastructure between Talbingo and Tantangara reservoirs. At depth, the headrace tunnel will be excavated across the plateau;
- **Lobs Hole** - this site will be used primarily for construction but will also become the main entrance to the power station during operation. Lobs Hole will provide access to the Exploratory Works tunnel, which will be refitted to become the main access tunnel (MAT), as well as the location of the emergency egress, cable and ventilation tunnel (ECVT), portal, associated services and accommodation camp;
- **Talbingo Reservoir** - at an FSL of about 546 m AHD, Talbingo Reservoir will be the lower reservoir for Snowy 2.0 and will include the tailrace tunnel and water intake structure. The site will also be used for temporary construction compounds and other temporary ancillary activities as well as an emplacement area for excavated rock and surplus cut materials; and
- **Rock Forest** – this area comprises private property under lease to Snowy Hydro for use as a logistics site during construction.

Supporting infrastructure will include establishing or upgrading access tracks and roads and electricity connections to construction sites as well as GIP and water bore monitoring sites.

Most of the proposed pumped hydro-electric and temporary construction elements and most of the supporting infrastructure for Snowy 2.0 Main Works are located within the boundaries of KNP. The maximum disturbance footprint for the project during construction is about 1,680 ha which is approximately 0.25% of the total KNP area. Some of the supporting infrastructure and construction sites and activities (including sections of road upgrade, power and communications infrastructure) extends beyond the national park boundaries. These sections of infrastructure are primarily located to the east and south of Tantangara Reservoir.

1.3. Development Consents, Leases and Licences and EPBC Approval

1.3.1. Development Approval CSSI 9687

Snowy 2.0 is classified as Critical State Significant Infrastructure (CSSI) under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). It is defined as CSSI in clause 9 of Schedule 5 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) on the basis that it is critical to the State for environmental, economic or social reasons.

Following extensive environmental assessment and consultation, Infrastructure Approval CSSI 9687 was granted by the Minister for Planning and Public Spaces on 20 May 2020. Under Section 5.19 of the NSW *Environmental Planning and Assessment Act 1979*, CSSI 9687 is subject to consent conditions required to:

- Prevent, minimise and/or offset adverse environmental impacts.
- Set standards and performance measures for acceptable environmental performance.
- Require regular monitoring and reporting.
- Provide for the ongoing environmental management of the development.

To comply with the Schedule 3 Condition 10 of CSSI 9687, an RMP must be prepared by Snowy Hydro and approved by the Planning Secretary of the NSW Department of Planning, Industry and Environment (DPIE). The requirements Schedule 3 Condition 10 of CSSI 9687 have been summarised in Table 1-1 along with where each condition has been addressed within this document.

Table 1-2. **CSSI 9687 Requirements for the Preparation of an RMP**

Condition	Requirement	Where addressed
Infrastructure Approval for Snowy 2.0 Main Works (CSSI 9687)		
Condition 10	Within 18 months of the commencement of construction, the Proponent must prepare a Rehabilitation Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This document.
Condition 10 (a)	Be prepared by a suitably qualified and experienced person in consultation with the NPWS, BCD, EPA, NSW DPI and TfNSW;	Section 1.5 Section 1.7
Condition 10 (b)	Be consistent with the Spoil Management Plan, Recreation Management Plan, Long-Term Road Strategy and Visual Mitigation Management Plan;	Section 1.6
Condition 10 (c)	Include a conceptual plan for the rehabilitation of the whole site	This document Section 5 Section 6
Condition 10 (d)	Include the detailed program for the rehabilitation of roads in the Kosciuszko National Park in accordance with the approved Long-Term Road Strategy;	Section 6.2 It is noted that the Long-Term Road Strategy (LTRS) is currently being prepared. On completion of the LTRS, this RMP will be reviewed and revised where required
Condition 10 (e)	Include a topsoil balance for the site, which includes a strategy for: - maximising the reuse of topsoil on site (provided it is suitable for reuse); - using other suitable growth media; and - importing additional topsoil to the site (if necessary); Monitor, treat, weeds in stockpile topsoil	Section 6.3.1.4 Appendix H
Condition 10 (f)	Include a native seed collection and propagation program in accordance with Florabank (www.florabank.org.au) and/or NPWS guidelines for the site, which includes a strategy for: - maximising the collection and use of native seed resources from the site prior to disturbance; - collecting seed from the surrounding area, including other parts of the Kosciuszko National Park (with the approval of the NPWS); and prioritising the use of local sources of seed for the ecological rehabilitation of the site;	Section 6.3.1.1 See appendix G Snowy 2.0 Rehabilitation Species List

Condition	Requirement	Where addressed
Condition 10 (g)	Include detailed plans for the rehabilitation of the disturbance area at each of the following sites, describing the measures that would be implemented to comply with the rehabilitation objectives in Table 3 or 5: - Talbingo Reservoir; - Lobs Hole; - Marica; - Plateau; - Tantangara Reservoir; and Rock Forest;	Section 1.1.2 Section 5 Site specific RMPs in Appendices K to P (to be included as they are progressively developed). Plans will be developed in order of priority and availability of long term land use confirmation
Condition 10 (h)	Include a detailed ecological rehabilitation management plan for the development that: - provides an overarching description of the proposed ecological rehabilitation works, identifying the: - plant community types to be established; and - area of land to be established for each plant community type; - provides maps showing the proposed location of each plant community type; describes the detailed measures that would be implemented to comply with the ecological rehabilitation objectives in Table 4;	Section 5 Section 6.3. Additional detail will be included as required in the Site Specific RMPs (Appendices K to P). Appendix J PCT Target Species List
Condition 10 (i)	Identify the key risks to the successful completion of the rehabilitation and describe the contingency measures that would be implemented to address these risks;	Section 3 Section 10
Condition 10 (j)	Include detailed completion criteria and performance indicators for the rehabilitation of the development (having regard) to the criteria and indicators in Table 4, including criteria for triggering remedial action (if necessary); and	Section 4
Condition 10 (k)	Include a program to monitor and publicly report on: - the rehabilitation of the site; - the implementation of the each of the detailed plans, including the effectiveness of the proposed mitigation and contingency measures; and progress against the detailed completion criteria and performance indicators.	Section 8

1.3.2. EPBC Act Approval 2018/8322

In addition to the State approval, a referral (EPBC 2018/8322) was prepared and lodged with the Commonwealth Department of Agriculture, Water and the Environment (DAWE) under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Commonwealth Minister's delegate determined on 5 December 2018 that Snowy 2.0 Main Works is a "controlled action" under the EPBC Act. The EPBC Act referral decision determined that the project will be assessed by accredited assessment under Part 5, Division 5.2 of the NSW Environmental Planning and Assessment Act 1979. The referral was approved by DAWE on 29 June 2020.

Commonwealth approval under section 130(1), 133(1) and 143(1A) of the EPBC Act specified the NSW consent conditions must be adhered to and was subject to the following consent conditions:

- **Condition 24** - *Minimise impacts to the environment and comply with conditions 4-7 of the NSW approval relating to spoil management and site rehabilitation.*
- **Condition 25** - *The Rehabilitation Management Plan required by condition 10 of the NSW approval must include provisions to make monitoring data (excluding sensitive ecological data) available as part of the monitoring, evaluation and reporting program required under 10k of the NSW approval.*

This RMP has been prepared to ensure the Commonwealth and NSW consent conditions are adhered to and there is a defined plan to achieve the objectives of these conditions.

1.3.3. Revised Environmental Management Measures

Environmental safeguards and management measures are included in the Main Works EIS in Section 6.3.5. During preparation of the Submissions Report, revised environmental management measures were developed and are included in Appendix C of the Submissions Report. The environmental management measures relevant to rehabilitation are listed in Table 1-2.

Table 1-3 Revised Environmental Management Measures

Impact	Reference	Environmental Management Measures	Timing	Implementation Responsibility	Section
Rehabilitation	REHAB01	A Rehabilitation Management Plan will be prepared for the new landforms at Tantangara Reservoir, Lobs Hole and Talbingo Reservoir. The plan will: - include a detailed plan for rehabilitation of the site; - include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the sites, and triggering any remedial action (if necessary); - describe the measures that would be implemented to: – comply with the rehabilitation objectives and associated performance and completion criteria; – progressively rehabilitate the site; – include a program to monitor and report the effectiveness of these measures.	Construction	Contractor	This RMP
Creation of new landforms	REHAB02	New landforms will: - Be safe, stable and non-polluting - Maximise surface drainage to the natural environment	Construction	Contractor	Section 6.3.2
Alpine humus soils and peat bogs/fens	SOIL01	Mitigations will be included in the Rehabilitation Management Plan to minimise impacts to Alpine humus soils and peat bogs/fens.	Construction	Contractor	See Section 6.3.6.1 for additional rehabilitation specific measures

Impact	Reference	Environmental Management Measures	Timing	Implementation Responsibility	Section
Loss of soil resource	SOIL02	Development and implementation of soil management measures to assist in the preservation of the quantity and quality of the soil resource including: - An inventory of soils to be stripped, including depths and volumes; and Topsoil management measures including stripping and stockpiling procedures	Construction and operation	Contractor	Section 6.3.1.4 Appendix H
Soil capability	SOIL04	The Rehabilitation Management Plan (refer to REHAB01) will be implemented and will include measures to minimise: - loss of soil; - loss of organic matter and nutrient decline; - soil structural decline; and - compaction. Regular rehabilitation monitoring will be undertaken to identify any defects, such as slumping, erosion or poor vegetation establishment. Identified defects will be rectified.	Construction and operation	Contractor	Section 6.3

Impact	Reference	Environmental Management Measures	Timing	Implementation Responsibility	Section
Visual and landscape impacts resulting from permanent placement of excavated material	LCV01	The placement of excavated material in Talbingo, Lobs Hole and Tantangara Reservoir will be rehabilitated as guided by the this document and in consultation with NPWS.	Detailed design	Contractor Snowy Hydro	Section 2.2.2 Section 5 of S2-FGJV-ENV-PLN-0259 – H Main Works – Visual Impact Management Plan (Draft) Site specific plans
Visual and landscape impacts resulting from permanent infrastructure	LCV02	Detailed design is to consider: - materials and finishes that complement or where possible recede into the surrounding landscape; - the use of vegetation to screen project elements and re-vegetation of disturbed areas in line with the Rehabilitation Strategy; and lighting to avoid spill that might affect sensitive areas or receivers.	Detailed design	Contractor	Section 2.2.2 Section 5 of S2-FGJV-ENV-PLN-0259 – H Main Works – Visual Impact Management Plan (Draft) Site specific plans

1.3.4. Works Access Licence & Construction Lease

Snowy Hydro has a Deed of Agreement for Lease (AfL) with NPWS for Snowy 2.0, which is the governing agreement for Snowy 2.0 tenure within the KNP. Tenure arrangements for Snowy 2.0 for Main Works construction include one Main Works Construction Lease (CL) for all areas where Snowy Hydro has exclusive access for during construction of Snowy 2.0, and one Works Access Licence (WAL) for all areas where Snowy Hydro has shared access for during construction of Snowy 2.0. The Main Works CL and WAL are varied as there are changes to the project including addition of new areas or decommissioning and rehabilitation of new areas. Prior to operation of Snowy 2.0, these tenure arrangements will be modified to reflect access during operations.

The AfL includes requirements around the completion of the works covered under the CL and WAL and the standard for remediation. Clause 20.1 requires that upon completion of particular works, Snowy Hydro (the Tenant) must obtain an updated environmental condition report in respect of the land that:

- (a) describes the nature and extent of any Contamination on the relevant Land and the impact of the Works on the Land;
- (b) describes the investigation undertaken to identify the nature and extent of the Contamination;
- (c) sets out the recommendations to achieve the standard of remediation required by clause 20.4;
- (d) is addressed to and can be relied upon by both the Landlord and the Tenant; and
- (e) any other environmental reports that the Landlord considers, acting reasonably, may be relevant in determining the extent of remediation required.

As can be seen above, the focus of AfL Clause 20.1 is on addressing any contamination impacts on the land subject to the Tenant's activities. This aspect is not dealt with by this RMP and will be dealt with separately under the AfL.

Potential contamination risks resulting from geochemical aspects of construction spoil is addressed under CSSI 9687 Schedule 3 SPOIL MANAGEMENT Conditions 4, 5, 6, 7 and 8.

As per AfL clause 20.4, Snowy Hydro must Remediate and restore all areas of the Land accessed by the Tenant for the purposes of the Works so that:

- (a) the nature and extent of any Contamination on the relevant Land is no greater than the nature and extent of the Contamination that was detailed in the relevant EIS reports in respect to the relevant Land on or prior to the commencement of any Works on that Land;
- (b) all recommendations outlined in the report under clause 20.1 that are required to Remediate and restore all areas of the Land accessed by the Tenant for the purpose of the Works, are implemented to the satisfaction of the Landlord (acting reasonably); and
- (c) each of those areas accessed by the Tenant are, on completion of the Remediation and restoration works, to a standard equivalent to the assessment established under the Biodiversity Assessment Methodology report.

As can be seen above, the focus of AfL Clause 20.4 requires the remediation and restoration of land accessed by the Tenant, however Clause 20.4 a) refers to contaminated land and levels of contamination, which are not addressed by this RMP. Similarly AfL Clause 20.4 b) refers to recommendations of the report to be prepared in Clause 20.1, which is also focussed on addressing contamination, which is not addressed by this RMP. Clause 20.4 c) requires the standard of remediation and restoration to be to a standard equivalent to the assessment established under the BAM report. This requirement is addressed by rehabilitation objectives and completion criteria set out in Section 4 of this RMP.

1.3.5. Environment Protection Licence 21266

Snowy 2.0 is regulated by Environment Protection Licence (EPL) 21266 issued under the *Protection of the Environment Operations Act 1997* (POEO Act). EPL 21266 allows for the generation of electrical power otherwise than from coal, diesel or gas. EPL 21266 applies to all ancillary activities carried out on the site including:

- Chemical Storage;

- Concrete Batching;
- Extractive Activities;
- Process Water Treatment;
- Road Construction and Maintenance; and
- Sewage Treatment.

EPL 21266 nominates required environmental monitoring and concentration limits for surface and groundwater quality, which apply during construction and up until completion of rehabilitation. EPL 21266 is renewed annually on 9 May.

1.3.6. KNP Plan of Management

The KNP Plan of Management (PoM) (DEC, 2006) provides a framework to guide the long-term management of the broad range of values contained in the KNP. It contains a suite of actions to be undertaken by the National Parks and Wildlife Service (NPWS) and other organisations to protect and conserve the values of the park.

Various references are made to the Snowy Scheme in the PoM including within the Park Zoning provisions. The Park Zoning covers the whole of the KNP and is intended to:

- protect the values of the park, as set out in the PoM under the headings of Natural Values, Cultural Values and Recreational Values;
- optimise opportunities for a wide range of recreational activities and visitor experiences; and
- minimise conflict between participants in different recreational activities, and between visitors, management operations and other authorised uses.

The KNP PoM was consulted and reviewed in the preparation of the Main Works EIS (EMM, 2018a) and the design of the project. As outlined in the EIS Section 2.3.2, the challenges for the design team included the need to develop solutions that balance the need for ensuring a safe working environment for the construction of Snowy 2.0 Main Works, including the safe movement of plant, equipment, materials and personnel across the sites, 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 reasonable and feasible.

1.3.7. Policies and Guidelines

In addition to the regulatory requirements identified above, this RMP has been prepared with consideration to the following legislation, guidelines and standards:

- *National Parks and Wildlife Act 1974*
- *Soil Conservation Act 1938*
- *Protection of the Environment Operations Act 1997*
- *Native Vegetation Act 2003*
- *Biodiversity Conservation Act 2017*
- *Australian Alps Rehabilitation Manual* (NSW DECC for NPWS, 2007);
- *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (Good, R. [Australian Alps Liaison Committee], 2006);
- *Kosciuszko National Park Plan of Management* (NPWS, 2006);
- *Managing Urban Stormwater – Soils and Construction, Volume 1, 4th edition* (Landcom, 2004);
- *Managing Urban Stormwater – Soils and Construction, Volume 2A Installation of Services* (DECC, 2008a);
- *Managing Urban Stormwater – Soils and Construction, Volume 2C Unsealed Roads* (DECC, 2008b);
- *Global Acid Rock Drainage Guide* (INAP, 2009);
- *Form and way: Rehabilitation Management Plan (large mines)* (RR, 2021);
- *Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines* (RR, 2021);
- *Guideline: Rehabilitation risk assessment* (RR, 2021); and
- *Guideline: Rehabilitation objectives and rehabilitation completion criteria* (RR, 2021).

1.4. Land Ownership and Land Use

1.4.1. Current Land Use and Land Ownership

The overall Snowy 2.0 project is within both the Snowy Valleys and Snowy Monaro Regional local government areas (LGAs).

Most of the project area is located within the KNP with the predominant land use being a conservation area. Within the project area, KNP is characterised by two key zones:

- upper slopes and inverted treelines in the west of the project area (referred to as the 'ravine') and
- associated subalpine treeless flats and valleys in the east of the project area (referred to as the 'plateau').

The project area is interspersed with built infrastructure including recreational sites and facilities, main roads as well as unsealed access tracks, hiking trails, farmland, electricity infrastructure, and infrastructure associated with the Snowy Scheme.

Lobs Hole is no longer accessible to the public during construction. The area was previously used as a remote campground (known as Ravine campground) within KNP and provides space for recreational activities including camping, fishing, and 4WD. Following completion of construction non-operational areas will again be accessible to the public at the discretion of NPWS.

Main Works construction is also being undertaken at the Tantangara and Talbingo Reservoirs, previously popular boating, camping and fishing destinations. The Tantangara and Talbingo reservoirs cover areas of 19.4 square kilometres (km²) and 21.2 km² respectively. Major watercourses in the project area include the Yarrangobilly, Eucumbene and Murrumbidgee rivers and some of their tributaries (such as Nungar, Gooandra and Tantangara creeks).

The only elements of the project occurring outside the KNP are:

- Rock Forest which comprises farmland on a private property under lease to Snowy Hydro for use as a logistics site during construction.
- Polo Flat Segment factory (not part of the Main Works Approval)

Access to the major project work sites is via the following roads; Snowy Mountains Highway (Marica & Plateau sites), Link Road (Lobs Hole / Talbingo) and Tantangara Road (Tantangara).

1.4.2. Existing Native Vegetation and Plant Community Types

Plant Community Types (PCTs) are a NSW classification used to identify native vegetation plant communities. As reported in the Biodiversity Management Plan, site surveys identified 20 PCTs comprising 1,281 ha of native vegetation within the construction envelope. The three most abundant PCTs, which constitute 63% of the native vegetation mapped within the construction envelope, include:

- **PCT 1196** - Snow Gum - Mountain Gum shrubby open forest of montane areas, South Eastern Highlands Bioregion and Australian Alps Bioregion (372.42 ha);
- **PCT 644** – Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern KNP, South Eastern Highlands Bioregion and Australian Alps Bioregion (222.75 ha); and
- **PCT 1224** – Sub-alpine dry grasslands and heathlands of valley slopes, southern South Eastern Highlands Bioregion and Australian Alps Bioregion (212.91 ha).

A complete list of the PCTs mapped within the construction envelope is presented in Appendix A. The extents of the mapped PCTs are shown in Appendix B.

One threatened ecological community (TEC), listed as an Endangered Ecological Community under both NSW and Commonwealth legislation, has been confirmed within the construction envelope:

- NSW Biodiversity Conservation Act 2016 (BC Act):

PCT 637 – Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions; and

- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act):

Alpine Sphagnum Bogs and Associated Fens.

1.4.3. January 2020 Bushfire

On 4 January 2020, the Snowy 2.0 project site and overall northern section of KNP was impacted by a significant bushfire. The project site at Lobs Hole was severely impacted with much of the groundcover and trees burned, leaving the catchment area with bare soil and no ground protection. Other parts of the Main Works project area including the Plateau, Marica and Tantangara were also impacted by the bushfire to varying degrees. The post-bushfire recovery of the surrounding areas is of key concern to KNP stakeholders.

Following the bushfire, the vegetated areas within and adjacent to the project had exposed soil which is susceptible to introduced weed invasion and a reduction in habitat features which makes native fauna more vulnerable to feral animal predation. Monitoring of reference sites in the bushfire affected area as part of the rehabilitation monitoring program will track the recovery of areas following the bushfire. Monitoring of reference sites as a baseline for the achievement of rehabilitation criteria will occur in relevant target PCT's, preferably where seed collection is undertaken to further understanding of the impact of fire on seed availability.

If possible, seed collection and reference site monitoring will be undertaken in close proximity to the construction site. However, the recent bushfire events have impacted upon the available areas for seed collection within the KNP. The seed collection program developed as part of this RMP will consider appropriate areas for seed collection within the KNP and if necessary, areas of appropriate PCT's found at similar altitude outside of the KNP. This approach is a scientifically accepted approach for the mitigation of climate change impacts such as bushfire impacts on the pre-construction area and will increase the genetic diversity within a genotype to provide a greater chance of survival in extreme weather conditions.

Seed availability of herbaceous species (grasses and forbs) has increased since the 2019/20 fires in KNP. This is due to a release of nutrients post fire and the El Nino event which has facilitated ecological recovery. However, trees and shrubs will take up to 5 to 10 years to have the seed loads they supported before the latest fire.

Climate Change needs to be included in all revegetation/rehabilitation projects as it has already started to affect ecological processes. The following reference can be used as a guide: Climate-ready revegetation A guide for natural resource managers. Version 2,; https://www.mq.edu.au/__data/assets/pdf_file/0006/807666/Climate-Reveg-Guide-v2-2018.pdf

1.5. Preparation of the Plan

In accordance with Schedule 3 Condition 10(a) of CSSI-9687, a suitably qualified and experienced project team was engaged by Snowy Hydro for the development of the RMP. The project team included:

- Dedicated in-house specialists to manage the development of the RMP and delivery of the project.
- External specialists to provide technical inputs and advice to inform the development of the RMP.

Key members of the project team are presented in Table 1-3.

Table 1-4 Key Project Team Members and Technical Specialists

Name	Company	Role/Speciality
Chris Buscall	Snowy Hydro	Project Director
Ben Croome	Snowy Hydro	Project Manager
Joshua Chikan	Snowy Hydro	Procurement
Paul Smith	Snowy Hydro	Engineering Lead
Rod Masters	SLR	Specialist - Growth media, landform, rehabilitation specialist
Elizabeth MacPhee	Alpine Flora	Specialist - Sub-alpine ecology, seed collection / propagation, rehabilitation
Dennis Garside	GSS	Specialist - Seed collection / propagation, rehabilitation
Chris Waygood	Golder	Specialist – Landform

1.6. Integration with Other Plans

As required by Schedule 3 Condition 10(b) of CSSI-9687, the RMP has been developed to be consistent with other management plans which are being developed separately for the project. These management plans include but are not limited to the:

- Spoil Management Plan - S2-FGJV-ENV-PLN-0019 – P | Snowy 2.0 Main Works - Spoil Management Plan ;
- Recreation Management Plan;
- Long-Term Road Strategy; and
- Visual Mitigation Management Plan.

Appendix C Final Land Use Domains provides details of integration and consistency between these plans. (Note: because of the staging required of the forementioned management plans, Appendix C will be updated in parallel to incorporate any additional requirements.

1.7. Consultation

This RMP is to be prepared in accordance with Schedule 3 Condition 10(a) of CSSI-9687, which notes:

Within 18 months of the commencement of construction, the Proponent must prepare a Rehabilitation Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:

(a) be prepared by a suitably qualified and experienced person in consultation with the NPWS, BCD, EPA, NSW DPI and TfNSW;

Ongoing consultation has been undertaken with NPWS for this RMP as summarised in Table 1-5. A copy of this Plan will be provided to the relevant agencies listed above, along with DPIE for review and comment. Any feedback will be considered and if appropriate, included in future revisions of this plan.

Table 1-5 Summary of Consultation

Stakeholder	Date	Consultation
NPWS	8/09/2021	Rehab lessons learnt from NPWS including monitoring results. Discussion regarding the use of both fire impacted and non-impacted control sites to give valid representation
NPWS	2021/ 2022	Ongoing consultation regarding the seed collection program and individual site-specific rehabilitation plans.
NPWS , BCD, EPA	22/04/2022	SHL Draft RMP submission
NPWS	12/07/2022	NPWS comments
NPWS	28/07/2022	RMP comments clarification session
NPWS ,BCD, EPA	24/11/2022	SHL RMP Submission revision 2 Addressed Rev 1 comments
NPWS	3/02/2023	NPWS comments received
NPWS,EPA, BCD	T28/04/2023	Address Rev 2 comments and circulation of RMP Rev 3
NPWS, BCD	12/07/2023	Meeting to discuss monitoring program use of UAV
BCD	13/07/2023	Follow up discussion with AJ to discuss use of UAV and monitoring program
TfNSW	15/08/2023	TfNSW consultation meeting
BCD, EPA, NSW DPI and TfNSW	21/08/2023	Circulation of Rev 3.1 to all other agencies
NPWS/ BCD/	14/09/2023	NPWS Rev 3.1 remaining comments meeting
NPWS, BCD	21/09/2023	Submission of section 8 Monitoring for review
NPWS	06/10/2023	Resubmission of Rev 3.2 for final review prior to submission to DPE after addressing all comments (including section 8)
NPWS / BCD	16/01/2024	NPWS comments received RMP Main body
NPWS / BCD	28/01/2024	NPWS comments received for Site Specific Plans
NPWS / BC	15/02/2024	Meeting to discuss Site Specific Plans
NPWS	22/04-2024	NPWS comments received after review of site specific plans
NPWS	15/05/2024	Submission of Rev 3.3 for final review prior to submitting to DPHI

2. Final Land Use

2.1. Regulatory Requirements for Rehabilitation

A summary of all known regulatory requirements for post mining land use and rehabilitation for Snowy 2.0 are listed in Table 2-1. Regulatory requirements have included consideration of the consents and Environmental Protection licences and leases listed in Section 1.3.

Table 2-1 Regulatory Requirements for Decommissioning and Rehabilitation

Condition	Requirement	Section Addressed
Schedule 2 Condition 1	Demolition The Proponent must ensure that all demolition work is carried out in accordance with AS 2601-2001: The Demolition of Structures, or its latest version.	Section 6.2.2
Schedule 2 Condition 12	Protection of Infrastructure Unless the Proponent and the applicable authority agree otherwise, the Proponent must: (a) repair, or pay the full cost associated with repairing, any public infrastructure that is damaged by the development; and (b) relocate, or pay the full cost associated with relocating, any public infrastructure that needs to be relocated as a result of the development. <i>Note: This condition does not apply to any damage to roads caused by the development.</i>	Section 6.2.2
Schedule 3 Condition 9	Rehabilitation Requirements The Proponent must: (a) rehabilitate all parts of the site within the Kosciuszko National Park to comply with the rehabilitation objectives in Table 3 and the ecological rehabilitation objectives in Table 4; (b) rehabilitate the Rock Forest site to comply with the rehabilitation objectives in Table 5; (c) complete the initial rehabilitation of the site - including the removal of all temporary infrastructure, creation of landforms, narrowing of roads - within 3 years of completing construction; (d) complete the ecological rehabilitation of the site, apart from the areas used for operations, within 20 years of completing construction; (e) complete the final rehabilitation of the site, including the removal of all remaining infrastructure, within 3 years of decommissioning the development; and (f) complete the ecological rehabilitation of the areas used for operations within 20 years of decommissioning the development.	Section 4 Section 6.1

Condition	Requirement	Section Addressed										
	<i>Table 3: Rehabilitation Objectives – Kosciuszko National Park</i> <table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Land use</td><td> - Enhance the recreational use of the site in accordance with the approved Recreation Management Plan </td></tr><tr><td>Land</td><td> - Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance of site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds to other parts of the Kosciuszko National Park </td></tr><tr><td>Infrastructure</td><td> - Decommission and remove infrastructure, unless NPWS agrees otherwise - Restore all roads on site in accordance with the Long-Term Road Strategy </td></tr><tr><td>Community</td><td> - Ensure public safety </td></tr></table>	Feature	Objective	Land use	Enhance the recreational use of the site in accordance with the approved Recreation Management Plan	Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance of site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds to other parts of the Kosciuszko National Park	Infrastructure	- Decommission and remove infrastructure, unless NPWS agrees otherwise - Restore all roads on site in accordance with the Long-Term Road Strategy	Community	Ensure public safety	
Feature	Objective											
Land use	Enhance the recreational use of the site in accordance with the approved Recreation Management Plan											
Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance of site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds to other parts of the Kosciuszko National Park											
Infrastructure	- Decommission and remove infrastructure, unless NPWS agrees otherwise - Restore all roads on site in accordance with the Long-Term Road Strategy											
Community	Ensure public safety											
	<i>Table 5: Rehabilitation Objectives – Rock Forest Site</i> <table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Land use</td><td> - Return the site to its previous use in consultation with the landowner </td></tr><tr><td>Land</td><td> - Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance on site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds </td></tr><tr><td>Infrastructure</td><td> - Decommission and remove development-related infrastructure, unless the Planning Secretary agrees otherwise </td></tr></table>	Feature	Objective	Land use	Return the site to its previous use in consultation with the landowner	Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance on site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds	Infrastructure	Decommission and remove development-related infrastructure, unless the Planning Secretary agrees otherwise			
Feature	Objective											
Land use	Return the site to its previous use in consultation with the landowner											
Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance on site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds											
Infrastructure	Decommission and remove development-related infrastructure, unless the Planning Secretary agrees otherwise											

Schedule 3 Condition 10	Rehabilitation Management Plan Within 18 months of the commencement of construction, the Proponent must prepare a Rehabilitation Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: (a) be prepared by a suitably qualified and experienced person in consultation with the NPWS, BCD, EPA, NSW DPI and TfNSW; (b) be consistent with the Spoil Management Plan, Recreation Management Plan, Long-Term Road Strategy and Visual Mitigation Management Plan; (c) include a conceptual plan for the rehabilitation of the whole site; (d) include the detailed program for the rehabilitation of roads in the Kosciuszko National Park in accordance with the approved Long-Term Road Strategy; € include a topsoil balance for the site, which includes a strategy for: • maximising the reuse of topsoil on site (provided it is suitable for reuse); • using other suitable growth media; and • importing additional topsoil to the site (if necessary); (f) include a native seed collection and propagation program in accordance with Florabank (www.florabank.org.au) and/or NPWS guidelines for the site, which includes a strategy for: • maximising the collection and use of native seed resources from the site prior to disturbance; • collecting seed from the surrounding area, including other parts of the Kosciuszko National Park (with the approval of the NPWS); and • prioritising the use of local sources of seed for the ecological rehabilitation of the site; (g) include detailed plans for the rehabilitation of the disturbance area at each of the following sites, describing the measures that would be implemented to comply with the rehabilitation objectives in Table 3 or 5: • Talbingo Reservoir; • Lobs Hole; • Marica; • Plateau; • Tantangara Reservoir; and • Rock Forest; (h) include a detailed ecological rehabilitation management plan for the development that: • provides an overarching description of the proposed ecological rehabilitation works, identifying the: - plant community types to be established; and - area of land to be established for each plant community type; • provides maps showing the proposed location of each plant community type; • describes the	See table 1-2.
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Condition	Requirement	Section Addressed
	detailed measures that would be implemented to comply with the ecological rehabilitation objectives in Table 4; (i) identify the key risks to the successful completion of the rehabilitation and describe the contingency measures that would be implemented to address these risks; (j) include detailed completion criteria and performance indicators for the rehabilitation of the development (having regard) to the criteria and indicators in Table 4, including criteria for triggering remedial action (if necessary); and (k) include a program to monitor and publicly report on: • the rehabilitation of the site; • the implementation of the each of the detailed plans, including the effectiveness of the proposed mitigation and contingency measures; and • progress against the detailed completion criteria and performance indicators.	
EPBC 2018/8322 Conditions		
24	Amenity and Landscape To minimise impacts to the environment in Kosciuszko National Park, the approval holder must comply with conditions 4—11 of the NSW approval relating to spoil management and site rehabilitation.	This document
25	The Rehabilitation Management Plan required by condition 10 of the NSW approval must include provisions to make monitoring data (excluding sensitive ecological data) available as part of the monitoring, evaluation and reporting program required by condition 10k of the NSW approval.	Section 11
NPWS Agreement for Lease (AFL)		
Clauses 20.1	Clause 20.1 requires that upon completion of particular works, Snowy Hydro (the Tenant) must obtain an updated environmental condition report in respect of the land. the focus of AFL Clause 20.1 is on addressing any contamination impacts on the land subject to the Tenant's activities	Section 1.3.4

Condition	Requirement	Section Addressed
Clauses 20.4	AfL clause 20.4, Snowy Hydro must Remediate and restore all areas of the Land accessed by the Tenant for the purposes of the Works so that: (a) the nature and extent of any Contamination on the relevant Land is no greater than the nature and extent of the Contamination that was detailed in the relevant EIS reports in respect to the relevant Land on or prior to the commencement of any Works on that Land; (b) all recommendations outlined in the report under clause 20.1 that are required to Remediate and restore all areas of the Land accessed by the Tenant for the purpose of the Works, are implemented to the satisfaction of the Landlord (acting reasonably); and (c) each of those areas accessed by the Tenant are, on completion of the Remediation and restoration works, to a standard equivalent to the assessment established under the Biodiversity Assessment Methodology report.	Section 1.3.4

2.2. Final Land Use Statement

2.2.1. Final Land Use

All areas not retained for permanent infrastructure will be revegetated and rehabilitated to be suitable for land uses outlined in Appendix C Final Land Use Domains (Including Recreation and roads). Suitability for final land uses will be attained by achieving the rehabilitation completion criteria for Snowy 2.0 Main Works set out in Table 4.4

The following surface infrastructure areas will be required and retained for the operation of Snowy 2.0:

- Water intake structures and gate houses at the Tantangara and Talbingo reservoirs;
- Permanent access tunnel portals and associated infrastructure including:
 - Main access tunnel (MAT);
 - Emergency Cable and Ventilation Tunnel (ECVT) portal;
- Ventilation shaft and head race tunnel surge shaft at Marica area;
- Permanent access roads;
- Tantangara and Talbingo barge launch areas;
- Transmission cableyard at the ECVT portal
- Lobs Hole Substation;
- Fish barriers;
- Water monitoring bores (extent of network to be confirmed); and
- Other ancillary permanent infrastructure.

Following the completion of construction, temporary construction pads, accommodation camps, rock emplacements and some access roads will be rehabilitated to be suitable for agreed final land uses as outlined in Appendix C. Final Land Use Domains (Including Recreation and roads) by achieving Table 4-4 Rehabilitation completion criteria for Snowy 2.0 Main Works

The Talbingo and Tantangara Reservoirs will continue to be used for boating and fishing; however permanent safety exclusion zones will be put in place in the vicinity of the intakes. Remote camping areas will be retained in the Lobs Hole and Tantangara areas for recreational use. These areas will either be retained or will be recreated during rehabilitation if they are disturbed during construction activities. Recreational areas will be restored and landscaped as agreed with NPWS and specified in the Recreation Management Plan and /or future master plans.

GF01 and Main Yard in Lobs Hole will be land formed mounds sympathetic with the surrounding topography and appropriate vegetation of the target PCT. All other temporary construction pad areas will be rehabilitated to native vegetation using the target PCT species, or an agreed recreational user camping area as agreed with NPWS.

The primary aim of rehabilitation works undertaken will be to leave a legacy that enables the Project to co-exist within KNP and maintain its values.

2.2.2. Final Landform Design

Final landform design and planning has been undertaken to identify opportunities for the reuse of excavated material in rehabilitation and in the construction of final landforms which complement the surrounding topography in the KNP. The final landform will be constructed from excavated material to create a safe and stable landform, commensurate with the surrounding topography of the area.

Reuse of the excavated material in the final landform will be subject to geochemical testing to confirm it is suitable to remain in situ. Any unsuitable materials will be remediated and removed from the areas to be rehabilitated and treated in accordance with the spoil management plan.

Detailed plans for the design (objectives, risks and completion criteria) for each emplacement area will be progressively developed and included in the Spoil Management Plan once prepared. The detailed plans will be approved prior to any construction occurring in the relevant emplacement area.

Geomorphic and ecological characterisation of construction areas will be undertaken prior to disturbance to record the existing conditions and values and the placement and rehabilitation approach will be progressive.

2.3. Final Land Use

2.3.1. Final Land Use Domains

Final land use domains are defined as land management units characterised by similar final land use objectives. Each final land use domain will require specific decommissioning and rehabilitation methods. The final land use domains for Snowy 2.0 are presented in Table 2-2 and shown in Appendix C.

Table 2-2 Final Land Use Domains

Code	Final Land Use Domain	Description
A	Retained Infrastructure	The following infrastructure areas will be retained as a final land use: - Water intake structures and gate houses at the Tantangara and Talbingo reservoirs; - Permanent access tunnel portals and associated infrastructure including: ○ Main access tunnel (MAT); ○ Emergency Cable and Ventilation Tunnel (ECVT) portal; - Ventilation shaft and head race tunnel surge shaft at Marica area;; - Permanent access roads; - Tantangara and Talbingo barge launch areas; - Transmission cableyard - Lobs Hole substation - Fish barriers - Water monitoring bores (Extent to be confirmed) - Other ancillary permanent infrastructure
B	Roads	Some new access roads or those which are upgraded, widened and sealed will be retained with agreement from NPWS in accordance with the Long Term Road Strategy. Some retained roads will remain open to the public post-construction and will enable access to locations previously only accessible by four-wheel drive; however, some will be utilised exclusively by Snowy Hydro for access to operational areas. (refer Appendix C Final Land Use Domains) This is to be determined through a Long Term Roads strategy.
C	Recreation Sites	It is intended that Lobs Hole and Tantangara areas will be retained as remote campsites. Recreational areas will be rehabilitated and landscaped in accordance with the Recreational Management Plan (to be completed). (refer Appendix C 2.0 Final Land Use Domains)
D	Native Vegetation	Areas in this final land use domain will be revegetated and returned to a native vegetation final land use. The species used for each area will be commensurate with that present prior to disturbance as per the Plant Community Type (PCT) mapped for the area (refer Appendix C Final Land Use Domains). Areas to be rehabilitated to native vegetation will include rehabilitated access roads.
E	Water Management	The Talbingo and Tantangara dams will remain as water storages that may permit fishing and boating as controlled by NPWS. Appropriate safety exclusion zones will be put in place in the vicinity of the intake structures.

2.3.2. Active Domains

Active domains identify the footprint of areas disturbed for project related activities. Active domains are defined as the set of discrete areas that have a particular operational or functional purpose and characteristics, such as similar geophysical and geochemical characteristics, or different built or temporary features such roads, culverts, pipes, power lines etc that will have similar decommissioning and rehabilitation requirements. Active domains were determined based on the EIS project disturbance area and project design. The indicative footprint of each active domain is shown in Appendix D and described in Table 2-3.

Table 2-3 Active Domains

Code	Active Domain	Description
1	Infrastructure	Infrastructure will be split into sub-domains 1.1 and 1.2 as follows:
1.1	Accommodation Camps	This domain will include the accommodation camps at Lobs Hole, Marica and Tantangara. Accommodation camps will provide accommodation and supporting services for the construction workforce.
1.2	Construction Portals and pads	This will include the construction pads on which construction facilities will be placed. Construction pads will typically be in the vicinity of construction portals where tunnelling is taking place.
2	Access Roads	This will include all access roads associated with the project. The number of utilised and upgraded access roads will increase as the project progresses. Stabilisation of disturbance associated with access roads will occur as soon as possible following disturbance.
3	Intakes	This domain will include the proposed permanent intake structures situated on the banks of the reservoirs. The following intake structures are proposed: - Talbingo intake and gatehouse; and - Tantangara intake and gatehouse.
4	Stockpiles	This domain includes the on-land emplacement areas (stockpiles) utilised for excavated material management.
5	Utilities	This domain will include disturbance corridors associated with the installation of the supporting utilities to service the project. This will include: - Power; - Water; - Sewage and process water treatment facilities; and - Communications. - GIP monitoring sites It is noted that a number of utilities will be installed within existing access road corridors; in this case these areas are included in Domain 2.

Code	Active Domain	Description
6	Water Management	This domain will include the disturbance areas for the Talbingo and Middle Bay barge ramps and associated Middle Bay navigation channel. Works in these areas will include the construction of barge infrastructure and dredging to establish the navigation channel.

3. Rehabilitation Risk Assessment

3.1. Rehabilitation Risk Assessment Workshop

In accordance with Condition 10(i) of CSSI 9687, the RMP must identify the key risks to the successful completion of rehabilitation and identify appropriate contingency measures to address the risks.

An initial rehabilitation risk assessment workshop was completed on Friday 3 September 2021 and included key Snowy Hydro personnel, consultants and rehabilitation specialists from the project team as shown in Table 3-1.

Table 3-1 Risk Assessment Participants

Name	Company	Position	Role
Rod Masters	SLR	Consultant Coordinator	Facilitator, Growth media, landform, rehabilitation specialist
Nathan Archer	SLR	Principal	Facilitator, rehabilitation specialist
Chris Buscall	Snowy Hydro	Project Director	Participant
Ben Croome	Snowy Hydro	Project Manager	Participant
Joshua Chikan	Snowy Hydro	Procurement	Participant
Paul Smith	Snowy Hydro	Engineering Lead	Participant
Russell Griffiths	Snowy Hydro	GIS	Participant, GIS specialist
Elizabeth MacPhee	Alpine Flora	Specialist	Participant, Sub-alpine ecology, seed collection / propagation, rehabilitation specialist

The workshop was guided by the *Guideline - Rehabilitation Risk Assessment (RR 2021)* and with consideration to ISO 31000:2009 *Risk Management Principles and Guidelines*. The risk assessment considered previous risk assessments including the Snowy 2.0 Exploratory Works Risk Assessment and was completed with the Snowy 2.0 Risk Matrix.

The risk assessment has been used to inform the preparation of this Plan. The objectives of the risk assessment were to:

- Identify the risks associated with rehabilitation of disturbance associated with the construction of the Snowy 2.0 to achieve the agreed final land use(s);
- Identify knowledge gaps in Snowy Hydro's current understanding of the risks to rehabilitation;
- Identify the investigations/controls/action plans necessary to effectively mitigate risks and/or realise opportunities and to close any identified knowledge gaps;
- Inform the development of this RMP, to provide a basis to determine additional investigations and/or project works to be undertaken; and

- Provide the framework to satisfy relevant internal and government guidelines, requiring implementation of a risk-based approach to closure.

The risk assessment workshop assessed a total of 42 key rehabilitation risks, which are summarised as:

- 8 risks were ranked as low;
- 22 risks were ranked as moderate;
- 12 risks were ranked as high; and
- 0 risks were ranked as extreme.

Following the initial risk assessment, a number of specialist project workshops were undertaken to address high risks and identify actions to fill the knowledge gaps. The workshops included key project team members and relevant technical specialists. A summary of the RMP workshops and key topics is included in Table 3-2.

Table 3-2 Rehabilitation Management Plan Specialist Workshops

Workshop	Content
Seed collection and propagation	• Species selection • Seed collection areas • Seed supply • Seed management • Cleaning and storage • Certification Tubestock propagation
Whole of site conceptual rehabilitation plan	• Rehabilitation objectives • Rehabilitation phases • Active domains • Final land use domains • Landform design • Revegetation strategy • Erosion and sediment control • Weed management Rehabilitation maintenance
Roads rehabilitation	• Roads' configuration (cut / fill batters) • Drainage • Erosion and sediment control • Temporary revegetation • Permanent revegetation • Maintenance
Topsoil management	• Soils inventory • Progressive soil testing • Stripping depths • Soil balance • Stripping, handling, stockpiling, resspreading • Amelioration • Weeds and pathogens • Seed bank

Workshop	Content
Detailed site rehabilitation plans	• Talbingo Reservoir • Lobs Hole • Marica • Plateau • Tantangara Reservoir • Rock Forest
Detailed Ecological RMP	• Ecological values • Rare vegetation • Habitat restoration • Ecology and landscape integration • Incorporation of cultural values • Mitigation • Awareness training • Adaptive management
Progressive rehabilitation implementation	• Rehabilitation schedule • Interim rehabilitation • Rehabilitation phases

Following the completion of the rehabilitation workshops, the risk assessment was reviewed to close out actions and re-assess the residual risk based on the completion of actions and filling of knowledge gaps. The risk assessment review assessed the residual risks as follows:

- 14 risks were ranked as low;
- 20 risks were ranked as moderate;
- 8 risks were ranked as high; and
- 0 risks were ranked as extreme.

A summary of the residual high risks is provided in Table 3-3. The rehabilitation risk assessment is attached as Appendix E.

Table 3-3 Summary of High and Extreme Risks

Risk to Rehabilitation	Risk Control	Current Risk Rating	Proposed New Control
Insufficient funding for rehabilitation activities	Budget preparation Experienced team to prepare RMP, Rehab Management Plan Scheduled workshops for preparation of RMP. Preliminary Rehabilitation works proposed as a guide for major rehabilitation works. Contract administrator allocated to rehabilitation	High	Use early rehabilitation to inform budget decisions Dedicated contract administrator allocated to rehabilitation Forecast based on price per HA

Risk to Rehabilitation	Risk Control	Current Risk Rating	Proposed New Control
Budget creep and inadequate budget management	Budget preparation Experienced team to prepare RMP, Rehab Management Plan Scheduled workshops for preparation of RMP. Early rehabilitation to provide guide for cost of different techniques	High	Use initial rehabilitation to inform budget decisions using traditional and alternative techniques Continued engagement with the market and revisitation of implementation strategy to ensure value for money.
Poorly defined, or unachievable ecological rehabilitation objectives	EIS approved Experienced team to prepare RMP, Rehab Management Plan Scheduled workshops for preparation of RMP. Rehab trials. Review of rehabilitation objectives. Regular reporting of rehabilitation progress throughout the project to identify issues. NPWS engagement through the steering committee. S HL to have dedicated personnel to manage rehabilitation program and quality aspects	High	SMART completion criteria, appropriate ecological function criteria. S - Smart M - Measurable A - Assignable R - Realistic T - Time related

Risk to Rehabilitation	Risk Control	Current Risk Rating	Proposed New Control
Inadequate seed collection/supply	Experienced team to prepare RMP, Rehab Management Plan Scheduled workshops for preparation of RMP. Rehab trials. GIS and spatial mapping of required rehab areas (understanding seed requirements), Seed collection undertaken last 3 years	High	Investigating what is appropriate provenance for seeding to get sufficient seed equivalent altitudes out of the KNP. Determine seed requirements per species. Literature review of seed collection-> seed success (mining examples) Establish Production Areas (SPAs) for hard to collect species where large quantities are required Include a TARP in RMP for issues with seed availability
Poor topsoil management.	Experienced team to prepare RMP, Rehab Management Plan Scheduled workshops for preparation of RMP. BMP Spoil management plan controls Testing of soil parameters to be include in RMP	High	Communication of stripping and stockpiling procedures with contractors Compliance with procedures set out in Snowy 2.0 Main Works - Spoil Management Plan - Appendix B and C Topsoil substitutes such as development of growth medium and amelioration of subsoils included in RMP. Scheduled audits of topsoil storage Include TARP in RMP for poor topsoil quality or inadequate quantity
Weed infestations in subsoil and topsoil resources	'Weed management plan measures in RMP Implemented by FG and Snowy Topsoil management plan Weed monitoring and spraying Consultation with NPWS on weed management	High	Inspect and use weed status of individual sites prior to topsoil stripping to help inform rehabilitation techniques. Defer use of weed laden topsoil for 2 years where possible. Reference sites to inform weed management criteria. Include TARP in RMP for weed infestations

Risk to Rehabilitation	Risk Control	Current Risk Rating	Proposed New Control
Damage from fauna (e.g. kangaroos, feral pigs, horses, deer etc.)	Management Plan includes some feral animal controls: - Monitoring - NPWS culling program - NPWS baiting	High	Fencing to be considered for rehabilitation areas. Engagement with NPWS if surrounding areas have high levels of pest animals that are having an effect on site control measure
Failure to obtain signoff for works from DPIE / not achieving satisfaction of NPWS	Engagement with NPWS throughout the process to ensure no surprises Experienced team to prepare RMP, Rehab Management Plan to include rehab maintenance program Scheduled workshops for preparation of RMP. Inclusion of NPWS in steering committees	High	Regular rehab progress inspections with key members of NPWS and supply of monitoring data (all sites at least every 2 years)

4. Rehabilitation Objectives and Rehabilitation Completion Criteria

4.1. Rehabilitation Objectives and Rehabilitation Completion Criteria

4.1.1. CSSI 9687 Requirements

In accordance with Schedule 3 Condition 9 of CSSI 9687 Snowy Hydro will:

- rehabilitate all parts of the site within the KNP to comply with the rehabilitation objectives in Table 4-1 and the ecological rehabilitation objectives in Table 4-2;
- rehabilitate the Rock Forest site to comply with the rehabilitation objectives in Table 4-3;
- complete the initial rehabilitation of the site - including the removal of all temporary infrastructure, creation of landforms, narrowing of roads - within three years of completing construction;
- complete the ecological rehabilitation of the site, apart from the areas used for operations, within 20 years of completing construction;
- complete the final rehabilitation of the site, including the removal of all remaining infrastructure, within three years of decommissioning the development; and
- complete the ecological rehabilitation of the areas used for operations within 20 years of decommissioning the development.

Table 4-1 Rehabilitation Objectives – Kosciuszko National Park

Feature	Objective
Land use	- Enhance the recreational use of the site in accordance with the approved Recreation Management Plan
Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2¹ - Minimise surface disturbance of site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds to other parts of the Kosciuszko National Park
Infrastructure	- Decommission and remove infrastructure, unless NPWS agrees otherwise - Restore all roads on site in accordance with the Long-Term Road Strategy
Community	- Ensure public safety

1

Table 4-2 Ecological rehabilitation objectives, including indicative completion criteria and performance indicator

Ecological Rehabilitation Objective	Completion Criteria	Performance Indicators
Ecological rehabilitation objective 1: The vegetation composition of the rehabilitation is recognisable as the target vegetation community contained within the BioNet Vegetation Classification and which was present on site prior to the project's temporary disturbance.	(a) Native plant species composition is characteristic of the target PCT based on suitable analysis against a reference data set using the PCT Assignment Tool (b) The target PCT BAM composition score is within or greater than the inter-quartile range of local reference site values for the assigned PCT.	All native vascular plant species are monitored to species level from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary. Monitoring should include appropriate reference sites outside the disturbance area, ideally capturing the range of variation of the 2003 and 2019/20 fires.
Ecological rehabilitation objective 2: The vegetation structure of the rehabilitation is recognisable as, or shows a substantial trend towards, a PCT contained within the BioNet Vegetation Classification, and which was present on site prior to the project's temporary disturbance.	Cover, abundance and height range of native plant growth forms are characteristic of the target PCTs and within or greater than the inter-quartile range of local reference site values for the assigned PCT.	The cover, abundance and height range of all native vascular plant species are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary.
Ecological rehabilitation objective 3: Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable or shows a substantial trend towards a self-sustaining state.	Growth medium, including topsoil, is suitable for target PCTs establishment, and indicators of nutrient cycling are suitable for sustaining the target PCTs. All priority attributes of nutrient cycling, soil processes and both subsoil and topsoil properties should be within or greater than the interquartile range of local reference site values for the assigned PCT. Rehabilitation vegetation communities are maturing, and natural recruitment is occurring for species within each growth form at rates within or greater than the interquartile range of local reference site values for the assigned PCT.	Growth medium, covering both subsoil and topsoil properties, and soil processes are monitored using methods approved by the Planning Secretary. All species are monitored for establishment of second-generation juveniles /immatures and capacity for recruitment from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary

Ecological Rehabilitation Objective	Completion Criteria	Performance Indicators
	The number and ground cover of weed species is comparable to, or less than, the interquartile range of local reference site values for the assigned PCT.	Number and ground cover of weed species are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary.
	Fauna habitat features and resources (food and shelter characteristics) within the rehabilitation vegetation communities are present and within or greater than the interquartile range of local reference site values for the assigned PCT.	Presence/absence of some fauna habitat features (e.g. flowering plant, decorticated bark, stags with hollows and/or nest boxes) and quantitative assessment of other features (e.g. leaf litter cover, bare ground, wood debris) are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method and/or other method approved by the Planning Secretary.

Table 4-3 Rehabilitation Objectives – Rock Forest Site

Feature	Objective
Land Use	- Return the site to its previous use in consultation with the landowner
Land	- Safe, stable and non-polluting - Ensure the creation of all new landforms complies with the design criteria in Table 2 - Minimise surface disturbance on site during construction - Progressively rehabilitate the site as soon as possible following disturbance - Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, and the spread of weeds
Infrastructure	- Decommission and remove development-related infrastructure, unless the Planning Secretary agrees otherwise

4.1.2. Snowy 2.0 Main Works Rehabilitation Strategy EIS Commitments

The following overarching rehabilitation objectives are as reported in the Snowy 2.0 Main Works Rehabilitation Strategy (SLR, 2019) submitted with the Environmental Impact Statement (EIS).

The primary rehabilitation objective for Snowy 2.0 is to provide a landform that is safe, hydraulically and geotechnically stable and non-polluting. The final landform will be designed and constructed to be similar to the pre-development landform and topography and commensurate with the surrounding ecosystems.

In consideration of the proposed final land use, Snowy Hydro have established key rehabilitation principles to restore the park following impacts of the Project and potential changes to parts of the park's character and habitats. Rehabilitation objectives for the project include:

- Preserve the KNP's natural assets and values;
- Agree on future land use and consider long-term site management;
- 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 under Commonwealth legislation, respectively;
- Where reasonable and feasible, rehabilitate disturbed areas to their pre-existing or improved state at completion of construction activity in consultation with NPWS; and
- Minimise visual impact of construction works from significant public viewpoints.

4.2. Rehabilitation Completion Criteria

Completion criteria are objective target levels or values assigned to a variety of indicators (e.g. slope, species diversity, percent groundcover), which can be measured to demonstrate progress and ultimate success of rehabilitation. As such, they provide a defined end point, at which point in time rehabilitation can be deemed successful and the lease relinquishment process can proceed. The rehabilitation completion criteria for all areas of Snowy 2.0 are listed in Table 4-4 (derived from COA schedule 3 condition 9 (table 4)).

These completion criteria will be utilised to demonstrate achievement of rehabilitation objectives. It is noted that the completion criteria may be subject to refinement as rehabilitation progresses, including as a result of ongoing consultation with the relevant stakeholders, studies yet to be completed and continuous improvement process informed by rehabilitation monitoring results. The achievement (or otherwise) of the completion criteria will be monitored and reported as required.

Rehabilitation completion criteria have been informed by the following information:

- Relevant conditions of CSSI 9687;
- The RR rehabilitation guideline documents including:
- Form and way: Rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan for large mines. (NSW Resources Regulator, 2021a)
- Guideline: Rehabilitation objectives and rehabilitation completion criteria. (NSW Resources Regulator, 2021)
- Completion criteria from the previously prepared rehabilitation strategies for the Snowy 2.0 Exploratory Works and Main Works Environmental Assessments;
- Similar rehabilitation projects; and
- Specific information collected to date during detailed planning investigations.

Table 4-4 Rehabilitation completion criteria for Snowy 2.0 Main Works

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
Phase 1 - Active					
All domains	All domains	Minimise risk of injury to people and animals	Appropriate security measures implemented (where required) prior to commencing works.	Appropriate security measures in place.	Risk assessment completed and actioned
		Minimise the impact of vegetation clearance activities on flora and fauna	Appropriate measures have been implemented (where required) to minimise the impact on flora and fauna	Pre-clearance surveys undertaken and disturbance / no go areas demarcated.	Pre-clearance records
		Erosion will be managed	Erosion and sediment controls	Erosion and sediment control structures have been progressively installed and maintained during disturbance in accordance with the site Erosion and Sediment Control Plans.	Site records and reports Erosion and Sediment Control Plans
		Topsoil and subsoil will be appropriately stripped and managed for use in rehabilitation	Soil resource available for rehabilitation	Topsoil and subsoil stripped and stockpiled in accordance with requirements stipulated in the Rehabilitation Management Plan and Topsoil Strategy.	Site records and reports Soil inventory
		Seeds, sods or cuttings have been collected from appropriate PCTs for use in final rehabilitation	Appropriate seed is available for rehabilitation.	Appropriate seeds, sods or cuttings have been collected from appropriate PCTs for use in final rehabilitation and established for use as required.	Site records and reports Seed inventory

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
		Employ interim rehabilitation strategies to areas that can't be permanently rehabilitated yet to minimise dust generation, erosion, uncontrolled discharges of sediment, minimise visual impact where appropriate and the spread of weeds to other parts of the Kosciuszko National Park	Installation of interim rehabilitation measures	Appropriate interim rehabilitation measures including erosion and sediment controls have been progressively installed and maintained during disturbance. This may include weed control, mulching, hydromulching seeding, planting	Site records, inspections and reports
Phase 2 – Decommissioning and Demolition					
All domains	1 - Infrastructure	Decommission and remove infrastructure, unless NPWS agrees otherwise	All services, including power, water, data and telephone, that are not required for final land use have been safely isolated, disconnected and terminated.	All utility infrastructure removed.	Site records and reports
			All surface and subsurface infrastructure that is not required for the final land use dismantled and removed from the site. Unless approved by NPWS to remain	All redundant infrastructure removed.	Statement provided and before/after photos.

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
			All surface entries and tunnels have been closed and sealed	All surface entries and tunnels not required for operational access have been closed and sealed to prevent public access.	Engineered design and final construction reports, closure records
			Infrastructure to be retained is agreed with NPWS	The infrastructure proposed for retention is acknowledged by NPWS.	Written agreement for retained infrastructure from NPWS
B - Roads	2 – Access Roads	Restore all roads onsite in accordance with the Long-Term Road Strategy	Retained roads and access tracks are stabilised and restored.	Stabilisation of roads and access tracks complete.	As-constructed final landform plan, photos etc. Plans for all non-exclusive SHL roads to be provided to NPWS
A – Retained Infrastructure B – Roads C – Recreation Sites	1 – Infrastructure 2 – Access Roads	Unless the Proponent and the applicable authority agree otherwise, the Proponent must: (a) repair, or pay the full cost associated with repairing, any public infrastructure that is damaged by the development; and (b) relocate, or pay the full cost associated with relocating, any public infrastructure that needs to be relocated as a result of the development.	All public infrastructure damaged by the project is repaired/relocated and is safe and stable for use.	Repair / relocation works complete.	Post construction survey Applicable authority agency agreement

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
All domains	All domains	Land and Water Contamination: There is no residual soil contamination on site that is incompatible with the final land use or that poses a threat of environmental harm.	Waste material systematically removed from site during construction and/or visible contamination areas on site surface are removed.	There are no visible signs of contamination following the removal of plant, equipment and materials. No inadvertent burial of contaminated materials All rubbish/ waste materials removed from site.	Contamination reports. Written statement. Photographic records Waste facility receipts.
		Contaminated areas are identified and remediated, removed or otherwise managed	Contaminated soils presenting constraints to final land use have been identified and remediated or removed from the areas to be rehabilitated or appropriately managed (in accordance with legislation and EPL).	Contamination reports. Written statement. Photographic records Waste facility receipts.	Contaminated areas are identified and remediated, removed or otherwise managed Contamination reports provided to appropriate agencies
A – Retained Infrastructure B – Roads C – Recreation Sites D – Native Vegetation	4 - Stockpiles	All Potential Acid Forming (PAF) materials are identified and remediated, removed or otherwise managed	PAF materials areas are identified and remediated, removed or otherwise managed	PAF material tested to confirm it is suitable to remain in situ and any hostile materials remediated, removed from the areas to be rehabilitated, or appropriately managed. Subject to testing indicating it is non PAF and meets all requirement of the spoil management plan the material may be disposed of sub-aqueously. Materials managed in accordance with EPL	Geochemical test results and/or remediation and verification, rehabilitation, or disposal records

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
Phase 3 – Landform Establishment					
C – Recreation Sites D – Native Vegetation	1 - Infrastructure 2 - Roads 4 - Stockpiles	The final landform is stable for the long-term and does not present a risk of environmental harm downstream/downslope of the site or a safety risk to the public/stock/native fauna. Landform is commensurate with surrounding natural landform.	Landform constructed to design	Landform survey verifies constructed landform safe and stable and is generally in accordance with the approved landform detailed design.	Detailed design - use of heat map to compare as-built levels with design levels.
			Indicators of erosion and land instability. Indicators that surface water management structures are functioning as designed.	Rehabilitated slopes are free draining with appropriate drainage in place so that water will not undermine the structure in the long term. No visual signs of land instability such as mass movement. No gullies, tunnel erosion features or rills > 300mm deep or wide.	“Significant” deviations from the design gradient assessed using static erosion risk assessments and adjustments made to the final capping layer if required.
			Drainage structures are constructed to design and specification	Final landform drainage structures including drains, banks, drop structures and dams constructed in accordance with best practice site specific erosion and sediment control requirements where required .	Visual inspection including photographic documentation of any rills or gullies of concern. As constructed survey to verify features such as drainage lines.
C – Recreation Sites D – Native Vegetation	4 - Stockpiles	Landform has been constructed in accordance with the Design Objectives for Permanent Spoil Emplacement Areas (Table 2 of CSSI 9687)	Slope, aspect, height, geomorphic design indicators (static erosional assessment) as calibrated against the LEM modelling	Landform survey verifies constructed landform safe and stable and is generally in accordance with the approved landform detailed design.	Use of high-density LiDAR (minimum 20points/m2) on an annual or bi-annual basis to verify erosion rates and overall stability. Frequency to be reduced as acceptable trends are established.
				Landform meets the Emplacement Area Completion Criteria specified in the relevant Spoil Management Plan	

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
		Landform that is commensurate with surrounding natural landform.	Slope, aspect, height, geomorphic design indicators	Landform survey verifies constructed landform is generally in accordance with the approved landform detailed design.	Assessment records, including Wolman counts on the rock drain after construction to demonstrate adequacy of rock grading. Verification of level of basal cover achieved by the vegetation where relevant
Phase 4 – Growth Medium Development					
C – Recreation Sites D – Native Vegetation	All domains	Growth media appropriate for the intended final land use is reinstated at all rehabilitation areas.	Growth media application and depth	Topsoil or suitable alternative is spread in designated areas at the specified depth appropriate to the final land use.	Rehabilitation records Landform survey
	4 – Stockpiles	Growth media characterised and ameliorated for final land use as required	Soil/spoil quality parameters	Areas of benign excavated material utilised for targeted native vegetation are characterised as suitable for vegetation establishment	Soil testing results Rehabilitation records
				Soil ameliorants (e.g. gypsum, mulch, biosolids, composts) are applied where necessary at the recommended application rate based on soil analysis.	Soil testing results Rehabilitation records
Phase 5 – Ecosystem and Land Use Development					
D – Native Vegetation	All domains	Ground cover comparable to reference vegetation communities.	Direct seeding rate	Direct seeding has been undertaken at the specified rate (t/ha) to provide sufficient ground coverage once established.	Planting records
			Plant density and ground cover	Rehabilitation plantings have been planted at the specified density (plants/ha) to provide sufficient ground coverage once established.	Planting records Meeting completion criteria

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
		Community structure/species composition is comparable to reference vegetation communities	Community composition	A mixture of native trees, shrubs and grasses generally commensurate with that in the appropriate PCT(s) has been seeded/planted in accordance with specifications.	Planting records Meeting completion criteria
C – Recreation Sites	All domains	Recreational sites have been seeded / landscaped as agreed with NPWS and specified in the Recreation Management Plan and /or future master plans	Ground cover	Landform survey assessment confirms recreational sites have been seeded / landscaped in accordance with the agreed master plan.	Planting and rehabilitation records NPWS Agreement that works have been completed as per agreed criteria
All domains	All domains	Erosion does not present a safety hazard or compromise the post construction land capability.	Indicators of erosion and land instability.	No erosion features (greater than 500 mm depth) that compromise land capability or the final post construction land use.	Rehabilitation monitoring records
		Weeds and animals do not present a risk to rehabilitation	Weed density	Weed density in rehabilitation areas is comparable with reference sites.	Weed presence in rehabilitation monitoring and site inspection records
			Grazing animal impacts	Plantings have been installed with appropriate vegetation protection implemented.	Site specific rehabilitation plans Planting records Site inspection reports
Phase 6 – Ecosystem and Land Use Sustainability					

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
D - Native Vegetation	All domains	Ecological rehabilitation objective 1: The vegetation composition of the rehabilitation is recognisable as the target vegetation community contained within the BioNet Vegetation Classification and which was present on site prior to the project's temporary disturbance. (As per CSSI 9687 Schedule 3 Condition 9)	All native vascular plant species are monitored to species level from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary. Monitoring should include appropriate reference sites outside the disturbance area, ideally capturing the range of variation of the 2003 and 2019/20 fires.	(a) Native plant species composition is characteristic of the target PCT based on suitable analysis against a reference data set using the PCT Assignment Tool (b) The target PCT BAM composition score is within or greater than the inter-quartile range of local reference site values for the assigned PCT. Site specific rehabilitation plans include species list for either direct seeding or tube stock planting of key species identified for the relevant PCTs based on both the Biodiversity Development Assessment Report (BDAR) and specialist input	Rehabilitation monitoring reports Final Independent ecological reports that validate rehabilitation completion criteria have been met Site specific rehabilitation plans

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
D - Native Vegetation	All domains	Ecological rehabilitation objective 2: The vegetation structure of the rehabilitation is recognisable as, or shows a substantial trend towards, a PCT contained within the BioNet Vegetation Classification and which was present on site prior to the project's temporary disturbance.	The cover, abundance and height range of all native vascular plant species are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary.	Cover, abundance and height range of native plant growth forms are characteristic of the target PCTs and within or greater than the inter-quartile range of local reference site values for the assigned PCT.	Rehabilitation monitoring reports Final Independent ecological reports that validate rehabilitation completion criteria have been met
D - Native Vegetation	All domains	Ecological rehabilitation objective 3: Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable or shows a substantial trend towards a self-sustaining state.	Growth medium, covering both subsoil and topsoil properties, and soil processes are monitored using methods approved by the Planning Secretary.	Growth medium, including topsoil, is suitable for target PCTs establishment, and indicators of nutrient cycling are suitable for sustaining the target PCTs. All priority attributes of nutrient cycling, soil processes and both subsoil and topsoil properties should be within or greater than the interquartile range of local reference site values for the assigned PCT. Attributes include; depth of leaf litter, cryptograms Total Carbon and total Nitrogen	Rehabilitation monitoring reports Final Independent ecological reports that validate rehabilitation completion criteria have been met

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
			All species are monitored for establishment of second-generation juveniles /immatures and capacity for recruitment from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary	Rehabilitation vegetation communities are maturing, and natural recruitment is occurring for species within each growth form at rates within or greater than the interquartile range of local reference site values for the assigned PCT.	Rehabilitation monitoring reports Final Independent ecological reports that validate rehabilitation completion criteria have been met
			Number and ground cover of weed species are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method, and/or other method approved by the Planning Secretary.	The number and ground cover of weed species is comparable to, or less than, the interquartile range of local reference site values for the assigned PCT. Monitoring program to feed into annual weed control program	Rehabilitation monitoring reports Weed control program records

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
			Presence/absence of some fauna habitat features (e.g. flowering plant, decorticating bark, stags with hollows and/or nest boxes) and quantitative assessment of other features (e.g. leaf litter cover, bare ground, wood debris) are monitored from fixed 0.04 ha monitoring plots in accordance with the BAM, transect intercept method and/or other method approved by the Planning Secretary.	Fauna habitat features and resources (food and shelter characteristics) within the rehabilitation vegetation communities are present and within or greater than the interquartile range of local reference site values for the assigned PCT. Site specific rehabilitation plans include target quantities of stags and hollows based on the interquartile range of appropriate PCTs based on the BDAR survey	Rehabilitation monitoring reports Site specific rehabilitation plans Final Independent ecological reports that validate rehabilitation completion criteria have been met
D - Native Vegetation	All domains	Rehabilitation areas are healthy, sustainable and comparable with surrounding vegetation community	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	Rehabilitation monitoring reports

Final Land Use Domain	Active Domain	Rehabilitation Objective (desired feature and/or characteristics of the final land use domain)	Indicator (specific attribute associated with the objective)	Rehabilitation Completion Criteria (benchmark for the indicator, based on reference data where appropriate) Derived from COA schedule 3 condition 9 (table 4)	Record/Justification/Validation Method (evidence that the benchmark has been achieved)
			Animal impacts	Vertebrate pest species – presence and damage is recorded and controlled. Domesticated stock - presence and damage is recorded and controlled.	Rehabilitation monitoring reports Site Inspections
All domains	All domains	Bushfire: The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Appropriate relevant controls demonstrated in accordance with Bushfire management plan	Bushfire controls including Asset Protection Zones (APZs) implemented.	Statement provided and before/after photos.
E - Water Management	6 - Water Management	Surface Water: Runoff water quality from project site is similar to, or better than the pre-disturbance runoff water quality.	Water quality parameters as specified in the EPL	Water quality discharged from rehabilitated area meet specifications in EPL	Water quality monitoring reports. Independent hydrological assessment report.

5. Final Landform and Rehabilitation Plan

5.1. Final Landform and Rehabilitation Plan – electronic copy

In accordance with the requirements of the Form and Way: Rehabilitation Management Plan for Large Mines (RR, 2021a) Final Landform and Rehabilitation Plans have been prepared to show the proposed final land use and final landform of the Snowy 2.0 Project Area.

Given the geographic extent of the Snowy 2.0 project area, the final land use plans have been presented as a number of plans over the project area. The final land use plans are as presented in Appendix C.

Detailed final landform plans are presented in the approved S2-FGJV-ENV-PLN-0019- P] Snowy 2.0 Main Works - Spoil Management Plan and associated agreed site-specific spoil management plans (currently in draft)..

6. Rehabilitation Implementation

6.1. Progressive Rehabilitation

Rehabilitation will be carried out in several phases through the construction period as outlined in Section 6.3 to achieve the desired outcome for KNP and also for Rock Forest which is outside KNP. Preparatory activities during (or prior to) construction to achieve improved rehabilitation outcomes will be performed, such as salvaging habitat resources and native seed collection, collection of seeds, sods or cuttings from appropriate plant community types (PCTs) for use in final rehabilitation.

Disturbed areas and areas of completed final earthworks will be rehabilitated in progressive sequence as soon as practicable following the completion of earthworks, or when disturbed areas (such as lay-down areas or access tracks) are no longer required for construction purposes. The sequence of progressive rehabilitation will be undertaken in accordance with the rehabilitation schedule discussed in Section 6.2.

6.2. Proposed Rehabilitation Schedule

The currently scheduled progressive rehabilitation is presented in Table 6-1. The rehabilitation schedule will be regularly reviewed during the project with additional areas added as they become available for rehabilitation. Updates to the rehabilitation schedule will be included in future revisions of this RMP. The general rehabilitation sequencing for the project is shown in Figure 6-1.

Table 6-1 Rehabilitation Program (as of May 2024)

Activity ID	Start	Finish
MCA0 - Ravine Road Stage II - Ch. 0 to Ch. 7+000 - Topsoil and mulch application	Commenced	Ongoing
MCA0 - Ravine Road Stage II - Ch. 7+000 to Ch. 14+900 - Topsoil and hydromulch application	Commenced	Ongoing
Trunk Services Plateau section – Reinstatement of natural surface level, topsoil and hydromulching including native seed	Commenced	Ongoing
Access tracks and drill sites – Topsoil and mulch application	Commenced	Ongoing
Marica Trail Ch. 0 to Ch 1+200 - Topsoil and hydromulch application including native seed	Commenced	Ongoing
Lobs Hole Site Entrance	Spring 2024	Ongoing
Tantangara Quarry Trail – Topsoil, mulching and native seed application	Commenced	Ongoing
Mine Trail Cut batter -	Autumn 2024	Ongoing
Completed Permanent Infrastructure APZs and surrounds	Autumn 2024	Ongoing
GF01 Spoil emplacement	Spring 2024	Ongoing
Tantangara spoil emplacement	Spring 2024	Ongoing

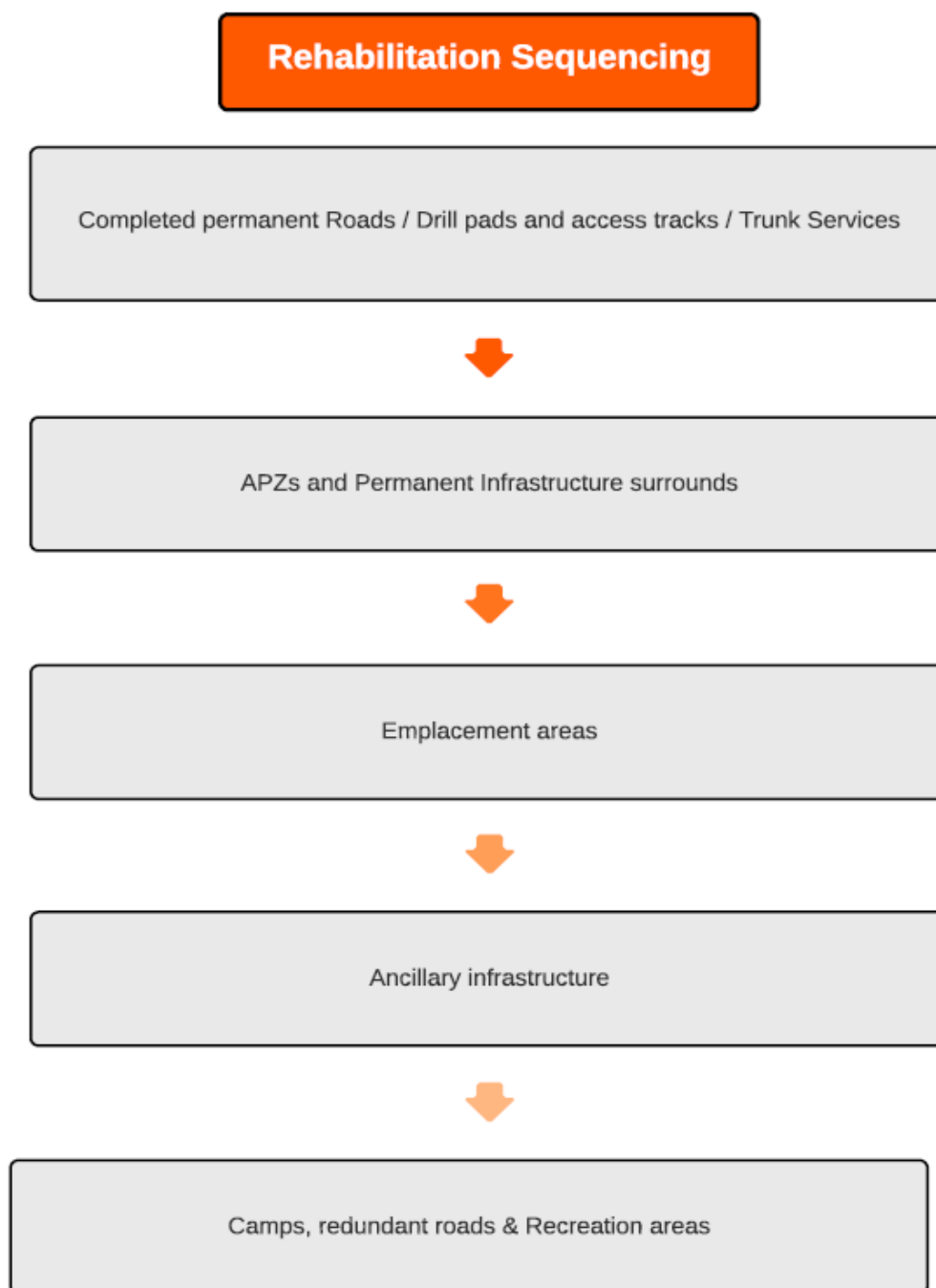


Figure 6-1 **Rehabilitation Sequencing**

6.3. Phases of Rehabilitation and General Methodologies

Achievement of the agreed post land use will be reached through a series of conceptual rehabilitation phases. Consistent with the Resource Regulator (2021) the rehabilitation phases are presented in Table 6-2.

Table 6-2 Rehabilitation Phases

Rehabilitation Phase	Description
Active	Activities undertaken during (or prior to) construction and operations to enhance rehabilitation, such as salvaging and managing soil resources, salvaging habitat resources and native seed collection. Temporary stabilisation of batters and construction of appropriate erosion and sediment control devices. Topsoil application, mulching and seeding where appropriate
Decommissioning	This phase of rehabilitation includes activities associated with the removal of infrastructure, unless agreed to be retained, and the removal, remediation or management of contaminated and hazardous materials.
Landform Establishment	This phase of rehabilitation consists of the processes and activities required to construct the approved final landform. In addition to profiling the surface of rehabilitation areas to the approved final landform profile this phase may include works to construct or remove surface water drainage features, encapsulate problematic materials and preparation of a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials).
Growth Medium Development	This phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species) to ensure achievement of the rehabilitation objectives and completion criteria. This phase will include spreading the prepared landform with topsoil and/or subsoil and/or soil substitutes, applying soil ameliorants to enhance the physical, chemical and biological characteristics of the growth media, and actions to minimise loss of growth media due to erosion. Production of growth medium replacements will also be produced where required.
Ecosystem and Land Use Establishment	This phase of rehabilitation consists of the processes to establish the final land use following construction of the final landform. For vegetated land uses this rehabilitation phase includes planting and seeding of species that form the desired Plant community and implementing land management activities such as weed control and the additional of thatch and logs. Techniques for establishing adequate conditions for affected bogs and fens within the project footprint to function will also be implemented
Ecosystem and Land Use Development and sustainability	This phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the rehabilitation objectives and completion criteria. For vegetated land uses this phase may include processes to develop characteristics of functional self-sustaining ecosystems, such as nutrient recycling, vegetation flowering and reproduction, and increasing habitat complexity, and development of a productive, self-sustaining soil profile. This phase of rehabilitation will include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.

6.3.1. Active Phase

A number of activities will be undertaken during or prior to active works associated with the project to enhance rehabilitation outcomes. Activities undertaken in this regard are summarised below for context.

6.3.1.1. Seed Collection and Propagation

Species Selection

Seed collection and establishment of a propagation program is a key component of the successful completion of rehabilitation for the Snowy 2.0 project.

Snowy Hydro has engaged Alpine Flora to review the species list for the project to determine the viability of the various species for use in rehabilitation of the different community types. Alpine Flora has specialist knowledge of rehabilitation in KNP both in seed collection and rehabilitation works.

The review determined that not all native species are viable for collection and/or use in rehabilitation due to the following reasons:

- Species is semi parasitic and there is no contemporary knowledge of how to grow it;
- Species is very hard to grow with limited chance of success;
- Species too small with limited viability (will not be able to compete);
- Species will re-establish naturally; and/or
- Species is currently under stress or not seeding because of the 2020 bushfire.

As such, Snowy Hydro has elected not to collect seed or cuttings from a number of species to focus time and effort on collection of species with greater chances of rehabilitation success.

Snowy Hydro has developed a species list for species to be targeted for seed collection, the list excludes inappropriate species for use in active rehabilitation for the reasons dot pointed above. The rehabilitation species list is attached as Appendix G. The species list will be reviewed annually by SHL rehabilitation manager and an appropriately qualified and experienced specialist, based on new information / changes to the above-mentioned limitations (particularly fire recovery) and results from monitoring undertaken as part of the project.

Seed Collection Program

Seed collection will be undertaken by approved seed collection contractors in accordance with the *Florabank Model Code of Practice for community-based collectors and suppliers of native seed* (www.florabank.org.au) and/or NPWS regulations and guidelines.

Seed collection is undertaken in consultation/ approval with NPWS, with appropriate notifications provided prior to commencing works.

The Snowy 2.0 seed collection program commenced in the 2020/21 season and targeted the dominant overstorey species that have moderate to long term viability in regard to seed longevity, given that the majority of the Main Works rehabilitation is a few years away.

Species from the Myrtaceae, Mimosaceae, Proteaceae and Fabaceae were the target collection Families for seed for the Snowy 2.0 project. Seed collection areas for the 2020/21 season included:

- The Blowering Foreshore where 300,000 trees and shrubs, which have many of the target species for collection, were planted as carbon offsets by Greenfleet. This area extends from Log Bridge to the Blowering NPWS depot predominately on the upslope side of Snowy Mountain Highway.
- Southern areas of KNP that were not burnt in the 2019/20 bushfires, which have many of the target species for collection. This is a large area; however, no alpine areas were accessed for seed collection. Areas such as the Thredbo Valley Track corridor /Alpine Way, the foreshore of the Jindabyne Lake and Guthega Road (lower reaches) were the focus collection areas.

Given the severe fire damage of January 2020, no seed was collected from the Lobs Hole or any other burnt area within the KNP that season.

Cutting collection also occurs within the proposed areas for seed collection.

Seed collection in the 2021/22 season continued in the above listed areas with addition of other areas around the project where particularly the grass and forbs species had recovered. The seed collection program will be reviewed annually to focus on appropriate areas within the KNP.

Seed Inventory, Storage and Propagation

The current seed inventory (as of September 2023) is presented in Appendix F Snowy 2.0 Seed Inventory - September 2023. The seed inventory will be updated following each seed collection campaign to ensure volumes of seed are maintained (note there is a lag from collection from collection to drying processing and being included in the inventory).

All collected seed will be stored in accordance with Florabank guidelines and independent seed viability testing will be undertaken on a regular /as needed basis. Seed is currently stored in 3 locations by appropriate third party providers

As tubestock will also be needed to achieve suitable vegetation community composition, engagement and / or establishment of a local nursery will be undertaken to produce projected numbers of suitable species. Collected seed and cuttings will be supplied to the nursery to propagate tubestock, together with a proposed schedule for rehabilitation. Seed will be provided for propagation through the seed collection program managed by SHL as authorised as part of the SSI project approval.

6.3.1.2. Site Preparation and Establishment

All temporary construction pads and accommodation camps will be temporary and will be decommissioned and rehabilitated at the completion of construction (within 3 years). As such, these areas will be planned, established and managed with consideration of the final decommissioning and rehabilitation of the site. Key activities which will be undertaken in this regard are as follows:

- reviewing detailed design and construction methodologies to minimise clearing then conducting pre-clearance surveys to minimise the impact of vegetation clearance activities on flora and fauna;
- minimising access to, and disturbance of, watercourses and aquatic habitats by construction plant;
- establishing stockpiles and construction material compounds in locations where they will not impact watercourses;
- progressively installing appropriate best practice erosion and sediment control devices. Erosion and sediment control devices should be designed and installed in accordance with the specifications contained in *Managing Urban Stormwater – Soils and Construction, Volume 1, 4th edition* (Landcom, 2004), *Volume 2A Installation of Services* (DECC, 2008a) and *Volume 2C Unsealed Roads* (DECC, 2008b) or equivalent.
- collecting and stockpiling organic matter from construction cuts and clearances, including topsoil, woodchip and mulch for use in rehabilitation;
- installing appropriate hazardous materials controls prior to any hazardous materials being brought to the site to minimise the risk of contamination during the project. This may include temporary bunding, sealed and bunded storage facilities and spill kits; and
- implementing appropriate waste management protocols to ensure that construction materials are removed from the site once they are no longer required.

6.3.1.3. Erosion and Sediment Control

Site specific Erosion and Sediment Control Plans (ESCPs) will be prepared throughout the project to address the individual requirements of the various construction areas.

Erosion and sediment controls will be designed and installed in accordance with the specifications contained in *Managing Urban Stormwater – Soils and Construction, Volume 1, 4th edition* (Landcom, 2004), *Volume 2A Installation of*

Services (DECC, 2008a) and *Volume 2C Unsealed Roads* (DECC, 2008b) or equivalent. Local alpine conditions and guidelines will be considered where applicable.

6.3.1.4. Vegetation Removal and Topsoil Stripping

Stripping and stockpiling of topsoil and mulching vegetation has been conducted project wide, both of these resources have been stockpiled to allow the reconstruction of growth media and is a key rehabilitation management measure.

Vegetation Removal

Native trees and other features (e.g. trunks, logs, large rocks, branches, small stumps and roots) for the most part have been salvaged during vegetation clearance activities and stockpiled for relocation to areas undergoing rehabilitation. These features may be used to assist with erosion and sediment control measures and will potentially provide habitat resources for a range of invertebrate and ground dwelling fauna. However it should be noted that materials stockpiled during exploratory works were lost during the 2019/2020 fires. Also following the fires a hazardous tree removal program was undertaken by the project with a significant volume of trees stockpiled that could be utilised for rehabilitation activities if required.

Other native trees removed during vegetation clearance activities will be mulched and stockpiled for use during landscape planting. The ground-layer vegetation and low shrubs can be incorporated into the topsoil when it is stripped. This will enhance the soil seed bank on the rehabilitation.

Topsoil Stripping and Handling

Topsoil will be stripped progressively and in a staged manner. Suitable topsoil will be identified through the following steps:

- identification of usable soil resources and stripping guidelines;

The following steps will be undertaken during topsoil stripping:

- Environmental avoidance areas will be marked and fenced;
- Undertake preparation of the site and installation of control measures as required by the EMS and other sub-plans. In particular, erosion and sediment control measures will be installed and further planned for where progressive installation is required;
- The area to be stripped will be clearly identified on the ground to avoid over stripping and / or entering areas beyond the disturbance footprint. The target depths of topsoil and subsoil to be stripped for each location will be clearly communicated to machinery operators and supervisors;
- Subsoil stockpile locations will be identified during planning and will be stripped of topsoil before they are used for stockpiling of subsoils. Topsoil stockpile locations will not require stripping of topsoil;
- Collect vegetative matter for future use as a seed source from which indigenous plants can be propagated;
- To minimise soil exposure duration, stripping will commence as soon as practicable prior to bulk earthworks;
- All plant and machinery involved in topsoil stripping will be inspected and certified to be free of weed seed and pest plant material prior to mobilisation. Machinery and vehicles working in areas of known weed infestation will be washed down before moving to "clean areas";
- Any trees present will be cleared and grubbed before topsoil salvage;
- Machinery haulage circuits will be located to minimise the compaction of the stockpiled soil;
- Topsoil and subsoil will be stripped to the required depths and then stockpiled where not immediately required in the works. Subsoil will be stripped and stockpiled separately to topsoil where identified as suitable for reuse. Depending on compaction and recovery rates, deep ripping may be required to maximise topsoil recovery. Where soils are shallower, topsoil and subsoils will be stripped and stockpiled together;

- Handling and rehandling of stripped topsoil will be minimised as far as practicable by progressively stripping vegetation and soil only as needed for development activities;
- An inventory of soils to be stripped, including depths and volumes will be developed and updated; (See Appendix H)
- Topsoil from contaminated areas, or areas of immense weeds (such as thick blackberry) will not be recovered for rehabilitation works. These materials will be appropriately managed on-site or if there is a potential to spread contamination then the material will be sent off-site to a disposal facility that is lawfully permitted to receive it; and
- To avoid dust hazards, soil will not be stripped during particularly dry conditions. Alternatively, water trucks can be used as a control mechanism during dry conditions.

Topsoil and Subsoil Maintenance

Topsoils will be maintained following stripping as follows:

- Topsoil will be stockpiled, signposted and separated from other materials, and tracked;
- Stripped topsoil will be stockpiled separately from woody material and subsoil stockpiles; within the disturbance footprint
- Topsoil stockpile heights will not exceed 2.5 m, to minimise the risk of compaction and to maintain the viability of the soil seed bank;
- Topsoils will be stockpiled using methods and machinery that limit the amount of compaction so as to minimise soil structural decline;
- Topsoil stockpiles will be placed away from water discharge zones and flow paths; topsoil should not be stockpiled against fences or vegetation and should be retained separately from mulch (apart from a surface layer);
- Topsoil stockpiles will have control measures installed to prevent erosion, sedimentation and dust emissions. Stockpiles in place for extended period shall be suitably stabilised;
- Topsoils to be maintained for an extended period of time should have the surface left in a rough state and monitored for weed management; and
- The stockpiles should be accessible to enable weed control to be carried out. Weed management shall be implemented on a routine basis;
- Topsoil stockpiles may be subject to application of weed-free mulch, from clearing activities on the project in the locality from which the topsoil was sourced (where possible), to manage nutrient decline;
- Topsoil stockpiles to be covered with weed-free mulch, jute mesh, geofabric or similar to assist with reducing temperature extremes and reducing weeds and helps to maintain its integrity for future use.

Subsoils will be maintained following stripping as follows:

- Subsoil should be removed and stockpiled separately from topsoil;
- Areas will be compacted to an appropriate density following backfilling with subsoil;
- Excess displaced subsoil (e.g. on trenches) will be prevented from mixing with topsoil;
- Excess subsoil will be stockpiled separately for disposal/re-use by appropriate methods. This may include burial in voids, or, if tested and found suitable, as fill; and
- Inspections for dispersion and erosion of subsoil stockpiles will be undertaken, particularly on moderately dispersive soils. Suitable measures will be applied to reduce erosion potential as required.

Soil Inventory

As required by Schedule 3 Condition 10(e), Snowy Hydro will maintain a soil balance/inventory throughout the project. The soil balance will be maintained to determine:

- Current soil stockpile locations, including estimate volumes;
- Projected soil clearing and future estimated soil volumes and rehabilitation volume requirements; and
- Soil quality testing results and recommended amelioration requirements.

The current topsoil stockpile inventory is presented in Appendix H.

Where the soil balance indicates that there is a deficit of soil resources for the required rehabilitation areas, alternative growth media options will be utilised as required.

6.3.1.5. Slope Stabilisation

Areas disturbed as part of the project will be temporarily stabilised and vegetated as soon as practicable following construction works to minimise dust generation, soil erosion and weed incursion until the area can be permanently rehabilitated(. Temporary stabilisation to be undertaken within 2 weeks of completion of construction or prior to rainfall, these works will include:

- Stabilisation of slopes and preparation of sites for revegetation including placement of organic matter and jute matting if required;
- Mitigation of sediment runoff from rock emplacement areas, soil/mulch stockpiles and construction works including planting within swales and use of coir logs for sediment traps;
- Hydroseeding/hydromulching of slopes to assist stabilisation;
- Planting of higher risk slopes (i.e. steeper slopes) during appropriate planting seasons for plant survival; and
- Erosion and sediment control structures will remain in place and be maintained until the new vegetation is established and provides sufficient ground cover.

Stabilisation works will particularly focus on road batters with required temporary stabilisation and permanent revegetation methodology determined based on the batter slope as presented in Figure 6-2. Batter Types A to E in Figure 6-2 are categorised according to slope gradient. The accompanying table in Figure 6-2 provides temporary and permanent revegetation options for each Batter Type. Additional measures to break up slopes will be implemented on a case by case basis

Permanent rehabilitation will be undertaken when it is confirmed that no more works are required in a given location. Where it is confirmed no further works are required, rehabilitation will occur within 3 months subject to the time of year. No rehabilitation will occur during June – September.

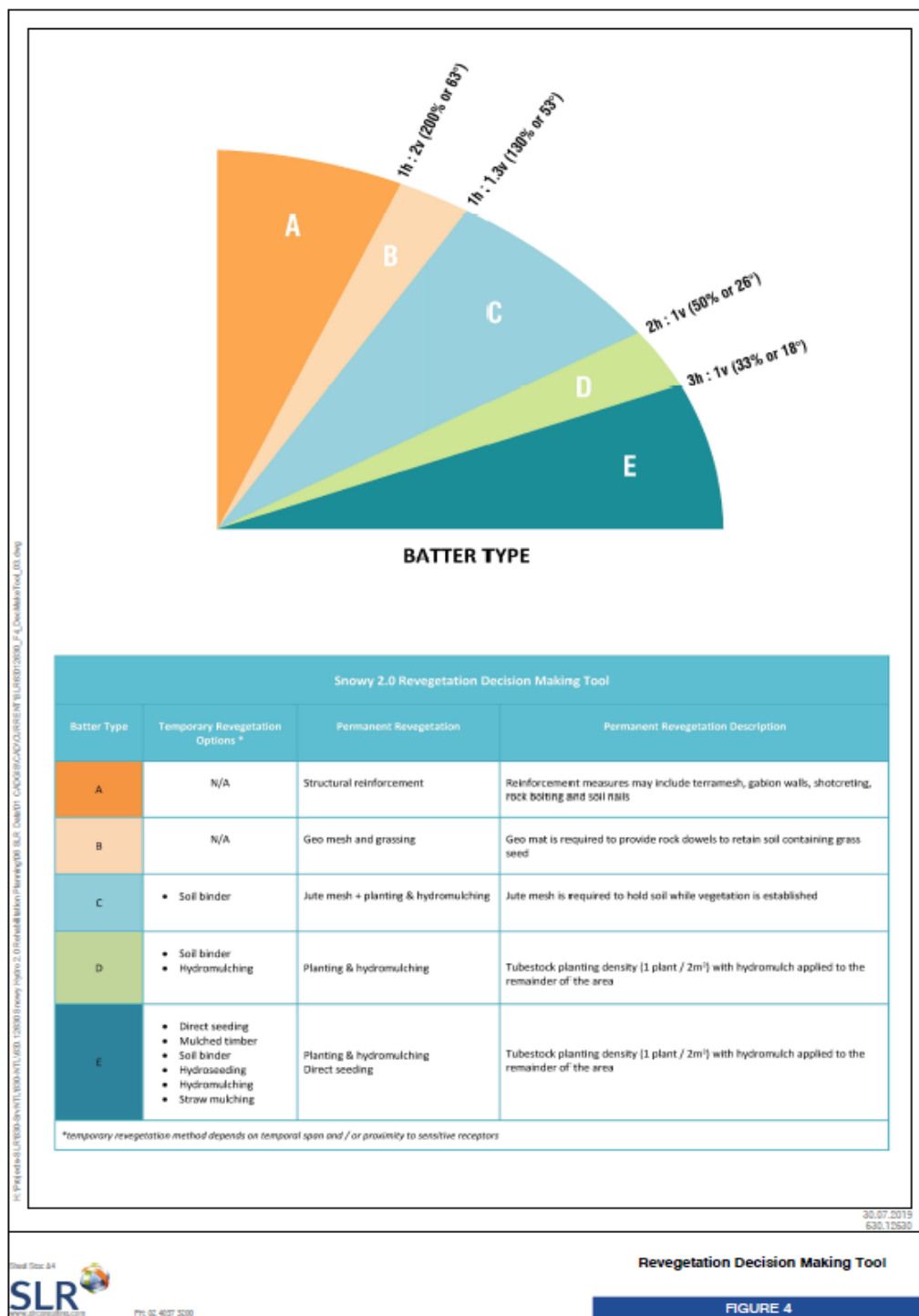


Figure 6-2 Revegetation Decision Making Tool

6.3.1.6. Excavated Material Management

Excavated material management will be undertaken in accordance with the approved Snowy 2.0 Main Works – Spoil Management Plan (revision I dated 6 September 2022). All spoil material will be appropriately classified prior to placement or disposal. Spoil material will be assessed and characterised as follows:

- **Non-reactive** spoil suitable for use or placement within the project, or elsewhere within KNP.
- **Reactive** spoil suitable for use or placement within the project with appropriate treatment (if required) and engineering and environmental controls.
- **Naturally Occurring Asbestos (NOA)** (both reactive or non-reactive) spoil to be placed within designated encapsulation cells at the Tantangara Peninsula emplacement area with appropriate engineering and environmental controls.
- **Unsuitable** spoil to be disposed of off-site to facilities lawfully permitted to receive it (waste).

Further detail on the proposed spoil uses and destinations is provided in Section 6 of the Spoil Management Plan. Detailed plans for each emplacement area will be progressively developed and included in Appendixes F – J of the Spoil Management Plan. Key activities undertaken during rehabilitation on excavated material sites include:

- Final shaping of landform and erosion and sediment control features
- Growth media application
- Seeding and tube stock planting

Detailed rehabilitation plans for each of these areas will be included as appendices of this plan in future revisions

6.3.2. Decommissioning Phase

At the completion of the construction of Snowy 2.0, all infrastructure not required for the final land use will be decommissioned and removed unless retained with the agreement of NPWS. In general, decommissioning and demolition activities will involve the following key activities:

- Disconnecting and terminating services including power and water;
- Removal of all accommodation facilities;
- Removal of all construction infrastructure;
- Removal of road surface gravel from any temporary access roads not to be retained;
- Identifying and removing (or remediating in situ) all hazardous and contaminated materials;
- Identifying and removing any remaining temporary stockpile materials not used in the construction of the final landform;
- Demolishing and removing all fixed plant and buildings from the site;
- Removing all mobile equipment from the site;
- Removal of all construction fencing;
- Breaking up and removing any concrete footings, pads and pavements; and
- Closure, backfilling and sealing of construction portals.
- Monitoring of soil stabilisation, potential erosion / subsidence)

In accordance with Schedule 2 Condition 10 of CSSI 9687, any demolition work will be undertaken in accordance with *AS 2601-2001: The Demolition of Structures*, or its latest version.

In accordance with Schedule 2 Condition 12 of CSSI 9687, any public infrastructure (excluding roads) that is damaged by the development will be repaired unless agreed otherwise with the relevant public authority.

6.3.3. Landform Establishment

Landform establishment incorporates shaping the final landform to a safe, stable and non-polluting landform that is appropriate for the desired final land use and consistent with the surrounding landscape. During the landform establishment phase, activities will include slope stabilisation and the construction of long-term water management and erosion and sediment controls.

6.3.3.1. Slope Stabilisation

The design of all slope batters will consider long-term stabilisation with minimal monitoring and maintenance requirements. As outlined in Section 6.2.1.5 and Figure 6-2, slope stabilisation techniques will depend upon the grade of the batter. Final slopes will be permanently stabilised according to slope gradient based on the methodology in Figure 6-2. Slopes not suitable for revegetation will be detailed in the site specific rehabilitation plans.

6.3.3.2. Erosion and Sediment Control

Long-term erosion and sediment controls will be designed and installed in accordance with best practice and the specifications contained in *Managing Urban Stormwater – Soils and Construction, Volume 1, 4th edition* (Landcom, 2004), *Volume 2A Installation of Services* (DECC, 2008a) and *Volume 2C Unsealed Roads* (DECC, 2008b) or equivalent where applicable.

6.3.3.3. Excavated Rock Management

As outlined in Section 6.3.1.6, excavated material may be reused to form the agreed final landform. Where excavated materials are used in the final landform they will be shaped to merge into the natural topography of the area. The final landform will be designed to incorporate micro-relief and undulations to create a natural looking landform similar to the pre-development landform.

To ensure long term stability and sustainability, reshaping will ensure that final slopes are stabilised as outlined in Section 6.3.1.5. Appropriate water management and erosion and sediment control structures will be constructed to ensure effective surface drainage to the natural environment.

The placement and shaping of excavated rock to the final landform will be detailed in the site-specific Spoil Management Plans included as Appendices to the Snowy 2.0 Main Works – Spoil Management Plan (FGJV, 2020) which will be developed progressively as construction commences in different areas. Site Specific Spoil Management Plans include:

- Lobs Hole Main Yard Emplacement Area (Appendix F of the SMP);
- GF01 Emplacement Area (Appendix G of the SMP);
- Ravine Bay Emplacement Area (Appendix H of the SMP) ;
- Tantangara Emplacement Area (Appendix I of the SMP) ; and
- Rock Forest Emplacement Area (Appendix J of the SMP) (not yet approved).

6.3.3.4. Roads Rehabilitation

It is anticipated that new access roads or those which are upgraded, widened and sealed will be retained with agreement from NPWS. Some of the retained access roads will remain open to the public post construction and will enable access to locations previously only accessible by four-wheel drive; however, some will be utilised exclusively by Snowy Hydro for access to operational areas and some roads will be closed and rehabilitated.

Snowy Hydro is currently preparing a Long-Term Road Strategy (LTRS) for the project. The LTRS will provide a detailed program for the rehabilitation of roads in the KNP. Within 6 weeks of completion of the LTRS, this RMP will be updated to include key rehabilitation methodologies for the KNP road network.

The LTRS is being prepared in accordance with the KNP Plan of Management (PoM) (DEC, 2006), *Managing Urban Stormwater – Soils and Construction, Volume 1, 4th edition* (Landcom, 2004) and *Volume 2C Unsealed Roads* (DECC, 2008b) and best practice for local environment.

6.3.4. Growth Medium Development

Growth Medium Development will incorporate the processes involved to achieve growing media which are capable of supporting a sustainable vegetation community. It includes consideration of the chemical, physical and biological properties of the media. Where required, the growth medium will be developed similarly to the NPWS medium or commercial varieties that meet appropriate nutrient and pathogen standards. Other potential sources include surplus topsoil and subsoil from the shallow works.

It is likely there will be a deficit in quality topsoil for rehabilitation in Lobs hole. To ensure progressive rehabilitation is not impacted a Growth medium development and storage procedure will be developed and enacted within 12 months of approval of this plan. Note the majority growth of medium will be required for application near completion of the project. Use of a propriety compost blanket may also be used where topsoil is not available prior to growth medium development, (material will be certified pathogen free).

6.3.4.1. Characterisation of Materials

Soil Sampling

Sampling and analysis of topsoil and subsoil resources, whether stockpiled or in-situ, will be conducted prior to resspreading to appropriately characterise the materials. This will assist in ensuring that soil quality is consistent with proposed land use objectives. Understanding soil characteristics will also assist in estimating required rates of fertiliser or ameliorants (e.g. gypsum or lime) and may also assist in blending specific soil types to achieve enhanced outcomes.

At a minimum, soil sampling will be undertaken to analyse the following parameters:

- pH
- Electrical Conductivity (EC)
- Particle Size Distribution (PSD)
- Exchangeable Sodium Percentage (ESP)
- Total Organic Carbon
- Total Nitrogen
- Available Phosphorus

During February 2022, Snowy Hydro sampled soil, subsoil and spoil from Tantangara, Rock Forest, Marica and Lobs Hole to provide some preliminary baseline data for assessment of these growth media's suitability to establish and sustain vegetative growth. All samples were subsequently tested by ALS's NATA accredited laboratories at Scoresby, VIC and Mayfield West, NSW.

A summary of the results for key parameters (pH, EC, PSD and ESP) is provided in Table 6-3.

Table 6-3 Soil Testing Results

SLR Sample	Project Area	Media	Snowy Hydro Sample ID	Soil Texture	pH	pH H ₂ O		Exchangeable Na (ESP) %		Saturated electrical conductivity (FCe) dS/m
				Not limiting		6.0-8.0		<6		<2.0
				Possibly limiting		4.5-6 or 8.0-8.5		6-12		2-8
				Limiting		<4.5 or >8.5		≥12		>8.0
1	Tantangara	Subsoil	TAN-TSK-SS-001	Silty Clay Loam	6.0	Moderately Acidic	0.4	Non sodic	0.0	Non-saline
2		Topsoil	TAN-TSK-SS-0021	Silty Clay Loam	6.0	Moderately Acidic	0.3	Non sodic	0.1	Non-saline
3		Topsoil	TAN-TSK-SS-0022	Clay Loam	5.6	Moderately Acidic	0.4	Non sodic	0..2	Non-saline
4		Topsoil	TAN-TSK-SS-003	Silty Clay	5.6	Moderately Acidic	0.2	Non sodic	0.2	Non-saline
5		Topsoil	TAN-TSK-SS-004	Silty Clay	6.5	Slightly Acidic	0.6	Non sodic	0.4	Non-saline
6	Rock Forest	Topsoil	ROCK-TSK-001	Silty Clay Loam	5.8	Moderately Acidic	0.2	Non sodic	0.1	Non-saline
7		Topsoil	ROCK-TSK-002	Silty Clay Loam	5.8	Moderately Acidic	0.2	Non sodic	0.1	Non-saline

SLR Sample	Project Area	Media	Snowy Hydro Sample ID	Soil Texture	pH	pH H ₂ O		Exchangeable Na (ESP) %		Saturated electrical conductivity (FCe) dS/m
				Not limiting		6.0-8.0		<6		<2.0
				Possibly limiting		4.5-6 or 8.0-8.5		6-12		2-8
				Limiting		<4.5 or >8.5		≥12		>8.0
8		Topsoil	ROCK-TSK-003	Silty Clay Loam	6.0	Moderately Acidic	0.3	Non sodic	0.2	Non-saline
9	Marica	Topsoil	MAR-TSK-001	Silty Clay Loam	5.7	Moderately Acidic	0.3	Non sodic	0.1	Non-saline
10		Topsoil	MAR-TSK-002	Silty Loam	5.2	Strongly Acidic	0.5	Non sodic	0.2	Non-saline
11		Topsoil	MAR-TSK-003	Silty Clay Loam	5.6	Moderately Acidic	0.2	Non sodic	0.1	Non-saline
12		Topsoil	MAR-TSK-004	Silty Clay Loam	5.6	Moderately Acidic	0.3	Non sodic	0.1	Non-saline
13		Topsoil	LOB-TSK-001	Silty Clay Loam	6.7	Neutral	0.2	Non sodic	0.1	Non-saline
14	Lobs Hole	Topsoil	LOB-TSK-003	Silty Clay Loam	6.1	Slightly Acidic	0.4	Non sodic	0.2	Non-saline
15		Topsoil	F10-F13 Pipe Cover	Silty Clay Loam	6.7	Neutral	2.5	Non sodic	0.2	Non-saline

SLR Sample	Project Area	Media	Snowy Hydro Sample ID	Soil Texture	pH	pH H ₂ O		Exchangeable Na (ESP) %		Saturated electrical conductivity (FCe) dS/m
				Not limiting		6.0-8.0		<6		<2.0
				Possibly limiting		4.5-6 or 8.0-8.5		6-12		2-8
				Limiting		<4.5 or >8.5		≥12		>8.0
16		Subsoil	LH-Sub-001	Silty Clay Loam	7.7	Mildly Alkaline	1.1	Non sodic	8.8	Highly saline
17		Spoil	MAT-Soil-001	Silty Loam	8.7	Strongly Alkaline	12.0	Sodic	19.3	Extremely saline
18		Spoil	ECVT-Soil-001	Silty Loam	9.7	Very Strongly Alkaline	8.2	Marginally Sodic	28.8	Extremely saline

Textural characteristics of all samples are desirable for the establishment of vegetation. Textures range from clay loam to silty clay loams to silty loams which have an adequate mix of fine and coarse particles to ensure sufficient porosity for moisture infiltration / percolation and good water holding capacity.

Soil reaction levels for topsoil and subsoil samples range from strongly acidic (pH 5.2) to mildly alkaline (pH 7.7), with most samples being moderately acidic. These pH recordings are optimal for most native species. All soil samples are non-sodic and non-saline, with the exception of the subsoil sample from Lobs Hole (sample 16), which has an elevated salinity level.

The Lobs Hole spoil (samples 17 & 18) is unsuitable as a growth medium due to high alkalinity, sodicity and salinity recordings. This spoil will require deeper burial in the emplacement area and / or have sufficient depth of cover of subsoil and / or topsoil to ensure successful germination and establishment of native vegetation. Maximum cover will be prioritised with available resources.

Weed Assessment

Prior to re-spreading stockpiled topsoil, an assessment of weed infestation on stockpiles will be undertaken to determine if stockpiles require herbicide application and / or “scalping” of weed species prior to topsoil spreading. Stockpiles will be regularly monitored for weed and controlled as necessary

6.3.4.2. Topsoil Re-spreading

Where available, topsoil will be respread to designated areas at a depth to be specified in the final design following determination of available volumes.

Topsoil will be spread and seeded in an integrated operation wherever possible. This strategy will allow mitigation of the potential for topsoil loss to wind and water erosion. Appropriate earthmoving equipment will be used to avoid the compaction of the growth media.

Thorough seedbed preparation will be undertaken to ensure optimum establishment and growth of vegetation. Topsoiled areas will be contour ripped, where practicable, to create a “key” between the topsoil and the subsoil. All topsoiled areas will, as far as practical, maintain surface roughness to reduce run-off, increase infiltration and support seed establishment.

Where topsoil is limited, an appropriate topsoil substitute material may be used (e.g. ameliorated subsoil), and in some areas, where excavated material is benign and favourable for the establishment of native trees and shrubs, direct vegetation establishment may be utilised. Where alternate growth mediums are utilised, they may be treated with fertiliser where seeding is being undertaken. Required growth medium will be developed similarly to the NPWS medium or commercial varieties that meet appropriate nutrient and pathogen standards. Other potential sources include surplus topsoil and subsoil from the shallow works. Use of a propriety compost blanket may also be used where topsoil is not available and before growth medium development has occurred, (material will be certified pathogen free) this material will be applied in conjunction with traditional hydromulching as the foundation layer.

6.3.5. Ecosystem and Land Use Establishment

The Ecosystem and Land Use Establishment phase constitutes activities associated with establishing the desired post disturbance PCTs including seeding / planting and land management activities such as weed control and browsing animal control. Ecosystem and land use establishment strategies are summarised below.

6.3.5.1. Revegetation

Revegetation will be undertaken in the correct season to optimise plant growth. Revegetation will generally be undertaken from mid-October to mid-April. Revegetation will, as far as practicable, be scheduled to occur promptly following the completion of topsoil placement, or if required, growth medium development activities. Where rehabilitated areas become available out of season the use of mulch cover will be prioritised. In areas with that are unstable / highly erodible with high weed potential, temporary sterile cover crops such as sterile rye corm will be sown to stabilize the site until the native vegetation cover can be established. For similar areas with lower potential weed

loads alternative native cover crops such as *Anthosachne Scabra* will be used. The construction, rehabilitation and monitoring schedule will be developed with consideration to the required timing of revegetation.

Species selection for areas to be rehabilitated to native vegetation will be undertaken using species specific to the Plant Community Type (PCT) commensurate with the surrounding native vegetation of the disturbed area. Data obtained from the BDAR will also be used to inform the makeup of the community being established in concert with specialist advice.

Revegetation techniques will include direct seeding, tubestock planting and hydromulching. The preferred rehabilitation approach will be to create a suitable landform to integrate each site into the surrounding landform, spread topsoil, mulch the soil with an organic mulch, plant trees and shrubs as tubestock at equivalent densities and spacing of the target PCT's and then after 1 to 2 years, after weed control measures to direct sow grass and forb species of the target PCT.

The final revegetation methodology for each site specific plan will be informed by the outcomes of the initial revegetation campaigns, however, will generally be undertaken using the following known current best practices. Establishment of shrubs and trees as a primary method of rehabilitation will be utilised using tubestock and in some cases this may be supplemented with direct seeding.

6.3.5.2. Direct Seeding

Deep Ripping

All rehabilitation areas will be deep ripped after landforming. The long-term success of native vegetation is dependent on the ability of tree and shrub roots to penetrate deeply into the soil and spoil. Deeper ripping increases the ability of planted tree roots to access deeper moisture and nutrients and allows for greater storage of infiltrated water. This also increases plant stability and the ability to withstand high winds and storms due to deeper root structures.

Depending on the site, deep ripping can often bring rock of various sizes to the surface. While not preferable for pasture rehabilitation, excellent results have been observed across a range of sites outside of KNP.

For any form of revegetation, a rough de-compacted surface (either topsoil or overburden), which encourages infiltration and reduces runoff and erosion will result in superior germination and establishment of sown species. This is particularly true in times of drought.

Deep ripping will constitute the main form of decompaction and will be undertaken as follows:

- With machinery capable of ripping to an approximate depth 400mm. This is generally achieved with a mid-size dozer.
- Ripping will be undertaken along (parallel) to the contour. Even small grades can result in erosion and subsequent soil loss.
- Ripping will be undertaken to address compaction and specified spacing given for individual sites.

Seed Spreading

Native forb and grass seed will be spread (outside of drainage lines and access tracks) using a variety of methods, (pozi track, tractor or tracked challenger or hand sown). Where timber debris has been respread, or where slopes are too steep, hand or aerial spreading may be necessary. For large areas, aerial seeding using a drone will be considered taking into account known issues regarding small seeds. A trial will be conducted prior to large scale implementation.

Native grass and forb seed will be sown when soils are warmest, and preferably between late September and May. Sown native seed will mostly be applied to the soil surface and never buried. In most cases sowing will be undertaken immediately after site preparation and before rain and surface crusting can occur. Where weeds are being actively suppressed within and overstorey species are planted first additional site prep may be required.

Seed viability testing will be undertaken to inform sowing rates with known dormancies included in the seed sowing schedule.

6.3.5.3. Tubestock Planting

Site Preparation

Site preparation via deep ripping will be conducted well in advance of actual tubestock planting, allowing time for the rip lines (to be located outside of drainage lines and access tracks) to settle and take advantage of any rain received before planting, building up soil moisture.

Planting

Most trees and shrubs for each PCT will be planted as tubestock. At the time of planting, each plant will receive a mix of native fertilizer and water crystals (where water holding capacity of soils is not adequate) which will be placed in the hole and assist in providing the required nutrients for plant establishment and growth as well as assist in water retention around the root structure. Use of water crystals is to be assessed on a site-to-site basis, depending on soil types and aspect. Where crystals are utilised, they will be pre-wet before use.

Upon completion of the tubestock planting program, regular monitoring and maintenance will be required as described in section 8.2.

Watering may be required until plants become established or sufficient rain is received to eliminate the need for watering. It is envisaged that additional watering of tubestock will only be done in periods of drought. Best practice is to allow planted tubestock to establish with only the available soil moisture as this promotes deep roots and aids in the evolutionary biology of planted seedlings.

6.3.5.4. Hydromulching

Hydromulching is a hydraulic technique to efficiently apply a mixture of wood fibre pulp (mulch), a binding chemical (tackifier), fertilisers, and seed as a slurry in water, onto open or disturbed ground to prevent erosion while supporting revegetation. It is commonly used to rehabilitate land disturbed by road and infrastructure construction amongst many other reasons. Disturbed land can result in accelerated erosion attributed to loss of vegetative cover and soil fertility, alteration of the natural topsoil and changes in topography.

Hydromulch mixtures typically include a soil stabilizer in a liquid slurry that is sprayed with a specialized water truck that incorporates a tank, agitators, and spraying equipment such as hoses and cannons. Hydromulching promotes seed growth by trapping moisture and increasing soil and seed stability.

Hydromulching will be utilised as required on Batter Types D and E described in Figure 6-2 (Section 6.2.1.5).

6.3.5.5. Vegetation Protection

Browsing animals can have significant detrimental impacts on emerging vegetation in rehabilitated areas and reduce the likelihood of revegetation success due to damage to juvenile vegetation from grazing, spreading weed seeds and erosion.

A vegetation protection programme will be developed and implemented during planting, if required. Alternatively, protection measures may be implemented in response to the TARP process.

Examples of vegetation protection tools include; fences to deter wild horses and wild deer, tree guards for rabbits, hares, wallabies and kangaroos, potentially Blood and Bone and wood thatch for wombats and other small native mammals.

6.3.5.6. Weed Control

A program for the control of weeds on the site will be developed and implemented in consultation with NPWS and in accordance with the KNP Plan of Management (NPWS, 2006). Early control of weeds will minimise competition and maximise early growth and survival of desired rehabilitation species. This can be achieved by physical removal or by chemical control where appropriate. Weed management will be a component of rehabilitation and management activities and will comprise:

- Regular inspections of the site are conducted as part of the compliance assurance program) that includes identification of potential weed infestations; and
- Identifying, removing and/or spraying weed populations, where appropriate.

The spread of declared noxious weeds will be prevented by using the measures above. Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Herbicides will be used in accordance with regulatory requirements. Records will be maintained of identified weed infestations and control programs will be implemented according to best management practices for the weed species of concern.

6.3.6. Ecosystem and Land Use Development and Sustainability

Activities associated with the ecosystem sustainability phase of rehabilitation are generally ongoing maintenance and land management activities and rehabilitation monitoring. Maintenance of rehabilitated areas will include, but not be limited to:

- Weeds and pest animal control;
- Managing bushfire risks;
- Minor earthworks to remediate any significant erosion features, including contour banks and diversion channels;
- Infill planting and/or seeding to meet vegetation community requirements; and
- Maintaining erosion and sediment controls.

Required rehabilitation maintenance activities will be informed by rehabilitation inspections and monitoring. Rehabilitation inspections and monitoring will be undertaken in accordance with the Rehabilitation Quality Assurance Process detailed in Section 7, until it can be demonstrated that rehabilitation areas have met all conditions for Rehabilitation Completion. Rehabilitation monitoring is discussed in Section 8.

6.3.6.1. Bogs and Fens

Bogs and fens are Commonwealth TECS that require specific rehabilitation techniques above normal soil erosion and revegetation practices. Disturbance (veg removal, roads, drainage) can interrupt normal hydrological processes and the impact will expand if unchecked. Cutting off sphagnum patches from water can result in death even if otherwise appearing undisturbed. Small water channels formed by peat/sphagnum veg removal can start an incising process that will increase down slope as water velocity increases if not managed correctly.

Rehabilitation techniques such as the use of coir logs and straw bales to slow flow, fill in incisions, leak water into newly isolated patches, and act as a temporary organic replacement will be implemented where active disturbance is observed requiring intervention. Sods and sphagnum plugs are acknowledged to be more effective than nursery grown plants and significantly reduce risk of importing pathogens and will be prioritised. Additional techniques described in *The Australian Alps rehabilitation manual 2006 & Restoration of Mires (bogs and fens) in the Australian Alps following domestic stock grazing and the impacts of the 2003 wildfires* may be implemented under the guidance of a suitable Alpine rehabilitation specialist.

Locations of bogs and fens are included in the site specific rehabilitation plans allowing for monitoring of hydrological processes and intervention where required.

7. Rehabilitation Quality Assurance Process

A Rehabilitation Quality Assurance Process (RQAP) will be implemented throughout the rehabilitation process. The RQAP will ensure that:

- Rehabilitation is being implemented in accordance with the required methodologies outlined in Section 6.3, or site specific methodologies identified in site specific RMPs; and
- Identified risks to rehabilitation are being adequately addressed at each phase of rehabilitation.

Snowy Hydro will implement the RQAP through every phase of rehabilitation to confirm that the rehabilitation strategies outlined in this RMP, and associated management plans, have been completed in accordance with the required methodologies.

The RQAP will include inspections, monitoring and documentation to ensure that each phase of decommissioning and rehabilitation has been completed in accordance with the required methodology prior to proceeding to the next phase of rehabilitation. Formal rehabilitation monitoring and reporting will occur annually, with quarterly monitoring undertaken to ensure any emerging threats are identified and actioned. Observational monitoring may also be required following significant events such as storms or bushfires. Below table 7.1 outlines minimum monitoring requirements for each phase

Table 7-1 Rehab Phase monitoring requirements

Stage	Rehabilitation phase	Monitoring requirement
1	Active	Weed and erosion
2	Decommissioning	Completion of demobilisation checklist (waste removal, appropriate soil testing, agreed infrastructure removal where applicable)
3	Landform Establishment	Weeds and erosion – applicable observational monitoring
4	Growth Medium Establishment	Implementation of observational and annual monitoring as described in section 8.2 including soil testing
5	Ecosystem and Land Use Establishment	Implementation of all components of section 8.2
6	Ecosystem and Land Use Development	Implementation of all components of section 8.2

Specific validation methodologies are nominated for each rehabilitation completion criteria listed in Table 4-4 and will include:

- **Active**
 - Documentation of pre-clearance surveys;
 - Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources and estimated volumes available for rehabilitation activities;
 - Regular inspections of temporary and permanent erosion and sediment controls;
 - Maintenance of a seed inventory and documentation of seed collection;

- Regular inspections to identify potential weed infestations; and
- Documentation of all weed management and eradication programs and follow-up inspections.
- **Decommissioning**
 - Inspections and demolition reports to confirm all infrastructure not to be retained has been removed, services disconnected and terminated;
 - Documentation to confirm any infrastructure to be retained is agreed with NPWS;
 - Validation testing to ensure any contamination and hazardous materials have been appropriately remediated and/or removed.
- **Landform Establishment**
 - Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures;
 - Relevant assessment records to verify the stability of the final landforms;
- **Growth Medium Establishment**
 - Site records of re-spread topsoil, ameliorants, fertiliser etc; and
 - Soil testing results to confirm appropriate soil geochemical parameters for plant establishment.
- **Ecosystem and Land Use Establishment**

Documentation of reseeding or planting activities undertaken including:

- Target PCT
 - list of species planted
 - date of planting;
 - weather conditions;
 - seeding rate (kg/ha) and/or planting rate (tubestock/ha) for each species; and
 - fertiliser / gypsum / soil amendment rate (kg/ha); and
 - Regular site inspections of rehabilitated areas to allow early identification of any emerging threats to rehabilitation;
 - Rehabilitation monitoring records [Quarterly Observational Monitoring Form](#)
-
- **Ecosystem and Land Use Development**
 - Inspections of temporary and permanent erosion and sediment controls;
 - Inspections to identify potential weed infestations;
 - Documentation of Rehabilitation Monitoring; and
 - Documentation of weed and feral animal management and eradication programs and follow-up inspections.

8. Rehabilitation Monitoring Program

A dedicated monitoring program is critical to assessing the effectiveness of rehabilitation implementation measures as well as to identify the need for corrective action as soon as required. A rehabilitation monitoring program has been established to track the progress of rehabilitated areas towards completion. The program incorporates the most appropriate indicators and methods that:

- Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives;
- Are reproducible;
- Utilise scientific recognised techniques; and
- Are cost-effective.

The rehabilitation monitoring program outlined in Section 8.2 has been developed to reflect the nature of disturbance and rehabilitation and will be implemented progressively during works to cover new areas of disturbance and rehabilitation.

8.1. Reference Site Selection & Monitoring Methodology

8.1.1. Initial Reference site selection

As part of the monitoring program, reference sites will be established to allow for a comparison of the development and success of the rehabilitation against a control. Data from both reference and rehabilitation sites is an integral part of the monitoring procedure throughout the monitoring process, so that varying seasonal conditions ultimately result in a “band” of values that act as the long-term target for rehabilitation.

Reference sites have been identified for establishment based on PCTs that have been cleared for construction of the project. Sites been selected to encompass varying degrees of fire intensities / impact. However, given the broad impact of the 2019 /2020 bushfires some this was not always possible. Establishment of reference sites that provide the most accurate representation of the current and past condition of target PCTs have prioritised.

Reference sites will be selected based on the following general criteria, and in consultation with NPWS and BCD:

- Contains the same PCTs / vegetation types as the rehabilitation sites;
- Secure from future disturbance;
- Proximity to rehabilitation areas
- Including appropriate consideration of the impacts of the 2020 bushfire, previous land use and PCT variability
- Creation of acceptable range of spatial and temporal variation
- Accessibility to ensure the program can be completed when required. (If accessibility of selected sites is found to be prohibitive, alternate sites within mapped PCTs and with proximity to rehabilitation monitoring sites may be utilised).

Table 8.1 below details the number of reference sites to be monitored in the initial monitoring period (November / December 2023) as well as detailing their corresponding plot numbers from the BDAR. These sites are included in Appendix I Rehabilitation monitoring

To provide greater range of variation plots from similar PCTs have also been grouped together for the measurement of non-species specific measures groupings are as per below ecosystem type

Table 8-1 Year 1 (November / December 2024 baseline) reference sites

PCTs	Predicted impact Area (Ha)	Number of reference site	BDAR plot references
285	14	3	5, 144,2265
296	12	4	190,42,3076,79
299	0.7	1	1036
300	30	5	3300,192,87,3179,2024
302	8	3	198, 197,198, 2267
303	15	4	2145,2097,2228,2145
311	4	2	1029,3151
637	0.4	3	205 /204,99
639	5	3	1041, 2030,114, 105
643	0.1	1	173
644	23	4	77, 102,3165,38,212,2150
679	0.07	1	2273,333
729	46	7	165,1033,2084,2091,3078,3177,3060
953	3	3	5206, 112,5205
999	10	3	146, 1037,2272
1191	8	3	185,2269,
1196	36	5	3302,3229,2013,3189,90, 157
1224	58	8	35,2248,3229,2013, 3036,224,3096,199, 2044
1225	2	2	2030,33,123, 120

To provide additional rigour plots from similar PCTs will be used for the measurement of non PCT specific measures - groupings are as per below ecosystem type

Subalpine grasslands (Tantangara, Nungar and parts of Gooandra) – 1224 / 1225 Black Sallee grass/sedge woodlands in wetter zones (Sub-alpine) – 285,679,302

Ribbony Gum/Peppermints and Brittle Gum forests (montane to temperate forests) – 296,299,311,999

Snow Gum/Candlebark forests – 303, 1191, 1196

Ribbony Gum, Mountain Gum, Peppermint dry forest – 300,729,953

8.1.2. Reference site Monitoring

Reference site monitoring will be undertaken commencing November / December 2023 then every 3 years. Monitoring will be undertaken in accordance with table 8.2 below

Table 8-2 Monitoring methods for reference sites

Method number	Monitoring method
1	Permanent, full floristic plots (i.e., 20x20m; cover and abundance estimate for all species present). Sites will have a GPS point recorded and 2 permanent corner posts for plots. Data to be collected is: full scientific name, estimated % foliage cover. If less than 1% cover then decimals to be used (0.1, 0.2, 0.3...). Estimated abundance of each species to be recorded from 1 to 10, 10 to 100 with intervals of 10 and 100 to 1000 in intervals of 100 and so on. Species type, i.e., native, exotic or high threat exotic to be recorded. Threatened species will be recorded per plot.
2	Permanent 50m midline transect located through the middle of the 20m x20m plot. A way point recorded at 0m and 50m and posts used to mark the points. See Figure 1. See section 5.1 page 29 of Biodiversity Conservation Trust Ecological Monitoring Module Operational Manual February 2022) for further detail
3	Measurement of all trees for Diameter at Breast Height (DBH) per plot.
4	Recording of all hollow bearing trees per plot.
5	Habitat resources (coarse woody debris, ponds, rocks) per plot. Type and size of coarse woody debris to be recorded.
6	Evidence of vertebrate pests and native species (scats, digging, chewing) per plot to be recorded.
7	Soil surface characteristics will be recorded along the 50m line transect at 5m intervals. Characteristics recorded will be: Native vascular plant (living), Exotic vascular plant (living), Litter (type, depth and origin), Cryptogams, Logs (standing or dead), Rock, Water, Bare ground
8	Soil characteristics - field tests - pH, EC, texture (Samples taken in accordance with steps 1-6 of Section 5.4.1 of Biodiversity Conservation Trust Ecological Monitoring Module Operational Manual February 2022)
9	Soil characteristics - Laboratory tests - Nitrogen, Total Carbon, Available Phosphorus, pH, EC

	(Samples taken in accordance with steps 1-6 of Section 5.4.1 of Biodiversity Conservation Trust Ecological Monitoring Module Operational Manual February 2022)
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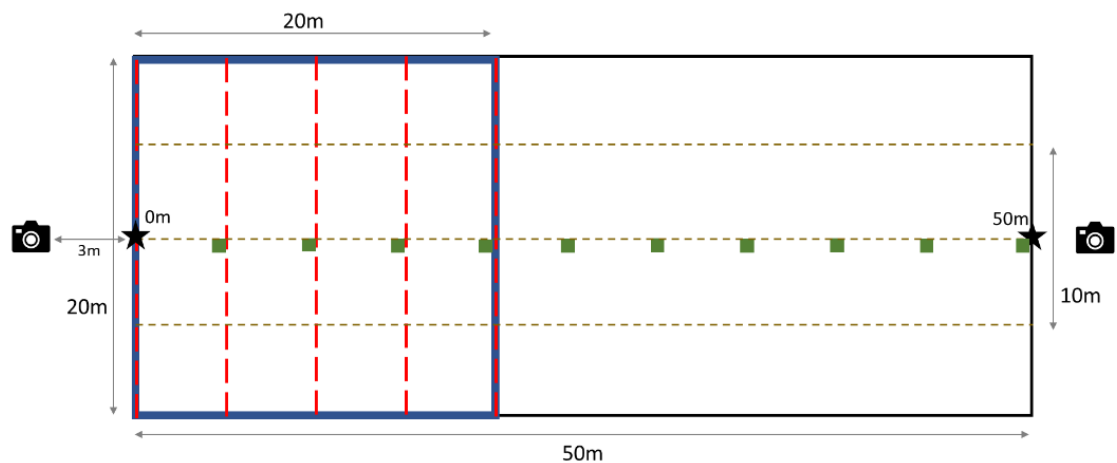


Figure 1: Monitoring plot style – Snowy 2.0 Reference Sites.

- Blue box = floristics plot.
- Small green box = soil surface condition points, every 5m.
- Black star = Permanent transect markers.
- Camera = photo point.

Monitoring styles, plot replication and data collection methodology has been sourced from: Biodiversity Conservation Trust Ecological Monitoring Module Operational Manual | February 2022:

<https://www.bct.nsw.gov.au/sites/default/files/2021-02/EMM%20Operational%20Manual%20-%20Final%20Feb%202021.pdf>

Monitoring sites will be physically demarcated in the field using a combination of large stainless steel tent pegs and star pickets. Plot ID will also be visible.

8.1.3. Reference Site selection validation

In conjunction with the monitoring conducted described in section 8.1.2 and its subsequent data analyses to determine replication sufficiency, Snowy Hydro’s will also survey the relevant PCTs / vegetation adjoining the project site to establish general variation in the PCT condition in proximity to the project.

The survey will be conducted using a UAV with species identification capabilities that will be trained to identify PCT characteristic species and weeds of the region. The aim is to use the data collected to provide additional information regarding variability of the representative PCTs to help assess reference site selection. Ground truthing will be undertaken at the time of survey by qualified and experienced ecologists to confirm PCT characteristic species and weed identification.

Variation of the condition of the reference sites will be interpreted by the species recorded and abundance of native and pest species within each reference plot for each PCT (1 digital quadrat per hectare) This will aid the review of the adequacy of the selected sites by providing a measure of uniformity of the PCTs surveyed.

PCT characteristic species are outlined in Appendix G of the Snowy 2.0 Main Works -Biodiversity Development Assessment Report (Revised) February 2020.

In addition to the monitoring conducted of reference sites described in table 8.1 a minimum of 10 digital reference sites per PCT will be monitored using digital quadrats from UAV collected data this information will be made available during the post monitoring consultation to determine inclusion in annual reporting.

Upon completion of the initial baseline monitoring SHL will consult NPWS to determine the suitability of both the number and suitability of the initial reference sites selected in accordance with below timeline.

1. November / December / January 2024 / 2025 – Baseline monitoring of reference sites conducted
2. April 2025 – Monitoring data and analysis provided to NPWS
3. April 2025 - Consultation
4. June 2025 – Update monitoring plan if required

8.1.4. Final Reference site selection process

Final reference site selection for measurement against completion criteria will be determined in conjunction with the NPWS following initial data collection and analysis. The initial analysis will be provided to all stakeholders by April 2025 for consultation.

Note: Analysis of the UAV data from the initial survey seeking to provide insight on the variation and condition of the relevant PCTs will be presented separately to the ecological monitoring undertaken as per table 8.2.

8.2. Rehabilitation Monitoring Methodology

8.2.1. Monitoring techniques

Monitoring of rehabilitation will be conducted using 3 different types of monitoring techniques

- 1- Observational
- 2- Formal ecological field survey and
- 3- UAV monitoring

These difference methods will be used inform both maintenance required during the establishment phase and the trajectory towards the desired rehabilitation state. The following describes each of the monitoring types and its application.

Observational monitoring of rehabilitation sites to be done quarterly (4 times per year). A checklist will be used and will generate maintenance programs and further rehabilitation works (if required). This checklist will include the measures linked to the TARPs outlined in section 10.2. See link to a digital checklist that will form the basis for the quarterly observational monitoring:

[Quarterly Observational Monitoring Form](#)

Information from observational monitoring to be provided in Snowy 2.0 Annual Reports.

UAV monitoring - Will primarily be used to provide whole of site monitoring of elements such as erosion, bare ground, plant growth and weed cover that enable accurate tracking of rehabilitation trajectory year on year. **Table 8.3** outlines the details of the UAV monitoring program).

Table 8-3 UAV Annual rehabilitation monitoring

Monitoring parameter	Description
PCT variation	(1 digital 20m x 20 quadrat per Ha) Identification of 5 PCT characteristic species and weeds with species planted as tube stock added over time with machine learning
Weeds	Weed abundance and species
Native species	species composition, cover, structure and health
Bare ground	% Area and location
Erosion	Depth, width, length, change over time
Habitat features	Logs and rock
Pest species	Track and individual at time of survey
Human Disturbance	Wheel tracks, waste
Legacy Items	Infrastructure for removal

The application of UAV monitoring for completion criteria measurement will be reviewed following processing of survey results and discussed with NPWS and BCD to determine the suitability for potential use in the future it is understood at this point in time it is not an acceptable measure of completion

Formal ecological monitoring - To monitor the vegetative and ecological function of the rehabilitation sites and compare this data with reference site data over time. This will provide data on the ecological recovery of the rehabilitation sites for each PCT. Conducted ever every 3 years, this interval of monitoring will assess the changes and deficiencies within the rehabilitation zones and how the rehabilitation sites are tracking as compared to reference sites. Formal ecological monitoring to be undertaken in accordance with the reference site monitoring in **table 8.2**.

Quarterly observational monitoring and the annual UAV monitoring will be used as the primary management tool for rehabilitation assessment / progress in the initial phases of rehabilitation in addition to guiding the maintenance program. Formal ecological monitoring will be increasingly important as the rehabilitation sites develop.

8.2.2. Rehabilitation Monitoring plot establishment

- The number of monitoring plots for each PCT to align with reference site selection numbers outlined in **table 8.1**. Heterogeneity of rehabilitation sites will be considered, and plot numbers increased where differences in aspect, topography and site characteristics are recognised.
- Rehabilitation monitoring points will be specified in the individual site rehabilitation plans.
- All monitoring sites identified in the site-specific rehabilitation plans will be added to the project GIS platform and included on the figures presented in Appendix I Rehabilitation Monitoring - Reference sites as they are established.
- Monitoring sites will be physically demarcated in the field using a combination of large stainless steel tent pegs and star pickets. Plot ID will also be visible.

8.2.3. Rehabilitation Monitoring frequency

Table 8.4 below outlines the required frequency and timing of the different monitoring types

Table 8-4 Rehabilitation monitoring frequency

	Monitoring Type	Frequency	Timing
1	Observational / Event based	After 100mm rainfall event (within 48 hours)	As required
2	Observational Routine	Quarterly	March, June, September, Dec
3	UAV	Annually	November / December
4	Ecological (reference and rehabilitation)	Every 3 years	November / December / January 2024 , 2027 , 2030 etc

8.3. Reporting

As required by Schedule 3 Condition 10(k) of CSSI-9687 and condition 25 of EPBC 2018/8322, Snowy Hydro will publicly report via the SHL website on the rehabilitation monitoring undertaken for the project including details of the:

- rehabilitation of individual sites;
- implementation of the each of the detailed plans, including the effectiveness of the proposed mitigation and contingency measures; and
- progress against the detailed completion criteria and performance indicators.

Reporting will include an Annual Rehabilitation Report which will:

- report on the rehabilitation (both quantity and quality) undertaken over the previous 12-month (June – May) period to demonstrate adequate progress through the phases of rehabilitation; and
- establish whether rehabilitation is on a trajectory towards meeting the Rehabilitation Objectives and Completion Criteria outlined in Section 4.
- Be provided to NPWS and BCD by July 31st each year

Annual Reporting to NPWS and BCD will also include:

- Identification of TARPs that have been activated and actions taken in response
- Drone summary data captured as per table 8.3
- Quarterly monitoring reports
- Draft rehabilitation program for the following monitoring period

9. Rehabilitation Research

9.1. Current Rehabilitation Research

No targeted rehabilitation trials have been undertaken as part of the Snowy 2.0 project. However, monitoring has been undertaken in areas of Lobs Hole which were cleared for infrastructure development and/or burnt in the 2019-20 bushfire have shown some native colonising species germinating and establishing. A Flora Monitoring Report (Alpine Flora, 2021) https://drive.google.com/file/d/1d_VcUKcx7SKU-7U7Kt7AR5abqgWXfnvP/view?usp=drive_link has been prepared to identify the floral species occurring on three different areas within Lobs Hole. The monitoring report concluded the following:

- Most species recorded are from the Myrtaceae, Fabaceae, Mimosaceae, Asteraceae and Poaceae families and consist of the dominant colonising species of the Kosciuszko National Park at this altitude.
- There is little natural colonisation of native species where rye-corn was sown as an erosion control method. This is most likely because rye-corn is allelopathic, which means it exudes a phyto-chemical from its roots that inhibits the germination of other species. This chemical leaches away over time.
- Overall, there are some species common to the sites, such as *Acacia pravissima*, *Cassinia longifolia* and *Kunzea parvifolia*. All the species listed provide a good indication of what species are good for rehabilitating the Lobs Hole area.
- .

It is acknowledged that between NPWS and consultants such as Alpine Flora that a significant amount of rehabilitation has been undertaken in KNP and this plan hopes to incorporate these practical learnings from this work. Proven rehabilitation techniques of reshaping, decompacting soils, mulching with rice straw or woodchips and tubestock planting has been used successfully and has been incorporated into the rehabilitation planning to the project.

Effective rehabilitation is based on frequent site visits and adaptive management to address any issues. However, multiple techniques have been used in effective rehabilitation projects in the Australian Alps. The Rehabilitation Field Guide of the Australian Alps - The Green Book: E.MacPhee 2013 will be referenced for proven rehabilitation techniques in these ecosystems.

9.2. Future Rehabilitation Research

Snowy Hydro focus is on conducting detailed monitoring of early rehabilitation works to further inform preferred techniques for the Main Works rehabilitation particularly where they may vary from traditional methods. However it is noted that these techniques will likely only build on the methodologies already described in *The Rehabilitation Field Guide of the Australian Alps - The Green Book: E.MacPhee 2013*.

As the rehabilitation program commences Snowy Hydro will also look to foster further research opportunities to gain additional knowledge that can be applied to both improve ecological outcomes both within the project and regionally.

As outlined in section 8 SHL will look to determine the suitability of UAV monitoring data in measurement of completions criteria in the future in conjunction with key stakeholders.

10. Intervention and Adaptive Management

10.1. Threats to Rehabilitation

Unpredictable events such as bushfires, droughts and floods/ heavy rainfall events may present risks to rehabilitation. These events generally have significant consequences for rehabilitation quality and are likely to require adaptive management in order to mitigate risks and achieve relinquishment of affected rehabilitation areas within a satisfactory timeframe. Although these events may have a high degree of unpredictability, monitoring the status of contributing factors enables an assessment of the likelihood of a major impact to rehabilitation occurring.

Other major risks to rehabilitation may not present as sudden events, but as an increasing impact over an extended period of time. For example, increasing feral pest numbers may increase pressure on native fauna and vegetation communities. Threats to rehabilitation have been assessed as part of the rehabilitation risk assessment detailed in Section 3 along with current and proposed controls to mitigate the risks.

Table 10-1 summarises the key threats to rehabilitation for the project as identified during the rehabilitation risk assessment. Where the RQAP or monitoring indicates that there is a significant threat to rehabilitation, adaptive management will be undertaken in accordance with the Rehabilitation Trigger Action Response Plan (TARP) described in Section 10.2.

Threats to rehabilitation such as insufficient or timeliness of tubestock production, planting success or direct seeding germination rates will be reduced by engagement of personnel and creation of partnerships with people with extensive experience in plant production and seed germination requirements. All seed will be tested prior to providing it to nurseries or application for direct seeding. No species will be sown or planted in a PCT where it has not been recorded in corresponding reference sites.

Table 10-1 Key Threats to Rehabilitation

Threat	Caused by
Erosion and Sediment Control	- Rainfall events. - Lack of appropriate vegetation cover. - Failure of water management structures.
Soil Type(s) and Suitability	- Inadequate growth media available. - Poor growth media quality. - Weed infested growth media. - Poor recovery of topsoil/subsoil from disturbed areas.
Spontaneous Combustion	- Poor management of stockpiled materials with propensity for spontaneous combustion.
Flora	- Not considering requirements in rehabilitation planning. - Not collecting and propagating sufficient native seed stock. - Failure to manage weeds. - Pest species / grazing pressures (kangaroos, rabbits deer etc.).
Geotechnical	- Geotechnical slope failure.
Geology and Geochemistry	- Poor knowledge of material and its geochemistry. - Poor management of potentially acid forming material (PAF) - Inappropriate placement of materials. - Inappropriate compaction - Inappropriate material unsuitable for target plant growth

Threat	Caused by
Bushfire	- Location within KNP - Regional fire. - Lightning strike. - Spontaneous combustion / construction activity

10.2. Trigger Action Response Plan

The following TARP for rehabilitation has been developed to identify required management actions in the event of impacts to rehabilitation, or where rehabilitation outcomes are not achieved in an acceptable time frame. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards to achieve the objectives outlined in this RMP.

The TARP is provided as Table 10-2 and may be revised as conditions change, new information becomes available from supporting specialist assessments/monitoring or new risks to rehabilitation are identified. Revised TARPs will be circulated to RMP stakeholders for consultation and included in RMP revisions.

The Rehabilitation Manager is responsible for implementation of the TARP.

Table 10-2 Trigger Action Response Plan

Aspect/Category	Key	Element	Trigger	First-Level Trigger	Second-Level Trigger
Landform stability	Erosion	1	Trigger	a) Minor erosion present. (less than 300 mm) b) Incision noted in bogs and fens	Major erosion present which is compromising landform stability.
			Response	a) An inspection of the site will be undertaken by a suitably trained person. Investigate opportunities to install (or augment existing) water management infrastructure or erosion control measures to address erosion. Remediate as appropriate.(Within 3 months) b) implement appropriate remediation guided by alpine specialist (within 1 month) –	Engage a consultant / appropriately qualified persons to assist with the management of erosion and sedimentation at the site and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable. (within 3 months)
Growth media	Topsoil	2	Trigger	Topsoil balance indicates a deficiency in topsoil available for rehabilitation through comparison of stockpiled material against areas to be rehabilitated at notional cover of ~50mm following completion of all stripping and consolidation of topsoil inventory.	Deficiency significant and alternate not available such that it will delay rehabilitation progression and the likelihood of rehabilitation success is low.
			Response	Investigate options and alternatives to be able to meet future topsoil requirements. Choose an alternative for implementation.	Source and budget for topsoil alternative for use in rehabilitation, investigate use of alternatives such as organic material. Develop plan / procedure for implementation within 12 months

Aspect/Category	Key	Element	Trigger	First-Level Trigger	Second-Level Trigger
		3	Trigger	a) Properties of soil are inconsistent with reference sites but are capable of sustaining selected vegetation species. b) Drying out of bogs/fens intersecting project area / not consistent with surrounding conditions	Properties of soil are inconsistent with reference sites and the area is not able to sustain selected vegetation species.
			Response	a) Investigate application of additional soil, and/or use of appropriate soil ameliorants or management options to address soil quality if deemed unlikely to meet completion criteria / support growth and implement. b) implement appropriate remediation guided by alpine specialist (within 3 months)	Consultant to be engaged to assist with recommendations to appropriately remediate soil quality and depth. Remediate as soon as practicable, within 12 months.
Vegetation	Ground	4	Trigger	Bare patches are > 15% and < 30 % (excluding rocks and logs).	Bare patches are > 30% (excluding rocks and logs).
			Response	Investigate likely causes of unsatisfactory germination rates and treat accordingly. Treatments may include: - Replanting of expired planted tubestock with the equivalent species for the PCT. - Reseeding areas with unsatisfactory cover. - Review seeding procedures including seasonal mixes, timing and seed rate per hectare. - Application of mulch The response program is to target reseeding/replanting within 12 months or in the next available planting season, subject to suitable weather conditions.	Revisit revegetation methodology (i.e., substitute seeding for tubestock) Undertake analytical soil testing and evaluation, where appropriate implement recommendations for amelioration. Implement appropriate management actions including revising rehabilitation procedures if required.

Aspect/Category	Key	Element	Trigger	First-Level Trigger	Second-Level Trigger
	Vegetation	5	Trigger	Vegetation health not in the range of reference sites. 5 -20% mortality rate	Long term declining trend in vegetation health Greater than 20% mortality rate
			Response	Investigate likely causes of vegetation sickness and / or mortality rates. Reseed or replant areas with high sickness or mortality rates. Review seeding and / or planting procedures. Prepare and Implement plan for treatment for weeds and pathogens e.g. phytophthora The response program is to target treatment/reseeding/replanting within 12 months or in the next available planting season, subject to suitable weather conditions.	Engage a suitably qualified specialist to investigate causes for vegetation sickness and mortality. Implement appropriate management actions including revising rehabilitation procedures if required.
	Species	6	Trigger	Species composition is not consistent with the sewn seed mix, target PCT and or, reference sites.	Ongoing decline in species composition away from reference site and target PCT composition.

Aspect/Category	Key	Element	Trigger	First-Level Trigger	Second-Level Trigger
	Weeds	7	Response	Investigate the likely causes of unsatisfactory germination and or, growth rates. Reseed / replant areas with unsatisfactory cover. Review seeding procedures including seasonal mixes, timing and seed rate per hectare. The response program is to target reseeding/replanting within 12 months /in the next available planting season, subject to suitable weather conditions.	Undertake analytical soil testing and evaluation. Where appropriate implement recommendations for amelioration. Revisit revegetation methodology (i.e.. substitute seeding for tubestock) Implement appropriate management actions including revising rehabilitation procedures if required.
			Trigger	Monitoring indicates the density of weeds in rehabilitation areas exceeds reference sites.	Monitoring indicates substantial weed infestations.
			Response	Undertake weed management to remove / spray introduced weed species. Treatment of infestations as appropriate to the species with all registered noxious weeds to be removed/sprayed.	Undertake weed management to remove introduced weed species. Investigate management measures to reduce weeds including additional soil amelioration, establishment and retention of cover crops until weed presence is at acceptable levels. Implement recommendations as appropriate.

Aspect/Category	Key	Element	Trigger	First-Level Trigger	Second-Level Trigger
	Pest	8	Trigger	Pest animal species are causing damage to rehabilitation.	Continued damage to rehabilitation from pests after tree guards and fencing has been installed.
			Response	Consult with relevant government agencies to recommend and implement appropriate pest animal control campaign. This may be run by the project or if agreed as part of a joint program. Fence select areas of rehabilitation where appropriate after consultation with NPWS	Liaise with government agencies and consider appropriate options in accordance with NPWS guidelines regulations.

11. Review, Revision and Implementation

11.1. Review and Revision of the RMP

In accordance with Schedule 4 Condition 4 of CSSI 9687, unless agreed otherwise by the Secretary this RMP will be reviewed, and if necessary updated, within three months of

- a) the submission of an incident report;
- b) the submission of an independent environmental audit report under condition 10 below;
- c) any modification to the conditions of this approval; or
- d) a direction of the Planning Secretary under condition 4 of schedule 2.

This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

This RMP will also be regularly reviewed and, if necessary, updated to incorporate the site-specific plans which will be prepared in consultation with key stakeholders progressively throughout the project.

Any major amendments to the project that affect its application will be undertaken in consultation with the appropriate regulatory authorities and stakeholders.

11.2. Implementation

The role and responsibilities for each team position is summarised in Table 11-1.

Table 11-1 Roles and Responsibility

Position	Role	Responsibility
Project Director	Oversee the delivery of the project rehabilitation.	Sponsor and provide high level input to the project. Provide resources required to support implementation of this plan Ensure delivery of the project.
Environmental Manager	Manage the delivery of this plan	Manage the costs and schedule performance of the project. Provide project updates to the Project Director. Evaluation of potential subcontractors. Report on rehabilitation progress and success
Decommissioning and Rehabilitation Advisor	Manage day to day implementation of this plan	Provide advice on decommissioning and rehabilitation strategies and approaches Facilitate and manage engagement of subcontractors to complete works to meet schedule Undertake progress reviews Participate in internal meetings, as well as with SHL and regulators. Prepare reports on rehabilitation progress and success Coordinate works with wider project Ensure linkages are made and are consistent with other management plans

Position	Role	Responsibility
Rehabilitation specialists	Provide specialist advice and input where required.	Provide input into site specific rehabilitation plans Undertake specialist activities such as rehabilitation implementation and monitoring
Engineering Lead	Provide engineering support associated with the design and construction of the spoil dumps and civil works.	Provide required engineering details to project manager and technical specialists.
Procurement	Provide finance and administrative support for the project	Provide a range of financial and administrative support to the Environmental manager. Support the procurement process for the tenders and engagement of sub-contractors.

APPENDIX A

PCTs within the Construction Envelope (Source: BMP)

APPENDIX B

Mapped PCTs within the Construction Envelope (Source: BMP)

APPENDIX C

Final Land Use Domains (Including Recreation and roads)

*(To be updated following approval of Recreation management plan and
Long Term Roads Strategy)*

APPENDIX D

Active Domains

APPENDIX E

Rehabilitation Risk Assessment

APPENDIX F

Snowy 2.0 Seed Inventory - November 2023

APPENDIX G

Snowy 2.0 Rehabilitation Species List

APPENDIX H

Topsoil Inventory May 2024

APPENDIX I

Rehabilitation Monitoring - Reference Sites

(To be updated following initial UAV survey to identify PCT variability for reference site selection and review of initial reference site monitoring undertaken – (Survey completed Jan 2024 – review of data not yet finalised)

APPENDIX J

PCT Target Species List

APPENDIX K

Site Specific Rehabilitation Management Plan – Plateau

- **Inclusive of BH3203 & 3210**

APPENDIX L

Site Specific Rehabilitation Management Plan – Talbingo Reservoir

(To be completed after finalisation of all stages of the Ravine spoil
emplacement management plan approval - Stage 2)

APPENDIX M

Site Specific Rehabilitation Management Plan – Lobs Hole
(Overarching plan to be developed including Main Yard emplacement
subplan when recreation management plan finalised - Stage 2)

Sub plans included for Stage 1:

- GF01 Spoil emplacement
- Lobs Hole Site Entrance

APPENDIX N

Site Specific Rehabilitation Management Plan – Marica

- **Inclusive of BH4201 &4201**

APPENDIX O

Site Specific Rehabilitation Management Plan – Tantangara Reservoir
(Overarching plan to be updated when Recreation MP approved - Stage 2)

APPENDIX P

Site Specific Rehabilitation Management Plan – Rock Forest
(To be developed following Spoil management plan approval - Stage 2)