Whitehaven

Narrabri Mine Rehabilitation Management plan

Summary Table

Name of mine	Narrabri Colliery
Rehabilitation management plan commencement date	1 August 2025
Rehabilitation management plan revision dates and version numbers	V1 29 July 2022 V2A 16 November 2023 V3 26 August 2025 V3A 23 June 2026 V3B 14 September 2026
Mining leases (lease number(s)) and expiry date(s)	ML1609 18 January 2029 ML1839 13 September 2043
Name of lease holder(s)	Narrabri Coal Operations Pty Ltd
Date of submission	14 September 2026

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1. Introduction to mining project

1.1 History of operations

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield, approximately 25 kilometres south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council (NSC) Local Government Area, in New South Wales (NSW). The mine is covered by Mining Lease (ML) 1609, ML1839 and ML Application (MLA) 2 for the purpose of mining for coal from the Hoskissons Coal Seam.

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (NCOPL), on behalf of the Narrabri Mine Joint Venture[1]. The Narrabri Mine includes underground longwall (LW) and cut and fill (CF) mining areas, a coal handling and preparation plant (CHPP), and associated rail siding and surface infrastructure.

Stage 1 was approved in November 2007 (as PA 05_0102) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Construction of the mine and supporting infrastructure commenced in 2008, with production using a continuous miner commencing in 2010. Following the approval of the Stage 2 Environmental Assessment (R.W Corkery & Co., 2009) (the EA) and the issue of the Stage 2 Project Approval (PA) 08_0144 in July 2010, and Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act (Commonwealth [Cwlth])) approval (2009/5003) in January 2011, the Narrabri Mine was converted to an 8 million tonnes per annum (Mtpa) run of mine (ROM) longwall mining operation, which commenced in 2012.

The Project Approval has been modified on seven occasions. The environmental assessment for Modification 5 (Resource Strategies, 2015) (MOD 5), approved in December 2015, changed the mine geometry by reducing the number of LW panels from 26 to 20, increased some LW panel widths and increased the production to 11 Mtpa of ROM coal until July 2031.

Modification 7 of the Project Approval was approved on 23 November 2021. The environmental assessment for Modification 7 (Resource Strategies, 2021) describes the change in mining method within the extent of the previously approved LW 201 and LW 202 and allows for up to 0.7 Mtpa via bord and pillar extraction at pillar reduction panels CF 201 to CF 205. There is no change to the previously approved longwall panels LW 203 to LW 209. The bord and pillar mining will occur concurrently with existing longwall operations for a period of approximately five years, with the maximum ROM coal production rate remaining within the approved limit of 11 Mtpa.

The Narrabri Underground Mine Stage 3 Extension Project (Stage 3) involves a southern extension to the Stage 2 mining area (approximately 609 ha of additional surface development footprint) to gain access to additional areas of coal reserves within ML1839 and MLA2, an increase in the mine life to 2044, and the development of supporting surface infrastructure.

The Stage 3 Extension Project State Significant Development (SSD) was granted approval under section 4.38 of the EP&A Act on 1 April 2022, following the determination by the Independent Planning Commission (SSD-10269). Approval for Stage 3 under the EPBC Act (EPBC 2019/8427) was granted on 24 September 2024 by the Commonwealth Department of Climate Change, Energy, the Environment and Water (Cwlth DCCEEW). The conditions of EPBC 2019/8427 are primarily relevant to threatened species and water resources.

In accordance with CoC A14, on 20 June 2025, NCOPL notified the Department of Planning, Housing and Infrastructure (DPHI) that physical commencement of the development, mining operations, and the extraction of ROM coal phases would commence on 1 August 2025.

The Cwlth DCCEEW was notified of project commencement on 23 July 2025 in accordance with condition 31 of EPBC 2019/8427.

The Narrabri Mine underground mining layout is shown in Figure 1-1 and surface development footprint is shown in Figure 1-2.

[1] For full details on the joint venture ownership, refer to the introduction of the Environmental Management Strategy.

Figure 1-1 Underground mining layout

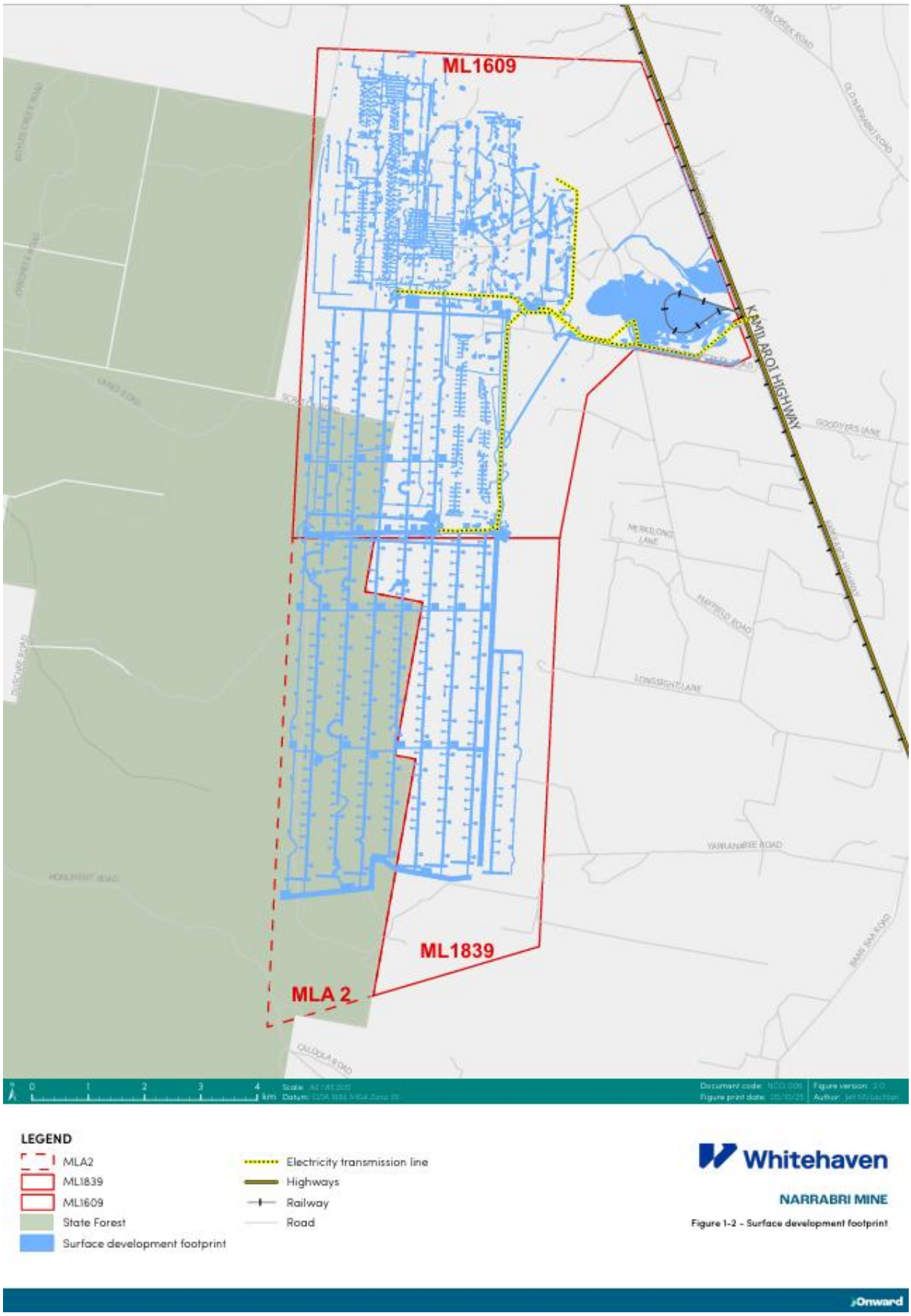


Figure 1-2 Surface development footprint

1.1.1 Surface disturbance activities

Surface disturbance activities carried out at the Narrabri Mine include:

- vegetation clearance to support longwall and bord and pillar mining;
- services corridors and access tracks for surface infrastructure;
- gas management and services infrastructure;
- exploration and service boreholes;
- pre-conditioning areas; and
- Reject Emplacement Area (REA).

The existing disturbance footprint also incorporates the Narrabri Mine surface and underground infrastructure, including the box cut, coal handling and preparation plant (CHPP), ROM and product stockpiles, rail loop, product coal load-out infrastructure, water management infrastructure and mine ventilation infrastructure.

1.1.2 Rehabilitation activities

Rehabilitation at the Narrabri Mine has been undertaken progressively since 2008 as areas become available following mining operations (i.e. as soon as reasonably practicable).

Progressive rehabilitation activities include:

- decommissioning boreholes and reclaiming gas drainage infrastructure for reuse;
- borehole sealing;
- filling of sumps associated with drilling activities;
- grading landforms and re-spreading topsoil/subsoil;
- natural regeneration;
- fertilising and seeding topsoiled areas (where required);
- subsidence remediation;
- inspections of roads and creeks, water management structures, soil stockpiles and seeded areas for erosion;
- inspections of progressively rehabilitated areas to assess germination rates; and
- weed and feral pest monitoring and management.

The above processes will continue over the life of mine, with the extent and nature of activities undertaken being consistent with this Rehabilitation Management Plan (RMP or Plan), and other relevant plans such as the Biodiversity Management Plan and the Extraction Plans. Rehabilitation activities and monitoring are currently documented utilising procedures and checklists, the collection of spatial data and reported in the Annual Rehabilitation Report and Annual Review.

1.2 Current development consents, leases, and licences

Table 1-1 summarises the Narrabri Mine development consents, leases, and licences.

Table 1-1 Narrabri Mine Project Approval

Authority	Reference	Grant date	End date
Environmental Planning and Assessment Act 1979	PA 08_0144[2]	July 2010	July 2031
	SSD-10269	01/04/2022	31/12/2044
Mining Act 1992	EL 6243	21/05/2004	21/05/2029
	EL 9455	6/09/2022	6/09/2028

[2] PA 08_0144 is to be surrendered in accordance with SSD-10269

Authority	Reference	Grant date	End date
	EL 9456	6/09/2022	6/09/2028
	ML 1609	18/01/2008	18/01/2029
	ML 1839	13/09/2022	13/09/2043
Environmental Protection and Biodiversity Conservation Act 1999	EPBC 2009/5003	17/08/2009	N/A
	EPBC 2019/8427	24/09/2024	N/A
Protection of the Environment Operations Act 1997	EPL 12789	20/02/2008	N/A
NSW Murray-Darling Basin Porous Rock Groundwater Sources Order 2020	Details of Water Access Licences are provided in the Site Water Management Plan		
NSW Great Artesian Basin Groundwater Sources 2020			
Namoi Alluvial Groundwater Sources Order 2020			
Upper Namoi and Lower Namoi Regulated Water Sources 2016			
Namoi and Peel Unregulated River Water Sources 2012			

1.3 Land ownership and land use

1.3.1 Land ownership

ML 1609 covers an area of approximately 5,298 ha while ML 1839 covers an area of approximately 2,085 ha.

The Narrabri Mine site comprises of a number of land parcels, including freehold land owned by NCOPL, land owned by the NSW Government (managed by the Forestry Corporation of NSW) and Crown Land (road reserves). Land ownership within and surrounding the Narrabri Mine is summarised in Table 1-2. Land ownership and land, soil and vegetation characteristics within and surrounding the Narrabri Mine are shown on **Error! Reference source not found.** to Figure 1-8.

Table 1-2 Narrabri Mine land ownership

Tenure	Lot number	Deposited plan number	Ownership
ML1609			
Freehold	1	254523	NCOPL
Freehold	1	659899	NCOPL
Freehold	3	757104	NCOPL
Freehold	7	757104	NCOPL
Freehold	8	757104	NCOPL
Freehold	10	757104	NCOPL
Freehold	25	757104	NCOPL
Freehold	67	757104	NCOPL
Freehold	68	757104	NCOPL
Freehold	57	757114	Privately owned

Tenure	Lot number	Deposited plan number	Ownership
Freehold	58	757114	Privately owned
Freehold	63	757114	NCOPL
Freehold	64	757114	NCOPL
Freehold	65	757114	NCOPL
Freehold	60	757124	NCOPL
Freehold	61	757124	NCOPL
Freehold	81	757124	Privately owned
Freehold	83	757124	NCOPL
Freehold	115	757124	NCOPL
Freehold	1	798487	Privately owned
Freehold	1	811171	NCOPL
Freehold	2	811171	NCOPL
Freehold	151	816020	NCOPL
Freehold	152	816020	NCOPL
Freehold	3	1005608	NCOPL
Freehold	381	1028753	NCOPL
Freehold	382	1028753	NCOPL
Freehold	1	1124652	Privately owned
Freehold	2	1124652	NCOPL
Freehold	841	1134385	NCOPL
Freehold	842	1134385	NCOPL
Freehold	1	1206684	NCOPL
Freehold	2	1206684	NCOPL
Freehold	1	1210797	NCOPL
ML1839			
Freehold	1	757119	NCOLP
Freehold	1	1207324	NCOPL
Freehold	1	1208522	NCOPL
Freehold	18	757104	NCOPL
Freehold	20	757104	NCOPL
Freehold	21	757104	NCOPL
Freehold	22	757104	NCOPL
Freehold	23	757104	NCOPL
Freehold	25	755525	Privately owned
Freehold	25	757104	NCOPL
Freehold	27	757104	NCOPL
Freehold	27	755525	Privately owned
Freehold	28	755525	Privately owned
Freehold	5	757119	NCOPL
Freehold	50	755525	NCOPL

Tenure	Lot number	Deposited plan number	Ownership
Freehold	6	757104	NCOPL
Freehold	8	757104	NCOPL
Other			
NSC or Crown Roads located between or adjacent to the above parcels of land.		Other roads located between or adjacent to the above parcels of land.	
Part of the Pilliga East State Forest and Jacks Creek State Forest.		Creeks or streams located between or adjacent to the above parcels of land.	

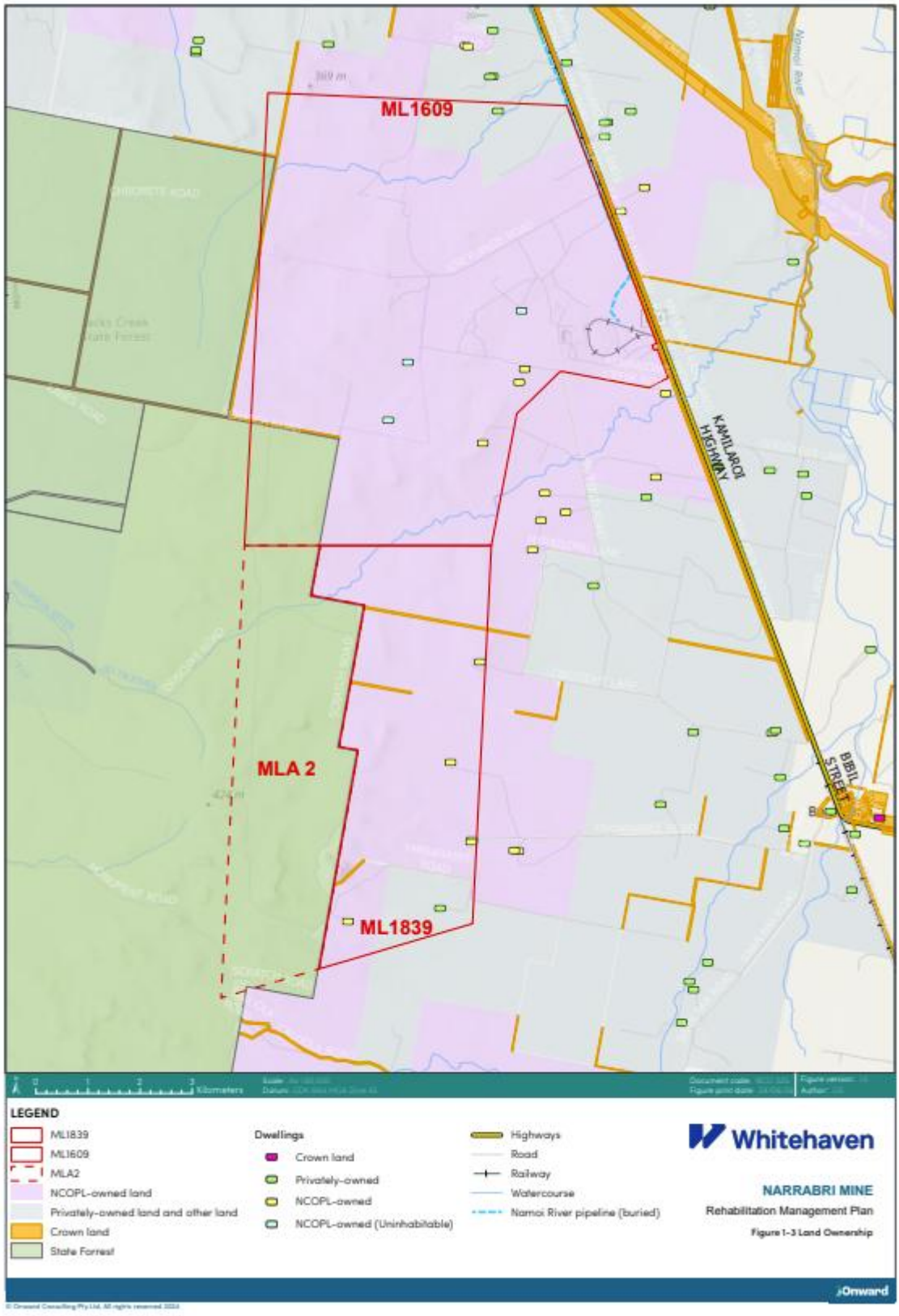


Figure 1-3 Narrabri Mine land ownership

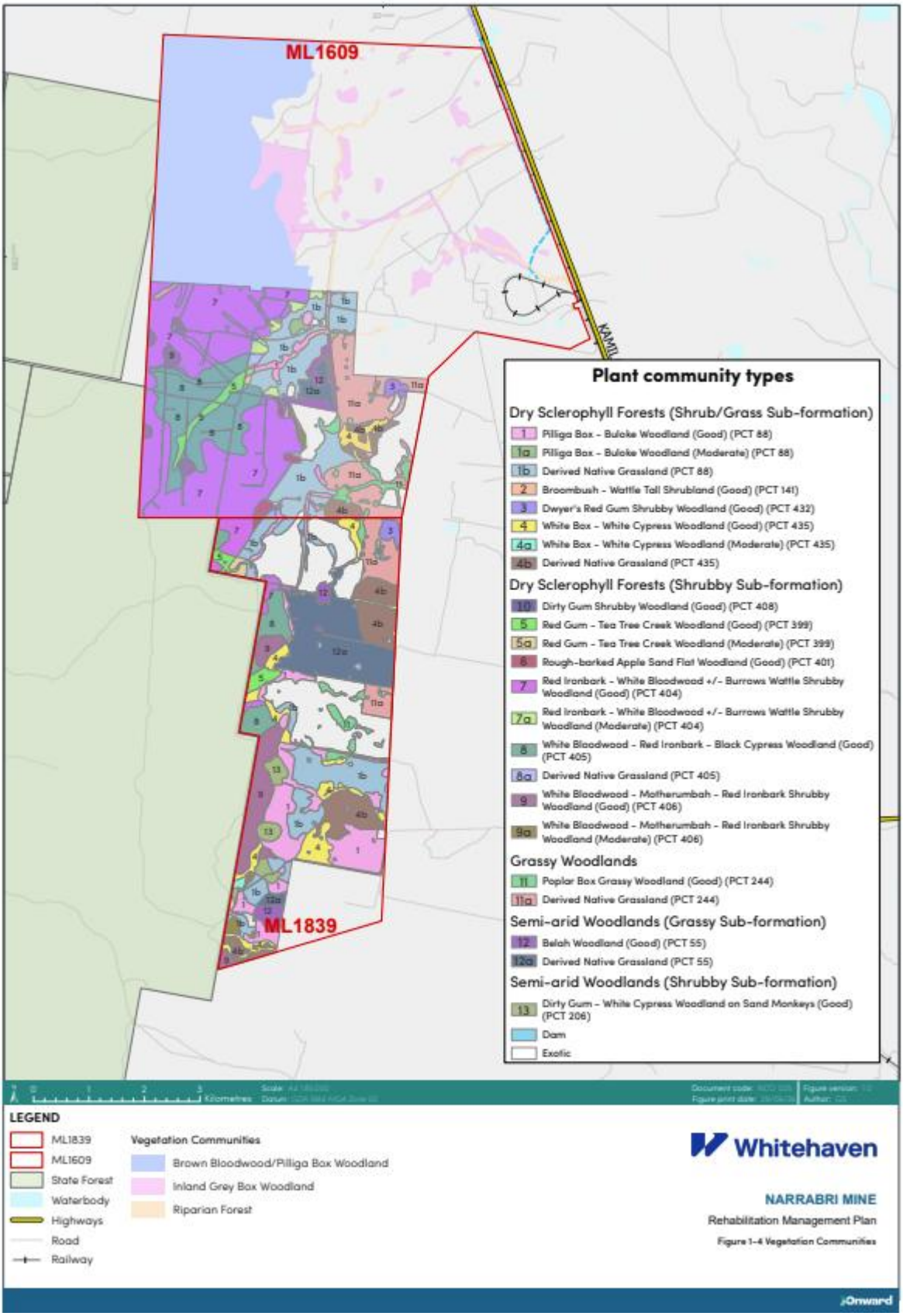


Figure 1-4 Vegetation communities -

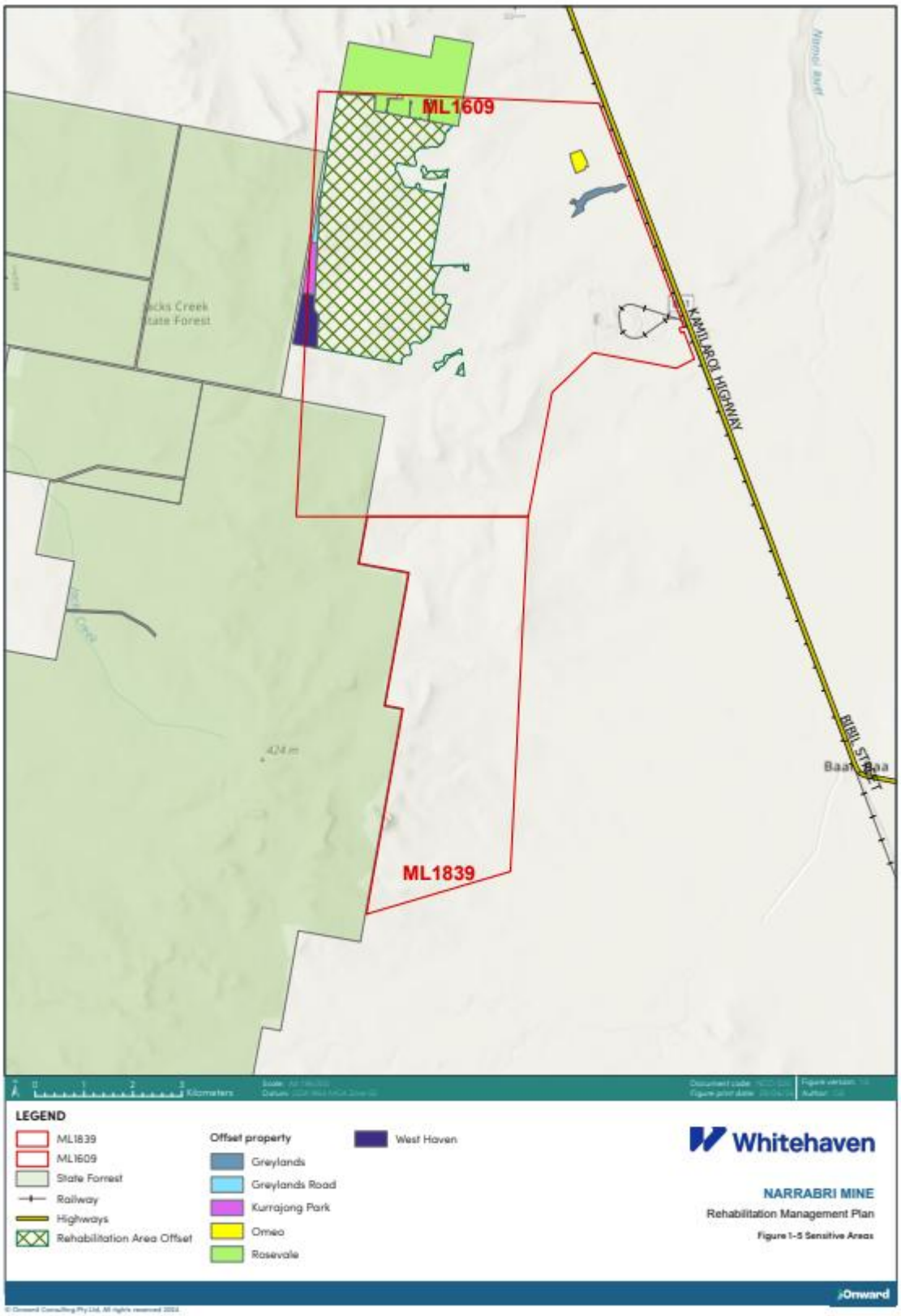


Figure 1-5 Sensitive areas

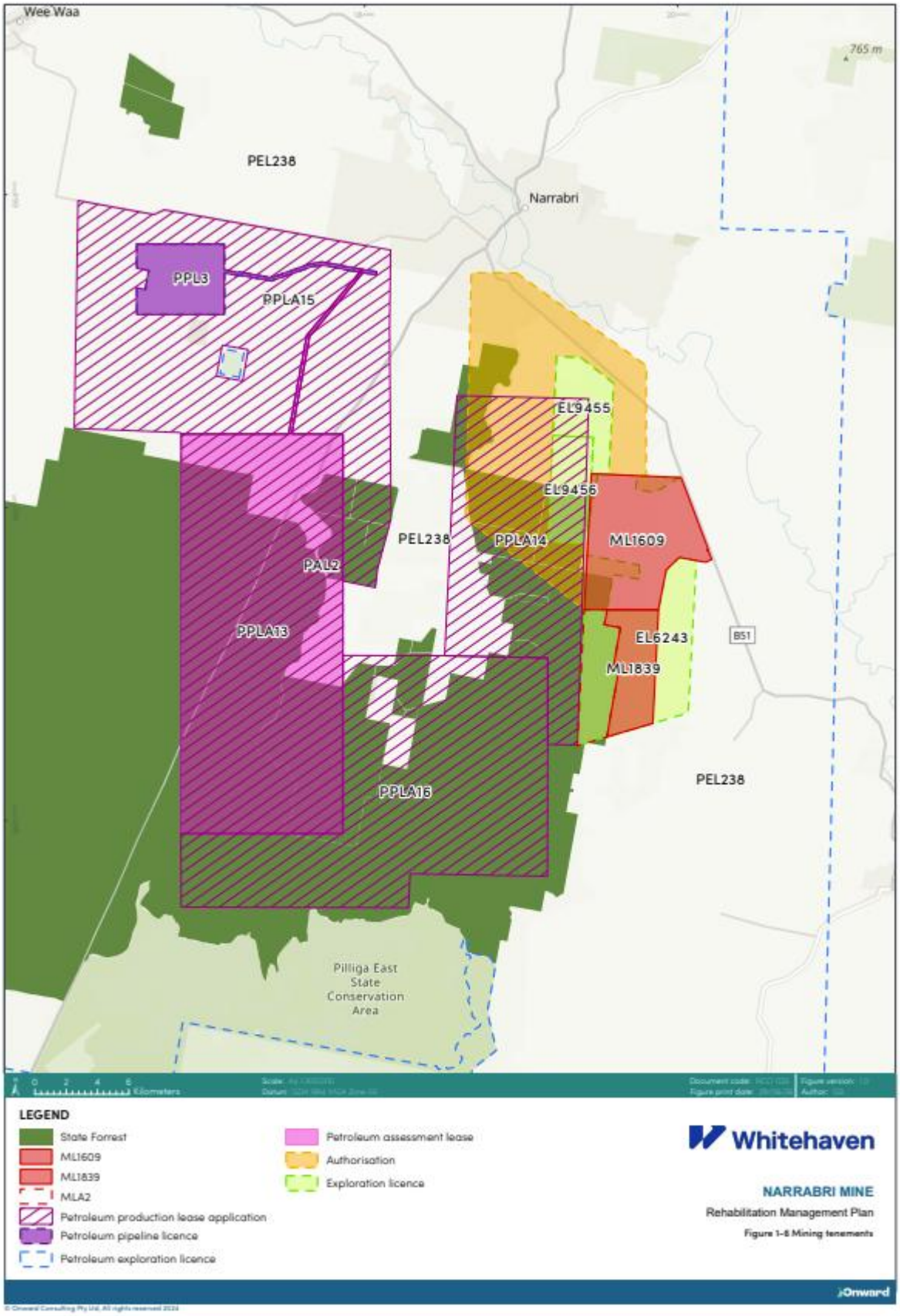


Figure 1-6 Mining tenements

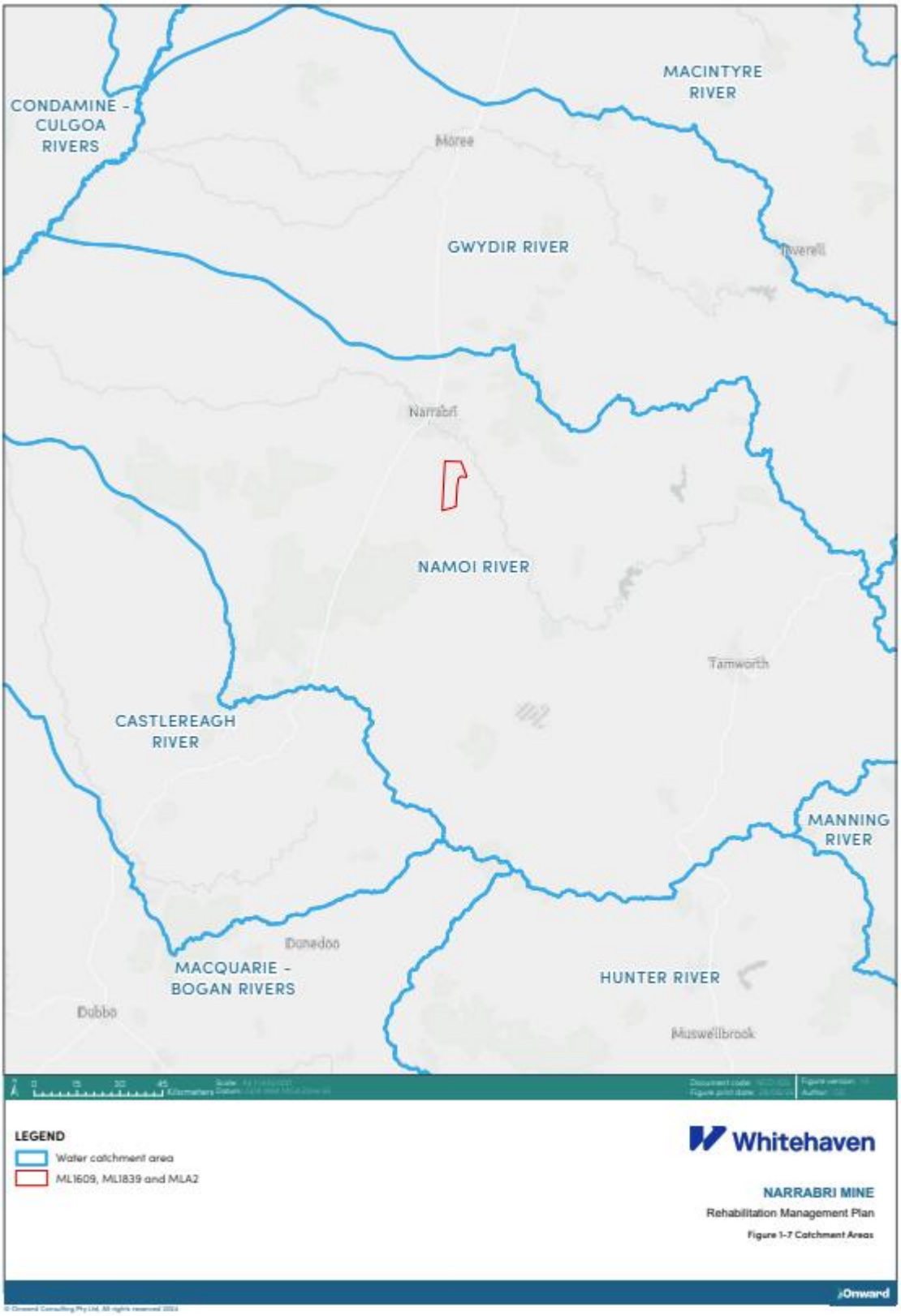


Figure 1-7 Catchment areas

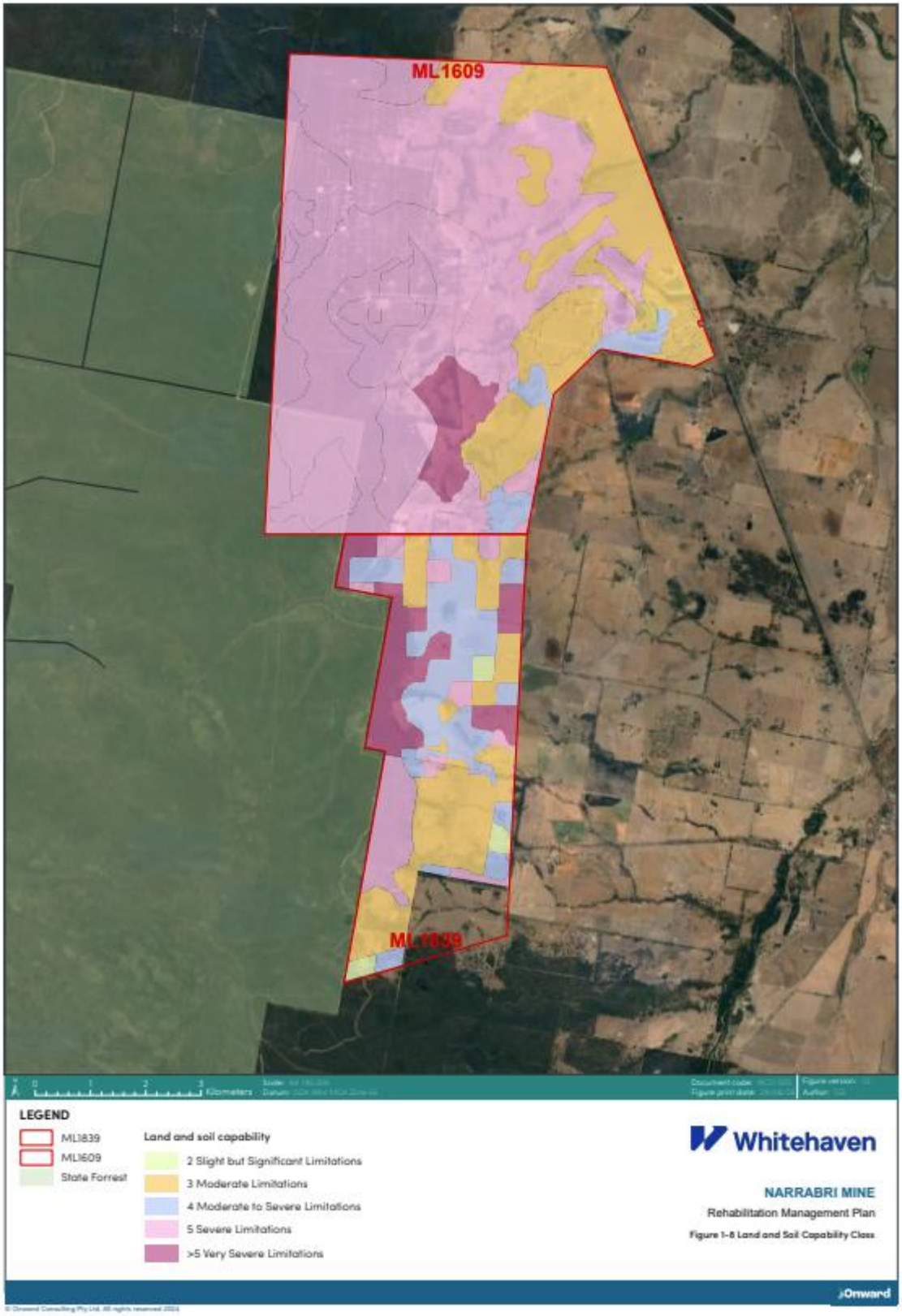


Figure 1-8 Land and soil capability class

1.3.2 Historic and current use

Narrabri Mine is located in a rural environment away from urban centres and has a relatively low density of surrounding residences. Prior to commencement of mining operations, the historic land use was predominantly agriculture and forestry. Current surrounding land uses include:

- mining (Maules Creek Coal Mine, Boggabri Coal Mine and Tarrawonga Coal Mine);
- commercial forestry (Pilliga East, Leard, and Jacks Creek State Forests);
- biodiversity conservation (Leard State Conservation Area and Mount Kaputar National Park);
- quarrying activities undertaken by NSC;
- transport corridors including the Kamilaroi Highway and adjacent rail line;
- coal seam gas activities (Santos); and
- traditional agriculture (cropping and grazing) on privately held freehold land.

1.3.3 Proposed final land use/s

Final land uses will include a mix of native ecosystem, biodiversity offset areas, agriculture – grazing, and water storage. The approved final land uses will include agricultural land comparable to that of the pre-mining environment (based on Land and Soil Capability (LSC)). Consistent with the current and historical land use practices, the post mining landform is capable of supporting grazing, with small areas capable of opportunistic cropping.

Native ecosystem final land use areas which have been subject to subsidence impacts or clearance for infrastructure are expected to rehabilitate via natural regeneration, with supplementary rehabilitation activities applied to areas as required to meet completion criteria. Rehabilitated landforms will also integrate with the adjoining State forests to enhance regional biodiversity and conservation outcomes.

The final land use of the REA will be a mix of native and introduced grasses (pastures) with a native woodland overstorey commensurate with the vegetation communities of the surrounding area, with grazing discouraged[3].

Detailed mine closure planning will identify infrastructure that is to be decommissioned and removed as well as infrastructure that will be retained to support the final land use.

1.3.4 Agreements specific to mining lease areas

In accordance with CoC B45, NCOPL must implement the approved Stage 2 Revised Biodiversity Offset Strategy (WHC, 2025). Following the cessation of mining, approximately 1,171 ha of native vegetation, known as the Rehabilitation Area Offset, will be conserved for biodiversity offsets as required by EPBC 2009/5003 and underpinned by the RMP. In addition, approximately 431 ha of native vegetation adjacent to ML 1609 has already been conserved for biodiversity offsets.

[3] Unless carefully managed, grazing of the REA has potential to reduce the effective vegetation cover below target levels until the vegetation can re-establish. As such, grazing creates a risk to the long-term erosional stability of the REA (ATC Williams, 2022).

2. Final land use

2.1 Regulatory requirements for rehabilitation

Appendix A outlines the regulatory requirements for rehabilitation that apply to the Narrabri Mine.

2.2 Final land use options assessment

The final land use goal is to create a physically and chemically stable mine landform that is adequately drained and integrates with the surrounding landform, with all mine-induced subsidence rehabilitated.

The final land uses previously approved for Stage 2 have been updated to include Stage 3 and are approved under SSD-10269, as summarised in Table 2-1.

In accordance with the *Form and Way – Rehabilitation Management Plan for Large Mines* (Resources Regulator, 2021), NCOPL are not required to undertake a further land use options assessment.

Table 2-1 Narrabri Mine approved final land uses

Domain	Description
Water Storage	Includes all water management structures and dams retained in the final landform.
Rehabilitation Area – Agricultural pasture	Landholdings that were previously used for agriculture and have been impacted by mining, such as subsidence areas and infrastructure areas will be rehabilitated to the pre-mining land capability class, capable of pasture production and occasional cropping.
Rehabilitation Area – Native ecosystem (existing)	Woodland areas that have been impacted by mining, such as subsidence areas and infrastructure areas will be rehabilitated to native ecosystem. The areas of the Jacks Creek and Pilliga East State Forests impacted by mining will continue to be used for forestry post-mining.
Rehabilitation Area Offset	Up to 1,121.65 ha of woodland vegetation that may be subject to subsidence impacts and mine site rehabilitation, will be progressed for offset purposes following completion of longwall mining

2.3 Final land use statement

As discussed in section 2.2, the final land use goal is to create a physically and chemically stable landform that is adequately drained and integrates with the surrounding landform with all mine-induced subsidence rehabilitated.

NCOPL has considered post-mining land uses taking into account strategic land use objectives in the vicinity of the site. The rehabilitation of disturbed areas will be planned to deliver final land uses that achieve strategic biodiversity and agricultural outcomes. Rehabilitated landforms will integrate with the adjoining State forests to enhance regional biodiversity and conservation outcomes.

Final land use themes include native ecosystem, agriculture (pasture), biodiversity offset area, and water storage. The rehabilitation objectives statement is detailed in section 4.1 and Appendix B, with the final land use for the Narrabri Mine spatially depicted on the Final Landform and Rehabilitation Plan (section 5).

2.4 Final land use and mining domains

2.4.1 Final land use domains

Final land use domains are defined as areas of land characterised by the same final land use objectives. Each final land use unit represents a separate final land use domain which require specific rehabilitation objectives.

The final land use domains relevant to the Narrabri Mine are presented in Table 2-2 and are depicted on the Final Landform and Rehabilitation Plan (Figure 5-1).

Table 2-2 Narrabri Mine final land use domains

Code	Final land use domain	Description
A	Native ecosystem	Areas of native vegetation that have been impacted by mining including areas of Jacks Creek and Pilliga East State Forests. These areas will be rehabilitated to restore ecosystem function, including maintaining or establishing self-sustaining native ecosystems comprised of local native plant species.
B	Agricultural – grazing	Landholdings that were previously used for agriculture (e.g. grazing) that have been impacted by mining will be rehabilitated to the pre-mining agricultural land capability class.
D	Rehabilitation biodiversity offset area	Areas of native vegetation within the Rehabilitation Area Offset, including remnant vegetation or rehabilitation areas proposed to be subject to a biodiversity offset application under the *Biodiversity Conservation Act 2016*.
G	Water storage area	Includes dams retained for the final land use.

2.4.2 Mining domains

Mining domains are defined as the footprint of areas disturbed for discrete mining-related activities. They have discrete geophysical and geochemical characteristics that will require specific rehabilitation treatments to achieve the final land use.

The mining domains relevant to the Narrabri Mine are presented in

Table 2-3.

Table 2-3 Narrabri Mine mining domains

Code	Mining domain	Description
1	Infrastructure area	This domain incorporates all surface infrastructure, including: • site access road and internal access tracks • office and administration buildings • light vehicle carpark and equipment laydown areas • workshop and stores buildings • electrical sub-station and associated electricity infrastructure • rail loop and train loadout bin and train loader • sewage treatment plant • box cut and mine portals • drift and skyline conveyors • explosives magazine • ventilation fans and shafts, gas drainage and mine safety pre-conditioning infrastructure, and water pipelines • topsoil stockpiles and visual amenity bunds.
3	Water management area	Includes operational sediment dams, temporary creek diversions and other significant constructed drainage features. This mining domain includes the Pit Top Area water storage/brine ponds.
4	Overburden emplacement area	Reject Emplacement Area.
6	Underground mining area	The area that is managed for subsidence impacts, for example subsidence management area in accordance with an extraction plan. Excludes 'infrastructure areas' such as ventilation shafts and other surface infrastructure associated with underground mining.
7	Beneficiation facility	Coal crushing station, CHPP, ROM and product coal pad hardstand areas.

3. Rehabilitation risk assessment

3.1 Summary of historic risk assessments

Conditions of a mining lease granted under the *Mining Act 1992* require the lease holder to conduct a rehabilitation risk assessment and implement measures to eliminate, minimise or mitigate the risks in accordance with the *Guideline: Rehabilitation risk assessment* (Resources Regulator, 2021) (Risk assessment guideline*)*.

Multiple risk assessments have been completed for rehabilitation activities associated with the Narrabri Mine.

Table 3-1 summarises the completed rehabilitation risk assessments to date.

Table 3-1 Rehabilitation risk assessments

Date	Risk Assessment	Details
10 August 2015	Risk Assessment workshop	Informed the 2015 MOP.
5 August 2020	Broad brush risk assessment for the Narrabri Mine MOP Amendment B	Informed the preparation of the 2020 MOP
10 to 15 January 2021	Bow tie risk assessment	Informed critical controls required to be implemented onsite to ensure compliance with environmental obligations.
11 May 2022 and 18 May 2022	Risk assessment workshop	Aligned with the requirements of the *Mining Amendment (Standard Conditions of Mining Leases—Rehabilitation) Regulation 2021* and the *Guideline: Rehabilitation Risk Assessment.*
19 May 2025	Risk assessment workshop	Review of risk assessment and updates to reflect commencement of SSD-10269.
26 March 2026	Review of risk register	Review of risk assessment and inclusion of additional risks as recommended by Resources Regulator Targeted Assessment Program.

3.2 Current rehabilitation risk assessment

A risk assessment workshop was conducted on 19 May 2025 to identify key issues presenting a risk to achieving the rehabilitation objectives and completion criteria.

The risk assessment included key Whitehaven personnel and was conducted in accordance with the *AS/NZS ISO 31000:2018 Risk Management – Guidelines* (Standards Australia/Standards New Zealand, 2018) and the *Guideline: Rehabilitation risk assessment*. The Whitehaven Risk Matrix was used to calculate the consequence and likelihood of an event and to evaluate the subsequent risk level (residual risk rating).

The objectives of the risk assessment were to:

- identify the risks associated with rehabilitation and closure of the mine to achieve the approved final land uses;
- identify knowledge gaps in Whitehaven's current understanding of the risks to rehabilitation;
- identify the investigations/controls/actions necessary to effectively mitigate risks and/or identify opportunities; and
- inform the review of this RMP.

The risk workshop assessed a total of 35 risks, which were ranked as follows:

- 29 risks were ranked as low;
- six risks were ranked as moderate;
- no risks were ranked as high or critical; and
- one (1) risk was not applicable (N/A) as it relates to retained underground workings and habitation by native fauna.

The risks ranked as ‘moderate’ have been adopted as the key risks to rehabilitation and are summarised in Table 3-2, which includes key controls to mitigate the risk and a cross reference to where these controls have been integrated in this RMP. A copy of the full risk assessment is maintained on the NCOPL server and will be available as a record in accordance with Schedule 8A, Clause 17 of the Mining Regulation 2016.

Rehabilitation risks and controls will regularly be reviewed and revised as required.

Table 3-2 Key risks and controls

Key risk	Key controls	Document reference
Inadequate decommissioning of brine dams and mine water storages	• Groundwater assessment as part of EIS considers brine reinjection at mine closure	Refer to the Water Management Plan
	• Reinjection management plan as required by relevant approvals	Section 6.2.1
	• Groundwater monitoring program post closure	Refer to the Water Management Plan
Inadequate and/or inappropriate management of mineral waste	• Detailed geochemical assessment on rejects material propensity for spontaneous combustion and saline leachate	Section 6.2
	• REA capping assessment and design (ATC Williams, 2022)	Section 6.2.1
	• Characterisation of soil and reject material - 5 yearly geochemical assessment of rejects	Section 7
	• Quality assurance process	Section 6.2.3
	• REA standards outlining the permeability and compaction for new cells in accordance with capping and design report	Refer to the Water Management Plan
	• Spontaneous Combustion Management Plan	Refer to the Spontaneous Combustion Management Plan
	• Seepage monitoring bores	Refer to the Water Management Plan
	• Groundwater monitoring program	Refer to the Water Management Plan
	• Surface water catchment plan - runoff captured	Section 6.2.3 and the Water Management Plan
	• Contained REA catchment area	Section 6.2
Larger/changing/unplanned surface water impacts (qualities and quantities) than anticipated from the rehabilitated site	• REA capping assessment and design	Section 6.2.3
	• Detailed geotechnical assessment on rejects material	Section 6.2.1
	• Quality assurance process	Section 7
	• Forward Program	Section 6.1
	• Characterisation of soils on site	Section 6.2.1
	• Site Water Management Plan including an ESC Plan, and surface water monitoring program	Refer to the Water Management Plan
	• Progressive rehabilitation	Section 6
	• Rehabilitation monitoring program	Section 8
	• Permit-to-work process includes ESC standard for rehabilitation areas	Section 6.2.1
Unplanned interactions and/or impacts on areas/sites of heritage and cultural significance	• ACH Management Plan inc. unexpected finds protocol	Section 6.2.1 and refer to the Aboriginal Cultural Heritage Management Plan

Key risk	Key controls	Document reference
	• Annual audit of cultural heritage sites	Section 6.2.1 and refer to the Aboriginal Cultural Heritage Management Plan
	• Subsidence crack repair procedure including interaction with heritage sites	Section 6.2.1
	• Consultation processes with the RAPs when finalising care agreements (restoring salvaged items to country)	Section 6.2.1 and refer to the Aboriginal Cultural Heritage Management Plan
	• Register of Cultural and Heritage sites (digital)	Refer to the Aboriginal Cultural Heritage Management Plan
Poor seed viability and seed dormancy	• Progressive rehabilitation occurs within 24 months of disturbance, ensuring degeneration of topsoil wind rows and their seedbanks is minimised.	Section 6.2
	• Topsoil scrapping methods and stockpile heights favourable for seed preservation.	Section 6.2.1
Monitoring program does not capture the correct or adequate data.	• Monitoring activities conducted in accordance with the RMP and Vegetation and Landform Rehabilitation Monitoring Methodology.	Section 8
	• Results reported in annual review and Annual rehabilitation Report.	Section 11

4. Rehabilitation objectives and rehabilitation completion criteria

4.1 Rehabilitation objectives and completion criteria

Appendix B lists the approved rehabilitation objectives and proposed rehabilitation completion criteria associated with each final land use. The rehabilitation objectives were approved by the Resources Regulator on 5 June 2026.

4.2 Stakeholder consultation

Appendix C provides detail of the stakeholder consultation conducted for rehabilitation at the Narrabri Mine.

5. Final landform and rehabilitation plan

5.1 Final landform and rehabilitation plan

The final landform and rehabilitation plan data was submitted to the Resources Regulator via the Resources Regulator portal on 26 August 2025, as depicted in Figure 5-1 with final landform contours depicted in

Figure 5-2.

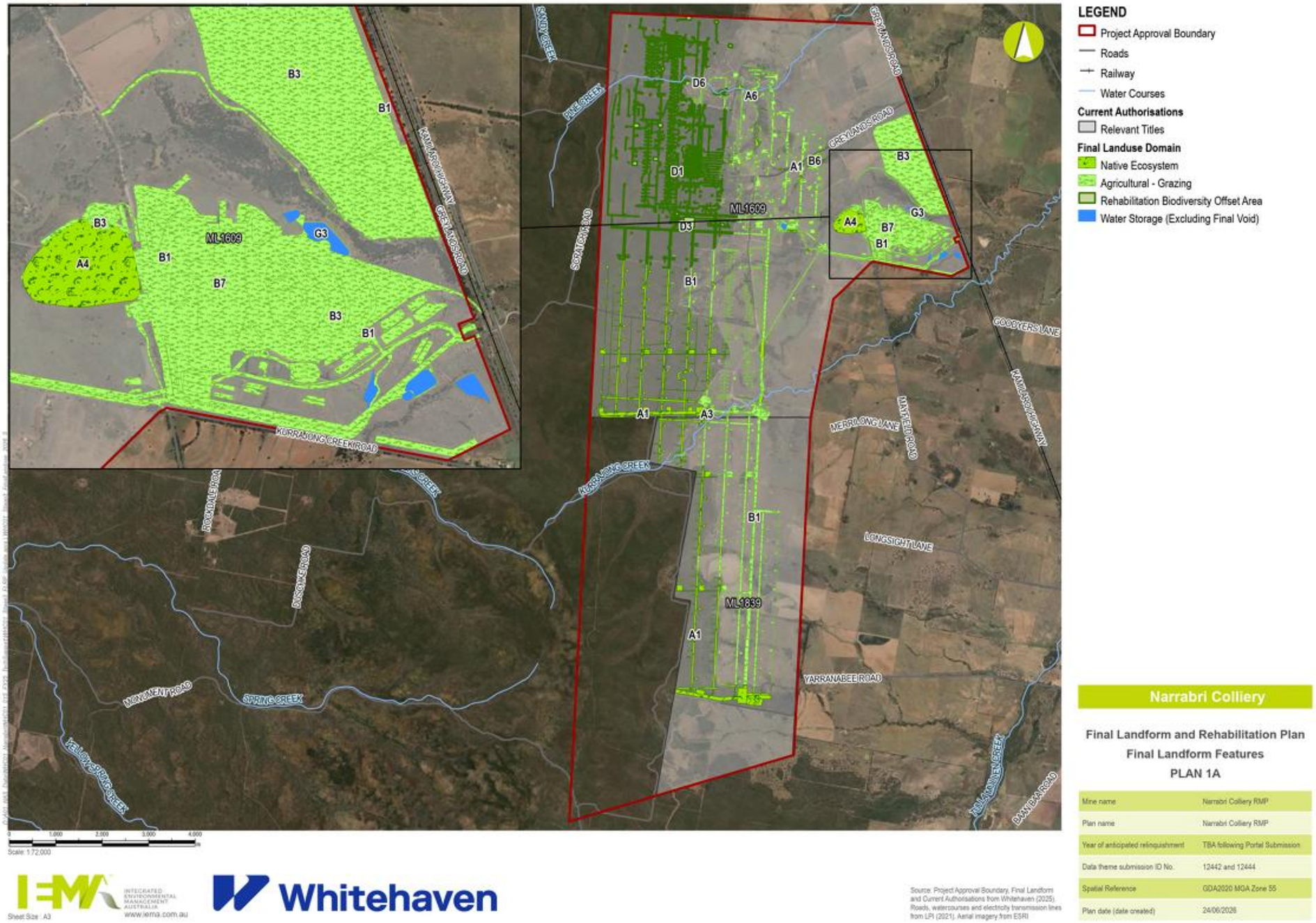


Figure 5-1 Final landform and rehabilitation plan

Figure 5-2 Final landform contours

6. Rehabilitation implementation

NCOPL will implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from any rehabilitation required under SSD-10269. The Narrabri Mine will be rehabilitated to a safe, stable and non-polluting landform of a similar character to surrounding areas.

The life of mine rehabilitation schedule and rehabilitation methodologies for each phase of rehabilitation are detailed in the following sections.

6.1 Life of mine rehabilitation schedule

Key infrastructure associated with the Pit Top Area (e.g. CHPP, brine storage ponds, REA, box cut, rail etc.) and ventilation shaft areas within ML1609 and ML1839 that will be be decommissioned on cessation of mining and processing activities (i.e. 2044). Progressive decommissioning and rehabilitation will continue to occur for areas temporarily disturbed during the progressive development of the mine such as access roads, service and gas drainage boreholes, pre-conditioning areas, and subsidence cracks. Construction and development activities that will progressively occur to support normal mining activities during the life of mine include:

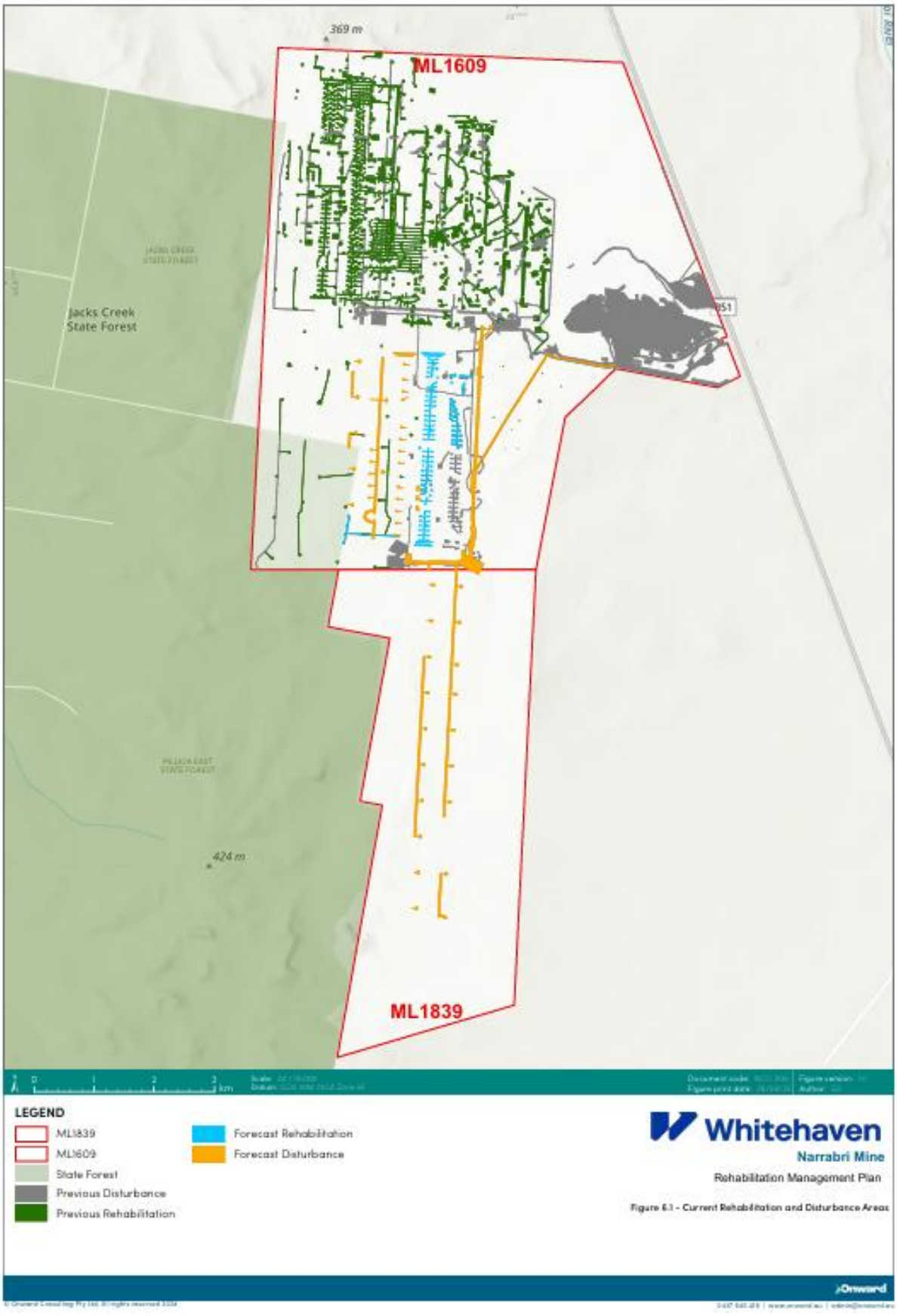
- mining approved under SSD-10269 until 2044 with a production rate of up to 11 Mtpa;
- goaf gas drainage behind the progressing longwall;
- clearing and maintenance of access tracks and services corridors for as long as the goaf gas drainage is required to be maintained;
- drilling of service bores for the installation of services (i.e. compressed air, water, power or monitoring) or for gas extraction from underground to inseam gas drainage;
- mine safety pre-conditioning drillholes;
- construction of a number of brine storage ponds to the north of the Pit Top Area (as required) (Figure 1-2); and
- exploration activities within ML 1609 and ML 1839.

Production milestones and resulting reject material volumes are the key assumptions that are relied on for the development of the life of mine rehabilitation schedule. Importantly, the staging of mining operations will be determined by the requirements of the coal market, product specification and/or blending requirements. As these requirements are likely to vary over the life of mine, the development sequence of the underground mine, coal extraction rates, gas drainage requirements and rehabilitation areas may vary accordingly. Changes to the life of mine rehabilitation schedule will be reflected in the Annual Rehabilitation Report and Forward Program. Subsequently, this RMP will be revised accordingly.

Detailed mine closure planning will commence a minimum of five years from the cessation of mining, in consultation with DPHI, the Resources Regulator, NSC and the Community Consultative Committee (CCC). Detailed mine closure planning will further identify key actions, assessments, studies, detailed designs, and regulatory approvals required to decommission and/or demolish built infrastructure.

With cessation of mining activities in 2044, decommissioning and final rehabilitation activities will be completed. Ongoing environmental monitoring of surface water, groundwater, rehabilitation and biodiversity are expected to continue for at least five years post mining.

The current and forecast (3-year) rehabilitation and disturbance areas are provided in



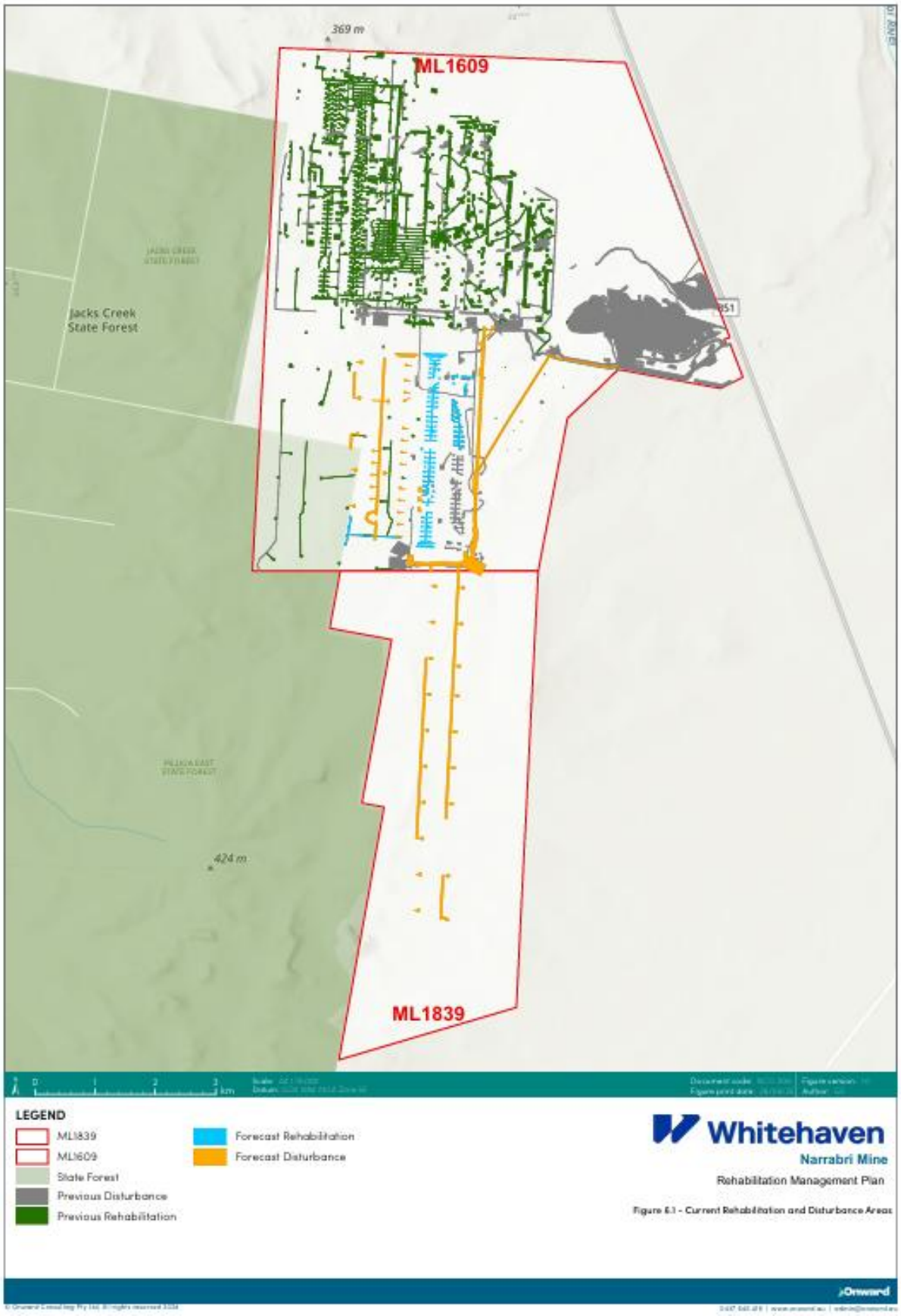


Figure 6-1.

Figure 6-1 Current and forecast (3-year) rehabilitation and disturbance

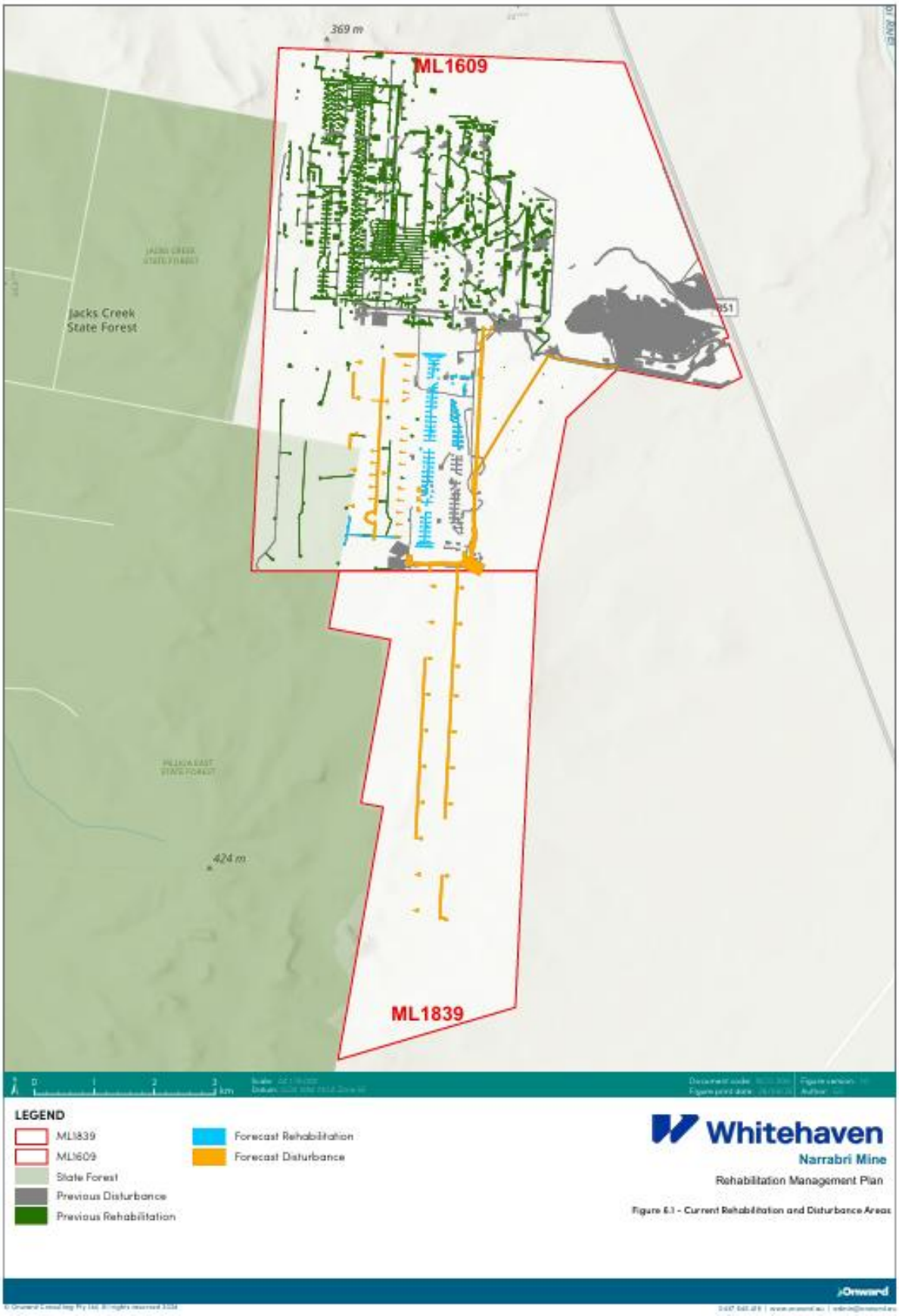


Figure 6-1 Current and forecast (3-year) rehabilitation and disturbance

6.2 Phases of rehabilitation and general methodologies

Rehabilitation phases are defined in Table 6-1 and discussed in detail in the following sections.

Table 6-1 Rehabilitation phases

Rehabilitation Phase	Description
Phase 1: Active mining	This phase consists of the rehabilitation activities undertaken during mining operations such as land clearing, salvaging and managing soil resources, salvaging habitat resources, and native seed collection. This phase also includes management actions taken during operations to manage risks to rehabilitation and enhance rehabilitation outcomes.
Phase 2: Decommissioning	This phase includes activities associated with the removal of mining infrastructure and removal and/or remediation of contaminants and hazardous materials. In the context of the RMP, this phase may also include studies and assessments associated with decommissioning and demolition of infrastructure or works carried out to make safe or 'fit for purpose' built infrastructure to be retained for future use(s) following lease relinquishment.
Phase 3: Landform establishment	This phase 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 surface water drainage features and prepare a substrate with the desired physical and chemical characteristics (i.e. rock raking or ameliorating sodic materials).
Phase 4: Growth medium development	This phase consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community to ensure achievement of the approved or proposed rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan. This phase may 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.
Phase 5: Ecosystem and land use establishment (ELUE)	Rehabilitation is 0 – 2 years old. This phase consists of the processes to establish the approved final land use following construction of the final landform (as per the approved final landform and rehabilitation plan). For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.
Phase 6: Ecosystem and land use development (ELUD)	Rehabilitation is >2 years old and supported by two years of monitoring data. This phase consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving the approved or proposed rehabilitation objectives, rehabilitation completion criteria and final landform and rehabilitation plan. 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 may include specific vegetation management strategies and maintenance such as tree thinning, supplementary plantings and weed management.
Phase 7: Rehabilitation completion (sign-off)	The final phase of rehabilitation when a rehabilitation area has achieved the final land use for the mining area as stated in the approved rehabilitation objectives and the approved rehabilitation completion criteria and as spatially depicted in the approved final landform and rehabilitation plan. Rehabilitation areas may be classified as complete when the Resources Regulator has determined in writing that rehabilitation has achieved the final land use following submission of the relevant application by the lease holder.

6.2.1 Active mining phase

a. Soils and materials

Mine site

The Stage 2 Environmental Assessment (R.W. Corkery, 2009) (Stage 2 EA) identified a variety of soil types within ML 1609. Some soil types, particularly those derived from the Purlawaugh Formation, were identified as being moderately to highly dispersive, erodible, and saline. Management of these soils is required where subsidence results in cracking, slope increases, or occurs within drainage lines.

The Stage 3 EIS Agricultural Impact Statement identified Biophysical Strategic Agricultural Land (BSAL), which was confirmed to occupy 215 ha within ML 1839 and MLA 2, consisting of dermosol and vertosol soil types within the Garrawilla Volcanic soil landscape unit. The mining area within ML 1609 is dominated by low to moderately low soil fertility classes, with smaller regions of moderate and high fertility classes in the eastern portion. Approximately 172 ha of BSAL is located within ML 1609.

Consistent with the current and historical land use practices, the LSC mapping confirmed that the land with ML 1609, ML 1839 and MLA 2 is capable of supporting grazing land use with small areas capable of opportunistic cropping and a smaller area capable of supporting a more frequent cropping regime.

Impact to soils within the disturbance area is considered temporary and manageable.

Soil attributes and limitations for the identified geological formations associated with the Narrabri Mine are provided in Table 6-2.

Table 6-2 Topsoil and subsoil attributes and limitations

Soil attribute	Surface geology			
	Purlawaugh formation	**Pilliga sandstone**	**Garrawilla volcanics**	**Napperby siltstone**
Dominant soil types	Chromosols, Dermosols, Ferrosols	Orthic Tenosol, Sodosols, Dermosols, Rudosols	Vertosols, Dermosols, Sodosols, Chromosols, Kandosols, Rudosols, Leptic Tenosols, Clacarosols	Sodosols, Rudosols
Soil depth	Usually very deep profiles on the crests where profiles tend to be shallower	Generally less than 0.25 m; shallower on crests and slopes	Deep profiles on slopes, floodplains and in drainage lines. More likely to be shallower on upper slopes and crests.	Generally shallow profiles, less than 0.2 m
	Not limiting	*Not limiting*	*Not limiting*	*Not limiting*
Soil texture	A mix of often coarse textured topsoil and more clayey subsoils	Generally the most sandy soils across the mine site	Usually finer textured (more clayey)	A mix of often sandy/loamy topsoil and more clayey subsoils
	Not limiting	*Not limiting*	*Not limiting*	*Not limiting*
Soil surface characteristics	Surface stone often absent but noted on slopes; surface sometimes self-mulching; not hydrophobic	Surface stone usually absent but noted on upper slopes; surface sometimes self-mulching; often hydrophobic	Surface stone usually absent, but noted on upper slopes; surface sometimes self-mulching; not hydrophobic	Surface stone often absent but noted on slopes; surface not typically self-mulching; may be hydrophobic
	Not limiting	*Not limiting*	*Not limiting*	*Not limiting*
Erodibility	May be some limitations where subsidence results in slope increases and in drainage lines	May be some limitations where subsidence results in slope increases and in drainage lines	Some limitations where subsidence results in slope increases	May be some limitations where subsidence results in slope increases and in drainage lines
	Low to moderate limitations	*Low limitations*	*Low to moderate limitations*	*Low to moderate limitations*
	May be limiting near subsidence cracks or where slope gradient increases following subsidence but may be an advantage in filling in cracks	*May be limiting near subsidence cracks or where slop gradient increases following subsidence but may be an advantage in filling in cracks*	*Limitation in vicinity of subsidence cracks*	*May be limiting near subsidence cracks or where slope gradient increases following subsidence but may be an advantage in filling in cracks*
pH	Generally favourable to plant growth; usually increasing with depth but some lower horizons quite acidic	Generally lower than in the other Geological Formations and not increasing much with depth	Generally favourable to plant growth; usually increasing with depth	Not generally favourable to deep-rooted plant growth; increases with depth with some lower horizons quite alkaline
	Not limiting	*Not limiting*	*Not limiting*	*Low limitations*

Soil attribute	Surface geology			
Salinity	Slight to moderate salinity detected in drainage line, floodplain and some slopes areas	Salinity not recorded	Salinity not recorded	Slight to moderate salinity detected in drainage line, floodplain and some slopes areas
	Limitation in areas associated with subsidence cracks where down slope saline areas may develop after erosion	*Not limiting*	*Not limiting*	*Limitation in areas associated with subsidence cracks where down slope saline areas may develop after erosion*

Soils

General soil management processes for soil stripping and stockpiling are described in the Vegetation Clearance Protocol. In summary, NCOPL will implement the following prior to and during vegetation clearing:

- selectively collect seeds from felled trees for propagation and use in rehabilitation, if practicable;
- retain ground cover (e.g., logs, fallen branches and leaf litter) within stripped topsoil to improve the viability of the soil when it is used in rehabilitation;
- locate topsoil wind rows considering drainage lines; and
- conserve topsoil (i.e., seed bank) for reuse in rehabilitation.

Topsoil stockpiles are long term storage areas located strategically, predominantly holding topsoils from the pit top area, water storages, REA, and vent fan complexes. Topsoil wind rows are established directly adjacent to cleared areas for access tracks and surface infrastructure and are re-spread during rehabilitation activities.

Topsoil and subsoils will be managed during stripping activities to maximise their suitability for re-use in site rehabilitation, with stripping and reuse restricted to soils identified as suitable for this purpose.

The topsoil seed bank is an important reserve of indigenous plant seeds and soil microflora, which will assist with the preservation of local genetic material and the reestablishment of a similar range and mix of species of the original vegetation in the rehabilitation area.

Where possible, topsoils will be directly placed onto prepared rehabilitation areas to ensure the health and viability of stripped soils.

Where stockpiling is required, the current controls to ensure growth media resources are managed appropriately to retain their structure, and chemical and biological properties include:

- all equipment brought to site is to be certified as clean and free of soil and vegetation;
- ensure the area to be stripped and the area of stockpiling are clearly identified prior to disturbance;
- informed by a test pit, strip topsoil to a depth of at least 150 mm, where possible;
- soils to be stockpiled in wind rows immediately adjacent to the area of disturbance;
- wind rows are to be created no higher than 2 m, slopes no greater than 2:1 (H:V) with a roughened surface to minimise soil erosion;
- wind rows retained for more than three (3) months that do not have a naturally established vegetation cover will be seeded with a selection of pasture species such as triticale, ryecorn or millet and perennial species such as phalaris, cocksfoot, perennial rye and sub clover;
- sediment controls including catchment banks, silt-stop fencing, mulch berms, or coir logs will be placed immediately down slope of any wind rows and will be maintained until such time as a stable vegetation cover is achieved in accordance with the Erosion and Sediment Control Plan;
- Drill pad and access track disturbance typically results in stripped topsoil windrowed along the edges of the disturbance footprint, enabling direct placement during rehabilitation activities, preserving topsoil quality and reducing the requirements for amelioration.
- if weeds are observed on wind rows, the BMP weed control program will be implemented;
- operation of machinery on wind rows will be avoided in order to prevent compaction and maintain soil aggregation;
- maintain a record of the topsoil stripping depths achieved, location and volume, any wind row seeding, and sediment and erosion controls of stockpiled soils; and
- monitor wind rowed material as part of the ongoing pre-stripping soil assessment program (including the REA).

If sufficient topsoil is unavailable, NCOPL will source appropriate materials from offsite.

Habitat features

Key habitat features will be salvaged during vegetation clearance activities and stockpiled for later use in rehabilitation areas. The habitat features will be respread over the disturbed areas during progressive rehabilitation to provide habitat resources for a range of invertebrate and ground-dwelling fauna.

Threatened flora

NCOPL will provide for the reasonable and feasible salvage, transplanting and/or propagation of threatened flora found during pre-clearance surveys, including *Coolabah bertya*, in accordance with the BMP and the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al., 2018).

REA

The general soil profile within the footprint of the REA was assessed as part of the Stage 2 EA that identified topsoil to 25 cm depth comprising brown to reddish brown, light to heavy clays; with some angular gravel 1cm to 3cm. Subsoil was identified as and comprising up to four layers consisting of brown, reddish brown or yellowish brown, light to heavy clays; with stones and gravel absent or some-to-much gravel present; some large stones and floaters present in some profiles. The measured dispersibility values for topsoils and subsoils were found to be generally low and pH and salinity levels within the soils were found to be within acceptable values for stockpiling and future use in rehabilitation.

The *Narrabri Mine Rejects Emplacement Area Capping Assessment and Closure Design* (ATC Williams, 2022) (REA Closure Design Report) found that soils available for use were categorised as either 'Silty Clay' (insitu or stockpiled) or 'Sandy Gravel' (some clay/silt). Both soil types had relatively high plasticity, and clay soils indicate non-dispersive behaviour. Potential capping materials were summarised as being typically non-sodic and alkaline, with the REA footprint materials slightly acidic to neutral. Based on the erosional stability documented in the REA Closure Design Report, the soil is considered likely to be susceptible to erosion.

Two risks relating to the REA during the active mining phase were identified in the risk assessment, these are:

- inadequate and/or inappropriate management of mineral waste caused by either incorrect geochemical characterisation and assessment of materials, inappropriate placement of adverse materials, or poor final landform establishment (moderate risk); and
- inadequate and/or inappropriate capping design caused by either unsuitable capping materials, or capping materials placed at an unsuitable thickness and not in accordance with design, or erosion of capping layer with potential exposure of coarse rejects (low risk).

Current controls (e.g. 5 yearly geochemical assessments, implementation of the REA Closure Design Report, and seepage monitoring program) are considered effective controls to mitigate the risks.

Materials deficit

A capping materials balance was conducted as part of the REA Closure Design Report which concluded that a sufficient volume of topsoil and subsoils exists to achieve the proposed capping design. Measures for stripping and stockpiling of soils for the REA will follow the general measures as described in the following section.

The current soil mass balance estimate indicates that there will be sufficient resource available for rehabilitation activities. Approximately 123,800 m^3 of topsoil and 202,900 m^3 of subsoil is available for rehabilitation activities. This will continue to be recorded in future, along with future demand.

b. Flora

Pre-clearance surveys prior to disturbance will be conducted in accordance with the Vegetation Clearance Protocol detailed in the Biodiversity Management Plan (BMP) to identify if any threatened flora are present within the proposed disturbance footprint. Risk of impacts to vegetation will be avoided, mitigated, and managed through the implementation of the 'Permit to Work' process. If clearing is likely to impact individuals of *Coolabah bertya* or other identified threatened flora, salvage or translocation of at least a portion of the impacted individuals is to be conducted in accordance with Appendix E of the BMP.

c. Fauna

As previously stated for flora, pre-clearance surveys will be conducted in accordance with the Vegetation Clearance Protocol detailed in the BMP prior to disturbance to identify if any threatened fauna species are present within the proposed disturbance footprint, along with any active nests or hollows and noting salvageable habitat features for use in rehabilitation.

A suitably trained and qualified ecologist or wildlife handler will be present during clearing to manage any fauna that may be encountered.

d. Rock/overburden emplacement

Narrabri is an underground coal mine, subsequently there is no overburden generated at the site.

Overburden removed from the initial box-cut excavation (underground mine access portal) was stockpiled for backfilling the box-cut at end of mine life rehabilitation activities.

Rock and drill cuttings from gas drainage and service boreholes will either be consolidated with excavated soil to backfill sumps at the drill pad site or disposed of at the REA.

e. Waste management

Waste generation onsite can be categorised as either production waste (e.g. drill cuttings, reject generated by the CHPP and underground areas, brine) or non-production wastes (e.g. hydrocarbons, treated sewage and effluent, food scraps and recyclable materials such as cardboard).

Wastes generated at the Narrabri Mine are to be managed in accordance with the relevant approvals.

Contaminated soils

NCOPL will conduct ongoing management of contaminated soil to allow for the completion of remedial works prior to progressive rehabilitation within the relevant domains.

The following hydrocarbon management controls will be implemented and maintained:

- all water from wash areas and workshops is directed to oil water separators and containment systems;
- all storage tanks are either self-bunded or partitioned with an impermeable bund with capacity to contain a minimum 110% of the largest storage tank capacity;
- all hydrocarbon products are securely stored;
- most equipment is refuelled at the bunded fuel farm in the Pit Top Area and any refuelling activities in the field are undertaken in accordance with site procedures and following the implementation of adequate controls to minimise the risk of spills;
- spill kits are available where hydrocarbons are used/stored; and
- internal audits and spot checks of hydrocarbon storage and waste management areas are conducted.

In the event of an internally reportable hydrocarbon spill, an incident report will be completed, appropriate spill response and corrective actions will be implemented; the Pollution Incident Response Management Plan (PIRMP) will be activated where necessary. The affected area will be inspected after remediation to ensure there is no ongoing effect on the land that could prevent it from being successfully rehabilitated.

f. Geology and geochemistry

Physical characteristics of REA material

Physical characteristics of reject material were assessed from particle size distribution testing. The sample tested indicates gravel, of cobble to boulder size (up to 150mm size), with trace of sand and clay/silt fines.

Consistent with this classification and supported by visual classification, reject material is expected to be competent (i.e. not readily crushable under load), be highly permeable and free draining (due to its grading), and therefore generally of low field moisture capacity.

Geochemical characteristic of REA material

A range of parameters were tested as part of the geochemical assessment of reject material, sampled from both the REA and the ROM stockpile (ATC Williams, 2022). The objectives of the geochemical assessment were to support the assessment of salinity, sodicity, acid forming potential and metals enrichment, and solubility. A summary of the geochemical characteristics for reject material is provided in Table 6-3 and a summary of geochemical characteristics for potential capping materials is provided in Table 6-4.

Table 6-3 Summary of geochemical characteristics for reject material

Characteristics	Summary
pH	Typically alkaline with median values of 9.3 and 9.4 for placed and fresh rejects respectively.
Salinity	Placed rejects typically range from slightly to highly saline. Fresh rejects typically slightly saline.
Sodicity	Stockpiled and REA footprint capping materials typically non-sodic (one sample slightly sodic)
Acid Forming Potential	Total sulfur content low All samples classified as non-acid forming (NAF) and barren in terms of acid generation and neutralisation
Metal Enrichment	Selenium concentration significantly enriched in all samples. Arsenic and antimony concentrations slightly enriched in some samples.
Solubility (Leaching)	Initial results indicate neutral pH and high salinity.

Table 6-4 Summary of geochemical characteristics for potential capping materials

Characteristic	Summary
pH	Stockpiled and placed REA capping materials typically alkaline. REA footprint materials slightly acidic to neutral.
Salinity	• Stockpiled capping materials non-saline to slightly saline. • Placed REA capping materials highly saline. • REA footprint materials non-saline.
Acid Forming Potential	Total sulfur content relatively low, with majority of contained sulfur occurring as reactive sulphide. All samples classified as NAF.
Metal Enrichment	• Selenium (Se) concentration significantly enriched in all samples, compared to average crustal abundance. • Arsenic (As) and antimony (Sb) concentrations slightly enriched in some samples. • Relative enrichment described above is a typical feature of strata in this region.
Solubility (Leaching)	Initial results indicate leachate with alkaline pH, with high to very high salinity (primarily due to significant sulfate salts).

The findings of the geochemistry assessment are discussed in more detail throughout this section, as well as in section 6.2.3 (c).

g. Material prone to spontaneous combustion

Spontaneous combustion within coal stockpiles

The Hoskissons coal seam has a high intrinsic spontaneous combustion propensity. Therefore, spontaneous combustion represents a potential hazard within the coal stockpiles and the goaf during operation and requires ongoing monitoring for evidence of self-heating. Spontaneous combustion events within stockpiles are recorded in accordance with the Spontaneous Combustion Management Plan and managed through a TARP.

At the cessation of mining, the coal stockpiles will be removed, and the area will be rehabilitated to an agriculture - grazing final land use.

Spontaneous combustion within the REA

The test results from the REA Closure Design Report indicate that the reject material is classified as having a propensity rating of low and the risk of spontaneous combustion, in the form of fires or heating within the REA, is also low. As such, it is considered that specific measures in relation to placement and encapsulation are not necessarily required. Notwithstanding, the adopted capping design should consider measures to minimise potential for oxygen diffusion into the rejects mass (measures to align with those stated for salinity generation), which would be a key trigger for spontaneous combustion.

h. Material prone to generating acid mine drainage

The geochemical assessment conducted as part of the REA Closure Design Report assessed the acid forming potential of reject material and concluded that:

- the total sulphur content is relatively low, with the majority of contained sulphur occurring as reactive sulphide; and
- all samples were classified as non-acid forming.

In addition, assessments undertaken for the Stage 2 EA identified low sulphate concentrations in groundwater suggesting that there is little concern for acid producing potential from groundwater inflows.

Therefore, acid mine drainage is considered a low risk to rehabilitation. Notwithstanding, analysis of coal and reject material will continue to occur throughout the life of mine (and when conditions change). If in the event acid mine drainage is identified, a works program for the identification of any potentially acid forming (PAF) material would be conducted and specific controls implemented.

i. Ore beneficiation waste management (reject disposal)

Coal from the underground workings is sent to the CHPP which produces a combined (part washed) (thermal) coal product and a washed (pulverised coal injection) coal product.

The coal preparation process removes approximately 2% of the total ROM feed as reject, which is predominantly rock from the floor of the mine workings. Currently, coarse rejects are unloaded onto a reject stockpile before being transferred via truck to the REA. Fine rejects are mechanically dewatered and blended with the unwashed (thermal) product coal.

j. Erosion and sediment control

Given the Narrabri Mine is an underground mine, there are relatively few areas of exposed ground with the potential for erosion and sedimentation. Erosion and sedimentation can result directly or indirectly from the following activities:

- vegetation clearing, topsoil stripping and soil wind rows;
- surface runoff from the construction and maintenance of unsealed roads and newly constructed embankments and drains;
- erosion of drainage channels;
- disturbed areas not yet rehabilitated; and/or
- operation of the REA.

Erosion and sediment control measures are further detailed in the Erosion and Sediment Control Plan.

Erosion potential for the REA

As identified in the REA Closure Design Report, erosion is a primary issue of concern for rehabilitation of the REA. Landform evolution modelling was conducted to assess the performance of the modified landform as a basis for supporting the application of geomorphic design principles. The results indicate that an 80% vegetation cover scenario achieves the target erosion rate of 5 tonnes per hectare per year, and that gully depths developed within the capping layer are unlikely to expose emplaced coarse reject within the 1,000-year model period. These results highlight the critical role that vegetation establishment plays in erosion management for the REA.

The appropriate final land use includes the establishment of mixed native and introduced grasses (pastures) with a native woodland overstorey community across the plateau surface and batters to reflect the surrounding areas, with grazing discouraged.

A summary of the ongoing erosion and sediment control measures for the REA are provided in Table 6-5.

Table 6-5 REA erosion and sediment control measures

Measure	Application	Affected area
Check dams	The installation of check dams allows for collection of the sediment along the drainage line minimising its offsite transport	Perimeter drains
Silt fences	Minimises the potential for erosion by reducing the velocity of stormwater sheet flow.	Capped REA surface prior to revegetation and during establishment of vegetation
Bare earth stabilisation	Use of soil stabiliser during construction and prior to revegetation to reduce rill formation.	Capped REA surface following compaction and prior to revegetation
Revegetation (hydromulching with tackifier)	Long term stability by reinforcing the soil with vegetation. Use of tackifier also increases stability during establishment phase.	Capped REA surface

k. Ongoing management of biological resources for use in rehabilitation

Habitat features

Key habitat features will be salvaged during vegetation clearance activities and stockpiled for later use in rehabilitation areas. The habitat features will be respread over the disturbed areas during progressive rehabilitation to provide habitat resources for a range of invertebrate and ground-dwelling fauna.

Threatened flora

NCOPL will provide for the reasonable and feasible salvage, transplanting and/or propagation of threatened flora found during pre-clearance surveys, including *Coolabah bertya*, in accordance with the BMP and the *Guidelines for the Translocation of Threatened Plants in Australia Third Edition* (Commander et al., 2018).

l. Mine subsidence

Mining activities are conducted using both the longwall retreat and bord and pillar methods. Due to the underground nature of mining operations, the proposed mining method is not considered a significant risk to rehabilitation. Previous subsidence impacts on natural features include surface cracking and ponding.

Potential subsidence related impacts to natural features that may occur include:

- surface cracking and shearing;
- general and localised slope instability;
- surface gradient increase/decrease; and
- additional ponded areas.

A multi-scale, multi-data monitoring approach has been developed to monitor the environmental consequences of subsidence effects. Whole-of-site monitoring includes remote sensing data (multi-spectral imaging and LiDAR), while field surveys focus on native vegetation, watercourses, surface cracking and erosion.

Rehabilitation liabilities that may be incurred as a result of subsidence (as identified in the risk assessment) include:

- changes to form and function of surface water catchments, and riparian communities;
- damage to infrastructure;
- unstable final landform; and/or
- damage to heritage sites.

Current measures for managing subsidence are detailed in the relevant Extraction Plan/s, which include a TARP to manage impacts from subsidence.

Subsidence monitoring and remediation will be on-going throughout the life of the mine.

m. Management of potential cultural and heritage issues

Aboriginal heritage is managed in accordance with the Aboriginal Cultural Heritage Management Plan (ACHMP) that was developed in consultation with the Registered Aboriginal Parties (RAPs) and Heritage NSW.

The ACHMP documents the outcomes of all Aboriginal cultural heritage assessments conducted to date, along with management and mitigation measures to protect, monitor and manage Aboriginal cultural heritage sites and values registered within the approved disturbance areas.

Engagement with the RAPs and Heritage NSW will be conducted as part of detailed mine closure planning, and all archival reports will be completed and submitted to the relevant departmental agencies.

n. Exploration activities

Exploration activities and subsequent rehabilitation will be undertaken in accordance with the requirements of the *Exploration Code of Practice: Rehabilitation*[4]. Disturbance from exploration will be rehabilitated as soon as reasonably practicable following the completion of exploration activities. Surveying and sealing of all drill holes will be conducted in accordance with relevant Government department guidelines and standards.

6.2.2 Decommissioning

In accordance with SSD-10269, NCOPL is required to decommission the mine and rehabilitate the site. The SSD-10269 will continue to apply in all respects at the cessation of mining (i.e. 31 December 2044), other than to permit the carrying out of mining operations, until the rehabilitation of the site and other requirements have been carried out to the required standard.

a. Site security

Site security measures will be implemented during and following the decommissioning phase to prevent access by members of the public and secure rehabilitation areas, including any heritage sites and any retained infrastructure.

Site security measures will include:

- site sign-in and induction processes;
- fencing and signage;
- habitat features such as logs placed over rehabilitated areas in woodland to prevent vehicle access;
- routine inspections of fences; and
- maintenance of existing security fences and signage, including fencing for Aboriginal cultural heritage sites.

b. Infrastructure to be removed or demolished

Site features, services, and structures that are to be decommissioned and demolished to achieve the final land use/s are described in Table 6-6. In accordance with SSD-10269, all demolition work must be carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Table 6-6 Infrastructure to be decommissioned

Code	Mining domain	Description
1	Infrastructure area	Site access road and internal access tracks, office and administration buildings, light vehicle carpark, workshop and stores buildings, electrical sub-station and associated electricity infrastructure, equipment laydown areas, rail loop and train loadout bin and train loader, sewage treatment plant, box cut and mine portals, explosives magazine, ventilation fans and shafts, gas drainage infrastructure and water pipelines.
3	Water management area	Network of sediment dams, produced water dams including lined evaporation ponds and brine storage ponds, water diversion bunds and associated water management infrastructure.
4	Overburden emplacement area	Signage, access roads, storage areas.
7	Beneficiation facility	Drift and skyline conveyors, coal crushing station, CHPP, ROM and product coal pad hardstand areas.

As part of detailed mine closure planning, NCOPL will assess if any surface infrastructure (e.g. conveyor belt, building materials, cement pads/footings, poly pipe) could be disposed of on-site (e.g. in backfilled box cut or underground).

Gas drainage infrastructure and mine safety pre-conditioning drill pads will be progressively decommissioned and rehabilitated following mining when the infrastructure is no longer required for operational purposes.

Mine entrances will be sealed in accordance with the relevant Government department guidelines. Boreholes will be decommissioned in accordance with the *Exploration Code of Practice: Rehabilitation* and the *Guideline for mineral exploration drilling; drilling and integrity of petroleum exploration and production wells*[5] or the latest versions.

[4] NSW Resources Regulator (March, 2022)

[5] Department of Industry – Resources and Energy, (August, 2016)

c. Buildings, structures and fixed plant to be retained

Infrastructure associated with the water storage area final land use domain will include retained sediment dams, contour banks and drainage structures, with appropriate erosion and sediment controls implemented to ensure water is adequately managed during closure and beyond. The structural integrity of the infrastructure will be determined as part of detailed mine closure planning.

The detailed mine closure planning process will:

- determine the structural integrity of the infrastructure to be retained;
- identify the associated short-term and long-term risks to public safety and the environment, which should identify potential modes of failure; and
- engage a suitably qualified engineer to verify that any risks have been satisfactorily addressed (if required).

d. Management of carbonaceous/contaminated materials

Carbonaceous material

During decommissioning, detailed inspections or audits will be undertaken within the infrastructure and beneficiation facility mining domain footprints, as well as the REA and access roads to identify remaining sources of carbonaceous material.

Following the inspections or audits, all carbonaceous material will be removed from the surface of the site and will be disposed of in the box cut with at least 5 m of inert cover.

Contaminated material

Contaminated material will be managed in accordance with relevant guidelines under the *Contaminated Land Management Act 1997*. NCOPL will engage a suitably qualified contamination expert to assist with the management of contaminated materials when required.

Contamination assessments will be completed as part of mine closure planning. The scope for these assessments will include:

- engage a suitably qualified contamination expert to conduct contamination and remediation assessments:
  - conduct a Phase 1 assessment for all features, services and structures within the infrastructure mining domain;
  - subject to the findings and recommendations of the Phase 1 assessment, a targeted Phase 2 assessment may be required.
- if contamination is identified, a Remedial Action Plan will be developed, detailing remediation strategies for potential contamination.

e. Hazardous materials management

During decommissioning, hazardous materials (e.g. hydrocarbons and chemicals) will be managed and stored in accordance with the Waste Management Plan. Removal of hazardous materials will be conducted by a licenced waste disposal contractor and disposed of/recycled at a licenced waste facility.

Accumulated salt in the brine ponds will be excavated and either placed within the drifts of the box-cut prior to backfilling or reinjected back into the goaf. A brine reinjection management plan will be developed as part of the mine closure plan.

f. Underground infrastructure

Following completion of underground mining activities, infrastructure associated with the box cut, drifts, shafts and boreholes will be decommissioned and removed. All remaining entries, shafts, adits, drifts and boreholes will be surveyed prior to being backfilled, capped and/or sealed in accordance with relevant Government department guidelines and standards.

Detailed mine closure planning will identify and describe how underground mining infrastructure will be decommissioned to achieve the final land use. Mine closure planning will include details for the following aspects:

- detailed design for sealing and decommissioning entries, shafts, adits and drifts which will be supervised and subsequently validated by a suitably qualified engineer to ensure that any risks associated with achieving the final land use outcome have been adequately addressed;
- procedure for the salvage of underground mining equipment and materials;
- the sealing and decommissioning of any remaining boreholes including services, gas wells, and dewatering;

- implementation of any specific measures required for the future management of groundwater accumulation in the underground workings, which may include measures to be implemented to minimise any environmental or community impacts associated with potential future discharges from the underground workings; and
- details of any consultation with Government agencies and any subsequent approvals that may be required to allow for any ongoing discharges.

Security measures will be implemented for public safety purposes whilst sealing and decommissioning works are being conducted. These will include exclusion zones demarcated by fencing and signage.

Subsidence monitoring pegs will be removed following cessation of monitoring as outlined in the relevant Extraction Plan/s.

6.2.3 Landform establishment

a. Water management infrastructure

Water management structures associated with the Water Management Area final land use, such as contour banks, diversion drains, or re-established drainage lines, will be constructed with longitudinal gradients that permit the transfer of water at non-erosive velocities (e.g., 1:200 (V:H)) (where practicable). Consequently, specialised rehabilitation treatments will generally not be required. No flumes are required due to limited heights of any embankments constructed. However, in the event that unacceptable levels of erosion are observed, specialised treatments such as jute meshing, or rock lining will be implemented.

Sedimentation dams will be constructed and retained during rehabilitation to collect runoff from rehabilitated areas until discharge water quality meets the relevant assessment criteria and dams can be decommissioned. Sediment accumulated in sediment dams will be appropriately removed or remediated.

The mine water and brine storage pond walls will be pushed in and re-profiled to be consistent with the surrounding landscape and rehabilitated to agriculture – pasture final land use.

b. Final landform construction: general requirements

The final landform will be designed to be stable, adequately drained, and consistent with the surrounding natural and modified landforms using a geomorphic engineered design. Final landform drainage will be designed and constructed to achieve long term stability and to minimise erosion.

Ongoing general landform construction activities include:

- removal of water retained within the sump(s) adjacent to each borehole/drill site by pump truck for reuse or disposal, or allow to evaporate over time;
- consolidated drill cuttings and fines will be excavated, and the sump backfilled using consolidated drilling spoil stockpiled during the bore construction phase;
- any upstream diversion banks or downstream catch banks will be pushed over and profiled to natural surface level;
- where cut and fill works were required, these areas will be re-excavated to return the site to its natural slope;
- access tracks will be progressively closed and rehabilitated (unless required for future access to monitor or manage subsidence-related impacts) and ripped using the tynes of a bulldozer (or similar) and regraded and trimmed to make a landform that is consistent with the surrounding topography;
- regrading will be such that it will enable the free drainage of surface runoff from the site; and
- soil resources stockpiled within native ecosystem rehabilitation areas will be reapplied in the same order as they were stripped to ensure the seed bank of the target vegetation community remains viable.

Remediation of subsidence effects such as surface cracking, ponding, and erosion will be conducted in accordance with the relevant Extraction Plan/s. Final subsidence inspections and rehabilitation will be conducted as part of the detailed mine closure planning. Surveys of the rehabilitated landform will be conducted to ensure it meets the final landform and final land use requirements.

c. Final landform construction: reject emplacement area

A final landform design has been developed based on material characterisation and modelling outcomes (ATC Williams, 2022) and is summarised below. The REA will be progressively capped as external batters formed using the overall capping philosophy stated in the REA Closure Design Report.

Final landform comprising:

- maximum height of 15m above natural surface level;
- a plateau area separated from external batters by a perimeter crest bund;
- the plateau will be partitioned into a series of flat internal ‘cells’ through incorporation of internal cross-bunding over the plateau surface; and
- permanent batters with concave slopes (14º transitioning to 11º).

The proposed capping configuration is presented in Figure 6-2.

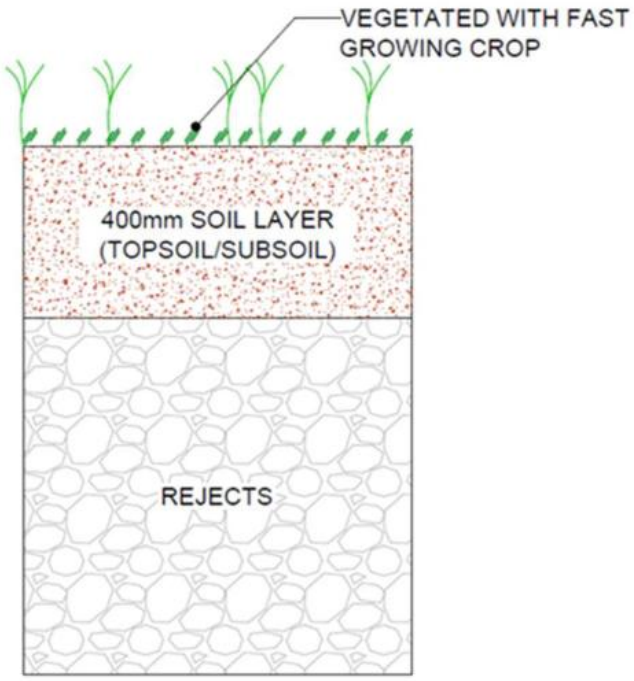


Figure 6-2 Proposed capping configuration for REA landform

The base case capping layer will be formed using topsoil and subsoil stripped from the REA footprint (nominal total thickness of 400mm). An alternative case comprising ameliorated capping soil using rock is also to be considered.

The completed landform design forms the basis for the closure and capping works to be undertaken progressively as each ‘cell’ is formed and reaches capacity. The final REA landform design will be confirmed by survey of slopes and elevations upon completion.

Key closure design criteria are summarised in Table 6-7.

Table 6-7 REA closure design criteria summary

Design aspect	Criteria / Features
Landform attributes	• Maximum height 15 m • Footprint area 25 ha • Concave batters (transitioning from upper 7.5 m at 4H:1V to 5H:1V) • Plateau perimeter bund and internal cross-bunding to form cells • Internal (operational) batters 2H:1V
Capacity	• Design airspace capacity 1.9 million m^3 (based on revised design landform) • Existing rejects disposal 577,000 m^3 (estimated from survey)
Capping configuration	• 400mm thick soil layer using CLAY capping material borrowed from topsoil and subsoil stripping from the REA development area • Revegetation by hydromulch (with tackifier) grass cover; species selection appropriate for soil properties and local climate conditions
Stormwater management	• External perimeter drain (clean water diverted around REA for release) • Internal perimeter drain (site water directed to sediment basin SB3 during operations; offsite release post-closure) • Flat cross-bunded cells on plateau to retain all runoff water on top of the landform

d. Final landform construction: final voids, highwalls and low walls

There will be no final voids, highwalls and/or low walls in the final landform.

e. Construction of creek/river diversion works

There will be no creek or river diversion works as part of the final landform.

6.2.4 Growth medium development

This section outlines how rehabilitation areas will be prepared with growth media (e.g. vegetation substrate) suitable for establishing vegetation in accordance with the approved final land use.

Soil characterisation

Depending on stockpile or wind row age, soil characterisation will be undertaken to determine if the soil is suitable for rehabilitation, or if it requires amelioration. Details are provided in Section 8.

Soil respreading and amelioration

Prior to the respreading of topsoils, an assessment will:

- consider disturbance history and compaction considerations (i.e. the need for additional ripping of tracks);
- confirm availability of soil resources, vegetation communities, and final land use proposed for the rehabilitated area;
- verify the requirement for soil testing depending on date of stripping;
- assess amelioration requirements;
- assess weed treatment requirements; and
- plan timing of soil respreading depending on season and rainfall.

For all suitable stockpiled material, the following re-spreading measures will be applied as informed by the assessment, where appropriate:

- Prior to re-spreading, the ground will be scarified along the contour to a depth of 50-100 mm to break up any hard setting surfaces and to provide a good bond between the re-spread material and sub-soil.
- Fertiliser application will be considered prior to seeding (agricultural grazing only) while the surface is being lightly scarified to create an optimal seed bed.

- Topsoil will be spread to a minimum depth of approximately 150 mm and will consider the soil depth information obtained through the pre-stripping soil assessments.
- When the topsoil is replaced, it will be replaced such that it resembles the surrounding landscape.

Where necessary, soil will typically be ameliorated using one or more of the following methods:

- mulching to increase organic carbon and improve the soils water holding capacity and soil biota levels;
- fertiliser applied to increase nutrient levels where possible, or as a slow-release formula applied directly beneath hand planted tree seedlings; and/or
- gypsum to treat dispersion, calcium to magnesium ratio, and improve structure and water holding capacity.

In addition to the above, the respreading of woody debris (logs, hollows etc.) to improve habitat value will also be conducted within the native ecosystem final land use domain.

If the growth medium cannot be effectively ameliorated, the unsuitable spoil will be buried and capped where fill is required (such as in backfilling the box cut). Capping spoil will be ameliorated if required, and contour ripped prior to the placement of the topsoil.

Reject emplacement area

The recovered topsoil and subsoil will be placed over the completed landform to provide a growth medium (ATC Williams, 2022). The capping layer surface will be revegetated by hydromulching with a fast growing cover crop. It is critical that selection of the cover crop species be appropriate for the soil properties and local climate conditions, with modelling suggesting that some perennial and drought tolerant species would be best suited to this application.

6.2.5 Ecosystem and land use establishment

This section describes how the target vegetation associated with the final land use will be established and subsequently managed to progress to the ecosystem and land use development phase (section 6.2.6). Revegetation activities are undertaken progressively and will be planned to occur after the completion of landform establishment, reshaping, topdressing with growth media and construction of drainage structures.

Native Ecosystem and Rehabilitation Offset Area

The majority of the rehabilitated sites located within the native ecosystem and rehabilitation offset area final land uses will be left to self-regenerate following reinstatement with topsoil and the spreading of habitat features. This method has been demonstrated to be successful, as the minor topsoil disturbance and direct replacement preserves the soil seed bank. In some instances, if regeneration is not self-sustaining, infill planting may be required using endemic species commensurate with the surrounding vegetation communities (refer to Appendix D for plant community types (PCT) indicative species).

At a minimum, rehabilitation of canopy species should reflect the number of trees identified during pre-clearance surveys or count per m^2 as follows:

- upper canopy – one (1) canopy planting per 10 m2;
- mid-canopy – one (1) mid-storey planting per 5 m2; 1 shrub planting per 1 m2; and
- groundcover – four (4) groundcover plantings per 1 m2.

All plants will be planted as tube stock by a suitably qualified person with appropriate records maintained. The timing of planting will be carried out when climatic growth conditions are optimal, generally autumn through to the beginning of spring. Planting season will depend on species and germination conditions, including soil moisture, temperature, humidity and rainfall. Timing may be adjusted to avoid unsuitable seasonal conditions, or periods with adverse weather conditions. The use of tree guards will be determined at the time of planting depending upon the predicted level of grazing and/or weather conditions.

Initial follow-up care and maintenance works for the native ecosystem and rehabilitation biodiversity offset area final land uses will include watering planted tube stock, possible fertiliser application, and monitoring for the incursion of weeds and damage caused by pest animal species.

REA

The REA Closure Design Report states the REA requires a consistent vegetation cover level of 80% or greater to achieve erosional stability. Therefore, an open native woodland community with mixed native and introduced grass species understorey will be established. With appropriate agronomic conditions, grass can reach cover levels over and above 95%, with the capacity to protect the

underlying surface from erosion even under high intensity rainfall. Deep drainage of rainfall through the cover will be minimised by the combination of deep root systems and relatively high annual rates of evapotranspiration.

Agricultural - grazing

Approximately 672.6 ha will be re-established as agricultural – grazing final land use. The main rehabilitation method for the final land use will be via self-regeneration following reinstatement with topsoil. Where monitoring indicates natural regeneration is not sufficient, these areas will be sown with a pasture seed mix relevant to the season of planting, with a typical fertiliser application rate as specified in Table 6-8.

The timing of seeding may be postponed to avoid seeding in adverse conditions or where sufficient provenance seed is not available. Where seeding with the final seed mix is delayed, prepared rehabilitation areas will be sown with a suitable cover crop to minimise dust generation and erosion.

Seed stock will be sourced from local reputable suppliers where possible. Advice on alternative seed/s to be used in rehabilitation will be sought from local Agronomists if certain seed species are not available.

Initial care and maintenance may include watering and light ripping after seeding to cover the seeds along with additional fertiliser where required.

Table 6-8 Winter and summer pasture species seed mixes

Summer			Winter		
Pasture species	**Rate (kg/ha)**	**Fertiliser**	**Pasture species**	**Rate (kg/ha)**	**Fertiliser**
Grasses					
Bombasti panic	1 - 2	Di-ammonium Phosphate 250kg/ha	Phalaris (Sirolan or Holdfast)	1 - 2	Di-ammonium Phosphate 250 kg/ha
Green panic	2 - 4		Wallaby Grass	0.3 - 1	
Purple pigeon grass	1 - 2				
Japanese Millet	10		Couch	5	
Legumes[1]					
Subterranean clover	4 - 5	-	Subterranean clover	4 - 5	-
			Barrel (Sephi) medic	2 - 4	-
			Snail (Sava) medic[2]	3 - 5	-
			Woolly pod vetch	4 - 6	-
			Serradella (Elagara)	1 - 2	-
			Lucerne	0.5	-

Notes:

[1] Inoculated with appropriate rhizobia.
[2] Specific soil conservation application

Water storage

In the event that unacceptable levels of erosion are observed within retained sediment dams, fast growing species identified as having a particular soil conservation application will be planted around the water management structure. The planting of trees and other vegetation will enhance the filtration capability of these structures and surrounding areas, minimise the potential for erosion, and encourage their use by native fauna.

All domains - Weed management

In accordance with the *Biosecurity Act 2015*, NCOPL has a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose.

Weed management of the rehabilitation areas will be aimed at controlling the occurrence and spread of environmental (e.g. Weeds of National Significance) and noxious weeds whilst encouraging native species.

Weed management measures include the following in accordance with the BMP:

- vehicles and equipment keep to formed roads;
- areas will be inspected regularly for the presence of weed species;
- relevant personnel will be provided with pictures and descriptions of known weed species and asked to report incidental sightings;
- treatment of entire infestations where possible;
- re-treatment of recurring infestations at regular intervals;
- mapping of key weed infestations following monitoring to track progress and focus control activities where necessary; and
- prompt rehabilitation of land post disturbance.

Weed control programs will involve:

- identifying weeds;
- application of weed control techniques in accordance with best practice and with consideration of the Noxious Environmental Weed Control Handbook (DPI, 2014) and local weed management plans published by the Narrabri Shire Council;
- follow-up monitoring; and
- follow-up weed control as required.

All personnel involved in weed management will be required to hold relevant permits /licences, including a chemical licence to use herbicides and a chainsaw certificate to operate chainsaws (if required).

The monitoring and management of weeds during the growth medium phase will be conducted in accordance with the BMP.

All domains - Pest management

Pest animal identification and control will be conducted over the life of mine. Pests will be identified as part of biannual monitoring and will be controlled with timing, frequency and techniques such as baiting, trapping, mustering, or shooting (as appropriate) as recommended by suitably qualified person based on the outcomes of biannual monitoring. The management of pest animals will consider the relevant threat abatement plans for Feral pig, European rabbit, Goat, Red fox and Feral cat.

NCOPL will engage qualified and experienced contractors that hold appropriate pesticide accreditation in accordance with the *Pesticides Act 1999* or Firearm Licence under the *Firearms Act 1996*. NCOPL will also ensure the contractors provide copies of their accreditation and will retain records of pest species, control techniques and location.

Pest control actions will be undertaken in accordance with the Humane Pest Animal Control: Code of Practice and Standard Operating Procedures (DPI, 2013, or its latest revision) and the BMP.

6.2.6 Ecosystem and land use development

This section details how rehabilitated areas will be actively managed to achieve the approved final land use, including the proposed management and monitoring programs that will be implemented to demonstrate that rehabilitation is likely to be sustainable in the long-term.

All domains

Activities associated with the ecosystem and land use development phase will generally consist of rehabilitation monitoring, ongoing maintenance, and land management activities.

Rehabilitation monitoring will be undertaken throughout the ecosystem and land use development phase until it can be demonstrated that rehabilitation areas have met the specific completion criteria as detailed in section 4.1. Monitoring results will be assessed against the relevant TARP, and where required, NCOPL will conduct maintenance or remedial works. Rehabilitation monitoring is discussed further in section 8.

Maintenance in rehabilitated areas will include, but is not limited to:

- weed 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;
- maintenance fertilising where required;
- maintaining erosion and sediment controls; and
- repair of fence lines, access tracks and other general related land management activities.

The ongoing rehabilitation maintenance activities will be identified via the rehabilitation monitoring program and ongoing requirements will be reported annually in the Annual Rehabilitation Report.

Domain B - agricultural grazing

To demonstrate agricultural productivity, NCOPL will record pasture establishment success and progression towards pre mining pasture conditions. Areas of agricultural - grazing final land use domain will be monitored whilst bearing livestock.

Ongoing monitoring will identify potential threats such as weed incursion, pest animals, erosion, and/or poor soil health. If potential threats are identified, appropriate management and amelioration measures will be implemented in accordance with the TARP. This may include the application of gypsum and fertiliser to topsoil in order to address potential acidity, organic carbon and/or nutrient deficiency constraints, and enhance rapid establishment of a sustainable vegetation growth.

6.3 Rehabilitation of areas affected by subsidence

Subsidence will be remediated in accordance with the relevant Extraction Plan/s. Minor surface cracks (i.e. less than 50 mm wide) are not expected to require remediation as geomorphological processes will likely result in these cracks filling naturally over time. However, if larger surface cracks (i.e. more than 50 mm wide) have not self-corrected within two months, remediation will be conducted.

To ensure that subsidence remediation techniques have been effective, NCOPL conduct subsidence monitoring in accordance with the relevant Extraction Plan/s

Subsidence impact monitoring, as described in the relevant Extraction Plan/s includes:

- Visual subsidence inspections
- Visual watercourse inspections; and
- Remote sensing.

Should subsidence effects pose a risk to successful rehabilitation, the relevant TARP will be implemented.

7. Rehabilitation quality assurance process

A Rehabilitation Quality Assurance Process (RQAP) will be implemented throughout the life of mine across all phases of rehabilitation. The RQAP will include records of inspections and monitoring which will be required to ensure that:

- rehabilitation is being implemented in accordance with the nominated methodologies; and
- identified risks to rehabilitation are being adequately addressed at each phase of rehabilitation.

Table 7-1 details the proposed RQAP for the Narrabri Mine.

Table 7-1 Narrabri Mine quality assurance

Phase	Key quality assurance steps	Timing	Formal documentation/validation method
Active mining	Records of competent personnel for active mining and rehabilitation.	Ongoing	• Position description
	Pre-clearance surveys	Ongoing	• Pre-clearance survey reports
	Permit to work (disturbance)	Ongoing	• Permit to Work procedure
	Salvage of resources	Ongoing	• Ecological Survey report added to Permit to Work record.
	Dumping plans and surveys for the REA	Ongoing	• REA Capping Assessment & Closure Plan technical specifications
	Up to date mine plans	Ongoing	• Mine planning procedures • RMP and Forward Program
	Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources	Ongoing	• Topsoil inventory maintained in spatial data management system • Soil assessment results
	Regular inspections to identify potential weed infestations. Details of weed status included in rehabilitation monitoring.	Ongoing	• Biodiversity monitoring reports • Rehabilitation monitoring reports
	Weed control records	Ongoing	• Results of weed control maintained in spatial data management system
	Regular inspections to review spontaneous combustion	Ongoing	• Spontaneous Combustion Management Plan, and procedures
	Soil testing	Ongoing	• Soil surveys reports (pre mining) • Soil testing in rehabilitation areas • REA Capping Assessment & Closure Plan
Decommissioning	Mine and borehole sealing	Progressive rehabilitation and at mine closure	• Documentation of sealing (records of fill materials and concrete plugs, filling methods etc.)
	Inspection of demolition to confirm all infrastructure to be demolished has been removed	Completion of mining in area	• Inspection reports • Decommissioning reports
	Waste generated during decommissioning will be removed from site by an appropriately licensed waste contractor. Brine storage pond liners will be removed from site by an appropriately licensed waste contractor.	Ongoing	• Waste records
	Phase 2 contamination assessment report for any contaminated areas have been remediated to an appropriate standard commensurate with the post-mining land use	Mine closure	• Contamination assessment report

Phase	Key quality assurance steps	Timing	Formal documentation/validation method
	Validation testing to ensure any contamination has been appropriately remediated and/or removed.	Mine closure	• Contamination remediation report
	Public safety risks are assessed during decommissioning such as fencing, signage and security	Completion of mining in area	• To be included in the detailed mine closure planning
	Subsidence pegs removed	Completion of mining in area	• To be included in the detailed mine closure planning
	Future landowner responsible for the ongoing upkeep and management of retained infrastructure	Relinquishment	• To be included in the detailed mine closure planning
Landform establishment	Survey and preparation of as constructed drawings of final constructed slopes, landforms and water drainage structures	Completion of mining in area	• Survey plans • As constructed drawings
	Demonstrate that the post-mining landform is stable and slopes are stable for agreed post-mining land use	Completion of mining in area	• Geotechnical report
	Subsidence remediation conducted in accordance with the Extraction Plan	Completion of mining in area	• End of panel reports • Rehabilitation monitoring reports
	Verification report to confirm the specified REA depth of capping has been implemented	Ongoing and at Mine closure	• Survey and rehabilitation records
Growth medium establishment	Maintenance of a topsoil and subsoil inventory to document stripped, stockpiled and re-spread resources	Ongoing	• Topsoil and subsoil inventory maintained in spatial data management system
	Records of re-spread topsoil, ameliorants, fertiliser etc.	Ongoing	• Rehabilitation completion records • Rehabilitation monitoring reports
	Habitat features (hollow bearing logs, felled timber not mulched and large rocks) were salvaged during pre-stripping operations for re-use where practicable	Ongoing	• Pre and post clearance ecological survey reports
	Soil testing to confirm appropriate soil geochemical parameters for plant establishment	Ongoing	• Rehabilitation monitoring reports • Soil assessment reports
	Records of identification and management of actual acid forming, PAF and NAF material and ongoing monitoring.	Mine closure	• Specialist geotechnical report
Ecosystem and land use establishment	Reseeding or planting activities undertaken such as, date of planting, weather conditions, fertilizer application rates, seeding rates and/or planting rates.	Ongoing	• Rehabilitation completion records • Rehabilitation monitoring reports
	Soil geochemical parameters for plant establishment and growth	Ongoing	• Soil assessment reports
	Site inspections and monitoring of rehabilitated areas to allow early identification of any emerging threats to rehabilitation	Ongoing	• Biodiversity monitoring reports • Rehabilitation monitoring reports • Site inspection reports
	Weed and pest animal infestations and control	Ongoing	• Biodiversity monitoring reports • Rehabilitation monitoring reports • Weed control records • Pest animal control records
Ecosystem and land use	Inspections of temporary and permanent erosion and sediment controls	Ongoing	• Biodiversity monitoring reports • Rehabilitation monitoring reports

Phase	Key quality assurance steps	Timing	Formal documentation/validation method
development			• Site inspection reports
	Weed and pest animal infestations and control	Ongoing	• Biodiversity monitoring reports • Rehabilitation monitoring reports • Weed control records • Pest animal control records
	Rehabilitation Monitoring	Ongoing	• Rehabilitation monitoring reports

8. Rehabilitation monitoring program

Rehabilitation monitoring will be conducted to measure rehabilitation success and assess trends towards achieving the rehabilitation objectives and completion criteria (section 4.1). NCOPL will conduct monitoring of rehabilitated areas to:

- identify specific problems to enable research on causes and appropriate solutions (e.g. erosion, low emergent numbers, loss of seedlings, loss of particular species);
- determine if the actions detailed in this RMP are leading to positive rehabilitation outcomes (e.g. vegetation in rehabilitation site is trending towards the target vegetation community, landform is stable);
- track progress of rehabilitation and vegetation establishment against the relevant completion criteria; and
- provide feedback for continuous improvement of the rehabilitation and revegetation program as detailed in this Plan.

Rehabilitation monitoring data will be collected by a suitably qualified and experienced person(s), recorded spatially, and reported in an annual report. Rehabilitation monitoring results will be compared against the TARP (section 10 and Appendix E) and rehabilitation completion criteria to allow early identification of any emerging threats to rehabilitation and inform any refinements required to the rehabilitation methodology. Any changes will be outlined in this RMP, the Annual Rehabilitation Report and the Forward Program.

Rehabilitation monitoring under this RMP and the BMP will continue until it can be demonstrated that rehabilitation has satisfied all rehabilitation completion criteria. A summary of the monitoring program is provided in Table 8-1 and further discussed in this section.

Table 8-1 Rehabilitation monitoring program

Aspect	Location	Method	Frequency	Phase	Record
Groundcover Presence of weeds Emergence of trees Erosion	All rehabilitated areas	Initial establishment monitoring	6, 12 and 24 months post growth medium development phase	ELUE	Site-specific checklists
Landform stability	All rehabilitated areas	Remote sensing over longwall panels	Triennially	Active mining ELUE	Remote sensing data Annual review
	Where required	Targeted field surveys of impacted areas	As required	Active mining ELUE	Site-specific reports
	Active longwall face	Subsidence crack inspections	Monthly	Active mining ELUE	Subsidence crack inspection records
Soil	Where required	Soil characterisation survey	As required in accordance with TARP	ELUE	Survey reports
			Prior to relinquishment	ELUD Completion	Survey reports
Vegetation	Vegetation monitoring plots	Modified BAM survey	Annually in spring	ELUE ELUD	Ecology reports
Weed and pest	As identified	In accordance with BMP	In accordance with BMP	ELUE ELUD	Weed monitoring and control reports

8.1 Analogue site baseline monitoring

Three (3) analogue site will be established for each vegetation class in accordance with the BAM (i.e. “best-on-offer” reference sites) and results will be averaged to compare with each equivalent rehabilitation site. Note, only two analogue plots will be established for the Eastern Riverine Forests vegetation class due to the small total area of disturbance across all Longwalls (one rehabilitation plot only). A total of 12 rehabilitation plots and a total of 8 analogue plots are established across Longwalls 101-110.

8.2 Rehabilitation establishment monitoring

At the completion of the growth medium development phase, rehabilitation areas will be subject to initial establishment monitoring at 6 months, 12 months and 24 months. This includes:

- an assessment of ground cover;

- weed presence;
- emergence of native trees; and
- evidence of erosion.

Results will be compared against the TARP and adaptive management measures assessed and implemented, where triggered.

8.3 Measuring performance against rehabilitation objectives and rehabilitation completion criteria

The rehabilitation monitoring program as described in section 8 is designed to provide quantitative and qualitative data which will be used to assess rehabilitation progress towards the rehabilitation objectives and completion criteria, and to further assist in refining rehabilitation methods across the site.

NCOPL is required to demonstrate (with records) that they have achieved the final land use (or are trending towards) for the mining area prior to applying for rehabilitation completion. In summary, NCOPL must demonstrate that:

- the approved rehabilitation objectives have been met
- the approved rehabilitation completion criteria have been achieved
- the final landform and final land use(s) have been implemented.

Rehabilitation monitoring results will be compared against the relevant TARP to provide the management responses when monitoring indicates areas of rehabilitation are not progressing.

Rehabilitation records must be maintained of all rehabilitation actions taken in accordance with the Mining Regulation 2016. To achieve rehabilitation completion, all monitoring required under the *Mining Act 1992* will be completed and no further ongoing monitoring will be required (e.g. subsidence, water or ecological monitoring). Consultation will also be required to be undertaken with relevant government agencies and any regulatory requirements under other legislation have been satisfied in accordance with the *Guideline - Achieving Rehabilitation Completion (Sign-Off)*[6].

NCOPL will be required to formally apply for rehabilitation completion using the relevant application form.

8.3.1 Landform stability

Remote sensing (multispectral imaging and light detection and ranging [LiDAR]) and visual subsidence inspections are conducted to monitor landform stability in accordance with the relevant Extraction Plan/s.

NCOPL will utilise remote sensing LiDAR and multi-spectral imaging to provide a quantitative comparison of landscape condition and vegetation cover to that of selected control sites. Control sites are established within zones where no subsidence impacts have been predicted. Targeted field surveys will be conducted to examine any cause of change.

Monthly visual inspections behind the longwall face (i.e. during active subsidence) will be conducted to determine surface crack locations (depth, width and length) and required rehabilitation, the extent of any ponding, and observations of erosion and/or sedimentation.

Remote sensing will be utilised at mine closure, along with survey data and targeted inspections to determine if the landform is stable in accordance with the proposed completion criteria.

8.3.2 Soil characterisation

8.3.2.1 Ecosystem and land use establishment

Where initial establishment monitoring results show an exceedance of TARP triggers, soil characterisation surveys may be required to determine adaptive management measures. Depending on the identified issue, characterisation will test from the following parameters as per completion criteria:

- Total Carbon (TC), total Nitrogen (TN), organic matter, TC/TN ratio;
- Brayland II Phosphorus and Colwell Phosphorus;

[6] NSW Resources Regulator (2021) *Guideline - Achieving Rehabilitation Completion (Sign-Off)*

- available cations (Calcium, Magnesium, Potassium, Ammonium, Nitrate, Phosphate, Sulfur);
- available micronutrients (Zinc, Manganese, Iron, Copper, Boron, Silicon);
- Exchangeable (Sodium, Potassium, Calcium, Magnesium, Hydrogen, Aluminium, Cation Exchange Capacity);
- pH and EC (1:5 water);
- basic colour; and
- basic texture.

Where the final land use is rehabilitation offset area or native ecosystem, characterisation may also include:

- total organic Carbon;
- soil biota; and
- seedbank viability (presence of viable seeds, species composition, and weed risk).

The results of the surveys will inform required soil treatments.

8.3.2.2 Rehabilitation completion

Within the native ecosystem domain, soil will be surveyed for total organic carbon by the collection of bulked soil samples within each vegetation monitoring plot (both rehabilitated and analogue (section 8.1)). Rehabilitated sites with a final land use domain agricultural – grazing will be subject to a suite of soil analyses as per the completion criteria (Appendix B).

Soil surveys will focus on the top 10 cm of soil, depending on topsoil depth, to provide a mean value representative of the monitoring site soil condition. The aim is to collect a composite topsoil sample weighing approximately 500 grams. Four soil samples, representative of the expected variation across the monitoring site, will be taken from each quadrant within each vegetation monitoring plot (section 8.1.3). An additional core sample may be required to ensure enough soil is collected where soil depth is less than 10 cm, or soils are skeletal or rocky.

To analyse the soil survey results, data from the corresponding analogue sites will be averaged and compared against the respective rehabilitation monitoring sites to determine if the land capability is consistent with the final land use domain or vegetation class.

Data and results from the soil surveys will be summarised and incorporated into the Annual Rehabilitation Report.

8.3.3 Vegetation monitoring

Vegetation monitoring will be undertaken to evaluate the progress of the rehabilitated areas towards meeting performance and completion criteria.

Monitoring locations will be determined onsite by a suitably qualified ecologist and selected based on disturbance history, rehabilitation methods, access routes and mapped vegetation class/s. For each individual longwall, where vegetation has been disturbed (cleared for drill pads and/or roads), one monitoring plot will be established for each type of disturbance and vegetation class that has been disturbed (i.e. vegetation class X with access track disturbance and drill site disturbance will have one plot per disturbance type, equalling two monitoring plots).

Rapid vegetation integrity monitoring plots will be established across rehabilitated surface disturbance areas within the native ecosystem and rehabilitation offset area final land use domains. The size of the monitoring plots will differ from the BAM (DPIE, 2020) to accommodate the relatively small size of the rehabilitated areas. As an underground mining operation, most disturbed areas across all Longwalls at NCO are unable to accommodate a 50 m transect and, as such, all monitoring plots (rehabilitated and analogue) include a 20 m transect within a 20 x 20 m (0.04 ha) floristic plot (Figure 8-1).

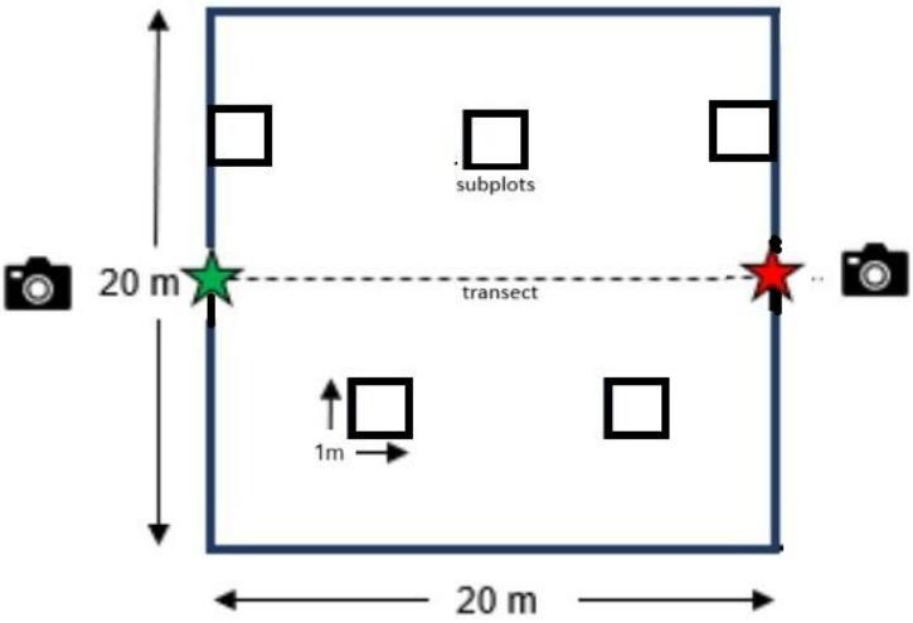


Figure 8-1 Modified BAM plot

The aim of the rapid vegetation integrity monitoring (informed by the BAM[7]) is to achieve a rapid vegetation integrity (condition) score which can rapidly generate a vegetation integrity score to measure change, comparable to the full BAM method, while at the same time increasing efficiency.

The data collected at each monitoring plot will include all variables currently used in a BAM assessment; however, utilises bands (Appendix B; Table B-1) to categorise results for each variable. Native species diversity and vegetation cover for each growth form group will be assessed against analogue site data for the corresponding vegetation communities / classes / PCTs. The presence of trees in stem classes based on diameter at breast height, including presence of hollows, % litter cover, foliage cover for high threat weeds and soil total organic carbon will also be monitored. The aim is to achieve a 'low' percentage difference compared to analogue site data.

The variables to be collected are:

- Composition: a count of each distinct species:
  - species richness in each growth form (i.e. direct counts) - trees, shrubs, grass & grass-like, forb, fern and other.
  - number of weed species.
- Structure: an estimate of the overall percentage of each growth form group:
  - sum percent cover of each species in the following growth form - trees, shrubs, grass & grass-like, forb, fern and other.
- Function (recorded as per the BAM):
  - number of large trees;
  - total length of logs (fallen or salvaged and reused) >10cm diameter and >0.5m length;
  - average litter cover (5 x 1m^2 located on alternate dies and 5m from the midline at the locations 0, 5, 10, 15, 20 m along the midline);
  - regeneration present (stems <5cm diameter at breast height); and
  - number of stem size classes present (5 – 9 cm, 10 – 19 cm, 20 – 29 cm, 30 – 49 cm, 50 – 79 cm and 80 cm+).

Two photographs will be taken within each monitoring plot to supplement the data. The first photograph will be taken from the most northerly corner of the plot (location recorded during initial monitoring event) in the direction of the diagonally opposite corner. The second photograph will be taken from the diagonally opposite corner in the direction of the most northerly corner of the plot.

[7] https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/about/biodiversity-assessment-method

Observations of erosion will also be recorded during each monitoring event.

8.3.4 Weed and pest animal monitoring

Weed and pest animal monitoring will be ongoing in accordance with the BMP. Rehabilitation monitoring will record the presence of weeds and observational recording of pest animals.

8.3.5 Surface and groundwater

Monitoring of surface and groundwater impacts, including monitoring of groundwater dependent ecosystems, will continue during the life of mine and post closure in accordance with the Water Management Plan. The Water Management Plan will be revised as part of the detailed mine closure planning, including revision of the groundwater model.

Seepage monitoring will verify that seepage/leachate is not contributing to land or groundwater contamination.

8.3.6 Subsidence monitoring

Subsidence monitoring will continue to be conducted in accordance with the relevant Extraction Plan/s and the subsidence pond monitoring program. Final subsidence inspections will be conducted as part of mine closure planning.

End of panel reports will be prepared, comparing subsidence impacts and environmental consequences with predictions in accordance with CoC C11.

9. Rehabilitation research, modelling and trials

9.1 Current rehabilitation research, modelling and trials

NCOPL adopts a continuous improvement approach to rehabilitation. Outcomes from rehabilitation monitoring, audits, assessments and opportunistic observations are used to evaluate rehabilitation performance and identify opportunities to refine rehabilitation methodologies and management practices. Where relevant industry standards, emerging technologies and best-practice methodologies are identified, NCOPL will consider their applicability and, where appropriate, incorporate these into rehabilitation activities and future revisions of this RMP.

The Resources Regulator Targeted Assessment Program (TAP) recommended NCOPL undertake a Rehabilitation Monitoring Gap Analysis to review existing rehabilitation monitoring and management practices and identify opportunities for improvement. NCOPL completed the Rehabilitation Monitoring Gap Analysis on 30 June 2026. The Gap Analysis identified eight recommendations aimed at strengthening rehabilitation planning, implementation, monitoring, assessment and adaptive management practices at Narrabri Mine.

An associated Gap Analysis Action Plan and implementation schedule has been developed to address the eight recommendations. The recommendations broadly relate to improvements in rehabilitation planning and documentation, routine inspections, initial establishment monitoring, retrospective assessment of rehabilitation performance, long-term monitoring, rehabilitation objectives and completion criteria, and adaptive management measures. The Action Plan also includes consideration of alternative rehabilitation techniques, technologies and monitoring approaches where these may support improved rehabilitation outcomes.

A summary of the eight Gap Analysis recommendations and their respective implementation timeframes is provided in **Table 9-1**.

Table 9-1 Gap Analysis Recommendations

RECOMMENDATION	INDICATIVE SCHEDULE
Recommendation 1 – Improvements to the data hub ePTW process	30/06/2027
Recommendation 2 – Routine environmental inspections of operational areas	31/12/2026
Recommendation 3 – Improvements to the data hub rehabilitation execution form	30/06/2027
Recommendation 4 – Initial establishment monitoring program	30/06/2027
Recommendation 5 – Retrospective assessment of overlooked rehabilitation areas	30/06/2027
Recommendation 6 – Improve long-term annual monitoring program	31/12/2027
Recommendation 7 – Review and update rehabilitation objectives and completion criteria	31/12/2027
Recommendation 8 – Consideration of adaptive management measures	30/06/2028

Progress against the Gap Analysis recommendations will be tracked by NCOPL and reported annually through the Annual Rehabilitation Report. Outcomes and learnings arising from implementation will be used to inform ongoing rehabilitation management and, where appropriate, incorporated into future revisions of this RMP.

9.2 Future rehabilitation research, modelling and trials

Should suitable research/trial opportunities be identified, they will be investigated and implemented. Rehabilitation monitoring and methodology records are shared among WHC operations to inform decision making regarding future rehabilitation campaigns.

10. Intervention and adaptive management

If rehabilitation performance is not trending toward the rehabilitation objectives and completion criteria, NCOPL will implement additional response actions to investigate any potential threat to long term rehabilitation success. Threats to rehabilitation may include extreme weather events such as extended periods of drought, rainfall, bushfire, or pressures from the incursion of weeds.

The TARP (**Error! Reference source not found.**) provides an overview of management responses for lower (Level 1) and upper (Level 2) triggers. The TARP will continue to be updated to reflect updates to completion criteria and in response to emerging rehabilitation risks.

11. Review, revision and implementation

The Environmental Superintendent is responsible for the day-to-day management and implementation of this RMP. NCOPL will review, and if necessary, revise this RMP as required. The review of this RMP will be informed by ongoing stakeholder consultation.

The EMS describes the triggers for reviewing and revising management plans required under SSD-10269. The revision status of this RMP is indicated in section 11.1.

11.1 Review history

Revision	Comments	Author	Authorised by	Date
1	Initial plan under the *Mining Act 1992*	SLR Consulting Australia Pty Ltd	Environment Superintendent, NCOPL	29 July 2022
2A	Revision to include approved rehabilitation objectives and other minor updates	Onward Consulting	Superintendent - Environment, NCOPL	16 November 2023
3	Revision to incorporate Stage 3 requirements, refine methods and monitoring program, updated rehabilitation objectives and other minor updates	Onward Consulting	Superintendent - Environment, NCOPL	26 August 2025
3A	Revision to include outcomes of TAP and independent review of rehabilitation monitoring program	Onward Consulting	Superintendent - Environment, NCOPL	23 June 2026
3B	Revision to Section 9.1 to incorporate the Gap Analysis Action Plan and associated indicative work schedule.	NCOPL	Superintendent – Environment, NCOPL	14 September 2026

Appendix A Rehabilitation regulatory requirements

Table A-1 Regulatory requirements for rehabilitation

<table>
<tr><th>Condition</th><th>Requirement</th><th>Final land use domain</th><th>Timing</th><th>Section</th></tr>
<tr><td colspan="5">State Significant Development SSD 10269</td></tr>
<tr><td>Schedule 2, Condition A1</td><td>In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction and operation of the development, and any rehabilitation required under this consent.</td><td>All</td><td>Ongoing</td><td>Section 6</td></tr>
<tr><td>Schedule 2,
Condition B61</td><td>Rehabilitation Objectives
The applicant must rehabilitate the Narrabri Mine in accordance with the conditions imposed on the mining lease(s) associated with the development under the Mining Act 1992. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS and must comply with the objectives in Table 8.
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>All areas of the site affected by the development</td><td>• Safe, stable and non-polluting
• Fit for the intended post-mining land use/s
• Establish the final landform and post-mining land use/s as soon as practicable after cessation of mining operations
• Minimise post-mining environmental impacts</td></tr>
<tr><td>Areas proposed for native ecosystem re-establishment</td><td>• Establish/restore self-sustaining native woodland ecosystems
• Establish local plant community types
• Establish:
○ riparian habitat within any diverted and/or re-established creek lines and retained water features;
○ habitat, feed and foraging resources for threatened fauna species; and
○ vegetation connectivity and wildlife corridors, as far as is reasonable and feasible</td></tr>
<tr><td>Watercourses</td><td>• Remediation of subsidence impacts and environmental consequences that are not 'negligible'</td></tr>
<tr><td>Final Landform</td><td>• Stable and sustainable for the intended post-mining land use/s
• Consistent with surrounding topography to minimise visual impacts
• Incorporate relief patterns and design principles consistent with natural drainage that mimic natural topography and mitigate erosion to the greatest extent practicable</td></tr>
<tr><td>Rehabilitation materials</td><td>• Soil and vegetative materials from areas disturbed under this consent (including topsoils, substrates and seeds) are recovered, managed and used as rehabilitation resources</td></tr>
<tr><td>Surface facilities sites</td><td>• To be decommissioned, unless the Resources Regulator agrees otherwise
• All surface facilities sites are to be revegetated with suitable local native plant species to a landform consistent with the surrounding environment or the intended post mining land use(s)</td></tr>
<tr><td>Portals and vent shafts of the development</td><td>• To be decommissioned and made safe and stable</td></tr>
<tr><td>Mine water discharges following mine closure (from any location)</td><td>• Negligible environmental consequence</td></tr>
<tr><td>Water quality</td><td>• Water retained on the site is fit for the intended post-mining land use/s
• Water management is consistent with the regional catchment management strategy</td></tr>
<tr><td>Built features damaged by mining operations</td><td>• Repair to pre-mining condition or equivalent unless the:
• owner agrees otherwise; or damage is fully restored, repaired or compensated for under the Coal Mine Subsidence Compensation Act 2017</td></tr>
<tr><td>Cliffs, minor cliffs, rock face features and steep slopes</td><td>• No additional risk to public safety compared to prior to mining</td></tr>
<tr><td>Community</td><td>• Ensure public safety
• Minimise adverse socio-economic effects associated with mine closure</td></tr>
<tr><td>GHGEs</td><td>• Effective sealing of the mine at closure to minimise future GHGEs</td></tr>
</table>
Note: These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by all underground mining of the development and to all surface infrastructure components of the development.</td><td>All</td><td>Ongoing</td><td>Section 4
Section 5
Section 6
Section 8</td></tr>
<tr><td>Schedule 2,
Condition B62</td><td>Progressive Rehabilitation
The Applicant must rehabilitate the Narrabri Mine progressively, that is, as soon as reasonably practicable following disturbance, including construction disturbance. All reasonable and feasible steps must be taken to minimise the total area exposed at any time. Interim stabilisation and temporary vegetation strategies must be employed when areas prone to dust generation, soil erosion and weed incursion cannot be permanently rehabilitated.
Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the development.</td><td>Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural– grazing</td><td>Ongoing</td><td>Section 6</td></tr>
<tr><td>Schedule 2,
Condition B64</td><td>The Applicant must implement the Rehabilitation Strategy approved by the Planning Secretary.</td><td>All</td><td>Ongoing</td><td>This RMP</td></tr>
</table>

Condition	Requirement	Final land use domain	Timing	Section
Schedule 2, Condition B65	**Rehabilitation Management Plan** The Applicant must prepare a Rehabilitation Management Plan for the development, in accordance with the conditions imposed on the mining lease(s) associated with the Narrabri Mine under the *Mining Act 1992*. This plan must:	All	Life of mine (revised throughout)	This RMP
	• include a life of mine rehabilitation and mining schedule which outlines the key progressive rehabilitation milestones from the commencement of operations through to decommissioning and mine closure;	All	Life of mine	Section 6.1
	include Rehabilitation Objectives, Rehabilitation Completion Criteria and a Final Landform and Rehabilitation Plan;	All	Life of mine	Section 4 and 5
	include detailed performance indicators and completion criteria for each rehabilitation domain, and triggers for remedial actions, including actions to be undertaken in the event that vegetation establishment is impacted by spontaneous combustion;	All	Life of mine	Section 4 Section 10
	include an overview of the identified risks to achieving successful rehabilitation;	All	Life of mine	Section 3 Appendix A
	describe the measures to be implemented on the site to achieve the Rehabilitation Objectives in Table 7 and to address the identified risks;	All	Ongoing	Section 6
	include a program to monitor, independently audit and report on progress against the criteria in paragraph (c) and the effectiveness of the measures in paragraph (e);	All	Ongoing	Section 8 Section 11
	describe any further studies, work, research or consultation that will be undertaken to expand the site-specific rehabilitation knowledge base, reduce uncertainty and improve rehabilitation outcomes; and	N/A	Life of mine	Section 9
	outline intervention and adaptive management techniques to ensure rehabilitation remains on a trajectory of achieving the Rehabilitation Objectives, Rehabilitation Completion Criteria and the Final Landform and Rehabilitation Plan as soon as reasonably practical.	All	Ongoing	Section 10
	Notes: • The Rehabilitation Management Plan should address all land impacted by the Narrabri Mine. • The Rehabilitation Management Plan may be combined with a Mining Operations Plan, or similar plan, required under mining lease/s granted for the development. • The Biodiversity Management Plan, Stage 2 Biodiversity Offset Strategy, Rehabilitation Strategy and Rehabilitation Management Plan require substantial integration to achieve the biodiversity objectives for the rehabilitated site.	-	-	-
Schedule 3, Condition C11	**End of Panel Reporting** Within 4 months of the completion of each longwall panel, or as otherwise agreed by the Planning Secretary, the Applicant must: (a) prepare an end-of-panel report: (i) reporting all subsidence effects (both individual and cumulative) for the panel and comparing subsidence effects with predictions; (ii) describing in detail all subsidence impacts (both individual and cumulative) for the panel; (iii) discussing the environmental consequences for watercourses, water yield, water quality, aquatic ecology, terrestrial ecology, groundwater, cliffs and steep slopes; and (iv) comparing subsidence impacts and environmental consequences with predictions; and (b) submit the report to the Department, Resources Regulator, BCS, DPIE Water and any other relevant agency, to the satisfaction of the Planning Secretary. The Applicant must include a comprehensive summary, analysis and discussion of the results of monitoring of subsidence effects, subsidence impacts and environmental consequences in each Annual Review.	All	Ongoing	Section 8.1.4
Stage 3 Environmental Impact Statement				
Attachment 5, Section A5.2	**Rehabilitation of the Project** NCOPL would continue rehabilitation of the Stage 2 mining areas at the Narrabri Mine as part of the project.	All	Ongoing	Section 5 Section 6
Attachment 5, Section A5.2.1	**General Rehabilitation and Mine Closure Objectives** The Project would be rehabilitated to a safe, stable and non-polluting landform of a similar character to surrounding areas.	All	Ongoing	Section 6
	General Rehabilitation and Mine Closure Objectives Rehabilitation would be undertaken progressively as soon as reasonably practicable as areas become available following mining operations.	All	Ongoing	Section 6
Attachment 5, Section A5.2.2	**Conceptual Final Landform Design – Pit Top Area Surface Infrastructure** Following the completion of mining, surface infrastructure would be decommissioned, unless otherwise agreed with the relevant regulatory authorities and landholders.	Agricultural - grazing	Upon on cessation of mining	Section 6

Condition	Requirement	Final land use domain	Timing	Section
	Conceptual Final Landform Design – Pit Top Area Surface Infrastructure Waste generated during decommissioning would be removed from site by an appropriately licensed waste contractor.	Agricultural - grazing	Upon on cessation of mining	Section 6
	Conceptual Final Landform Design – Pit Top Area Surface Infrastructure The decommissioned surface infrastructure areas would then be re-profiled to be consistent with the surrounding landscape.	Agricultural - grazing	Upon on cessation of mining	Section 6
	Conceptual Final Landform Design – Box Cut Following the completion of mining, mine entrances in the box cut would be sealed in accordance with the requirements of *MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams* (NSW Trade and Investment, 2012).	Agricultural - grazing	Upon on cessation of mining	Section 6.2.2
	Conceptual Final Landform Design – Box Cut Consistent with the approved final landform, the box cut would then be backfilled with material recovered from the amenity bund and other areas on-site before being re-profiled to be consistent with the surrounding landscape.	Agricultural - grazing	Upon on cessation of mining	Section 6
	Conceptual Final Landform Design – Reject Emplacement Area The rehabilitated reject emplacement area would be approximately 15 metres (m) high with batter slopes of generally 1(Vertical [V]):5(Horizontal [H]) with a maximum grade of 1(V):4(H) on the north-east batter. An approximate 400 millimetre (mm) clay capping layer would be placed over the final landform prior to revegetation (ATC Williams, 2019).	Native ecosystem	Upon on cessation of mining	Section 6
	Conceptual Final Landform Design – Brine Storage Area Brine generated at the Project would be stored in brine storage ponds.	Agricultural - grazing	Ongoing	Section 6
	Conceptual Final Landform Design – Brine Storage Area Consistent with the current post-mining water management strategy, brine would be re-injected into the longwall goaf through the disused goaf gas drainage holes or via the underground infrastructure towards the completion of mining.	Agricultural - grazing	Prior to closure	Section 6.2.2
	Conceptual Final Landform Design – Brine Storage Area Following the dewatering of the brine storage ponds, accumulated salts would be removed from the brine storage pond floor and walls and placed in the box cut. Brine storage pond liners would be removed from site by an appropriately licensed waste contractor. The brine storage pond walls would then be pushed in and re-profiled to be consistent with the surrounding landscape.	Agricultural - grazing	Upon on cessation of mining	Section 6.2.2
	Conceptual Final Landform Design – Underground Mining Area Following the completion of each longwall panel, surface infrastructure associated with the completed longwall panel (except for selected gas drainage boreholes and associated access tracks) would be decommissioned.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural – grazing	Ongoing	Section 6.2.2
	Conceptual Final Landform Design – Underground Mining Area The gas drainage boreholes would be decommissioned following the completion of the adjacent longwall panel.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural – grazing	Ongoing	Section 6.2.2
	Conceptual Final Landform Design – Underground Mining Area Following the completion of mining, remaining surface infrastructure in the underground mining area would be decommissioned. The decommissioned surface infrastructure areas would then be re-profiled to be consistent with the surrounding landscape.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural – grazing	Ongoing	Section 6.2.2 Section 6.2.3
Attachment 5, Section A5.2.4	**Table A5-3:** Rehabilitation Objectives	All	Life of mine	Section 4

Rehabilitation Domain	Domain Rehabilitation Objective
Primary Domains	
Infrastructure Area (1)	• Infrastructure with no alternate post-mining use (where agreed with relevant regulatory authorities and landholders) would be decommissioned and removed. • Ventilation shafts would be backfilled with material recovered from the amenity bund, southern mine water storage and/or the stockpiles located at the ventilation complexes. • Mine entrances and ventilation shafts would be sealed in accordance with the requirements of *MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams* (NSW Trade and Investment, 2012). • Boreholes would be capped in accordance with the Exploration Code of Practice: Rehabilitation (Department of Planning and Environment – Division of Resources and Geosciences, 2017) and the Guideline for mineral exploration drilling; drilling and integrity of petroleum exploration and production wells (Department of Industry– Resources and Energy, 2016). • Hydrocarbons (petrol, diesel, oils, greases, degreasers and kerosene), chemicals, and liquid and non-liquid wastes unused at the completion of mining would be returned to the supplier in accordance with relevant safety and handling procedures. • Potentially contaminated soils would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*. • The landform would be re-profiled to be consistent with the surrounding landscape to allow for free drainage of surface water runoff. • Following rehabilitation, pasture, woodland, Mine Site Ecological Rehabilitation, State Forest and biodiversity offset areas land uses would be established.

Condition	Requirement		Final land use domain	Timing	Section
	Water Management Area (3)	• Water management structures and sediment control structures would either be retained as water sources for future land uses or decommissioned and rehabilitated. • Potentially contaminated soils would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*. • Where water management structures are decommissioned, the landform would be re-profiled to be consistent with the surrounding landscape to allow for free drainage of surface water runoff. • Following rehabilitation, pasture, woodland, Mine Site Ecological Rehabilitation and water management land uses would be established.			
	Reject Emplacement Area (4)	• The rehabilitated reject emplacement area would be constructed with a compacted floor with a permeability of less than 1x10-9 metres per second. • The rehabilitated reject emplacement area would be approximately 15 m high with batter slopes of generally 1(V):5(H) with a maximum grade of 1(V):4(H). • An approximate 400 mm capping layer would be placed over the final landform prior to revegetation. • Erosion control structures including batter contour drains; swale drains; perimeter drain would be constructed. • Potentially contaminated soils would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*. • Following rehabilitation, pasture land use would be established.			
	Stockpiled Material (5)	• Stockpiled material would be removed and used in rehabilitation activities. • Potentially contaminated soils would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*. • Following the removal of the stockpiled material, the landform would be re-profiled to be consistent with the surrounding landscape to allow for free drainage of surface water runoff. • Following rehabilitation, pasture land use would be established.			
	Underground Mining Area (8)	• Subsidence remediation measures would be implemented. • Potentially contaminated soils would be identified and remediated in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*. • Following rehabilitation, pasture, woodland, State Forest and biodiversity offset areas land uses would be established.			
	Approved Biodiversity Offset (9)	• Managed in accordance with the Biodiversity Offset Strategy (Section A5.1.4).			
	Secondary Domains				
	Water Management (A)	• Retained water management structures would support the post-mining land use (e.g. agriculture). • Retained water management structures would be appropriately licensed in accordance with the NSW *Water Management Act 2000* (if required).			
	Pasture (B)	• Pasture areas would be revegetated to include a mixture of pasture species. • Pasture areas would be suitable for light intensity grazing.			
	Woodland (C)	• Woodland areas would be revegetated to include endemic woodland species and to enhance the habitat values and biodiversity values. • Rehabilitated woodland areas would be self-sustaining and have comparable flora and fauna values of surrounding remnant vegetation			
	State Forest (D)	• State Forest areas would be revegetated to include endemic woodland species and to enhance the habitat values and biodiversity values. • Rehabilitated State Forest areas would be self-sustaining and have comparable flora and fauna values of surrounding remnant vegetation.			
	Mine Site Ecological Rehabilitation (E)	* Refer to Table A5-4.			
	Biodiversity Offset (F)	* Managed in accordance with the Biodiversity Offset Strategy (Section A5.1.4)			
Attachment 5, Section A5.2.5	**Mine Site Ecological Rehabilitation Areas** NCOPL would establish Mine Site Ecological Rehabilitation areas in accordance with the NSW Biodiversity Offsets Scheme as part of the Project.		Rehabilitation Biodiversity Offset Area	Ongoing	Section 1.3.3 Section 1.3.4 Section 5
	Mine Site Ecological Rehabilitation Areas NCOPL would aim to re-establish the same plant community types in similar locations to those cleared for the Project.		Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
	Mine Site Ecological Rehabilitation Areas		Native Ecosystem, Rehabilitation Biodiversity	Ongoing	Section 10

Condition	Requirement	Final land use domain	Timing	Section
	The Mine Site Ecological Rehabilitation areas would be rehabilitated consistent with the rehabilitation strategy for the Woodland secondary domain if the rehabilitation objectives, performance indicators and completion criteria for the Mine Site Ecological Rehabilitation areas are not able to be satisfied.	Offset Area		
Attachment 5, Section A5.2.7	**Key Rehabilitation Performance Measures and Completion Criteria** A MOP would be developed for the Project that would describe the rehabilitation performance measures and completion criteria, including more detailed and quantified criteria where applicable (based on the Development Consent conditions for the Project).	All	Life of mine (revised throughout)	This RMP
	Key Rehabilitation Performance Measures and Completion Criteria – Decommissioning • Project infrastructure (e.g. CHPP, ROM coal stockpile and product coal stockpile, rail loop, buildings) is to be decommissioned in accordance with the MOP to the satisfaction of the relevant regulatory authorities, unless otherwise agreed with the relevant regulatory authorities and landholders. • Mine entrances and ventilation shafts decommissioned and sealed in accordance with the MOP and NSW Resources Regulator requirements. Any potentially contaminated areas are to be tested and where required, remediated, in accordance with the NSW *Land Contamination Management Act 1997* following infrastructure decommissioning.	Agricultural – grazing	Cessation of mining	Section 4 Section 6.2.2
	Key Rehabilitation Performance Measures and Completion Criteria – Landform Establishment • Each domain re-profiled to the final landform design in accordance with the MOP, to be confirmed by survey of slopes and elevations. • Surface water management infrastructure designed and implemented in line with the approved Water Management Plan.	All	Cessation of mining	Section 4 Section 6.2.3
	Key Rehabilitation Performance Measures and Completion Criteria – Growth Medium Development • Application of a growth medium (e.g. suitable topsoil/subsoil) to bare or stripped areas in accordance with the MOP. • Soil application depths, amelioration requirements and soil application equipment on rehabilitated landforms are to be in accordance with the MOP. • Suitable soil preparation on final landforms (e.g. ripping on contour or tilling) is to be undertaken prior to establishment of vegetation.	All	Ongoing	Section 4 Section 6.2.4
	Key Rehabilitation Performance Measures and Completion Criteria – Ecosystem and Land Use Establishment • Salvaged habitat features placed on rehabilitated landforms in accordance with the MOP. • Re-profiled landforms stabilised by use of a cover crop (i.e. minimal erosion). • Natural revegetation allowed to establish, however if rehabilitation monitoring determines this is not successful, additional management measures would be developed (e.g. seeding using suitable woodland or pasture species in accordance with the nominated post-mining land use) and further rehabilitation monitoring would be undertaken. After revegetation establishment in a domain, representative rehabilitation monitoring sites would be established in that domain and in corresponding representative control sites in accordance with the requirements of the MOP.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 4 Section 6.2.5
	Key Rehabilitation Performance Measures and Completion Criteria – Ecosystem and Land Use Sustainability Adequate species diversity, succession and habitat development that meets applicable benchmark levels, as confirmed by survey. Satisfies the post-mining land use objective, as agreed with relevant regulatory authorities and stakeholders. Followed by lease relinquishment where applicable.	All	Prior to relinquishment	Section 4 Section 6.2.5
Attachment 5, Section A5.3.2	**Soil Stripping and Handling** The following management measures would be implemented during the stripping of soils: • Areas of disturbance requiring soil stripping would be clearly defined. • Soil stripping during periods of high soil moisture content (i.e. following heavy rain) would be avoided where practicable to reduce the likelihood of damage to soil structure. • Where ameliorants (e.g. lime, gypsum and fertiliser) are determined to be necessary to improve the condition of the soil, they would be applied to the soil prior to rehabilitation. In preference to stockpiling, wherever practicable, stripped soil would be directly replaced on completed sections of the final landforms.	All		
	Soil Stripping and Handling Any long-term soil stockpiles would be managed to maintain long-term soil viability through the implementation of the following management practices as listed below: • Soil stockpiles would be retained at a height of 2 m (where existing disturbance areas allow and does not require the need for additional disturbance) and with slopes no greater than 1(V):2(H) with a slightly roughened surface and a flat top to minimise erosion, where practicable. • All soil stockpiles would be protected with a non-persistent cover crop to reduce erosion potential as soon as practicable after completion of stockpiling.' • Soil stockpiles would be located in positions to avoid surface water flows and where required sediment control fencing would be placed immediately down-slope of stockpiles until stable vegetation cover has established. • No vehicle access on soil stockpiles would be allowed. • Weed control programs would be implemented on soil stockpiles if monitoring indicates weed control is required. An inventory of soil resources (available and stripped) would be maintained and regularly reconciled with rehabilitation requirements.	All	Ongoing	Section 6.2.1
Attachment 5, Section A5.3.4	**Decommissioning of Surface Infrastructure** Subject to the agreed final land use, decommissioning of surface infrastructure would include, but not be limited to, the following actions:	All	Upon cessation of mining	Section 6.2.2

Condition	Requirement	Final land use domain	Timing	Section
	• de-energising equipment (e.g. removing connections to power, water, gas, compressed air and sewerage) and isolation of power to the site (if appropriate); • removal of underground infrastructure, such as mining equipment and service infrastructure; • mine entrances would be sealed in accordance with the requirements of MDG6001 Guideline for the Permanent Filling and Capping of Surface Entries to Coal Seams (NSW Trade and Investment, 2012); • boreholes would be capped in accordance with the *Exploration Code of Practice: Rehabilitation* (Department of Planning and Environment – Division of Resources and Geosciences, 2017) and the *Guideline for mineral exploration drilling; drilling and integrity of petroleum exploration and production wells* (Department of Industry – Resources and Energy, 2016); • demolition and removal of buildings and other surface infrastructure (such as the CHPP, conveyors and train load-out facilities); • removal of roadways, concrete footings, drainage structures, hardstand and foundations, if not required for the post-mining land use; • removal of rail line, sleepers and ballast, if not required for the post-mining land use; • removal of the Namoi River pump station, alluvial production bore and pipeline; • removal of waste generated during decommissioning from site by an appropriately licensed waste contractor; and • removal and disposal of any hazardous materials such as fuel, lubricants, chemicals or other substances of concern.			
	Decommissioning of Surface Infrastructure As part of mine closure planning, NCOPL would assess whether Project surface infrastructure (e.g. conveyor belt, building materials, cement pads/footings, poly pipe) could be disposed of on-site (e.g. in backfilled box cut or underground).	Agriculture – grazing	Upon cessation of mining	Section 6.2.2
Attachment 5, Section A5.3.5	**Selection of Native Plant Species for Revegetation** The Mine Site Ecological Rehabilitation areas would be revegetated with species consistent with the plant community types listed in Table A5-4.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
	Selection of Native Plant Species for Revegetation Natural revegetation would be allowed to establish, however if rehabilitation monitoring determines this is not successful, additional management measures would be developed (e.g. seeding using suitable woodland species endemic to adjacent remnant vegetation) and further rehabilitation monitoring would be undertaken.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
	Selection of Native Plant Species for Revegetation Native plant species to be planted in woodland and biodiversity offset areas would be selected on a site-by-site basis, depending on nearby remnant vegetation associations, soil types, aspect and site conditions.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
	Selection of Native Plant Species for Revegetation Pasture areas would be sown with a native pasture seed mix relevant to the season of planting.	Agriculture – grazing	Ongoing	Section 6.2.5
Attachment 5, Section A5.3.6	**Establishment of Agricultural Land** Approximately 2,063 ha of surface development areas and remediated underground mine areas would be re-established as agricultural land (pasture) following the closure of the Project.	Agriculture – grazing	Ongoing	Section 6.2.5
Attachment 5, Section A5.3.8	**Erosion and Sediment Control Measures** Erosion and sediment control measures would be progressively developed and approved as part of the Water Management Plan. Sediment and erosion controls would be periodically updated and regularly reviewed.	All	Ongoing	Section 6
Attachment 5, Section A5.3.10	**Land Contamination Measures** Investigations would be undertaken at mine closure to identify and remediate any contaminated soil that may exist (e.g. in infrastructure areas), in accordance with the requirements of the NSW *Contaminated Land Management Act 1997*.	Agriculture – grazing	Upon cessation of mining	Section 6.2.1
	Land Contamination Measures Contaminated land would be remediated by removal and disposal at an appropriately licensed facility, encapsulation or appropriate remediation treatment on-site.	Agriculture – grazing	Upon cessation of mining	Section 6.2.2
	Land Contamination Measures At mine closure, a preliminary contaminated site analysis would be implemented to determine whether an assessment should be conducted.	Agriculture – grazing	Upon cessation of mining	Section 6.2.1
Attachment 5, Section A5.3.11	**Weed and Pest Control** Weed outbreaks in rehabilitation areas would be monitored, and control measures undertaken would be reported in the Annual Reviews.	All	Ongoing	Section 6 Section 8
	Weed and Pest Control NCOPL would minimise rubbish on-site to discourage scavenging and reduce the potential for colonisation of Project rehabilitation areas by non-endemic fauna. Humane control methods would be implemented for all animal pest species.	All	Ongoing	Section 6 Section 8
Attachment 5, Section A5.4	**Mining Operations Plan** Preliminary rehabilitation objectives, performance indicators and completion criteria for the Project would be reviewed as part of an update to the MOP for the Project, which would be undertaken in consultation with relevant regulatory authorities, and in accordance with the relevant NSW rehabilitation and mine closure guidelines.	All	Life of mine (revised throughout)	This RMP
Attachment 5 Section	**Rehabilitation Monitoring**	All	Post-closure	Section 8

Condition	Requirement	Final land use domain	Timing	Section
A5.5.1	Post-closure monitoring of rehabilitation areas at the Project would be conducted to assess the: • progress of rehabilitation areas; and • the effectiveness of the rehabilitation techniques being used to determine the need for any maintenance and/or contingency measures.			

	Rehabilitation Monitoring
	It is expected that the rehabilitation monitoring would include (subject to final land use agreement):
	• Documentation of all rehabilitation activities undertaken.
	• Baseline monitoring to determine conditions pre-mining and during mining:
	  ○ recording pasture establishment success and progression towards control sites;
	  ○ monitoring drains and rehabilitated mine landforms for localised failures or drilling and loss of topsoil after rainfall events;
	  ○ identifying potential threats to rehabilitated woodland and pasture areas (e.g. weed invasion, pest species, erosion);
	  ○ monitoring the stability of rehabilitated mine landforms; and
	  ○ recording key rehabilitation information (e.g. taking photographic records).
	• Initial monitoring for a period of one to two years post-closure and comparison with control sites.
	• Ongoing monitoring (less frequently) from two years post-mining until lease relinquishment.
	• Post-lease relinquishment monitoring (to be negotiated with future landholders).
	Use of adaptive management techniques and facilitation of research trials where appropriate.
		All	Ongoing and post-closure	Section 8

	Rehabilitation Monitoring Annual surveys of rehabilitation areas would be undertaken to review the progress of rehabilitation and to identify any additional measures required to achieve ongoing progression towards achieving rehabilitation criteria.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Ongoing	Section 8
	Rehabilitation Monitoring A monitoring report would be prepared annually that includes a summary of previous monitoring results, results of the current year's monitoring and any planned remedial works, if required.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Ongoing	Section 8
	Rehabilitation Monitoring The monitoring results would be summarised in the Annual Review.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Annually	Section 8
Attachment 5, Section A5.5.2	**Rehabilitation Investigations and Trials** NCOPL would continue to undertake rehabilitation and subsidence remediation trials and investigations over the life of the Project to allow for continued improvements in rehabilitation and remediation practice. It is anticipated that these trials and investigations by NCOPL would focus on: • Coolabah Bertya translocation techniques and processes; • rehabilitation practices implemented at the reject emplacement and at decommissioned surface facility sites; and techniques and processes for remediation of subsidence impacts.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Life of mine (revised throughout)	Section 9
	Rehabilitation Investigations and Trials The results of the rehabilitation and subsidence remediation trials would be summarised in the Annual Review.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Annually	Section 9
Attachment 5, Section A5.7	**Mine Closure Plan and Lease Relinquishment** The existing MCP would be updated for the Project in consultation with relevant regulatory authorities and community stakeholders.	All	5 years prior to mine closure	Section 6.1
	Mine Closure Plan and Lease Relinquishment The MCP would include consideration of amelioration of potential adverse socio-economic effects due to the reduction in employment at Project closure (Sections 6.15 and 6.16).	All	5 years prior to mine closure	Section 6.1
	Mine Closure Plan and Lease Relinquishment NCOPL would transfer to the relevant regulators any documents required to preserve the history of the site, once closed, to facilitate future land use planning.	All	5 years prior to mine closure	Section 6.1
	Mine Closure Plan and Lease Relinquishment The *Strategic Framework for Mine Closure* published by the ANZMEC-MCA (2000) (or its contemporary version) and *Leading Practice Sustainable Development Program for the Mining Industry – Mine Closure* (DIIS, 2016b) would be used as a guide for mine closure.	All	5 years prior to mine closure	Section 6.1
BDAR Section 5.1.4	**Rehabilitation** Infrastructure would be removed and surface development areas rehabilitated progressively or at the end of the Project life, unless otherwise agreed with the relevant government agencies and landholders (e.g. services corridors and access roads, sheds, buildings and sediment dams may provide for alternate post-mining uses).	All		
BDAR, Section 5.1.4	**Rehabilitation** To minimise impacts from environmental weeds, NCOPL would continue weed prevention measures, control and monitoring.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Ongoing	Section 6

Condition	Requirement	Final land use domain	Timing	Section
BDAR, Section 5.1.4	**Rehabilitation** Operational sediment and erosion control works would be maintained during the establishment of revegetation to minimise impacts from sedimentation or erosion.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6
BDAR, Section 6.1.1	**Measures to Mitigate and Manage the Impact** The following measures would be implemented to mitigate and manage the adverse impacts from land clearance on native vegetation: • progressive revegetation of disturbed areas (mine rehabilitation) with species characteristic of the surrounding vegetation (Biodiversity Measure 2).	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 5 Section 6
BDAR, Section 6.1.2	**Measures to Mitigate and Manage the Impact** The following measures would be implemented to mitigate and manage the adverse impacts from land clearance on habitat (Section 7): • salvage of suitable hollows and logs during vegetation clearance for use in rehabilitation (Biodiversity Measure 3); and	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6
BDAR, Section 6.2.5	**Measures to Mitigate and Manage the Impact** The main measure to mitigate edge effects is the progressive revegetation of disturbed areas (mine rehabilitation) with species characteristic of the surrounding vegetation (Biodiversity Measure 2).	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 5 Section 6
BDAR, Section 7 (Table 13)	**Mitigation Measures - Biodiversity Measure 2** Over the life of the mine. Surface facilities used for the Project would be progressively closed and rehabilitated once mine safety pre-conditioning activity has been undertaken, unless required for future access.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Ongoing	Section 6.2.1 Section 6.2.2
BDAR, Section 7.2	**Biodiversity Measure 2 – Rehabilitation and Revegetation** Surface disturbance areas associated with the Development Footprint would be rehabilitated and revegetated (when the surface facilities are no longer required or at the end of the mine life where no further ongoing beneficial use is identified).	All	Ongoing and upon cessation of mining	Section 6.1 Section 6.2.1 Section 6.2.2
BDAR Section 7.2	**Biodiversity Measure 2 – Rehabilitation and Revegetation** Mine components that would be progressively rehabilitated include goaf gas drainage infrastructure, service boreholes, access tracks and post drainage corridor and pre-conditioning area. Other mine components, such as the vents and services corridors, would typically be decommissioned following mine closure.	Native Ecosystem, Rehabilitation Biodiversity Offset Area, Agricultural - Grazing	Ongoing	Section 6.2.1 Section 6.2.2
BDAR, Section 7.17 (Table 15)	**Performance and Completion Criteria - Biodiversity Measure 2** Method: Revegetation using natural regeneration or seed collected from felled trees. Propagation and translocation of Coolabah Bertya.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
BDAR, Section 7.17 (Table 15)	**Performance and Completion Criteria - Biodiversity Measure 2** Completion Criteria: Revegetation of cleared areas	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
BDAR, Section 8.1.3	**The measure/s proposed to contribute to the recovery of the species in the IBRA subregion** Mine rehabilitation would be undertaken to restore foraging habitat for the Large-eared Pied Bat and Eastern Cave Bat.	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
BDAR, Section 9.2.1	**Poplar Box Woodland Endangered Ecological Community - Assessment** The clearance areas would be progressively rehabilitated and revegetated when the surface facilities are no longer required or at the end of the mine life. Mine rehabilitation would include species characteristic of the Poplar Box Woodland EEC and would aim to establish PCTs that would be cleared (Section 7).	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.5
BDAR, Section 9.2.2, 9.2.3, 9.2.4, 9.2.5, 9.2.6, 9.2.7, 9.2.9. 9.2.10, 9.2.11, 9.2.12	The clearance areas would be progressively rehabilitated and revegetated when the surface facilities are no longer required or at the end of the mine life to conserve the following species and species habitat: • Coolabah Bertya • Spiny Peppercress • Tylophora linearis • Swift Parrot • Superb Parrot • Regent Honeyeater • Painted Honeyeater • Koala • Corben's Long-eared Bat • Large-eared Pied Bat • Pilliga Mouse	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.1
BDAR Section 9.3 Table 22	**Impact Mitigation Measures Relevant to Threatened Species and Communities Listed Under the EPBC Act – Biodiversity Measure 2** Surface disturbance areas associated with the Development Footprint would be rehabilitated and revegetated (when the surface facilities are no longer required or at the end of the mine life where no further ongoing beneficial use is identified).	Native Ecosystem, Rehabilitation Biodiversity Offset Area	Ongoing	Section 6.2.1

Condition	Requirement	Final land use domain	Timing	Section
Standard mining lease conditions (ML 1609 and ML 1839)				
Division 1 (4)	Rehabilitation to occur as soon as reasonably practicable after disturbance	All	Ongoing	Section 6
Division 1 (5)	Rehabilitation must achieve final land use	All	Prior to relinquishment	Section 5
Division 1 (6)	Rehabilitation risk assessment	All	Life of mine (revised throughout)	Section 3
Division 2 (7)	Rehabilitation management plans for large mines	All	Life of mine (revised throughout)	This RMP
Division 3 (10)	Rehabilitation outcome documents	All	Life of mine (revised throughout)	This RMP
EPBC 2009/5003				
Condition 5	In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, the person undertaking the action must actively manage progressive disturbance of the mine site in accordance with a Rehabilitation Management Plan for the life of the mine. The Rehabilitation Management Plan must be developed and implemented prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010). The final version of this plan must be submitted to the Department.	All	Life of mine (revised throughout)	This RMP

Appendix B Rehabilitation objectives and completion criteria

Table B-1 Rehabilitation objectives and proposed completion criteria

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
Native Ecosystem	Infrastructure Area	A1	**Removal of infrastructure:** All surface infrastructure that is not to be used as part of the final land use is decommissioned and removed to ensure the site is safe and free of hazardous materials, including portals and vent shaft, and to minimise future greenhouse gas emissions.	Removal of all services (power, water, communications) that have been connected on site as part of operation.	All utility infrastructure removed.	• Statement provided. • Utility services disconnection records/notification.
	Overburden emplacement area	A4		Heritage obligations (e.g. development consent under the *Environmental Protection and Assessment Act 1979,* approvals under the *Heritage Act 1977*) have been met (e.g. archival recording).	All archival reports required are complete and submitted.	• Close out report. • Archival reports/records.
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1		Removal of all plant, equipment and associated infrastructure including processing facilities, stockpile areas, rail infrastructure and loading facilities, office complex, portable offices, storage racks, geological samples, maintenance sheds.	Infrastructure removed.	• As-constructed final landform plan. • Photos. • Decommissioning reports. • Site inspection records.
				Removal of all footings to a certain depth.	Footings removed to 1 m below surface to avoid exposure pathways to subsequent final land use.	• Surveyed and marked on the as-constructed final landform plan.
Agricultural – Grazing	Infrastructure Area	B1		Surveying and sealing of all drill holes, boreholes, preconditioning areas and gas wells in accordance with department guidelines and relevant standards.	Sealing completed and verified.	• Engineering report/statement. • Plug and abandonment log. • Photos. • As-constructed drawings. • Records of fill materials and concrete plugs. • Filling methods.
				Surveying and sealing of all underground mine entries in accordance with the department guidelines and relevant standards.	Sealing completed and verified by suitably qualified engineer.	• Engineering report/statement. • Plug and abandonment log. • Photos. • As-constructed drawings. • Records of fill materials and concrete plugs. • Filling methods.
Native ecosystem	Water Management Area	A3	**Removal of infrastructure:** All water management infrastructure that is not to be used as part of the final land use is removed to ensure the site is safe and free of hazardous materials.	Removal of all water management infrastructure such as sediment dams, produced water dams including lined evaporation ponds and brine storage ponds, water diversion bunds and associated infrastructure such as pumps, pipes and power.	All demolition work carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures.*	• Statement provided. • Before/after photos. As-constructed final landform plan.
Agricultural - grazing		B3			Mine water and brine storage pond walls are pushed in and re-profiled to be consistent with the surrounding landscape and rehabilitated to agriculture – pasture final land use.	
Rehabilitation Biodiversity Offset Area		D3			Removal of the Namoi River pump station, alluvial production bore and pipeline.	

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
Water Storage	Water Management Area	G3	**Retention of infrastructure:** All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.	The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	• Engineering report/statement. • Photos.
				Infrastructure is in a condition (e.g. structural, other hazards) that is suitable for the intended final land use.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	• Formal acceptance from landowner.
				Water quality in sediment dams is non-polluting.	Sediment accumulated in sediment dams is appropriately removed or remediated. Water quality within the dams meet specifications in Environment Protection License.	• Water quality monitoring reports. • Environment Protection Licence relinquished by Environment Protection Authority.
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1	**Retention of infrastructure:** All infrastructure that is to remain as part of the final land use benefits from the relevant approvals (e.g. development consent and / or licence/lease/binding agreement, etc).	The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	• Engineering report/statement. • Photos.
Agricultural – Grazing	Infrastructure Area	B1		Infrastructure is in a condition (e.g. structural, other hazards) that is suitable for the intended final land use.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	• Formal acceptance from landowner.
Native Ecosystem	Infrastructure Area	A1	**Retention of Infrastructure:** Built features such as fences and roads damaged by mining operations are to be repaired to pre-mining condition or equivalent unless the damage is fully restored, repaired or compensated for under the *Coal Mine Subsidence Compensation Act 2017*.	The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	• Engineering report/statement. • Photos. • Formal acceptance from landowner.
Native Ecosystem	Infrastructure Area	A1	**Land 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 and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment, and materials. All rubbish/ waste materials removed from site.	• Statement provided. • Before/after photos.
	Water Management Area	A3				
	Overburden emplacement area	A4		Soil testing for contaminants of concern as listed by the Health Investigation Level of the *National Environment Protection (Assessment of Site Contamination) Measure (1999)* applicable to the land use type.	Contamination will be appropriately remediated so that appropriate guidelines for land use are met, e.g. Health Investigation Level of the *National Environment Protection (Assessment of Site Contamination) Measure (1999)*. Excess sludge/material has been removed from surface water dams.	• Contamination Remediation Report prepared by Land Contamination Consultant. • Site Contamination Audit Report and Site Audit Statement prepared by Environment Protection Authority (EPA) Accredited Auditor (where required).
Agricultural - grazing	Infrastructure Area	B1				
	Water Management Area	B3				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1				
	Water Management Area	D3				
Water Storage	Water Management Area	G3				
Native Ecosystem	Overburden emplacement area	A4	**Management of waste and process materials:** Residual waste materials stored on site (e.g. coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended land use.	• Visual - capping material placement, type across emplacement • Visual – indication of capping performance on final landform – vegetation health • Visual – emplacement seepage and other indicators of groundwater issues (e.g. wet spots) • Measured - survey of emplacement capping to verify construction and to monitor settlement.	• Visual – verification that capping, type and placement consistent with REA closure design. • Visual – no signs of compromised capping performance indicated by vegetation health – such as tree death (deeper root systems) • Visual – no areas of unexpected seepage	• Photos. • Rehabilitation monitoring reports • As constructed surveys. • Quality assurance records for construction • Erosion surveys. • Independent geotechnical reports (where required), groundwater/surface water

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
				• Quality assurance records for the construction of the emplacement material including (where relevant) capping material, liner system, seepage control. • Measured - surface and groundwater levels to verify water balance modelling and capping function • Measured - contamination levels in surface and groundwater surrounding emplacement for contaminants of concern associated with waste material emplaced.	• Survey verifies that capping placement consistent with design (REA Closure Design Report) and settlement and/or material loss is within predicted limits and will not compromise final landform drainage via differential settlement. • Quality assurance records verify capping constructed and in accordance with design specifications relevant to site risks and target final land use (REA Closure Design Report). • Groundwater and surface water monitoring verify adequate containment of waste materials and seepage/leachate is not contributing to land/groundwater contamination.	monitoring reports. The structural integrity of the infrastructure and capping has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use and water material adequately contained.
Native Ecosystem	Infrastructure Area	A1	**Landform stability:** The final landform is stable and sustainable 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.	• Visual - indicators of erosion and land instability. • Visual - indicators that surface water management structures are functioning as designed. • Measured - survey of rehabilitated landform to verify final landform construction in accordance with Final Landform and Rehabilitation Plan. • Measured - survey of rehabilitated landform to specifically monitor settlement and/or material loss via erosion at the REA.	• Visual – minimal erosion that would not require moderate to significant ongoing management and maintenance works (i.e. no active gully or rill erosion >200 mm in depth). • Visual – no signs of land instability such as mass movement. • Visual - no evidence of tunnel erosion. • Visual - no evidence of active scour likely to compromise surface water management structure. • Survey verifies final landform complies with final landform construction in accordance with Final Landform and Rehabilitation Plan. • Survey verifies that settlement and/or material loss at the REA is within predicted limits and will not compromise final landform drainage via differential settlement.	• Before and after photos. • Rehabilitation monitoring reports. • As-constructed surveys. • Erosion surveys. • Independent geotechnical reports (where required) and/or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform.
	Water Management Area	A3				
	Overburden emplacement area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Infrastructure Area	B1				
	Water Management Area	B3				
	Underground Mining Area	B6				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1				
	Water Management Area	D3				
	Underground Mining Area	D6				
Water Storage	Water Management Area	G3				
Native Ecosystem	Infrastructure Area	A1	**Landform stability:** Incorporate relief patterns and design principles consistent with natural drainage that mimic natural topography and mitigate erosion to the greatest extent practicable. Landform is commensurate with surrounding natural landform and where appropriate, incorporates geomorphic design principles to minimise visual impacts.	Minimal active erosion and landform follows natural contours.	Absence of gullies > 300 mm wide or deep and gullies are stable. Survey determines the final landform follows the natural contours of the land.	• Rehabilitation monitoring reports. • Erosion surveys. • Independent geotechnical reports. • Survey reports.
	Water Management Area	A3				
	Overburden Emplacement Area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Infrastructure Area	B1				

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
	Water Management Area	B3				
	Underground Mining Area	B6				
	Beneficiation Facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Areas	D1				
	Water Management Area	D3				
	Underground Mining Area	D6				
Native Ecosystem	Infrastructure Area	A1	**Bushfire:** The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Appropriate bushfire hazard controls (where required) have been implemented on the advice from the NSW Rural Fire Service.	• Bushfire controls implemented.	• Statement provided. • Before/after photos.
	Water Management Area	A3				
	Overburden emplacement area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Infrastructure Area	B1				
	Water Management Area	B3				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1				
Water Storage	Water Management Area	G3				
Native Ecosystem	Infrastructure Area	A1	**Surface water:** Runoff water quality from mine site is similar to, or better than the pre-disturbance runoff water quality with negligible environmental consequence, and is consistent with the regional catchment management strategy.	Water quality parameters selected from the Environment Protection Licence or the site-specific trigger values documented in the Surface Water Management Plan.	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection License or meet the site-specific triggers values.	• Water quality monitoring reports. • Environment Protection Licence relinquished by Environment Protection Authority.
	Water Management Area	A3				
	Overburden emplacement area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Infrastructure Area	B1				
	Water Management Area	B3				
	Underground Mining Area	B6				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1				
	Water Management Area	D3				
	Underground Mining Area	D6				
Water Storage	Water Management Area	G3				
Water Storage	Water Management Area	G3	**Surface Water:** Water retained onsite is fit for the intended final land use/s			
Native Ecosystem	Underground Mining Area	A6	**Surface water:** Runoff water quality from mine site meets the	Water quality parameters selected from the Environment Protection Licence or the site-specific trigger values	Water quality discharged from rehabilitated mining operation meet specifications in	• Water quality monitoring reports. • Environment Protection Licence
Agricultural – grazing	Underground Mining Area	B6				

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
Rehabilitation Biodiversity Offset Area	Underground Mining Area	D6	requirements of the relevant development consent(s) / Environment Protection Licence and does not present a risk of environmental harm.	documented in the Surface Water Management Plan.	Environment Protection License or meet the site-specific triggers values.	relinquished by Environment Protection Authority.
Native Ecosystem	Underground Mining Area	A6	**Surface Water:** Remediation of subsidence impacts associated with watercourses and environmental consequences that are not 'negligible'.	Minimal erosion/instability associated with ponding and downstream water quality is within the Environment Protection Licence or the site-specific trigger values documented in the Surface Water Management Plan.	No erosion/instability present and downstream water quality meets specifications in Environment Protection License or meets the site-specific triggers values.	• Subsidence pond monitoring program reports. • Water quality monitoring reports. • Environment Protection Licence relinquished by Environment Protection Authority. • Erosion surveys.
Agricultural - grazing	Underground Mining Area	B6				
Rehabilitation Biodiversity Offset Area	Underground Mining Area	D6				
Water Storage	Water Management Area	G3	**Water Approvals:** Structures that take or divert water such as dams or levees are appropriately licensed (e.g. under the *Water Management Act 2000*) and where required, ensure sufficient licence shares are held in the water source(s) to account for water take.	Final landform considers advice from relevant Government Agency whether sufficient licence shares are available in the water source to account for water stored in dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency (if required).	• Confirmation from relevant Government Agency that relevant water approvals/licences are able to be granted.
Native Ecosystem	Infrastructure Area	A1	**Groundwater:** Groundwater quality is similar to, or better than the pre-disturbance groundwater quality with negligible environmental consequences, and is consistent with the regional catchment management strategy.	Water quality parameters selected from site-specific trigger values documented in the Water Management Plan.	Ground water quality meets specifications in the Water Management Plan.	• Independent hydrogeological assessment report.
	Water Management Area	A3				
	Overburden emplacement area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Infrastructure Area	B1				
	Water Management Area	B3				
	Underground Mining Area	B6				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1				
	Water Management Area	D3				
	Underground Mining Area	D6				
Native Ecosystem	Water Management Area	A3	**Groundwater:** Impacts to groundwater regime are within range as predicted in pre-mining environmental assessment.	Groundwater levels both on and off the mining lease represent an acceptable level of change in comparison to post mining predictions.	Groundwater levels are within post mining predictions.	• Groundwater level monitoring reports. • Independent hydrogeological assessment report.
	Overburden emplacement area	A4				
	Underground Mining Area	A6				
Agricultural – grazing	Water Management Area	B3				
	Underground Mining Area	B6				
	Beneficiation facility	B7				
Rehabilitation Biodiversity Offset Area	Water Management Area	D3				
	Underground Mining Area	D6				
Water Storage Area	Water Management Area	G3				

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
Native Ecosystem Rehabilitation Biodiversity Offset Area	Infrastructure Area Water management area Underground Mining Area Infrastructure Area Water management area Underground Mining Area	A1 A3 A6 D1 D3 D6	**Ecological rehabilitation:** The vegetation composition of the rehabilitation contains species that are commensurate with native vegetation communities of: • Inland Grey Box Woodland (PCT 81) • Riparian Forest (PCT 101) • Brown Bloodwood Shrubby Woodland (PCT 404, 406, 409) • Brown Bloodwood/Pilliga Box Woodland (PCT 404, 406, 409) • PCT 55 - Belah Woodland • PCT 88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland • PCT 206 - Dirty Gum - White Cypress Woodland • PCT 244 - Poplar Box Grassy Woodland • PCT 399 - Red Gum - Rough-barked Apple - Tea Tree • PCT 401 - Rough-barked Apple - Red Gum - Black Cypress • PCT 404 - Red Ironbark - White Bloodwood Shrubby Woodland • PCT 405 - White Bloodwood - Red Ironbark - Black Cypress • PCT 406 - White Bloodwood - Motherumbah - Red Ironbark • PCT 435 - White-box - White Cypress Woodland found in the local area.	Native species diversity for each growth form group is indicative of the analogue data for the corresponding vegetation communities / classes / PCTs.	Rehabilitation native species diversity data for each growth form group has a 'Low' percentage difference compared to the analogue data: Low: 0.1 – 33.3% Moderate: 33.4 – 66.6% High: 66.7%+	• Rehabilitation monitoring reports • Independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
Native Ecosystem Rehabilitation Biodiversity Offset Area	Infrastructure Area Water management area Underground Mining Area Infrastructure Area Water management area	A1 A3 A6 D1 D3	**Ecological rehabilitation:** The vegetation structure (including the maintenance or enhancement of corridor connectivity) of the rehabilitation is similar to that of native vegetation communities of: • Inland Grey Box Woodland (PCT 81) • Riparian Forest (PCT 101) • Brown Bloodwood Shrubby Woodland (PCT 404, 406, 409) • PCT 55 - Belah Woodland • PCT 88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland • PCT 206 - Dirty Gum - White Cypress Woodland • PCT 244 - Poplar Box Grassy Woodland • PCT 399 - Red Gum - Rough-barked Apple - Tea Tree • PCT 401 - Rough-barked Apple - Red Gum - Black Cypress • PCT 404 - Red Ironbark - White Bloodwood Shrubby Woodland • PCT 405 - White Bloodwood - Red Ironbark	Vegetation Cover – Sum of cover of native vascular plants by growth form group Vegetation Structure – Presence of trees in stem classes based on diameter at breast height, including presence of hollows	Rehabilitation vegetation cover and structure data has a 'Low' percentage difference compared to the analogue data. Low: 0.1 – 33.3% Moderate: 33.4 – 66.6% High: 66.7%+	• Rehabilitation monitoring reports • Independent ecological reports (where required) that validate rehabilitation completion criteria have been met.

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
	Underground Mining Area	D6	- Black Cypress • PCT 406 - White Bloodwood - Motherumbah - Red Ironbark • PCT 435 - White-box - White Cypress Woodland found in the local area.			
	Underground Mining Area	D6				
Native Ecosystem	Infrastructure Area	A1	**Ecological rehabilitation:** Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Indicators of nutrient cycling are suitable for sustaining the target vegetation community.	Litter cover % has a 'Low' percentage difference compared to the analogue data Low: 0.1 – 33.3% Moderate: 33.4 – 66.6% High: 66.7%+	• Rehabilitation monitoring reports. • Independent ecological reports (where required) that validate rehabilitation completion criteria
	Underground Mining Area	A6				
Rehabilitation Biodiversity Offset Area	Infrastructure Area	D1		Evidence of plant regeneration within fixed monitoring plots.	Second generation individuals of trees, i.e. stem class <5cm and/or 5–10cm, are present within rehabilitation plot data.	• Rehabilitation monitoring reports. • Independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
	Water Management Area	D3				
	Underground Mining Area	D6		Cover of exotic species within fixed monitoring plots is low.	Foliage cover of 'High Threat Weeds' % has a 'Low' percentage difference compared to the analogue data. Low: 0.1 – 33.3% Moderate: 33.4 – 66.6% High: 66.7%+	• Rehabilitation monitoring reports. • Independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
				Soil health is suitable to sustain the target vegetation community(s).	Total organic carbon % has a 'Low' percentage difference compared to the analogue data. Low: 0.1 – 33.3% Moderate: 33.4 – 66.6% High: 66.7%+	• Rehabilitation monitoring reports. • Independent soil reports (where required) that demonstrate long-term function of rehabilitated landform.
				Threats to rehabilitation.	Other completion criteria are not negatively impacted by vertebrate pest species.	• Pest management contractor reports and rehabilitation monitoring reports
Native Ecosystem	Overburden Emplacement Area	A4	**Ecological rehabilitation:** Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use of Native Grasses and Native Woodland Overstorey with grazing discouraged	Evidence of Native Grasses and Native Woodland Overstorey establishment.	As per ecological rehabilitation objectives above.	• Rehabilitation monitoring reports. • Independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
				Evidence of grazing.	Grazing impacts are absent, with stock access restricted or excluded	Ground condition inspections verifying absence of grazing impacts
Agricultural - grazing	Infrastructure Area	B1	**Agricultural revegetation:** Land use capability is capable of supporting the target agricultural land use.	Routine Soil Test (bulked soil cores 0-10 cm) – Includes: Total Carbon (TC), Total Nitrogen (TN), Organic Matter, TC/TN Ratio; Bray Iand II Phosphorus; Colwell Phosphorus; Available cations (Calcium, Magnesium, Potassium, Ammonium, Nitrate, Phosphate, Sulfur);	Land and Soil Capability classification criteria met (Figure 1-8). • ML 1609 – class 4 and class 5 (moderate land capability) with a small	• Qualified agronomist report

Final land use domain	Mining domain	Spatial reference	Approved rehabilitation objective	Indicator	Proposed completion criteria	Validation method
	Water Management Area	B3		Available Micronutrients (Zinc, Manganese, Iron, Copper, Boron, Silicon); Exchangeable (Sodium, Potassium, Calcium, Magnesium, Hydrogen, Aluminium, Cation Exchange Capacity); pH and EC (1:5 water); Basic Colour, Basic Texture.	region (to the east) of class 3 (high land capability) • ML 1839 and MLA 2 – class 5 or greater (low to moderate land capability) dominates the western side of both leases with class 4 (moderate capability) in the north east portion (i.e. largest area). Smaller areas of class 2, 4 and 5 are present across the leases (refer to Figure 1-8).	
	Underground Mining Area	B6			The re-established topsoil / subsoil substrate is capable of supporting the targeted pasture / cropping regime on a sustained basis.	
	Beneficiation facility	B7				

Appendix C Stakeholder consultation

Table C-1 Rehabilitation stakeholder consultation

Stakeholder	Date	Method of consultation	Matters raised	Actions taken by NCOPL
Narrabri Coal Stage 1 and Stage 2				
Various	2004	Various	During the scoping phase of Narrabri Coal Stage 1 Project, consultation was conducted with statutory regulators, other stakeholders and community members. During the assessment phase, the issues raised included all potential impacts of the project to the surrounding environment including discussions around how the project would be rehabilitated and closed.	Address any issues raised during the approval process.
Various	September 2008	Planning Focus Meeting	A Planning Focus Meeting was held for the proposed Longwall Project on 2 September 2008. The meeting was attended by representatives from all relevant government agencies and included a site visit and a presentation about the project. Issues raised included all potential impacts of the project to the surrounding environment including discussions around the proposed rehabilitation strategy and final landform.	Address any issues raised during the approval process and reflect in the Statement of Commitments (Appendix 3 of PA 08_0144)
Owners, residents or leaseholders of properties within and adjacent to (within 2km) the mine	2009	Preliminary Environmental Assessment Report for Stage 2	Once the decision to progress the mining operations to the Stage 2 Longwall Project was made, a Preliminary Environmental Assessment for the proposed Longwall Project was prepared and a copy provided to the owners, residents or leaseholders of properties within and adjacent to (within 2km) the Mine Site to inform them of the Proponent's intention to develop the longwall mine. Along with the Preliminary Environmental Assessment, an invitation was provided to the landowners/ residents to comment on the proposal.	Address any issues raised during the approval process and reflect in the Statement of Commitments (Appendix 3 of PA 08_0144)
Consultation during Preparation of MOD 5 Environmental Assessment				
NSW Department of Planning, Industry and Environment (now DPE)	May 2015	Meetings relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of MOD 5 key assessment requirements, preliminary environmental assessment outcomes and the proposed timing for EA lodgement.	Review and update the MOP (Revision B approved on 30 September 2015)
NSW Office of Environment and Heritage (now NSW Department of Environment and Heritage)	August 2015	Meeting relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5 and a summary of preliminary Aboriginal cultural heritage and biodiversity impacts were provided.	
NSW Office of Water (now DPE Water)	July 2015 August 2015	Provided briefing package relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment with a follow up briefing package.	An overview of Modification 5 key assessment requirements, preliminary environmental assessment outcomes and the proposed timing for EA lodgement. A summary of surface and groundwater assessment outcomes and water licensing.	
NSW Division of Resources and Energy (now NSW Mining,	July 2015 August	Provided briefing package relating to the Modification of PA 08_0144 (MOD 5)	An overview of Modification 5 key assessment requirements, preliminary environmental assessment outcomes including resource recovery outcomes and the	

Stakeholder	Date	Method of consultation	Matters raised	Actions taken by NCOPL
Exploration and Geoscience [Resources Regulator])	2015	and associated Environmental Assessment with a follow up meeting.	proposed timing for EA lodgement. It was noted that the existing mining tenement sufficient to cater for the Project.	
NSW Roads and Maritime Service (now Transport for NSW)	July 2015	Provided briefing package relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5 and potential road transport impacts, and proposed timing for EA lodgement.	
Environment Protection Authority	July 2015	Meeting relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5, preliminary noise, air quality and water quality assessment outcomes were provided. Environment Protection Licence (EPL) 12798 variation requirements were also discussed. Items discussed included recent noise monitoring outcomes and noise movement responses by NCOPL.	
North-West Local Land Service	July 2015	Provided briefing package relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5 key assessment requirements, preliminary environmental assessment outcomes and the proposed timing for EA lodgement.	
Forestry Corporation of NSW	August 2015	Provided briefing package relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	A description of the small changes to the modified underground mine layout proposed.	
Narrabri Shire Council	July 2015	Meeting via the CCC relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	NSC were updated on Modification 5 through its involvement in the CCC.	
Gunnedah Shire Council (GSC)	July 2015	Meeting relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5 and the key environmental assessment issues related to the GSC were discussed during the meeting.	
Rail and port operators	No date provided	Previous consultation	Consulted with the Australian Rail Track Corporation regarding an increase in rail movements dispatched from the mine as a result of Modification 5.	
Registered Aboriginal Parties	July 2015	Site surveys	The Registered Aboriginal Parties were invited to participate in site surveys in July 2015. Details of site surveys are provided in Section 4.9 of the Environmental Assessment (Resource Strategies, 2015).	
CCC and affected landowners.	June 2015	Meeting and community newsletter relating to the Modification of PA 08_0144 (MOD 5) and associated Environmental Assessment.	An overview of Modification 5. Landholders in the vicinity of the mine were also provided information on the Modification in the Narrabri Mine Community Newsletter in August 2015.	

Stakeholder	Date	Method of consultation	Matters raised	Actions taken by NCOPL
2016 MOP consultation				
NSW Division of Resources and Energy (now NSW Mining, Exploration and Geoscience)	January 2016 August 2016	Meeting	Consultation undertaken regarding the requirements for MOP development. It was confirmed that following approval of MOD 5, a new MOP would be required that aligned with the requirements of *ESG3 - Mining Operations Plan (MOP) Guidelines, September 2013*. Aspects discussed at the meeting included: • Infrastructure remaining in the final landform (however for the purposes of this • MOP it has been assumed all infrastructure will be removed); • Tree deaths and ponding; • The use of analogue sites in rehabilitation monitoring; • Capping and monitoring of the REA; • Consultation; and • Exploration. In response to consultation feedback, NCOPL undertook additional capping studies. The preliminary capping assessment report was issued to DRG in 2017. It was recommended that NCOPL conduct further assessment of some key aspects of the proposed capping and closure concepts.	Review and update the MOP (Revision C approved on 4 October 2016)
NSW Resources Regulator	July 2019 April 2020	Submission of report	NCOPL submitted the *Narrabri Mine Rejects Emplacement Area Capping Assessment and Closure Design* (ATC Williams, 2019). In April 2020, the Resources Regulator advised that the report was suitable for use and that the full report including recommendations and design criteria should be included in the next revision of the MOP for submission in 2020.	Revise MOP 2020
Secretary's endorsement for suitably qualified person				
DPE	July 2020	Letter	Narrabri issued a letter to DPE on 17 July 2020 seeking the Secretary's endorsement of a suitably qualified expert to review the Landscape Management Plan for the Narrabri Coal Mine (PA 08_0144) and approval to incorporate this plan into the MOP. Narrabri received DPE endorsement and approval to combine the Plans "provided that all the requirements of the conditions of PA 08_0144 are adequately addressed in the MOP and that this information is presented in a clear and distinguishable format for the Department's review". To satisfy the requirements of Schedule 5, Condition 3 of PA 08_0144, consultation with key government departments was required for the revision of the Landscape Management Plan to encompass Stage 2 mining activities. All previously received feedback was considered in the revised MOP.	Revision of the 2020 MOP (Approved on 26 November 2020)

Stakeholder	Date	Method of consultation	Matters raised	Actions taken by NCOPL
Narrabri Mine Stage 3 Extension Project				
Resources Regulator	April 2019	Consultation response on the Stage 3 Environmental Impact Statement (EIS)	During consultation for the Narrabri Mine Stage 3 Extension Major Project application, the Resources Regulator requested additional information to assess the suitability of geomorphic design principles for the final landform of the REA and assessment of the adequacy of the design for long term stability associated with erosion impacts, as follows: "As outlined in the letter from the Resources Regulator to DPIE dated 12 April 2019… the Regulator specified a requirement to evaluate geomorphological landform design characteristics. It is noted that the EIS does not include an evaluation of this issue, specifically in respect to the existing REA that is proposed to be utilised until the end of mine life in 2044." "Section A5.2.2 of Attachment 5 (Rehabilitation & Mine Closure) of the Stage 3 EIS describes a conventional final landform design for the REA with limited detail in regard to final surface water drainage. While this section of the EIS references the ATC Williams 2019 review of the REA, which indicates the emplacement design has a very low risk of global batter failure or displacement, further information is required to assess the adequacy of the design for long term stability associated with erosion impacts. This is required to determine its capability to support the final land use outcomes of pastures for light grazing."	Revision to the *Narrabri Mine Rejects Emplacement Area Capping Assessment and Closure Design* (ATC Williams, 2022)
Rehabilitation Objectives Statement (ROBJ)				
Resources Regulator	October 2022	Letter	The Rehabilitation Objectives Statement (ROBJ) (ROBJ0001146) for the Narrabri Colliery submitted on 9 September 2022 was assessed and the refusal of the ROBJs provided to NCOPL.	Revision of the ROBJs and Final Landform and Rehabilitation Plan to address the Notice of Refusal reasons.
Resources Regulator	1 August 2023	Meeting	Meeting to clarify expectations regarding the ROBJs which were revised and resubmitted in July 2023.	Revision of the ROBJs and Final Landform and Rehabilitation Plan.
Resources Regulator	18 October 2023	Submission	The Rehabilitation Objectives Statement (ROBJ) and Final Landform and Rehabilitation Spatial Plan (FLRP) were assessed and approved.	Revision of RMP.

Appendix D Indicative revegetation species list

Table D-1 Indicative species for native ecosystem/rehabilitation offset area final land use

Brown Bloodwood Shrubby Woodland (PCT 404, 406, 409)	*Corymbia trachyphloia* *Eucalyptus pilligaensis* *E. fibrosa*	*Callitris glaucophylla* *Acacia homalophylla* *A. harpophylla* *Calytrix tetragona* *Phebalium squamulosum* *A. burrowii* *Persoonia sericea* *Allocasuarina diminuta*	*Pomax umbellata* *Eragrostis brownii* *Dianella revoluta* *Microlaena stipoides* *Goodenia hederacea*
Inland Grey Box Woodland (PCT 81)	*Eucalyptus microcarpa* *E. populnea* *Eucalyptus blakelyi*	*Geijera parviflora* *Callitris glaucophylla* *Casuarina cristata* *Capparis mitchellii* *Geijera parviflora* *Maytenus cunninghamii* *Acacia homalophylla*	*Aristida benthamii* *Solanum ferocissimum* *Austrostipa ramosissima* *Austrostipa verticillata* *Chrysocephalum apiculatum*
Riparian Forest (PCT 101)	*Casuarina cunninghamiana* *Casuarina cristata* *Eucalyptus populnea* *Eucalyptus microcarpa*	*Eremophila* *mitchellii* *Myoporum montanum* *Geijera parviflora* *Acacia penninervis* *Notelaea microcarpa*	*Aristida benthamii* *Austrostipa aristiglumis* *Austrostipa ramosissima* *Bothriochloa decipiens* *Cyperus gracilis*
PCT 206: Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	*Eucalyptus chloroclada* *Callitris glaucophylla* *Eucalyptus populnea subsp. bimbil* *Atalaya hemiglauca* *Corymbia dolichocarpa* *Alstonia constricta* *Allocasuarina luehmannii* *Alectryon oleifolius subsp. canescens*	*Acacia ixiophylla* *Acacia salicina* *Hakea leucoptera subsp. Leucoptera* *Apophyllum anomalum* *Geijera parviflora* *Capparis mitchellii* *Petalostigma pubescens* *Choretrum candollei*	*Einadia nutans subsp. Nutans* *Sclerolaena bicornis* *Enteropogon acicularis* *Calotis lappulacea* *Calotis cuneifolia* *Aristida jerichoensis var. jerichoensis* *Austrostipa scabra* *Paspalidium constrictum* *Lachnagrostis filiformis* *Paspalum distichum* *Cynodon dactylon* *Austrostipa verticillate* *Wahlenbergia stricta subsp. Stricta* *Tribulus terrestris* *Eleocharis pallens* *Cyperus victoriensis* *Cyperus gracilis* *Aristida latifolia* *Aristida ramose* *Digitaria divaricatissima* *Glycine tomentella* *Ajuga australis*
PCT 244: Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	*Eucalyptus populnea subsp. bimbil*	*Acacia aneura s. lat.* *Acacia victoriae subsp. Arida* *Eremophila longifolia*	*Atriplex stipitate* *Eragrostis laniflora* *Austrostipa nitida*

		Chenopodium curvispicatum *Eremophila sturtii* *Maireana brevifolia* *Olearia pimeleoides* *Pluchea tetranthera* *Rhagodia spinescens* *Myoporum montanum* *Dodonaea viscosa subsp. Angustissima* *Myoporum platycarpum subsp. Perbellum* *Senna form taxon 'petiolaris'* *Hibiscus trionum* *Muehlenbeckia florulenta*	*Eragrostis eriopoda* *Eragrostis setifolia* *Aristida contorta* *Calotis cuneifolia* *Harmsiodoxa blennodioides* *Xerochrysum bracteatum* *Oxalis corniculate* *Rhodanthe floribunda* *Tetragonia eremaea* *Rutidosis helichrysoides* *Wahlenbergia stricta* *Panicum effusum* *Vittadinia cuneata var. cuneata f. cuneata* *Pterocaulon sphacelatum* *Zygophyllum humillimum* *Dissocarpus paradoxus* *Salsola tragus subsp. Tragus* *Sclerolaena patenticuspis* *Einadia nutans subsp. Eremaea* *Centipeda cunninghamii* *Solanum esuriale* *Marsilea drummondii*
PCT 399: Red gum - rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga to Goonoo sandstone forests, Brigalow Belt South Bioregion	*Eucalyptus blakelyi* *Eucalyptus chloroclada* *Angophora floribunda* *Allocasuarina luehmannii* *Callitris glaucophylla* *Eucalyptus populnea subsp. Bimbil* *Casuarina cristata* *Casuarina cunninghamiana subsp. Cunninghamiana* *Brachychiton populneus subsp. Populneus*	*Leptospermum polygalifolium subsp. Transmontanum* *Acacia penninervis var. penninervis* *Acacia spectabilis* *Acacia deanei subsp. Deanei* *Callistemon linearis;Cassinia arcuate* *Pultenaea foliolosa* *Aotus subglauca var. filiformis* *Dodonaea viscosa subsp. Cuneata* *Santalum acuminatum* *Acacia mariae* *Dodonaea heteromorpha* *Einadia hastata* *Daviesia genistifolia* *Sannantha cunninghamii* *Eremophila deserti* *Acacia caroleae* *Acacia sertiformis* *Hibbertia obtusifolia* *Bossiaea rhombifolia subsp. concolor;Melaleuca thymifolia;Oncinocalyx betchei;Grevillea arenaria subsp. canescens;*	*Arundinella nepalensis* *Cyperus gymnocaulos* *Juncus psammophilus* *Juncus continuus* *Microlaena stipoides var. stipoides* *Einadia nutans subsp. Linifolia* *Einadia nutans subsp. Nutans* *Lipocarpha microcephala* *Fuirena incrassate* *Oxalis perennans* *Vittadinia dissecta var. hirta* *Calotis cuneifolia* *Alternanthera denticulata* *Cymbonotus lawsonianus* *Hypericum gramineum* *Crassula sieberiana subsp. Sieberiana* *Oxalis chnoodes* *Austrodanthonia setacea* *Aristida jerichoensis var. subspinulifera* *Aristida ramose* *Eragrostis lacunaria* *Cynodon dactylon* *Chloris ventricose* *Austrostipa scabra subsp. Scabra* *Panicum effusum* *Imperata cylindrica var. major* *Dichelachne micrantha* *Echinopogon caespitosus var. caespitosus*

			Sporobolus creber *Aristida personata* *Plantago turrifera* *Goodenia heterophylla subsp. Heterophylla* *Goodenia macbarronii* *Haloragis heterophylla* *Pseudognaphalium luteo-album* *Epaltes australis* *Dianella revoluta var. revoluta* *Gahnia aspera* *Rumex brownii* *Goodenia paniculata* *Lomandra longifolia* *Juncus planifolius* *Juncus subsecundus* *Juncus aridicola* *Juncus ochrocoleus* *Philydrum lanuginosum* *Gratiola pedunculata* *Drosera peltate* *Cyperus sanguinolentus* *Juncus fockei* *Schoenus centralis* *Myriophyllum verrucosum* *Glycine tabacina* *Marsilea drummondii* *Elymus scaber var. scaber* *Chenopodium melanocarpum* *Daucus glochidiatus* *Cheilanthes sieberi subsp. Sieberi* *Xerochrysum bracteatum* *Ajuga australis* *Swainsona galegifolia* *Ranunculus sessiliflorus var. sessiliflorus* *Pratia purpurascens* *Mentha diemenica* *Centipeda minima var. minima* *Wahlenbergia gracilis* *Rostellularia adscendens var. adscendens* *Ptilotus erubescens* *Juncus prismatocarpus* *Hypericum gramineum* *Plectranthus parviflorus* *Lomandra leucocephala subsp. Leucocephala* *Ranunculus sessiliflorus var. sessiliflorus*
PCT 401: Rough-barked Apple - Blakely's Red Gum - Black Cypress Pine woodland on sandy flats. mainly in the Pilliga Scrub region	*Angophora floribunda* *Eucalyptus blakelyi* *Callitris endlicheri* *Eucalyptus chloroclada* *Corymbia trachyphloia subsp. Amphistomatica*	*Hibbertia obtusifolia* *Cassinia arcuate* *Acacia spectabilis* *Brachyloma daphnoides subsp. Pubescens* *Micromyrtus sessilis*	*Hypericum gramineum* *Arundinella nepalensis* *Imperata cylindrica var. major* *Lomandra longifolia* *Aristida vagans*

	Alphitonia excelsa *Eucalyptus crebra*	*Melichrus urceolatus* *Dodonaea viscosa subsp. Spatulate* *Leucopogon muticus* *Persoonia sericea* *Acacia penninervis var. penninervis* *Acacia buxifolia subsp. Buxifolia* *Styphelia trifloral* *Persoonia cuspidifera* *Correa glabra var. glabra* *Acacia tindaleae* *Olearia elliptica subsp. Elliptica* *Jacksonia scoparia* *Acacia deanei subsp. Paucijuga* *Macrozamia diplomera* *Acacia neriifolia* *Bossiaea rhombifolia subsp. Concolor* *Pultenaea foliolosa* *Banksia marginata* *Solanum ellipticum* *Solanum ferocissimum* *Spartothamnella puberula* *Acacia pravifolia* *Dodonaea peduncularis* *Crotalaria mitchellii subsp. Mitchellii* *Aotus subglauca var. filiformis* *Isopogon petiolaris* *Dodonaea heteromorpha* *Sannantha cunninghamii* *Hemigenia cuneifolia* *Dodonaea peduncularis* *Banksia marginata* *Leucopogon biflorus*	*Aristida caput-medusae* *Ajuga australis* *Lomandra leucocephala subsp. Leucocephala* *Lomandra filiformis subsp. Coriacea* *Cheilanthes sieberi subsp. Sieberi* *Dichondra sp. A* *Laxmannia gracilis* *Wahlenbergia stricta subsp. Stricta* *Dianella revoluta var. revoluta* *Chrysocephalum semipapposum* *Pomax umbellate* *Daucus glochidiatus* *Austrostipa scabra subsp. Scabra* *Cymbopogon refractus* *Aristida jerichoensis var. subspinulifera* *Microlaena stipoides var. stipoides* *Austrodanthonia racemosa var. racemosa* *Digitaria diffusa* *Themeda australis* *Desmodium brachypodum* *Desmodium varians* *Glycine clandestine* *Isolepis inundata* *Wahlenbergia multicaulis* *Xyris complanate* *Brachyscome multifida var. multifida* *Panicum effusum* *Schoenus ericetorum* *Eragrostis parviflora* *Enneapogon gracilis* *Vittadinia dissecta var. hirta* *Cymbopogon obtectus* *Wahlenbergia gracilis* *Oxalis radicosa* *Sporobolus creber* *Kennedia procurrens* *Glycine tomentella* *Panicum effusum* *Digitaria ammophila* *Fimbristylis dichotoma* *Bulbostylis barbata*
PCT 404: Red Ironbark – White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	*Eucalyptus fibrosa* *Corymbia trachyphloia subsp. Amphistomatica* *Callitris endlicheri* *Eucalyptus crebra* *Eucalyptus dwyeri* *Callitris glaucophylla*	*Acacia burrowii* *Phebalium squamulosum subsp. Gracile* *Homoranthus flavescens* *Cryptandra amara var. floribund* *Philotheca ciliata* *Hibbertia covenyana* *Hibbertia incana* *Hibbertia obtusifolia* *Acacia deanei subsp. Paucijuga*	*Gonocarpus elatus* *Goodenia rotundifolia* *Thyridolepis mitchelliana* *Schoenus kennyi* *Schoenus moorei* *Gahnia aspera* *Aristida leichhardtiana* *Actinotus gibbonsii* *Aristida jerichoensis var. subspinulifera*

		Exocarpos cupressiformis *Cryptandra longistaminea* *Solanum ferocissimum* *Acacia triptera* *Persoonia sericea* *Hibbertia circumdans* *Macrozamia diplomera* *Dodonaea falcata* *Cryptandra amara var. amara* *Melichrus urceolatus* *Brachyloma daphnoides subsp. Daphnoides* *Calytrix tetragona* *Boronia bipinnata* *Prostanthera granitica* *Melaleuca uncinate* *Micromyrtus sessilis* *Acacia gladiiformis* *Persoonia sericea* *Grevillea floribunda* *Zieria aspalathoides* *Acacia pilligaensis* *Harmogia densifolia* *Hibbertia cistoidea* *Allocasuarina diminuta subsp. Diminuta* *Westringia cheelii* *Acacia mariae* *Bertya gummifera* *Acacia caroleae* *Pultenaea cinerascens* *Platysace lanceolata* *Acacia pravifolia* *Pimelea linifolia subsp. Collina* *Olearia ramulosa*	*Aristida caput-medusae* *Pomax umbellate* *Digitaria breviglumis* *Lomandra filiformis subsp. Coriacea* *Aristida ramose* *Cleistochloa rigida* *Digitaria diffusa* *Cheilanthes sieberi subsp. Sieberi* *Platysace ericoides* *Austrostipa densiflora* *Cymbopogon refractus* *Microlaena stipoides var. stipoides* *Tricoryne elatior* *Stackhousia muricata* *Dianella revoluta var. revoluta* *Thysanotus tuberosus subsp. Tuberosus* *Opercularia diphylla* *Stypandra glauca* *Lomandra leucocephala subsp. Leucocephala* *Chloanthes parviflora* *Calotis cuneata var. cuneata* *Caladenia fuscata* *Austrodanthonia fulva* *Calochilus robertsonii* *Rhyncharrhena linearis* *Chrysocephalum semipapposum* *Dampiera purpurea* *Laxmannia gracilis* *Stypandra glauca* *Lepidosperma laterale* *Stackhousia viminea*
PCT 405: White Bloodwood – Red Ironbark - Black Cypress Pine shrubby sandstone woodland of the Pilliga Scrub and surrounding regions	*Corymbia trachyphloia subsp. Amphistomatica* *Eucalyptus fibrosa* *Callitris endlicheri* *Eucalyptus dwyeri;Eucalyptus crebra* *Callitris glaucophylla* *Eucalyptus chloroclada* *Eucalyptus macrorhyncha*	*Persoonia sericea* *Hibbertia obtusifolia* *Grevillea floribunda* *Xanthorrhoea acaulis* *Calytrix tetragona* *Cassinia arcuate* *Acacia mariae* *Allocasuarina diminuta subsp. Diminuta* *Homoranthus flavescens* *Acacia pilligaensis* *Melichrus urceolatus* *Brachyloma daphnoides subsp. Daphnoides* *Pimelea linifolia* *Boronia glabra* *Macrozamia heteromera* *Dillwynia sericea* *Acacia gladiiformis*	*Pomax umbellate* *Aristida jerichoensis var. subspinulifera* *Digitaria breviglumis* *Lomandra filiformis subsp. Coriacea* *Schoenus ericetorum* *Dianella revoluta var. revoluta* *Platysace ericoides* *Goodenia hederacea subsp. Hederacea* *Lomandra leucocephala subsp. Leucocephala* *Opercularia diphylla* *Lepidosperma laterale* *Oxalis radicosa* *Hardenbergia violacea* *Dampiera adpressa* *Chloanthes parviflora* *Dampiera lanceolata var. lanceolata* *Gonocarpus elatus*

		Zieria aspalathoides *Cryptandra amara var. floribunda* *Dodonaea viscosa subsp. Spatulate* *Olearia microphylla* *Astrotricha longifolia f. 'Inland'* *Styphelia trifloral* *Acacia flexifolia* *Acacia pravifolia* *Acrotriche rigida* *Ricinocarpos bowmanii* *Cassinia laevis* *Pultenaea boormanii* *Isopogon petiolaris* *Acacia cultriformis* *Persoonia curvifolia* *Cassytha pubescens* *Leptospermum parvifolium* *Dodonaea peduncularis* *Acacia penninervis var. penninervis* *Acacia caroleae* *Aotus mollis* *Hibbertia covenyana* *Acacia polybotrya* *Pultenaea cinerascens* *Prostanthera howelliae* *Leucopogon muticus* *Pultenaea cinerascens*	*Actinotus helianthin* *Poranthera microphylla* *Panicum simile* *Chrysocephalum semipapposum* *Wahlenbergia communis* *Helichrysum collinum* *Hybanthus monopetalus* *Goodenia heteromera* *Tricoryne elatior* *Stackhousia muricata* *Thysanotus tuberosus subsp. Tuberosus* *Coronidium oxylepis subsp. Lanatum* *Panicum effusum* *Wahlenbergia gracilis* *Aristida benthamii var. benthamii*
PCT 406: White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	*Corymbia trachyphloia subsp. Amphistomatica* *Acacia cheelii* *Eucalyptus fibrosa* *Eucalyptus nubila* *Callitris endlicheri* *Eucalyptus dwyeri* *Angophora floribunda* *Eucalyptus crebra*	*Homoranthus flavescens* *Philotheca salsolifolia subsp. Salsolifolia* *Harmogia densifolia* *Calytrix tetragona* *Leptospermum parvifolium* *Allocasuarina diminuta subsp. Diminuta* *Persoonia sericea* *Bertya opponens* *Philotheca ciliata* *Hibbertia circumdans* *Hibbertia incana* *Cassinia arcuate* *Ricinocarpos bowmanii* *Grevillea floribunda* *Dodonaea falcata* *Acacia penninervis var. penninervis* *Acacia pilligaensis* *Pimelea linifolia subsp. Linifolia* *Macrozamia heteromera* *Olearia microphylla* *Persoonia cuspidifera* *Boronia bipinnata* *Phebalium squamulosum subsp. gracile*	*Cleistochloa rigida* *Digitaria breviglumis* *Goodenia rotundifolia* *Stypandra glauca* *Pomax umbellate* *Chloanthes parviflora* *Joycea pallida* *Actinotus helianthin* *Lepidosperma laterale* *Schoenus kennyi* *Gonocarpus elatus* *Dianella revoluta var. revoluta* *Actinotus gibbonsii* *Austrodanthonia induta* *Dampiera lanceolata var. lanceolata* *Gahnia aspera* *Platysace ericoides* *Cheilanthes sieberi subsp. sieberi* *Lomandra filiformis subsp. coriacea* *Cymbopogon refractus* *Aristida caput-medusae* *Isotoma axillaris* *Elymus scaber var. scaber*

		Exocarpos cupressiformis *Melichrus urceolatus* *Acacia gladiiformis* *Gompholobium huegelii* *Styphelia trifloral* *Cassytha pubescens* *Prostanthera granitica* *Acrotriche rigida* *Bursaria spinosa subsp. spinosa* *Senna form taxon 'coriacea'* *Pultenaea cinerascens* *Mirbelia pungens*	*Dichelachne micrantha* *Gonocarpus teucrioides* *Calandrinia eremaea* *Calotis lappulacea* *Digitaria ramularis* *Iseilema membranaceum* *Aristida ramosa*
PCT 435: White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South. Bioregion and Nandewar Bioregion	*Callitris glaucophylla* *Eucalyptus albens* *Eucalyptus blakelyi* *Brachychiton populneus subsp. populneus* *Angophora floribunda*	*Cassinia quinquefaria* *Olearia elliptica subsp. elliptica* *Geijera parviflora* *Dodonaea viscosa subsp. angustifolia* *Acacia penninervis var. penninervis* *Acacia implexa* *Cassinia arcuata* *Indigofera australis* *Bursaria spinosa subsp. spinosa* *Pimelea neo-anglica* *Cassinia laevis* *Melichrus urceolatus;*	*Aristida personata* *Cymbopogon refractus* *Desmodium brachypodum* *Calotis lappulacea* *Vittadinia sulcata* *inadia nutans subsp. nutans* *Wahlenbergia communis* *Austrostipa verticillata* *Themeda australis* *Dianella longifolia var. longifolia* *Swainsona galegifolia* *Austrostipa scabra subsp. scabra* *Dichondra sp. A* *Desmodium varians* *Daucus glochidiatus* *Oncinocalyx betchei* *Austrodanthonia racemosa var. racemosa* *Swainsona microphylla* *Lomandra filiformis subsp. coriacea* *Ajuga australis* *Brunoniella australis* *Panicum queenslandicum var. queenslandicum* *Senecio prenanthoides* *Senecio lautus subsp. dissectifolius* *Einadia hastata* *Vittadinia cuneata* *Opercularia diphylla*
PCT 55: Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	*Eucalyptus largiflorens* *Eucalyptus coolabah subsp. coolabah* *Eucalyptus microcarpa* *Acacia pendula* *Atalaya hemiglauca*	*Geijera parviflora* *Alectryon oleifolius subsp. canescens* *Eremophila mitchellii* *Capparis mitchellii* *Apophyllum anomalum* *Acacia oswaldii* *Myoporum montanum* *Senna form taxon 'filifolia'* *Rhagodia spinescens* *Maireana enchylaenoides* *Alectryon oleifolius subsp. elongatus*	*Einadia nutans subsp. linifolia* *Enchylaena tomentosa* *Sclerolaena birchii* *Sclerolaena muricata* *Enteropogon acicularis* *Chloris truncata* *Atriplex leptocarpa* *Oxalis chnoodes* *Monachather paradoxus* *Abutilon oxycarpum var. subsagittatum* *Austrostipa scabra subsp. scabra*

		Pimelea microcephala subsp. microcephala *Eremophila longifolia* *Eremophila maculata* *Eremophila deserti* *Muehlenbeckia florulenta* *Exocarpos aphyllus* *Parsonsia eucalyptophylla* *Amyema linophyllum subsp. orientale* *Senna form taxon 'zygophylla'* *Solanum parvifolium* *Santalum acuminatum*	*Austrostipa aristiglumis* *Boerhavia dominii* *Paspalidium constrictum* *Leptochloa divaricatissima* *Dichanthium sericeum subsp. sericeum* *Vittadinia cuneata* *Vittadinia cuneata* *Zygophyllum apiculatum* *Sida trichopoda* *Sclerolaena divaricata* *Chenopodium desertorum subsp. desertorum* *Atriplex semibaccata* *Sporobolus caroli* *Austrodanthonia fulva* *Austrodanthonia setacea* *Marsilea hirsuta* *Marsilea drummondii* *Sida corrugata* *Sida trichopoda* *Boerhavia dominii* *Juncus radula* *Walwhalleya proluta* *Carex inversa* *Convolvulus erubescens* *Alternanthera denticulata* *Glycine tabacina* *Juncus radula* *Panicum simile* *Wahlenbergia fluminalis* *Eleocharis pallens* *Eleocharis pusilla* *Elymus scaber var. scaber* *Sclerolaena calcarata* *Plectranthus parviflorus* *Paspalidium caespitosum*
PCT 88: Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	*Eucalyptus pilligaensis* *Callitris glaucophylla* *Allocasuarina luehmannii* *Eucalyptus populnea subsp. bimbil* *Eucalyptus crebra* *Eucalyptus albens* *Atalaya hemiglauca*	*Eremophila mitchellii* *Acacia deanei subsp. paucijuga* *Maireana microphylla* *Dodonaea viscosa subsp. angustifolia* *Dodonaea viscosa subsp. cuneata* *Acacia hakeoides* *Acacia oswaldii* *Exocarpos aphyllus* *Geijera parviflora* *Myoporum montanum* *Eremophila deserti* *Acacia ixiophylla* *Sida cunninghamii* *Hakea tephrosperma* *Psydrax oleifolia*	*Einadia nutans subsp. linifolia* *Aristida ramosa* *Boerhavia dominii* *Rostellularia adscendens var. adscendens* *Vittadinia cervicularis var. subcervicularis* *Austrodanthonia bipartita* *Lomandra filiformis subsp. filiformis* *Calotis cuneifolia* *Aristida jerichoensis var. jerichoensis* *Eragrostis lacunaria* *Poa sieberiana* *Cymbopogon refractus* *Austrostipa scabra subsp. scabra* *Enteropogon acicularis* *Digitaria brownii*

		Acacia homalophylla *Santalum acuminatum* *Acacia cultriformis* *Senna form taxon 'petiolaris'* *Acacia spectabilis* *Eremophila longifolia* *Enchylaena tomentosa* *Sclerolaena birchii* *Alectryon oleifolius subsp. elongatus* *Pittosporum angustifolium* *Maytenus cunninghamii* *Amyema linophyllum subsp. orientale* *Amyema quandang var. quandang* *Lysiana exocarpi subsp. tenuis* *Daviesia genistifolia* *Acacia lineata*	*Digitaria diffusa* *Calotis lappulacea* *Chamaesyce drummondii* *Wahlenbergia planiflora subsp. longipila* *Paspalidium gracile* *Vittadinia sulcata* *Goodenia cycloptera* *Cyperus fulvus* *Cyperus gracilis* *Solanum tetrathecum* *Desmodium brachypodum* *Glycine tabacina* *Phyllanthus virgatus* *Chenopodium desertorum subsp. microphyllum* *Einadia hastata* *Austrodanthonia setacea* *Oxalis perennans* *Vittadinia cuneata* *Parsonsia lanceolata* *Aristida calycina var. calycina* *Austrostipa verticillata* *Austrostipa setacea* *Chloris truncata* *Solanum cinereum* *Solanum parvifolium* *Evolvulus alsinoides var. decumbens* *Desmodium varians* *Glycine clandestina* *Eremophila debilis* *Schoenus ericetorum* *Abutilon macrum* *Wahlenbergia gracilis*

Appendix E Trigger Action Response Plan

Table E-1 Trigger Action Response Plan

Performance measure	Status	Trigger	Action	Response
Decommissioning				
Decommissioning/sealing failure	Normal	Inspections identify that former ventilation shafts/boreholes/mine entries have been sealed in accordance with required standards.	None required	• None required
	Level 1	Inspections identify that former ventilation shafts/boreholes/mine entries have not been sealed in accordance with required standards.		• Engage a suitably qualified person to undertake investigations and develop sealing strategy. • Implement actions in consultation with the relevant Government department.
Landform establishment and growth medium development				
Topsoil wind rows for respreading	Normal	Wind row has been stored for <12 months and has low weed coverage (<20%)	None required	• Respread in accordance with this plan.
	Level 1	Wind row has been stored for >12 months or weed coverage is high (>20%)	Consider additional treatment required and record in data hub	• Undertake additional treatment as required prior to spreading.
Initial establishment monitoring - ELUE				
Soil physical, chemical, or biological characteristics	Normal	Initial establishment monitoring does not identify any areas requiring remediation.	None required	• Continue to implement soil management measures in accordance with this Plan.
	Level 1	Ground cover triggers established in initial establishment monitoring checklists	Conduct preliminary quality assurance to confirm results. Compare with analogue sites and consider climatic events. Define soil sampling suites required.	• Conduct soil sampling. • Engage a suitably qualified person to recommend appropriate soil amelioration. • Undertake amelioration and re-vegetation in accordance with the specialist recommendations.
	Level 2	Ground cover triggers established in initial establishment monitoring checklists	Conduct preliminary quality assurance to confirm results. Compare with analogue sites and consider climatic events. Define soil sampling suites required.	• Conduct soil sampling. • Engage a suitably qualified person to recommend appropriate soil amelioration. • Undertake amelioration and re-vegetation in accordance with the recommendations. • Retain area in ELUE phase.
Weeds	Normal	Weed cover triggers established in initial establishment monitoring checklists	None required	Continue to implement management measures in accordance with this Plan and BMP.
	Level 1	Weed cover triggers established in initial establishment monitoring checklists	Consider additional treatment required and record in data hub	• Undertake additional treatment as required. • Integrate area into weed management program.
Erosion control	Normal	No evidence of erosion during inspections.	None required	• Continue to implement erosion and sediment controls in accordance with the Erosion and Sediment Control Plan.
	Level 1	Evidence of active rill or gully erosion < 300 mm in depth or tunnel erosion <1m.	Inspection of the site will be undertaken by a suitably trained person.	• Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a suitably qualified person if ongoing erosion is observed following repair and implementation of additional controls.
	Level 2	Evidence of active rill erosion or gully erosion > 200 mm in depth or tunnel erosion >1m.	Inspection of the site will be undertaken by a suitably trained person.	• Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a suitably qualified person 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. • Review Erosion and Sediment Control Plan and update as required.
Water management/ sediment control structures	Normal	No erosion and/or scouring at water management structures observed during monitoring.	None required.	Continue implementing water management as per the Water Management Plan.
	Level 1	Water management structures (sediment dams, channels, contour banks) displaying minor erosion and/or scouring as determined by monitoring.	An inspection of the site will be undertaken by a suitably qualified person.	Undertake a review to identify remedial actions such as re-vegetation or alternative scour protection.

Performance measure	Status	Trigger	Action	Response
	Level 2	Water management structures fail or display significant scouring/erosion as determined by monitoring.	An inspection of the site will be undertaken by a suitably qualified person.	• Engage a suitably qualified person to develop a site-specific remediation plan and review of the water management structure design. Implement remediation/design changes as a result of the review.
Pest animals	Normal	Monitoring indicates no increase in animal pests impacting on rehabilitation and vegetation establishment.	None required.	Continue undertaking pest management as per the Plan.
	Level 1	Monitoring indicates animal pests impacting on rehabilitation and vegetation establishment.	Identify the location of pest animal issues.	Increase the frequency or extent of pest animal monitoring and control based on advice from a suitably qualified person.
	Level 2	Increase in numbers of pest animals causing widespread damage to rehabilitation.	Identify the location of pest animal issues.	Engage a suitably qualified person to prepare a site-specific management plan and implement recommendations such as augmenting pest animal exclusion fencing and re-vegetation.
Contaminated land	Normal	Initial establishment monitoring does not identify concerns.	None required.	Continue to implement management measures in accordance with this Plan.
	Level 1	Soil monitoring results identify presence of hydrocarbons and there is a monitored impact on rehabilitation.	Conduct preliminary quality assurance to confirm results.	Implement appropriate remediation strategy in accordance with site procedures.
Long-term monitoring – ELUD				
Insufficient cover material	Normal	Sufficient cover materials available.	None required	• Continue to implement soil management measures in accordance with this Plan.
	Level 1	Annual update of the material balance identifies minor shortfall for closure (<10%)	Confirm material balance.	• Identify alternative options for obtaining cover material. • Review and update planning process for stockpiling cover material.
	Level 2	Annual update of material balance identifies major shortfall for closure (>10%)	Confirm material balance.	• Identify alternative options for obtaining cover material and/or modifying capping depth in consultation with the relevant Government department. • Review and update planning process for stockpiling cover material.
Settlement/slumping	Normal	Survey or remote sending of the rehabilitated landforms shows no indication of settlement or slumping that could compromise stability.	None required	• None required.
	Level 1	Survey or remote sensing of the rehabilitated landforms indicates settlement or slumping that could compromise stability	Confirm observation.	• Undertake a review of the landform design to assess risks to stability and free draining design.
	Level 2	Survey or remote sensing of the rehabilitated landforms indicates major settlement or slumping.	Confirm observation.	• Engage a suitably qualified person to assist with the management of settlement and slumping and provide recommendations to appropriately remediate. • Consider rehandling material and/or regrading if required.
Native species diversity	Normal	Rehabilitation native species data has a ‘Low’ percentage difference compared to the analogue data.	None required.	• Continue undertaking rehabilitation as per the Plan.
	Level 1	Rehabilitation native species data has a ‘Medium’ percentage difference compared to the analogue data.	Identify locations and photograph.	• Review methods used by revegetation contractor; seed or seedling quality, soil quality or weather conditions since time of revegetation to determine if the cause of delayed native species richness.
	Level 2	Rehabilitation native species data has a ‘High’ percentage difference compared to the analogue data.	Identify locations and photograph.	• Engage a suitably qualified person to investigate causes for revegetation failure and recommend remedial actions. • Undertake a field survey to identify which species are not present in revegetation areas. • Re-seed or maintenance planting of revegetation areas with unsatisfactory species richness. • Implement appropriate management actions, including revising rehabilitation procedures if required.
Vegetation Cover and structure	Normal	Rehabilitation vegetation cover and structure data has a ‘Low’ percentage difference compared to the analogue data.	None required.	• Continue undertaking rehabilitation as per the Plan.
	Level 1	Rehabilitation vegetation cover and structure data has a ‘Medium’ percentage difference compared to the analogue data.	Identify locations and photograph.	• Review methods used by revegetation contractor; seed or seedling quality, soil quality or weather conditions since time of revegetation to determine if the cause of delayed vegetation cover and structure

Performance measure	Status	Trigger	Action	Response
	Level 2	Rehabilitation vegetation cover and structure data has a 'High' percentage difference compared to the analogue data.	Identify locations and photograph.	• Engage a suitably qualified person to investigate causes for revegetation failure and recommend remedial actions. • Re-seed or maintenance planting of revegetation areas with unsatisfactory vegetation cover and structure • Implement appropriate management actions, including revising rehabilitation procedures if required.
Native ecosystem establishment (native grasses and woodland)	Normal	Rehabilitation native grasses and woodlands data has a 'Low' percentage difference compared to the analogue data.	None required.	• Continue undertaking rehabilitation as per the Plan.
	Level 1	Rehabilitation native grasses and woodlands data has a 'Medium' percentage difference compared to the analogue data.	Identify locations and photograph.	• Review methods used by revegetation contractor; seed or seedling quality, soil quality or weather conditions since time of revegetation to determine if the cause of delayed native groundcover (grasses).
	Level 2	Rehabilitation native grasses and woodlands has a 'High' percentage difference compared to the analogue data.	Identify locations and photograph.	• Engage a suitably qualified person to investigate causes for germination failure and recommend remedial actions. • Undertake a field survey to identify likely causes of unsatisfactory germination rates. • Re-seed areas with unsatisfactory cover. • Review seeding procedures incl. seasonal mixes, timing and seed rate per hectare. • Implement appropriate management actions including revising rehabilitation procedures if required.
Revegetation success	Normal	As determined by a suitably qualified person, rehabilitated area/s are on a trajectory towards completion criteria at year 5 monitoring.	None required	• Continue undertaking rehabilitation as per the Plan.
	Level 1	As determined by a suitably qualified person, rehabilitated area/s are not on a trajectory towards completion criteria at year 5 monitoring.	Identify locations and photograph.	• Undertake inspection of rehabilitated area/s to identify possible threats (e.g. topsoil quantity/quality, weed and animal pest, drought conditions etc.). • Engage a suitably qualified person to investigate the cause and recommend management measures, if required. • Implement management actions commensurate to identified cause/risk.
	Level 2	As determined by a suitably qualified person, rehabilitated area/s are not on a trajectory towards completion criteria at year 10 monitoring.	Identify locations and photograph.	• Engage a suitably qualified person to investigate the cause and recommend management measures. • Implement management actions commensurate to identified cause/risk as required (e.g. in fill planting).
Drought, flood or bushfire affecting rehabilitated areas	Normal	Results in vegetation health, composition and/or structure not within the range of analogue sites.	None required.	• Continue undertaking rehabilitation as per the Plan.
	Level 1	Results in vegetation health, composition and/or structure not within the range of analogue sites.	Identify locations and photograph.	• Engage a suitably qualified person to undertake a preliminary investigation. • Implement recommendation actions as a result of the investigation.
	Level 2	Monitoring identifies long term declining trend in vegetation health, composition and/or structure.	Identify locations and photograph.	• Engage a suitably qualified person to undertake an investigation to determine the recommend actions. • Prepare a site-specific management plan and implement recommendation actions in consultation with the relevant Government department.
Weed cover	Normal	Weed infestations and/or High Threat Weeds <20% compared to baseline.	None required	• Continue implementing weed control measures.
	Level 1	Increase in weed infestations and/or High Threat Weeds > 20% compared to baseline data.	Identify locations of weed infestations and take photographs.	• Undertake additional monitoring. • Increase or review/amend weed control methods. • Conduct follow up targeted weed spraying (if suitable for targeted species).

Performance measure	Status	Trigger	Action	Response
	Level 2	Increase in weed infestations and/or High Threat Weeds > 40% compared to baseline data.	Identify locations of weed infestations and take photographs.	• As for Level 1. • Review weed management program to identify key priority areas and investigate alternative methods for control of target species. • Engage weed management contractor to remove introduced weed species. • Implement recommendations as appropriate.
REA				
Slope gradient	Normal	>70% of the rehabilitated REA has slopes within the limits stipulated in the REA Closure Design Report (ATC Williams 2022).	None required	Continue monitoring rehabilitated REA slopes.
	Level 1	<70% of the rehabilitated REA has slopes within the limits stipulated in the REA Closure Design Report (ATC Williams 2022).	Inspect and photograph site.	Undertake re-grading and revegetation of the REA.
	Level 2	<55% of the rehabilitation area has slopes within the limits stipulated in the REA Closure Design Report (ATC Williams 2022).	Inspect and photograph site.	• Undertake a review of the landform design, including survey if required. • Undertake re-grading and re-vegetation of the area.
Free draining landform	Normal	No ponding observed.	None required.	None required.
	Level 1	Landform exhibiting minor ponding.	Inspect and photograph site.	• An inspection of the site will be undertaken by a suitably qualified person to investigate opportunities to address issues. • Implement remediation measures as recommended.
	Level 2	Landforms exhibiting significant drainage issues, threatening or causing material harm to the environment.	Inspect and photograph site.	• Engage a suitably qualified person to undertake a review of the landform design, including survey if required. • Undertake re-grading and re-vegetation of the area.
Seepage	Normal	No seepage observed from REA.	None required	None required.
	Level 1	Isolated incidence of seepage from REA.	Inspect and photograph site.	• An inspection of the site will be undertaken by a suitably qualified person to investigate opportunities to address issues. • Remediate as appropriate.
	Level 2	Landform exhibiting seepage issues, threatening or causing material harm to the environment.	Inspect and photograph site.	• An inspection of the site will be undertaken by a suitably qualified person to identify remedial actions. • Notify the relevant Government department and implement recommended corrective actions.
Evidence of spontaneous combustion in capped and rehabilitated sections of the REA	Normal	No evidence of spontaneous combustion in REA.	None required	• Continue to monitor.
	Level 1	Isolated incidence of heating in REA with no impact on vegetation establishment.	Notify Surface Operations Manager or delegate on site of incidence.	• Investigate sources of potential ignition. • Excavate material with propensity for spontaneous combustion in proximity to rehabilitated surface. • Review rejects emplacement practices.
	Level 2	Multiple incidences of heating/ignition in REA with impacts to vegetation establishment.	Notify Surface Operations Manager or delegate on site of incidence.	• Consult with the relevant Government department to develop a remediation plan to mitigate spontaneous combustion such as increased capping depth. • Review spontaneous combustion management and reject emplacement practices.