Rehabilitation Management Plan

Mt Thorley Warkworth

DOCUMENT CONTROL

Version	Date	Revision Description	Author	Approver
1	28 July 2022	First document	Bill Baxter Environmental Specialist - Rehabilitation	Gary Mulhearn Environment & Community Manager
2	29 January 2024	Revised ROBJ and FLRP, IEA action.	Bill Baxter Environmental Specialist - Rehabilitation	Gary Mulhearn Environment & Community Manager

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Summary Table

Name of mine		Mount Thorley Warkworth	
Rehabilitation Management Plan commencement date		30 January 2024	
Rehabilitation Management Plan revision dates and version numbers		Version 2.0, January 2024	
Mining leases	**Leaseholder**	**No.**	**Expiry**
	Mt Thorley Operations Pty Ltd	CL 219	23 September 2044
		ML 1752	16 March 2038
	Warkworth Mining Limited	CCL 753	17 February 2034
		ML 1412	11 January 2038
		ML 1590	26 February 2028
		ML 1751	17 March 2038
	Mount Thorley Coal Loading Ltd	ML 1828	25 February 2043
Date of Finalisation		29 January 2024	

1 INTRODUCTION

Mount Thorley Warkworth Coal Mine (MTW) is managed by Coal & Allied (NSW) Pty Limited which is a wholly owned subsidiary of Yancoal Australia Limited (Yancoal). MTW is located approximately 14km to the south-west of Singleton in the Upper Hunter Valley of New South Wales (NSW). MTW is an amalgamation of two open cut mines, Mount Thorley Operations (MTO) and Warkworth Mining Limited (WML). Currently operating, MTW extract coal from the Whittingham Coal Measures of the Hunter Coalfield. Resulting product is then transported via the Mount Thorley Coal Loader (MTCL) by rail to the Port of Newcastle where it is shipped to international customers.

MTW is required to produce this Rehabilitation Management Plan (RMP) to meet Mining Lease commitments introduced in the Mining Amendment (Standard Conditions of Mining Leases – Rehabilitation) Regulation 2021 under the Mining Act 1992. This RMP has also been prepared to meet the NSW Resource Regulator's *Rehabilitation Management Plan for Large Mines – Form and Way* Document (2021).

Under the MTW Project Approvals (SSD-6464 and SSD-6465) this RMP is required to meet specific Project Approval conditions:

- SSD-6464 Schedule 3 Condition 58 (Warkworth);
- SSD-6465 Schedule 3 Condition 36 (Mt Thorley).

Further details about meeting these Project Approval conditions are outlined in **Section 2.1.**

1.1 History of Operations

In February 2004, MTO and WML were integrated into one operation to form MTW. MTO is a joint venture owned by Yancoal (80%) and Posco (20%). WML is a joint venture owned by Yancoal (55.6%), Mitsubishi Development (28.9%), Mitsubishi Materials (6%) and Nippon Steel (9.5%).

MTO commenced mining operations in 1981 within Coal Lease No. 219 (CL 219) and comprises approximately 1,992ha of land. MTO currently operates under project approval SSD-6465 which was issued on 26 November 2015 by the Planning Assessment Commission (PAC). MTO has produced semi-soft coking and thermal coal, mainly for the export market.

WML commenced mining operations in 1981, following the granting of a mining lease in February of the same year. The open cut mine is located within Consolidated Coal Lease No. 753 (CCL 753) and Mining Leases (ML) ML 1412, ML 1590, and ML 1751, which comprises a total of 4,200 hectares (ha) of land. WML operates under project approval SSD-6464 granted on 26 November 2015 by the PAC. Since 1981, WML has produced semi-soft coking and thermal coal for domestic and export markets through the operation of a multi-seam, open cut coal mine.

Project approvals SSD-6464 and SSD-6465 granted by the Minister for Planning enabled the continuation of the operations at MTO and WML, respectively. The approval allowed for the extension of mining activities generally to the west of the existing operations, maintaining previous production levels of 18 million tonnes per annum (Mtpa) of Run of Mine (ROM) coal.

In this RMP, MTO including its infrastructure and facilities, will be referred to as "South" MTW, while WML will be referred to as "North" MTW. MTO and WML will be used in a historical context.

In recent years, coal extraction from the Mount Thorley pit, also referred to as Loders Pit, has advanced west towards Charlton Road. At the time of writing, extraction at the Mount Thorley pit has ceased, with no further open cut extraction planned for the Mount Thorley component of the MTW lease. Extraction from the Warkworth North and West pits is expected to continue and progress to the west, towards Wallaby Scrub Road within ML 1751.

The Mount Thorley Coal Loader (MTCL) commenced in 1978 when a new rail spur line was built to the Mount Thorley site. In 1981, the facility was expanded to cater for expansions of existing mines and planned new mines in the area. Mount Thorley Coal Loading Ltd was formed to take over and expand the common use facility. This company is a joint venture now owned by Coal & Allied Operations Pty Ltd (approx. 44%) and RW Miller (Holdings) Pty Ltd, Warkworth Coal Sales Limited, United Collieries Pty Ltd and Wambo Coal Pty Ltd (approximately 14% each).

In the past, Lemington, Wambo and United mines delivered coal to MTCL using road transport however transport of coal from mines other than MTW was discontinued after the construction of the Wambo Rail Loop. The current facility is able to load approximately 20Mtpa through the two separate loading facilities located on the one rail loop.

MTCL is located within Mining Lease No. 1828 which comprises approximately 97ha of land. MTCL operates under Development application DA 177/94 which was issued on 5 May 1995 by Singleton Shire Council.

Exploration

The MTW area has been explored since the 1940's, however the most significant exploration campaigns were those of the late 1970's managed by the Joint Coal Board for both the then operators of Mount Thorley (R.W. Miller) and Warkworth (Warkworth Mining). This drilling, which formed the basis of feasibility studies for both sites, was conducted down to an approximate 250m square grid in restricted areas.

Additional drilling also commenced in 2011 to define any underground resource potential in the form of a pre-feasibility study, focusing on coal quality, geotechnical properties, and gas desorption testing for future underground mine safety. More recently, exploration drilling occurred in areas ahead of mining operations in the North Pit and South West Pit, within CL 219 and CCL 753.

Table 1 contains further detail on the history of mining development at MTW.

TABLE 1: MINING DEVELOPMENT HISTORY

Year	Mount Thorley Operations	Warkworth Mining Limited
1976	Authorisation 66 granted. Exploration commences by RW Miller.	Tender for coal lease released by NSW government. CL 205 granted.
1979		Environmental Impact Statement (EIS) submitted to Singleton Shire Council (SSC).
1980		Development Consent granted by SC for mining operations. State Pollution Control commission approval to develop mine granted.
1981	Development Consent (DA 80/53) first granted by the (then) Minister for Planning and Environment for the production of 1.1 Mtpa coal. CL 219 granted.	CL 276 granted. Official opening of mine. Overburden removal commenced and first coal shipment dispatched.
1983	Development Consent (DA 80 – 10059 Pt. 6) first granted by the (then) Minister for Planning and Environment to increase tonnage to 1.7 Mtpa coal.	
1984	The 1983 Development Consent modified and approved (File No. N94 / 001580 – 10059 Mod. 1) by the (then) Minister for Planning and Environment to increase tonnage to 2.5 Mtpa coal.	
1988		DMR approval to commence mining North Pit.
1990		CCL 753 issued in respect of CL 205 and CL 276
1991		DMR approval to extend operations in West Pit.

Year	Mount Thorley Operations	Warkworth Mining Limited
1993	The 1983 Development Consent modified and approved (DA 32/93 80 – 10059 Mod. 2) by SC to expand the mining area by approximately 50 hectares (ha).	
1994		DMR Approval to extend operations in North, South and West Pits.
1995		Development consent granted by the (then) NSW Department of Urban Affairs and Planning (DUAP) for expansion of operations to 4.5 Mtpa.
1996	Development Consent granted (DA 34/95) by the (then) Minister of Urban Affairs and Planning to extend the mine west to Charlton and Wallaby Scrub Roads. The consent allowed for the production of up to 8 Mtpa coal.	
1997		Operations commence in Woodlands Pit. Renewal of CCL 753. ML 1412 issued.
1999		Second dragline commissioned.
2000		Modification to consent granted by DUAP for expansion of operations to 7 Mtpa.
2001	The 1996 Development Consent was modified (File No. N94/001580 – 10059 Mod. 3) by the (then) Minister for Urban Affairs and Planning to allow for haulage of coal between MTO and WML.	Modification to consent granted by DUAP for an extension of the haul road between WML and MTO.
2002	The 1996 Development Consent was modified (DA 34 / 95 Mod. 1 (N91 / 00310)) by the (then) Minister for Urban Affairs and Planning to provide for the Abbey Green Project (2 pits), increase Coal Preparation Plant (CPP) production to 10 Mtpa and the transfer of water and reject between MTO and WML.	Modification to consent granted by the (then) NSW Department of Planning for transfer of tailings and water between WML and MTO.
2003		Approval for the extension of mining to Wallaby Scrub Road (DA 300-9- 2002-i).
2004	Modification of DA 34 / 95 (DA 34 / 95 Mod 2 File No: 502/02196) to allow modification to rejects and ROM Bins at South CPP. Modification of 2003 (DA 300-9-2002-i M1 File No: S02/02198) to allow modification to rejects and ROM Bins at North CPP. Commonwealth Approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) Approval 2002/629, along with variations EPBC 2002 / 629 Variation 1, EPBC 2002 / 629 Variation 2 & EPBC 2002 / 629 Variation 3.	
2007		ML 1590 was granted to Warkworth Mining Limited. Data acquisition for the Coal Seam Methane Pilot Program (CSMPP) commenced.
2009	Modification of DA 34/95 to allow for an extension of Dam existing mine water management structure (Dam9S).	MOP amendment raise dumps over CD
2010		MOP amendment raise dumps over active pit areas
		Application for MOP to dump over existing rehabilitation
2012	Modification of DA 34/95 to allow for extension of the AGN Pit and associated developments.	New Development Consent DA 09_0202 granted by the Minister for Planning and Infrastructure to allow for continuation of mining activities beyond the

Year	Mount Thorley Operations	Warkworth Mining Limited
		previous consent limit and for the extension of mining activities to the west.
		The new DA supersedes the previous Development Consent (DA-300-9-2002-i) which is to be surrendered by the end of December 2012 in accordance with Section 14A of the EP&A Act.
2013		Development Consent DA 09-0202 (3 February 2012) disapproved by the Land and Environment Court NSW. Warkworth Mine reverts to operating in accordance with the 2003 development consent (current version from October 2009 modification). Development Consent modification DA-300-9-2002-i (January 2014) granted by the Minister for Planning and Infrastructure to allow for open cut mining in a 350m wide strip within Non-Disturbance Area 1. MOP amendment Warkworth Modification 6 350m extension into NDA1 and inclusion of Common Boundary Rehabilitation Plan.
2015	New Development Consent SSD-6465 (26 November 2015) granted to extend the time for approved mining and continued use of existing mining infrastructure; and allow the transfer of additional overburden from Warkworth Mine to complete the final landform for an additional 21 years.	New Development Consent SSD-6464 (26 November 2015) granted to extend West Pit to the south and west into Saddleback Ridge and then extend both West Pit and North Pit through Wallaby Scrub Road.
2017	ML 1752 granted to Mt Thorley Operations Pty Limited on 17 March 2017 in the area of and north of Putty Road.	ML 1751 granted to Warkworth Mining Ltd on 17 March 2017 in the area of and west of Wallaby Scrub Road.
2022		SSD-6464 Modification 2 granted for MTW/HVO Lemington Underground Mine Water Storage Project.

Schedule 2, Condition 5 of both SSD-6464 and SSD-6465 states:

> *The Applicant may carry out mining operations on site for 21 years from the date of commencement of development under this consent.*
>
> *Note: Under this consent, the Applicant is required to rehabilitate the site and perform additional undertaking to the satisfaction of the Secretary and the DRE. Consequently, this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertaking have been carried out satisfactorily.*

Therefore, based on the current modified consents for MTW, the planned life of mine is until 2037. However, subject to gaining approval, mining may continue past this year to exploit further coal resources at MTW.

1.2 Current Development Consents, Leases and Licences

The following tables outline the development consents, authorisations, and other licences issued to MTW. The Standard Conditions for Mining Leases introduced in the 2021 Mining Amendment are also attached to this RMP in **Appendix A**. The new standard conditions outline rehabilitation requirements for lease holders, including the preparation and implementation of a Rehabilitation Management Plan.

TABLE 2: CONSENTS, AUTHORISATIONS AND LICENCES

Approval Number	Description	Consent Authority	Issue Date	Expiry Date
Warkworth				
SSD-6464	Warkworth Continuation 2014 Modification 2 issued 27 May 2022	Department of Planning and Environment	26 November 2015 (Date of Commencement 15 February 2016)	15 February 2037 (21 years from Commencement)
EPBC 2002/629	EPBC 2002/629 Variation issued 14 October 2018	Department of Climate Change, Energy, the Environment and Water	18 February 2004	25 February 2039
EPBC 2009/5081	EPBC 2009/5081 variation issued 14 October 2018	Department of Climate Change, Energy, the Environment and Water	9 August 2012	31 March 2033
CCL 753	Prospecting and Mining Coal	Department of Planning and Environment	17 February 2002	17 February 2034
ML 1412	Prospecting and Mining Coal	Department of Planning and Environment	11 January 1997	11 January 2038 (Renewal pending)
ML 1590	Prospecting and Mining Coal	Department of Planning and Environment	27 February 2007	26 February 2028
ML 1751	Prospecting and Mining Coal	Department of Planning and Environment	17 March 2017	17 March 2038
EPL 1376	Environment Protection Licence	NSW Environment Protection Authority		1 December (anniversary)
RML 5061122	Radiation Management Licence	NSW Environment Protection Authority		2 May 2024
XSTR200105	Store Explosives Licence	Safework NSW		18 August 2024

Approval Number	Description	Consent Authority	Issue Date	Expiry Date
Mount Thorley				
SSD-6465	Mt Thorley Operations 2014	Department of Planning and Environment	26 November 2015 (Date of Commencement 15 February 2016)	15 February 2037 (21 years from Commencement)
CL 219	Prospecting and Mining Coal	Department of Planning and Environment	23 September 1981	23 September 2044
(Part) ML 1547	Mining Purposes	Department of Planning and Environment	Registered to 31/12/2015	
ML 1752	Prospecting and Mining Coal	Department of Planning and Environment	17 March 2017	16 March 2038
EPL 1976	Environment Protection Licence	NSW Environment Protection Authority		1 April (Anniversary date)
RML 5061110	Radiation Management Licence	NSW Environment Protection Authority		31 July 2024
Mount Thorley Coal Loader				
ML 1828	Ancillary Mining activities	Department of Planning and Environment	25 February 2022	25 February 2043
EPL 24	Environment Protection Licence	NSW Environment Protection Authority		1 August (Anniversary date)

TABLE 3: WATER LICENCES

License No.	Description	Purpose	Legislation	Consent Authority	Renewal Date
WAL10543; WAL10544; WAL963; WAL18233; WAL18558; WAL43056; WAL43057	Water Access Licence	Water Access Licence	*Water Management Act 2000*	Water NSW	Perpetuity

License No.	Description	Purpose	Legislation	Consent Authority	Renewal Date
WAL40464	Water Access Licence	Mt Thorley Pit Excavation	*Water Management Act 2000*	Water NSW	Perpetuity
WAL40465	Water Access Licence	Warkworth Pit Excavation	*Water Management Act 2000*	Water NSW	Perpetuity
WAL39798	Water Access Licence	Lemington Underground Bore	*Water Management Act 2000*	Water NSW	Perpetuity
20BL168821; 20BL171729; 20BL171841; 20BL171842; 20BL171843; 20BL171844; 20BL171845; 20BL171846;20BL171847; 20BL171848; 20BL171849; 20BL171850; 20BL171864; 20BL171891; 20BL171892; 20BL171893; 20BL171894; 20BL172272; 20BL172273; 20BL172439; 20BL172518; 20BL173065; 20BL173276	Bore	Monitoring Bore	Part 5 *Water Act 1912*	Water NSW	Perpetuity
20BL170011; 20BL170012	Bore	Excavation-Mining	Part 5 *Water Act 1912*	Water NSW	26 November 2016
20AL209903	Diversion Works	Irrigation	Part 2 *Water Act 1912*	Water NSW	25 February 2023
20CA209904	Stream Diversion	Bywash Dams	Water Management Act 2000	Water NSW	25 February 2023
20WA209905	Stream Diversion	Bywash Dams	Water Management Act 2000	Water NSW	31 July 2022
20FW213276	Flood Work Approval	Block Dam	Water Management Act 2000	Water NSW	23 August 2020

TABLE 4: SECTION 87 AND SECTION 90 PERMITS

Permit No.	Location Description	Issue Date	Expiry Date
Warkworth			
1103070	Warkworth Sands – Section 90 Community Collection	21 July 2009	Expired – report submitted
1131171	STAGE 3 Warkworth Extension (DA-300-9-2002-i)	4 November 2011	Expired – report submitted
Aboriginal Objects Care & Control Permits			
2863	AHIP Care and Control Permit (time extension granted 27/08/2010)	16 January 2008	16 January 2016 (now covered under Care Agreement C0001890)
C0001890	HVO and MTW Care Agreement	3 June 2016	2 June 2036
C0001841	MTW Wollombi Brook Cultural Heritage Conservation Area Care Agreement	3 June 2016	2 June 2036

TABLE 5: REJECT EMPLACEMENT AREA APPROVALS

Approval	Approval Date	Expiry Date
Warkworth		
Swan Lake Void	21 October 2002	N/A
Tailings Dam 2	22 October 2002	N/A
Tailings Dam 2 – 130RL	9 December 2003	N/A
Tailings Dam 1 – Section 101 CMHSA 2002 approval to discontinue use of an emplacement area	22 November 2011	N/A
Notification of High Risk Activity for Tailings Dam 2 capping works	9 August 2016	N/A
Mount Thorley		
Section 126 Variation to Reject Emplacement Area	20 March 2001	N/A
Section 126 Construction of Reject Emplacement Area Centre Ramp Tailings Storage Facility	9 April 2001	N/A
Dam Safety Committee Centre Ramp Tailings Storage Facility Stage 2	12 February 2004	N/A
Mini Strip 24 Tailings Storage Facility	8 September 2004	N/A
Section 126 Centre Ramp Tailings Storage Facility Stage 2	8 September 2004	N/A
Section 126 Centre Ramp Tailings Facility – Raising Height of embankment	10 May 2006	N/A
Section 126 Abbey Green South Tailings Facility	10 May 2006	N/A
Notification of High Risk Activity for Centre Ramp Tailings Facility – Raising Height of Embankment to RL130	11 August 2015	N/A
Notification of High Risk Activity for Interim Tailings Storage Facility capping works	2 March 2015	N/A
Notification of High Risk Activity for Mini Strip Tailings Storage Facility minor capping works	4 June 2016	N/A
Notification of High Risk Activity for Loders Pit Tailings Storage Facility construction/operation	3 March 2022	N/A

1.3 Land Ownership and Land Use

WML and MTO, through Miller Pohang Coal Company Pty Limited, own a majority of the land within MTW. The area adjoining the mine is mostly privately owned freehold land, with Coal & Allied holding title over a selected area including a corridor to Wollombi Brook. MTW is located near public roads including the Golden Highway on the northern and eastern WML boundary, and Wollombi Brook and Charlton Roads to the west. The operation is bisected by Putty Road, with WML located to the north of the Putty Road, and MTO to the south. MTO shares its southern boundary with the adjoining Bulga Open Cut (BOC).

Table 6 contains a summary of the land ownership of the land held by MTW.

TABLE 6: LAND OWNERSHIP AND LAND USE

LOT	DP	OWNER
1	1041796	Warkworth Mining Limited
1	1043467	Miller Pohang Coal Company Pty Limited
1	1086834	The State of New South Wales
1	1097294	Warkworth Mining Limited
1	1245465	Warkworth Mining Limited
1	1273145	Warkworth Mining Limited
1	129799	Warkworth Mining Limited
1	129800	Warkworth Mining Limited
1	129806	Coal & Allied Operations Pty Limited
1	129808	Coal & Allied Operations Pty Limited
1	129811	Warkworth Mining Limited
1	129812	Warkworth Mining Limited
1	129819	Warkworth Mining Limited
1	129822	Warkworth Mining Limited
1	130264	Warkworth Mining Limited
1	130275	Warkworth Mining Limited
1	130276	Warkworth Mining Limited
1	136594	Miller Pohang Coal Company Pty Limited
1	176095	Warkworth Mining Limited
1	227280	Warkworth Mining Limited
1	245850	Warkworth Mining Limited
1	246201	Warkworth Mining Limited
1	247340	Miller Pohang Coal Company Pty Limited
1	248570	Warkworth Mining Limited
1	326244	Warkworth Mining Limited
1	326245	Warkworth Mining Limited
1	42614	Miller Pohang Coal Company Pty Limited
1	43383	Warkworth Mining Limited
1	43422	Miller Pohang Coal Company Pty Limited
1	45576	Miller Pohang Coal Company Pty Limited
1	573286	Warkworth Mining Limited
1	610376	Warkworth Mining Limited
1	705493	Warkworth Mining Limited

LOT	DP	OWNER
1	755267	Warkworth Mining Limited
1	804245	Warkworth Mining Limited
1	910550	Reference not held at the LRS
1	949066	Warkworth Mining Limited
10	1121154	Singleton Council - Putty Road
10	113342	Warkworth Mining Limited
10	246201	Warkworth Mining Limited
10	247340	Miller Pohang Coal Company Pty Limited
10	251238	State Rail Authority of New South Wales
102	755267	Warkworth Mining Limited
103	755267	Warkworth Mining Limited
104	755267	Warkworth Mining Limited
105	755267	Warkworth Mining Limited
106	755267	Warkworth Mining Limited
11	1121154	Warkworth Mining Limited
11	113342	Warkworth Mining Limited
11	246201	Warkworth Mining Limited
11	247340	Miller Pohang Coal Company Pty Limited
110	755267	Warkworth Mining Limited
111	755267	Warkworth Mining Limited
12	1121154	Warkworth Mining Limited
12	113342	Warkworth Mining Limited
12	246201	Warkworth Mining Limited
12	247340	Miller Pohang Coal Company Pty Limited
120	1089243	Warkworth Mining Limited
126	665628	Peter Glen Stuart
129	755267	Warkworth Mining Limited
13	113342	Warkworth Mining Limited
13	247340	Miller Pohang Coal Company Pty Limited
130	248186	Warkworth Mining Limited
130	755267	Warkworth Mining Limited
131	248186	Warkworth Mining Limited
131	755267	Warkworth Mining Limited
132	248186	Warkworth Mining Limited
132	755267	Warkworth Mining Limited
133	248186	Warkworth Mining Limited
134	248186	Warkworth Mining Limited
134	755267	Warkworth Mining Limited
135	248186	Warkworth Mining Limited
135	755267	Coal & Allied Operations Pty Limited
136	248186	Warkworth Mining Limited
136	755267	Warkworth Mining Limited
137	248186	Warkworth Mining Limited
137	755267	Warkworth Mining Limited

LOT	DP	OWNER
138	248186	Warkworth Mining Limited
139	248186	Warkworth Mining Limited
14	113342	Warkworth Mining Limited
14	247340	Miller Pohang Coal Company Pty Limited
140	248186	Warkworth Mining Limited
141	573290	Warkworth Mining Limited
142	573290	Warkworth Mining Limited
142	755267	Coal & Allied Operations Pty Limited
143	573290	Warkworth Mining Limited
143	755267	Coal & Allied Operations Pty Limited
144	573290	Warkworth Mining Limited
144	755267	Warkworth Mining Limited
146	970755	Coal & Allied Operations Pty Limited and HVO Resources Pty Ltd
15	113342	Warkworth Mining Limited
15	247340	Miller Pohang Coal Company Pty Limited
150	755267	Warkworth Mining Limited
151	755267	Warkworth Mining Limited
152	755267	Warkworth Mining Limited
154	755267	Warkworth Mining Limited
155	755267	Warkworth Mining Limited
156	755267	Warkworth Mining Limited
157	755267	Warkworth Mining Limited
159	755267	Warkworth Mining Limited
16	113342	Warkworth Mining Limited
16	247340	Miller Pohang Coal Company Pty Limited
16	755267	Warkworth Mining Limited
161	755267	Warkworth Mining Limited
162	755267	Warkworth Mining Limited
164	755267	Warkworth Mining Limited
165	755267	Warkworth Mining Limited
166	657481	Warkworth Mining Limited
167	755267	Warkworth Mining Limited
168	755267	Warkworth Mining Limited
17	113342	Warkworth Mining Limited
17	247340	Miller Pohang Coal Company Pty Limited
17	658927	Miller Pohang Coal Company Pty Limited
170	755267	Warkworth Mining Limited
172	755267	Warkworth Mining Limited
173	755267	Warkworth Mining Limited
177	755267	Warkworth Mining Limited
178	755267	Warkworth Mining Limited
179	755267	Warkworth Mining Limited
18	113342	Warkworth Mining Limited
18	247340	Miller Pohang Coal Company Pty Limited

LOT	DP	OWNER
180	755267	Warkworth Mining Limited
182	755267	Warkworth Mining Limited
183	755267	Warkworth Mining Limited
184	755267	Warkworth Mining Limited
185	755267	Warkworth Mining Limited
187	755267	Warkworth Mining Limited
189	755267	Warkworth Mining Limited
19	113342	Warkworth Mining Limited
19	247339	Miller Pohang Coal Company Pty Limited
190	755267	Warkworth Mining Limited
191	755267	Warkworth Mining Limited
196	755267	Warkworth Mining Limited
197	657482	Warkworth Mining Limited
1B	37572	Warkworth Mining Limited
2	1026900	Singleton Council - Putty Road
2	1086834	Wambo Coal Terminal Pty Limited
2	1097294	Warkworth Mining Limited
2	1241457	Warkworth Mining Limited
2	1245465	Miller Pohang Coal Company Pty Limited
2	129799	Warkworth Mining Limited
2	129806	Coal & Allied Operations Pty Limited
2	129811	Warkworth Mining Limited
2	129819	Warkworth Mining Limited
2	129822	Warkworth Mining Limited
2	130264	Warkworth Mining Limited
2	227280	Warkworth Mining Limited
2	245850	Warkworth Mining Limited
2	246201	Warkworth Mining Limited
2	247340	Miller Pohang Coal Company Pty Limited
2	248570	Warkworth Mining Limited
2	42614	Miller Pohang Coal Company Pty Limited
2	43383	Warkworth Mining Limited
2	602169	Trustee of Church Property for the Diocese of Newcastle
2	610376	Miller Pohang Coal Company Pty Limited
2	705493	Warkworth Mining Limited
2	735566	Warkworth Mining Limited
2	804245	Warkworth Mining Limited
2	827333	Warkworth Mining Limited
20	113342	Warkworth Mining Limited
200	755267	Warkworth Mining Limited
2011	1137289	The State of New South Wales
203	704466	Warkworth Mining Limited
21	113342	Warkworth Mining Limited
21	625709	Warkworth Mining Limited

LOT	DP	OWNER
22	113342	Warkworth Mining Limited
22	263943	Miller Pohang Coal Company Pty Limited
22	625709	Warkworth Mining Limited
220	1135537	Warkworth Mining Limited
24	755270	Warkworth Mining Limited
25	755270	Warkworth Mining Limited
26	755270	Warkworth Mining Limited
27	755267	Warkworth Mining Limited
271	260663	Miller Pohang Coal Company Pty Limited
271	600747	Miller Pohang Coal Company Pty Limited
272	260663	Warkworth Mining Limited
272	600747	Miller Pohang Coal Company Pty Limited
273	260663	Miller Pohang Coal Company Pty Limited
28	248429	Miller Pohang Coal Company Pty Limited
28	255730	Singleton Council
29	248429	Miller Pohang Coal Company Pty Limited
29	255730	Singleton Council
3	1026900	Singleton Council - Putty Road
3	1241457	Warkworth Mining Limited
3	1274662	Miller Pohang Coal Company Pty Limited
3	129811	Warkworth Mining Limited
3	129819	Warkworth Mining Limited
3	227280	Warkworth Mining Limited
3	245850	Warkworth Mining Limited
3	246201	Warkworth Mining Limited
3	247340	Miller Pohang Coal Company Pty Limited
3	42614	Miller Pohang Coal Company Pty Limited
3	43383	Warkworth Mining Limited
3	705493	The State of New South Wales
30	248429	Miller Pohang Coal Company Pty Limited
31	248429	Miller Pohang Coal Company Pty Limited
32	248429	Miller Pohang Coal Company Pty Limited
33	248429	Miller Pohang Coal Company Pty Limited
34	248429	Miller Pohang Coal Company Pty Limited
341	612684	Miller Pohang Coal Company Pty Limited
35	248429	Miller Pohang Coal Company Pty Limited
35	260056	Warkworth Mining Limited
35	755270	Warkworth Mining Limited
350	1135536	Warkworth Mining Limited
36	248429	Miller Pohang Coal Company Pty Limited
36	260056	Warkworth Mining Limited
36	755270	Miller Pohang Coal Company Pty Limited
360	1135647	Warkworth Mining Limited
37	248429	Miller Pohang Coal Company Pty Limited

LOT	DP	OWNER
371	1026537	Singleton Council
372	1026537	Daracon Engineering Pty Limited
38	248429	Miller Pohang Coal Company Pty Limited
39	248429	Miller Pohang Coal Company Pty Limited
4	10022	Miller Pohang Coal Company Pty Limited
4	1026900	Singleton Council - Putty Road
4	113342	Coal & Allied Operations Pty Limited and HVO Resources Pty Ltd
4	1241457	Warkworth Mining Limited
4	1274662	Warkworth Mining Limited
4	245850	Warkworth Mining Limited
4	247340	Miller Pohang Coal Company Pty Limited
4	248570	Warkworth Mining Limited
4	43383	Warkworth Mining Limited
4	658759	Warkworth Mining Limited
40	248429	Miller Pohang Coal Company Pty Limited
40	587922	Alpha Distribution Ministerial Holding Corporation
41	248429	Miller Pohang Coal Company Pty Limited
42	248429	Miller Pohang Coal Company Pty Limited
43	248429	Miller Pohang Coal Company Pty Limited
44	248429	Miller Pohang Coal Company Pty Limited
45	248429	Miller Pohang Coal Company Pty Limited
450	1119428	Hunter Energy Pty Limited
451	1119428	Wambo Coal Terminal Pty Limited
46	248429	Miller Pohang Coal Company Pty Limited
46	755267	Warkworth Mining Limited
47	1096589	Warkworth Mining Limited
48	755267	Warkworth Mining Limited
5	1026900	Singleton Shire Council
5	113342	Warkworth Mining Limited
5	1274662	Warkworth Mining Limited
5	245850	Warkworth Mining Limited
5	246201	Warkworth Mining Limited
5	247340	Miller Pohang Coal Company Pty Limited
5	248570	Warkworth Mining Limited
5	43383	Warkworth Mining Limited
5	587986	Miller Pohang Coal Company Pty Limited
543	252771	Miller Pohang Coal Company Pty Limited
549	589662	Miller Pohang Coal Company Pty Limited
551	569597	Miller Pohang Coal Company Pty Limited
555	609997	Miller Pohang Coal Company Pty Limited
56	755270	Miller Pohang Coal Company Pty Limited
57	755270	Miller Pohang Coal Company Pty Limited
6	113342	Warkworth Mining Limited

LOT	DP	OWNER
6	1274662	Miller Pohang Coal Company Pty Limited
6	245850	Warkworth Mining Limited
6	247340	Miller Pohang Coal Company Pty Limited
6	247820	Warkworth Mining Limited
6	248570	Warkworth Mining Limited
6	251238	State Rail Authority of New South Wales
6	587986	Miller Pohang Coal Company Pty Limited
61	755270	Miller Pohang Coal Company Pty Limited
63	755267	Warkworth Mining Limited
7	113342	Warkworth Mining Limited
7	245850	Warkworth Mining Limited
7	247340	Miller Pohang Coal Company Pty Limited
7	247820	Warkworth Mining Limited
7	248570	Warkworth Mining Limited
7	251238	State Rail Authority of New South Wales
7	587986	Miller Pohang Coal Company Pty Limited
708	749857	Miller Pohang Coal Company Pty Limited
71	755270	Warkworth Mining Limited
7300	1153730	The State of New South Wales
74	755267	Aaron James Stuart
75	755267	Aaron James Stuart
8	1026900	Warkworth Mining Limited
8	245850	Warkworth Mining Limited
8	246201	Warkworth Mining Limited
8	247340	Miller Pohang Coal Company Pty Limited
8	251238	Miller Pohang Coal Company Pty Limited
8	587986	Miller Pohang Coal Company Pty Limited
841	531116	Warkworth Mining Limited
851	612261	Miller Pohang Coal Company Pty Limited
87	755267	Warkworth Mining Limited
89	755267	Warkworth Mining Limited
9	1121154	Singleton Council - Putty Road
9	246201	Warkworth Mining Limited
9	247340	Miller Pohang Coal Company Pty Limited
9	251238	State Rail Authority of New South Wales
90	755267	Warkworth Mining Limited
91	755267	Warkworth Mining Limited
92	755267	Warkworth Mining Limited
93	755267	Warkworth Mining Limited
94	755267	Warkworth Mining Limited
95	755267	Warkworth Mining Limited
95	755270	Miller Pohang Coal Company Pty Limited
96	755267	Warkworth Mining Limited
97	755267	Warkworth Mining Limited

LOT	DP	OWNER
99	755267	Warkworth Mining Limited
99	755270	Miller Pohang Coal Company Pty Limited
A	182301	Warkworth Mining Limited
B	182301	Warkworth Mining Limited

This RMP outlines the proposed final land uses within MTW as consisting of agriculture (cattle grazing on rehabilitated grassland) and biodiversity (native woodland for habitat). This is consistent with the pre-mining land use, goals for protection of threatened species and establishment of wildlife corridors in accordance with the strategies outlined in the Synoptic Plan for Mine Rehabilitation in the Upper Hunter Valley (Andrews Neil, 1999).

The Mount Thorley Operations Environmental Impact Statement (EMM 2014) describes the aim of integrating final land use with surrounding landscapes and habitat connectivity. Surrounding areas significant to the final land use of MTW includes Wollemi National Park, Yengo National Park, Wollombi Brook, Pokolbin State Forest, the remnant vegetation in Singleton Military Area, and the rehabilitation and offset areas of surrounding mining operations.

Mt Thorley Operations Pty Ltd currently has a boundary agreement with Bulga Coal Management Pty Ltd that was implemented to allow coal recovery to be maximised and to develop a shared overburden emplacement area along the common boundary between CL 219 and ML 1547. Lands associated with the Mt Thorley Dump Sublease and the Boundary Corridor Sublease (subleases of Part Coal Lease No. 219) were transferred back from Bulga Coal Management to Mt Thorley Operations in 2011, following expiration of the subleases. Lands associated with the Western Area Sublease and the Bulga Mining Sublease (subleases of Part Coal Lease No. 219) were transferred back from Bulga Coal Management to Mt Thorley Operations in 2014 and 2015, respectively. During the period covered by the previous MOP (2015 to 2021), lands associated with the Area B Sublease, MTO Sublease and Dam Sublease (subleases of Part Mining Lease No. 1547) were planned to be de-registered, and this land transferred back to Mt Thorley Operations ahead of progression of mining and dumping activities at MTW.

A Common Boundary Rehabilitation Plan was developed by MTW and Bulga Surface Operations (BOC) to document the operational and environmental management activities for the Common Boundary at the direction of the Department of Industry, now Department of Planning and Environment (DPE).

Land ownership at site is shown in **Figure 1**. Land use is shown in **Figure 2**. **Figure 3** displays the mining and rehabilitation areas prior to the RMP being submitted (December 2022). The Form and Way does not require this figure to be included in this RMP, however, is included here to present the context of current activities at the site. The Annual Rehabilitation Report and Forward Program will be submitted annually and provide an update to **Figure 3**.

LEGEND

- Electricity Transmission Line
- Major Road
- Railway

Project Approval Number

- SSD 6464 - Warkworth
- SSD 6465 - Mount Thorley

Land Ownership

- Alpha Distribution Ministerial Holding Corporation
- Bulga Coal Management PTY Limited
- Coal & Allied Operations PTY Limited
- Coal & Allied Operations & HVO Resources
- Crown
- Daracon Engineering PTY Limited
- Freehold
- Glencore Coal (NSW) PTY Limited
- Hunter Energy PTY Limited
- Local Government Authority
- Miller Pohang Coal Company PTY Limited
- NSW Government
- Saxonvale Coal & Nippon Steel Australia
- Singleton Shire Council
- Stuart
- Diocese of Newcastle
- Unknown
- Wambo Mining Corporation PTY Limited
- Warkworth Mining Limited

Vegetation Communities

- Central Hunter Grey Box - Ironbark Derived Grassland
- Central Hunter Grey Box - Ironbark Woodland
- Exotic
- Hunter Lowlands Redgum Forest
- Hunter Valley River Oak Forest
- Hunter Valley Vine Thicket
- Regenerating Central Hunter Grey Box - Ironbark Woodland
- Regenerating Hunter Valley River Oak Forest
- River Red Gum Floodplain Woodland
- Warkworth Sands Grassland
- Warkworth Sands Grassland (2003 Consent)
- Warkworth Sands Woodland
- Warkworth Sands Woodland (2003 Consent)
- Warkworth Sands Woodland (EEC)
- White Box Woodland
- Yellow Box Woodland

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Sheet Size : A1

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MT THORLEY WARKWORTH

Source: Buildings, roads, waterbodies, Project Approval and private land holders from Yancoal (2022). Current Authorisations from DPIE (2022). Catchment areas from ArcGIS Online (2022). Roads, watercourses, electricity transmission lines, Local Government Areas and Land Owner information from LPI (2022). World Hillshade from ArcGIS Online (2022).

Mount Thorley Warkworth Complex

Rehabilitation Management Plan Land Ownership

FIGURE 1A

Mine name	Mount Thorley Warkworth Complex
Plan name	Mount Thorley Warkworth RMP
Year of anticipated relinquishment	To be determined closer to closure
Data theme submission ID No.	N/A
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/07/2022

LEGEND

- Waterways
- Electricity Transmission Line
- Major Road
- Railway

Project Approval Number

- SSD 6464 - Warkworth
- SSD 6465 - Mount Thorley

Current Authorisations

- Relevant Minerals Title

Land Use

- Commercial
- Environmental
- House
- Mining
- Rural
- Vacant Land

Points Of Interest

- Ambulance Station
- Cemetery
- Community Facility
- Filtration Plant
- Firestation - Bush
- Fuel Driven Power Station
- Grave
- Homestead
- Locality
- Manmade Waterbody
- Monument
- Park
- Place Of Worship
- Police Station
- Rural Place
- Sports Court
- Sports Field
- Town
- Village

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MT THORLEY WARKWORTH

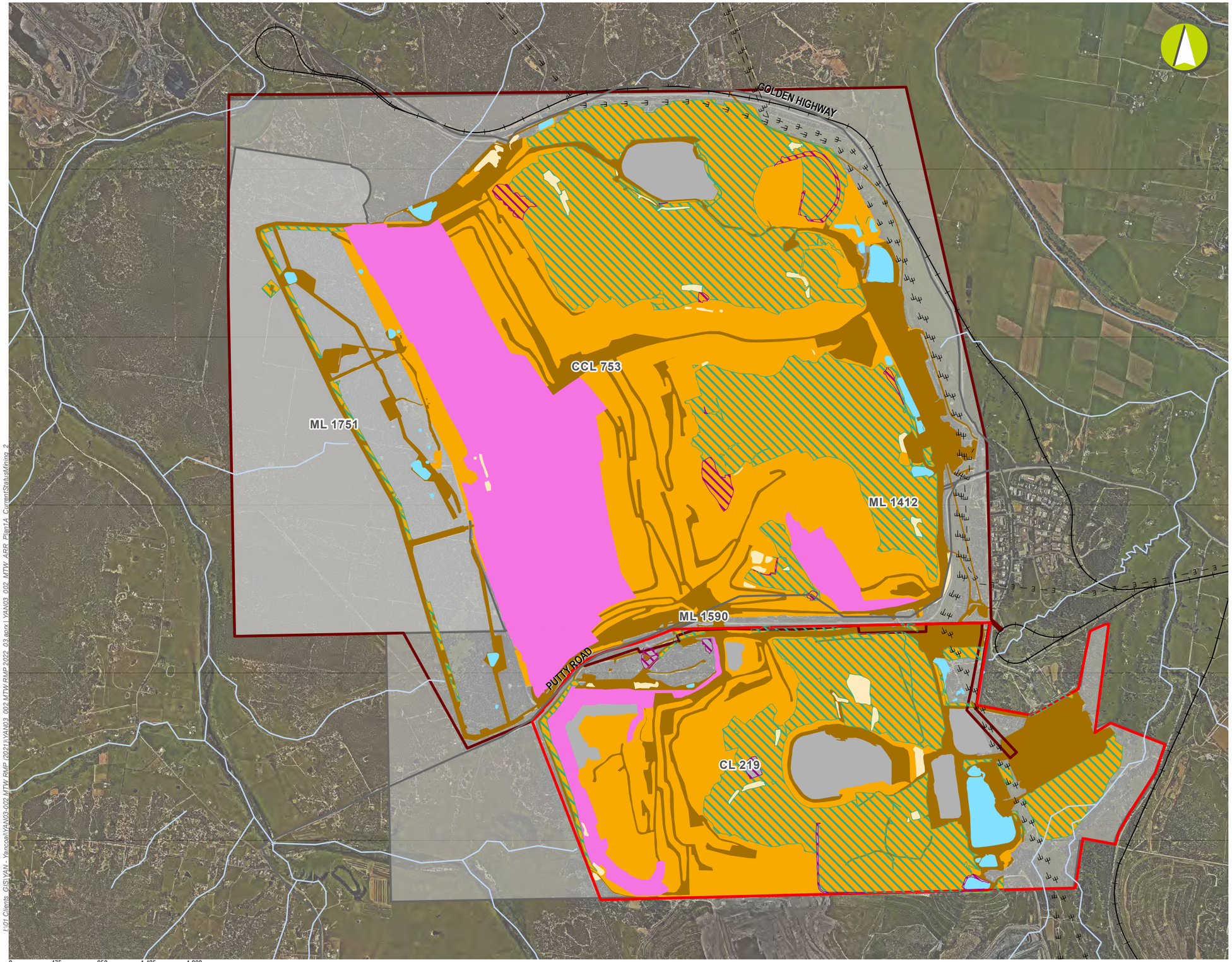
Source: Buildings, roads, waterbodies, Project Approval and private land holders from Yancoal (2022). Current Authorisations from DPIE (2022). Catchment areas from ArcGIS Online (2022). Roads, watercourses, electricity transmission lines, Local Government Areas and Land Owner information from LPI (2022). World Hillshade from ArcGIS Online (2022).

Mount Thorley Warkworth Complex

Rehabilitation Management Plan
Land Use

FIGURE 1B

Mine name	Mount Thorley Warkworth Complex
Plan name	Mount Thorley Warkworth RMP
Year of anticipated relinquishment	To be determined closer to closure
Data theme submission ID No.	N/A
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/07/2022



LEGEND

- Railway
- Major Road
- Electricity Transmission Line
- Waterways

Project Approval Number

- SSD 6464 - Warkworth
- SSD 6465 - Mount Thorley

Current Authorisations

- Relevant Minerals Title

Mining Domain Type

- Domain 1: Infrastructure Area
- Domain 2: Tailings Storage Facility
- Domain 3: Water Management Area
- Domain 4: Overburden Emplacement Area
- Domain 5: Active Mining Area (Open cut void)
- Domain 8a: Other - Topsoil

Rehabilitation Phase

- Growth Media Development
- Ecosystem and Land Use Establishment

0 475 950 1,425 1,900 m

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MT THORLEY WARKWORTH

Source: Project Approval Boundary, rehabilitation, disturbance, watercourses and Current Authorisations from Yancoal (2022). Aerial imagery from Yancoal (2022).

Mount Thorley Warkworth Complex

Current Status Mining and Rehabilitation PLAN 1A

Mine name	Mount Thorley Warkworth Complex
Plan name	Mount Thorley Warkworth ARR
Year of anticipated relinquishment	To be determined closer to closure
Data theme submission ID No.	2325 / 2399
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/07/2022

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2 FINAL LAND USE

2.1 Regulatory Requirements for Rehabilitation

Table 7 outlines all regulatory requirements for rehabilitation at MTW including from development consents, mining leases, relevant legislation, and relevant policies.

TABLE 7: REGULATORY REQUIREMENTS RELATING TO REHABILITATION

<table>
<tr><th>Condition</th><th>Requirement</th><th>Area</th><th>Timing</th><th>Section Addressed</th></tr>
<tr><td colspan="5">SSD-6464 Warkworth</td></tr>
<tr><td>Schedule 3 Condition 29</td><td>Within 10 years of the completion of mining operations under this consent, the Applicant shall retire ecosystem credits of a number and class specified in Table 11 to the satisfaction of OEH.
Table 11: Ecosystem Credit Requirements.
<table><tr><th>Vegetation Community</th><th>Code (BVT)</th><th>Biometric Vegetation Type</th><th>Area (ha)</th><th>Endangered Ecological Community (EEC)</th><th>[a]Credits Required</th></tr><tr><td>Central Hunter Grey Box - Ironbark Woodland</td><td>HU817</td><td>Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter</td><td>2,100</td><td>Central Hunter Grey Box-Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions EEC</td><td>11,204</td></tr></table>Note:
• [a] Or as otherwise determined by OEH as part of its detailed consideration of credits retirement.

The retirement of these credits must be carried out in accordance with the NSW Biodiversity Offsets Policy for Major Projects and can be achieved by:
(a) retiring credits generated by mine rehabilitation;
(b) acquiring or retiring credits under the Biobanking Scheme in the TSC Act;
(c) making payments into an offset fund that has been developed by the NSW Government; or
(d) providing supplementary measures.</td><td>Rehabilitation Offsets</td><td>Within 10 years of the completion of mining operations.</td><td>Section 6.2.6</td></tr>
<tr><td>Schedule 4 Condition 56</td><td>The Applicant shall rehabilitate the site to the satisfaction of the DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS (and depicted conceptually in the figure in Appendix 6) and comply with the objectives in Table 13.
Table 13: Rehabilitation objectives
<table><tr><th>Feature</th><th>Objective</th></tr><tr><td>Mine site (as a whole)</td><td>• Safe, stable and non-polluting
• Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately management and used effectively as resources in the rehabilitation of the site
• Final landforms to:
○ Sustain the intended land use for the post-mining domains
○ Be designed to minimise the visual impacts of the development</td></tr></table></td><td>Rehabilitation Areas</td><td>On relinquishment.</td><td>Section 4 and Appendix D.</td></tr>
</table>

Condition	Requirement	Area	Timing	Section Addressed
	<table><tr><td></td><td>○ Be in keeping with the natural terrain features of the area ○ Be integrated with the rehabilitated landforms of surrounding mines ○ Backfill the gap between the two main emplacements in accordance with the dozer (and dragline) option shown on the applicable figure in Appendix 6 ○ Incorporate micro-relief; and ○ Incorporate drainage lines consistent with topography and natural drainage where reasonable and feasible</td></tr><tr><td>Water quality</td><td>• Water retained on site is fit for the intended land use(s) for the post-mining domains • Water discharge from site is consistent with the baseline ecological, hydrological and geomorphic conditions of the creeks prior to mining disturbance • Water management is consistent with the applicable regional catchment strategy</td></tr><tr><td>Final voids</td><td>• Designed as long term groundwater sinks and to maximise groundwater flows across back-filled pits to the final void • Minimise: ○ The size and depth of final voids ○ The drainage catchment of final voids ○ Any highwall instability risk • Risk of flood interaction for all flood events up to and including the 1% AEP</td></tr><tr><td>Biodiversity</td><td>• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprising local plant species • Vegetation to be established, with the restoration of at least 1,617 hectares of Central Hunter Grey Box – Ironbark Woodland EEC • Size, location and species of native tree lots and corridors are established to sustain biodiversity habitats • Species are selected that re-establishes and complements regional and local biodiversity</td></tr><tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless the DRE agrees otherwise</td></tr><tr><td>Agriculture</td><td>Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within 5 years of land establishment (first planting vegetation)</td></tr><tr><td>Community</td><td>• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure</td></tr></table>			
Schedule 3 Condition 57	The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated. *Note: it is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the development.*	Rehabilitation Areas	In progress.	Section 6.2.3

Condition	Requirement	Area	Timing	Section Addressed
Schedule 4 Condition 70	The Applicant shall prepare a Rehabilitation Management Plan for the development to the satisfaction of the DRE, and carry out the development in accordance with this plan. The plan must: (a) be prepared in consultation with the Department, NOW, OEH, Council and the CCC; (b) be prepared in accordance with any relevant DRE guideline, including any existing NSW government policy regarding final voids; (c) be submitted to the DRE for approval prior to carrying out any development under this consent; (d) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); (e) describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including timeframes for achieving specified rehabilitation objectives; (f) includes a mine closure strategy, that details measures to minimise the long-term impacts associated with mine closure, including final landform and final voids, final land use and socioeconomic issues; (g) include interim rehabilitation where necessary to minimise the area exposed for dust generation; (h) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and (i) build to the maximum extent practicable on the other management plans required under this consent.	Rehabilitation Areas	Completed	(a) Section 4.2 (b) Completed in accordance with the Guidelines and Form and Way documents. (c) Section 4.2 (d) Section 4 (e) Section 7 (f) Section 6 (g) Section 6.2.1.10 (h) Section 8 (i) Throughout this RMP.
SSD-6465 Mount Thorley				
Schedule 3 Condition 34	The Applicant shall rehabilitate the site to the satisfaction of the DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS (and depicted conceptually in the figure in Appendix 5), and comply with the objectives in Table 9. Table 9: Rehabilitation objectives ***Feature*** / ***Objective*** Mine site (as a whole): • Safe, stable and non-polluting • Materials (including topsoils, substrates and seeds of the disturbed areas) are recovered, appropriately managed and used effectively as resources in the rehabilitation of the site • Final landforms to:	Rehabilitation Areas	On relinquishment	Section 6

Condition	Requirement	Area	Timing	Section Addressed
	<table><tr><td></td><td>○ Sustain the intended land use for the post-mining domains ○ Be designed to minimise the visual impacts of the development ○ Be in keeping with the natural terrain features of the area ○ Be integrated with the rehabilitated landforms of surrounding mines ○ Incorporate micro-relief; and ○ Incorporate drainage lines consistent with topography and natural drainage where reasonable and feasible</td></tr><tr><td>Water quality</td><td>• Water retained on site is fit for the intended land use(s) for the post-mining domains • Water discharge from site is consistent with the baseline ecological, hydrological and geomorphic conditions of the creeks prior to mining disturbance • Water management is consistent with the applicable regional catchment strategy</td></tr><tr><td>Biodiversity</td><td>• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprising local plant species • Vegetation to be established with at least 483 ha of Central Hunter Grey Box – Ironbark Woodland EEC • Size, location and species of native tree lots and corridors are established to sustain biodiversity habitats • Species are selected that re-establishes and complements regional and local biodiversity</td></tr><tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless the DRE agrees otherwise</td></tr><tr><td>Agriculture</td><td>• Land capability classification for the relevant nominated agricultural pursuit for each domain is established and self-sustaining within 5 years of land establishment (first planting vegetation)</td></tr><tr><td>Community</td><td>• Ensure public safety • Minimise the adverse socio-economic effects associated with mine closure</td></tr></table>			
Schedule 3 Condition 35	The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet 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.*	Rehabilitation Areas	In progress.	Section 6.2.1.10 and Section 6.2.3.

Condition	Requirement	Area	Timing	Section Addressed
Schedule 3 Condition 36	The applicant shall prepare and implement a Rehabilitation Management Plan for the development to the satisfaction of the DRE, and carry out the development in accordance with this plan. The plan must: a) Be submitted to the DRE for approval prior to carrying out any development under this consent; b) be prepared in consultation with the Department, NOW, OEH, Council and the CCC: c) Be prepared in accordance with any relevant DRE guideline, including any existing NSW government policy regarding voids; d) describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy; e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary); f) Describe the measures that would be implemented to ensure compliance with the relevant conditions of this consent, and address all aspects of rehabilitation including timeframes for achieving specified rehabilitation objectives; g) include a mine closure strategy, that details measures to minimise the long term impacts associated with mine closure, including final landform, final land use and socio-economic issues; h) Include interim rehabilitation where necessary to minimise the area exposed for dust generation; i) Include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and j) build to the maximum extent practicable on the other management plans required under this consent.	Rehabilitation Areas	Complete	a) Section 4.2 b) Section 4.2 c) Completed in accordance with the Guidelines and Form and Way documents. d) Section 6.2.6 e) Section 4 f) Section 7 g) Section 6 h) Section 6.2.1.10 i) Section 8 j) Throughout this RMP.
EPBC 2009/5081 – Warkworth Mine Extension				
Condition 11	The person taking the action must, within 12 months of the commencement of Construction of Phase 1, and within 12 months of the Commencement of Construction of Phase 2, submit to the Minister for approval a Mine Site Rehabilitation Plan (MSRP) for the progressive rehabilitation and revegetation of no less than 32ha woodland of mined areas for Phase 1	Rehabilitation Areas	Complete	a) Section 4 b) Section 5

Condition	Requirement	Area	Timing	Section Addressed
	and 2,303ha of woodland habitat on mined areas for Phase 2. The MSRP must include, at a minimum the following information: a. the desired outcomes/objectives of implementing the MSRP b. details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation c. a process to progressively report to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management d. a description of the potential risks to successful management and rehabilitation on the project site, and a description of the contingency measures that would be implemented to mitigate these risks e. details of parties responsible for reviewing and implementing the plan f. details of long term management and protection of the mine site The approved MSRP must be implemented.			c) Annual Rehabilitation Report and Forward Program d) Section 3 e) Section 11 f) Section 6.2
CL 219, CCL 753, and ML1547				
Condition 21	If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister any lands within the subject area which may have been disturbed by the lease holder.	Coal Lease area	On relinquishment	Section 6
Condition 22	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this authority or any renewal thereof, the lease holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Coal Lease area	2035	Section 6.2.2.2
Condition 23	If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject area which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the lease holder.	Coal Lease area	On relinquishment	Section 6

Condition	Requirement	Area	Timing	Section Addressed
ML1412				
Condition 22	If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister any lands within the subject area which may have been disturbed by the lease holder.	Coal Lease area	On relinquishment	Section 6
Condition 23	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this authority or any renewal thereof, the lease holder shall remove from such surface such buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister and such surface shall be rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister.	Coal Lease area	2035	Section 6.2.2.2
Condition 24	If so directed by the Minister the lease holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any lands within the subject area which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the lease holder.	Coal Lease area	On relinquishment	Section 6
ML1590				
Condition 13	Land disturbed must be rehabilitated to a stable and permanent form suitable for a subsequent land use acceptable to the Director-General and in accordance with the Mining Operations Plan so that: • there is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. • The state of the land is compatible with the surrounding land and land use requirements. • The landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land. • In cases where revegetation is required and native vegetation has been removed or damaged, the original species must be re-established with close reference to the flora survey included in the Mining Operations Plan. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density. • The land does not pose a threat to public safety.	Coal Lease area	On relinquishment	Section 4

Condition	Requirement	Area	Timing	Section Addressed
ML1751 and ML1752				
Condition 2	• Any disturbance resulting from the activities carried out under this mining lease must be rehabilitated to the satisfaction of the Minister.	Coal Lease area	On relinquishment	Section 6

2.2 Final Land Use Options Assessment

A Final Land Use Options Assessment was not applicable to the development of this RMP because the final land use for MTW has been determined through the existing project approval process, including the development consent and EIS, and the MOP.

2.3 Final Land Use Statement

In accordance with the biodiversity offset strategy outlined in the Warkworth Continuation 2014 EIS, the objective of rehabilitation during the closure of MTW is to integrate the rehabilitation of mining disturbed areas within the surrounding landscape, with multiple outcomes for sustainable agricultural production, conservation and biodiversity. This includes maximising the biodiversity and connectivity within landscape, through improved management of existing remnants and the establishment of a network of vegetation corridors.

The objectives of the defined management practices and re-establishment programs is to increase the quality of the vegetation, increase the long-term fauna habitat and improve ecosystem function and resilience of up to 2,419 ha of land in a landscape presently being utilised for agricultural purposes or without conservation management initiatives. The Warkworth Mine Biodiversity Management Plan details the implementation of the Biodiversity Offset Strategy and biodiversity management actions on MTW's operational land and Biodiversity Areas.

The objectives outlined in **Section 4** describe the framework for the final land uses of grazing and native woodland.

The final land use is represented spatially in the Final Landform and Rehabilitation Plan (refer to **Plan 1** and **Plan 2**).

As part of the Warkworth Continuation, MTW committed to establishing Biodiversity Areas to offset the impact on Matters of National Environmental Significance (MNES) by protecting and managing at least 4,212 ha of habitat for the Regent Honeyeater (*Anthochaera phyrygia)* and Swift Parrot (*Lathamus discolor*).

2.4 Final Land Use and Mining Domains

Domains are used to divide a mine site into small, more manageable areas. They are usually determined based on the consideration of specific requirements of the mining location and local environment.

The NSW Resources Regulator has provided a list of Final Land Use and Mining domain names and codes that must be adhered to when preparing this document. **Table 8** details the specific domain titles and the relevant codes.

TABLE 8: SUMMARY OF FINAL LAND USE AND MINING DOMAINS

FINAL LAND USE DOMAIN	CODE	MINING DOMAIN	CODE
Native Ecosystem	**A**	**Infrastructure Area**	**1**
Agricultural – Grazing	**B**	**Tailings Storage Facility**	**2**
Agricultural – Cropping	C	**Water Management Area**	**3**
Rehabilitation Biodiversity Offset Area	**D**	**Overburden Emplacement Area**	**4**
Industrial	E	**Active Mining Area (Open cut void)**	**5**
Water Management Areas	F	Underground Mining Area (SMP)	6
Water Storage (Excluding Final Void)	G	Beneficiation Facility	7
Heritage Area	H	Other	8
Infrastructure	**I**		
Final Void	**J**		
Other	K		

The domains highlighted grey in **Table 8** are not applicable to MTW but have been included in this table for context.

2.4.1 Final Land Use Domains

Table 9 describes the final land use domains within the mining leases held by MTW. Refer to **Plan 1**, Final Landform Features, for an illustration of the final land use domains. The RMP Form and Way Document outlines a series of locked in domains for mine sites. For MTW much of the site will be rehabilitated to a final land use of Domain A – Native Ecosystem, Domain B – Agriculture Grazing, and Domain D – Rehabilitation Biodiversity Offset Area.

TABLE 9: FINAL LAND USE DOMAINS

Code	RMP Final Land Use Domain	MOP Final Land Use Domain Reference (Now Superseded)	RMP Final Land Use Domain Description
A	Native Ecosystem	D - Rehabilitation Area – Woodland Other	This domain contains woodland trees and shrubs within pasture areas, but not necessarily conforming to any particular vegetation community. This is classified as 'Non-EEC rehabilitation' or 'Woodland'.
B	Agriculture Grazing	C – Rehabilitation Area - Grassland	Pastures with a native grass component on the residual disturbed mining areas.
D	Rehabilitation Biodiversity Offset Area	E - Rehabilitation Area – Woodland EEC	The Form and Way document states this domain includes *remnant vegetation or rehabilitation areas proposed to be subject to a Biodiversity offset application under the Biodiversity Conservation Act 2016.* Within 10 years of the completion of mining operations, Clause 29 of the NSW Planning Approval SSD-6464 for Warkworth Continuation Project requires the retirement of ecosystem credits from the 2,100ha of rehabilitation that has been returned to Central Hunter Grey Box – Ironbark Woodland EEC. The Woodland – EEC rehabilitation areas will therefore be legally protected under a Biodiversity Stewardship Agreement agreed with OEH and entered into with the Biodiversity Conservation Trust. This domain only includes areas of EEC rehabilitation that will be protected under Biodiversity Stewardship Agreement. It should be noted that MTW has other biodiversity offset areas, located both locally and regionally. The management of these offset areas is covered under the Biodiversity Management Plan.
I	Infrastructure	N/A	Includes built infrastructure proposed to be retained for future use.
J	Final Void	A - Final Void	A Final Void is the remnant open pit left at mine closure. A single final void in North and West pits is planned to remain in place at completion of mining.

The majority of existing rehabilitation at site has been areas of shaped overburden which have been rehabilitated as per Final Land Use Domain A - Native Ecosystem.

2.4.2 Mining Domains

Table 10 describe the mining domains within MTW. **Figure 3** shows the mining domains spatially.

TABLE 10: MINING DOMAINS

Code	RMP Mining Domains	MOP Mining Domain Reference (Now Superseded)	RMP Mining Domain Description
1	Infrastructure Area	3 – Infrastructure Area	Existing and proposed infrastructure at MTW are detailed in the RMP. MTW currently contains two sets of surface facilities, CPPs and

Code	RMP Mining Domains	MOP Mining Domain Reference (Now Superseded)	RMP Mining Domain Description
			coal stockpile areas, located in the north and south areas, respectively.
2	Tailings Storage Facility	4 – Tailings Storage Facility	TSFs are dams or voids to which fine coal rejects from the CPPs are disposed of for settlement and decantation. There are currently seven TSFs within the MTW site, with the Loders Pit TSF operating as the primary storage for both Mount Thorley and Warkworth CHPP's. The CRTSF, AGSTSF and Charlton TSF all have limited capacity remaining and are planned to receive tailings at a controlled rate to improve the tailings strength for subsequent capping. The other three TSF's are inactive, with TD1 capped; and capping activities underway at TD2 and Interim TSF. Loders Pit TSF will have sufficient tailings capacity for the remaining mine life.
3	Water Management Area	2 – Water Management Area	Includes components of the network of dams that compose the MTW water management system that is in place to control the movement of water around the site. These include sedimentation, diversion, mine water and water supply dams but exclude TSF's.
4	Overburden Emplacement Area	5 – Overburden Emplacement	Overburden is produced and disposed of within mined out sections of the open cut to create a final landform or designated out of pit emplacement area. Overburden material may be transferred from north to south areas to assist in the creation of the final landform. The placement of overburden occurs with the mine plans for the various MTW pits. There are sections of overburden that have been rehabilitated, with these shown in the Annual Rehabilitation Report and Forward Program in a phase of rehabilitation.
5	Active Mining Area (Open cut void)	1 – Final Void. (this has been reclassified to cover areas of active mining).	This is the current active mining area.

3 REHABILITATION RISK ASSESSMENT

A Rehabilitation Risk Assessment was completed on 30 May 2022. The objective of the risk assessment was to identify and assess the rehabilitation and closure risks for the site, in accordance with:

- Rehabilitation Risk Assessment Guideline (NSW Resources Regulator, 2021); and
- AS/NZS ISO 31000:2018 Risk management Guidelines; and list risk mitigation actions to reduce the risks.

The following personnel were present at the Rehabilitation Risk Assessment:

- Gary Mulhearn (Environment & Community Manager, MTW Yancoal);
- Bill Baxter (Environmental Specialist - Rehabilitation, MTW Yancoal)
- Andrew Lau (Mine Closure Manager, Yancoal)
- Chris Collier (Technical Services Manager, MTW Yancoal)
- Robert McGrath (Medium Term Planning Superintendent, MTW Yancoal);
- Brendan Behringer (Superintendent Projects, MTW Yancoal)
- Scott Bradly (Mining Engineer - Medium Term Planning, MTW Yancoal)
- Andrew Hutton (Risk Assessment Facilitator and Principal Environmental Consultant, IEMA);
- Chris Jones (Rehabilitation Specialist and Principal Environmental Consultant, IEMA); and
- Olivia O'Shannessy (Scribe and Environmental Consultant, IEMA).

A summary of the risks ranked as high in the RMP Rehabilitation Risk Assessment and their associated Treatment Plans are outlined in **Table 11** below.

Refer to **Appendix B** for the 2022 RMP Rehabilitation Risk Assessment.

TABLE 11: RMP RISK ASSESSMENT HIGH RISKS AND ASSOCIATED TREATMENT PLANS

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
Bowtie 1: Life of Mine Planning	Uncertainty around the agreed [or approved] post mining land form and/or land use	Consent outlines our obligations for post mining land use	
		Mine Closure Completion Criteria	TP 3 - Mine Closure Success Criteria - Review the current MOP success criteria to update and align with the requirements of the IMCP. This review should also include a review against the Yancoal Mine Closure Standard and the RMP Form & Way documents.
		Mine Planning and controls in field	
		ITP [Quality Assurance] processes in place	TP 4 - Inspection Test Plans (ITPs) - Review the existing ITPs and develop any additional ITPs that might be required to verify the implementation of the controls to be put in place to achieve successful rehabilitation and closure of the site. This should consider all phases of the rehabilitation process.
	Uncertainty around what our closure criteria are for the site	Mine Closure Completion Criteria	Refer to Treatment Plan 3.
	LTA corporate standards around closure expectations	Mine Closure Plan prepared in accordance with Mine Closure Standard	TP 2 - Internal Mine Closure Plan - Finalise and implement the outcomes of the internal mine closure plan for the site
		Obligations register prepared as part of the closure plan	TP 6 - Prepare a mine closure obligations register - Prepare a mine closure Obligations Register that also considers any existing agreements that are in place.
		Technical Support Dept [Corporate]	
	Poor Record and Document Management systems which supports closure planning	Mine Closure Record retention process / filing system	TP 7 - Record Keeping - Develop a record keeping system for all rehab phases that includes bringing together all ITPs, documents, spatial data and any other relevant information relating to closure. This register needs to be accessible and linked to some form of document control and backup.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
	LTA understanding around the potential Residual Risk elements that present a long term liability to the business	Mine Closure Risk Assessment to identify [maintain a risk register]	
		Environmental Impact Assessment with monitoring feedback	

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Engineering Design & Monitoring	
	Insufficient budget available to execute mine closure plan	Mine Closure Plan that is costed as part of the Mine Closure Standard	
		Corporate commitment to meeting regulatory obligations and commitments.	
		Budgetary allocation sufficient to cover regulatory obligations and commitments.	
Bowtie 2: Decommissioning	Failure to identify and rehabilitate exploration, service boreholes and shafts	Register of bores and rehabilitation status	TP 9 - Rehabilitation certification - Undertake a review of the exiting rehabilitation areas to identify the areas that could be taken through the ESF2 process with the RR. This is to include a review of the existing exploration sites and rehab. Sign off means that they will not be required to meet any future expectations as they [may] change.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
	Retained reconstructed creek diversions	Concept design that was originally used	TP 16 - Review design (Dr Creek) - Undertake a review to determine whether there is an approved design and then review the diversion to ensure that it was built as per the design. Commence stability monitoring and inspection of the diversion to demonstrate that it is long term stable, or where required undertake any required remedial works.
		Surface water monitoring and ad hoc inspections	
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
	LTA planning for the waste streams that will result from the Decom and demo activities (increased costs, impact on environment)	On site disposal options are included in the base case [inert waste streams only]	TP 17 - On site disposal of waste - Undertake a review the onsite disposal options following the preparation of a waste disposal strategy. The identification of waste streams and volumes would be part of the decomm plan. Where on site disposal is considered a viable alternative there would need to be a review of an engineering design and discussion with the EPA to ensure licencing of the option

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
	Areas of land contamination are not identified resulting on unplanned costs or off site impacts	Contamination register [internal]	TP 18 - Preliminary Site Investigation (PSI) - Undertake a PSI across the entire site to start to develop a register of the high-risk areas relating to land quality and contamination issues. A Detailed site investigation (DSI) would be undertaken closer to closure of the site.
		Currently and identified contamination is taken to the bioremediation area for treatment	
		Site standard in p[lace for installing in pit refueling which includes sampling where there are any spills	
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
Bowtie 3: Rehabilitation Materials	LTA understanding of the PAF/NAF materials balance to achieve suitable rehabilitation outcomes	Rejects are co-disposed and keep away from surface of the dump	
		Tailings Dams are generally built inside overburden [ramps, etc] which has a an acid neutralization	
		Historical geochem information on the main overburden materials	
		Mineral waste and acid rock drainage management plan	TP 19 - Update the Mineral waste and acid rock drainage plan - The MWARD plan was previously prepared under Rio Tinto management. It needs to be reviewed and updated against the Yancoal Closure Standard requirements and any additional knowledge there is around mineral waste characterisation.
		Spon Comm management Plan [PHMP]	
		Mine design guidelines	TP 26 - Mine design guidelines - Review the mine design guidelines to ensure that rehabilitation principles are adequately included and to make sure that the salvage and stockpile of all rehab relevant materials are included in the checklist.
		Training for and operators	TP 20 - Review the Training material - Undertake a review the training for operators and supervisors around the key rehabilitation principles and requirements, particularly around the salvage and stockpile of relevant rehabilitation materials.
	LTA materials balance for required clay or suitable capping material (tailings dams, diversion, dams, etc)	Rehandle stockpile [volume and location identified for final TSF capping]	TP 24 - LoM capping material balance - Undertake a LOM materials balance for the required capping material (ie. clay for TSF, etc). Once a volume is known identify where in the mining sequence the material is located and schedule the preferential stripping and stockpiling of the material rather than burial in the dumps.

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Suitable material can be won from existing dumps	TP 28 - Identify suitable capping material - Prepare a suitable specification for the parameters required for capping material and using that spec. Identify suitable capping material that exists in dumps and stockpiles that can be used where suitable volumes of clay material is not known during the mining process.
	LTA understanding of the growth media chemical properties results in failure to achieve preferred rehab outcomes	Soil testing prior to adding ameliorants	
		Mine Planning use surveys ahead of mining [stripping depth and plan]	TP 22 - Topsoil [growth media] stripping - Undertake a review of the required topsoil for rehabilitation based on the land use. the current stripping procedures are based on an agricultural land outcome where the key requirements are native veg. Ensure there is appropriate topsoil available for all pasture area rehabilitation where it is more important.
	Required seed stocks are not available or are required to be stored for a long time [particularly with the EEC]	Seed supply contractor in place	
		Scheduling of the see requirements to ensure forward supplies are required	
		Limited seed collection on site ahead of clearing	
		Successful rehab will be a viable seed source	TP 29 - Rehab as a seed source - Identify areas on the existing rehabilitation that are suitable as a source of seed for rehabilitation. Establish a program of seed collection and storage as the seasons and conditions permit.
	Cut and fill balance for the flyover & Abbey Green, etc may cut back into the dump and interact with carb material (ie spon comm)	LoM Cut and fill to achieve the approved landform	TP 25 - Cut and fill balance [Flyover & Abbey Green] - Undertake a review the LoM cut and fill balance for the site (for rehabilitation obligations) so that the requirements can be meet. The key areas are the flyover and Abbey Green areas. Ensure that any cut required does not expose the buried carb material and that a suitable depth of cover is retained.
	Poor Record and Document Management systems which supports closure planning	Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
Bowtie 4: Final Landform	The approved Final Void [location and geometry are not able to be achieved and relinquished	Mine planning is managing the landform to meet EIS expectations	
		RMP includes a proposed final landform	
		Landform Evolution Modelling	TP 30 - Landform Evolution Modelling (LEM) - Undertake a review the landforms on the site that may benefit from LEM in order to demonstrate that they meet the requirement of long term stable. As part of the review include consideration of what methods can be adopted to meet the requirements of LEM.

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Mine Design Guidelines	Refer to Treatment Plan 26.
	LTA design of final proposed highwalls [and low walls] for the final voids	Mine planning is managing the landform to meet EIS expectations	
		Final highwall design includes stability review [LoM]	TP 31 - Highwall/Lowwall stability Assessment - Undertake preliminary highwall and low wall design to understand what the impact might be on the final pit design. This review should include an assessment of the erosion in the weathered zone to ensure that any final landforms is fully contained within the project approval boundary. The impact of water on-flow and the separation of clean and mine impact water should also be a key consideration. Public Safety risks and appropriate mitigation should also be included (eg. catch bench, berm, bund, fence, etc) - there will be the need to ensure sufficient space for these features to be included. Any appropriate FoS for design is to be determined to be able to demonstrate the long-term stability of the features.
		Lowwalls have been designed at 1:4 (25%) - LEM may be required to demonstrate long term stability	
	LTA understanding of the final void(s) water quality and whether the voids will fill and spill.	Groundwater recover modelling has been completed for the EIS [voids will not spill]	
		Residual void water quality assessment	TP 32 - Residual void study - Undertake modelling to understand what the likely final water quality will be in the final voids. This work should also confirm the current assumption that the voids will NOT fill and spill.
	LTA consideration of the geophysical and geochemical properties of the landform materials	Historical geochem information on the main overburden materials	
		Spon Comm management Plan [PHMP]	
		Mineral waste and acid rock drainage management plan	Refer to Treatment Plan 19.
		Mine Design Guidelines	Refer to Treatment Plan 26.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	Geotechnical stability of the final landform cannot be achieved	Geofluv design principle & methodology has been adopted	
		Design and modelling including inspections by a competent geotechnical engineer	TP 43 - Inspections - Review and implement a program of inspections and walkovers by a geotechnical engineer to identify ant areas of the landform that may be showing a possibility of failure. Implement remedial actions in accordance with the RMP TARP.
		Review by SME where there are any changes to the landform [Golders and internal surveyors run checks to check any new risks]	TP 38 - Finalise the topofactor methodology - Including survey
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	Inability to achieve a long term stable design for the reinstated creek diversion [Dr Creek]	Concept design that was originally used	Refer to Treatment Plan 16.
		Surface water monitoring and ad hoc inspections	
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	LTA QA/QC process in place or poor recordkeeping to demonstrate that the constructed landforms meet the approved criteria	ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	Co-disposal of rejects not placed appropriately in the landform - historical issues where cut required - risk is where the landform changes	Develop a mitigation strategy for areas where carb material is identified so that the appropriate depth of cover is maintained [min 5m]	TP 37 - Carbonaceous material burial - Prepare a SOP which will include the requirements (including cover depths, methods, etc) for the burial of any carb material that might be unearthed during the cut and fill of landforms around the site.

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		3D surface is used to manage where carb material is placed - scheduling and tracking	
		Records of where rejects have been placed in dumps [but doesn't extend to interburdens]	TP 39 - Pre 2019 mining data [carb material] - Since 2019 there have been good records kept on the location of truck loads which will indicate where carb material has been placed. Review this data to ensure that the cover meets the minimum 2m requirement. There may also be a project to review the data that was collected pre 2019 and to use that to determine a risk profile on where the cover may not meet the minimum 2m. Additional investigation (ie drilling, backhoe) relating to these identified areas may be required. Where possible generate records that can be included in the mine closure records to verify that the controls are in place.
		Heat sensor on the drone (heat map showing heating)	TP 36 - Drone surveys (heat maps) - Review the use of drones to undertake regular hot spot surveys across the landforms and tailings dams. Where possible, use the drone to start to understand what is happening in the older areas where the risks are higher and look to implement actions in areas where there are issues identified.
		Training for and operators	Refer to Treatment Plan 20.
	Poor quality runoff from rehabilitated areas or dumps	Rehabilitation Monitoring using approved methodology [BAM methodology]	
		HRSTS - review currently being undertaken with the EPA to review this expectation.	TP 44 - HRSTS consultation (runoff from rehab areas) - Undertake consultation with the EPA to better understand what the trigger is likely to be to be able to allow water to flow into the environment from successful rehabilitation. It is noted that the NSW Minerals Council are currently engaged in discussion with the EPA on this issue.
		Surface water monitoring and ad hoc inspections	Refer to Treatment Plan 16 and Treatment Plan 52.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	Spontaneous combustion occurs in the landforms (LoX coal and rejects)	Historical geochem information on the main overburden materials	

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Mineral waste and acid rock drainage management plan	Refer to Treatment Plan 19.
		Spon com PHMP describes the mitigation for spon comm events [prevention and mitigation]	TP 41 - Spon Com Management - review the Spon Com PHMP to ensure that it adequately addresses spon com in the backfill. Update the RMP and the associated TARPS to ensure that all documents are consistent in their approach to the management and mitigation of spon com.
		Heat sensor on the drone (heat map showing heating)	Refer to Treatment Plan 36.
		Mine Design Guidelines	Refer to Treatment Plan 26.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
Bowtie 5: Ecosystem Sustainability	LTA management of weeds results in competition from weed species and failure to achieve the preferred rehab outcome [particularly native veg] - compared back to BBAM benchmark sites	Planning tries to avoid winter planting and temporary cover crops are utilised	
		Prioritising the better-quality soil on the native veg rehab areas	
		Weed Control [broad acre - pre-sowing spray] - selective weed controls	TP 48 - Weed contractor crews - Review the existing crews to see if there are additional resource that can be brought in when spraying is required. Currently three contractors to do weed control but not currently enough resources. The work can be seasonal and difficult to manage resources Consider the increased use of technology (eg., Dendra weed mapping) - to develop heat maps which can prioritise the areas that so that the greatest impact is being achieved with the resources available.
		Use of a weed wiper (roller set on a height to address exotic grasses)	
		Records (tablets) used for recording the weed control	

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
		Rehabilitation monitoring	TP 49 - Rehab monitoring - Review the more established areas of rehab to determine whether as the communities develop the weeds may be managed by shade and competition. Include this aspect in the rehab monitoring to determine whether this is a viable management solution for weeds in the rehab areas
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	LTA information collected to be able to demonstrate that the rehabilitation is resilient to bush fire, drought or grazing	Rehabilitation monitoring	
		ACARP Research and some trials are proposed	TP 50 - Fire studies - Undertake a review the learnings from other sites [using ACARP or Yancoal network] with a particular focus on woodland communities. Consider the use of trials at the site in rehabilitation that is advanced; undertake monitoring to demonstrate resilience to bushfire.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
	LTA information collected to demonstrate that water from rehab is appropriate for discharge (our of the mine water system)	Surface water monitoring	
		Inspections and rehab walkovers	
		Rehab monitoring sites being established to assess quality of water discharging from rehab areas	TP 52 - Water Monitoring Review - Undertake a review of the existing water quality monitoring for the site where water is collected from mature rehab areas. Use the data to start to present an argument for removing any water management structures and allowing this runoff from rehab areas to discharge directly to the environment.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.
	LTA record keeping [historically or in the future] to demonstrate that the preferred rehab objectives have been met.	Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.

Bowtie Risk Assessment	High Risk to Rehabilitation	Control	RMP Treatment Plans
	Inability to demonstrate that the completion criteria have been met	Agreed completion criteria in MOP to be brought into the RMP	TP 53 - BAM rather than BBAM - Review the completion criteria so it lines up with the new BAM method
		RMP contains TARPS	TP 51 - Link TARPs to rehab Monitoring - Review the existing TARPS against the rehabilitation monitoring being undertaken at the site and ensure that they are linked. Where they are not review either the TARP or the monitoring parameters
		Rehabilitation monitoring	Refer to Treatment Plan 49.
		Mine Closure Record retention process / filing system	Refer to Treatment Plan 7.
		ITP [Quality Assurance] processes in place	Refer to Treatment Plan 4.

4 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

4.1 Rehabilitation Objectives and Rehabilitation Completion Criteria

The overall rehabilitation objective for MTW is the development of sustainable ecosystems across the site and in connection with the surrounding landscape. **Appendix D** contains the specific rehabilitation objectives (ROBJs) and rehabilitation completion criteria (RCC) for each final land use domain and mining domain for MTW. The MTW rehabilitation objectives and rehabilitation completion criteria are consistent with the proposed final land use discussed in **Section 2.3** as well as the requirements approved under the statutory approvals.

The RMP Form and Way Document outlines a series of locked in domains for mine sites. The RMP Form and Way Document does not require the objectives to be summarised in a particular way (for example, was previously sorted by rehabilitation phase), however **Appendix D** is structured to be similar to the example ROBJs in the Resources Regulator's Rehabilitation Objectives and Rehabilitation Completion Criteria Guideline (2023, Version 3).

MTW holds other biodiversity offset areas which are described and managed under the relevant Biodiversity Management Plans. The Biodiversity Management Plans include separate criteria for those offset areas not included in this RMP.

4.2 Rehabilitation Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

A Final Closure Plan would be prepared 5 years prior to the estimated date of ceasing production at MTW and would be incorporated into the MTW RMP.

The key management requirements of the closure management plan would be to ensure the ongoing stability of the remaining highwall and end wall and safety for the community. Due to their location and design, rehabilitation of highwalls and end walls may be difficult, but measures that are designed to restrict fauna, pedestrian and vehicle access from these areas would be implemented to ensure their safety. These measures would be developed following consultation with stakeholders during mine closure planning. The closure management plan would also develop and maintain a socio-economic mitigation program which addresses socio-economic impacts, landowner considerations and community dependencies.

The key stakeholders for MTW are:

- Community Consultative Committee;
- NSW Department of Planning & Environment;
- Aboriginal Groups;
- NSW Office of Water;
- NSW Environmental Protection Authority (EPA);
- Singleton Shire Council; and
- Australian Government Department of Climate Change, Energy, the Environment and Water.

4.2.1 Previous Consultation

MTW continue to have an active Community Engagement approach, including through quarterly Community Consultation Committee meetings which represent multiple project stakeholders. MTW have also received consultation from the Resources Regulator in the form of feedback given from previous Targeted Assessment Programs on Soils and Materials Management (**Section 6.2.1.1**) and Landform Establishment (**Section 6.2.3**).

MTW have covered the Project Approval requirements for preparing Rehabilitation Management Plans, including consultation with the agencies listed in **Table 12** and the CCC. These conditions are included below for clarity.

Warkworth (SSD 6464 Schedule 3 Condition 58):

Be prepared to the satisfaction of the DRE

a) be prepared in consultation with the Department, NOW, OEH, Council and the CCC;

Mount Thorley (SSD 6465 – Schedule 3 Condition 36):

a) Be submitted to the DRE for approval prior to carrying out any development under this consent;
b) be prepared in consultation with the Department, NOW, OEH, Council and the CCC:

The previous MOPs were updated to address comments. It is noted that the OEH provided some comments on a previous MOP from 29 January 2016, with this referencing performance indicators and criteria:

> *Performance indicators and completion criteria will be used to determine if the reconstructed ecosystem is trending towards the analogue sites. It is important to note that many of the completion criteria are considered met if the relevant Performance Indicator shows development/trend towards analogue sites. However, it is difficult to determine at what point the ecosystem will be deemed to be trending enough towards an analogue site. Many of the completion criteria are still to be determined.*

It should be noted that criteria and objectives have been reviewed as part of this RMP to meet the requirements of the RMP Form and Way document.

4.2.2 Consultation from July 2022

The 2022 RMP was sent to required agencies in July 2022. MTW will continue to maintain the latest version of the RMP on the website and update the RMP with any key comments or recommendations received from agencies. Consultation with stakeholders and agencies on the RMP is summarised below.

TABLE 12: CONSULTATION FOR THE 2022 RMP

Agency/Stakeholder	Consultation Summary for RMP	MTW Comment
Community Consultative Committee	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
NSW Department of Planning & Environment	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
Aboriginal Groups	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
NSW Office of Water	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
EPA	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.

Agency/Stakeholder	Consultation Summary for RMP	MTW Comment
Singleton Shire Council	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
Australian Government Department of Environment and Energy	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465).	To be updated if comments or recommendations received.
NSW DPE Water	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465). DPE Water responded with comments on 1 November 2022.	Refer to **Appendix C** for a detailed response to DPE Water comments.
Biodiversity and Conservation Division	Copy of 2022 RMP has been sent to cover Warkworth (SSD 6464) and Mount Thorley (SSD 6465). The BCD responded with comments on 7 September 2022.	Refer to **Appendix C** for a detailed response to BCD comments.

4.2.3 Proposed Future Consultation

Further consultation with stakeholders will be completed closer to closure and outlined in detail for the Final Closure Plan.

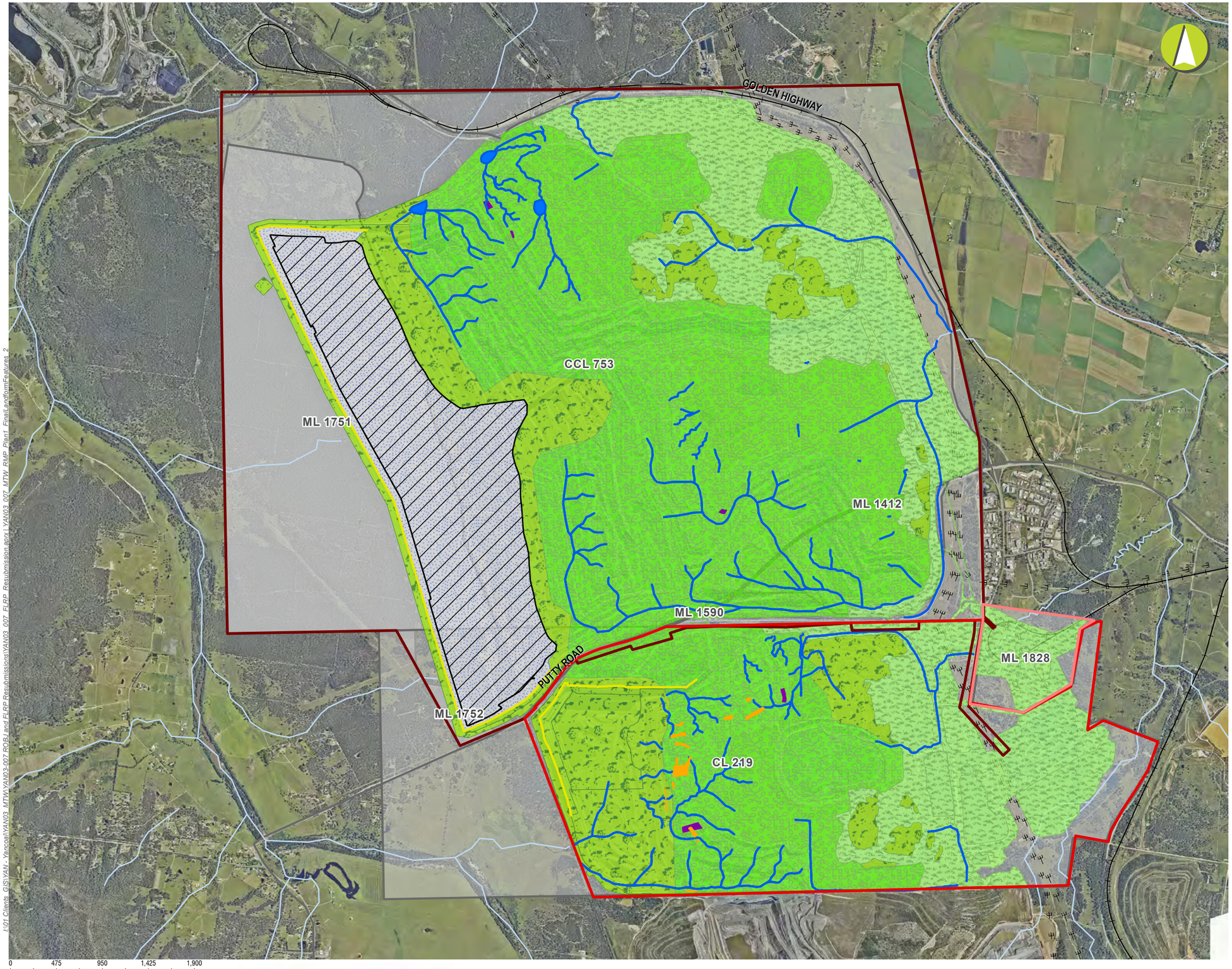
5 FINAL LANDFORM AND REHABILITATION PLAN

This section provides the Final Landform and Rehabilitation Plan (FLRP) for MTW which has been prepared as per the RMP Form and Way document. The FLRP has been prepared to show the final land uses and landform to be achieved by the MTW site. It is comprised of the Final Land Use, Final Landform Features, and Final Landform Contours spatial themes. The FLRP is divided into two plans for the purpose of this RMP.

The two plans include:

- **Plan 1**: Final Landform Features
- **Plan 2**: Final Landform Contours.

In accordance with Clause 10, Schedule 8A of the Mining Regulation 2016, the FLRP was submitted to the RR for approval via the Mine Rehabilitation Portal. **Plan 1** and **Plan 2** reference the Mine Rehabilitation Portal data theme submission ID numbers.



LEGEND

Project Approval Number
- ML 1828
- SSD 6464
- SSD 6465
- Railway
- Major Road
- Electricity Transmission Line
- Waterways

Current Authorisations
- Relevant Minerals Title

Final Landuse Domain
- Domain A: Native Ecosystem
- Domain B: Agricultural – Grazing
- Domain D: Rehabilitation Biodiversity Offset Area
- Domain J: Final Void

Final Landform Features
- Mixed Waste Organic Outputs (MWOO)
- Drainage Lines
- Safety Bund Fence
- Tyre disposal
- Water Body

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MT THORLEY WARKWORTH

Source: Project Approval Boundary, final landform, watercourses and Current Authorisations from Yancoal (2022). Roads, electricity transmission lines and railways from LPI (2021). Aerial imagery from Yancoal (2022).

Mount Thorley Warkworth Complex

Final Landform and Rehabilitation Plan
Final Landform Features
PLAN 1

Mine name	Mount Thorley Warkworth Complex
Plan name	Mount Thorley Warkworth RMP
Year of anticipated relinquishment	To be determined closer to closure
Data theme submission ID No.	5863 and 5861
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	29/08/2023

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MT THORLEY WARKWORTH

LEGEND

Project Approval Number

- ML 1828
- SSD 6464
- SSD 6465
- Final Landform Contour (5m)
- Railway
- Major Road
- Electricity Transmission Line
- Waterways

Current Authorisations

- Relevant Minerals Title

Source: Project Approval Boundary, final landform, watercourses and Current Authorisations from Yancoal (2022). Roads, electricity transmission lines and railways from LPI (2021). Aerial imagery from Yancoal (2022).

Mount Thorley Warkworth Complex

Final Landform and Rehabilitation Plan
Final Landform Contours
PLAN 2

Mine name	Mount Thorley Warkworth Complex
Plan name	Mount Thorley Warkworth RMP
Year of anticipated relinquishment	To be determined closer to closure
Data theme submission ID No.	5862
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	29/08/2023

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6 REHABILITATION IMPLEMENTATION

6.1. Life of Mine Rehabilitation Schedule

The RMP Form and Way document outlines that this section should describe the rehabilitation schedule over the life of the mine, from the commencement of the rehabilitation management plan until lease relinquishment. The life of mine rehabilitation schedule must include a series of plans illustrating the proposed mine layout and sequence of progressive rehabilitation across the leasehold area at a minimum of five-yearly intervals until completion of mining and achievement of the final land use.

Detailed mine planning is completed annually and outlines proposed mining/disturbance and rehabilitation areas. Detailed figures are prepared as part of the Annual Rehabilitation Report and Forward Program, with these outlining activities over the next three years. Beyond that, the site is working on detailed mine planning, but the information is not as detailed (conceptual), hence it has not been included in this RMP.

6.2. Phases of Rehabilitation and General Methodologies

The final land use objectives will be achieved through a series of conceptual stages of rehabilitation. Where available, definitions have been used from the RMP Form and Way document.

- Active – The RMP Form and Way document states in the context of rehabilitation, land associated with mining domains is considered 'active' for the period following disturbance until the commencement of rehabilitation.
- Stage 1: Decommissioning – The removal of infrastructure associated with mining activities including preparation plants, hard stand areas, buildings, contaminated materials, hazardous materials. The RMP Form and Way document states that this phase of rehabilitation 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.
- Stage 2: Landform Establishment – The RMP Form and Way document states that this phase of rehabilitation consists of the processes and activities required to construct the approved final landform (as per the development consent and, for large mines, the approved Final Landform and Rehabilitation Plan). 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, encapsulate problematic materials such as tailings, and prepare a substrate with the desired physical and chemical characteristics (that is, rock raking or ameliorating sodic materials). The landform design and construction part of this phase incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology.
- Stage 3: Growing Media Development – The RMP Form and Way document states that this phase of rehabilitation consists of activities required to establish the physical, chemical and biological components of the substrate required to establish the desired vegetation community (including short-lived pioneer species). 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. Additional characterisation of materials e.g. subsoils, topsoils, organic additives and overburden surface is usually required in this phase to cross check data from the earlier phases.
- Stage 4: Ecosystem and Land Use Establishment – The RMP Form and Way document outlines that this phase of rehabilitation consists of the processes to establish the approved final land use following construction of the final landform. For vegetated land uses this rehabilitation phase includes establishing the desired vegetation community (eg. Seeding or tube stocking) and implementing land management activities such as weed control. This phase of rehabilitation may also include habitat augmentation such as installation of nest boxes.
- Stage 5: Ecosystem and Land Use Development – The RMP Form and Way document outlines that this phase of rehabilitation consists of the activities to manage maturing rehabilitation areas on a trajectory to achieving rehabilitation objectives, completion criteria and the Final Landform and Rehabilitation Plan. Completion criteria for

this phase will include components of floristic structure, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape.

- Stage 6: Rehabilitation Competition – The RMP Form and Way document outlines that this final phase of rehabilitation occurs where 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 spatially depicted in the approved Final Landform and Rehabilitation Plan. Rehabilitation areas may be classified as complete when the NSW 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

6.2.1.1. Soils and Materials

During the active mining phase, soils and materials will be managed to the rehabilitation of each mining domain. Topsoil assessments at MTW have found that the structural and textural properties of soils within the proposed disturbance area are the most significant limiting factors. The topsoil stockpile reconciliation conducted in December 2014 indicated topsoil inventories across MTW of 1,174,066 m^3.

MTW have introduced controls to the stages of stripping, handling, and management of soils and materials in the active mining phase. Topsoil is to be stripped and salvaged as per the Ground Disturbance Permit (GDP) and salvaging procedures to maximise its value for re-use in rehabilitation. Soil testing will be undertaken to assess the characteristics, suitability, and required amelioration prior to reuse in rehabilitation activities.

Areas that are planned to be disturbed will be stripped of topsoil prior to disturbance. Advanced clearing and topsoil removal is minimised to reduce material loss caused by erosion. Erosion and sediment controls will be put in place at stockpiles and stripped areas to prevent off-site loss of topsoil and subsoil sediments. Topsoil will be stripped using appropriately sized earthmoving equipment, preferably track dozers. Where practicable, soil will be stripped when moist, but not saturated; and no stripping will occur in excessively dry or wet conditions. Where possible, the topsoil from high quality native vegetation areas will be directly transported from stripping to rehabilitation areas to maximise the value of the soil seed bank and soil biota. When mining operations dictate that topsoil storage is necessary, stockpiling procedures assist in maintaining the integrity of the material.

In 2015, the capping of the Eastern Tailings Dam trialled the use of breaker rock material originating from the South CHPP. The results of the trial found the material was suitable for capping. Consequently, breaker rock continued to be used to cap the Eastern Tailings Dam.

Due to the shallow nature of the in situ duplex topsoils there will be a shortfall in the amount of topsoil available for rehabilitation. The compost trials currently being undertaken are examining a spoil/compost mix as a growth medium for areas being returned to native vegetation (**Section 9**). If native vegetation can be successfully re-established without using topsoil then the available topsoil can be prioritised for use on areas being returned to pasture. Topsoil will also be prioritised for use on areas with potentially hostile spoil properties that make it difficult to establish vegetation.

6.2.1.2. Flora

All vegetation clearing is undertaken as a staged operation immediately in advance of mining operations. Prior to clearing, viable seed is collected for use in rehabilitation. Additionally, species identified as difficult to grow are targeted for cuttings and transplanting from the disturbance area. Remaining vegetation is generally mulched and incorporated into the topsoil. Seeds and propagules of local or endemic provenances are prioritised immediately after the salvaged seedbank and translocated plants for the landform establishment phase.

Seeding will occur by hand seeding or tractor mounted sowing equipment as soon as practical after the preparation of soil. Areas designated as grasslands are sown to pasture, with a low rate of tree and shrub seed designed to produce a lightly wooded pasture. Tree and shrub species may be used more extensively on the steeper slopes, which are less suitable for grazing. In these areas, belts of grasses may be used to help control erosion during the tree establishment phase. Hydro-mulching or hay mulching may be used for seeding on slopes that are inaccessible to tractors.

Table 19 in **Section 6.2.5** lists 130 species from which species mix selection can occur during revegetation in the active mining phase to meet the final land use objectives. The list includes diversity targets for seed mixes with targets set for minimum number of species/genera to be included for the functional groups in each strata of the target vegetation community. It has been developed from previous studies undertaken for Coal & Allied, vegetation lists for Central Hunter Box-Ironbark Woodland (Peake, 2006), and the 2019 Independent Rehabilitation Review by Emergent Ecology. Results from seed mix trials beginning in 2011 for Woodland rehabilitation have been incorporated into the list to increase native understorey diversity. The species list will continue to be refined as new information becomes available from rehabilitation monitoring results and research outcomes (**Section 9**), including trials on reducing seed dormancy.

The management of weeds will occur in accordance with MTW Environmental Procedure 10.4 – Weed Control and as per the advice of the Upper Hunter Weeds Authority. The Annual Works Schedule (AWS) also lists Weeds of National Significance, noxious and environmental weeds species as identified at MTW, and provides a framework to allow for structured weed management and control across mining domains. Assessment of the impact of weeds across the MTW site is ongoing with the results of the regular monitoring programmes used to update the AWS. Weed treatment control is conducted annually and at other times as determined by seasonal conditions that may promote excessive weed growth. Weed control activities are reported annually in the Annual Review.

The following summarises the results of the weed survey undertaken during December 2022 and is based upon the NSW Biosecurity Act 2015 which came into force from 1 July 2017 and repealed 14 Acts including the Noxious Weeds Act 1993. The new legislation has resulted in the development of the Hunter Regional Strategic Weed Management Plan 2017-2022 which covers the area occupied by MTW.

Six WONS were identified during the survey, they included:

- African boxthorn (*Lycium ferocissimum*) State – Asset protection
- Fireweed (*Scenecio madagascariensis*) State – Asset protection/ Regional – additional species of concern
- Lantana (*Lantana camara*) State – Asset protection Pear Species:
- Creeping pear (*Opuntia humifusa*) State – Asset protection
- Prickly pear (*Opuntia stricta*) State – Asset protection/ Additional species of concern
- Tiger pear (*Optunia aurantiaca*) State – Asset protection

Seventeen other priority weeds were identified at MTW during the survey including:

- African olive (*Olea europea* subspecies *cuspidae*) Regional – Asset protection
- African lovegrass (*Eragrostis curvulva*) Regional – Additional species of concern
- Balloon vine (*Cardiospermum grandiflorum*) Regional – Additional species of concern
- Bathurst burr (*Xanthium spinosum*) General biosecurity duty
- Blue heliotrope (*Heliotropium amplexicaule*) Regional – Additional species of concern
- Castor oil plant (*Ricinus communis*) General biosecurity duty
- Fleabane (Conyza bonariensis) General biosecurity duty
- Galenia (*Galenia pubescens*) Regional – Additional species of concern
- Golden dodder (Cuscuta campestris) General biosecurity duty
- Green cestrum (*Cestrum parqui*) Regional - Asset protection
- Mother of millions (*Bryophyllum delagonese*) Regional - Asset protection
- Noogoora burr (Xanthium occidentale) Regional – Additional species of concern

- Pampas grass (*Cortaderia selloana*) Regional - Asset protection
- Patersons curse (Echium plantagineum) Regional - Asset protection
- Saffron thistle (*Cartharmus lanatus*) General biosecurity duty
- Scotch thistle (Onopordum acanthium) General biosecurity duty
- St John's Wort (Hypericum perforatum) Regional – Additional species of concern

Seventeen weeds that are not officially declared or listed were also recorded at MTW including:

- Blackberry nightshade (*Solanum nigram*)
- Bulrush (Typha latifolia)
-
- Curled / Curly dock (Rumex crispus)
- Green panic grass (Panicum maximum)
- Golden wreath wattle or Saligna (*Acacia saligna*)
- Inkweed (*Phytolacca octandra*)
- Lambs tongue (*Verbascum Thapsus*)
- Mustard weed (*Sisymbrium* sp.)
- Narrow leaved cotton bush (*Gomphocarpus fructicosus*)
- Paddy's lucerne (Sida rhombifolia)
- Purpletop / Purple verbena (Verbena bonariensis)
- Rhodes grass (*Chloris 55ayana Kunth*)
- Stinking Roger (Tangetes minuta)
- Spiny Rush (*Juncas acutus*)
- Telegraph weed (Hetrotheca grandiflora)
- Tree Tobacco (*Nicotiana glauca*)
- Umbrella sedge (Cyperus eragrostis)

Topsoil stockpiles established prior to 2011 were seeded with exotic pasture species to provide a suitable cover for erosion protection. These competitive exotic species are causing weed problems in rehabilitation areas when the soil from these stockpiles is used on areas being returned to native vegetation. MTW has a topsoil stockpile maintenance program in place to spray out the exotic pasture species and sow native species on these old stockpiles. Stockpiles may require a number of weed control passes to adequately reduce weed levels before sowing to native species. New topsoil stockpiles are being treated in much the same way as new rehabilitation areas, in terms of weed control and soil amelioration, before being sown to native species. Establishment of native species on topsoil stockpiles will reduce the presence of weeds and provide a soil seed bank in rehabilitation areas that contains seeds from desirable native species.

6.2.1.3. Fauna

Pre-clearing surveys are undertaken to identify important habitats, including habitat trees or microhabitats such as fallen logs. Any trees that show signs of current or recent use are reserved for latest possible removal to encourage fauna to abandon the area of their own accord. Vegetation clearing is avoided during the breeding season of identified threatened fauna species.

Salvaged logs are placed on areas of post mining rehabilitation to form fauna habitat, either as logs on the ground or stag trees. Suitable logs may also be supplied to on-site or off-site projects for the construction of in-stream structures. As per the Warkworth Biodiversity Management Plan, large trees, with their branches intact and roots removed, are to be relocated to provide seed sources, habitat augmentation and protect the soil to create an improved microclimate for restoration.

MTW's project approvals require the management of the threatened species or populations as outlined in **Table 13**. Approvals under the EPBC Act 1999 (EPBC2002/629 and EPBC2009/5081) require WML to protect and manage offsets of at least 4,212 hectares to offset the impact upon the Regent Honeyeater (*Anthochaera phrygia*) and Swift Parrot (*Lathamus discolor*) habitat.

The Biodiversity Offset Strategy for Warkworth has committed a $1 million contribution to the Office of Environment and Heritage's (OEH) 'Saving Our Species – Regent Honeyeater' conservation program.

TABLE 13: THREATENED SPECIES AND POPULATIONS RECORDED OR CONSIDERED TO LIKELY OCCUR WITHIN THE MTW EXTENSION AREA

Threatened fauna species	TSC Act	EPBC Act
Brown Treecreeper (*Climacteris picumnus*)	V	-
Grey-crowned Babbler (*Pomatostomus temporalis*)	V	-
Speckled Warbler (*Chthonicola sagittata*)	V	-
Hooded Robin (*Melanodryas cucullata*)	V	-
Diamond Firetail (*Stagonopleura guttata*)	V	-
Glossy Black-cockatoo (*Calyptorhynchus lathami*)	V	-
Regent Honeyeater (*Anthochaera phrygia*)	E	E
Swift Parrot (*Lathamus discolour*)	E	E
Little Lorikeet (*Glossopsitta pusilla*)	V	-
Spotted Harrier (*Circus assimilis*)	V	-
Varied Sittella (*Daphoenositta chrysoptera*)	V	-
Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)	V	-
Large-eared Pied Bat (*Chalinolobus dwyeri*)	V	V
Eastern Free-tail Bat (*Mormopterus norfolkensis*)	V	
Little Bent-wing Bat (*Miniopterus australis*)	V	
Large-footed Myotis (*Myotis macropus*)	V	
Squirrel Glider (*Petaurus norfolcensis*)	V	-

V= Vulnerable; E = Endangered

The management of vertebrate pests follows a Working Vertebrate Pest Action Plan which is updated seasonally based on recommendations from the quarterly Vertebrate Pest Control Reports. This approach allows maximum flexibility to react to sightings, monitoring results, or pest infestations and allows customisation of the programme to effectively address these infestations. The quarterly Vertebrate Pest Control Reports provide a basis for all decision making on vertebrate pest control on the site. Pest control is undertaken quarterly and may include trapping, baiting and/or shooting. Performance of vertebrate pest species control is reported annually in the Annual Review.

6.2.1.4. Rock/Overburden Emplacement

Chemical analyses of spoil material have established that overburden is slightly sodic and alkaline, but within acceptable ranges for use as a plant growth medium.

Overburden removal is generally done by dragline and/or truck and shovel operations. The overburden material is reshaped and covered with topsoil. Overburden emplacements, that are identified to be inactive for a period of six months or more, are aerially seeded with fast germinating and growing cover crop species to mitigate dust generation and erosion.

The conventional landform slopes are designed to be less than 10 degrees on outward facing slopes and less than 14 degrees on internally draining slopes i.e., low walls into final voids, ramps etc. The final landform design incorporates micro-relief features, natural drainage, and a geomorphological approach to limit areas requiring rock lining.

6.2.1.5. Waste Management

The handling and disposal of industrial and putrescible wastes generated from MTW is in accordance with the MTW Total Waste Management System (TWMS), local ordinances, and regulatory guidelines. All waste management contractors used by MTW are licensed by OEH.

The site contains a specialised oil and grease storage facility which is a part of the fuel storage facility that meets Australian Standards. A licensed waste hydrocarbon disposal company removes and recycles all waste hydrocarbons produced onsite.

A licensed contractor removes recyclable wastes from site to the Thornton Materials Recycling Facility. Nonrecyclable wastes are disposed of at the Singleton Shire Council Landfill.

The TWMS includes waste monitoring, particularly the recording of waste types, weight, and cost. These statistics are summarised and reported in the Annual Review, enabling MTW to assess waste management over long-term periods and identify opportunities to mitigate waste and contamination risks to rehabilitation.

6.2.1.6. Geology and Geochemistry

Characterisation analyses have established MTW's soils are generally dispersive/sodic, with overburden material is slightly sodic and alkaline. However, this material is suitable for rehabilitation. Material characterisation analysis will continue to be undertaken. Amelioration activities will be undertaken and recorded.

Materials handling strategies have been established at MTW including selective handling and continued materials testing to document and characterise material, and consequently inform handling and emplacement activities. MTW's improved QA systems will subsequently support effective geological and geochemical characterisation and management throughout rehabilitation.

6.2.1.7. Material Prone to Spontaneous Combustion

Material at MTW generally has low potential for spontaneous combustion. Course rejects with low propensity for spontaneous combustion is nevertheless covered by approximately 5 metres of inert mine spoil to further reduce potential for spontaneous combustion and ensure vertical distance between the material and root zones in future rehabilitation phases.

MTW has identified additional controls for reducing the potential for spontaneous combustion:

- Identifying and selectively managing waste material susceptible to spontaneous combustion;
- Minimising unplanned coal losses in overburden emplacement areas;
- Maintaining overburden lift heights up to a maximum of 20 metres to increase stability and compaction of the emplacement area;
- Selectively placing carbonaceous material in active dumps where it can be rapidly buried;
- Rapidly and effectively burying carbonaceous material; and
- Not exposing loose sulphurous and carbonaceous material for periods of time that allows heating.

6.2.1.8. Material Prone to Generating Acid Mine Drainage

MTW commissioned an independent review in 2005 by GEM which found the potential for acid mine drainage (AMD) at the site was low. Between 2008 and 2016 additional testing was done at intervals to overburden and interburden material. The results determined the spoil to be non-acid forming.

AMD is managed and handled through MTW's Acid Rock Drainage and Mineral Waste Management Plan. Sampling of overburden and interburden intervals during operation will be undertaken as required for the purpose of identifying potential acid forming material (PAF) and managing AMD as a geochemical risk to rehabilitation.

6.2.1.9. Ore Beneficiation Waste Management (Reject and Tailings Disposal)

MTW's fine reject material (tailings) is thickened into a solid's density of approximately 20% to 30% by weight and is predominantly fine rock and clay with some coal and flocculent. The fine reject is wet with moderate conductivity.

During the active phase, fine reject from the CPPs is pumped as a slurry via a pipeline to the tailings storage facilities. Fine reject from both the North CPP and South CPP will be pumped as a slurry via pipelines to the Loders Pit Tailings Storage Facility (LPTSF), Centre Ramp Tailings Storage Facility (CRTSF) and the Abbey Green South Tailings Storage Facility (AGSTSF). Coarse reject material is hauled to active emplacement areas.

There are seven tailings emplacements within the MTW mining area. These are:

- Tailings Dam No. 1, within CL 753, currently nil activity for tailings emplacement. Stage 1 capping complete, Stage 2 capping to final landform design and rehabilitation completed 2015;
- Tailings Dam No. 2, within CL 753, currently nil activity for tailings emplacement. Closure of the Redbank Power Station has resulted in cessation of ash disposal on Tailings Dam 2. Partial capping and rehabilitation has occurred);
- Centre Ramp Tailings Storage Facility (CR TSF), within CL 219, currently active;
- Ministrip Tailings Storage Facility, within CL 219, currently nil activity for tailings emplacement;
- Abbey Green South Tailings Storage Facility (AGS TSF), within CL 219, currently active;
- Eastern (Interim) Tailings Dam, within CL 219, currently nil activity for tailings emplacement. Capping commenced in 2015; and
- Loders Pit Tailings Storage Facility (LP TSF), within CL 219, currently active.

Tailings dams have been designed by specialists ATC Williams.

According to Part 5 of the MTW Tailings Management Plan, secondary treatment methods were introduced into the deposition process in 2018. Secondary pipe head flocculation (PHF) was introduced as an improvement measure on conventional tailings disposal methods at more recently constructed TSFs. The rate of filling has been reduced for each TSF to facilitate the formation of thin layers of high strength tailings.

The Loders Pit TSF will provide sufficient tailings capacity through to the end of the currently approved life of mine. The current Loders Pit TSF design details its construction at the Stage 4 crest level of RL 40m. The current construction design by ATC has a reserve capacity of up to 11.7Mt of tailings above the LOM forecast during open cut operations. To address the risk of insufficient material for the capping of Loders Pit, MTW has identified the need for material haulage and stockpiling in advance of the landform establishment phase.

TABLE 14: DESCRIPTION OF TAILINGS FACILITIES

CPP/Pit	Activity	Storage Location	Timing
North and South CPP	Tailings Disposal	CRTSF	2001 to 2035
		AGTSF	2010 to 2035
		Ministrip TSF	2005-2024
		Loders Pit TSF	2020-End of Mine

6.2.1.10. Erosion and Sediment Control

The key considerations for erosion and sediment control at MTW include:

- Where practical, diverting runoff from undisturbed catchments around disturbed areas via diversion drains and banks to discharge into natural watercourses;
- Retaining runoff from disturbed areas in sediment dams to settle out suspended sediment with possible treatment prior to discharge back to the natural system;
- Returning water back to the mine water system if water quality is not suitable for release;
- Installing appropriate erosion and sediment controls prior to disturbance of any land;
- Limiting the extent of disturbance to the practical minimum and maintaining groundcover;
- Reducing the flow rate of water across the ground on disturbed surfaces;
- Progressively stripping and stockpiling topsoil for later use in rehabilitation and stabilisation;
- Stabilising topsoil stockpiles to minimise erosion;
- Progressively rehabilitating disturbed land to increase ground cover, increase infiltration and reduce erosion potential;
- Constructing drainage controls such as scour protection to improve stability in concentrated flow areas; and
- Restricting access to rehabilitation and non-disturbed areas.

A GDP is required for all disturbance activities. Prior to disturbance, appropriate erosion and sediment controls consistent with current best practice standards will be established. Where ground conditions allow, erosion and sediment controls will be designed generally in accordance with the 'Blue Book': Managing Urban Stormwater: soils and construction (Volume 1 and 2E – Mines and Quarries).

6.2.1.11. Ongoing Management of Biological Resources for Use in Rehabilitation

This section describes the topsoil management measures which aim to retain biological quality for rehabilitation. **Table 15** presents the soil characteristics and topdressing suitability found for the key soil types at MTW, based on previous assessments. The structural and textural properties of the future disturbance areas are the most significant limiting factors.

TABLE 15: MTW EXTENSION AREA SOIL TYPES

Soil Type	Percentage of area (%)	Description	Topdressing suitability
Brown kurosol	44.3	Characterised by an abrupt texture change between dark brown silty/loam surface soil and brown sandy clay loam and yellowish brown medium/heavy clay subsurface layers.	Surface 10cm of topsoil suitable for stripping and reuse in rehabilitation work. Good soil stability due to significant organic content.
Red sodosol	17.9	Characterised by an abrupt texture change between the dark brown loamy surface soil and the reddish-brown medium clay subsurface soil.	Surface 10cm of topsoil marginally suitable for stripping and reuse in rehabilitation work. Moderate stability and variable sodicity. Better used if mixed with other suitable media.
Yellow sodosol	14.5	Characterised by an abrupt texture change between the sandy surface soil and the medium-heavy clayey subsurface soil. Subsurface soils may be greyish, brownish or yellowish in colour.	Surface 30cm of topsoil suitable for stripping and reuse in rehabilitation work.
Grey sodosol	15.4	Associated with subsoil saturation and can be observed on higher slopes where local saturation zones occur. Characterised by an abrupt texture change between the grey-brown sandy-loam surface soil and the underlying grey-pink clayey subsurface soil.	Surface 30cm of topsoil suitable for stripping and reuse in rehabilitation work.

Soil Type	Percentage of area (%)	Description	Topdressing suitability
Arenic rudosol	7.0	Deep sand associated with Warkworth Sands Woodland (WSW) vegetation community.	Topsoil and sub-surface sand only suitable for stripping and reuse in WSW rehabilitation and re-establishment work.
Grey kandosol	0.9	Characterised by a gradual texture change between the brownish-black surface loam and the underlying greyish-brown sandy clay loam and sandy clay.	Surface 8cm of topsoil suitable for stripping and reuse in rehabilitation work.

Prior to topsoil stripping, sediment controls will be implemented to prevent off-site loss of subsoil sediments. Furthermore, soil testing will be undertaken to determine the level of soil amelioration required.

Topsoil will be transported from stripping to re-spreading directly to reduce the impacts to the biological activity and potential of the material. Topsoil will be spread using D6 sized dozers to minimise structural damage. However, when immediate re-spreading is prevented by mining operations, topsoil will be stored in accordance with the following:

- Stockpiles will be located away from trafficable or mine areas, trees or watercourses and placed on areas of flat topography or along the contour to prevent erosion;
- Good quality topsoil and marginal soil will be stockpiled separately and recorded as such;
- Topsoil stockpiles and volumes will be identified and monitored for weed control;
- Where possible, stockpiles will be limited to a maximum height of 3.0 metres and windrowed to increase surface area and assist biological activity; and
- Stockpiles will generally be sown with a cover crop of deep rooting, nitrogen-fixing species such as Lucerne or local Acacia species, to help maintain topsoil viability and minimise erosion and weed infestation if not being reused for prolonged periods.

Weed growth on topsoil stockpiles is managed in accordance with Yancoal Environmental Procedure 10.4 Weed Control. Weed control is further described in **Section 6.2.1.2** of this RMP.

The GDP and salvage procedures manage biological resources disturbed during the active mining phase to retain biological value into rehabilitation. The GDP requires smaller vegetation from the understory and overstorey to be mulched prior to stripping and incorporated into selected topsoils to provide a seed source. The salvage procedure determines hollow-bearing trees and habitat logs to be salvaged and relocated to rehabilitation areas. In this pre-clearance stage, salvaged habitat structures are stored.

Sandy topsoil is managed specifically due to its additional biological value in that it suppresses weed germination, reducing herbicide use in Warkworth Sands Woodland EEC biodiversity offset area.

The Warkworth Mine Biodiversity Management Plan (2018) describes the translocation of salvaged biological resources such as topsoil, mulch, timber, and plant material to support natural regeneration. The measures taken to reduce impacts to the biological value of materials include:

- Stockpiling of topsoil is avoided where possible;
- Topsoil is scalped to a depth of 10 centimetres and translocated to retain the seedbank;
- Assess in situ vegetation communities against the weed species present, ground cover, suitability of growing media and evidence of recruitment;
- To mitigate the potential lock up of nutrients in the soil, composted mulch will be applied prior to application, to a depth of 5cm. This will also provide soil disturbance and prepare the restoration site;
- Trees with intact branches and removed roots will be salvaged and relocated to provide seed, habitat augmentation, and protect soils by encouraging microclimates;

- Seeds, cuttings and plants will be salvaged from the disturbance area to further assist in the establishment of ecological characteristics in the re-establishment areas. Species that are known to be difficult to grown from seed will be targeted for cuttings and transplanting from the disturbance areas; and
- Seeds for the BAs will be of local or endemic provenance.

6.2.1.12. Mine Subsidence

As MTW is an open cut operation, subsidence has been regarded as a negligible risk. Regardless, mine subsidence was examined and risk-ranked in the RMP Risk Assessment. No subsidence incidents have been recorded at MTW. As such this RMP does not introduce measures and methods to address subsidence impacts to rehabilitation during the active phase of mining.

6.2.1.13. Management of Potential Cultural and Heritage Issues

At MTW Aboriginal cultural heritage is managed in accordance with the Aboriginal Heritage Management Plan (AHMP) required under Project Approval (SSD6464) Schedule 3, Condition 43 for Warkworth and Project Approval (SSD-6465) Schedule 3 Condition 28 for Mt Thorley. European heritage is managed in accordance with the Historic Heritage Management Plan (HHMP) required under Project Approval (SSD6464) Schedule 3 Condition 46 for Warkworth.

The new project approvals for Warkworth and Mt Thorley require conservation agreements to be established over aboriginal heritage conservation areas adjacent to the project area. Schedule 3 Condition 39 of SSD-6464 requires a Conservation Management Plan and a conservation agreement to be in place for the Wollombi Brook Aboriginal Cultural Heritage Conservation Area prior to carrying out any development to the west of Wallaby Scrub Road. Schedule 3 Condition 27 of SSD-6465 requires a conservation agreement to be in place for the Loders Creek Aboriginal Cultural Heritage Conservation Area within three years of commencement of the development. Both conservation agreements are required to be pursuant to Section 69B of the National Parks and Wildlife Act 1974.

A strategy for the ongoing management of heritage after lease relinquishment will be developed prior to MTW reaching 5 years from mine closure. At the present time all heritage aspects will be managed in accordance with the approved management plans and conservation agreements refences above.

MTW provides annual reports on heritage aspects through the Annual Environmental Review.

6.2.1.14. Exploration Activities

All exploration drilling activities are reviewed prior to commencement as part of MTW's GDP process. Planned borehole locations and access tracks are assessed for environmental, cultural heritage, approval and mining title issues and necessary constraints and conditions are placed on drilling locations for each borehole location.

All boreholes are surveyed and if not required for monitoring purposes are cement sealed on completion. All casing is removed where practicable. However, in isolated holes, this may not be possible requiring the casing to be cut off below ground level. Borehole sites are then rehabilitated to an appropriate standard, as dictated by the GDP.

An Exploration Report is sent to RR annually which outlines the status at site.

6.2.2 Decommissioning

Decommissioning is the formal process to remove some facet of the mining operation from its active status. This phase particularly applies to those domains where the risk of hazardous materials may exist. MTW will undertake progressive decommissioning as infrastructure becomes redundant. The rehabilitation objectives, completion criteria, and indicators relevant to the decommissioning phase are primarily captured in the 'Removal of Infrastructure' and 'Retention of Infrastructure' ROBJs in **Appendix D**. Decommissioning includes:

- Disconnection and termination of all redundant services and associated infrastructure;
- Removal of buildings, fixed plant, or other infrastructure not required in the post-closure land use, including infrastructure items related to exploration and TSFs;
- Remediation or removal of contaminated soils to acceptable contamination levels; and
- Maintenance of water management structures.

Further detail on decommissioning activities will develop as MTW approaches the cessation of production and closure.

6.2.2.1. Site Security

Site security will be maintained during the decommission phase to minimise the risk to public safety and rehabilitation areas, including heritage sites. Public safety at MTW is managed primarily through the implementation of MTW safety standards and daily security inspections. Fencing, signposting, restricted access areas, and locked external gates form part of the safety measures to ensure the safety of the public into decommissioning. These measures are implemented according to the mines safety standards and procedures and include audit, inspection, testing and reporting systems.

MTW will conduct inductions for all visitors and contractors prior to entering the site. Where necessary, visitors or contractors will also be accompanied by an inducted mine employee onto site.
There will be no public access from the mine entrance to pit areas, as part of the restraints to public access, and measures of public safety.

MTW's decommissioning measures around infrastructure, services, and contamination will also minimise the extent of hazards onsite in case of restricted access breaches.

6.2.2.2. Infrastructure to be Removed or Demolished

MTW will identify the site features, site services, and structures to be decommissioned to achieve final land use within the future Final Closure Plan. The Final Closure Plan will be developed within 5 years from the closure of MTW.

6.2.2.3. Buildings, Structure and Fixed Plant to be retained

MTW is committed to removing surface infrastructure, with exceptions to be approved by DPE. Both the Mount Thorley (Schedule 3 Condition 34) and Warkworth (Schedule 3 Condition 56) consents have the wording of 'Surface Infrastructure is to be decommissioned and removed unless the DRE agrees otherwise'.

6.2.2.4. Management of Carbonaceous/Contaminated Material

Contamination
Contamination is assessed on a case-by-case basis and will be addressed as per the MTW Environmental Procedures. Small amounts of contaminated material will be treated in on-site bioremediation areas. Once decontaminated, the material will be transported to the spoil dump.

Suitably qualified experts will be engaged to undertake further contamination assessments across the site in the decommissioning phase. Further control measures for contaminated material will be outlined closer to closure, in the Final Closure Plan.

The land contamination assessment will be undertaken in accordance with the relevant guidelines and requirements including:

- *The NSW Contaminated Land Management Act, 1997;*
- *Managing Land Contamination Planning Guidelines SEPP 55 – Remediation of Land;*
- *Guidelines for Consultants Reporting on Contaminated Sites; and*
- *The National Environment Protection (Assessment of Site Contamination) Measure.*

Contaminated areas, or areas with potential contamination, will be assessed and remediated. Remediation activities will likely include the extraction of contaminated materials for disposal off-site at a licenced facility, on-site bioremediation, or burial onsite subject to obtaining the relevant approvals. Following the completion of remediation works, a suitably qualified contamination expert would be engaged to assess that remediation works have been managed appropriately and in accordance with the relevant standards and requirements.

Carbonaceous Materials

At closure, carbonaceous material from the footprint of surface infrastructure including stockpiles, access roads and haul roads will be scalped and placed in the pit or overburden areas for disposal. These areas which previously had carbonaceous material will then be rehabilitated as per the process in this RMP.

6.2.2.5. Hazardous Materials Management

The potential for land and water contamination is minimised through the correct handling, storage and disposal of hazardous substances. These controls include storage within properly sealed containers and controlled areas, bunded for medium to long-term storage requirements. These storage and waste receival areas are isolated from clean water catchments to minimise the risk of land or water pollution should an unplanned spill occur.

Hazardous materials such as radiation devices or asbestos will be managed through the use of the ChemAlert system. All chemicals used on site are registered through a central database. The central database contains all information contained in the Material Safety Data Sheets (MSDS) and an inventory of chemicals held onsite. The information can be accessed at any computer terminal within the operation and provide guidance on storage, use and disposal.

Hazardous and explosive materials are transported and stored on site in accordance with MTW-10-PROC-H1-221 Hazardous Substances and Dangerous Goods Procedure. MTW will continue to track the volumes of hazardous materials such as hydrocarbons taken by authorised waste contractors through the TWMS.

Accidental spills or ground contamination will be assessed case-by-case and remediated using biodegradable spill absorbent. The comprehensive site spill response trailer and MTW emergency response procedure may be triggered if required. Hydrocarbon or chemical spills will also be reported in the mine site incident reporting and management system with corrective and preventative measures taken as appropriate.

6.2.2.6. Underground Infrastructure

This section is not relevant because no underground mining occurs at MTW.

6.2.3 Landform Establishment

Landform establishment is the process of shaping the final landform to a safe, stable and free draining landform that is appropriate for the desired final land use and consistent with the surrounding landscape.

The final shaped landform will be constructed in accordance with the requirements of this document. Rehabilitation will be undertaken progressively, generally commencing as soon as practicable following the completion of mining related activities.

Landform Establishment are the processes involved to achieve stable landforms including slopes, erosion controls, and drainage lines with integrated landscape features, which are compatible with surrounding landforms, whilst also ensuing that the rehabilitated areas of native vegetation link with undisturbed native vegetation. The overall objective of the landform is to be safe and stable.

The final landform of MTW has been designed using a geomorphological landform design approach based on alluvial analogues. This approach utilises the appropriate characteristics of stable natural alluvial landforms for the design of landforms to be constructed in mining overburden. The safety and stability of the landform will be evaluated using the principle of having no greater management requirements than other land with similar geographical conditions and land use. In terms of erodibility of the landform, it is envisaged that any rilling or gullying that may develop should be “minor” and “minimal”, that is, not significantly different to what might be found on similar landforms in the local area.

The final landform has been designed using a geomorphological landform design approach based on alluvial analogues. This means utilising the appropriate characteristics of stable natural alluvial landforms for the design of landforms to be constructed in mining overburden. The overall objective of the landform is to be safe and stable. This will be evaluated using the principle of having no greater management requirements than other land with similar geographical conditions and land use. In terms of erodibility of the landform, it is envisaged that any rilling or gullying that may develop should be “minor” and “minimal”, that is, not significantly different to what might be found on similar landforms in the local area.

In practical terms, the performance criteria will be assessed as follows:

- The initial design uses the relationship between catchment area and slope (raised to the factor of 1.5) to compile a Topography Factor (TF). This TF computation is a useful method of assessing erosion risk but is indicative only since it does not include detailed sediment transport analyses.
- From analyses in the general area and on other sites in the local area, it is expected that areas with various topography factors set out in **Table 16** will require the surface treatments indicated to limit the erosion risk both prior to vegetation establishing and post re-vegetation.

TABLE 16: DESCRIPTION OF TOPOGRAPHIC FACTORS AND RESPONSE

Topography Factor (TF)	Proposed Surface Treatments	Comments
<20	Revegetate	Equates to the erosion risk for the overland flow on the current 10m high lifts for the 1v:6h slopes with contour banks. Assumes infiltration rates on bare soil of around 20 to 25mm/hr achieved through surface treatments such as ripping or roughening. Stable once vegetated.
20<TF<50	Revegetate	On most sites in the local area and for most soils, experience indicates limited risk of rilling prior to vegetation establishing unless very erodible soils. Assumes infiltration rates on bare soil of around 20 to 25mm/hr achieved through surface treatments such as ripping or roughening. Stable once vegetated.
50<TF<150	Revegetate but potentially with use of heavy mulch, gravels, or other stabilisers.	Potential for some rilling prior to re-vegetation. Possible use of mulch / gravels / other alternatives for higher risk areas. Some hydro mulch techniques offer higher levels of protection. Expected to be stable once vegetated.

Topography Factor (TF)	Proposed Surface Treatments	Comments
150<TF<450	Revegetate but incorporate gravels where necessary.	These values are typically confined to creek lines and represent areas where rilling tends to be limited once vegetation is established but are high risk prior to re-vegetation with some risk of erosion even with vegetation.
>450	Rock Armouring	Drainage lines with the need for rock armouring both in the short to long term.

Because the erosion risk reduces significantly once vegetation is established, the extent of erosion and/ or rilling on the pre-vegetated surface can and will be used to monitor the values given in the table above, with the expectation that the values may change both due to additional data obtained during the operational phase and due to variations in the soils used in rehabilitation process. Importantly, the landform design work aims to limit the TF values for areas outside of the drainage lines to generally less than 50, although localised areas in the range of 50 to 150 may occur.

The final landform will be constructed in accordance with this document. As a result of the RR's 2021 Targeted Assessment Program (TAP) on Landform Establishment, MTW has undertaken key improvement actions on landform establishment documentation and procedures (refer to **Table 18**).

TABLE 17: 2021 LANDFORM ESTABLISHMENT TAP RECOMMENDATIONS AND MTW RESPONSE

TAP Recommendation	MTW Response
A. Undertake a revised risk assessment to identify all risk and risk controls (treatments) associated with mine rehabilitation and closure. The risk assessment should include information on how control effectiveness is assessed, and how updates to the risk assessment are undertaken as a result. The risk assessment needs to be specific to actual causes and controls used rather than listing management plans only. The risk assessment should include input from a suitably qualified team of appropriately skilled people representing a cross-section of the workforce and activities undertaken at the mine. It is recommended that a suitably qualified landform design specialist is involved in the next rehabilitation risk assessment review process. The risk assessment should specifically address the knowledge gaps identified above. Guidance on the range of risks to consider can be found on the Regulator's website.	Revised risk assessment undertaken with Landform Design specialists.
B. Material characterisation practices should be reviewed to ensure the assumptions of previous studies and assessments are validated, specifically in relation to tailings material. The mine should also undertake regular testing of all waste materials to confirm their geochemical properties. Moreover, the mine should consider the presence of 'problematic seams and measures' within the void floor and develop appropriate risk control treatments to manage potential geochemical issues, including incorporation within the Trigger Action Response Plan.	Review characterisation practices for tailings material. Include material management procedures for Archerfield Sandstone if future open cut or underground mining targets the Bayswater coal seam. Update maps showing sulphur levels in mined seams to confirm there is no increasing trend in future mining areas.
C. The mine should establish an inventory of materials (e.g. inert capping material etc.) to ensure there is enough material available for emplacement and or capping to achieve nominated final landform and sustainable rehabilitation outcomes, specifically material that was noted as being beneficial for incorporation within the cap (eg clays). The risk assessment should include an assessment of the risk and appropriate controls in the event of a shortage of material for capping.	The RMP risk assessment involved Landform Establishment experts. MTW identified opportunities to strengthen the Tailings Management Plan to include procedures around the storage, characterisation, and location of overburden and capping material. See **Section 3** or **Appendix B** for greater detail.
D. An assessment of the final landform hydrological performance and surface water management requirements of the WREs and tailings facilities post-closure is required, noting specific requirements in ANCOLD and now the ICMM Global Tailings Standard Review that	Assessment to be conducted.

TAP Recommendation	MTW Response
stipulates design life requirements for tailings facilities at closure. The design of the final landform to meet the performance requirement should be developed. This includes the initial design of significant surface water management structures that may be required.	
E. Review the tailings capping strategy to ensure performance requirements support the nominated rehabilitation outcomes (for example, cap design to minimise potential impacts from future tree root penetration, geochemical management requirements of tailings material etc) and is not limited to geotechnical stability.	Review to be conducted.
F. Implement a landform construction quality assurance process to ensure a comprehensive validation that the landform has been constructed in accordance with the design as well as provide evidence to support the final landform sign-off. The quality assurance process should also provide a TARP for landform construction tolerances of the design. Further formalisation, including quality assurance should be implemented for when landforms transition from control of 'operations' to 'environment/rehabilitation' teams.	Quality assurance process to be developed and implemented.
G. To assess the long-term stability of final landforms constructed across the site (both currently constructed and proposed), consider using a Landform Evolution Model (LEM) to determine the scope (if any) of management/maintenance requirements that may be needed to address potential erosion issues.	Assessment of final landform using a LEM to be conducted during Forward Program period.
H. The collection of actual erosion field parameters (e.g. soil loss and movement) to facilitate erosion model development and to validate the landform design performance over an extended period of time. This will also facilitate in providing evidence to support the eventual closure and relinquishment sign-off process to demonstrate that the risk of unacceptable long-term erosion from the rehabilitated landform is low.	Collection of erosion field parameters to be conducted to facilitate erosion model development.
I. The mine should further develop the rehabilitation objectives and completion criteria in line with the final land use (including target vegetation communities on site), which will also require refinement of the current rehabilitation monitoring program to ensure the range of required performance indices are being measured.	Review rehabilitation completion criteria for target EEC with consideration of guidance from Ancillary Rules.

6.2.3.1. Water Management Infrastructure

Construct Final Landform Drainage Structures

Final landform drainage structures will be designed and constructed to be consistent with the design included in the Rehabilitation Management Plan. Rehabilitation areas will be surveyed and drainage structures (e.g. channels and contour banks) will be constructed in accordance with the survey design to produce a free draining final landform.

There may be a requirement to add additional sediment dams to control runoff from newly rehabilitated areas. The drainage pattern of the final landform will be designed to integrate with the surrounding catchments and will be revegetated to achieve long term stability and erosion control and will be integrated into the final landform and revegetation strategy.

6.2.3.2. Final Landform Construction: General Requirements

Bulk Pushing and Minor Earthworks

Bulk pushing and minor earthworks are undertaken to shape the constructed landform to the desired profile. Overburden is shaped and designed to be compatible with adjacent land surfaces and will be generally consistent with the Final Landform Features Plan. Across the MTW site, the surrounding landscape and visual amenity have been considered in final landform modelling and design. The figures below represent the alluvial analogues used in MTW's geomorphological landform design approach.

FIGURE 4: 3D REPRESENTATION OF WARKWORTH NORTH PIT FINAL LANDFORM INCORPORATING MICRO-RELIEF AND NATURAL DRAINAGE LINES

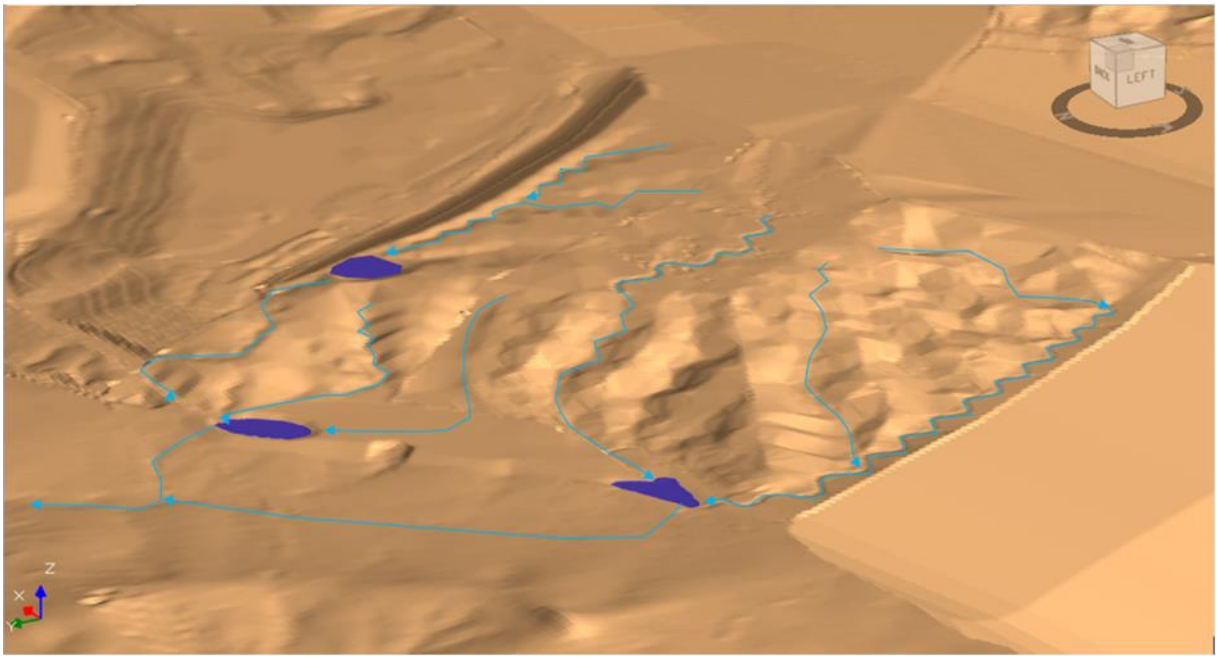


FIGURE 5: 3D REPRESENTATION OF WARKWORTH WEST AND SOUTH PIT FINAL LANDFORM INCORPORATING MICRO-RELIEF AND NATURAL DRAINAGE LINES

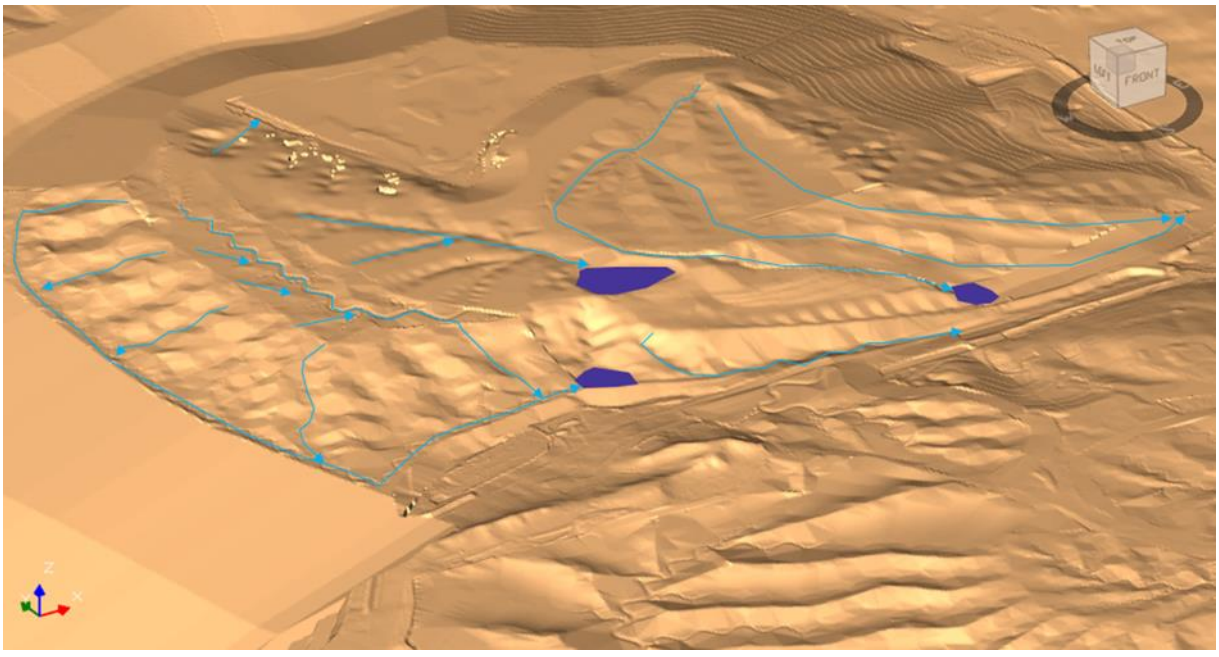
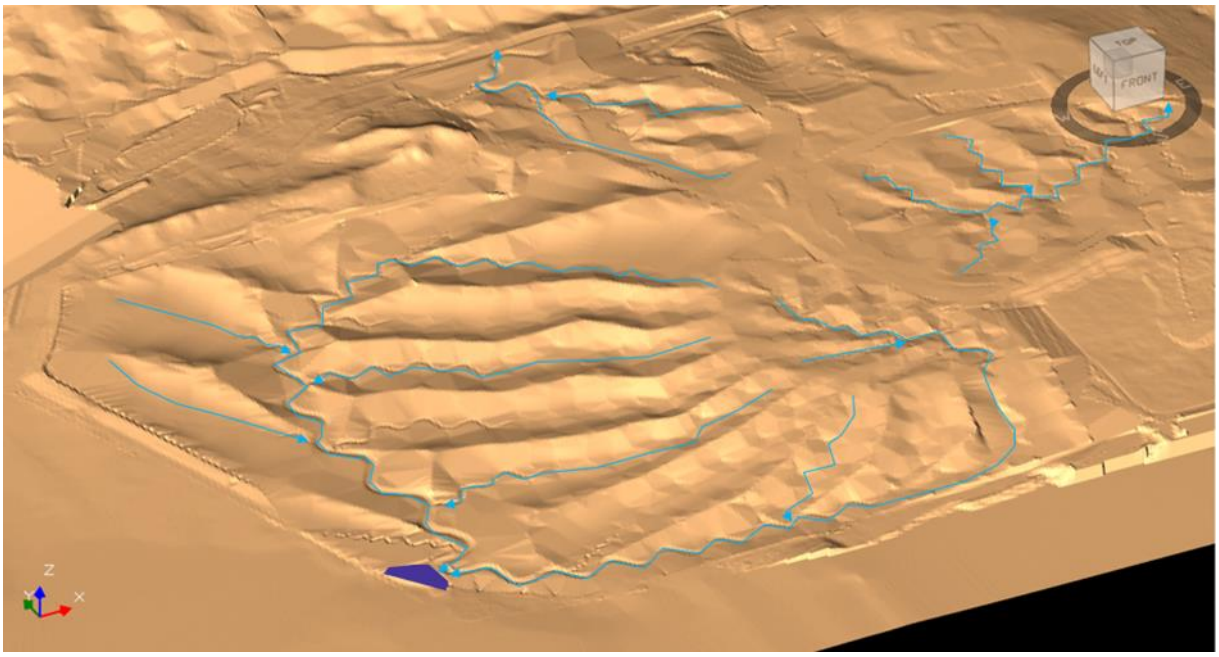


FIGURE 6: 3D REPRESENTATION OF MT THORLEY LODERS PIT FINAL LANDFORM INCORPORATING MICRO-RELIEF AND NATURAL DRAINAGE LINES



The Landform Establishment Phase rehabilitation completion criteria are assessed as follows:

- The initial design uses the relationship between catchment area and slope (raised to the factor of 1.5) to compile a Topography Factor (TF). The TF computation is a useful method of assessing erosion risk but is indicative only since it does not include detailed sediment transport analyses.
- From analyses in the general area and on other sites in the local area, it is expected that areas with various topography factors set out in **Section 6.2.1.10** will require the surface treatments indicated to limit the erosion risk both prior to vegetation establishing and post re-vegetation.

6.2.3.3. Final Landform Construction: Reject Emplacement Areas and Tailings Dams

Landform construction at TSFs have begun at MTW. In 2015 capping Tailings Dam No. 1 was completed using small contractor equipment and a design which stabilised cover over the tailings surface to allow the use of large equipment during the second stage of landform construction and capping.

REA and Tailings Facilities landform design are developed by suitably qualified experts. Tailings management during the active mining phase as per the MTW Tailings Management Plan considers and prepares for the landform design and establishment phase.

6.2.3.4. Final Landform Construction: Final Voids, Highwalls and Low walls

A Final Void is the remnant open pit left at mine closure. A single final void in North and West pits is planned to remain in place at completion of mining. Final voids will be used for water storage post-mining. The objective is for the final voids to be safe, stable and non-polluting. So far as is reasonable and feasible, final voids will be designed and constructed to:

- Minimise the size and depth of final voids;
- Minimise the drainage catchment of final voids;
- Minimise high wall instability risk;
- Maximise groundwater flows across back-filled pits to the void, having regard to their function as long-term groundwater sinks; and
- Minimise risk of flood interaction for all flood events up to and including the 1% AEP.

Additional detail will be required in the Final Closure Plan including final void water balance assessment, geotechnical studies, and future water licensing requirements.

6.2.3.5. Construction of Creek/River Diversion Works

There are no creek or diversion works required at closure. There are some existing clean water diversions which will remain in place at closure, including Doctors Creek.

6.2.4 Growth Medium Development

The soil types and their suitability for rehabilitation are presented in **Section 6.2.1.1**. Growing media will be tested prior to the growth medium development phase to determine soil ameliorants and consistency with the Completion Criteria. Additional treatments will be based on these soil analyses.

MTW maintain the following key objectives in relation to soil management:

- Minimising bare soil patches, which would be affected by wind and water movement and the introduction and transportation of resources into and out of the system; and
- Favourable nutrient, infiltration, and stability characteristics for the nominated vegetation communities.

Table 18 contains the feedback from the Resources Regulator's Soils and Materials Management TAP received by MTW in 2020 as well as MTW's response actions. Controls and treatment plans not outlined in **Table 18** are detailed in **Section 3**.

TABLE 18: 2020 SOILS AND MATERIALS MANAGEMENT TAP RECOMMENDATIONS AND RESPONSE

Resources Regulator Recommendation	MTW Response
1. Undertake a specific rehabilitation risk assessment to identify the range of risks and associated controls throughout the life of mine to achieve sustainable rehabilitation outcomes. Guidance on the range of risks to consider can be found on the Regulator's website.	Completed as part of the RMP
2. Develop a formalised quality assurance process throughout the life cycle of rehabilitation, which includes the verification of execution of procedures by responsible personnel as well as the recording of key data at each rehabilitation phase (e.g. actual methodologies undertaken, weather conditions etc.).	**Section 7** of the RMP. To be further developed as per the RMP Risk Assessment.
3. Set aside sufficient material to facilitate the future capping of the Loders and Central Ramp tailings dams.	Interim capping stockpile design has been completed for Loders Pit TSF. Studies planned in Forward Program period to reduce the capping requirement on this facility at closure. Centre Ramp TSF will be capped during the operational phase of the mine allowing capping material to be sourced from West Pit prestrip operations.
4. Further development of the rehabilitation objectives and completion criteria in line with the target EEC on site, which will also require refinement of the current rehabilitation monitoring program to ensure the range of required performance indices are being measured. Further guidance will be provided in the Ancillary Rules, which are anticipated to be soon published by the NSW Government.	Review rehabilitation completion criteria for target EEC with consideration of guidance from Ancillary Rules.
5. Consider the following opportunities that may assist in enhancing the rehabilitation areas on site where there is an obligation to establish endangered ecological communities (EEC): • the use of the topsoil seedbank (where viable) as a means to improve the species richness of the target EEC; and • undertake ecological enhancement works in advance of clearing (e.g. weed control) to maximise the value of the biological resource for salvage.	Maximise use of fresh topsoil on rehabilitation areas to benefit from topsoil seed bank. Target future stripping areas in weed control programs to maximise value of topsoil resource.

6.2.4.1 Key Controls Relating to Growth Medium Development

Following the surface shaping of landform establishment rehabilitation areas are rock-raked prior to any further treatment. Topsoil, where used, is to be spread at a nominal thickness of 100 mm.

Whenever possible, topsoil will be transferred directly from stripping to re-spreading operations to reduce the possibility of structural damage and maintain biological activity and potential. Topsoil is typically spread using D6 sized dozers to minimise structural damage.

Regular soil analysis is undertaken on re-contoured areas to determine suitable ameliorants for revegetation.

Soil modifiers, such as gypsum, are applied where required to improve topsoil condition. Gypsum and compost material is initially spread and incorporated into the recovered topsoil using an aerator implement.

Organics such as composted municipal or green waste materials may be used in place of chemical fertilisers to enhance soil nutrient and organic levels and improve soil structure. Suitable organic additives may also be used in accordance with industry lead practice and research findings to improve soils in areas to be returned to native vegetation.

6.2.5 Ecosystem and Land Use Establishment

Table 19 outlines the species selection options for planting and seeding to reach final land use and rehabilitation objectives. The recommended seed quantities for grassland and woodland areas are outlined below this, in **Table 20**. The sowing rate of seed is separated by category and again by functional group for each community.

TABLE 19: SPECIES OPTIONS, MINIMUM NUMBER OF SPECIES, AND MINIMUM NUMBER OF GENERA FOR DESIGN OF INDIVIDUAL SPECIES MIXES

Category	Min. no. species		Min. no. genera		Reference list/species pool
	Woodland Mix	Pasture/ Light Wooded Mix	Woodland Mix	Pasture/ Light Wooded Mix	
Trees					
Dominant tall trees	3	3	1	1	*Eucalyptus blakelyi, Eucalyptus crebra, Eucalyptus fibrosa, Eucalyptus moluccana, Corymbia maculata*
Sub-dominant tall trees	2	1	1	1	*Angophora floribunda, Eucalyptus albens, Eucalyptus glaucina, Eucalyptus punctata, Eucalyptus tereticornis*
Small trees nitrogen fixing	2	1	1	1	*Acacia implexa, Acacia parvipinnula, Acacia salicina, Allocasuarina leuhmanii,*
Small trees non-nitrogen fixing	2	1	2	1	*Brachychiton populneus, Bursaria spinosa, Callitris endlicheri, Notelaea microcarpa*
Shrubs/woody climbers					
Primary colonising and/or short-lived Acacias	2	1	1	1	*Acacia crassa, Acacia cultriformis, Acacia elongata, Acacia falcata, Acacia filicifolia, Acacia spectabilis*
Long lived and/or understory Acacias	2	2	1	1	*Acacia amblygona, Acacia decora, Acacia paradoxa*
Nitrogen fixing shrubs-non-Acacias (*Fabaceae* family)	3	2	2	1	*Daviesia genistifolia, Daviesia ulicifolia, Hardenbergia violacea, Indigofera australis, Jacksonia scoparia, Pultenaea spinosa*
Non-nitrogen fixing shrubs	4	N/A	3	N/A	*Breynia oblongifolia, Cassinia arcuata (syn. Cassinia sifton), Cassinia quinquefaria, Dodonaea viscosa subsp. cuneata, Kunzea ambigua, Melaleuca decora, Melaleuca nodosa, Myoporum montanum, Olearia elliptica, Ozothamnus diosmifolius, Pandorea pandorana, Senna artemesioides subsp. Zygophylla, Spartothamnella juncea (syn. Teucrium junceum)*
Subshrubs					
	3	N/A	2	N/A	*Atriplex semibaccata, Einadia hastata, Einadia nutans, Einadia polygonoides, Einadia trigonos, Enchylaena tomentosa, Eremophila debilis, Hibbertia obtusifolia, Maireana microphylla, Solanum cinereum*
Forbs					

Category	Min. no. species		Min. no. genera		Reference list/species pool
	Woodland Mix	Pasture/ Light Wooded Mix	Woodland Mix	Pasture/ Light Wooded Mix	
	6	1	5	1	*Ajuga australis, Calocephalus critreus, Calotis cuneifolia, Calotis lappulacea, Chrysocephalum apiculatum, Desmodium brachypodum, Glycine clandestina, Glycine tabacina, Haloragis heterophylla, Mentha satureoides, Sida corrugata, Sida hackettiana, Swainsona galegifolia, Vittadinia spp., Wahlenbergia spp.*
Grasses					
Grasses primary colonising	4	4	3	3	*Austrostipa scabra, Bothriochloa biloba, Bothriochloa decipiens, Bothriochloa macra, Chloris truncata, Cynodon dactylon, Digitaria spp, Panicum effusum*
Grasses long term understorey	5	4	3	3	*Aristida spp., Austrodanthonia spp., Austrostipa aristiglumis, , Austrostipa bigeniculata, Capillipedium spicigerum, Chloris ventricosa, Dicanthium sericeum, Elymus scaber, Eragrostis spp., Eulalia aurea, Heteropogon contortus, Paspalidium distans, Sporobolus creber, Themeda avenacea, Themeda triandra*
Grasses long term understorey shade tolerant	4	1	3	1	*Austrostipa ramosissima, Austrostipa verticillata, Aristida spp., Cymbopogon refractus, Dichelachne crinita, Echinopogon caespitosus, Echinopogon ovatus, Entolasia stricta, Imperata cylindrica, Joycea pallida (syn. Rytidosperma pallidum), Microleana stipoides, Oplesminus aemulus*
Monocots other than grasses					
	4	2	3	1	*Carex appressa, Carex inversa, Cyperus gracilis, Dianella spp., Fimbristylis dichotoma, Gahnia aspera, Juncus usitatus, Lomandra confertifolia, Lomandra filiformis, Lomandra longifolia, Lomandra multiflorus*

TABLE 20: SEED QUANTITIES FOR EACH SPECIES CATEGORY

Category	Woodland mix	Pasture/ Light Wooded Mix
	Approximate Sowing rate kg/ha	
Trees		
Dominant tall trees	0.4	0.1
Sub-dominant tall trees	0.1	0.05
Small trees- nitrogen fixing	0.25	0.2
Small trees- non-nitrogen fixing	0.25	0.05
Trees total	**1.0**	**0.4**
Shrubs		

Category	Woodland mix	Pasture/ Light Wooded Mix
	Approximate Sowing rate kg/ha	
Primary colonising and/or short-lived Acacias	0.5	0.25
Long lived and/or understory Acacias	0.5	0.25
Nitrogen fixing shrubs-non-Acacias (*Fabaceae* family)	0.75	0.25
Non-nitrogen fixing shrubs	0.75	0
Shrubs total	**2.5**	**0.75**
Sub shrubs		
	0.5	0
Forbs		
	0.5	**0.1**
Grasses		
Grasses primary coloniser	5.0	5.0
Grasses long term understorey	5.5	10.5
Grasses long term understorey shade tolerant	1.5	1.5
Grasses total	**12.0**	**17.0**
Monocots (other than grasses)		
	0.5	**0.25**
TOTAL	**17.0**	**18.5**

MTW's current revegetation strategy focuses on collection of seed prior to disturbance, propagation of collected seed, as well as alternative seed vectors, such as topsoil and seed-dispersing fauna. Planting of tubestock and seedlings include preparation by dozer ripping, hand auguring, and weed control. Plants are watered, fertilised, and protected with tree guards.

Table 19 describe the coloniser to long-lived species selection for the Woodland and Grassland vegetation communities. Short-lived coloniser species primarily include Acacias as well as multiple grass species. These pioneer grasses will be used as cover crops to provide erosion and weed protection whilst the target species mix is established.

Seed supply should be planned well in advance of planting to ensure sufficient quantity, diversity and quality are available, specifically rare species that may be difficult to source. Seed with local provenance that occur on similar topography, climatic conditions and soil types to where they are sown on the rehabilitation should be prioritised. Just as important is to source seeds that have high levels of genetic diversity, collected from plants that are spaced at least three plant-heights apart. This prevents the collection of too many closely related seeds. Quality seed will greatly increase the chances that the rehabilitation completion criteria can be met. Using seed of poor physical or genetic quality will result in poor germination, poor growth, lower resistance to diseases and pests, an inability to adapt to climate change and environmental shocks, an inability to self-regenerate and reduced diversity (Rawlings, et al., 2010).

Revegetation will be undertaken progressively as the surface preparation of mine spoil is completed. At the time of sowing all pasture revegetation areas are treated with up to 400 kg/ha of “Starter 15”, “Grower 11” or equivalent fertiliser. Grasslands will be maintained by periodic aerial applications of fertiliser (typically 100 - 250 kg/ha) until they become well established.

Stock grazing will not be commenced until the areas of grassland are well established and area securely fenced. Stocking rates will be carefully monitored to ensure that the areas are not overgrazed. Vehicular traffic will be generally kept off revegetation areas and restricted to designated access tracks.

Weeds will be controlled using appropriate management techniques, as the company is obliged to control weed growth on site under the Noxious Weeds Act 1993 (NSW). If weeds occupy greater than twenty percent of ground cover area in rehabilitation, they will be sprayed or controlled by other methods.

6.2.6 Ecosystem and Land Use Development

Information from analogue site monitoring in 2019 and 2020 is incorporated into the MTW Performance Criteria. As analogue site monitoring continues, so will the refinement of the Rehabilitation Performance Criteria.

In areas returning to post mining land use of grassland, progressive rehabilitation will allow stock to graze new areas when pasture is considered stable. This assessment will be based on the data collected from defined monitoring programmes, which utilises data collected from analogue sites as a basis for comparison to post mined lands. Stock water will be available from various sediment control dams and designated woodland and biodiversity areas will be protected by fencing.
Grazing in rehabilitation areas returned to grasslands will be controlled through formal licence agreements with the graziers involved. The typical arrangements under MTW Licence Agreements include:

- Licence conditions requiring the Licensee to manage the property in accordance with best agricultural and environmental practice i.e. grazing management, bushfire management, weed management and avoidance of vegetation clearing;
- Property inspections by the Specialist – Land Management, Land & Tenements MTW personnel to audit quality of property management; and
- Soil testing to check nutrient and soil carbon levels are being maintained.

Within 10 years of the completion of mining operations, Clause 29 of the NSW Planning Approval SSD-6464 for Warkworth Continuation Project requires the retirement of ecosystem credits from the 2,100ha of rehabilitation that has been returned to Central Hunter Grey Box – Ironbark Woodland EEC. The Woodland – EEC rehabilitation areas will therefore be legally protected under a Biodiversity Stewardship Agreement agreed with OEH and entered into with the Biodiversity Conservation Trust. The rehabilitation area protected under the Biodiversity Stewardship Agreement will include a further 235ha of woodland to meet the total woodland re-establishment requirement (2,335ha) of federal approval EPBC 2009/5081 Condition 11(c).

MTW proposed the following maintenance and corrective action activities include:

- Weed and feral animal control of rehabilitation;
- Erosion control works;
- Maintenance fertilising;
- Re-seeding; and
- Repair of fence lines, access tracks and other general related land management activities.

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6.3. Rehabilitation of Areas Affected by Subsidence

As MTW is an open cut operation, subsidence has been regarded as a negligible risk. Regardless, mine subsidence was examined and risk-ranked in the RMP Rehabilitation Risk Assessment. No subsidence incidents have been recorded at MTW. As such this RMP does not introduce measures and methods to address subsidence impacts to rehabilitation during the active phase of mining.

7 REHABILITATION QUALITY ASSURANCE PROCESS

The table below outlines the proposed rehabilitation and quality assurance process for MTW. This has been updated based on the quality assurance records determined during the risk assessment process. This table will continue to be reviewed.

TABLE 21: REHABILITATION QUALITY ASSURANCE PROCESS

Phase	Key Quality Assurance Steps	Current Record Status (In place/still required)
Active Mining	Up to date mine plans and engineering signoff.	Completed for this RMP.
	Documentation of pre-clearance surveys.	Required for any future clearing.
	Maintenance of a topsoil inventory to document stripped, stockpiled and re-spread resources.	Currently in place, but further work is required.
	Regular inspections of erosion and sediment controls.	Inspections currently being completed.
	Regular inspections to identify potential weed infestations. Details of weed status included in rehabilitation monitoring.	Inspections currently being completed
	Weed management spraying records.	Current records kept.
	Regular inspections to review spontaneous combustion.	Currently being completed.
	Soil testing to determine PAF.	Previously completed and reviewed during rehabilitation monitoring.
Decommissioning	Inspections and demolition reports to confirm all infrastructure has been removed.	Still required prior to closure. To be covered in Final Closure Plan.
	Removal of waste	Waste records.
	Validation testing to ensure any contamination/hazardous substances has been appropriately remediated and/or removed.	Still required prior to closure. To be covered in Final Closure Plan.
	Public safety risks are assessed during decommissioning.	Fencing, signage, security. To be covered in Final Closure Plan.
Landform Establishment	Landform survey Quality assurance signoff of constructed landforms including slopes, landforms and water drainage structures.	Inspections and rehabilitation monitoring is completed, but further validation of existing landforms are required prior to closure. Records for design and construction of landforms to be kept for future rehabilitation. To be covered in Final Closure Plan.
	Records of tailings and reject capping depth at site. MTW will use a minimum of 5 metres of capping in areas of woodland rehabilitation that is to be completed over tailings dams, unless a risk assessment has indicated that this amount of capping is not required.	Further work is required. To be reviewed as part of the development of the Final Closure Plan.
	Recording depths of ripping of rehabilitation areas.	Not previously completed, however can be determined from rehabilitation monitoring. Required for future rehabilitation.
	Slopes, geotechnical and stability assessment required for the Final Closure Plan	To be covered in Final Closure Plan.
	Void Water Management Assessment completed as part of Final Closure Plan.	To be covered in Final Closure Plan.
Growth Medium Establishment	Soil assessment for existing rehabilitation areas.	Covered in rehabilitation monitoring.
	Soil assessment for future rehabilitation areas.	Required prior to future rehabilitation.
	Register of topsoil and subsoil for future rehabilitation.	Not yet complete
	Records of identification and management of actual acid forming, potentially acid forming (PAF) and non-acid forming (NAF) material and ongoing monitoring.	Geochemical testing has been undertaken

Phase	Key Quality Assurance Steps	Current Record Status (In place/still required)
	Testing as per the MTW's Acid Rock Drainage and Mineral Waste Management Plan.	
Ecosystem and Land use Establishment	Documentation of seeding or planting activities undertaken including: • Date of planting; • Weather conditions; • Seed mix; • Seeding rate (kg/ha) and/or planting rate (tubestock/ha); • Fertiliser rate (kg/ha); • Records of the salvage of all rehabilitation resources including suitable capping materials, topsoils/subsoils, seeds, habitat structures (e.g. tree hollows and rocks) for use in rehabilitation.	Not all records available for existing rehabilitation sites. Records to be kept for future rehabilitation programs. Records of existing and proposed rehabilitation monitoring.
	Regular site inspections of rehabilitated areas to allow early identification of any emerging threats to rehabilitation.	Monthly inspections completed.
	Rehabilitation monitoring in accordance with Section 8 of the RMP to monitor the success of rehabilitation.	Records of existing and proposed rehabilitation monitoring.
	Continuation of environmental monitoring program.	Ongoing. To be reviewed closer to final closure.
	Weed and feral animal infestations; and Documentation of all weed management and eradication programs and follow-up inspections.	Current records kept.
Ecosystem and Land Use Development	Rehabilitation monitoring in accordance with Section 8 of the RMP to monitor the success of rehabilitation.	Criteria assessed in the annual rehabilitation monitoring.
	Regular site inspections of rehabilitated areas to allow early identification of any emerging threats to rehabilitation.	Monthly inspections.
	Weed and feral animal infestations; and Documentation of all weed management and eradication programs and follow-up inspections.	Current records kept.

The rehabilitation quality assurance process will be used when planning future rehabilitation activities. The objective for rehabilitation will be one of continuous improvement and includes:

- Utilising relevant industry best practice rehabilitation techniques;
- Utilising key personnel with rehabilitation and closure experience;
- Continuing to undertake rehabilitation monitoring and assessing against rehabilitation criteria; and
- Reviewing rehabilitation performance against the Trigger Action Response Plan in **Section 10**.

8 REHABILITATION MONITORING PROGRAM

8.1 Analogue Site Baseline Monitoring

Native vegetation analogue sites were established in 2016 based on the vegetation types cleared from the site as well as the MTW final land use domains. The two Biometric Vegetation Types included the Central Hunter Grey Box – Ironbark Woodland and the Central Hunter Ironbark – Spotted Gum – Grey Box Forest. Since 2021, the analogue site monitoring has been reduced to include only the Central Hunter Grey Box – Ironbark Woodland sites which is consistent with the final land use objective of achieving this vegetation community at the MTW site.

The 2021 Rehabilitation Monitoring Report by Emergent Ecology record the Central Hunter Grey Box – Ironbark Woodland analogue sites as located on two separate blocks of land in the central Hunter Valley. Four of these sites are on land owned by Yancoal, while two are located on land managed by Wambo Coal Mine.

Pasture analogue sites were established in 2015 to allow data to be collected from sites that reflect the local environmental and biophysical conditions, and as such can be used to inform targets for the rehabilitation lands returned to pasture. To ensure the suite of analogue sites appropriately capture the range of conditions occurring in the region, an overlay study was undertaken for the variables of soil type and land capability. The land capability variable was divided into two categories, grouping land capability classes I to III on one hand (i.e. land capable of supporting cultivation and/or grazing), and land capability classes IV to VI on the other (i.e. land capable of supporting grazing only). Land capability classes VII and VIII were excluded as those lands are incapable of agricultural land use, and because no post-mining landforms will be rehabilitated to these lower capability classes at MTW. Other variables of relevance to the selection of appropriate analogue sites included slope and aspect. These variables were accounted for in the field when choosing the location for monitoring site establishment, with various slope steepness and orientation trying to be captured.

Eight analogue sites were selected for monitoring on land adjacent to MTW and Hunter Valley Operations (HVO) that was owned at the time by Coal & Allied. The five analogue sites from the land capability Class IV to VI range are the most appropriate for comparison with the MTW pasture rehabilitation areas.

A consistent and quantitative methodology will be implemented and undertaken on a periodic basis, ensuring a satisfactory number of analogue/baseline sites are established to inform target setting. Data from analogue sites will be used to establish target values for key biophysical parameters and indicators related to pasture land use and vegetation diversity/structure and habitat complexity. Permanent quadrats will be established and reassessed at a maximum of two-year intervals, at least in the short term, to ensure restorative strategies (i.e. maintenance of soil health, maintenance of ground cover, achievement of suitable species richness etc.) are progressing as desired.

Information from monitoring of analogue sites has been used to inform the setting of targets for performance criteria. In the assessment of native vegetation rehabilitation quality, MTW use either benchmark values calculated from the Biobanking data of the analogue site or the published OEH benchmark values for HU817.

Grasslands will be maintained by periodic aerial applications of fertiliser (typically 100 - 250 kg/ha) until they become well established.

8.2 Rehabilitation Establishment Monitoring

In new revegetation sites, an annual monitoring program will be required as the site rapidly changes and can be vulnerable to effects of climates, pests and diseases. In addition, general inspections for erosion (particularly drainage lines), survival, mortality, weed control and pests will be undertaken more regularly and at least biannually until the sites have become well established. The duration between monitoring periods can be lengthened to five yearly intervals once it has been established that the

restorative strategies are appropriate and that conservation objectives are being met. Inspections of drainage lines in rehabilitation areas will be conducted on a quarterly basis during the first year.

The native vegetation monitoring methodology adopted is a standard and simple procedure that can be replicated over any vegetation community or rehabilitation area and allows results to compare similar communities. The methodology uses a combination of:

- Landscape Function Analyses (LFA) (CSIRO Tongway and Hindley 1996);
- accredited soil analyses and various measures of ecosystem diversity and habitat values (adapted from CSIRO Gibbons 2002); and
- the Biobanking Assessment Methodology - Site Value Score (OEH 2014).

Permanent transects and photo-points will be established to record changes in structural diversity, floristics, and other biodiversity/land use attributes. These methods will provide quantitative data that measures changes in:

- Floristic diversity including species area curves and growth forms;
- Ground cover diversity and abundance;
- Vegetation structure and habitat characteristics (including ground cover, cryptogams, logs, rocks, litter, projected foliage cover at various height increments);
- Understorey density and growth (including established shrubs, direct seeding and tubestock plantings and tree regeneration);
- Overstorey characteristics including tree density, health and survival; and
- Other habitat attributes such as the presence of hollows, mistletoe and the production of buds, flowers and fruit.

The pasture monitoring methodology adopted allows for rehabilitation areas to be compared with local unmined pasture lands. The methodology uses a combination of:

- Landscape Function Analyses (LFA) (CSIRO Tongway and Hindley 1996);
- Accredited soil analyses;
- Botanal or Ground Cover assessments; and
- Forage Quality – Feed Analysis.

Landscape Function Analysis (LFA) is a methodology used to assess key indicators of ecosystem function including landscape organisation and soil surface condition as a measure of how well the landscape retains and uses vital resources. The indicators used quantify the utilisation of the vital landscape resources of water, topsoil, organic matter and perennial vegetation in space and time.

LFA methodology collects data at two “nested” spatial scales:

- At coarse scale, landscape organisation is characterised. Patches and interpatches, indicators of resource regulation, are mapped at the 0.5 to 100 m scale from a gradient-oriented transect (making sense of landscape heterogeneity); and
- At fine scale, soil surface assessment (soil “quality”) examines the status of surface processes at about the 1-m scale, with rapidly assessed indicators on the patches and interpatches identified at coarse scale.

Soil analysis will be used to collect data on the rehabilitation sites, compare this to the analogue sites, and therefore predict emerging issues during rehabilitation establishment. Standard soil sampling techniques with a core sampler within a monitoring quadrat will be used. Cores are to be taken at each site and bulked together. Soil samples are to be sent to an accredited laboratory

for analysis. Soil analysis will consist of the parameters pH, EC, Available Ca, Mg, K, Ammonia, sulphur, organic matter, exchangeable Na, Ca, Mg, K, H, Al, cation exchange capacity, available and extractable phosphorus, micronutrients (Zn, Mn, Fe, Cu, B), Total Carbon and Nitrogen. To assist in the interpretation of the data a report with analysis and appropriate recommendation will be provided by the laboratory.

Site Value is the quantitative measure which forms part of the Biobanking *Assessment Methodology* (OEH 2014) and is a quantitative measure of the condition of native vegetation assessed for each vegetation zone. This value can be used to determine the condition of the certain habitat attributes used by threatened species on the site. The calculation of the Site Value Score is determined from the assessment of the data obtained from the defined transect and then compared to benchmark ranges obtained from local reference sites. This methodology will assist in informing MTW's adaptive management and continuous improvement approach to rehabilitation.

Botanal (Tothill et al 1992; Hargreaves and Kerr 1992; McDonald et al 1996) is a technique for the visual estimation of botanical composition, herbage mass and ground cover of pastures. It was added to the rehabilitation monitoring programme following consultation with NSW DPI Agriculture as it provides the following benefits:

- A 'whole-of-paddock' vs. a fixed transect-based assessment. The technique covers a much wider sampling area than the transect approach and as such provides a more comprehensive and representative assessment of pasture performance, factoring the variability of pasture quality across individual paddocks.
- Obtaining practical data that allows the land manager to make inform decisions in terms of carrying capacity and stocking rates.

The Botanal tool is most useful to assess the quality of well-established pastures, and as such is not applied at those younger rehabilitated sites where pasture establishment is in progress. At the younger rehabilitation sites, where Botanal is not implemented, a rapid ground cover assessment is undertaken.

Forage quality is determined for all well-established pasture sites. Sampling is undertaken at random by taking between 15 and 20 'grab' samples at grazing height across the Botanal polygon study area. All 'grabs' are combined and mixed well. The green fraction of the sample was then immediately separated from the dead fraction whilst in the field, and both sub-samples stored in refrigerated conditions. At completion of the field survey programme, all samples are sent to an agricultural laboratory for feed quality testing using overnight courier. The feed quality results are then combined with the Botanal data (i.e. total green and dead herbage mass) to determine the amount of feed available, and derive potential carrying capacities and stocking rates for the sampled areas based on the NSW DPI's 'Beef stocking rates and farm size – Hunter Region' (2006).

8.3 Measuring Performance Against Rehabilitation Objectives and Rehabilitation Completion Criteria

The combination of monitoring methodologies described in **Section 8.2** allows the site to be assessed over time with the resultant data enabling MTW to assess the trajectory of the ecosystem being monitored whilst also providing an overall assessment of lands in terms of land capability. In turn, this data can be used to decide if the site is converging on a target functional state or requires further treatment plans.

In response to two Notice of Directions issued by DPE on 5 July 2019, Yancoal commissioned Emergent Ecology to produce an Independent Review of Rehabilitation Progress on MTW rehabilitation.

Periodic cluster analysis and ordination analysis will be undertaken of the floristic data from rehabilitation and reference sites to see how the floristic composition compares. This will provide confidence that rehabilitation has the composition of the targeted vegetation community and identify sites that may require targeted additional seeding/planting.

MTW will evaluate the rehabilitation monitoring and methodologies annually based on performance and consultation with key stakeholders. Any changes will be outlined in the RMP and Annual Review.

9 REHABILITATION RESEARCH, MODELLING AND TRIALS

9.1. Current Rehabilitation Research, Modelling and Trials

Research at MTW is undertaken in conjunction with organisations such as DPE, NSW State Forests and the NSW Minerals Council. Some examples of research and resulting rehabilitation techniques include:

- Establishing forests by direct seeding into overburden emplacements or CPP reject without topsoil;
- Developing a sustainable pasture mix that provides year round grazing capacity;
- Managing rehabilitated areas so that viable grazing land is maintained;
- Nutrient cycling in rehabilitated mine spoils;
- Phytoremediation treatment of hydrocarbon contaminated soils;
- Trialling the performance of rehabilitation areas as grazing land.

Compost Trials

Mixed source compost trials have been managed by MTW since 2011. These rehabilitation trials have contributed to the site's knowledge base on soils and materials and biological resources, assisting to manage multiple risks prior to reaching the Growth Medium Development Phase. The trials assessed mixed source compost as a soil ameliorant for rehabilitation. The mixed source compost material was also assessed in the context of two substrates, with topsoiled and spoil areas being used in the trial. The purpose of the research was to ascertain the effectiveness of compost as opposed to traditional chemical fertilisers in both areas of pasture mix and diverse tree/shrub/understorey native species mix. Investigations were undertaken in relation to the inoculation of the compost stockpiles to mitigate odour nuisance for onsite personnel whilst also improving the agronomic properties of the compost.

In 2018 mixed source compost was replaced with an alternative green waste material. This was due to the EPA's revocation of the waste exemption that permitted the use of Mixed Waste Organic Output (MWOO) on mine rehabilitation.

Trialling compost application and incorporation to topsoil and spoil areas has resulted in improved methods of growth media management. The results of the compost trials have informed the scope and design of future compost trials.

Native Understorey Establishment Trials

The native vegetation seed mixes used for rehabilitation activities at MTW were modified in 2011 to include more native understorey species diversity. Trials have been undertaken in relation to the sowing techniques for the native seed with previous trials of hydro seeding, hand broadcasting and a triple–disc direct drill machine with a native seed box.

The direct drill method was found to be the most cost-effective and placed seeds at the desired depths. Further, the direct drill enabled seed to soil contact in comparison to broadcasting seed to the surface.

In addition to sowing techniques, banded seed mixes have been assessed to determine if sowing separate bands of tree/shrub seed and native understorey seed is more efficient for establishing trees and shrubs with a diverse native understorey. Results of previous trials indicated that banded seed mixes were not more effective at establishing the desired vegetation so the seed mixes being used have all of the various strata combined.

Woodland rehabilitation trials began in 2011 to assess seed mixes to provide diverse native understorey. 25-30 species of native grasses and other native understorey species were included in the seed mixes to replace exotic grass species used previously to provide erosion protection. Species selection lists have been adjusted to accord to the results of these trials, as shown in **Table 19**.

Carlson Regrade Landform Investigation

The purpose of this study is to investigate the effect on dump volume and dump extents (i.e. dump limits and heights) from using the Carlson package to design the landform. It is understood that the benefits of using Carlson Regrade is that it will produce more natural looking landforms with inherent stability, removing the need for contour drains and rock lined drop structures to convey water off slopes.

This investigation will inform landform establishment activities in the active mining phase and into the landform establishment phase.

Fire Trials

Testing the resilience of rehabilitation areas to disturbance by fire will be an important component of understanding the long-term sustainability of rehabilitation. MTW will conduct pre-burn and post-burn monitoring of rehabilitation areas to gain information on erosional stability and vegetation recovery following prescribed and/or accidental burning.

This trial will inform management measures for the long-term final land use sustainability of the site.

9.2. Future Rehabilitation Research, Modelling and Trials

Yancoal will continue to undertake extensive research into rehabilitating open cut mines in the Hunter Valley.

MTW will undertake trials to test the suitability of different compost types for use on topsoil and mine spoil growth mediums. This information will be included in the next Forward Program as MTW are still developing a scope of works.

Further details on the outcomes of the trials will be reported in the Annual Rehabilitation Report.

10 INTERVENTION AND ADAPTIVE MANAGEMENT

The Trigger Action Response Plan, outlined in **Table 22,** identifies the proposed contingency strategies in the event of unexpected variations from the trajectory to final land use or impacts to rehabilitation outcomes.

To ensure an adaptive management approach, the outcomes of rehabilitation research and trials will be continually integrated into rehabilitation measures. The results of trials and investigation will be assessed for integration into relevant rehabilitation procedures or documentation.

TABLE 22: REHABILITATION TRIGGER ACTION RESPONSE PLAN

Aspect/ Category	Item	Element	Trigger	Response
Landform Stability	1	Water Management Structures	Water management structures (sediment dams, channels, contour banks) erosion &/or scouring	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as amelioration, revegetation or alternative scour protection as required. Tier 2 - For significant failures or repeat minor failures conduct review of design criteria and construction standards.
	2	Conventional Landform Slope Gradient – General	Overall slope grades > 10 degrees unless otherwise agreed.	Undertake a review of the landform design, including survey if required. Undertake re-grading and revegetation of the area, if required. Note, localised steepening of slopes will occur due to contour bank construction etc.
	3	Conventional Landform Slope Gradient – Ramps	Overall slope grades > 14 degrees unless otherwise agreed.	Undertake a review of the landform design, including survey if required. Undertake re-grading and revegetation of the area, if required. Note, localised steepening of slopes will occur due to contour bank construction etc.
	4	Conventional Landform Slope Gradient – Low Walls Into Voids	Overall slope grades > 18 degrees unless otherwise agreed.	Undertake a review of the landform design, including survey if required. Undertake re-grading and revegetation of the area, if required. Note, localised steepening of slopes will occur due to contour bank construction etc.
	5	Geofluv Landform Slope Gradient	Active rill/gully erosion	Tier 1 - Undertake a review of the landform design, including survey if required. Undertake re-grading, surface treatment and revegetation of the area, if required. Tier 2 - For widespread erosion activity review methods for erosion risk assessment and control measures.
	6	Geofluv Landform Drainage Lines	Drainage line erosion &/or scouring	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as amelioration, revegetation or alternative scour protection as required. Tier 2 - For significant failures or repeat minor failures conduct review of design criteria and construction standards.
	7	Batter Slopes – Final Void	Failure of final void batter slopes.	Undertake a review of final void design, including survey if required. Undertake remedial blasting &/or re-grading of the area, if required.
	8	TSF Final Capping Surface	Settlement of tailings causing ponding of water on TSF capping surface.	An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as backfilling, reinstating drainage lines and revegetating as required.
Spontaneous Combustion	9	Carbonaceous Material on Surface of Rehabilitation	Active spontaneous combustion within rehabilitation areas.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as extinguishment by watering, capping with inert material or excavation and removal as required. Tier 2 - For widespread spontaneous combustion activity review management measures for carbonaceous material.
	10	Exposed Coal Seams	Active spontaneous combustion from exposed coal seams.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as extinguishment by watering or flooding or burial with inert material as required.

Aspect/ Category	Item	Element	Trigger	Response
				Tier 2 - For widespread spontaneous combustion activity review management measures for covering exposed coal seams.
Growth Medium Suitability	11	Acid Rock Drainage	Evidence of ARD products affecting vegetation establishment.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as capping with inert material and revegetating as required. Tier 2 - For widespread ARD activity review management measures for burial of potential ARD producing material.
	12	Chemical and Nutritional Properties	Soil properties atypical for the surrounding landscape &/or outside desirable ranges provided by the agricultural industry: Pasture Trigger Levels (to implement TARP) pH <5.5 or >8.5; Electrical Conductivity >2 dS/m; Phosphorous <40ppm; Organic Carbon <1.5%; Cation Exchange Capacity <12 Cmol+/kg; Exchangeable Sodium Percentage >10%; and Calcium/magnesium ratio <1 or >10. Woodland Trigger Levels pH <5.5 or >8.5; Electrical Conductivity >2 dS/m; Phosphorous and Organic Carbon not within levels in analogue sites by Year 5; Cation Exchange Capacity, Exchangeable Sodium Percentage and Calcium/magnesium ratio not within levels in analogue sites by Year 2.	Engage a consultant to recommend appropriate soil/spoil amelioration. Undertake amelioration and revegetation in accordance with the consultant recommendations as required.
	13	Growth Medium Depth	Soil depth (topsoil and ameliorates) is less than 100mm in areas in the Growth Medium Development phase.	Tier 1 - Top dress with additional suitable topsoil resource and /or ameliorants if required. Tier 2 - For repeat topsoil thickness issues conduct review of topsoil placement procedures and operational practices.
Vegetation Establishment	14	Weed Levels	>10% cover of problematic weed species present in Ecosystem Establishment phase.	Engage land management contractor to control problematic weed using methods such as removal, biological control, herbicide application and slashing. Treatment of infestations as appropriate to the species. Conduct follow-up inspections to assess the effectiveness of weed management measures.
	15	Bushfire Resilience	Rehabilitation areas not able to recover in a reasonable time from effects of bushfire.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as re-seeding affected area as required.

Aspect/ Category	Item	Element	Trigger	Response
				Tier 2 - Review bushfire management procedures particularly with a view to protecting young rehabilitation areas.
	16	Uncontrolled Entry of Livestock or Vehicles	Damage to vegetation caused by uncontrolled access by livestock or vehicles.	An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as fence installation or repairs, maintaining access tracks and sign posting.
	17	Understorey Species Diversity	Understorey species diversity atypical compared to analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as grazing, controlled burning, soil amelioration, reseeding and fertilising as required. Tier 2 - For widespread low understorey diversity review seed mix understorey species composition and seeding rates. Review monitoring results to determine rates of successful establishment for various understorey species in seed mixes.
	18	Tree and Shrub Species Diversity	Tree and shrub species diversity atypical compared to analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as cultivation or spraying to reduce grass competition, reseeding and fertilising as required. Tier 2 - For widespread low tree and shrub diversity review seed mix tree/shrub species composition and seeding rates. Review monitoring results to determine rates of successful establishment for various tree/shrub species in seed mixes.
	19	Tree Density	Tree density is outside typical range for analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as cultivation or spraying to reduce grass competition, reseeding (for low density) and thinning (for high density) as required. Tier 2 - For widespread tree density outside analogue site ranges review seed mix tree species composition and seeding rates. Review monitoring results to determine rates of successful establishment for various tree species in seed mixes. Review seed bed preparation, weed/grass control and sowing procedures.
	20	Ground Cover	Total ground cover < 70% during Ecosystem Establishment phase.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as soil amelioration, soil aeration, reseeding and fertilising as required. Tier 2 - For widespread low results for total ground cover review seasonal mixes and seeding rates.
	21	Tree Growth Rate	Average trunk diameter (dbh) of the tree population measuring growth rate is atypical compared to analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as soil amelioration and fertilising as required. Tier 2 - For widespread low results for tree growth rate review soil amelioration and preparation procedures.
	22	Tree Health	Tree health is atypical compared to analogue sites. Trigger levels still to be determined for tree health in Woodland – Other and Woodland – EEC areas.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as soil amelioration and fertilising as required. Tier 2 - For widespread low results for tree health review land management practices with a view to increasing biodiversity to provide habitat for pest insect predators.

Aspect/ Category	Item	Element	Trigger	Response
	23	Tree Productive Health and Recruitment	Tree health and recruitment levels are atypical compared to analogue sites. Trigger levels still to be determined for tree productive health and recruitment in Woodland – Other and Woodland – EEC areas.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as soil amelioration and fertilising as required. Tier 2 - For widespread low results for tree productive health review land management practices with a view to increasing biodiversity to provide habitat for pollinators.
Fauna Recolonisation	24	Vertebrate Pest Levels	Vertebrate pest species density increased in annual monitoring events or causing significant damage to rehabilitation.	Consult with relevant government agencies (including OEH) to develop and implement appropriate vertebrate pest control programme.
	25	Habitat – Fallen Logs	Total length of fallen logs in Woodland – EEC areas is <50% that of analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as introducing additional fallen timber (consider pruning or thinning standing trees) as required. Tier 2 - For widespread low results for fallen logs review land management practices with a view to reducing loss of logs through regular bush fires or fire wood collection.
	26	Habitat- Hollows	Total length of hollows/ nesting sites in Woodland – EEC areas is <50% that of analogue sites.	An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as introducing stag trees or nest boxes as required.
Ecosystem Function	27	Stability, Infiltration and Nutrient Cycling	LFA indices values for stability, infiltration, nutrient cycling or landscape organisation are trending away from the values of analogue sites.	Tier 1 - An inspection of the site will be undertaken by a suitably trained person. Undertake remedial actions such as soil amelioration, soil aeration, reseeding and fertilising as required. Tier 2 - For widespread negative trends for LFA indices review rehabilitation procedures related to soil amelioration and preparation.

11 REVIEW, REVISION AND IMPLEMENTATION

11.1 Review

In accordance with Clause 11 of Schedule 8A to the Mining Regulation 2016, the lease holder (MTW) must amend the prepared Rehabilitation Management Plan in the following circumstances:

- As a consequence of an amendment made to the rehabilitation objectives, rehabilitation completion criteria or final landform and rehabilitation plan;
- To reflect any changes to the risk control measures in the Rehabilitation Management Plan that are identified in a rehabilitation risk assessment; and
- Whenever directed in writing to do so by the Secretary.

The lease holder (MTW) must ensure that the Rehabilitation Management Plan remains current and relevant to ensure it defines the rehabilitation outcomes to be achieved in relation to the mining area and sets out the strategy to achieve those outcomes.

Whenever any foreseeable hazard is identified that presents a risk to achieving the rehabilitation objectives, the rehabilitation completion criteria and the final landform and rehabilitation plan, the lease holder is required to update the rehabilitation risk assessment and the Rehabilitation Management Plan.

11.2 Responsibilities

Table 23 outlines the responsibilities of key personnel to the review and implementation of the RMP.

TABLE 23: KEY PERSONNEL RESPONSIBILITIES TO THE RMP

Title	Responsibility
Mine Manager	• Implement the procedures referenced in this RMP. • Undertake training in relevant Management Plans and procedures as required. • Provide resources required and support to implement these procedures. • Construct landforms in accordance with this RMP. • Develop dumping strategies to allow for progressive rehabilitation of mined land.
Technical Service Manager	• Implement the procedures referenced in this RMP. • Undertake training in relevant Management Plans and procedures as required. • Provide resources required to implement these procedures. • Develop mine plans to allow for progressive rehabilitation of mined land.
Environmental Specialist	• Prepare the relevant Management Plans. • Implement, monitor and review the programs and procedures linked to this RMP. • Consult with regulatory authorities as required. • Undertake monitoring as required. • Undertake maintenance as required. • Provide measures for continual improvement to this RMP and procedures. • Ensure all personnel undertaking works in relation to this RMP are trained and competent.

Title	Responsibility
	• Report the progress of any rehabilitation and monitoring of biodiversity in the Annual Rehabilitation Report.
Environment – Advisor	• Provide support for the implementation of the Environmental Specialist's responsibilities.

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13 APPENDICES

Appendix A - STANDARD CONDITIONS UNDER MINING REGULATION 2016, SCHEDULE 8A, PART 2

Condition Number	Condition
Division 1 - Protection of the environment and rehabilitation	
4	**Must prevent or minimise harm to environment** (1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease. (2) In this clause-- "harm" to the environment has the same meaning as in the Protection of the Environment Operations Act 1997 .
5	**Rehabilitation to occur as soon as reasonably practicable after disturbance** The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by activities under the mining lease as soon as reasonably practicable after the disturbance occurs.
6	**Rehabilitation must achieve final land use** (1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. (2) The holder of the mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). (3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1). Note--: Clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause. (4) In this clause-- "final land use" for the mining area means the final landform and land uses to be achieved for the mining area-- (a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and (b) for a large mine--as spatially depicted in the final landform and rehabilitation plan, and (c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease--as stated in the condition. "planning approval" means-- (a) a development consent within the meaning of the Environmental Planning and Assessment Act 1979 , or (b) an approval under that Act, Division 5.1.
Division 2- Risk Assessment	
7	**Rehabilitation risk assessment** (1) The holder of a mining lease must conduct a risk assessment (a "rehabilitation risk assessment") that-- (a) identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease-- (i) the rehabilitation objectives, (ii) the rehabilitation completion criteria, (iii) for large mines--the final land use as spatially depicted in the final landform and rehabilitation plan, and (b) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. (2) The holder of the mining lease must implement the measures identified. (3) The holder of a mining lease must conduct a rehabilitation risk assessment-- (a) for a large mine--before preparing a rehabilitation management plan, and (b) for a small mine--before preparing the rehabilitation outcome documents for the mine, and (c) whenever a hazard is identified under clause 6(3)--as soon as reasonably practicable after it is identified, and (d) whenever given a written direction to do so by the Secretary.

Condition Number	Condition
Division 3 - Rehabilitation Documents	
8	**Application of Division** This Division does not apply to a mining lease unless-- (a) the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or (b) the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.
9	**General requirements for documents** A document required to be prepared under this Division must-- (a) be in a form approved by the Secretary, and Note--: The approved forms are available on the Department's website. (b) include any matter required to be included by the form, and (c) if required to be given to the Secretary--be given in a way approved by the Secretary.
10	**Rehabilitation management plans for large mines** (1) The holder of a mining lease relating to a large mine must prepare a plan (a "rehabilitation management plan") for the mining lease that includes the following-- (a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, (b) a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, (c) a summary of rehabilitation risk assessments conducted by the holder, (d) the risk control measures identified in the rehabilitation risk assessments, (e) the rehabilitation outcome documents for the mining lease, (f) a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. (2) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. (3) A rehabilitation management plan is not required to be given to the Secretary for approval. (4) The holder of the mining lease-- (a) must implement the matters set out in the rehabilitation management plan, and (b) if the forward program specifies timeframes for the implementation of the matters--must implement the matters within those timeframes.
11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows-- (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary--within 30 days after the document is approved, (b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document--within 30 days after the amendment is made, (c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment--as soon as practicable after the rehabilitation risk assessment is conducted, (d) whenever given a written direction to do so by the Secretary--in accordance with the direction.

Condition Number	Condition
12	**Rehabilitation outcome documents** (1) The holder of a mining lease must prepare the following documents (the "rehabilitation outcome documents") for the mining lease and give them to the Secretary for approval-- (a) the "rehabilitation objectives statement" , which sets out the rehabilitation objectives required to achieve the final land use for the mining area, (b) the "rehabilitation completion criteria statement" , which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, (c) for a large mine, the "final landform and rehabilitation plan" , showing a spatial depiction of the final land use. (2) If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.
13	**Forward program and annual rehabilitation report** (1) The holder of a mining lease must prepare a program (a "forward program") for the mining lease that includes the following-- (a) a schedule of mining activities for the mining area for the next 3 years, (b) a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, (c) a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. (2) The holder of a mining lease must prepare a report (an "annual rehabilitation report") for the mining lease that includes-- (a) a description of the rehabilitation undertaken over the annual reporting period, (b) a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, (c) a report demonstrating progress made towards the achievement of the following-- (i) the objectives set out in the rehabilitation objectives statement, (ii) the criteria set out in the rehabilitation completion criteria statement, (iii) for large mines--the final land use as spatially depicted in the final landform and rehabilitation plan. (3) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. (4) The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary. (5) In this clause-- "annual reporting period" means each period of 12 months commencing on-- (a) the date on which the mining lease is granted, or (b) if the Secretary approves another date in relation to the mining lease--the other date.
14	**Amendment of rehabilitation outcome documents and forward program** (1) This clause applies to-- (a) a rehabilitation outcome document if it has been approved by the Secretary, and (b) a forward program if it has been given to the Secretary. (2) The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless-- (a) the Secretary gives the holder a written direction to do so, or (b) the Secretary, on written application by the holder, gives a written approval of the amendment. (3) The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. (4) Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.

Condition Number	Condition
15	**Times at which documents must be prepared and given** (1) The holder of a mining lease must do the following before the end of the initial period-- (a) prepare a rehabilitation management plan, and (b) prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and (c) prepare a forward program and give it to the Secretary. (2) The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before-- (a) 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or (b) a later date approved by the Secretary. (3) A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary. (4) The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before-- (a) 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or (b) a later date approved by the Secretary. (5) A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). (6) The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause. (7) The holder of the mining lease must comply with the direction. (8) In this clause-- "initial period" means the period commencing when the mining lease is granted and ending-- (a) 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or (b) if this Division applies to the mining lease because of an increase in the required security deposit-- (i) when the surface of the mining area is disturbed by activities under the mining lease, or (ii) at a later date approved by the Secretary.
16	**Certain documents to be publicly available** (1) This clause applies to the following documents-- (a) a rehabilitation management plan, (b) a forward program, (c) an annual rehabilitation report. (2) The holder of a mining lease must make a document to which this clause applies publicly available by-- (a) publishing it on its website in a prominent position, or (b) if the holder does not have a website-- providing a copy of it to a person-- (i) on the written request of a person, and (ii) without charge, and (iii) within 14 days after the request is received. (3) If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published-- (a) for a rehabilitation management plan--within 14 days after it is prepared or amended, or (b) for a forward program or an annual rehabilitation report--within 14 days after it is given to the Secretary or amended, (4) Personal information within the meaning of the Privacy and Personal Information Protection Act 1998 is not required to be included in a document made available to a person under this clause.

Condition Number	Condition
Division 4 - Records, Reporting and Notification	
17	**Records demonstrating compliance** The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. Note--: The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.
18	**Report on non-compliance** (1) The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with-- (a) a condition of the mining lease, or Note--: The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. (b) a requirement of the Act or this Regulation relating to activities under the mining lease. (2) The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. (3) The holder of the mining lease must ensure the report-- (a) identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and (b) describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and (c) describes the causes or likely causes of the non-compliance, and (d) describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.
19	**Nominated contact person** (1) The holder of a mining lease must nominate a natural person to be the contact person with whom the Secretary can communicate in relation to the mining lease for the purposes of the Act. Note--: The Act, section 383 sets out the ways in which notices or other documents may be issued or given to, or served on, a person for the purposes of the Act. (2) The holder of the mining lease must give written notice to the Secretary of-- (a) the full name and contact details of the nominated person--within 28 days after the date on which the standard conditions apply to the mining lease under clause 31A of this Regulation, and (b) any change in nomination or in the nominated person's contact details--within 28 days after the change occurs. (3) The holder of the mining lease must ensure that the contact details for the nominated person include the person's phone number and postal and email addresses.
Division 5 - Applications relating to development consent	
20	**Additional requirements--application for or to modify development consent** (1) The holder of a mining lease must give written notice to the Secretary within 10 days after-- (a) making an application for development consent that relates to the mining area, or (b) making an application for modification of a development consent-- (i) under the Environmental Planning and Assessment Act 1979 , section 4.55(2), and (ii) that proposes to modify a condition of the consent that relates to rehabilitation of the mining area in a way that may affect an obligation under the mining lease relating to rehabilitation of the mining area. (2) This clause does not apply if the development is State significant development.

Appendix B - RMP REHABILITATION RISK ASSESSMENT (2022)

Appendix C - RMP CONSULTATION INCLUDING DETAILED RESPONSES

The following table summarises the feedback provided by NSW Department of Planning and Environment (DPE) – Water on 1 November 2022 in response to the MTW Rehabilitation Management Plan (2022).

Item	NSW DPE Water Recommendation	MTW Response/Where Addressed
	The Rehabilitation Management Plan is recommended to be reviewed to achieve the following outcomes. These are intended to meet the department's legislative, policy and water management requirements.	
1	Sharing of water must protect the water source, its dependent ecosystems and basic landholder rights.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; and Mount Thorley Operations 2014 EIS Chapters 15 and 16.
2	Water sources, floodplains and dependent ecosystems are protected and restored.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; Mount Thorley Operations 2014 EIS Chapters 15 and 16; and RMP Sections **6.2.1.10** and **6.2.3.1**.
3	Activities within a water source should avoid or minimise land degradation, including soil erosion, compaction, geomorphic instability, contamination, and where possible land should be rehabilitated.	Addressed in RMP **Section 6**. Erosion, sediment control and potential contamination impacts are managed by the MTW management plans. Rehabilitation will be completed in accordance with the Rehabilitation Objectives which are approved by RR.
4	The final Rehabilitation Management Plan is made electronically available on a public accessible website.	RMP is made available on Mount Thorley Warkworth website.
5	A conceptual model/diagram clearly presents how the groundwater and surface water systems interact with the final landform. This is to be informed by recent environmental assessments/modelling reviews.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17 and Appendices K and L; and Mount Thorley Operations 2014 EIS Chapters 15 and 16 and Appendices I and J. A final void water balance assessment is planned to be completed as part of the Final Closure Plan. The RMP will be updated as environmental assessments/modelling reviews are completed.
6	The final design and location of surface drainage features achieves a stable landform and maintains or improves riparian corridor functioning. This is to be completed with reference to industry guidelines such as: "Rehabilitation Manual for Australian Streams (LWRRDC 2000)", "Guideline: Works that interfere with water in a watercourse for a resource activity (DNRME 2019)" and "Guidelines for Controlled Activities on Waterfront Land (2012)" or their latest versions.	Addressed in RMP **Section 6.2.3**.
7	Dirty runoff catchment areas are rehabilitated and the conveyance of clean surface runoff downstream is maximised.	Addressed in RMP **Section 6**. Surface runoff is managed by the erosion and sediment controls outlined in Section **6.2.1.10**. Rehabilitation will be completed in accordance with the Rehabilitation Objectives which are approved by RR.
8	Decommissioning of groundwater boreholes is in accordance with the "Minimum Construction Requirements for Water Bores in Australia (2020)".	Addressed in RMP Sections 6.2.1.10 and 6.2.1.14.

Item	NSW DPE Water Recommendation	MTW Response/Where Addressed
9	Ongoing water take by the final landform via interception, storage or diversion is quantified and complies with relevant approvals and licences under the Water Management Act 2000 or a relevant exemption. Please note exemptions from the requirement to hold approvals under s.90 and 91 of the Water Management Act 2000 for approved SSD/SSI projects will not apply once the project approval ceases. Therefore, any relevant water management works that are to be retained will need to obtain an approval prior to the development consent lapsing.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; Mount Thorley Operations 2014 EIS Chapters 15 and 16; and RMP **Section 4**.
10	Aquifer interference activities are designed to minimise ongoing water take and water quality impacts and meet the requirements of the NSW Aquifer Interference Policy.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; and Mount Thorley Operations 2014 EIS Chapters 15 and 16.
11	Final voids do not present a risk to important groundwater ecosystems and assets (groundwater dependent ecosystems, alluvial aquifers, and landholder bores).	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; and Mount Thorley Operations 2014 EIS Chapters 15 and 16.
12	Final voids are designed to be sinks or to flow through the local groundwater system and need to be confirmed by a post-mining groundwater model.	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapter 16 and Appendix K; and Mount Thorley Operations 2014 EIS Chapter 15 and Appendix I.
13	Residual risk to water sources is clearly understood and minimised. This is to include relevant assessment documentation and updated risk assessments to meet the requirements of the NSW Aquifer Interference Policy. Further detail can be found in Fact Sheet 5 in **Appendix C** of the "Guidelines for Groundwater Documentation for SSD/SSI Projects. Technical guideline (DPE 2022)".	Addressed in Warkworth Continuation 2014 Environmental Impact Statement (EIS) Chapters 16 and 17; and Mount Thorley Operations 2014 EIS Chapters 15 and 16; and RMP **Section 3**. This RMP will be updated as required as further investigations, studies, and assessments are completed.
14	A monitoring and review program is included to ensure the rehabilitation outcomes are met.	Addressed in RMP **Section 8**.

The following table summarises the feedback provided by the Biodiversity and Conservation Division on 7 September 2022 in response to the MTW Rehabilitation Management Plan (2022).

Item	BCD Recommendation	MTW Response/Where Addressed
1	BCD recommends that periodic cluster analysis and ordination analysis (say every four years) is undertaken of the floristic data from rehabilitation and reference sites to see how the floristic composition compares. This will identify sites that may require targeted additional planting and provide confidence that rehabilitation has the composition of the targeted vegetation community.	Included in RMP **Section 8.3**.
2	BCD recommends that details are provided on the disturbance history of the reference sites to provide an understanding of how they may be best used when compared to rehabilitation.	An investigation of the disturbance history of reference sites will be undertaken and detailed in future revisions of the RMP.
3	BCD recommends that uncommon, but functionally important species (e.g., Ficus rubiginosa, Macrozamia species, and parasitic plants (e.g., Exocarpos species) are added in low numbers, in appropriate microhabitats to increase the diversity and function of the vegetation and provide more opportunities for native animals to use the area.	Initial rehabilitation works at MTW are focussed on re-establishing species associated with the target Central Hunter Grey Box - Ironbark Woodland. The inclusion of the suggested uncommon species in rehabilitation will be considered by MTW for inclusion in the rehabilitation methods (**Section 6**) in future revisions of the RMP.
4	BCD recommends that field data sheets, with the raw data collected from monitoring sites is provided in the next produced Annual Review for the MTW mine.	MTW can provide field data sheets from monitoring programs where requested by relevant stakeholders.
5	BCD recommends that Figures 1, 2 and 3 and Plans 1 and 2 are revised to make features on them earlier to distinguish and their locations easier to determine.	The scale of the MTW operation makes it difficult to clearly present data on the RMP plans and figures. MTW can provide high resolution electronic copies of plans and figures to assist with readability where requested by relevant stakeholders.
6	BCD recommends that references to the 'Department of Planning, Industry and Environment' are updated.	RMP updated with recommended update.
7	BCD recommends that the Rehabilitation Management Plan is revised to include a reference list to provide details of all cited papers and reports.	MTW has adopted the recommended format for the RMP. Refer to **Section 12**.

Appendix D – REHABILITATION OBJECTIVES AND COMPLETION CRITERIA

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Removal of infrastructure	All buildings, fixed plant and other infrastructure that is not required as part of the post-closure land use will be demolished and removed from the site.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
A1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Disconnect and terminate services	All redundant services disconnected and terminated.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
A1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Heritage obligations (e.g. development consent under the Environmental Planning and Assessment Act 1979, approvals under the Heritage Act 1977, etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved).	Permits and approval documents issued. All archival reports required are complete and submitted.	Copy of any relevant approval documentation and archival reports/records.
A1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Surveying and sealing of all drill holes, boreholes and gas wells in accordance with departmental 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 etc.
B1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Removal of infrastructure	All buildings, fixed plant and other infrastructure that is not required as part of the post-closure land use will be demolished and removed from the site.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
B1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Disconnect and terminate services	All redundant services disconnected and terminated.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
B1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Heritage obligations (e.g. development consent under the Environmental Planning and Assessment Act 1979, approvals under the Heritage Act 1977, etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved).	Permits and approval documents issued. All archival reports required are complete and submitted.	Copy of any relevant approval documentation and archival reports/records.
B1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Surveying and sealing of all drill holes, boreholes and gas wells in accordance with departmental 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 etc.
D1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Removal of infrastructure	All buildings, fixed plant and other infrastructure that is not required as part of the post-closure land use will be demolished and removed from the site.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
D1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Disconnect and terminate services	All redundant services disconnected and terminated.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
D1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Heritage obligations (e.g. development consent under the Environmental Planning and Assessment Act 1979, approvals under the Heritage Act 1977, etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved).	Permits and approval documents issued. All archival reports required are complete and submitted.	Copy of any relevant approval documentation and archival reports/records.
D1	Removal of infrastructure	Mining infrastructure within the identified disturbance area will be removed if no longer required and the affected lands rehabilitated. The objective is for the infrastructure areas to be safe, stable, and non-polluting.	Surveying and sealing of all drill holes, boreholes and gas wells in accordance with departmental 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 etc.
I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Potential hazards (e.g. electrical, mechanical) have been effectively isolated and secured	Hazards isolated and secured.	Statement provided by suitably qualified engineer.
I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Damage to access tracks has been repaired and stabilised.	Repairs complete.	As-constructed final landform plan, photos, etc.
I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, 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, risk assessment verifying modes of failure are adequately addressed to minimise risks to public safety or the environment.
I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	Infrastructure is in a condition (e.g. structural, electrical, 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.
I1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe, does not pose any hazard to the community	If any underground pipelines or other infrastructure are to remain in situ, they do not pose a hazard for the intended final land use. Note: If any underground pipelines or other infrastructure are to remain in situ in areas to be returned for Agriculture	The location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig. Formal acceptance from the subsequent landowner that underground infrastructure has been left in a condition	Surveyed and marked on the as-constructed final landform plan. Copy of notification to local Council and Dial Before You Dig Formal acceptance from landowner.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
			– cropping they are at a depth Xm nominated depth (e.g. >1m).	that is suitable for the intended final land use in accordance with formal agreement.	Identified on an appropriate legal instrument associated with the land title.
I1	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)	Where applicable, necessary approvals are in place (e.g. development consent under the Environmental Planning and Assessment Act 1979) where buildings and infrastructure are to be retained as part of final land use	Permits and approval documents issued	Copy of any relevant approvals or evidence if approvals not required e.g. fencing
I1	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)	Heritage obligations as required under the Environmental Planning and Assessment Act 1979, Heritage Act 1977, etc. have been met (e.g. archival recording, building retention and restoration).	Permits and approval documents issued; archival reports (where required) complete and submitted.	Copy of any relevant approval documentation.
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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
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 and before/after photos.
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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
A2	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
A2	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 and before/after photos.
A2	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
A3	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
A3	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 and before/after photos.
A3	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
A4	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
A4	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 and before/after photos.
A4	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
B1	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
B1	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 and before/after photos.
B1	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).

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B2	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
B2	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 and before/after photos.
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B4	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
D1	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
D1	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 and before/after photos.
D1	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
D2	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
D2	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 and before/after photos.
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D3	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
D3	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 and before/after photos.
D3	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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).	Contamination Remediation Report prepared by Land Contamination Consultant Site Contamination Audit Report and Site Audit

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
				Excess sludge/material has been removed from surface water dams.	Statement prepared by EPA Accredited Auditor (where required).
D4	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facility
D4	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 and before/after photos.
D4	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
J5	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.	Remediation of contaminated soils.	All contaminated soils removed from site or remediated to acceptable contamination levels.	1. Details in Final Closure Plan. Contamination Assessment and Demolition Assessment. 2. Documentation from disposal facilities 3. Landform records
J5	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 and before/after photos.
J5	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.	Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to 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 EPA Accredited Auditor (where required).
A1	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
A2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
A2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Tailings storage facilities are capped with overburden and rehabilitated after consolidation of tailings.	Decommissioning and capping of tailings storage facilities in accordance with the approved design.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
A2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	TSF capping design to allow for settlement of tailings surface to occur. TSF design and management to allow for initial overfilling of the covering material to compensate for expected settlement.	TSF capping design to allow for settlement of tailings surface. Capping thickness to be >2m, or as per design by expert tailings consultant.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
A4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
A4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Problematic materials will be capped.	Net acid generating materials and coarse rejects will be disposed amongst non-carbonaceous overburden materials and covered with 5 metres of inert materials	1. Site records – tailings design, testing and implementation of design. 2. Testing results for overburden, interburden and soils.
B1	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
B2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
B2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Tailings storage facilities are capped with overburden and rehabilitated after consolidation of tailings.	Decommissioning and capping of tailings storage facilities in accordance with the approved design.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
B2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	TSF capping design to allow for settlement of tailings surface to occur. TSF design and management to allow for initial overfilling of the covering material to compensate for expected settlement.	TSF capping design to allow for settlement of tailings surface. Capping thickness to be >2m, or as per design by expert tailings consultant.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
B4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
B4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Problematic materials will be capped.	Net acid generating materials and coarse rejects will be disposed amongst non-carbonaceous overburden materials and covered with 5 metres of inert materials	1. Site records – tailings design, testing and implementation of design. 2. Testing results for overburden, interburden and soils.
D1	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
D2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Tailings storage facilities are capped with overburden and rehabilitated after consolidation of tailings.	Decommissioning and capping of tailings storage facilities in accordance with the approved design.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
D2	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	TSF capping design to allow for settlement of tailings surface to occur. TSF design and management to allow for initial overfilling of the covering material to compensate for expected settlement.	TSF capping design to allow for settlement of tailings surface. Capping thickness to be >2m, or as per design by expert tailings consultant.	1. Engineering design records 2. Site records - tailings design, testing and implementation of design.
D4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Minimise risk of spontaneous combustion.	Absence of carbonaceous material on the surface of the rehabilitation and no active spontaneous combustion areas.	1. Inspection records 2. Thermal camera surveys
D4	Management of waste and process materials	Residual waste materials stored on site (e.g. tailings, coarse rejects and other wastes) will be appropriately contained/encapsulated so it does not pose any hazards or constraints for intended final land use.	Problematic materials will be capped.	Net acid generating materials and coarse rejects will be disposed amongst non-carbonaceous overburden materials and covered with 5 metres of inert materials	1. Site records – tailings design, testing and implementation of design. 2. Testing results for overburden, interburden and soils.
A1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms 4. Erosion surveys
A1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
A1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
A2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Removal of pipelines and pumps and related tailings infrastructure.	All pipelines and pumps and related tailings infrastructure removed from the site.	Site waste and demolition records prior to closure.
A2	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A2	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
A3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Removal of excess sediment.	Removal of excess sediment from the surface dams for future use by the subsequent land owner or alternatively filling the dams if they are no longer required.	1. Site records of material placement/disposal accompanied by test results of sediment characteristics.
A3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
				areas Absence of active rill/gully erosion > 30cm in depth.	
A3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
A3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
A4	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A4	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
A4	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
A4	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
B1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
B1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
B1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
B1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
B2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
B2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Removal of pipelines and pumps and related tailings infrastructure.	All pipelines and pumps and related tailings infrastructure removed from the site.	Site waste and demolition records prior to closure.
B2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
B2	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
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Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
				areas Absence of active rill/gully erosion > 30cm in depth.	
B3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
B3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
B3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Removal of excess sediment.	Removal of excess sediment from the surface dams for future use by the subsequent land owner or alternatively filling the dams if they are no longer required.	1. Site records of material placement/disposal accompanied by test results of sediment characteristics.
B3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
B3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
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B4	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
B4	Landform stability	The final landform is safe, stable, and non-polluting for the long term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
D1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
D1	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
D1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
D1	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
D2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
D2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Removal of pipelines and pumps and related tailings infrastructure.	All pipelines and pumps and related tailings infrastructure removed from the site.	Site waste and demolition records prior to closure.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D2	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
D2	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
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D3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Removal of excess sediment.	Removal of excess sediment from the surface dams for future use by the subsequent land owner or alternatively filling the dams if they are no longer required.	1. Site records of material placement/disposal accompanied by test results of sediment characteristics.
D3	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
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D3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
D3	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
D4	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Minimisation of constructed slopes for conventional landforms greater than 10 degrees – low walls, ramps and drainage structures.	Landform is generally compatible within the context of the local topography. The landform is to be shaped to ensure overall slopes are 10 degrees or less unless otherwise agreed. Avoidance of straight lines and angular corners in profiles of final landforms. Approvals in place for slopes >18 degrees.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
D4	Landform stability	The final landform will be undulating, free draining, commensurate with the surrounding natural landform, and where appropriate incorporate geomorphic design principles.	Geofluv landform slopes stable and compatible with local topography	Landform is generally compatible within the context of the local topography. Surface treatments are applied based on Topography Factors calculated from as-built surveys of rehabilitation areas Absence of active rill/gully erosion > 30cm in depth.	1. Engineering Design Records 2. Quality assurance process for rehabilitation (still to be developed, refer to the Rehabilitation Risk Assessment). 3. As-built survey records for final landforms
D4	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
D4	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Drainage paths and contour drains installed.	Drainage paths and contour drains to be constructed to suitable design standard.	1. Engineering design records 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance
J5	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Landform modelling to verify the long-term stability of rehabilitated landform.	Landform modelling verifies that erosion levels are within the range of target analogue sites representative of final land use.	1. An engineering assessment undertaken by a suitably qualified person to assess long term stability
J5	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Removal of pipelines and pumps and related pit infrastructure.	All pipelines and pumps and related pit infrastructure removed from the site.	1. Site waste and demolition records prior to closure. 2. Details of decommissioning of infrastructure to be included in the Final Closure Plan.
J5	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Exposed coal seams will be covered	Exposed coal seams will be covered with five metres of inert materials to prevent spontaneous combustion where practical.	1. Engineering design records 2. Records of overburden placement

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
J5	Landform stability	The final landform is safe, stable, and non-polluting for the long-term.	Long term stability of final void batter slopes.	The final void batter slopes and benching will be designed to ensure the long-term stability of the landform.	1. Engineering design records 2. Records of overburden placement
A1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
A2	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
A3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
A4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
B1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
B2	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
B3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
B4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
D1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
D2	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
D3	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
D4	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation.	Vegetation is managed to control fire.	Implementation of actions as per the Bushfire Management Plan.	Records indicating implementation of Bushfire Management Plan
A1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
A1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
A2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
A2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
A3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
A3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
A4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
A4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
B1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
B1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
B2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
B2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
					as per Blue Book. 3. Water management maintenance.
B3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
B3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
B4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
B4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
D1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
D1	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
D2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
D2	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
D3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
D3	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
D4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Runoff water quality to be broadly trending towards less than 1,000µS/cm after 5 years.	Runoff water quality less than 1,000µS/cm after 5 years.	Water monitoring results
D4	Surface water	Water retained on site is fit for the intended land use. Water quality leaving site to be consistent with the baseline conditions of the receiving watercourses prior to mining disturbance. The drainage catchment of the final void will be minimised so far is reasonable and feasible.	Erosion and sediment controls installed	The installation of appropriate sediment and erosion control measures.	1. Inspection records. 2. Records of water management design and construction as per Blue Book. 3. Water management maintenance.
J5	Surface water	Final Void to be designed to minimise risk of flood interaction for all flood events up to and including the 1% AEP.	Catchment area of the Final Void.	The drainage catchment of the final void will be minimised so far is reasonable and feasible.	1. Details in Final Closure Plan. 2. Final Void water modelling. 3. Survey records for final landforms.
J5	Water approvals	Structures that take or divert water such as final voids, dams, levees etc. 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 voids and dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency.	Confirmation from relevant Government Agency that relevant water approvals / licences are able to be granted.
A1	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
A1	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
A2	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A2	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
A3	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
A3	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
A4	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
A4	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
B1	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
B1	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
B2	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
B2	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
B3	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
B3	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
B4	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
B4	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
D1	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
D1	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
D2	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
D2	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.

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D3	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
D3	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
D4	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
D4	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
J5	Groundwater	Groundwater quality meets the requirements of the relevant development consent(s) (Water Management Plan) and does not present a risk of environmental harm.	Water quality parameters (pH, EC, TSS) within trigger limits.	Water quality parameters (pH, EC and TSS) in groundwater monitoring bores are within trigger limits (as specified in Water Management Plan)	1. Water quality monitoring reports. 2. Independent hydrological assessment report.
J5	Groundwater	Impacts to groundwater regime are within range as per the development consent(s) / pre-mining environmental assessment.	Groundwater levels and yields both on and off the mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater yield.	Independent hydrological assessment report.
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Pasture - pH >5.5 and <8.5	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Pasture - Electrical Conductivity <2 dS/m	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Soil Phosphorous levels to be trending towards the range suitable for plant growth.	Pasture - Phosphorous >40ppm	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Pasture - Organic Carbon >1.5%	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Pasture - Cation Exchange Capacity >12 Cmol+/kg	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Exchangeable Sodium Percentage <10%	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Calcium/magnesium ratio >1 and <10	Soil testing results
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of perennial grass species supports a sustainable pasture.	>5 perennial grass species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of pasture species is comparable to that of analogue sites.	No single grass species >60% cover	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Total groundcover is the sum of protective ground cover components (dead and live plant material, rocks and logs) and is comparable to that of analogue sites (% Cover).	TBD	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B1	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	High Threat Exotic* (HTE) species are controlled to appropriate levels. * HTEs as specified under the Biodiversity Assessment Method (BAM) (Office of Environment and Heritage 2017)	HTEs (excluding pasture species) <20% cover	1. Records of weed control activities. 2. Rehabilitation and Ecological monitoring.
B1	Agricultural revegetation	Land use capability (minimum Land Capability Class VI) is capable of supporting the target agricultural land use.	Land and Soil Capability classification/ Agricultural Land Classification consistent with the Environmental Assessments.	Land and Soil Capability classification or Agricultural Land Classification criteria met.	1. Rehabilitation monitoring reports. 2. Independent agronomist report/Independent soil report.
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Pasture - pH >5.5 and <8.5	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Pasture - Electrical Conductivity <2 dS/m	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Soil Phosphorous levels to be trending towards the range suitable for plant growth.	Pasture - Phosphorous >40ppm	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Pasture - Organic Carbon >1.5%	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Pasture - Cation Exchange Capacity >12 Cmol+/kg	Soil testing results

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Exchangeable Sodium Percentage <10%	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Calcium/magnesium ratio >1 and <10	Soil testing results
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of perennial grass species supports a sustainable pasture.	>5 perennial grass species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of pasture species is comparable to that of analogue sites.	No single grass species >60% cover	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Total groundcover is the sum of protective ground cover components (dead and live plant material, rocks and logs) and is comparable to that of analogue sites (% Cover).	TBD	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B2	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	High Threat Exotic* (HTE) species are controlled to appropriate levels. * HTEs as specified under the Biodiversity Assessment Method (BAM) (Office of Environment and Heritage 2017)	HTEs (excluding pasture species) <20% cover	1. Records of weed control activities. 2. Rehabilitation and Ecological monitoring.
B2	Agricultural revegetation	Land use capability (minimum Land Capability Class VI) is capable of supporting the target agricultural land use.	Land and Soil Capability classification/ Agricultural Land Classification consistent with the Environmental Assessments.	Land and Soil Capability classification or Agricultural Land Classification criteria met.	1. Rehabilitation monitoring reports. 2. Independent agronomist report/Independent soil report.
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Pasture - pH >5.5 and <8.5	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Pasture - Electrical Conductivity <2 dS/m	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Soil Phosphorous levels to be trending towards the range suitable for plant growth.	Pasture - Phosphorous >40ppm	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Pasture - Organic Carbon >1.5%	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Pasture - Cation Exchange Capacity >12 Cmol+/kg	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Exchangeable Sodium Percentage <10%	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Calcium/magnesium ratio >1 and <10	Soil testing results
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of perennial grass species supports a sustainable pasture.	>5 perennial grass species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of pasture species is comparable to that of analogue sites.	No single grass species >60% cover	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Total groundcover is the sum of protective ground cover components (dead and live plant material, rocks and logs) and is comparable to that of analogue sites (% Cover).	TBD	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B3	Agricultural revegetation	Land use capability (minimum Land Capability Class VI) is capable of supporting the target agricultural land use.	Dam reshaping as required.	Re-shaping dams (where required) in accordance with their intended use, this may involve re-sizing, facilitating cattle access or reshaping to enhance habitat functionality for specific fauna species.	1. Engineering design records. 2. Quality assurance process for rehabilitation (Still to be developed). 3. Records of repairs. 4. Details of water management in Final Closure Plan.
B3	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	High Threat Exotic* (HTE) species are controlled to appropriate levels. * HTEs as specified under the Biodiversity Assessment Method (BAM) (Office of Environment and Heritage 2017)	HTEs (excluding pasture species) <20% cover	1. Records of weed control activities. 2. Rehabilitation and Ecological monitoring.
B3	Agricultural revegetation	Land use capability (minimum Land Capability Class VI) is capable of supporting the target agricultural land use.	Land and Soil Capability classification/ Agricultural Land Classification consistent with the Environmental Assessments.	Land and Soil Capability classification or Agricultural Land Classification criteria met.	1. Rehabilitation monitoring reports. 2. Independent agronomist report/Independent soil report.
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Pasture - pH >5.5 and <8.5	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Pasture - Electrical Conductivity <2 dS/m	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Soil Phosphorous levels to be trending towards the range suitable for plant growth.	Pasture - Phosphorous >40ppm	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Pasture - Organic Carbon >1.5%	Soil testing results

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Pasture - Cation Exchange Capacity >12 Cmol+/kg	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Exchangeable Sodium Percentage <10%	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Pasture - Calcium/magnesium ratio >1 and <10	Soil testing results
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of perennial grass species supports a sustainable pasture.	>5 perennial grass species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	The diversity of pasture species is comparable to that of analogue sites.	No single grass species >60% cover	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	Total groundcover is the sum of protective ground cover components (dead and live plant material, rocks and logs) and is comparable to that of analogue sites (% Cover).	TBD	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
B4	Agricultural revegetation	Revegetation is sustainable for the long-term and only requires maintenance that is consistent with the intended final land use.	High Threat Exotic* (HTE) species are controlled to appropriate levels. * HTEs as specified under the Biodiversity Assessment Method (BAM) (Office of Environment and Heritage 2017)	HTEs (excluding pasture species) <20% cover	1. Records of weed control activities. 2. Rehabilitation and Ecological monitoring.
B4	Agricultural revegetation	Land use capability (minimum Land Capability Class VI) is capable of supporting the target agricultural land use.	Land and Soil Capability classification/ Agricultural Land Classification consistent with the Environmental Assessments.	Land and Soil Capability classification or Agricultural Land Classification criteria met.	1. Rehabilitation monitoring reports. 2. Independent agronomist report/Independent soil report.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Total groundcover is the sum of plant based ground cover components (dead and live plant material) and is comparable to that of analogue sites (% Cover).	Target: 32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	Target: 1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	Target: 50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	Target: 10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	High Threat Exotic* (HTE) species are controlled to appropriate levels.	HTEs (excluding pasture species) <10% cover	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
A1	Ecological rehabilitation	The vegetation composition of the Native Ecosystem rehabilitation areas contains species that are commensurate with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community.	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
A1	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Total groundcover is the sum of plant based ground cover components (dead and live plant material) and is comparable to that of analogue sites (% Cover).	Target: 32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	Target: 1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	Target: 50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	Target: 10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A2	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	High Threat Exotic* (HTE) species are controlled to appropriate levels.	HTEs (excluding pasture species) <10% cover	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
A2	Ecological rehabilitation	The vegetation composition of the Native Ecosystem rehabilitation areas contains species that are commensurate with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community.	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
A2	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Total groundcover is the sum of plant based ground cover components (dead and live plant material) and is comparable to that of analogue sites (% Cover).	Target: 32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	Target: 1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	Target: 50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	Target: 10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box –	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
		Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.			
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Dam reshaping as required.	Re-shaping dams (where required) in accordance with their intended use, this may involve re-sizing, facilitating cattle access or reshaping to enhance habitat functionality for specific fauna species.	1. Engineering design records. 2. Quality assurance process for rehabilitation (Still to be developed). 3. Records of repairs. 4. Details of water management in Final Closure Plan.
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	High Threat Exotic* (HTE) species are controlled to appropriate levels.	HTEs (excluding pasture species) <10% cover	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
A3	Ecological rehabilitation	The vegetation composition of the Native Ecosystem rehabilitation areas contains species that are commensurate with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community.	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
A3	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Total groundcover is the sum of plant based ground cover components (dead and live plant material) and is comparable to that of analogue sites (% Cover).	Target: 32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	Target: 1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	Target: 50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	Target: 10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	The vegetation structure of the Native Ecosystem rehabilitation areas is on a path towards obtaining comparable flora values with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
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A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	High Threat Exotic* (HTE) species are controlled to appropriate levels.	HTEs (excluding pasture species) <10% cover	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
A4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
A4	Ecological rehabilitation	The vegetation composition of the Native Ecosystem rehabilitation areas contains species that are commensurate with unmined reference sites of remnant Central Hunter Grey Box – Ironbark Woodland and Central Hunter Ironbark – Spotted Gum – Grey Box Forest vegetation in the local area.	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community.	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
A4	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
D1	Ecological rehabilitation	The vegetation composition of the rehabilitation is recognisable as Central Hunter Grey Box - Ironbark Woodland EEC.	The native plant species richness is within 50-100% or exceeds that of OEH Benchmark sites (no. species/area).	13 to 41 species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native over storey cover is within the range or exceeds that of OEH Benchmark sites.	15% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native mid storey cover is within the range or exceeds that of OEH Benchmark sites.	5% to 60%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (grasses) is within the range or exceeds that of OEH Benchmark sites.	5% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (shrubs) is within the range or exceeds that of OEH Benchmark sites.	5% to 10%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (other) is within the range or exceeds that of OEH Benchmark sites.	5% to 40%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Exotic plant cover (calculated as a percentage of total ground cover and mid storey cover) is within 5-33% or less than that of analogue sites.	5% to 33%	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Total groundcover is the sum of plant-based ground cover components (dead and live plant material) and is within the range or exceeds that of OEH benchmark sites (% Cover).	32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The abundance of native understorey species per square metre, averaged across the site, provides an indication of the heterogeneity of the site and that the number of native species is comparable to analogue sites.	16 to 27 species within a 20m x 20m quadrat	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of maturing trees and shrubs with a stem diameter greater than 5cm that are local endemic species is comparable to analogue sites.	90% to 100%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The total length of fallen logs is within 50-100% or exceeds that of analogue sites.	≥3m within a 20m x 20m quadrat	1. Records of habitat installation. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The number of hollows / nesting sites is within 50-100% or exceeds that of analogue sites.	≥0.5 within a 20m x 20m quadrat	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
D1	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 1,617 ha of which is established in the Warkworth Development Consent area (SSD 6464). (Refer to Schedule 3 Condition 56 of SSD 6464).	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	1,617 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Warkworth Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D1	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
D1	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 483 ha of which is established in the Mount Thorley Development Consent area (SSD 6465). (Refer to Schedule 3 Condition 34 of SSD 6465).	Native plant species recorded fro fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	483 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Mount Thorley Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D2	Ecological rehabilitation	The vegetation composition of the rehabilitation is recognisable as Central Hunter Grey Box - Ironbark Woodland EEC.	The native plant species richness is within 50-100% or exceeds that of OEH Benchmark sites (no. species/area).	13 to 41 species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native over storey cover is within the range or exceeds that of OEH Benchmark sites.	15% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native mid storey cover is within the range or exceeds that of OEH Benchmark sites.	5% to 60%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (grasses) is within the range or exceeds that of OEH Benchmark sites.	5% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (shrubs) is within the range or exceeds that of OEH Benchmark sites.	5% to 10%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (other) is within the range or exceeds that of OEH Benchmark sites.	5% to 40%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Exotic plant cover (calculated as a percentage of total ground cover and mid storey cover) is within 5-33% or less than that of analogue sites.	5% to 33%	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Total groundcover is the sum of plant-based ground cover components (dead and live plant material) and is within the range or exceeds that of OEH benchmark sites (% Cover).	32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The abundance of native understorey species per square metre, averaged across the site, provides an indication of the heterogeneity of the site and that the number of native species is comparable to analogue sites.	16 to 27 species within a 20m x 20m quadrat	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of maturing trees and shrubs with a stem diameter greater than 5cm that are local endemic species is comparable to analogue sites.	90% to 100%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The total length of fallen logs is within 50-100% or exceeds that of analogue sites.	≥3m within a 20m x 20m quadrat	1. Records of habitat installation. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The number of hollows / nesting sites is within 50-100% or exceeds that of analogue sites.	≥0.5 within a 20m x 20m quadrat	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
D2	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland ~~and / or Central Hunter Ironbark-Spotted Gum-Grey Box Forest~~ on rehabilitated mine lands, 1,617 ha of which is established in the Warkworth Development Consent area (SSD 6464). (Refer to Schedule 3 Condition 56 of SSD 6464).	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	1,617 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Warkworth Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D2	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
D2	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 483 ha of which is established in the Mount Thorley Development Consent area (SSD 6465). (Refer to Schedule 3 Condition 34 of SSD 6465).	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	483 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Mount Thorley Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D3	Ecological rehabilitation	The vegetation composition of the rehabilitation is recognisable as Central Hunter Grey Box - Ironbark Woodland EEC.	The native plant species richness is within 50-100% or exceeds that of OEH Benchmark sites (no. species/area).	13 to 41 species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native over storey cover is within the range or exceeds that of OEH Benchmark sites.	15% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native mid storey cover is within the range or exceeds that of OEH Benchmark sites.	5% to 60%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (grasses) is within the range or exceeds that of OEH Benchmark sites.	5% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (shrubs) is within the range or exceeds that of OEH Benchmark sites.	5% to 10%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (other) is within the range or exceeds that of OEH Benchmark sites.	5% to 40%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Exotic plant cover (calculated as a percentage of total ground cover and mid storey cover) is within 5-33% or less than that of analogue sites.	5% to 33%	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Total groundcover is the sum of plant-based ground cover components (dead and live plant material) and is within the range or exceeds that of OEH benchmark sites (% Cover).	32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The abundance of native understorey species per square metre, averaged across the site, provides an indication of the heterogeneity of the site and that the number of native species is comparable to analogue sites.	16 to 27 species within a 20m x 20m quadrat	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of maturing trees and shrubs with a stem diameter greater than 5cm that are local endemic species is comparable to analogue sites.	90% to 100%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Dam reshaping as required.	Re-shaping dams (where required) in accordance with their intended use, this may involve re-sizing, facilitating cattle access or reshaping to enhance habitat functionality for specific fauna species.	1. Engineering design records. 2. Quality assurance process for rehabilitation (Still to be developed). 3. Records of repairs. 4. Details of water management in Final Closure Plan.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The total length of fallen logs is within 50-100% or exceeds that of analogue sites.	≥3m within a 20m x 20m quadrat	1. Records of habitat installation. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The number of hollows / nesting sites is within 50-100% or exceeds that of analogue sites.	≥0.5 within a 20m x 20m quadrat	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
D3	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 1,617 ha of which is established in the Warkworth Development Consent area (SSD 6464). (Refer to Schedule 3 Condition 56 of SSD 6464).	Native plant species recorded from ~~0.04 hectare~~ fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	1,617 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Warkworth Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D3	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
D3	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 483 ha of which is established in the Mount Thorley Development Consent area (SSD 6465). (Refer to Schedule 3 Condition 34 of SSD 6465).	Native plant species recorded from ~~0.04 hectare~~ fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	483 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Mount Thorley Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D4	Ecological rehabilitation	The vegetation composition of the rehabilitation is recognisable as Central Hunter Grey Box - Ironbark Woodland EEC.	The native plant species richness is within 50-100% or exceeds that of OEH Benchmark sites (no. species/area).	13 to 41 species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native over storey cover is within the range or exceeds that of OEH Benchmark sites.	15% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native mid storey cover is within the range or exceeds that of OEH Benchmark sites.	5% to 60%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (grasses) is within the range or exceeds that of OEH Benchmark sites.	5% to 50%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (shrubs) is within the range or exceeds that of OEH Benchmark sites.	5% to 10%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of native ground cover (other) is within the range or exceeds that of OEH Benchmark sites.	5% to 40%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Exotic plant cover (calculated as a percentage of total ground cover and mid storey cover) is within 5-33% or less than that of analogue sites.	5% to 33%	1. Records of weedc control activities. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Total groundcover is the sum of plant-based ground cover components (dead and live plant material) and is within the range or exceeds that of OEH benchmark sites (% Cover).	32% to 74%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The abundance of native understorey species per square metre, averaged across the site, provides an indication of the heterogeneity of the site and that the number of native species is comparable to analogue sites.	16 to 27 species within a 20m x 20m quadrat	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The diversity of maturing trees with a stem diameter greater than 5cm is comparable to that of analogue sites (no./area).	1 to 4 tree species within a 20m x 20m quadrat.	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of maturing trees and shrubs with a stem diameter greater than 5cm that are local endemic species is comparable to analogue sites.	90% to 100%	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.

Spatial Reference (e.g. A3)	Rehabilitation Objective Category	Rehabilitation Objectives	Indicator	Completion Criteria	Validation Method
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The density of maturing trees with a stem diameter greater than 5cm is comparable to analogue sites (no./area).	50 to 725 stems per ha	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	Average trunk diameter (dbh) of the maturing tree population provides a measure of age and growth rate and that it is trending towards that of analogue sites (cm).	10.8cm to 65cm	1. Records of seed mixes and sowing rates. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in healthy condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a medium health condition and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The percentage of the tree population which are in a state of advance dieback and that the percentage is comparable to analogue sites.	TBD	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	The vegetation structure of the EEC Rehabilitation is recognisable as, or is trending towards (based on ongoing monitoring data), the Central Hunter Grey Box - Ironbark Woodland EEC.	The proportion of over-storey species occurring as regeneration is within 50-100% or exceeds that of analogue sites.	0.5 to 1.0	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	pH of replaced topsoil to be broadly within the range suitable for targeted species growth.	Woodland - pH >5.5 and <8.5	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Electrical Conductivity of replaced topsoil to be broadly within the range suitable for plant growth.	Woodland - Electrical Conductivity <2 dS/m	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Soil Phosphorous levels to be trending towards the range suitable for plant growth	Woodland - Phosphorous within levels in analogue sites by Year 5 Target: 1.2 to 13.0ppm	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Organic carbon levels are typical of that of the surrounding landscape, increasing or fall within desirable ranges provided by the agricultural industry.	Woodland - Organic Carbon within levels in analogue sites by Year 5 Target: 1.6 to 8.7%	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Cation Exchange Capacity is typical of that of the surrounding landscape, or fall within desirable ranges provided by the agricultural industry.	Woodland - Cation Exchange Capacity within levels in analogue sites by Year 2 Target: 7.4 to 20.4 Cmol+/kg	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Exchangeable Sodium Percentage (a measure of sodicity) is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Exchangeable Sodium Percentage within levels in analogue sites by Year 2 Target: 0.2 to 8.7%	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Calcium/Magnesium ratio is typical of that of the surrounding landscape or fall within desirable ranges provided by the agricultural industry.	Woodland - Calcium/magnesium ratio within levels in analogue sites by Year 2 Target: 0.7 to 2.1	Soil testing results
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Monitoring of the placement and utilisation of habitat features and artificial roosting/nesting boxes.	Nest boxes will be installed to supplement arboreal habitat. Data on the location and species specificity of each nest box is collected and collated via GIS. Record utilisation of nest boxes.	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The total length of fallen logs is within 50-100% or exceeds that of analogue sites.	≥3m within a 20m x 20m quadrat	1. Records of habitat installation. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	The number of hollows / nesting sites is within 50-100% or exceeds that of analogue sites.	≥0.5 within a 20m x 20m quadrat	1. Records of nest box location and species specificity. 2. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable.	Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation. Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	1. Rehabilitation and Ecological monitoring.
D4	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 1,617 ha of which is established in the Warkworth Development Consent area (SSD 6464). (Refer to Schedule 3 Condition 56 of SSD 6464).	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	1,617 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Warkworth Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met
D4	Ecological rehabilitation	Establishing a network of tree corridors to ensure connectivity of woodland community areas.	Vegetation communities in areas of rehabilitation have been designed to enhance connectivity across the site and to adjoining landscape.	Align vegetation communities on areas of rehabilitation to adjacent landscape. GIS data reflects connectivity of vegetation communities.	1. Rehabilitation and Ecological monitoring. 2. Vegetation Mapping
D4	Ecological rehabilitation	Rehabilitation Biodiversity Offset Area Woodland EEC Establishment of 2,100 ha of Central Hunter Grey Box-Ironbark Woodland on rehabilitated mine lands, 483 ha of which is established in the Mount Thorley Development Consent area (SSD 6465). (Refer to Schedule 3 Condition 34 of SSD 6465).	Native plant species recorded from fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	483 ha of Central Hunter Grey Box-Ironbark Woodland is achieved in the Mount Thorley Development Consent area.	1. Rehabilitation and Ecological monitoring. 2. Photos 3. Independent ecological monitoring reports that validates completion criteria have been met