CENTENNIAL

Newstan Complex

Mining Operations Plan

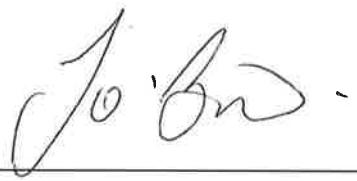
1 June 2021 – 6 July 2023

May 2021

DOCUMENT CONTROL

SUBMISSIONS REPORT DETAILS	**Title:**	Newstan Complex Mining Operations Plan
	Applicant:	Centennial Newstan Pty Limited
	Revision No.:	1.0

TITLE BLOCK

Newstan Colliery	
Mining Operations Plan	
Name of Mine	Newstan Colliery
MOP Commencement Date	1 June 2021
MOP Completion Date	6 July 2023
Mining Authorisations (Lease/Licence No.)	ML1380, ML1452, ML1480, ML1586, ML1587 MPL304, MPL305, MPL327, MPL 328 CCL727, CCL746, CCL763, CCL764 Private Lands Lease 497
Name of Authorisation / Authorisation holder(s)	Centennial Newstan Pty Ltd
Name of Mine Operator (if different)	N/A
Name and Contact Details of the Mine Manager (or equivalent)	Terry O'Brien 02 4935 8988
Name and Contact Details of Environmental Representative	Alanna Ryan 02 4935 8921
Name of Representative of the Authorisation Holder(s)	Terry O'Brien
Title	Mine Manager
Signature	
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1 INTRODUCTION

This Mining Operations Plan (MOP) has been prepared in accordance with Department of Planning and Environment – Division of Resources and Geoscience (DRG) guideline *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013).

This MOP relates to operations at the Newstan Complex (refer **Figure 1.1** and **Figure 1.2**) which includes Newstan Colliery, Northern Coal Services and Awaba Colliery. The MOP covers the period between 1 June 2021 – 6 July 2023 (herein referred to as the MOP term).

1.1 History of Operations

1.1.1 Newstan Colliery

Newstan Colliery is an existing underground coal mine owned and operated since 2002 by Centennial Newstan Pty Limited (Centennial Newstan), a wholly owned subsidiary of Centennial Coal Company Limited (Centennial). Newstan Colliery is regionally located approximately 25 kilometres south-west of Newcastle and 140 kilometres (km) north of Sydney within the Lake Macquarie Local Government Area (LGA). The Newstan Colliery surface site is located in Fassifern approximately four kilometres north of the township of Toronto. The residential areas of Fassifern and Wakefield are located in close proximity to the Newstan Colliery surface site.

Newstan Colliery began mining operations in 1887, prior to the implementation of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), and operated under continuing use rights pursuant to section 109 of the EP&A Act. On 14 May 1999, the (then) Minister for Urban Affairs and Planning granted development consent to Newstan Colliery under Part 4 of the EP&A Act for the Newstan Colliery Life Extension Area pursuant to Development Application 73-11-98 (DA 73-11-98).

Underground mining at Newstan Colliery has been undertaken in the Young Wallsend, Great Northern, Fassifern, Borehole and West Borehole coal seams and has produced both a semi-soft coking coal and thermal coal product for the domestic and export markets.

In April 2009 Newstan was placed on care and maintenance. In July 2011, Newstan Colliery recommenced underground mining within the Main West Area and the Main East Area. In August 2014, the underground operations at Newstan Colliery were placed back onto care and maintenance. The coal preparation plant (CPP), coal handling plant (CHP), coal rail and loading facilities are still operational.

1.1.2 Northern Coal Services

The Northern Coal Logistic Project (NCLP), in conjunction with Centennial's Newstan Extension of Mining Project and Mandalong Southern Extension Project, was part of the long-term strategy Centennial has developed for its future operation in the Newcastle Coalfields to provide the infrastructure and flexibility required to meet future opportunities in both the domestic and export coal markets.

On 29 September 2015, Centennial Newstan obtained approval to re-develop and upgrade the existing coal preparation and handling infrastructure at the Newstan Colliery Surface Site to enable continued utilisation for the receipt, handling and processing of up to 8 million tonnes per annum (Mtpa) ROM coal from the Newstan Colliery (up to 4.5 Mtpa), the Awaba Colliery (up to 0.88 Mtpa) and Mandalong Mine (up to 6 Mtpa).

1.1.3 Awaba Colliery

Awaba Colliery was an underground coal mine operated by Centennial Newstan. Mining operations commenced at the Awaba Colliery in 1947, prior to the implementation of the EP&A Act and continued without abandonment until 2012. , and Awaba Colliery operated under continuing use rights pursuant to section 109 of the EP&A Act, prior to the Planning and Assessment Commission of New South Wales granting conditional approval to Centennial Newstan for their Part 3A Application (10_0038) on 13 May 2011.

The surface facilities are located approximately one kilometre south of the Awaba village and 5.5 kilometres south-west of Toronto on the western side of Lake Macquarie, near Newcastle NSW. In March 2012, the Awaba Colliery ceased mining operations as the available coal reserves were exhausted. All mine entries were sealed in 2012, removing access to the underground workings.

On 28 June 2011, the *Awaba Coal Mine Rehabilitation and Environmental Management Plan* (REMP) dated April 2011 to 31 December 2015 was approved by the Department of Regional NSW – Resources Regulator (Resources Regulator) in accordance with the Mining Operations Plan Condition of Awaba Collieries mining leases. This REMP was also developed to satisfy the requirements of Schedule 3, Conditions 28, 29 and 30 of MP 10_0038. The REMP was later incorporated into the Newstan Complex MOP which was approved by the Resources Regulator on 5 August 2015.

Following the approval of SSD 5145, the Cooranbong Entry Site and Cooranbong Haul Road were transferred from Mandalong Mine to Northern Coal Logistics; however, since operations at the Cooranbong Entry Site continue to be managed by Centennial Mandalong they have been included in the Mandalong MOP.

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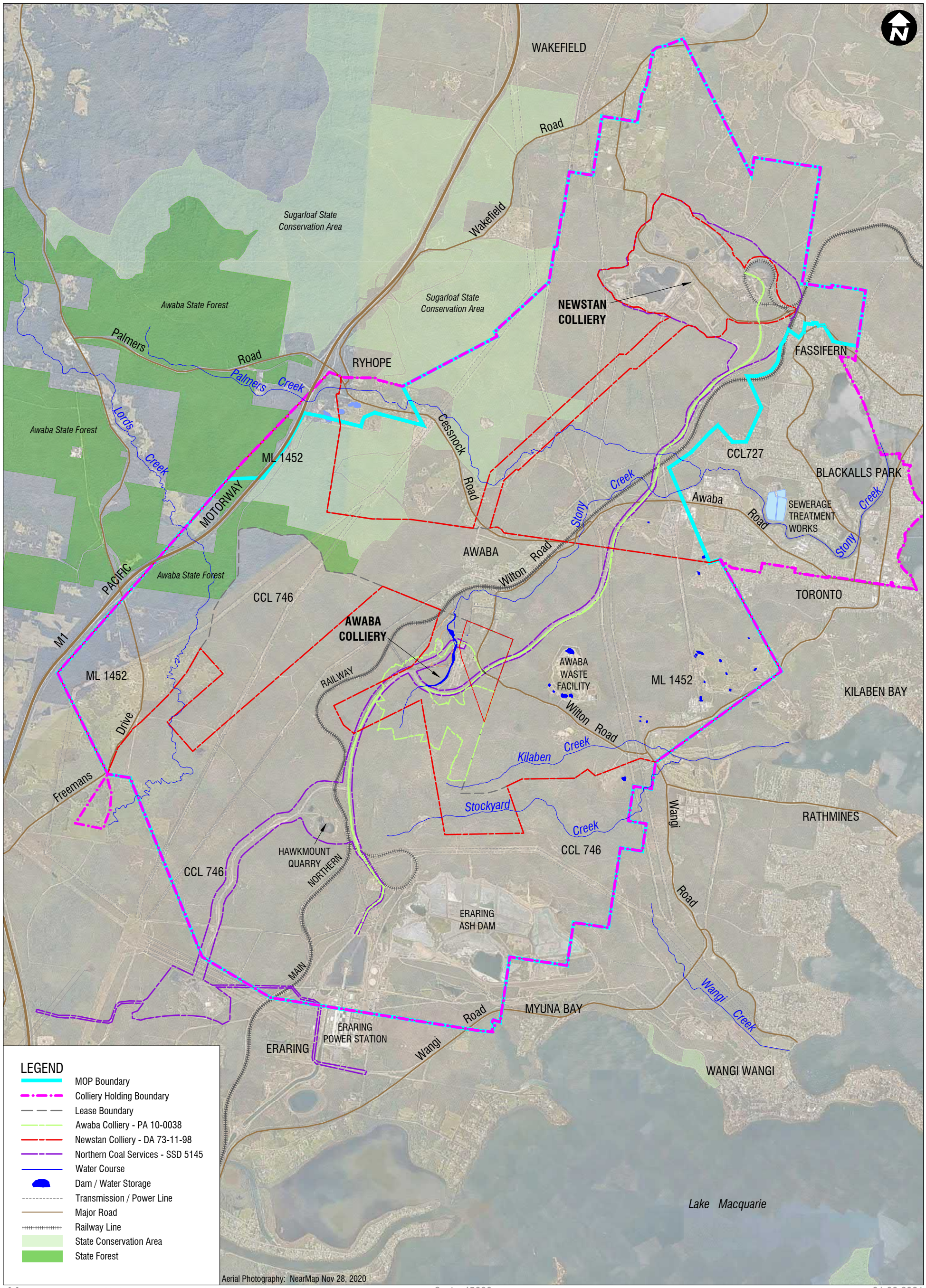
REGIONAL LOCALITY

FIGURE 1.1



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SITE LAYOUT

FIGURE 1.2

1.2 Current Consents, Authorisations and Licences

1.2.1 Development Consents

Newstan Colliery Development Consents

In 1998, Powercoal Pty Limited, the former owners of Newstan, submitted an Environmental Impact Statement (Umwelt 1998) to the New South Wales Department of Planning (now DPIE), seeking approval for the expansion of Newstan Colliery in an area referred to as the Life Extension Area (LEA). On 14 May 1999, the Minister for Urban Affairs and Planning granted development consent under Part 4 of the EP&A Act for the Newstan Colliery Life Extension Area pursuant to Development Application 73-11-98 (DA 73-11-98). **Table 1.1** lists the Development Consents applicable to Newstan Colliery.

Table 1.1: Newstan Colliery Development Consents

Condition	Issue Date	Consent Authority	Expiry Date
Development Consent DA 73-11-98			
Approved the continuation of existing mining operations and extension of mining into the Newstan Colliery Life ExtensionArea, including the upgrade of associated surface facilities.	May 1999	DPIE	July 2020
DA 73-11-98 (MOD 1) – modification to allow: Mining of one additional panel (longwall 24) locatedoutside the approved mining area to extract an additional 3 Mt of coal. Relocation of an approved, but not yet constructed, ventilation shaft, fans and associated service corridors (servicing the West Borehole Seam). This relocation was at the Awaba Colliery Surface Site from adjacent tothe heliport to a disused quarry located to the west of the Awaba Colliery Surface Site.	Sep 2007		
DA 73-11-98 (MOD 2) – modification to allow: Temporary increase of up to 400,000 tonnes of coal to be delivered to Eraring Power Station from Cooranbong Entry Site (via overland conveyor) for stockpiling and subsequent road haulage to Newstan Colliery (until construction of the Cooranbong Private Haul Road was complete, February 2010). Delivery of coal from Mandalong Mine by truck to the Newstan Colliery washery as opposed to the rail loop facility. Washing coal from Mandalong Mine at the Newstan Colliery washery and storing the washed coal at the surface site. Placement of the coarse and fine rejects material generated from washing the Mandalong Mine coal in the Newstan Colliery rejects emplacement. MOD 2 essentially facilitated the road transport of coal from Mandalong Mine to Newstan Colliery Surface Site for washing. It also included modification of the Mandalong Mine development consent (DA 97/800).	Nov 2009		
DA 73-11-98 (MOD 3) – modification to allow: Transport (via internal haul roads) and washing of 0.88 Mtpa of ROM coal from Awaba Colliery at the Newstan Colliery Surface Site. Acceptance of Mandalong Mine's stone rejects at the Newstan Colliery Surface Site for capping the NREA tailings dam. Establishing a 30,000 tonne emergency coal stockpile at the Newstan Colliery Surface Site.	Nov 2010		

Condition	Issue Date	Consent Authority	Expiry Date
DA 73-11-98 (MOD 4) – modification to allow: The extraction of 3.2 Mt of ROM coal from an area partly outside the existing development consent boundary known as the "Main West Mining Area". This involved bord and pillar extraction (i.e. first workings development only).	Mar 2012	DPIE	July 2020
DA 73-11-98 (MOD 5) – modification to allow: Receipt, handling and processing of up to 4 Mtpa of coal from the Cooranbong Entry Site at the Newstan Colliery Surface Site via private haul roads (up from the approved 2 Mtpa). Transportation of excavated coal and stone material (not exceeding 0.88 Mtpa) produced from the construction of the two approved shafts at the Awaba Colliery Surface Site to the Newstan Colliery REAs or the CPP for processing via private haul roads (previously only the transportation of coal from Awaba Colliery to the Newstan Colliery Surface Site was approved).	Nov 2012		
DA 73-11-98 (MOD 6) – modification to allow: Adjustment of the Consolidated Consent Boundary in the Main West Mining Area to include four small excluded areas, and bord and pillar mining within two of these areas containing an estimated 60,740 tonnes of coal (the remaining two areas already accommodate mine workings undertaken under continuing use rights).	Jan 2014		
DA 73-11-98 (MOD 7) – modification to allow: Update of the MOD6 approval to remove duplication of consent conditions due to the approval of SSD5145.	Dec 2015		
DA 73-11-98 (MOD 8) – modification to allow: Adjustment of the Consolidated Consent Boundary in the Mod 8 Area to undertake first workings within the Mod 8 boundary in addition to extending the consent expiry date to 6th July 2021.	Jan 2019		6 July 2021*
Development Consent DA 83/877			
Authorised the transport of coal from Awaba Colliery Surface Site via the Newstan – Eraring Private Haul Road to Eraring Power Station and Newstan Colliery Surface Site CPP.	Jan. 1984	LMCC	N/A
Development Consent DA 88/0645			
Permitted the establishment of a coal storage area and water management facilities adjacent to rail loop at Newstan Colliery Surface Site.	Feb 1989	LMCC	N/A
Development Consent DA 93/00080			
Allowed the development of coal storage and a rail loading area at Newstan Colliery Surface Site.	Apr 1993	LMCC	N/A
Development Consent DA 95/00152			
Permitted an addition to the lease area for land under ML 1380.	Mar 1995	LMCC	N/A
Development Consent DA 99/02806/1N			
Permitted the establishment of an emergency egress and bulk materials delivery facility.	Jun 1999	LMCC	N/A

*Considers the provisions of the *COVID-19 Legislation Amendment (Emergency Measures – Miscellaneous) Act 2020.*

Development Consent DA 73-11-98 conditions relevant to the preparation of this MOP have been summarised in **Table 1.2** along with where each condition has been addressed within this document.

Table 1.2: DA 73-11-98 Consent Conditions Relevant to this Document

Condition	Condition Requirement	Section Addressed
1	**General** There is an obligation on the Applicant to prevent and minimise harm to the environment throughout the life of the project. This requires that all practicable measures are to be taken to prevent and minimise harm that may result from the construction, operation and, where relevant, decommissioning of the development.	Section 7
3.2(b)	The Environmental Management Strategy shall include: (iii) overall environmental management objectives and performance outcomes, during construction, mining and decommissioning of the mine, for each of the key environmental elements for which management plans are required under this consent;	Section 4.3
3.6	**Site Rehabilitation Management** The Applicant shall carry out rehabilitation of all mine areas in accordance with the requirements of any Mining Lease.	Section 4
3.12	**Subsidence Management in the Main West Mining Area** The applicant shall: (c) remediate any unpredicted subsidence impacts on the 330 kV power transmission lines and towers in the Main West Mining Area, to the satisfaction of TransGrid.	Section 7
3.13	**Subsidence Management in the Newstan MOD 8 Area** The Applicant must: (b) remediate any subsidence impacts to the land, ensuring that public safety is maintained at all times	Section 7

Northern Coal Services Development Consent

On 29 September 2015, Northern Coal Services obtained Development Consent SSD 5145 for the NCLP to regulate the approved existing coal handling, processing and transport operations at the Newstan Colliery Surface Site, Cooranbong Entry Site and along the private haul roads, as well as to utilise existing and proposed new surface infrastructure.

The Development Consent applies to the existing Newstan Colliery Surface Site, including coal handling and preparation infrastructure, reject emplacement areas, water management infrastructure and rail loading infrastructure, extension to the Newstan Colliery Surface Site, existing infrastructure at Cooranbong Entry Site, the existing Hawkmount Quarry, and the existing Cooranbong Private Haul Road, Awaba Private Haul Road and Newstan-Earing Private Haul Road. Note: Approvals for Cooranbong Entry Site and Mandalong Haul Road are managed by Centennial Mandalong and under the Mandalong MOP. **Table 1.3** lists the Development Consents applicable to Northern Coal Services.

Table 1.3: Northern Coal Services Development Consent

Description	Issue Date	Consent Authority	Expiry Date
SSD 5145 – Northern Coal Services Project			
Coal Transportation and Processing Operations	29 Sep 2015	DPIE	Dec 2045
MOD 1 – modification to allow: Update to noise monitoring conditions for Cooranbong Entry Site.	Dec 2017	DPIE	Dec 2045

Development Consent DA SSD 5145 conditions relevant to the preparation of this MOP have been summarised in **Table 1.4** along with where each condition has been addressed within this document.

Table 1.4: SSD 5145 Consent Conditions Relevant to this Document

<table>
<tr><th>Condition</th><th>Condition Requirement</th><th>Section Addressed</th></tr>
<tr><td>Schedule 2, Condition 1</td><td>Obligation to Minimise Harm to the Environment
In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.</td><td>Section 7</td></tr>
<tr><td>Schedule 3, Condition 27</td><td>Rehabilitation Objectives
The Applicant must rehabilitate the site to the satisfaction of DRG. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS, and comply with the objectives in Table 6.
Table 6: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Site (as a whole)</td><td>• Safe, stable and non-polluting.</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless DRG agrees otherwise.
• NCSS, CES, Hawkmount Quarry and Reject Emplacement areas to be made safe and hydraulically and geotechnically stable.
• NCSS and CES to be rehabilitated for use as light industrial areas; or revegetated with suitable local native plant species to a landform consistent with the surrounding environment.</td></tr>
<tr><td>Rehabilitation materials</td><td>• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources.</td></tr>
<tr><td>Reject Emplacement Areas</td><td>• Hawkmount Quarry and the Reject Emplacement Area sites to be revegetated with suitable local native plant species, and to a landform consistent with the surrounding environment.
• Capping materials (including depth of application) to be approved by DRG prior to capping.</td></tr>
<tr><td>Revegetated final landforms</td><td>• Stable and sustain the intended land use.
• Consistent with surrounding topography to minimise visual impacts.
• Incorporate relief patterns and design principles consistent with natural drainage.</td></tr>
<tr><td>Native flora and fauna</td><td>• Flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity.
• Rehabilitated areas contribute to achieving self-sustaining biodiversity habitats.</td></tr>
<tr><td>All watercourses subject to mine-water discharges</td><td>• Hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same or better than prior to grant of this consent.</td></tr>
<tr><td>Water quality</td><td>• Water retained on site is fit for the intended post mining land use(s).
• Water management is consistent with the regional catchment management strategy.</td></tr>
<tr><td>Community</td><td>• Ensure public safety.
• Minimise the adverse socio-economic effects of mine closure.</td></tr>
</table></td><td>Section 4.3</td></tr>
<tr><td>Schedule 3, Condition 28</td><td>Progressive Rehabilitation
The Applicant shall rehabilitate the site progressively, that is, as soon as is practicable following disturbance to the satisfaction of DRG.</td><td>Section 7</td></tr>
</table>

Condition	Condition Requirement	Section Addressed
Schedule 3, Condition 29	**Rehabilitation Management Plan** The Applicant must prepare a Rehabilitation Management Plan for the development, to the satisfaction of the Secretary and DRG. This plan must: (a) be prepared consultation with DRG, OEH, CLWD, LMCC and the CCC; (b) be submitted to the Secretary and DRG for approval prior to clearing any native vegetation, or as otherwise agreed by the Secretary; (c) be prepared in accordance with relevant guidelines and consistent with the rehabilitation objectives in the EIS and in Table 6; (d) describe how the performance of the rehabilitation would be monitored and assessed against the objectives in Table 6; (e) provide for detailed development closure planning, including measures to minimise socio-economic effects associated with mine closure, to be developed prior to the site being placed on care and maintenance; and (f) be integrated with the other management plans required under this consent. The Applicant must implement the plan as approved by the Secretary.	This MOP

EPBC Approval

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of Agriculture, Water and the Environment (DAWE) and provides a legal framework to protect and manage nationally and internationally significant flora, fauna, ecological communities and heritage places defined as 'matters of national environmental significance'. Approval under Part 9 of the EPBC Act for the Northern Coal Logistics Project (referral 2013/6906) was granted on 2 March 2016. A Green and Golden Bell Frog Research Program has been developed and is underway to ensure compliance with the conditions of the EPBC Act approval. The program is to ensure that the operations of Cooranbong Entry Site and NCSS (as part of Northern Coal Services) do not contribute to a decline in the extent, quality or availability of Green and Golden Bell Frog (*Litoria aurea*) habitat downstream of mine water discharge locations.

Awaba Colliery Development Consent

An application for a Part 3A Project Approval was lodged in March 2010 by Centennial for the Awaba Colliery Mining Project, which sought approval from the Minister for Planning to allow ongoing and extended underground mining and associated surface operations. The then Planning and Assessment Commission of New South Wales granted project approval MP PA10_0038 on 13 May 2011. The current project approval has since been declared a State Significant Development (SSD) under Clause 6 of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*, for the purposes of the EP&A Act. Accordingly, Awaba Colliery now operates as an SSD approval (MP 10_0038).

The Awaba Colliery Project sought to:

- Continue bord and pillar development and pillar extraction by continuous miners within the "Main South Area" (being the remaining sections of Stage 2 and Revised Stage 3);
- Extend bord and pillar development and pillar extraction by continuous miners into the "East B" Area;
- Produce, handle and distribute up to 880,000 tonnes of ROM coal per annum (financial year) using existing surface facilities;
- Continue the use of existing ancillary surface facilities; and

- Continue the delivery of coal to the Newstan Colliery and/or the Eraring Power Station using the existing private haul road/transport facilities.

Table 1.5 lists the Development Consents applicable to Awaba Colliery.

Table 1.5: Awaba Colliery Development Consent

Description	Issue Date	Consent Authority	Expiry Date
MP 10_0038 – Awaba Colliery Mining Project			
Awaba Colliery Mining Project	13 May 2011	DPIE	31 Dec 2015

Development Consent MP 10_0038 conditions relevant to the preparation of this MOP have been summarised in **Table 1.6** along with where each condition has been addressed within this document.

Table 1.6: MP 10_0038 Consent Conditions Relevant to this Document

<table>
<tr><th>Condition</th><th>Condition Requirement</th><th>Section Addressed</th></tr>
<tr><td>Schedule 2, Condition 1</td><td>Obligation to Minimise Harm to the Environment
The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the project.</td><td>Section 7</td></tr>
<tr><td>Schedule 2, Condition 28</td><td>Rehabilitation Objectives
The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed rehabilitationstrategy described in the EA, and comply with the objectives in Table 6.
Table 6: 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.
Final land use compatible with surrounding land uses.</td></tr>
<tr><td>Any plug failure</td><td>Filled with earth materials to the natural land surface and compacted so as to prevent any significant ingressof surface waters to the mine.
Revegetated in a manner consistent with surroundingland.</td></tr>
<tr><td>Project surface infrastructure.</td><td>To be decommissioned and removed, unless theExecutive Director Mineral Resources agrees otherwise.</td></tr>
<tr><td>Watercourses of 2nd order or higher to be undermined.</td><td>Hydraulically and geomorphologically stable.</td></tr>
<tr><td>Built Features.</td><td>Repair to pre-mining condition or equivalent unless:
– the owner agrees otherwise; or
– the damage is fully restored, repaired or compensated for under the Mine Subsidence Compensation Act 1961.</td></tr>
<tr><td>Community.</td><td>Ensure public safety.
Minimise the adverse socio-economic effectsassociated with mine closure.</td></tr>
</table></td><td>Section 4.3</td></tr>
<tr><td>Schedule 2, Condition 29</td><td>Progressive Rehabilitation
The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance.</td><td>Section 7</td></tr>
</table>

Condition	Condition Requirement	Section Addressed
Schedule 2, Condition 30	**Rehabilitation Management Plan** The Proponent shall prepare and implement a Rehabilitation Management Planfor the project to the satisfaction of the Executive Director Mineral Resources. This plan must: (a) be prepared in consultation with the Department, OEH, NOW, Council and the CCC; (b) be prepared in accordance with any relevant DRG guideline; (c) provide for detailed mine closure planning, including measures to minimise socio- economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; (d) build, to the maximum extent practicable, on the other management plans required under this approval; and (e) be submitted to the Department and the Executive Director Mineral Resources within 12 months of this approval.	This MOP

1.2.2 Authorisations

Mining Authorisations

The Newstan Complex holds a number of authorisations which are outlined in **Table 1.7**.

Table 1.7: Mining Authorisations

Mining Title	Title Holder	Mineral (ha)	Surface (ha)	Expiry	Brief Description of Surface Area
Mining Leases					
ML1380	Centennial Newstan Pty Limited	78.0	Nil	18/09/2037	NA
ML1452	Centennial Newstan Pty Limited	1587.0	Nil	06/07/2020 (Renewal Sought)	NA
ML1480	Centennial Newstan Pty Limited	14.49	14.49	20/07/2023	Part Northern Rejects Emplacement Area (NREA)
ML1586	Centennial Newstan Pty Limited	449.1	Nil	13/10/2022	NA
ML1587	Centennial Newstan Pty Limited	3	3	23/10/2027	Surface area incl Southern Rejects Emplacement Area (SREA).
Mining Purpose Leases					
MPL304	Centennial Newstan Pty Limited	Nil	0.0699	25/03/2035	Part NREA
MPL305	Centennial Newstan Pty Limited	Nil	0.4044	25/03/2035	Water Tanks
MPL327	Centennial Newstan Pty Limited	Nil	1.041	05/08/2036	Awaba Nitrogen Plant
MPL328	Centennial Newstan Pty Limited	Nil	0.397	05/08/2036	Part Awaba Stockpile
Consolidated Coal Leases					
CCL727	Centennial Newstan Pty Limited	2058.0	577.67	12/08/2027	Pit top, SREA, NREA and surrounds

Mining Title	Title Holder	Mineral (ha)	Surface (ha)	Expiry	Brief Description of Surface Area
CCL746	Centennial Newstan Pty Limited	2510.5	1900	31/12/2028	Area above underground workings, within Crown Land.
CCL763	Centennial Newstan Pty Limited	190.9	74.57	09/06/2022	Parcel land south of the pit top, including Stony Creek Pipeline.
CCL764	Centennial Newstan Pty Limited	108.8	9.332	18/05/2021	Area between the railloops and the haul roads
Private Lands Lease					
PLL497	Centennial Newstan Pty Limited	20.23	Nil	24/08/2038	N/A
Exploration Authorisations					
A399	Centennial Newstan Pty Limited	-	693	17/11/2017 (Renewal Sought)	-
EL5138	Centennial Newstan Pty Limited	-	1793	10/10/2021	-
EL6641	Centennial Newstan Pty Limited	-	454.1	23/10/2017 (Renewal Lodged)	-

Sub-Leases

Recent changes to the *Mining Act 1992* have resulted in all the subleases held by Newstan Colliery being deregistered. All subleases have now been reregistered and Newstan Colliery is in the process of having these subleases included into the Newstan Colliery Holding.

The Newstan Colliery has eight benefiting subleases with adjoining mining lease holders to mine various coal seams. Generally, all mineable economic reserves subject to these subleases have been extracted. However, there are mineable reserves remaining within CCL718.

All sublease agreements for Newstan Colliery are assignable. Sublease agreements for the Newstan Colliery Holding are summarised in **Table 1.8**.

Table 1.8: Sub-Leases

Mining Lease	Agreement		Sublessor	ExpiryDate	Description
	Type	Date			
Pt CCL 718	Sublease	2/3/81	Oceanic Coal Australia Limited	11/02/2014	Subsurface leases only. Subleases are historical mining areas only. There is no active mining or rehabilitation within these subleases.
Pt CCL 774	Sublease	18/12/76	Mount Thorley Operations	29/6/2014	
		20/9/78			
		10/3/80			
		18/2/81			
		24/10/84			
Note: Subleases continue with periodic renewal of headleases.					

Centennial has had discussions with relevant title holders to arrange transfers of these subleases, which will permanently eliminate sublease requirements. There is currently no active mining within these subleases.

All subleases are for underground mining. There are no surface areas included in any of the subleases. These subleases are not included in the rehabilitation cost estimates.

1.2.3 Licences

Environment Protection Licence

Coal mining and coal works are "scheduled" activities under the *Protection of the Environment Operations Act 1997* (POEO Act) and therefore are subject to the provisions of this Act. The provisions relate to control of water pollution, air pollution, noise control, waste, odour and environmental offences.

An Environment Protection Licence (EPL) is required under section 43(b) of the POEA to authorise the carrying out of "scheduled" activities. EPL 395 is currently held for the activities of Newstan Colliery, while EPL 443 is for the activities carried out at Awaba Colliery.

Water Licences

Water licencing requirements are detailed within the *Water Act 1912* and the *Water Management Act 2000*. Centennial Newstan currently holds the following water licences as listed in **Table 1.9**. Additional water licences have been applied for through the Natural Resource Access Regulator (NRAR). Centennial Newstan will continue seeking approval of these licences.

Table 1.9: Water Licences

Description	Licence	Lot//DP	Expiry
Water Monitoring Borehole	20BL169865	4//816752	Perpetuity
Water Monitoring Borehole	20BL167832	152//755207	Perpetuity
Water Monitoring Borehole	20BL169871	221//548001	Perpetuity
Water Monitoring Borehole	20BL169863	21//532058	Perpetuity
Water Monitoring Borehole	20BL169861	143//755218	Perpetuity
Water Monitoring Borehole	20BL169870	48//755218	Perpetuity
Water Monitoring Borehole	20BL169871	221//548001	Perpetuity
Water Monitoring Borehole	20BL169871	221//548001	Perpetuity
Water Monitoring Borehole	20BL173649	101//709415	Perpetuity
Water Monitoring Borehole	20BL169867	95//755218	Perpetuity
Water Monitoring Borehole	20BL169866	2//755218	Perpetuity
Water Monitoring Borehole	20BL169870	48//755218	Perpetuity
Water Monitoring Borehole	20BL169869	18//755218	Perpetuity
Water Monitoring Borehole	20BL169870	48//755218	Perpetuity
Water Monitoring Borehole	20BL169870	48//755218	Perpetuity
Water Monitoring Borehole	20BL172209	28//755207	Perpetuity
Water Monitoring Borehole	20BL172267	94//755207	Perpetuity
Water Monitoring Borehole	20BL172266	95//755207	Perpetuity
Water Monitoring Borehole	20BL172269	Crown Land East 95//823682	Perpetuity
Water Monitoring Borehole	20BL172268	99//755218	Perpetuity
Water Monitoring Borehole	20BL172270	Crown Land Adj 7052//1057169	Perpetuity
Awaba - Artificial Recharge	20BL173232	213//755207	12/12/2017
Awaba - Artificial Recharge	20BL173232	213//755207	12/12/2017
Water Access Licence	WAL (18735)	441//583057	

1.2.4 Additional Approvals

Tailings Emplacement

An application was made under Section 101 of the *Coal Mines Health and Safety Act 2002* on 1 October 2008 to discontinue the use of an emplacement area for the NREA to the RR.

This application included the use of coarse reject material being used in the capping process of the NREA Tailings Dam, and as part of the ongoing rehabilitation process for the NREA. As discussed in the application, Newstan Washery was scheduled to process Newstan, Awaba and Mandalong coal. The course reject produced from washing Newstan coal was to be diverted to the SREA Stage 2 Dam to increase the capacity of the dam, as Newstan's course reject is suitable for dam construction, and the additional capacity would be required for tailings storage when the Awaba and Mandalong coal is processed.

Course reject produced from processing Awaba coal and Mandalong coal will be used for the NREA tailings dam capping. Centennial Newstan received ministerial approval to discontinue use of an emplacement area on 4 February 2009.

An application was made under Section 100 of the *Coal Mine Health and Safety Act 2002* on 27 November 2006 to construct stages two through to five of the SREA tailings storage facility. Approval was granted by the Chief Inspector of Coal Mines on 10 January 2007. There is no expiry on this approval.

Historically, Centennial also gained approval to transport up to 0.88 Mtpa of material (including coal and stone from construction activities undertaken as part of the Newstan Colliery Extension of Mining Project) by truck via private haul roads from the Awaba Colliery Surface Site to the reject emplacement areas at the Newstan Colliery Surface Site.

Electricity Generating Works

On 18 May 2018, Awaba Colliery received Development Consent DA 477/2018 issued under the EP&A Act Sections 4.16, 4.17 and 4.18 (1)(a) by Lake Macquarie City Council. The Development Consent approves Electricity Generating Works for the construction and operation of a 200kW photovoltaic (PV) solar system at the Awaba Colliery pit top. The installation of 100kW was completed on 22 November 2019 with no plans to install the additional 100kW during the MOP term.

1.3 Land Ownership and Land Use

The historic land use includes mining, with the wider area having been extensively undermined since around 1887.

The land use around the Newstan Colliery Surface Site is predominantly undeveloped bush land, along with residential and rural-residential properties associated with Fassifern and Wakefield. The Main Northern Railway Line traverses on a north-south alignment immediately to the east of the Newstan Colliery Surface Site.

Hawkmount Quarry is located in a bushland setting between Newstan-Eraring Private Haul Road and the Cooranbong Private Road. The Main Northern Railway Line traverses through this site and Eraring Power Station is located to the south-east.

Awaba Colliery's surface facilities are located in hilly forested country, on the western slopes of a north-south trending spur which is approximately one kilometre south of the Awaba village. The immediate vicinity is bush land, located on Crown Land, generally extending at least two kilometres in all directions from the colliery, except to the north where the Awaba village is located. To the east of Awaba Colliery is the Awaba Waste Disposal Site, an area of bush land used by the Westlake's Automobile Club, and privately owned land (Aboriginal land owned by Koompahtoo Local Aboriginal Land Council (KLALC)). To the west of the Colliery is the Main Northern Railway line. The Newstan-Eraring private coal haul road links Awaba Colliery with Newstan to the north and Eraring Power Station to the south.

There are small pockets of Awaba State Forest and Sugarloaf State Conservation Area land which are located inside the MOP boundary (refer **Figure 1.2**).

A Schedule of Lands for the Newstan Complex is provided as **Appendix 1**.

1.4 Stakeholder Consultation

As a well-established mine operating in the surrounding area for over 125 years, Centennial Newstan has built upon a well-established register of existing stakeholders in addition to stakeholder identification specifically undertaken for the Development of the *Subsidence Management Plan* (SMP) and Development Consent submissions. The mine has an active Community Consultation Committee (CCC) through which environmental issues and project developments are discussed.

A Stakeholder Engagement Plan (SEP) was developed by Centennial Newstan for the Newstan Complex. The purpose of the SEP was to provide a consistent management framework, to identify and consult with stakeholders, with an interest in the Project and to ensure appropriate monitoring and reporting of community initiated enquiries.

The objectives of the SEP are to:

- Understand the characteristics of the local community and the impact of its operations (current and proposed);
- Set a process for consultation and engagement with stakeholders of interest;
- To openly communicate with stakeholders about Newstan Complex regarding current and potential future activities; and
- To provide a means of ongoing reporting and monitoring of activities.

Further communication and consultation methods utilised by the Newstan Complex include:

- Publications in the local newspaper (the “Lakes Mail”);
- Newstan/Awaba Community Information and Complaints Line (1800 247 662); and
- Centennial website – Newstan Colliery community information page.

1.4.1 Community Consultation

The Newstan Complex meets with the Newstan and Awaba CCC three times a year to provide a formal forum whereby the community can communicate with Newstan Colliery and be kept up to date with the progress of the mine. In addition, the Newstan Complex may consult with the CCC members in between the meetings.

This MOP was submitted to these CCC members for consultation on 1 April 2021.

1.4.2 Statutory Authorities

Stakeholder consultation was undertaken during the preparation of this MOP in accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013).

Centennial Newstan consulted with the Resources Regulator during the preparation of this MOP and held a teleconference on 1 March 2021 to discuss Resources Regulator expectations regarding MOP requirements and content.

To satisfy the requirements of Schedule 3, Condition 29 of SSD 5145 and Schedule 3, Condition 30 of MP 10_0038, this MOP was submitted to the DPIE, Biodiversity Conservation Division (BCD), NRAR and Lake Macquarie City Council (LMCC) for consultation on 1 April 2021.

2 PROPOSED MINING ACTIVITIES

2.1 Project Description

2.1.1 Newstan Colliery

The Newstan Colliery surface facilities area includes offices; a workshop; a bathhouse; and coal handling infrastructure consisting of a coal preparation plant, truck loading bins, a rail loading facility, the NREA and the SREA.

Table 2.1 summarises and provides a general overview of the approved components of the Newstan Colliery operation under Development Consent DA 73-11-98 and the existing components of the Newstan Colliery operation.

Table 2.1: Newstan Colliery Operations

Aspect	Approved Operations	Existing Operations
Life of Operation	Development consent expires 6 July 2023*.	As approved.
Operational Hours	24 hours a day, seven days per week.	As approved.
Operational Employment	320 full-time equivalent (FTE) personnel, with 75 of these employed for Newstan Colliery Surface Site coal handling, processing and transport.	Newstan underground operations were put on care and maintenance in August 2014. Newstan underground currently employs approximately 75 people for operating the coal handling, processing and transport.
Mine access	Men and materials drift and winder for access to the underground workings from the Newstan Colliery Surface Site. A men and materials access shaft is approved for construction at the Awaba Colliery Surface Site to access the underground workings.	As approved. The men and materials access shaft at the Awaba Colliery Surface Site has not yet been constructed.
Coal Extraction	Up to 4 Mtpa of ROM coal from within the Life Extension Area and the Main West Mining Area using longwall mining and bord-and-pillar mining methods.	As approved. No coal extraction is planned for this MOP term.
Surface Infrastructure Sites	Newstan Colliery Surface Site. Awaba Colliery Surface Site	As approved.
Mine Ventilation	Newstan Colliery Surface Site – two surface ventilation fans. Awaba Colliery Surface Site – surface ventilation fan.	As approved. The ventilation shaft at Awaba Colliery Surface Site has been constructed, however the ventilation fans at the site have not yet been installed.
Coal Stockpiles	(a) 80,000 tonne ROM Coal Stockpile. (b) 180,000 tonne Rail Loop Stockpile approved to be progressively increased to 400,000 tonnes. (c) 50,000 tonne product stockpile. (d) 30,000 tonne emergency stockpile. (e) Construction of a 100,000 tonne product stockpile on the north side of LT Creek. (f) Middlings stockpile.	(a) As approved. (b) Yet to be increased beyond 180,000 tonnes. (c) As approved. (d) As approved. (e) Not constructed. (f) As approved.

Aspect	Approved Operations	Existing Operations
Water Management	Newstan Colliery Surface Site – management systems in place for clean, dirty and mine water. Clean Water Plant. Stony Creek Pipeline. Approval to pipe two sections of the north arm of LT Creek through the Newstan Colliery Surface Site, comprising approximately 175 metres within the rail loop and approximately 150 metres between the Main By-Wash Dam and the rail loop.	As approved. The second length of piping of LT Creek comprising approximately 150 metres between the Main By-Wash Dam and the rail loop has not yet been installed.
General Waste Management	Systems are in place for the various non-production waste streams generated by the mining operation.	As approved.
Post Mining Closure and Rehabilitation	The primary objective for rehabilitation is to return areas to a natural land use that is consistent with the area's pre-mining land use and/or to some form of beneficial land use (for example, industry) that is acceptable to relevant stakeholders.	As approved.
Environmental Management	An established Environmental Management System (EMS) that has been developed in accordance with the Centennial Environmental Management System Framework (2011). The EMS includes a comprehensive set of environmental management plans, which are backed by an environmental monitoring network.	As approved.

*Considers the provisions of the *COVID-19 Legislation Amendment (Emergency Measures – Miscellaneous) Act 2020.*

2.1.2 Northern Coal Services

The Cooranbong Entry Site and Mandalong Haul Road, which are components of the Northern Coal Logistics Project Development Consent, are included within the Mandalong MOP. All other operations at Newstan Colliery and the Cooranbong Haul Road are included within this Newstan Complex MOP.

Table 2.2 outlines the operations at Northern Coal Services.

Table 2.2: Northern Coal Services Operations

Aspect Approved	Approved Operations	Existing Operations
Coal Receipt	Receive up to 8 Mtpa of coal from the Newstan Colliery, Awaba Colliery and Mandalong Mine: (a) Mined coal is transported from Newstan Colliery via an underground conveyor to the Newstan Colliery Surface Site at a rate of up to 4.5 Mtpa. (b) Coal from Mandalong Mine (via Cooranbong Entry Site) is transported along private haul roads in trucks to the Newstan Colliery Surface Site at a rate of up to 6 Mtpa. (c) Coal from Awaba Colliery is transported along private haul roads in trucks to the Newstan Colliery Surface Site at a rate of up to 0.88 Mtpa.	As approved. Newstanwill receive coal.

Aspect Approved	Approved Operations	Existing Operations
Coal Handling and Processing	CPP and CHP, which each have an approved capacity of 8 Mtpa. Requirement to provide an automated train loading system when export exceeds 5.5 Mtpa.	As approved. Automation of the train loading system has not yet been undertaken.
Coal Transport	(a) Up to 4.5 Mtpa of coal transported by truck to the Eraring Power Station via the private haul road. (b) Short-term road haulage of coal to Vales Point Power Station. (c) Up to 8 Mtpa of coal transported by rail along the Main Northern Railway Line to the Port of Newcastle and/or Port Kembla (for export) and/or to Vales Point Power Station. Up to 4 Mtpa is approved to be exported via the Port of Newcastle or Port Kembla subject to upgrades to the CHP and automation of the train loading system, (d) Up to 0.5 Mtpa of middlings back- hauled by truck via private haul roads to Cooranbong Entry Site for subsequent supply to the Eraring Power Station.	(a) As approved. (b) No longer undertaken. (c) As approved. Automation of the train loading system has not yet been undertaken given export coal has not yet exceeded 5.5 Mtpa. (d) As approved.
Coal Trains from Newstan Colliery Surface Site	Up to eight trains per day.	As approved.
Coal Rejects and Tailings Management	(a) Coarse rejects from Newstan Colliery Surface Site transported by truck to the SREA and NREA. (b) Fine rejects (tailings) from Newstan Colliery Surface Site pumped underground workings and/or the tailings dams at the NREA and/or SREA. (c) Up to 0.88 Mtpa of stone material from the Awaba Colliery Surface Site transported by truck along the private haul roads to the Newstan Colliery Surface Site for rehabilitation purposes or emplacement (NREA or SREA). (d) Up to 7,800 tpa of stone material from the Cooranbong Entry Site transported by truck along the private haul roads to the Newstan Colliery Surface Site for rehabilitation purposes or emplacement (NREA or SREA).	(a) As approved. (b) Tailings only pumped SREA tailings dam. (c) As approved. (d) As approved.

2.1.3 Awaba Colliery

Awaba Colliery was an underground coal mine operated by Centennial Newstan Pty Limited. In March 2012, the Awaba Colliery ceased mining operations as the available coal reserves were exhausted. All mine entries were sealed in 2012, removing access to the underground workings.

The *Awaba Colliery Mining Project Environmental Assessment* (GSSE 2010) states that following the completion of mining identified that the administration buildings, workshop, CPP, associated stockpile and haul truck loading facility could be maintained for coal preparation or other mining related activities. The remaining assets at Awaba Colliery are to remain onsite until further assessments have been completed for the Newstan Extension Project.

Table 2.3 outlines the operations at Awaba Colliery.

Table 2.3: Awaba Colliery Operations

Aspect Approved	Approved Operations	Existing Operations
Mining Method	Bord and pillar development, and pillar extraction within narrow panels by continuous miners. This method was developed in consultation with the Resources Regulator and successfully used since 2007 in the Main South Area and 3 North Area.	Currently no underground mining. Underground areas sealed. No coal extraction during MOP term.
Mining Areas	Mining in existing/historical workings areas of the Main South Area in remaining areas of Stage 2 (SMP Approved 2008). Mining will similarly continue into the existing workings of the Revised Stage 3 Area.	
Predicted Subsidence in Mining Areas	Predicted maximum subsidence is assessed to be less than 200 mm (upper limit used for assessment) although generally subsidence is within a range of 90-135 mm. Maximum subsidence measured to date is 119 mm. Awaba Colliery also undertakes a very conservative risk-based approach through also considering the highly unlikely worst case scenario of a “plug” failure event (2,000 mm subsidence) in mining areas.	
Production	Approximately 880,000 tonnes per annum.	
Hours of Operation	24 hours per day, 7 days per week	As approved
Employment	Approximately 100 staff and contractors employed personnel	Shared staff with Newstan.
Coal Preparation	Coal is crushed on-site at the Awaba Colliery CPP. (Note: No reject material)	No coal preparation required during MOP term.
Land Preparation	As Awaba Colliery is a well established underground mine with adequate support infrastructure and a well defined resource boundary there is minimal land preparation undertaken for exploration or construction purposes. Minor change in surface facilities area to expand capacity of the site’s Pollution Control Dam, which will be undertaken in a previously disturbed area. No other changes proposed.	As approved.
Infrastructure	Infrastructure and support facilities at Awaba Colliery generally includes infrastructure for mine access and ventilation, coal handling, preparation, and transport, workshop and administration, water management and pollution control.	As approved. Mine access has been sealed, the conveyors, coal handling and preparation plant has been demolished. The remaining buildings will remain during the MOP term.
Mine Access	Access to Awaba Collieries Surface Facilities is off Wilton Road.	As approved.
Product Coal Transport	Coal is loaded into trucks from the Final Product Bin or by a front end loader (when coal has been stockpiled), for transport along a private haul road to either Newstan Run of Mine stockpile or Rail Loop (export) or Eraring Power Station.	No coal transport required during MOP term.

Aspect Approved	Approved Operations	Existing Operations
Water Management	The aim of water management system is to divert clean water away from areas of potential "dirty" water, such as, coal stockpiles and some hardstand areas. Dirty water is pumped from the surface into the underground where it is filtered through goaf areas before being discharged through a number of existing Licensed Discharge Points or the 10 South Bore into the Eraring Energy Ash Dam.	As approved.
Rehabilitation	Rehabilitation that occurs at Awaba Colliery generally relates to the filling of any sinkholes. Rehabilitation of a number of former Licensed Discharge Points has also occurred, however, monitoring may still occur in these locations.	As approved.
Solar Energy	Installation of 200kW prefabricated solar system.	Approval was received on 18 May 2018 under DA 477/2018 issued by Lake Macquarie City Council. The installation of 100kW was completed on 22 November 2019.

2.2 Activities Over the MOP Term

2.2.1 Exploration

No exploration drilling is currently planned to be undertaken during the MOP term.

2.2.2 Construction

Ventilation Fans

A shaft and ventilation fan is approved to be constructed in accordance with the Newstan Colliery Statement of Environmental Effects (Hansen Bailey 2007) approved under MOD 1 of DA 73-11-98 at the Awaba Colliery Surface Site to assist in the ventilation of the Newstan Colliery underground workings. While the shaft was constructed between July 2012 to August 2013, the fans are yet to be installed.

The existing ventilation shaft at Awaba will not be required to be converted into an upcast shaft during the MOP term.

Minor Infrastructure

The construction of additional minor infrastructure including, boreholes, minor powerlines, access tracks and methane degassing shafts may occur as required to maintain the underground workings as safe. For all such works the approved protocol in Section 3.4.7 of the Newstan EIS (Umwelt 1998) is implemented. This ensures the best positioning of facilities without any requirement for modification to the Development Consent, while minimising disturbance to the Environment.

Awaba Seepage

Works are proposed to be undertaken to implement the requirements of Clean-up Notice 155387. Centennial Newstan will continue to consult with the EPA regarding this Notice and works will be progressed accordingly during the MOP term.

Installation of 200kW Solar System

The installation and operation of a prefabricated 200 kW photovoltaic (PV) system at Awaba Colliery was approved by Lake Macquarie City Council on 18 May 2023 under Development Consent DA 477/2018. The installation of 100kW was completed on 22 November 2019 with no plans to install the additional 100kW during the MOP term.

Grout filling of Awaba Intersection Near Railway Corridor

In conjunction with the Resources Regulator and Sydney Trains, grouting of the Awaba 2SW intersection is proposed during the MOP term to stabilise a historical intersection of the Awaba mine workings. These works will be subject technical review.

Surface Disturbance Protocol

The nature of underground mining does not always allow exact location of minor infrastructure to be determined at an early stage. At Newstan, all such works would be undertaken such as to minimise any vegetation clearance. Flora, fauna and heritage surveys are conducted prior to disturbance of any vegetation associated with these activities. The majority of these activities can be relocated, as necessary, to avoid significant environmental impacts. Rehabilitation works such as rehabilitation of subsidence cracks and sinkholes, will not be able to be relocated.

Temporary sediment and erosion controls are implemented throughout all surface activities and maintained until the site is stabilised and rehabilitated. Any site disturbance is rehabilitated using native species.

2.2.3 Mining Operations

Newstan currently has approval to mine in three distinct areas, the Western Zone, South West and the Eastern Zone. Newstan Colliery underground operations were placed on care and maintenance in August 2014. No underground mining is planned during the MOP term.

Newstan Colliery utilises a variety of other equipment for its operation of the Surface Facilities Area and CPP. The current equipment used in the operation of Newstan Colliery includes coal handling, coal processing, coal loading and product coal haulage. The Newstan Colliery surface operations are operated 24 hours, seven days a week, and will continue during the MOP term.

Coal Handling and Transport

The Northern Coal Logistics Newstan Colliery Surface Site is approved to receive and process up to 4.5 Mtpa of ROM coal from Mandalong Mine. ROM coal from Mandalong Mine (via Cooranbong Entry Site) is transported along private haul roads in trucks to the Newstan Colliery Surface Site at rates of up to 6 Mtpa. The trucks unload the coal directly on to the 80,000 tonne ROM coal stockpile prior to it being reclaimed using a dozer or loader in to the CHP.

The Newstan CHP and CPP, which have an approved capacity of up to 8 Mtpa, have been designed to process up to 16,000 tonnes of ROM coal per day to produce product coal (both steaming and coking coal types). The nominal CPP plant capacity is 700 tonnes per hour, with the feed rate being controlled by vibratory feeders installed under the 4,000 tonne ROM coal surge bin.

Newstan will continue to receive, process and transport coal from Mandalong Mine during the MOP term.

Coal to Rail (Port of Newcastle and/or Port Kembla and/or Vales Point Power Station)

Product coal from the CPP is conveyed to coal storage bins and trucked to stockpiles within the rail loop. The coal is loaded from the rail loop stockpile by front end loaders into trains for transport at a current rate of 3 Mtpa via the Main Northern Railway Line to the Port of Newcastle and/or Port Kembla

(for export) and/or Vales Point Power Station. Up to eight trains per day are approved to transport coal from the Newstan Colliery Surface Site.

There are several coal handling infrastructure upgrades and new infrastructure items that are approved for the Newstan Colliery Surface Site but not yet constructed. These are:

- A 100,000 tonne product stockpile is approved to be established to the north of LT Creek;
- The 180,000 tonne rail loop stockpile is approved to be progressively increased to 400,000 tonnes; and
- Up to 4 Mtpa of product coal is approved to be transported from the Newstan Colliery Surface Site via rail subject to automation of the train loading system, which has not been undertaken given the coal export has not yet exceeded 3 Mpta.

This work is not planned to be completed during this MOP term.

Middlings to Cooranbong Entry Site

Up to 0.5 Mtpa of middlings from the CPP is approved to be back-hauled via the private haul roads from Newstan Colliery Surface Site to Cooranbong Entry Site for subsequent supply to the Eraring Power Station. The term “middlings” describes a middle quality coal product produced from the washing of coal. Once middlings are blended with coal from Mandalong Mine at the Cooranbong Entry Site it is of suitable quality for supply to Eraring Power Station for power generation. This will continue during the MOP term.

Coal to Eraring Power Station

Product coal from the CPP is conveyed to coal storage bins before being loaded in to trucks for transport to Eraring Power Station via the Newstan Eraring Private Haul Road at a rate of up to 4.5 Mtpa. When storage capacity in the truck loading bins are exceeded, coal may be temporarily stockpiled in a 50,000 tonne product stockpile located adjacent to the truck loading bins or trucked to the 30,000 tonne emergency stockpile prior to being loaded into trucks via a front end loader and transported to either the Eraring Power Station or the rail loop stockpile.

2.2.4 Rock/Overburden Emplacement

Newstan and Awaba are underground coal mines, subsequently there is no overburden generated at the site.

2.2.5 Processing Residues and Tailings

Production of saleable coal from the Newstan CPP results in the two forms of processing residues / reject material requiring disposal, being coarse rejects and fine rejects (tailings). The approved and existing disposal locations at the Newstan Colliery Surface Site, is the NREA and SREA (including the Main Tailings Dam).

Northern Rejects Emplacement Area (NREA)

Coarse rejects are transported by truck from the CPP to the NREA where it is used as capping material, as well as an emplacement area for course rejects material. The NREA, which has been utilised for rejects emplacement since the late 1950s, is in the process of being capped and is undergoing progressive rehabilitation. It has an approved development area of 29 hectares, with emplacement permitted to a maximum height of approximately 80 metres AHD.

An application was made under Section 101 of the *Coal Mines Health and Safety Act 2002* on 1 October 2008 to discontinue the use of emplacement area for the NREA to the former Department of Primary Industries (now Resources Regulator). This application included the use of coarse reject material being used in the capping process of the NREA Tailings Dam, and as part of the ongoing rehabilitation process for the NREA. As discussed in the application, Newstan Washery was scheduled to process Newstan,

Awaba and Mandalong Coal. Centennial Newstan received ministerial approval to discontinue use of an emplacement area on 4 February 2009.The NREA is divided into several emplacement area management zones, with rejects tipped in to a specific zone in accordance with a site-specific dumping strategy.

The dumping strategy includes the following requirements:

- Tipped material is spread in layers of approximately 400 mm and compacted using a bulldozer;
- The maximum slope of the final landform 4H:1V;
- Compaction tests are conducted on the placed material at regular intervals. The objective is to maximise the density and quantity of material placed and gain an 80-90% level of compaction;
- The final landform is to be capped with inert material with a minimum depth of 500 mm; and
- Revegetation of the final landform with native species must occur following capping.

Rejects emplacement has involved the emplacement of rejects in a series of layers across the entire 29 hectare area. The tailings dam occupying a significant proportion of the surface of the NREA has been filled. Progressive shaping, capping and revegetation of both the tailings dam and coarse rejects emplacement area is underway.

The course rejects is being utilised to rehabilitate the tailings dam in accordance with the S101 Approval.

The historical course rejects emplacement area in the NREA has been capped with 0.5 m of inert material and rehabilitated.

The rehabilitation and management of the NREA will be undertaken in accordance with the *Northern Coal Services Reject Emplacement Area Strategy* (2020).

Southern Rejects Emplacement Area (SREA)

The SREA was approved as part of the Newstan Colliery Life Extension Project (Umwelt 1998). Coarse rejects material is transported by truck from the CPP to the SREA for emplacement and use in the construction of the tailings dam wall.

The SREA, which has an approved development area of 75 hectares, has been designed and approved to be developed in a series of stages to allow alternative disposal options to be utilised in the future (should one(s) become available) whilst minimising the land area that needs to be cleared and disturbed at any one time. This sequential development also allows a free draining and stable final landform to be achieved if emplacement in this area ceases at any stage of the development.

The emplacement staging and conceptual final landform make provision for the progressive filling up to an elevation of up to 62 metres AHD, and progressive rehabilitation.

Following site preparation, coarse rejects are emplaced in the same manner to that utilised on the NREA, which includes:

- Regular updating of site-specific dumping strategy;
- Rejects being spread and compacted in layers of approximately 400 mm;
- Material compacted to 80-90%compaction level;
- Capping of rejects with 500 mm of inert material;
- The maximum slope of final landform will be 4H:1V; and
- Revegetation of the final landform with native species.

The rehabilitation and management of the SREA will be undertaken in accordance with the *Northern Coal Services Reject Emplacement Area Strategy* (2020).

Tailings

All tailings produced from the washing of coal at the Newstan Colliery Surface Site are now pumped to the Main Tailings Dam at the SREA, which has an approved development area of approximately 37 hectares. The tailings dam consists of an embankment that has been constructed using coarse rejects, and other materials, across the upper reaches of the south arm of LT Creek. The maximum slope of dam's side batters are 3H:1V.

The top level of the Main Tailings Dam will be progressively raised to meet tailings disposal requirements to a maximum height of 60 metres AHD, with the maximum approved height of the dam wall being approximately 0.5 metres below the SREA final landform to provide for capping and topsoiling. The dam is proposed to be capped with approximately 1.5 metres of coarse rejects and then further covered with 0.5 metres of inert capping material and topsoil prior to being revegetated. A Detailed Tailings Capping Design will be developed and submitted for approval to the Resources Regulator (or contemporary equivalent) prior to commencing rehabilitation with a High Risk Activity approval issued under the *Work Health and Safety (Mines) Regulation 2014.*

As the tailings settle out, water is decanted from the Main Tailings Dam into the Fassifern Underground Storage. The dam is also used to supplement the supply of water to Connolly's Dam for reuse in the CPP. At maximum tailings capacity, an operational freeboard of 2.0 metres is maintained to enable the Main Tailings Dam to cater for runoff from a 100,000 year ARI design storm event, in accordance with Dam Safety Committee Guideline DSC19.

Hawkmount Quarry

Hawkmount Quarry was approved as an REA under SSD 5145, however this was never utilised. Hawkmount Quarry rehabilitation will be managed by LMCC and has therefore not been considered further in this MOP.

2.2.6 Waste Management

General Waste and Routine Maintenance Consumables

All general wastes and routine maintenance consumables from the daily servicing of equipment are collected on a regular basis from the surface sites by a licensed contractor for either recycling or off-site disposal within a waste facility approved to accept such waste. The waste contractor is charged with sorting comingled general waste on-site in order to remove any recyclable items, such as oil filters, cartridges and scrap metal.

Waste Oil and Grease

The generation of waste oils and grease is currently limited to the routine maintenance of plant and equipment. Waste oils and greases are stored in tanks and drums within bunded areas at the surface sites for collection by a licensed contractor, along with parts and packaging (for example, filters and waste oil drums) for recycling and/or off-site disposal within a waste facility approved to accept such waste.

Oily water from the vehicle maintenance and equipment storage areas, along with the compressor and drum crushing bunker at the Newstan Colliery Surface Site is drained to three hydro-cyclone oil-water separators.

Additional oil-water separators are located at the conveyor drifts for treatment of oily water in these areas. A licensed contractor regularly services and maintains the separators, including removing all waste hydrocarbons from the site for recycling.

Waste oils and greases are no longer stored at Awaba Colliery.

Sewage

Sewage and wastewater from the bathhouse and other surface facilities at the Newstan Colliery Surface Site is pumped to an on-site wastewater treatment plant. Effluent from this treatment plant is pumped via a holding tank to the Maturation Dam in the NREA.

2.2.7 Decommissioning and Demolition

There are no planned major decommissioning or demolition activities planned during the MOP term.

2.2.8 Temporary Stabilisation

Large scale temporary stabilisation of landforms is generally not required at the Newstan Complex. Where minor works are undertaken, erosion and sediment control and temporary stabilisation measures will be implemented.

2.2.9 Progressive Rehabilitation and Completion

Progressive rehabilitation within this MOP term is focused on the following areas:

- Tailings Storage Facility (Domain 2):
  - NREA – The NREA is being progressively rehabilitated as areas become available following capping and shaping. Capping of the tailings storage facility will continue during the MOP term.
  - SREA – The SREA has been designed to be progressively developed in stages. Progressive rehabilitation works have been undertaken in this area and will continue where areas become available.
- Underground Mining Areas (Domain 8):
  - It also areas that may be subject to subsidence, and where required subsidence remediation and rehabilitation works will be undertaken including rehabilitation of surface cracks or sinkholes by (ripping/excavating and backfilling and reseeding), minor erosion/sediment control works and minor remedial drainage earthworks. It also includes monitoring infrastructure (piezometers, weirs and transducers, seismometers, survey markers).

Further details of rehabilitation planned during the MOP period is included within **Section 7**.

2.2.10 Material Production Schedule during MOP Term

The material production schedule during the MOP term is provided in **Table 2.4**. There will be no mining or coal processing at the Newstan or Awaba Collieries during the MOP term. **Table 2.4** details the schedule for the material planned to be received, washed, and transported Northern Coal Services.

Table 2.4: Material Production Schedule during the MOP Term

Material	Unit	2021	2022	2023
Newstan and Awaba Colliery				
Stripped topsoil	m^3	0	0	0
Rock/Overburden	m^3	0	0	0
ROM Coal	Mt	0	0	0
Reject Material	Mt	0	0	0
Product	Mt	0	0	0
Northern Coal Services				
Stripped topsoil	m^3	0	0	0
Rock/Overburden	m^3	0	0	0
ROM Coal	Mt	1.995	2.080	1.955
Reject Material	Mt	0.060	0.042	0.040
Product	Mt	1.935	2.038	1.915

2.3 Primary Domains

For the purposes of this MOP, primary (operational) domains have been defined as the set of discrete areas that have a particular operational or functional purpose. All areas previously disturbed by mining, or proposed to be subject to the activities described in **Section 2.2**, have been assigned to an appropriate primary domain. Primary domains at the Newstan Complex are defined in **Table 2.5**. The footprint of each primary domain at the commencement of the MOP term is depicted on Plan 2 (refer **Appendix 2**).

Table 2.5: Primary Domains

Code	Primary Domain	Description
1	Infrastructure	The infrastructure in Domain 1 includes the mining infrastructure at Newstan Colliery Surface Site, and Awaba Colliery Surface Site. This also includes the Cooranbong Private Haul Road and Awaba Private Haul Road. These haul roads are sealed and include surface water management infrastructure (e.g. pipes / drains / culverts). The Newstan-Eraring Private Haul Road is located within the Mining Lease area, however it is owned by Eraring Energy and, as such, is not included in this MOP.
2	Tailings Storage Facility	The tailings and reject storage facilities at Newstan Colliery including the NREA and SREA.
3	Water Management Area	The water management area in Domain 3 includes the network of dams and associated water management infrastructure (e.g. surface water diversions) at Newstan and Awaba Collieries, and the haul road.
4	Overburden Emplacement Area	Not applicable to this MOP.
5	Stockpiled Material	The area within Domain 5 includes current stockpiles at Newstan and Awaba Colliery Surface Sites.
6	Void	Not applicable to this MOP.
7	Rehabilitation Area – Pasture	Not applicable to this MOP.
8	Underground Mining Area	The underground mining area in Domain 8 includes land above underground mining areas and all other remaining lands within the Newstan Mining Lease area. It generally includes the areas that have been subject to undermining and as result include some areas that have shown been affected by mining induced subsidence. These areas are to be actively managed for potential subsidence related impacts. There is also some mine related infrastructure such as dewatering boreholes, exploration boreholes, gas monitoring wells and monitoring equipment (e.g. survey marks).
9	Conservation and Biodiversity Offset Area	Not applicable to this MOP. The *Northern Coal Services Biodiversity Offset Strategy* (2019) satisfies the biodiversity offset requirements for future clearing at Northern Coal Services. The clearing is not yet scheduled or planned.

2.4 Asset Register

The asset register included as **Table 2.6** summarises the major components of each primary domain (refer **Section 2.3**) at the Newstan Complex and the principal activities required for rehabilitation. This asset register is intended to provide a suitable level of context for the Rehabilitation Cost Estimate (RCE).

The areas for each primary domain outlined in **Table 2.6** represent the total disturbance footprint for each Newstan Complex domain at the commencement of the MOP term. These areas are depicted on Plan 2 (refer **Appendix 2**).

Table 2.6: Asset Register

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Domain 1 – Infrastructure: 75.2 ha					
Bridge	Bridge for access – currently utilised	Removal of bridge over RailCorp easement.	None	335.6	m^2
Substation	Power supply – currently utilised	Remove substation.	None	416	m^2
Switchyards	Power supply – currently utilised	Remove substation.	None	875	m^2
Small buildings, administration buildings, tanks	Administration and staff facilities – currently utilised	Disconnect services; demolish and remove infrastructure; remove concrete pads; and remove potentially contaminated material.	None	3,194	m^2
Industrial buildings and workshops	Industrial facilities / workshops – currently utilised	Disconnect services; demolish and remove infrastructure; remove concrete pads; and remove potentially contaminated material.	None	12,493	m^2
CPP and CHP	Coal crushing, sizing and washing – currently utilised	Disconnect and terminate all services; demolish and remove CPP/CHP buildings; demolish and remove CPP/CHP; remove carbonaceous material.	None	4,480	m^2
Coal bin	4,000T coal bin – currently utilised	Remove coal bin.	None	1	quantity
Train load out bin	2,000T train load out bin – currently utilised	Remove train load out bin.	None	1	quantity
Rejects Bin	500T rejects bin – currently utilised	Remove rejects bin.	None	1	quantity
Conveyors	Transporting coal to the CPP and product stockpile (790m) and conveyors from reclaim tunnel (125m) – currently utilised.	Demolish and remove conveyors.	None	915	m
Reclaim tunnel	Reclaim tunnel – currently utilised.	Demolish and remove reclaim tunnel	None	540	m^2

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Small thickener tank	Thickener tank 3-9m diameter – currently utilised.	Demolish and remove tank.	None	1	quantity
Extra large thickener tank	CPP thickener tank >50m diameter – currently utilised.	Demolish and remove tank.	None	1	quantity
Bitumen	Awaba car park area and helipad – currently utilised.	Remove bitumen and dispose locally or onsite.	None	22,196	m^2
Concrete pads and footings	At surface facilities, buildings workshops, CPP etc	Remove concrete pads and footings and dispose locally or onsite.	None	121,195	m^2
Rail line and loop	Rail line from where it exits and rejoins the Fassifern rail line – currently utilised.	Demolish and remove rail line and loop and dispose locally or onsite.	None	2,260	m
Rail spur and loadout area	Rail loop and loadout area – currently utilised.	Remove rail spur and loadout area.	None	11.8	ha
Drifts	Newstan Colliery, Awaba Colliery and conveyor drifts – currently utilised.	Remove and seal drifts.	Resources Regulator approval for sealing	3	quantity
Ventilation shafts	All ventilation shafts at Newstan Colliery	Remove and seal 5m, 5.5m and 6m ventilation shafts.	Resources Regulator approval for sealing	3	quantity
Service boreholes	Boreholes include 1 x electricity, 1 x gas and 2 x nitrogen monitoring – currently utilised.	Cap and seal service boreholes.	Resources Regulator approval for sealing	4	quantity
Haul roads	Internal haul routes – currently utilised.	Remove haul roads.	None	4.5	ha
Domain 2 – Tailings Storage Facility: 63.7 ha					
NREA	Receive tailings – currently not utilised	Decommission pipelines and bury or remove. Capping of tailings dam in accordance with an approved Capping Design.	Section 101 Approval under the *Coal Mine Health and Safety Act 2002* (already existing).	7.6	ha

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
SREA	Receive tailings – currently utilised		Schedule 3, Clause 27 of the *Work Health and Safety (Mines) Regulation 2014* – Notifying the regulator of a high risk activity form.	56.1	ha
Domain 3 – Water Management Area: 11.9 ha					
Newstan Colliery <u>Pit Top Area</u> Connolly's Dam Final Pollution Control Dam Surface Catchment Dam Surface Overflow Dam Rail loop Dams (2) Sediment Sumps Mandalong Haul Road Sediment Dams <u>NREA</u> Graunch's dam cells 1 and 2 Clean and Dirty Water Diversion Drains McKendries Dam Maturation Pond <u>SREA</u> Seepage Dam Clean Water Dam Pre-Sediment Dam Haul Road Dam **Awaba Colliery** Pollution Control Dam and associated infrastructure	Water storage – currently utilised	Drain and remove contaminated sediments from the floor of the dam to enable it to be converted into a clean water structure.	None	11,545	m^3
	Water storage – currently utilised	Fill dams with local material, cart and spread to cap or backfill	None	52,561	m^3

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Maturation Pond and associated infrastructure Sediment Sumps					
Clean water diversions and dirty water drains	Diversions/drains – currently utilised	Remove and remediate diversions/drains	None	190	m
Domain 4 – Overburden Emplacement Area					
Not applicable to this MOP.					
Domain 5 – Stockpiled Material: 11.8 ha					
Newstan Colliery 80,000 tonne ROM coal stockpile. 50,000 tonne product coal stockpile. 180,000 tonne rail loop stockpile (approved to be progressively increased to 400,000 tonnes). 30,000 tonne emergency stockpile. Middlings stockpile. Water diversion drains, culverts and pipelines **Awaba Colliery** ROM coal stockpile	Storage of coal awaiting transport offsite – currently utilised	Remove carbonaceous material and dispose of onsite within tailings dam or in the disused underground workings.	None	11.8	ha
Domain 6 – Void					
Not applicable to this MOP.					
Domain 7 – Rehabilitation Area – Pasture					
Not applicable to this MOP.					
Domain 8 – Underground Mining Area: 3,602 ha					

Major Assets	Use	Demolition / Rehabilitation Activities	Approvals Required	Quantity	Unit
Monitoring infrastructure (piezometers, weirs and transducers, seismometers, survey markers)	Surface infrastructure – currently utilised	Sealing and rehabilitation of bores to the Resources Regulator standards.	EDG01 – Borehole Sealing Requirements on Land	3,602	ha
Domain 9 – Conservation and Biodiversity Offset Area					
Not applicable to this MOP. The *Northern Coal Services Biodiversity Offset Strategy* (2019) satisfies the biodiversity offset requirements for future clearing at Northern Coal Services. The clearing is not yet scheduled or planned.					

3 ENVIRONMENTAL ISSUES MANAGEMENT

3.1 Environmental Risk Assessment

A risk assessment was undertaken across three days in February and March 2021 to identify the key issues that presented a risk to achieving satisfactory rehabilitation at the Newstan Complex. This risk assessment was undertaken in accordance with the *Australian Standard AS/NZS ISO 31000:2009 – Risk Management – Principles and Guidelines*, the *Minerals Industry Safety and Health Risk Management Guideline (MDG1010)* (Department of Trade and Investment – Mine Safety 2011) and the Centennial (2020) *Risk Management Standard.*

The workshops assessed 61 key rehabilitation risks which are summarised as:

- 15 risks were ranked as not applicable;
- 18 risks were ranked as low;
- 19 risks were ranked as moderate;
- 6 risks were ranked as significant;
- 3 risks were ranked as high; and
- 0 risks were ranked as extreme.

A copy of the Risk Register developed in this workshop is attached as **Appendix 3**. This Risk Assessment was also prepared to satisfy the recommendations made by the Resources Regulator in the *Newstan and Awaba Targeted Assessment Program – Soils and Materials Management* letter dated 1 October 2020.

Further details of the existing and proposed environmental management controls are provided in **Section 3.2**.

3.2 Environmental Risk Management

All operations are undertaken in accordance with approved environmental management plans (EMPs) which have been developed in accordance with the development consents. These management plans are integral to the implementation of the MOP and should be read in conjunction with this document. The management plans which have been prepared for the Newstan Complex include:

- Regional Management Plans:
  - *Northern Region Aboriginal Cultural Heritage Management Plan;*
  - *Northern Region Air Quality and Greenhouse Gas Management Plan;*
  - *Northern Region Biodiversity Management Plan;*
  - *Northern Region Historic Heritage Management Plan;*
  - *Northern Region Noise Management Plan; and*
  - *Northern Region Mine Water Discharges Management Plan.*
- Newstan Colliery:
  - *Newstan Land Management Plan;*
  - *Newstan Landscape Management Plan;*
  - *Newstan Erosion and Sediment Control Management Plan (incorporating Soil Stripping Management Plan);*
  - *Newstan Construction Noise Monitoring Program – Newstan Ventilation Shaft Site;*
  - *Newstan Water Management Plan;*

- *Newstan Groundwater Monitoring Program – Main West Mining Area;*
- *Newstan Wetland Management Plan;*
- *Northern Region Historic Heritage Management Plan;*
- *Newstan and NCS Bushfire Management Plan;*
- *Awaba Colliery and Newstan Colliery Pollution Incident Response Management Plan;*
- *Awaba Colliery and Newstan Colliery Sinkhole Management Plan;*
- *Newstan Colliery and Northern Coal Services Environmental Management Strategy;*
- *Newstan Pollution Incident Response Management Plan;* and
- *Newstan Environmental Management Strategy.*

- Northern Coal Services:
  - *Newstan and NCS Environmental Management Strategy;*
  - *Northern Coal Services Water Management Plan;*
  - *Northern Coal Services Reject Emplacement Area Strategy;*
  - *Mine Water Discharges Management Plan;*
  - *Newstan Colliery and Northern Coal Services Environmental Management Strategy*;
  - *Construction Traffic Management Plan;* and
  - *Rehabilitation Management Plan*.
- Awaba Colliery:
  - *Awaba Environmental Management Strategy;*
  - *Awaba Colliery and Newstan Colliery Pollution Incident Response Management Plan;*
  - *Awaba Stakeholder Engagement Plan;*
  - *Awaba Colliery and Newstan Colliery Sinkhole Management Plan;*
  - *Awaba Colliery Pollution Incident Response Management Plan;* and
  - *Awaba Colliery Sinkhole Rehabilitation Management Plan*.

3.3 Environmental Issues Management

3.3.1 Geology and Geochemistry

The geological association of the Newstan Complex is the Permian conglomerate, shale and sandstones of the Awaba Hills.

The Newstan Complex is located in the central part of the Newcastle Coalfield which in turn occupies the north-eastern portion of the Sydney Basin. The strata associated with the coal seams were laid down during the Late Permian period and comprise the Moon Island Beach, Boolaroo, Adamstown and Lambton formations. **Table 3.1** outlines the stratigraphy for the Newstan Complex.

Table 3.1: Stratigraphy

<table>
<tr><th>Group</th><th>Formation</th><th colspan="3">Coal Seam</th></tr>
<tr><td rowspan="9">Newcastle Coal Measures</td><td>Moon Island Beach</td><td colspan="3">Vales Point
Wallarah
Great Northern</td></tr>
<tr><td colspan="4">Awaba Tuff</td></tr>
<tr><td>Boolaroo</td><td colspan="3">Fassifern
Upper Pilot
Lower Pilot
Hartley Hill</td></tr>
<tr><td colspan="4">Warners Bay Tuff</td></tr>
<tr><td>Adamstown</td><td colspan="3">Australasian
Montrose
Wave Hill
Fern Valley
Victoria Tunnel</td></tr>
<tr><td colspan="4">Nobbys Tuff</td></tr>
<tr><td rowspan="4">Lambton</td><td rowspan="4">West Borehole</td><td rowspan="2">Young Wallsend</td><td>Nobbys</td></tr>
<tr><td>Dudley</td></tr>
<tr><td colspan="2">Yard</td></tr>
<tr><td colspan="2">Borehole</td></tr>
<tr><td colspan="5">Waratah Sandstone</td></tr>
</table>

The coal seams dip gently to the east-south-east towards the axis of the Macquarie Syncline at overall grades of 1 in 20. Occasional “seam rolls” with grades of up to 1 in 10 have been encountered in the workings at Newstan Colliery. These “rolls” range between 10 and 100 metres in width and were sometimes associated with faults. The presence of paleochannels above and below the target seam could also cause localised seam rolls. Depth of cover of the target seam ranges from 60 metres in the west to 350 metres in the south-east.

A number of igneous dykes and a sill have been identified by magnetic surveys and drilling. A large igneous sill has intruded the West Borehole Seam in the south-west of the lease area. At present, the boundary of this sill is defined by a limited number of surface exploration boreholes. Several dykes have been encountered in the Newstan workings. The orientation of most of these dykes conforms to the northwest-southeast structural trend which dominates the Newcastle Coalfield.

The risk to the Newstan Complex for geochemistry caused by inadequate surface water management and material geochemistry / characteristics resulting in inability to relinquish lease, company reputation damage, land contamination and/or surface water contamination was ranked as moderate. The risk of failure to achieve the rehabilitation outcomes prescribed in this MOP were ranked as low. It is noted that there have been no acid mine drainage issues at the Newstan Complex and material sampling (including coal materials, tailings and rejects) demonstrated a low risk of acid generation.

3.3.2 Soil Types and Suitability

There are six main soil landscape units (not including the area mapped as ‘disturbed terrain’) at the Newstan Complex, with the major soil landscape units across the area being the Doyalson soil landscape and the Gateshead soil landscape.

A *Soil Stripping Management Plan* has been developed as part of the *Newstan Erosion and Sediment Control Management Plan*. The objectives of the *Soil Stripping Management Plan* include:

- Recognise that existing soils are a valuable environmental commodity and that Newstan will maximise the reuse of soils in the rehabilitation of the site;
- To document the management of soil stripping activities; and
- To document the management of stockpiles.

Topsoil and soil for rehabilitation at the Newstan Complex is a limited resource and generally of poor quality, therefore, topsoil and soil is treated as a valuable resource for the rehabilitation process.

There is limited available topsoil or soil for rehabilitation purposes at the Newstan Complex. The limited amount of soil that was stripped from the SREA has been utilised in the construction of the Main Tailings Dam, and rehabilitation onsite at Newstan Colliery. A minor amount of soil may still be available in the SREA which can be utilised for rehabilitation in the future.

Due to the shortage of soil and topsoil there is a soil deficit, accordingly the Newstan Complex imports Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM) under *the Protection of the Environment Operations (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A - The excavated natural material exemption 2012* for capping and rehabilitation purposes.

The risk to the Newstan Complex from soil types and suitability was ranked as a significant risk due to the possibility of failure to achieve the rehabilitation outcomes prescribed in the MOP caused by the current clay substitute potentially being inadequate and the lack of available topsoil material resulting in an inability to reach closure and relinquishment of the lease, or significant costs to obtain suitable material and ameliorants. This risk is mitigated through the quality assurance process outlined in **Section 7.10**.

3.3.3 Spontaneous Combustion

Spontaneous combustion may occur within exposed coal seams, coal reject areas or product coal stockpiles. The potential for spontaneous combustion to occur depends on a range of factors including inherent coal properties, moisture content, coal sizing, stockpile configurations, the duration of stockpiling, and the exposure of stockpiles to high prevailing wind conditions.

Newstan Colliery has well established procedures to avoid spontaneous combustion of exposed coal seams within the underground workings. These procedures include sealing of disused underground areas, adequate mine ventilation, balancing of underground ventilation pressure and stringent inspection and monitoring procedures.

In regard to the propensity for spontaneous combustion within coal stockpiles at Newstan Colliery, it should be noted that the coal seams have been mined at Newstan for many years and there have been few minor occurrences of spontaneous combustion within stockpiles during this time. In all cases, areas of heating were extinguished by removal of the affected coal.

The raw product is not a highly susceptible coal for spontaneous combustion in surface stockpiles. The normal operating mode for the stockpiles means that the stockpiles will not usually be formed for any significant period of time.

Course reject material was analysed by ACIRL (1995) for potential for spontaneous combustion. The material was found to have a relative ignition temperature of 193^{o}C and an average rate of self heating of 0.24^{o}C/hour. These results indicate that the existing coarse reject material has low potential for occurrence of spontaneous combustion.

A *Spontaneous Combustion Hazard Assessment of Centennial Coal Preparation Plant Tailings* was also completed by B3 Mining Services (2020) which determined that the adiabatic testing of the tailings samples has resulted in R70 values ranging from 0.46^{o}C/h (NREA) to 0.80^{o}C/h (SREA). These R70 values indicate that the intrinsic spontaneous combustion propensity rating for the samples is low based on NSW conditions. The R70 values are consistent with the rank and type of coal (high ash content, aged and partially oxidised from storage). Calculated spontaneous combustion index values for minimum self-heating temperature are invalid due to the high carbonate mineral components in the tailings. However, the calculated crossing point temperature values are valid and indicate a low spontaneous combustion propensity rating. The relative ignition temperature values measured for the samples confirm the intrinsic spontaneous combustion propensity rating obtained from the R70 values.

The likelihood of self-heating generating a hot spot that leads to a spontaneous ignition event is moderated by various coal tailings physical properties and mine site-specific factors. The biggest moderating influence is the presence of moisture. Consequently, if the intrinsic reactivity of the samples is insufficient to overcome the heat loss from moisture liberation and evaporation, then thermal runaway is not possible. Based on the R70 values (a measure of the sample intrinsic reactivity) and the moisture content values of the samples the spontaneous combustion likelihood of the NREA and SREA tailings is classified as No Thermal Runaway (NTR).

The risk or spontaneous combustion was ranked as a low risk.

3.3.4 Acid Mine Drainage

The risk of inadequate capping performance and geochemistry is considered moderate based on the potential impacts to the business, environment and a long term legacy health and safety issue. However, it is noted that there have been no acid mine drainage issues at the Newstan Complex and material sampling (including coal materials, tailings and rejects) demonstrated a low risk of acid generation..

3.3.5 Mine Subsidence

There will be no mining operations during the MOP term. Subsidence will be managed in accordance with the approved Extraction Plans and SMPs prepared for the Newstan Complex.

The Newstan Complex has experienced subsidence, in the form of subsidence cracks, or sinkholes in areas above historical workings with shallow depth of cover.

The risk to the Newstan Complex from subsidence was ranked as significant due to the risk of from known sink holes/subsidence cracks in historical workings caused by excavations above old workings, mining under waterways or shallow depth of cover in historical mining areas resulting in failure to achieve the rehabilitation outcome prescribed in the MOP, inability to reach closure and relinquish lease or ongoing costs for rehabilitation and liability. The risk of unlocated subsidence was risked as high due to injury, damage to company reputation damage and environmental damage.

A program is in place for the Newstan Complex to rehabilitate sinkholes identified in accordance with the *Awaba Colliery Sinkhole Management Plan* (SLR 2020). Remediation of subsidence cracks is undertaken in accordance with this MOP. Subsidence and rehabilitation is to be reported in the Annual Review, and a schedule of proposed works is provided to the Resources Regulator prior to commencing subsidence rehabilitation work.

3.3.6 Erosion and Sedimentation

Erosion and sediment control activities at the Newstan Complex are undertaken in accordance with the *Newstan Colliery Erosion and Sediment Control Plan* (2006).

With regards to rehabilitation, the major objective is to eliminate erosion until an adequate cover of vegetation is achieved. There are 10 basic principles that will be followed to ensure effective soil and water management during decommissioning. These are:

- Plan for erosion and sediment control during project design and well in advance of earthworks;
- Minimise the area of soil exposure;
- Conserve available topsoil – introduce topsoil, where required;
- Control water flow;
- Divert clean runoff away from disturbed areas;
- Minimise slope gradient and length where possible;
- Minimise water runoff velocities;
- Trap sediments and pollutants;

- Revegetate disturbed areas as soon as possible; and
- Maintain and monitor erosion controls to ensure the quality of water released is acceptable.

The risk to the Newstan Complex from erosion and sediment control on pit top areas was ranked as a low risk, however, the risk from the potential failure of water storages resulting in failure to achieve successful rehabilitation or impacts to surface water quality in creeks or ongoing management issues and costs was ranked as moderate. This risk is mitigated through the implementation of the *Erosion and Sediment Control Plan*, *Northern Coal Logistics Water Management Plan* and monitoring/inspection programs.

3.3.7 Flora and Fauna

Existing vegetation communities at Newstan Complex are shown on Plan 1B (refer **Appendix 2**).

Flora and fauna at the Newstan Complex are managed in accordance with the *Northern Operations Regional Biodiversity Management Plan* (2019) which has been prepared to:

- Provide an overarching document for Centennial personnel to consult on biodiversity management and information at a regional scale;
- Ensure that biodiversity is managed consistently at all Centennial sites within the northern region;
- Recognise the cumulative interactions of Centennial sites within a regional context;
- Satisfy statutory requirements relevant to aquatic and terrestrial biodiversity; and
- Streamline biodiversity management at a regional scale for an improved environmental outcome.

The impact on threatened species as a result of sealing old mine entrance (referred to as Bat Alley) was identified as a low risk. Prior to sealing the mine entrance, a detailed strategy will be developed in consultation with relevant government agencies, including BCD and the Resources Regulator. Suitably qualified experts will also be consulted during the preparation of the sealing strategy.

While the primary consideration will be ensuring that the old mine entrance is made safe and does not pose a potential risk to human health, the ongoing access and use by bats will also be a consideration. The sealing strategy will consider:

- Sealing method that facilitates bat movement;
- Extent of the old mine workings and the potential for toxic gases to accumulate, such as methane, and the propensity for spontaneous combustion;
- Water management requirements, including surface water diversions to prevent surface water draining into the workings;
- Fencing and signage to prevent public access within 50 metres of the old mine entrance; and
- Ongoing management requirements.

Studies will also be undertaken to provide detailed information regarding the bat populations and support the sealing strategy including:

- Number and species of bats roosting in the workings;
- Roosting type, including maternity and over-wintering; and
- Other habitat in the area, including both natural and man-made.

The risk to clearing of EECs and threatened flora species during closure was ranked moderate as a result of inadequate mapping of vegetation communities and/or threatened species, however this is mitigated through the implementation of the Ground Disturbance Permit (GDP) process. Potential changes upon riparian vegetation/habitat should mine water discharge into LT Creek cease post-mining was ranked as significant. It is noted that the LT Creek northern arm is an ephemeral stream, with mine water discharge increasing flows.

3.3.8 Air Quality

Air quality at the Newstan Complex is managed in accordance with the *Northern Region Air Quality and Greenhouse Gas Management Plan* (2019) which was prepared to:

- Address the Conditions of Consents and Environmental Protection Licences (EPL) for the northern region operations in relation to air quality and greenhouse gas;
- Identify air quality impact pathways from Centennial operations in the northern region;
- Provide a description of air quality management measures implemented across these operations;
- Outline air quality monitoring requirements and standards; and
- Provide a procedure to manage and respond to complaints relating to air quality or a measured air quality incident.

Air quality was identified as a moderate risk at the Newstan Complex for an increase to airborne dust due to drying out the tailings dams, rehabilitation and/or closure activities, exposed areas, rehabilitation failure or drought.

3.3.9 Water

Management and monitoring of water at Newstan Complex is undertaken in accordance with the:

- *Northern Region Mine Water Discharges Management Plan;*
- *Newstan Water Management Plan;*
- *Northern Coal Services Water Management Plan;* and
- *Awaba Colliery Water Management Plan.*

The documents address the requirements of the respective Newstan Complex development consents. Collectively they:

- Ensure effective and structured monitoring of surface water/groundwater resources;
- Ensure that water quality leaving the site meets the appropriate quality standards outlined in EPL 395 and EPL 443;
- Demonstrate sufficient water supply for all stages of operations associated with NCLP;
- Outline programs for stream health, ecotoxicology and aquatic ecology monitoring; and
- Capture the water management measures being implemented.

3.3.10 Contaminated Land

A Phase 1 desktop Contaminated Land Assessment for Newstan Colliery and Awaba Colliery was undertaken in 2010 and identified potential contamination at the surface sites to be generally associated with fuel storage and handling and equipment storage and maintenance. The risk associated with potential contamination at both the Newstan Colliery and Awaba Colliery surface sites was considered to be moderate.

A Phase 2 Environmental Site Assessment (ESA) was undertaken by AECOM (2011) to assess the presence of impact within the Newstan Colliery pit top area, with the impact identified as:

- Isolated exceedances of the Soil Assessment Criteria (SAC) for heavy end petroleum hydrocarbons in fill materials in the vicinity of the underground waste storage and drum crushing area, adjacent to the vehicle wash bay and sump in the northern part of the pit top, and near the two formerly decommissioned Underground Storage Tanks (USTs) and associated infrastructure;
- Elevated metal concentrations, namely arsenic and lead, were identified in the shallow fill materials immediately beneath the concrete slab adjacent to the maintenance workshop. It was

noted that the concrete slab was in good condition and it is likely that the soil impact identified was present prior to the placement of the concrete hardstand. The fill material in that area may have potentially been sourced from the former arsenic smelter, where it is reported that material from the waste dumps at the former smelter may have been used as general infill in the surrounding area;

- Heavy end petroleum hydrocarbons were detected in groundwater in three of the five wells sampled across the site; and
- Copper and zinc were reported at concentrations exceeding the Groundwater Assessment Criteria (GAC); however, these elevated metal concentrations may be attributed to naturally occurring background conditions. Total chromium concentrations were also reported exceeding the GAC in one of the monitoring wells adjacent to the maintenance workshop.

The Newstan Phase 2 ESA recommended:

- Further delineation sampling in each of the areas where exceedances were identified to confirm the extent of the impact; and
- Further investigation to address data gaps, particularly in the eastern part of the site and to further assess the regional groundwater.

A Phase 2 ESA was also undertaken by AECOM (2014) to assess the presence of contamination within the Awaba Colliery pit top area, with the following Site conditions and impacts identified:

- The elevated Total Petroleum Hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) concentrations identified in one Sediment Sample (SED04) may be related to runoff originating from the central and southern parts of the pit top area and/or from up-gradient non-mine related activities. Anecdotal evidence from Centennial staff and the AECOM (2012) surface water monitoring team indicates that Stony Creek has ephemeral flow, which will likely result in the mitigation/impedance of the down-stream transport of contaminated sediments;
- An unconfined aquifer was intercepted within the permeable fill material and natural soil deposits and was inferred to flow in a north-westerly direction towards Stony Creek. Monitoring Well (MW)01 and MW03 were dry, and the quality of groundwater migrating onto the Site and in the southern portion of the Site was not assessed;
- Groundwater underlying the Site is acidic in nature and likely to have resulted in the increased mobility/leachability of metals from soils into the underlying groundwater. The identified concentrations of dissolved metals (cadmium [MW02 and MW06], copper [MW04 and MW06], and zinc [all wells]) above the GAC in the monitoring wells is limited to the northern portion of the pit top area. This observed increase in both acidity and metal concentrations, in particular zinc, as groundwater migrates through some parts of the Site, suggests that it is reasonable to attribute this phenomenon to mining operations across the Site;
- The identified TPH (C10-C36) impact greater than the groundwater screening criteria (GSC), appears localised as TPH was only detected in a single monitoring well (MW04) located in the vicinity of the abandoned UST and service bay. The groundwater monitoring well located further down-gradient of the abandoned UST and adjacent to Stony Creek did not have petroleum hydrocarbon impacts, indicating that the identified petroleum hydrocarbon impact is not presently migrating off-site; and
- Elevated concentrations of copper, lead and zinc greater than the ANZECC (2000) criteria protective of 99% species were detected at similar concentrations in the upstream and downstream locations of Stony Creek, indicating that Site activities are unlikely to be significantly impacting on the quality of surface water. The LDP was last sampled and analysed in December 2011 and reported similar metal concentrations, with concentration of copper, lead and zinc also greater than the ANZECC (2000) criteria protective of 99% species. The impact of overflow from the pollution control dam (PCD) into Stony Creek has not been completely assessed as the surface water and PCD have only been analysed for oil and grease, which reported concentrations below limits of reporting during all monitoring events. On this basis, the PCD remains a potential source of impact.

The Awaba Colliery Phase 2 ESA (AECOM 2014) recommended:

- Decommission the abandoned UST and remaining associated infrastructure in accordance with SafeWork NSW guidance and the *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008* (UPSS [2008] Regulation). Subsequent to the decommissioning of the abandoned UST, the remaining soils and any imported material should be validated in accordance with the UPSS (2008) Regulation;
- Document the nature and location of the identified TPH and metals impacted groundwater across the Site in Centennial's *Environmental Management Plan* (EMP) for the Site and ensure that all necessary precautions are taken to ensure that any intrusive works for maintenance or otherwise is undertaken in a manner that protects and mitigates harmful exposure to workers;
- Undertake an additional groundwater investigation, comprising the installation of additional groundwater monitoring wells to investigate naturally occurring background concentrations of dissolved metals and the source of metals including cadmium, copper and zinc and confirm the current data set and/or identify temporal trends;
- Temporarily augment the current surface water monitoring program conducted in Stony Creek and the PCD to accommodate for TPH and PAHs analysis;
- Undertake sediment sampling and analysis, particularly up-gradient of the Site nearer to the UPSTREAM surface water sampling location, to further delineate the impact on sediments within Stony Creek and evaluate the quality of sediment up gradient of mining operations; and
- Characterise soils beneath the existing building footprints should the buildings be demolished and removed for mine redevelopment works.

The additional information obtained should be used to evaluate remedial and/or environmental management requirements. In addition, consideration should be given to the management of impacted fill materials during the redevelopment works associated with the Newstan extension of mining project.

In response to the recommendations of the Awaba Colliery Phase 2 ESA (AECOM 2014) a Targeted ESA (AECOM 2021) was prepared. The Targeted ESA (AECOM 2021) was limited to the six on site groundwater monitoring wells, three surface water sites and six sediment samples, which included:

- MW01 – MW06;
- PCD (Surface water);
- Upstream (surface water, within Stony Creek);
- Downstream (surface water, within Stony Creek);
- SED01 – SED05 (sediments within Stony Creek); and
- SED06 (sediments within PCD).

The findings of the Awaba Colliery Targeted ESA found:

- Site observations of areas of proposed facilities associated with the Newstan Mine Extension Project (MEP), noted no visual signs of potential contamination;
- The data collected in this investigation was used to identify and evaluate contamination risks to human health receptors. Data was evaluated in the context of a commercial/industrial land use;
- Based on the available data and visual observations from the targeted monitoring locations, it is considered that the identified contamination presents a low risk to human health. It is noted that targeted assessment does not constitute a comprehensive assessment of the Site; and
- Based on analytical data from the Targeted ESA, installation of additional upgradient monitoring wells is currently not deemed necessary.

The Awaba Colliery Targeted ESA (AECOM 2021) recommended:

- If future development entails demolition/ removal of existing buildings or infrastructure, investigations to characterise soils beneath the existing building footprints should be undertaken;
- Investigations should include, but not be limited to the following:
  - intrusive soil bore investigation, drilling of bores to a maximum depth of three metres;
  - collection of soil samples from the surface at 0.5mbgs intervals;
  - field screening of samples to determine required samples to be analysed;
  - the number of soils bores to investigated should be assessed based on representativeness of the footprint of the associated building/infrastructure;
- Continuation of the current monthly Awaba Colliery surface water monitoring program to assess any changes in surface water quality conditions at Site; and
- Ensure adequate soil and erosion controls are implemented during any future earthworks/ development for the purpose of the MEP and sediment runoff is mitigated for the period of MEP related construction works.

The risk of contamination and/or hazardous materials remaining on site at closure from an inadequate knowledge of contamination and/or hazardous materials locations resulting in exposure, health impacts and potential litigation is ranked as low.

3.3.11 Hazardous Materials

Newstan Colliery and Awaba Colliery operate in accordance with the *Newstan Colliery Asbestos Management Plan* and *Awaba Colliery Asbestos Management Plan*, respectively.

The Newstan Complex currently holds all necessary approvals and maintains a system for managing dangerous goods and hazardous materials that satisfies the requirements of the legislation and relevant Safe Work NSW Codes Of Practice.

The dangerous goods and hazardous materials used at Newstan Colliery Surface Site, and included within the Newstan Colliery Dangerous Goods Dossier, are:

- Oils and greases, including engine coolants, hydraulic oil, transmission oil and gear oil;
- Diesel;
- Gases, including oxygen, acetylene, nitrogen, helium, argon, methane and liquid petroleum gas;
- Mining chemicals (chemical inserts for roof support, mine grouts, shotcrete);
- Other general use chemicals, including calcium lime rust (CLR) remover, rat poison, general paints, coagulator, cleaning substances and dust suppression polymer; and
- Ferric Chloride and Sodium Hydroxide (within the clean water plant).

The dangerous goods will continue to be stored at the Newstan Colliery Surface Site using the current storage/management systems.

A Hazardous Materials Survey and Register has been completed for Newstan Colliery. This survey defined hazardous materials as asbestos and asbestos containing material, synthetic mineral fibres, lead paint and polychlorinated biphenyls associated with lighting capacitors. Infrastructure with the potential to cause arsenic contamination at the site was also assessed. The risk of being unable to achieve rehabilitation outcomes as a result of hazardous material was ranked as a low risk.

3.3.12 Noise and Blasting

Noise emissions from Newstan and Awaba operations will be managed in accordance with the *Northern Region Noise Management Plan* (RNMP). Site specific NMP's are appended to the RNMP. The RNMP has been prepared to adopt a regional approach to the management and monitoring of noise emissions including the following:

- Provision of consistent and consolidated management measures and procedures across all sites;
- Management of cumulative impacts, rather than focusing on individual operations; and
- Rationalisation of monitoring procedures and locations with consideration of cumulative impacts.

It is not expected that there will be any surface blasting taking place at the Newstan Complex during the MOP term. Blasting may occur underground.

Blasting is ranked as a low risk at the Newstan Complex. Noise is ranked as moderate for the potential increased noise during decommissioning activities and rehabilitation works.

3.3.13 Visual and Lighting

The objectives for managing the scenic quality of this area are to minimise the visual impacts of development by protecting the natural character of ridgelines, retaining as much vegetation as possible and locating development in such a way that visual impact is minimal.

Although the densely settled urban areas of Blackalls Park, Fassifern and Fennel Bay lie within 2 - 4 kilometres southeast of Newstan Colliery, few residents have direct views of the surface infrastructure and the NREA because of the undulating topography and local vegetation.

The visual impacts of the surface infrastructure and REAs on viewers on the eastern side of Newstan Colliery is minimised by the vegetation surrounding the site and the forested backdrop of Sugarloaf Range. Travellers using Miller Road (previously Fassifern Road) have intermittent views of the surface infrastructure and the REA's in through breaks in roadside vegetation.

Measures to minimise visual impacts associated with the proposed reject emplacement and Newstan Colliery include:

- Progressively revegetating the reject emplacement area as soon as practicable following final landform shaping; and
- Establishment of a vegetated "rim" of the final landform on the edge of the SREA adjacent to Fassifern Road to visually screen operations in the SREA from view of those travelling along Miller Road.

Visual and lighting risk are considered low at the Newstan Complex.

3.3.14 Heritage

The *Northern Region Aboriginal Cultural Heritage Management Plan* (2019) was developed for Centennial's Northern Holdings to provide a consistent approach to consultation between Centennial and the Aboriginal community as well as identify standard Aboriginal cultural heritage monitoring and management requirements.

The *Northern Region Aboriginal Cultural Heritage Management Plan* is used by Centennial personnel to ensure that the appropriate protocols are adopted for the identification, monitoring and management of Aboriginal material culture. The structure of this report has been designed as an over-arching document which must be followed in conjunction with specific development consent requirements for each operation within the Northern Holdings.

A *Northern Region Historic Heritage Management Plan* to cover Newstan and Northern Coal Logistics was developed in July 2016 to identify European cultural heritage monitoring and management requirements.

The Lake Macquarie LEP 2004 identifies one “potential” archaeological item, being Newstan Colliery. Higginbotham (1997, cited in RPS 2014b)) identified three items at the Newstan Colliery having local heritage significance, these being Tucker’s House, Bat Alley Tunnel and the Arsenic Works.

For the Newstan Complex only Bat Alley is included within this MOP, and special considerations will need to be given when rehabilitating this site.

A *Post Mining Heritage Management Plan* was prepared by RPS (2012) for Awaba Colliery to satisfy Schedule 3, Condition 31 of MP 10_0038.This is incorporated as part of the *Northern Region Historic Heritage Management Plan*.

The pit top complex is considered to be of local heritage significance. Assessment of the site against the NSW State heritage significance criteria, the site was found to embody historical aesthetic/technical values. The Awaba Colliery pit top complex’s importance lies in it being an early and intact example of the state coal mine. Furthermore, that the continuity of use and historical associated with Wangi Power Station are significant. In physical terms, the sites strong industrial aesthetic and visually pleasing setting also contribute to its value.

Building, structures and features which contribute to the heritage significance of the site have been identified. These comprise of:

- Main brick building complex;
- Workshop;
- Three drift portals dating from 1947, 1949 and 1987;
- Rail track;
- The fire station shed; and
- The sites setting.

Internal features of interest include original signage and lamp and battery equipment racks.

Conservative management and mitigation recommendations for the site have been provided within the *Post Mining Heritage Management Plan*.

The risk of unintended interaction with Aboriginal site or artefact is ranked as low for the Newstan Complex.

3.3.15 Bushfire

Bushfire is managed in accordance with the *Newstan Colliery and Northern Coal Services Bushfire Management Plan* (2020).

The risk to the Newstan Complex due to damage to rehabilitation areas from bushfire is considered low.

The primary bushfire risks identified by Kleinfelder (2014) include:

- Danger caused to lives and/or damage to property from radiant heat, flame, smoke and embers;
- Stalling of production and/or damage to infrastructure assets, financially impacting Northern Coal Services and local and regional commercial operations; and
- Negative impact to fauna and flora, including threatened species.

4 POST MINING LAND USE

4.1 Regulatory Requirements

Regulatory requirements specific to post-mining land use, landscape and rehabilitation outcomes at the Newstan Complex are summarised in **Appendix 4**.

4.2 Post Mining Land Use Goal

The conceptual long term mine rehabilitation objective is to provide a low maintenance, geotechnically stable and safe landform. Specific conceptual long-term objectives include:

Achieve an acceptable post-disturbance land use:

- Rehabilitation will aim to create a landform with land use capability and/or suitability compatible with the surrounding land-use unless other beneficial land uses are pre-determined and agreed.

Create a stable post-disturbance landform:

- Disturbed land will be rehabilitated to a condition that is self-sustaining or a condition where maintenance requirements are consistent with an agreed post-mining land use. Surface water features, such as dams, retained on the lease will be safe, self- sustaining and acceptable for the post-mining land uses.

Preserve downstream water quality:

- The quality of surface water and groundwater that leave the mining leases will be adequate to maintain environmental values and beneficial uses downstream of the Mining Lease areas.

Preserve the integrity of public utilities:

- Decommissioning and rehabilitation activities will be undertaken in a manner which minimises impacts of public utilities.

Utilise existing infrastructure for potential industrial land use:

- The workshops, store, bathhouse and offices may also provide for a light industrial land use such as an engineering/workshop complex, or, as a bulk storage/container/internodal facility. This post-mining land use option would need to be developed in consultation with the Lake Macquarie City Council to ensure that the appropriate zoning is applied to the land to allow for a light industrial land use.

This MOP addresses the current post mining land use and landscape goals and objectives that are currently approved.

Suitable post-mining land uses are continuing to be investigated that will allow ongoing use of the infrastructure and facilities, whilst providing beneficial socio-economic and environmental outcomes. This includes the recent State and Commonwealth government funded Pumped Hydro Energy Storage Project. The $13M technical feasibility study and pilot trial using old underground mine workings has attracted support of approximately $5M from State and Commonwealth government, aiming to discover factors that could lead to broad commercialisation of brownfield sites for energy storage facilities. Additional options are being investigated with potential users of water management infrastructure/water resources.

During closure planning, Centennial will liaise with stakeholders to identify a suitable alternative use(s) for the haul roads, which may include use by industry and/or use as public roads. In the event that an alternative post disturbance use is not identified and agreed with relevant stakeholders, the haul roads will be rehabilitated to native vegetation.

4.3 Rehabilitation Objectives

The overall long term mine rehabilitation objective is to provide a low maintenance, geotechnically stable and safe landform that blends in with the surrounding topography suitable for subsequent land use as determined through consultation with stakeholders and company requirements.

Specific long-term objectives include:

- Final landforms are safe, stable, non-polluting and free-draining;
- Remove all infrastructure that does not have any post mining beneficial use;
- If required, preserve surface infrastructure that is heritage listed;
- Re-establishing land disturbed by the operation to an appropriate final land use;
- Provide habitat for fauna and corridors for fauna movement within the final landforms;
- Improve the visual amenity of the area;
- Not preclude other potential post mining land use options that may be considered feasible in the detailed mine closure planning process; and
- Monitor rehabilitation success in terms of physical and biological parameters.

Rehabilitation objectives are also stipulated in the applicable development consents for Northern Coal Services and Awaba Colliery which are replicated in **Table 4.1**.

Table 4.1: Rehabilitation Objectives

Feature	Objective
Northern Coal Services	
SSD 5145 – Schedule 3, Condition 27	
Site (as a whole)	• Safe, stable and non-polluting.
Surface infrastructure	• To be decommissioned and removed, unless DPIE agrees otherwise. • NCSS, CES, Hawkmount Quarry and Reject Emplacement areas to be made safe and hydraulically and geotechnically stable. • NCSS to be rehabilitated for use as light industrial areas; or revegetated with suitable local native plant species to a landform consistent with the surrounding environment.
Rehabilitation materials	• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources.
Reject Emplacement Areas	• Hawkmount Quarry and the Reject Emplacement Area sites to be revegetated with suitable local native plant species, and to a landform consistent with the surrounding environment. • Capping materials (including depth of application) to be approved by DPIE prior to capping.
Revegetated final landforms	• Stable and sustain the intended land use. • Consistent with surrounding topography to minimise visual impacts. • Incorporate relief patterns and design principles consistent with natural drainage.
Native flora and fauna	• Flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity. • Rehabilitated areas contribute to achieving self-sustaining biodiversity habitats.
All watercourses subject to mine-water discharges	• Hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same or better than prior to grant of this consent.

Feature	Objective
Water quality	• Water retained on site is fit for the intended post mining land use(s). • Water management is consistent with the regional catchment management strategy.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects of mine closure.
Awaba Colliery	
MP 10_0038 – Schedule 3, Condition 28	
Mine site (as a whole)	• Safe, stable and non-polluting. • Final land use compatible with surrounding land uses.
Any plug failure	• Filled with earth materials to the natural land surface and compacted so as to prevent any significant ingress of surface water to the mine. • Revegetated in a manner consistent with surrounding land.
Project surface infrastructure	• To be decommissioned and removed unless the Executive Director Mineral Resources agrees otherwise.
Watercourses of 2nd order or higher to be undermined	• Hydraulically and geomorphologically stable.
Built features	• Repair to pre-mining condition or equivalent unless: • The owner agrees otherwise; or • The damage is fully restored, repaired or compensated for under the *Mine Subsidence Compensation Act 1961*.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with mine closure.

4.4 Mine Closure Planning

The principal objectives of the Mine Closure Plan are to:

- Provide an overall framework for mine closure planning and rehabilitation; and
- Propose decommissioning and rehabilitation strategies for areas disturbed that will:
  - Mitigate environmental impacts;
  - Ensure closure is completed in accordance with leading industry practice;
  - Ensure that the Project Area impacted by mining operations can be used for suitable beneficial uses post closure;
  - Consider the biodiversity value of the surrounding area and integrate these values with the final land use options for the Project Area;
  - Establish clear and agreed criteria that can be used to provide the standards against which the final mine rehabilitation and post disturbance land use can be assessed; and
  - Ensure the closed facility does not pose an unacceptable risk to public health and safety.

In accordance with the *Northern Coal Logistics Project Decommissioning and Rehabilitation Strategy* (SLR 2014a) and the *Strategic Framework for Mine Closure* (Minerals Council of Australia 2004) Newstan Complex will commence the detailed mine closure planning process at least five years prior to the anticipated mine closure date (i.e. the planned cessation of mining). Detailed mine closure planning will include:

- Stakeholder consultation regarding mine closure will commence five years prior to planned closure of the mine to assist in minimising long term impacts associated with mine closure, including socio-economic impacts;
- An agreed detailed mine closure plan will be developed at least two years prior to the anticipated mine closure date;
- An infrastructure demolition plan will be developed two years prior to mine closure; and
- The final closure plan will be submitted to the appropriate regulatory agencies for approval two years prior to cessation of mining and coal handling at Newstan Colliery.

As per the *Northern Coal Services Reject Emplacement Area Strategy* (2020), a detailed closure plan will be developed in consultation with stakeholders three years prior to closure of the REAs.

5 REHABILITATION PLANNING AND MANAGEMENT

5.1 Domain Selection

In accordance with the *ESG3: Mining Operations Plan (MOP) Guidelines* (DRG 2013), the Newstan Complex has been categorised into a series of primary (operational) domains and secondary (post mining land use) domains as outlined in **Table 5.1**. The primary domains have been defined on the basis of existing land management units within the mine site which have similar operational purposes and therefore similar geophysical characteristics. The secondary domains have been defined as land management units characterised by similar post mining land use objectives.

The domains are shown on **Figure 5.1**.

Table 5.1: Domains

Primary Domains (Operational)	Code	Secondary Domains (Post Mining Land Use)	Code
Infrastructure Areas: The infrastructure in Domain 1 includes the mining infrastructure at Newstan CollierySurface Site, and Awaba Colliery Surface Site. This also includes the Cooranbong Private Haul Road and Awaba Private Haul Road. These haul roads are sealed and include surface water management infrastructure (e.g. pipes/drains/culverts). The Newstan-Eraring Private Haul Road is located within the Mining Lease area, however it is owned by Eraring Energy and, as such, is not included in this MOP.	1	**Infrastructure:** Domain A includes infrastructure that may have a beneficial post mining industrial landuse. Approval for infrastructure to remain onsite will need to be obtained from LMCC, DPIE, and the landowner, as well as any other required approvals. Industrial land use comprises the Newstan Colliery Surface Site, the Awaba Pit Top, as well as the Cooranbong Private Haul Road and Awaba Private Haul Road (to be retained). Where it is determined that the infrastructure will be removed, the site will be rehabilitated to woodland (see Secondary Domain E).	A
Tailings Storage Facility: The tailings and reject storage facilities to be decommissioned and rehabilitated in Domain 2 includes the NREA and SREA at Newstan Colliery Surface Site.	2	**Water Management Area:** Domain B is the footprint of water management structures that will be retained in the final landform. These water management structures may remain as sediment basins or drains in the final landform, or act as a wetland system within the catchments.	B
Water Management Area: The water management area in Domain 3 includes the network of dams and associated water management infrastructure (e.g. surface water diversions) at Newstan and Awaba Collieries, and the haul road.	3	**Rehabilitation Area – Grassland:** Not applicable to this MOP.	C
Overburden Emplacement Area: Not applicable to this MOP.	4	**Rehabilitation Area – Pasture:** Not applicable to this MOP.	D

Primary Domains (Operational)	Code	Secondary Domains (Post Mining Land Use)	Code
Stockpiled Material: The area within Domain 5 includes current stockpiles at Newstan and Awaba Colliery Surface Sites.	5	**Rehabilitation Area – Woodland:** Domain E includes areas that will be rehabilitated in accordance with relevant approvals using native vegetation. This domain will provide wildlife corridors in the post mining landscape. Native vegetation will comprise components of NREA and SREA. NREA/SREA rehabilitation predating approval of SSD 5145 will use native species (Umwelt 1998). Awaba rehabilitation will be undertaken using flora species commensurate with the surrounding landscape (GSSE 2010). NCLP rehabilitation will comprise native grasses and tree species commensurate with adjacent remnant vegetation (GSSE 2014).	E
Void (open cut void): Not applicable	6	**Rehabilitation Area – Forest:** Not applicable to this MOP.	F
Rehabilitation Area – Pasture: Not applicable to this MOP.	7	**Rehabilitation Area – Rural Land Capability Classification I to VIII:** Not applicable to this MOP.	G
Underground Mining Area: The underground mining area in Domain 8 includes land above underground mining areas and all other remaining lands within the Newstan Mining Lease area. It generally includes the areas that have been subject to undermining and as result include some areas that have shown been affected by mining induced subsidence. These areas are to be actively managed for potential subsidence related impacts. There is also some mine related infrastructure such as dewatering boreholes, exploration boreholes, gas monitoring wells and monitoring equipment (e.g. survey marks).	8	**Relinquished Lands:** Not applicable to this MOP.	H
Conservation and Biodiversity Offset Area: Not applicable to this MOP.	9	**Final Void:** Not applicable to this MOP.	I
		Conservation and Biodiversity Offset Area: Not applicable to this MOP.	J

INSET A - NEWSTAN COLLIERY

See INSET A

See INSET B

INSET B - AWABA COLLIERY

Road
Wakefield
Palmers Creek
Lords Creek
MOTORWAY
ML 1452
Cessnock Road
CCL727
Stony Creek
Awaba Road
SEWERAGE TREATMENT WORKS
Stony Creek
PACIFIC
M1
CCL 746
Wilton Road
RAILWAY
AWABA WASTE FACILITY
ML 1452
Drive
Freemans
Kilaben Creek
Stockyard Creek
CCL 746
Wangi
HAWKMOUNT QUARRY
NORTHERN
CCL 746
ERARING ASH DAM
Road
MAIN
ERARING POWER STATION
Wangi Road

LEGEND

- MOP Boundary
- Colliery Holding Boundary
- Lease Boundary
- Awaba Colliery - PA 10-0038
- Newstan Colliery - DA 73-11-98
- Northern Coal Services - SSD 5145
- Water Course
- Dam / Water Storage
- Transmission / Power Lines
- Major Roads
- Railway Line

PRIMARY DOMAINS

- Domain 1 - Infrastructure
- Domain 2 - Tailings Storage Facility
- Domain 3 - Water Management Area
- Domain 5 - Stockpiled Material
- Domain 8 - Underground Mining Area

SECONDARY DOMAINS

- Domain A - Infrastructure
- Domain B - Water Management
- Domain E - Rehabilitation Woodland (End of Mine)

REHABILITATION PHASES

- Phase 2 - Landform Establishment
- Phase 4 - Ecosystem and Land Use Establishment
- Phase 5 - Ecosystem and Land Use Sustainability

Aerial Photography: NearMap Nov 28, 2020

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Scale: 45000
(GDA94) MGA Zone 56

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DOMAIN PLAN

FIGURE 5.1

5.2 Domain Rehabilitation Objectives

General rehabilitation objectives for the Newstan Complex are outlined in **Section 4.3**. Rehabilitation domains require specific management objectives to realise the desired final land use outcome due to the distinct geophysical features associated with the current land function.

Rehabilitation objectives for each domain, and the relevant regulatory and approval requirements, are listed in **Table 5.2**.

Table 5.2: Domain Rehabilitation Objectives

Domain	Rehabilitation Objective
Primary Domains	
Domain 1 – Infrastructure Areas	• Sediment-laden (dirty) water runoff from disturbance areas will be captured and diverted to retention dams; • To identify appropriate post mining land uses that can make full use of the existing facilities. Where it is not required it will be decommissioned and removed. • Retain a safe and stable landform which will pose no long-term environmental hazard. • Ensure public safety by providing site security and in particular preventing public access to former underground workings. • All hazardous and/or contaminated materials will be identified and removed or appropriately stabilised / remediated in-situ such that the land is suitable for the intended post mining land use. • Disturbed areas will be re-graded to produce free draining landforms. • Weeds and feral animals that present a risk to rehabilitation success at the site will be managed. • Management measures will be implemented to minimise bushfire risks. • To retain the existing roadways were possible to enhance or complement existing access on the western side of Lake Macquarie. Where certain roads are not required, they will be rehabilitated and returned to native vegetation.
Domain 2 – Tailings Storage Facilities	• Final landforms are safe, stable, non-polluting and free-draining. • All hazardous and/or contaminated materials will be identified and removed or appropriately remediated in-situ such that the land is suitable for the intended post miningland use. • Infrastructure, fixed plant and services will be progressively decommissioned and rehabilitated when no longer required • All tailings pumping infrastructure will be decommissioned and removed. • Tailings emplacements will be back filled, capped and rehabilitated to produce a geotechnically stable, free draining, and non-polluting landform. • Tailings will be backfilled and capped with: – Course Reject Material and/or; – Selected inert material (clays and/or select weathered rock); and – Covered with topsoil or suitable alternative. • The tailings dam capping will be designed and constructed to minimise the potential for acid mine drainage or spontaneous combustion. • Progress of rehabilitation and restoration will be monitored as part of the rehabilitation monitoring program for the site. • The rejects and tailings emplacement area will be rehabilitated with native vegetation. • Weeds and feral animals that present a risk to rehabilitation success at the site will be managed. • Management measures will be implemented to minimise bushfire risks.

Domain	Rehabilitation Objective
Domain 3 – Water Management Area	• Final landforms are safe, stable, non-polluting and free-draining. • Infrastructure, fixed plant and services will be progressively decommissioned and rehabilitated when no longer required • Clean water will be diverted around operational areas, where practical. • Mine water and sediment laden (dirty) water runoff from disturbance areas will be captured and diverted to mine water and dirty water dams. • Mine water and dirty water will be preferentially used for operational requirements such as dust suppression and earthworks. • Mine water discharged in accordance with the EPL. • All hazardous and/or contaminated materials will be identified and removed or appropriately remediated in-situ such that the land is suitable for the intended post mining land use. • Sediment dams and associated water management structures will remain in place until the catchment is rehabilitated and discharge water quality is similar to comparable undisturbed landforms. • Mine water dams and sediment dams are dewatered and desilted prior to being converted to clean water dams. • Where the water management structures are to be removed, the areas will be rehabilitated with native vegetation. • Weeds and feral animals that present a risk to rehabilitation success at the site will be managed. • Management measures will be implemented to minimise bushfire risks.
Domain 5 – Stockpiled Material	• Final landforms are safe, stable, non-polluting and free-draining. • All hazardous and/or contaminated materials will be identified and removed or appropriately remediated in-situ such that the land is suitable for the intended post mining land use. • Infrastructure, fixed plant and services will be progressively decommissioned and rehabilitated when no longer required • All coal stockpiles will be excavated with all carbonaceous materials re-processed for sale or transported to the Main Tailings Dam in the SREA. • The areas will be rehabilitated with native vegetation. • Weeds and feral animals that present a risk to rehabilitation success at the site will be managed. • Management measures will be implemented to minimise bushfire risks.
Domain 8 – Underground Mining Areas	• Final landforms are safe, stable, non-polluting and free-draining. • Removal of any built infrastructure (e.g. water boreholes, gas monitoring wells, exploration boreholes and monitoring equipment). • All hazardous and/or contaminated materials will be identified and removed or appropriately remediated in-situ such that the land is suitable for the intended post mining land use. • Rehabilitate any subsidence related issues related to current and historical mine workings. Where required subsidence remediation and rehabilitation works will be undertaken including rehabilitation of surface cracks by ripping/excavating and backfilling and reseeding, minor erosion/sediment control works and minor remedial drainage earthwork.
Secondary Domains	
Secondary Domain A – Infrastructure	• As per Domain 1.

Domain	Rehabilitation Objective
Secondary Domain B – Water Management Area	• Final landforms are safe, stable, non-polluting and free-draining. • Sediment dams and water storage structures identified for retention in the final landform will be decontaminated and preserved as clean water dams or water sources for native fauna. • Final landform drainage will integrate with surrounding catchments and will achieve long term geomorphic stability and minimise erosion. • Erosion does not present a safety hazard or compromise the post mining land capability. • Any mining related disturbance in creeks will be rehabilitated with appropriate riparian vegetation.
Secondary Domain E – Rehabilitation Area - Woodland	• Final landforms are safe, stable, non-polluting and free-draining. • Woodland rehabilitation areas will contribute to habitat corridors and provide suitable habitat for threatened species. • Soil fertility and soil structure is comparable between rehabilitation areas and reference sites. • Monitoring demonstrates soils are self-sustaining. • Erosion does not present a safety hazard or compromise the post mining land capability. • Woodland rehabilitation areas species diversity is comparable to analogue sites. • Weeds and feral animals that present a risk to rehabilitation success at the site will be managed. • Management measures will be implemented to minimise bushfire risks in rehabilitation areas.

5.3 Rehabilitation Phases

Achievement of the agreed post mining land use will be achieved through a series of conceptual phases which are described as:

- **Phase 1: Decommissioning** – removal of hard stand areas, plant, equipment, buildings and other structures, contaminated materials, hazardous materials;
- **Phase 2: Landform Establishment** – incorporates gradient, slope, aspect, drainage, substrate material characterisation and morphology;
- **Phase 3: Growth Medium Development** – incorporates physical, chemical and biological components of the growing media and ameliorants that are using to optimise the potential of the media in terms of the preferred vegetative cover;
- **Phase 4: Ecosystem Establishment** – incorporates revegetated lands and habitat augmentation; species selection, species presence and growth together with weed and pest animal control /management and establishment of flora;
- **Phase 5: Ecosystem Development** – incorporates components of floristic structure, nutrient cycling recruitment and recovery, community structure and function which are the key elements of a sustainable landscape; and
- **Phase 6: Land Relinquishment** – completion criteria for rehabilitation are met and the land is determined to be suitable to be relinquished from the mine lease.

Table 5.3 provides a summary of the expected completion of rehabilitation phases for each relevant secondary domain at the end of the MOP term.

Table 5.3: Summary of Rehabilitation Phases Proposed for Completion at end of the MOP Term

Domain / Rehabilitation Phase	Infrastructure Area – Rehabilitation Area – Woodland (1E)	Tailings Storage Facility – Rehabilitation Area – Woodland (2E)	Water Management Area – Water Management Area (3B)	Water Management –Area – Rehabilitation Area – Woodland (3E)	Stockpiled Material -– Rehabilitation Area – Woodland (5E)	Underground Mining Area – Rehabilitation Area – Woodland (8E)
Active Mining Area	✓	✓	✓	✓	✓	✓
Phase 1 - Decommissioning	X	✓	X	X	X	✓
Phase 2 – Landform Establishment	X	✓	X	X	X	✓
Phase 3 – Growth Medium Development	X	✓	X	X	X	✓
Phase 4 – Ecosystem and Land Use establishment	X	✓	X	X	X	✓
Phase 5 – Ecosystem and Land Use Sustainability	X	X	X	X	X	X
Phase 6 – Relinquished Lands	X	X	X	X	X	X

6 PERFORMANCE INDICATORS AND COMPLETION / RELINQUISHMENT CRITERIA

The completion criteria, measures and indicators were developed in accordance with the relevant Newstan Complex approvals.

The completion criteria are objective values that can be measured to quantitatively show the progress and final success of a biophysical process. These criteria have been developed for each phase of the rehabilitation so that the rehabilitation success can be quantitatively tracked throughout the life of the mine.

The performance measures quantify the rehabilitation and land management program regarding efficiency or effectiveness and establish indicative timeframes for completion.

The performance indicators are used to define and check the program, typically in terms of making progress towards sustainable ecosystems whilst also providing a framework for the implementation of key activities. These indicators provide the basis for the procedural context of the site work practices.

The criteria, measures and indicators which provide the framework for this MOP are supported by a range of documents which relate to land management. These include industry standards, as well as Centennial standards and procedures.

The performance indicators and completion criteria for each of the rehabilitation phases are included in **Table 6.1** to **6.5**.

The tables have been developed based upon the preferred post-mining land uses. If in the event that a suitable industrial land use is not found, additional requirements have been outlined in **Appendix 4**.

Table 6.1: Decommissioning Phase

Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
All Domains						
Final landforms are safe, stable, non-polluting and free-draining.	Public safety/site security	A public safety risk assessment to be completed with all identified actions implemented and closed out. Appropriate security measures (e.g. adequate fencing) has been implemented (where required) prior to commencing decommissioning and demolition works.	MOP; the Awaba Mine Closure Plan Section 7.5	No	Section 9.2	Ongoing
All hazardous and/or contaminated materials will be removed or remediated in-situ such that the land is suitable for the intended post mining land use.	Hazardous materials removed, encapsulated or made safe	Hazardous materials are identified and removed from site including hydrocarbons, chemicals, explosive products, asbestos containing materials (ACMs), lead paints, synthetic mineral fibres (SMFs) and polychlorinated biphenyls (PCBs). Verified by Certificates of disposal and / or a Hazard Material Assessment of any remaining infrastructure.	MOP; the Awaba Mine Closure Plan Section 7.10	No	Section 9.2	Not commenced.
	Remediation of contaminated land as required	A contamination assessment has been undertaken and any contaminated areas have been remediated so that appropriate guidelines for land use are satisfied.	Northern Coal Logistics Project Environmental Impact Statement (GSSE 2014) Section 4.3	No	Section 9.2	Not commenced.
	Carbonaceous material	All carbonaceous material has been removed (where practical).	MOP; the Awaba Mine Closure Plan Section 7.10	No	Section 9.2	Not commenced.
Built infrastructure, fixed plant and services will be progressively decommissioned and rehabilitated when no longer required	Groundwater monitoring bores	All groundwater monitoring bores are decommissioned (piezometers and standpipes removed) and sealed in accordance with RR guidelines.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.

Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
	Seal exploration holes	All drill holes (and excavations that remain abandoned from previous mining or exploration), have been backfilled and sealed in accordance with RR guidelines.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.
	LT Creek Piping	If an industrial-type development is progressed as the post-operational land use, the lengths of LT Creek piped through the Newstan Colliery Surface Site will be retained and left in-situ. If the site is to be rehabilitated back to native vegetation, an assessment will be undertaken to determine if the pipework should be removed and the natural regime of the creek re-established or whether this would cause unnecessary disturbance and impact to the aquatic environment and, as such, whether the pipework should remain. If the decision is made to remove the pipework, a suitably qualified consultant will be engaged to design the re-establishment of the natural creek channel. The decommissioning and rehabilitation activities associated with the re-establishing LT Creek as a natural waterway (i.e. not piped) will include: • Re-instatement of the creek channel in accordance with designs developed by a suitably qualified expert during detailed closure planning; • Installing rock armouring where necessary, for example at significant bends; and • Installing rock drains where drainage lines enter the creek to minimise scouring and to assist dissipation of run-off.	Northern Coal Logistics Project – Decommissioning and Rehabilitation Strategy (SLR 2014)	No	Section 9.2	Not commenced.
Domain 1: Infrastructure						

Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
Where not required post mining, the built infrastructure and fixed plant and services will be progressively decommissioned and rehabilitated when no longer required	Demolition	All demolition work has been carried out in accordance *with AS2601-2001: The Demolition of Structures* or its latest version	*AS2601 - 2001*	No	Section 9.2	Not commenced.
	Removal of infrastructure	All surface infrastructure that is not required as part of the post-mining land use has been demolished and removed from the site (unless otherwise agreed by the Resources Regulator.	MOP; the Awaba Mine Closure Plan Section 7.3	No	Section 9.2	Not commenced.
	Disconnection of Services	All services are disconnected and infrastructure removed (or marked on plans where left in-situ by agreement with the Resources Regulator and/or landholder.	MOP; the Awaba Mine Closure Plan Section 7.2	No	Section 9.2	Not commenced.
	Portals sealed	Portals sealed in accordance with RR guidelines	Northern Coal Logistics Project Environmental Impact Statement (GSSE 2014) Section 4.3	No	Section 9.2	Not commenced.
		A detailed strategy will be developed for Bat Alley as outlined in Section 3.3.7 of this MOP.	Northern Coal Logistics Project – Decommissioning and Rehabilitation Strategy (SLR 2014)	No	Section 9.2	Not commenced.
	Ventilation shafts and service bore holes decommissioned and sealed	Sites will be decommissioned and sealed in accordance with RR guidelines.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.
	Removal of plant and equipment	Removal of all mobile plant and equipment from the site.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.

Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
Where roads are not being retained, removal of culverts, crossing, bridges and roadway running surface.	Removal of infrastructure	All paved roadway infrastructure that is not required as part of the post-mining land use has been dug up and demolished and removed from the site and areas rehabilitated (unless otherwise agreed by the Resource Regulators or Council).	Northern Coal Logistics Project – Decommissioning and Rehabilitation Strategy (SLR 2014)	No	Section 9.2	Not commenced.
	Temporary access tracks	Temporary access tracks (not required for the post mining land use) have been ripped, topsoiled and revegetated after they are no longer required for mining operations.	ML1587 Condition 20	No	Section 9.2	Not commenced.
Domain 2: Tailings Storage Facility						
All tailings pumping infrastructure will be decommissioned and removed.	Tailings infrastructure	All tailings infrastructure (pipelines, pumps and related infrastructure) is decommissioned and removed (or marked on plans where left in-situ by agreement with the Resources Regulator and/or landholder.	MOP	No	Section 9.2	Not commenced.
	Tailings Storage Facility Capping Design	A Detailed Tailings Capping Design has been developed and approved by the Resources Regulator (or contemporary equivalent) prior to closure.	Schedule 3, High Risk Activities, Part 5, Clause 27 Emplacement Areas. Work Health and Safety (Mines) Regulation 2014	No	Section 9.2	In progress.
Domain 3: Water Management Area						
Mine water dams and sediment dams are dewatered and desilted prior to being converted to clean water dams.	Pumping Infrastructure	All pumps and associated infrastructure that are not required are decommissioned and removed from site. Any infrastructure to remain is to be marked on plans where left in-situ by agreement with the Resources Regulator and/or landholder.	MOP	No	Section 9.2	Not commenced.

Objective	Performance Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
	Sediments	Sediments accumulated in mine water and sediment dams is removed from the dam floor and emplaced in the SREA. Records will be retained showing the volumes and locations.	MOP	No	Section 9.2	Not commenced.
	Obsolete water management structures	All dams, diversion drains and banks not required in the final landform have been demolished and accumulated sediment removed and disposed of in SREA.	MOP	No	Section 9.2	Not commenced.
Final landforms are safe, stable, non-polluting and free draining	Water discharging from the surface facilities through the LDP complies with the relevant EPL	pH is between 6.5 and 8.5 TSS < 50mg/L Conductivity < 3250 mS/cm Aluminium <0.15mg/L Lead < 0.038mg/L Nickel < 0.0425 mg/L Zinc < 0.04 mg/L	EPL395, EPL443 GHD Assessments	No	Section 9.2	Ongoing.
Domain 5: Stockpiled Material						
All coal stockpiles will be excavated with all carbonaceous materials re-processed for sale or transported to the Main Tailings Dam in the SREA	Carbonaceous material	All carbonaceous material has been removed (where practical) from the footprint of the CHPP, conveyors and associated structures, and disposed of in the final void. This material will be reprocessed for sale or transported to the Main Tailings Dam in the SREA.	MOP; the Awaba Mine Closure Plan Section 7.10	No	Section 9.2	Not commenced.
Domain 8: Underground Mining Area						
Removal of any built infrastructure (e.g. water boreholes, gas monitoring wells, exploration bores, monitoring equipment and any other related infrastructure). All fixed plant and services will be progressively decommissioned and rehabilitated if they are no longer required.	Removal of infrastructure	Exploration and water boreholes are sealed and decommissioned in accordance with RR guidelines.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.
		All surface infrastructure that is not required as part of the post-mining land use has been demolished and removed from the site (unless otherwise agreed by the Resource Regulator.	Awaba Colliery Environmental Assessment (September 2010)	No	Section 9.2	Not commenced.

Table 6.2: Landform Establishment Phase

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
All Domains						
Final landforms are safe, stable, non-polluting and free-draining.	Landform Stability	Landforms are assessed to be stable and free draining to local watercourses.	Northern Coal Logistics Project Environmental Impact Statement (GSSE 2014)	No	Section 9.2	Not commenced.
	Erosion	There is no evidence of slumping or uncontrolled erosion that would cause a safety issue or compromise the preferred post mining land use.	MOP; Erosion and Sediment Control Plan	No	Section 9.2	Not commenced.
		Monitoring verifies there are no gully or tunnel erosion features, or rills >200mm deep.	MOP; Erosion and Sediment Control Plan	No	Section 9.2	Not commenced.
	As built survey	Landform survey verifies constructed landform is generally in accordance with the approved landform design in current approvals.	MOP, EISs, SEEs, etc.	No	Section 9.2	Not commenced.
	Cuttings and highwalls	There are some earthworks cuttings and highwalls adjacent to the workshop within the Newstan Colliery Surface Site and the rail loop areas that will be retained. Where possible clean fill material will be benched against the walls to provide buttressing to ensure they are long-term stable. If this is not possible a suitably qualified geotechnical engineer will be engaged to inspect the walls at closure and provide a suitable long-term engineering treatment to ensure the benches/highwalls are stable and do not present a safety hazard. This may include, but not be limited to, rock bolting and shot-creting. Where a highwall face of greater than 5 metres is retained, the top of the will be fenced and sign-posted to limit access and advise of the hazard.	Northern Coal Logistics Project – Decommissioning and Rehabilitation Strategy (SLR 2014)	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
Domain 1: Infrastructure Area						
All hazardous and/or contaminated materials will be removed or remediated in-situ such that the land is suitable for the intended post mining land use.	Carbonaceous Material	Infrastructure areas, including hardstands and the ROM and product stockpiles coal bedding layers are capped with inert material and shaped to a free draining landform.	MOP	No	Section 9.2	Not commenced.
Road embankments are reshaped to allow the flow of water and to look commensuratewith the surrounding landform.	Undulating Profiles	Disturbed areas will be shaped and graded to include informal undulations and be free draining, supported by survey.	This MCP	No	Section 9.2	Not commenced.
Domain 2: Tailings Storage Facility						
Final landforms are safe, stable, non-polluting and free-draining	Tailings Capping (NREA)	Tailings storage areas have been capped in accordance with an approved Detailed Capping Design outlined in the Tailings Facility Emplacement Application.	S101 Application and Approval, Newstan EIS, Schedule 3, High Risk Activities, Part 5, Clause 27 Emplacement Areas. Work Health and Safety (Mines) Regulation 2014	No	Section 9.2	Not commenced.
Final landforms are safe, stable, non-polluting and free-draining	Course Rejects Material Capping (NREA)	Course material will be capped with 0.5m of inert material and be free draining.	Newstan EIS	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
	Tailings Capping (SREA)	Tailings storage areas have been capped in accordance with an approved Detailed Capping Design outlined in the Tailings Facility Emplacement Application.	Schedule 3, High Risk Activities, Part 5, Clause 27 Emplacement Areas. Work Health and Safety (Mines) Regulation 2014	No	Section 9.2	Not commenced.
	Course Rejects Material Capping (SREA)	Course material will be capped with inert material, and be free draining.	Newstan EIS,	No	Section 9.2	Not commenced.
	Landform stability	Rehabilitated slopes are generally less than 10 degrees, and not more than 14 degrees without regulatory approval and incorporation of appropriate erosion protection controls.	Development of Rehabilitation Criteria for Native Ecosystem Establishment on Coal Mines in the Hunter Valley (Nichols 2005)	No	Section 9.2	Not commenced.
	Free Draining	All capped tailings storage facilities are confirmed by survey to be free draining following the expected settlement period.	MOP	No	Section 9.2	Not commenced.
	Spontaneous Combustion	Monitoring records verify that there is no evidence of spontaneous combustion.	MOP, s100 Tailings Emplacement Application	No	Section 9.2	Ongoing.
	Acid Mine Drainage (AMD)	Capped tailings geotechnical analysis indicates there is no evidence of AMD generation as indicated by acidic pH (<5.0), The water leaving the site is to meet the criteria nominated in the EPL for the site.	MOP	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
Domain 3: Water Management Area						
Final landforms are safe, stable, non-polluting and free-draining.	Final landform drainage design	Final landform drainage structures including drains, banks, drop structures and dams have been designed and constructed in accordance with an approved detailed drainage design, EPL and the Blue Book Vol 2E.	DECC 2008 - Blue Book Vol 2E ACARP C13048	No	Section 9.2	Not commenced.
	Geomorphicstability	Monitoring verifies that drainage structures are stable with no active gully heads, tunnel erosion or bank failure.	DECC 2008 - Blue Book Vol 2E ACARP C13048	No	Section 9.2	Not commenced.
Final landforms are safe, stable, non-polluting and free-draining	Undulating Profiles	Disturbed areas will be shaped and graded to include informal undulations and be free draining, supported by survey.	MOP	No	Section 9.2	Not commenced.
	Final Landform Survey	Final landform survey is generally in accordance with the approved final landform design.	MOP	No	Section 9.2	Not commenced.
Domain 8: Underground Mining Area						
Rehabilitate any subsidence related issues related to current and historical mine workings	Repair of subsidence related issues	Any subsidence within the Mining Lease is within the maximum predicted limits outlined within the Subsidence Management Plan and any subsidence impacts associated with the operations are appropriately remediated as per the management procedures outlined within the Subsidence Management Plan, the Sinkhole Rehabilitation Plan or this MOP.	MOP; Subsidence Management Plan, Sinkhole Rehabilitation Plan	No	Section 9.2	Ongoing.
Domain B: Water Management Area						
Final landforms are safe, stable, non-polluting and free-draining.	Final landform drainage design	Final landform drainage structures including drains, banks, drop structures and dams have been designed and constructed in accordance with an approved detailed drainage design, EPL and the Blue Book Vol 2E.	DECC 2008 - Blue Book Vol 2E ACARP C13048	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/ Source	Complete	Link to TARP	Progress at Start of MOP
	Geomorphicstability	Monitoring verifies that drainage structures stable with no active gully heads, tunnel erosion or bank failure.	DECC 2008 - Blue Book Vol 2E ACARP C13048	No	Section 9.2	Ongoing.
Any disturbance in creeks will be rehabilitated with appropriate riparian vegetation and include habitat enhancement features		Creeks below the site are assessed to be 'stable' as defined by the CSIRO Ephemeral Stream Assessment	CSIRO 2008	No	Section 9.2	Ongoing.

Table 6.3: Growth Medium Development Phase

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
All Domains						
Growing media appropriate for the intended final land use is reinstated at all rehabilitation areas.	No topsoil	Where no topsoil material is available, Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM) is used for capping and rehabilitation purposes, subject to testing and suitable ameliorants as required.	MOP	No	Section 9.2	Ongoing.
	Topsoil depth	Where available, topsoil or a suitable alternative has been spread uniformly at the specified depth appropriate for the final land use.	MOP	No	Section 9.2	Ongoing.
	Topsoil characterisation	Where available, topsoil's and topsoil substitutes have been tested to assess suitability for post mining land use.	MOP; Soil Stripping Management Plan	No	Section 9.2	Ongoing.
	Amelioration	Where required appropriate soil ameliorants (e.g. gypsum, fertilisers, mulch) have been applied in accordance with specifications.	MOP; Soil Stripping Management Plan	No	Section 9.2	Ongoing.
	Material source	Previously stockpiled topsoil, subsoil and rock/gravel material has been used.	MOP; Soil Stripping Management Plan	No	Section 9.2	Ongoing.
	Growth medium material quality is stable and non-polluting	Material used to establish a growth medium layer is characterised as: Non-contaminated (hydrocarbon) Non-acid generating (NAPP & NAG testing). Of low spontaneous combustion risk. Not consisting of coal process waste or other carbonaceous material.	Interim protocol for site verification and mapping of biophysical strategic agricultural land (NSW Government, 2013). Interpreting Soil Test Results. 3rd Edition (CSIRO, 2016).	No	Section 9.2	Ongoing.
Final landforms are safe, stable, non-polluting and free-draining	Temporary erosion and sediment control	Rehabilitation records verify that temporary ESCs are installed prior to seeding and the establishment of a vegetation cover.	MOP. Erosion and Sediment Control Plan	No	Section 9.2	Ongoing.

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
	Growth medium material management	All topsoil material has been ameliorated with lime or gypsum to amend low pH. Subsoils will not be used as a growth medium due to excessive acidity (unless characterised otherwise).	Soils and Land Capability Assessment (SLR 2014)	No	Section 9.2	Ongoing.
		Topsoil is stored in stockpiles less than 3 m high, shaped to shed water and seeded for weed control.	Soils and Land Capability Assessment (SLR 2014)	No	Section 9.2	Ongoing.
		Stockpiled material has been assessed for weed impact, and treated if required, before use.	Soils and Land Capability Assessment (SLR 2014)	No	Section 9.2	Ongoing.
		Suitable alternative topsoil substitutes (for example bio-solids, organics, etc.), if required to make up any short-fall in the topsoil demand, will be sourced and applied in accordance with relevant NSW EPA guidelines and regulations.	Soils and Land Capability Assessment (SLR 2014)	No	Section 9.2	Ongoing.

Table 6.4: Ecosystem Establishment Phase

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
All Domains						
Weeds and feral animal species do not present a risk to rehabilitation.	Weed presence	Monitoring verifies there are no significant weed infestations and weeds do not comprisea significant proportion of the species in any stratum.	MOP; Landscape Management Plan; Land Management Plan	No	Section 9.2	Ongoing.
		Records indicate that noxious weeds are controlled in accordance with legislation and the MOP.	MOP; Landscape Management Plan; Land Management Plan	No	Section 9.2	Ongoing.
	Feral animal density	Records indicate that feral animal pests are controlled in accordance with legislation and the MOP.	MOP; Land Management Plan	No	Section 9.2	Ongoing.
Management measures will be implemented to minimise bushfire risks in rehabilitation areas.	Bushfire risk management	Bushfire mitigation actions including managing fuel loads, maintaining fire-breaks and firefighting access are implemented in accordance with the Bushfire Management Plan.	MOP; Bushfire Management Plan	No	Section 9.2	Ongoing.
Erosion does not present a safety hazard or compromise the success of rehabilitation.	Erosion and Sediment Control	Visual monitoring indicates there is no significant erosion that compromises success of rehabilitation.	MOP; Erosion and Sediment Control Plan	No	Section 9.2	Ongoing.
Domain B – Water Management Area						
Final landform drainage will integrate with surrounding	Water discharging from the surface	Records indicate that discharge water quality meets EPL requirements.	EPL 395	No	Section 9.2	Ongoing.

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
catchments, achieve long term geomorphic stability and minimise erosion.	facilities through the LDP complies with the relevant EPL	pH is between 6.5 and 8.5 TSS < 50mg/L Conductivity < 3250 mS/cm Aluminum <0.15mg/L Lead < 0.038mg/L Nickel < 0.0425 mg/L Zinc < 0.04 mg/L	EPL443 GHD Assessments			
	Geomorphicstability	Drainage structures are assessed by a suitable qualified engineer to be stable at year 5 following establishment.	DECC 2008 - Blue Book Vol 2E GHD Assessments	No	Section 9.2	Ongoing.
Domain E - Rehabilitation to Woodland Areas						
Woodland rehabilitation areas species diversity is comparable to analogue native vegetation community.	Vegetation health	Rehabilitation monitoring verifies more than 75% of trees are healthy and growing as indicated by rehabilitation monitoring at Year 5 following establishment.	Tongway and Hindley 1996 Annual Flora and Fauna Monitoring Report.	No	Section 9.2	In progress.
	Species composition	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is comparable to analogue sites at Year 5 following establishment	Tongway and Hindley 1996 Annual Flora and Fauna Monitoring Report.	No	Section 9.2	In progress.
Soil fertility and soil structure is comparable between rehabilitation areas and reference sites	pH	Testing verifies that pH is within 0.5 of analogue sites or between 5.5 and 7.5 at Year 5.	MOP; Soil Stripping Management Plan	No	Section 9.2	Not commenced.
	EC	Testing verifies that EC of surface soils is below 1000 mS/cm at Year 5 following establishment.	MOP; Soil Stripping Management Plan	No	Section 9.2	Not commenced.
	Nutrients	Nitrogen, potassium and phosphorus are within 20% of analogue sites at Year 5 following establishment.	Tongway and Hindley 1996	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
	Soil carbon	Testing indicates that organic carbon levels are broadly trending toward 20% of levels at reference sites at Year 5 following establishment.	Tongway and Hindley 1996	No	Section 9.2	Not commenced.
	Surface cover	Rehabilitation monitoring verifies that ground cover (vegetation, leaf litter, mulch) is greater than 70% at Year 5 following establishment.	Tongway and Hindley 1996	No	Section 9.2	Not commenced.

Table 6.5: Ecosystem Development Phase

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
All Domains						
Weeds and feral animals that present a risk to rehabilitation success at the site will be managed.	Weed presence	Rehabilitation monitoring verifies weed presence is broadly comparable to analogue sites and does not present a risk to rehabilitation.	MOP; DPI Control Category Regional Weed Management Plan Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
	Feral animal density	Records indicate that feral animal pests are controlled in accordance with legislation and the MOP.	MOP. Land Management Plan Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
Domain B – Water Management Area						
Final landform drainage will integrate with surrounding catchments, achieve long term geomorphic stability and minimise erosion	Water discharging from the surface facilities through the LDP complies with the relevant EPL	Discharge water quality meets EPL requirements. pH is between 6.5 and 8.5 TSS < 50mg/L Conductivity < 3250 mS/cm Aluminum <0.15mg/L Lead < 0.038mg/L Nickel < 0.0425 mg/L Zinc < 0.04 mg/L	EPL 395EPL443 GHD Assessments	No	Section 9.2	Ongoing.
	Geomorphicstability	Drainage structures are assessed by a suitable qualified engineer to be stable at Year 5 following establishment.	DECC 2008 - Blue Book Vol 2E GHD Assessments	No	Section 9.2	Ongoing.
Domain E – Rehabilitation Area – Woodland						

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
Woodland rehabilitation areas species diversity and structure is comparable to analogue native vegetation community.	Vegetation health	Rehabilitation monitoring verifies more than 75% of trees are healthy and growing as indicated by rehabilitation monitoring.	Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
	Species composition	Rehabilitation monitoring verifies species diversity for each stratum (canopy, mid storey and ground cover) is comparable to analogue sites at Year 10 following establishment.	Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
	Projected foliage cover	Projected foliage cover for each stratum is comparable to analogue sites.	Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
	Structure	Native vegetation rehabilitation areas providea range of structural habitats (e.g. eucalypts, shrubs, ground cover, developing litter layer etc.).	Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
	Reproduction	Rehabilitation monitoring verifies second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites.	Annual Flora and Fauna Monitoring Report.	No	Section 9.2	Ongoing.
Woodland Rehabilitation Areas will contribute to habitat corridors and provide suitable habitat for threatened species	Connectivity	Woodland rehabilitation area features are considered compatible with adjacent areas	MOP	No	Section 9.2	Ongoing.
Management measures will be implemented to minimise bushfire risks in rehabilitation areas.	Fuel Loads	Fuel loads are assessed and managed in accordance with the Bushfire Management Plan.	MOP; Bushfire Management Plan	No	Section 9.2	Ongoing.
	Access	Firefighting access is maintained across rehabilitation areas and to water storages (dams) in accordance with the Bushfire Management Plan.	MOP; Bushfire Management Plan	No	Section 9.2	Ongoing.
Monitoring demonstrates soils are self-sustaining	Soil Quality	Rehabilitation monitoring verifies soil characteristics (pH, EC and ESP, nitrogen and phosphorus) are in the range of analogue sites at Year 10.	MOP	No	Section 9.2	Not commenced.

Domain Objective	Indicator	Completion Criteria	Justification/Source	Complete	Link to TARP	Progress at Start of MOP
	Surface cover	Rehabilitation monitoring verifies ground cover (vegetation, leaf litter, mulch) is in the range of analogue sites at Year 10 following establishment.	Tongway and Hindley 1996	No	Section 9.2	Not commenced.
	Nutrient Recycling	Rehabilitation monitoring indicates evidence of nutrient recycling (e.g. presence of fungi).	Tongway and Hindley 1996	No	Section 9.2	Not commenced.
	Management Inputs	Rehabilitation records verify that management inputs (e.g. ameliorants, fertilizers) required to maintain vegetation health are comparable to analogue sites.	MOP	No	Section 9.2	Not commenced.

7 REHABILITATION IMPLEMENTATION

7.1 Status at MOP Commencement

The status of each Primary and Secondary Domain at the commencement of this MOP term has been shown on **Plan 2**. The status of operations and rehabilitation relevant to each domain at the commencement of the MOP term is summarised in **Table 7.1**.

Table 7.1: Status of Primary and Secondary Domains at MOP Commencement

Domain	Description
Primary Domains	
Domain 1 – Infrastructure Area	Domain 1 is currently active and will remain operational during the MOP period. The surface facilities will remain active. There are no plans to rehabilitate this domain, or parts of this area during the MOP term. This domain occupies 75.2 ha.
Domain 2 – Tailings Storage Facility	The SREA will remain active during the MOP period. Tailings will continue to be pumped to the tailings storage facility. The NREA is in the process of being rehabilitated. The Tailings Dam is currently being capped using course reject. Once capping is completed, the dam will be rehabilitated. The NREA course reject emplacement (or batters) has been capped and rehabilitated. Ongoing maintenance and monitoring of the rehabilitation will continue during the MOP term. The active areas within this domain occupy 63.7 ha.
Domain 3 – Water Management Area	Domain 3 is currently active and will remain operational during the MOP period. There are no plans to rehabilitate this domain or parts of this area during the MOP term. This domain occupies 11.9 ha.
Domain 5 – Stockpiled Material	Domain 5 is currently active and will remain operational during the MOP period. There are no plans to rehabilitate this domain or parts of this area during the MOP term. This domain occupies 11.8 ha.
Domain 8 – Underground Mining Area	Domain 8 is currently active and will remain operational during the MOP period. Rehabilitation of subsidence and other mining impacts will occur during the MOP period withinthis domain as required. This domain occupies 3,602 ha.
Secondary Domains	
Domain A – Infrastructure	This domain is currently active and subject to ongoing operations. This domain occupies 44.4 ha.
Domain B – Water Management Area	This domain includes those dams which will be retained in the final landform. This domain is currently active and subject to ongoing operations. This domain occupies 8.3 ha.
Domain E – Rehabilitation Area - Woodland	The total active rehabilitation areas within this domain are associated with the NREA and SREA, it encompasses 162.2 ha. Ongoing maintenance and monitoring of the rehabilitation will continue during the MOP term.

Note: Primary Domains 4, 6, 7 and 9 and Secondary Domains C, D, F, G and J are not applicable to this MOP.

7.2 Proposed Rehabilitation Activities this MOP Term

Short to medium term mining and rehabilitation activities (the term of this MOP) are shown on Plan 3 (refer **Appendix 2**). Long term rehabilitation management measures are identified through the annual rehabilitation planning process, annual monitoring program and annual review process.

A summary of forecast rehabilitation progress at the Newstan Complex during the MOP term has been provided in **Table 7.2**.

Table 7.2: Rehabilitation and Disturbance Rates during the MOP Term

Year	Total Disturbance Area (ha)	Total Rehabilitation Area (ha)	Cumulative Rehabilitation Areas)	Comments
Start of MOP term (1 June 2021)	162.6	39.3	39.3	Refer Plan 2, 2A and 2B
2022	162.6	0	39.3	Refer Plan 3
2023	162.6	0	39.3	Refer Plan 3
Total	**162.6**	**0**	**39.3**	

7.2.1 Domain 1 – Infrastructure Area

There are no decommissioning or rehabilitation activities proposed during MOP term.

7.2.2 Domain 2 – Tailings Storage Facility

SREA

Minimal decommissioning activities proposed at the SREA during MOP term. Minor rehabilitation proposed for the timber and mulch area. Due to the nature of the area, only minimal actions will need to be carried out. Topsoil will be applied (ameliorated as required), the area will be scarified and a suitable seed mix will be applied.

NREA

The Tailings Dam within the NREA is used as an active coarse rejects emplacement area, as well as serving for the purpose of capping the tailings dam.

Rehabilitation of the NREA will continue during the MOP term. The tailings dam will continue to be capped using coarse reject (although capping will be minimal). The compaction of the material and the final landform RL will be as outlined in the Newstan EIS (1998) (refer **Section 2.2.5** and **Appendix 2**).

Once capping is completed, the dam will be rehabilitated as outlined in **Sections 7.5 – 7.8**. This will not occur during this MOP term.

The NREA coarse reject emplacement (or batters) has been capped (minimum of 500 mm) with suitable ENM of VENM prior to being seeded. Some small areas may be capped or repaired during the reporting period.

Ongoing maintenance and monitoring of the rehabilitation will continue during the MOP term within the NREA.

7.2.3 Domain 3 – Water Management Area

There are no decommissioning or rehabilitation activities are proposed during MOP term.

7.2.4 Domain 5 – Stockpiled Material

There are no decommissioning or rehabilitation activities are proposed during MOP term.

7.2.5 Domain 8 – Underground Mining Area

There will be no decommissioning during the MOP term. Rehabilitation of boreholes may be undertaken in accordance with the current industry standards.

At Awaba Colliery, sinkhole remediation will continue in accordance with the *Awaba Colliery Sinkhole Rehabilitation Plan* (SLR 2020).

Should subsidence impacts occur to surface features, remediation and rehabilitation will be undertaken in accordance with the existing SMP, the existing Extraction Plan and future approved Extraction Plans that will be developed. Subsidence remediation and rehabilitation will be on-going throughout the life of the mine.

If any surface cracks are found not to fill naturally, some remedial measures may be required at the completion of mining. Where necessary, rehabilitation methods for surface features may include such actions as repairing surface cracks in roads and general disturbed areas where the land surface has been cleared, or surface cracking in the natural environment. These works will be undertaken as per best practice for landform design in mine rehabilitation (Department of Industry, Tourism and Resources 2006).

Should cracking occur in roads or general disturbed areas, the surface will be graded and the cracks filled with sand, or other suitable material, prior to the surface being re-graded and compacted. If the area is no longer utilised, it will be deep ripped, topsoiled and appropriately revegetated.

Subsidence cracking may also occur in densely vegetated areas away from established tracks. In such instances where access by equipment is an issue, the most natural way to rehabilitate surface cracking is to place locally occurring vegetative matter above or within the cracks, hastening the natural processes that occur over a prolonged period. Appropriate materials placed in or above the cracks will be determined by the size of the cracks and the intended depth to which these materials would be used in the rehabilitation. Logs, sticks, leaf litter and local soil (ensuring a localised seed bank) could all be placed within and/or above the cracks. This form of rehabilitation would result in a natural looking rehabilitated crack that would continue to accumulate additional natural leaf litter and debris over time. Using this method of rehabilitation would avoid additional access requirements and significant disturbance to existing natural vegetation. Prior to implementing this method of rehabilitation, a site inspection will be undertaken by the Environment and Community Coordinator to determine if the site and the associated substrate are suitable for infilling with natural materials (i.e. subsidence cracks within sandy soils are likely to repair naturally through sedimentation and infilling). If the substrate is not suitable for infilling with natural materials (i.e. subsidence cracks are within rocky areas) infilling of subsidence cracks will be undertaken using non-decomposing materials such as rocks and local soil (ensuring a localised seed bed).

Any disturbance associated with access tracks to the groundwater (piezometer) and surface water monitoring sites will be reshaped as required and re-vegetated to be consistent with the surrounding vegetation.

If any other mining related disturbance or infrastructure is identified in this domain, they will be rehabilitated in accordance with relevant guidelines.

7.3 Summary of Rehabilitation Areas during the MOP Term

A summary of rehabilitation in each primary and secondary domain during the MOP term is outlined in **Table 7.3**.

7.4 Relinquishment Phase Achieved during MOP Period

There will be no relinquishment during the MOP Period.

Table 7.3: Changes in Domain Areas during the MOP Term

Primary Domain	Secondary Domain	Code	Rehabilitation Phase	Total Area at MOP start (ha)	Area at end of MOP (ha)
Infrastructure Area	Infrastructure	1A	Active	23.7	23.7
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**23.7**	**23.7**
Infrastructure Area	Rehabilitation Area – Woodland	1E	Active	51.5	51.5
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**51.5**	**51.5**
Tailings Storage Facility	Rehabilitation Area – Woodland	2E	Active	63.7	63.7
			Decommissioning	-	-
			Landform Establishment	5.0	0.0
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	6.5	11.5
			Ecosystem and Land Use Sustainability	27.9	27.9

			Relinquished Lands	-	-
			Domain Total	**103.1**	**103.1**
Water Management Area	Infrastructure	3A	Active	0.2	0.2
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**0.2**	**0.2**
Water Management Area	Water Management Area	3B	Active	8.1	8.1
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**8.1**	**8.1**
Water Management Area	Rehabilitation Area – Woodland	3E	Active	3.6	3.6
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-

			Domain Total	**3.6**	**3.6**
Stockpiled Material	Rehabilitation Area – Woodland	5E	Active	11.8	11.8
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**11.8**	**11.8**
Underground Mining Area	Rehabilitation Area – Woodland	8E	Active	3,602	3,602
			Decommissioning	-	-
			Landform Establishment	-	-
			Growth Medium Development	-	-
			Ecosystem and Land Use Establishment	-	-
			Ecosystem and Land Use Sustainability	-	-
			Relinquished Lands	-	-
			Domain Total	**3,602**	**3,602**

7.5 Landform Design

Prior to the commencement of rehabilitation, the landform will be established. The primary objective of landform establishment within infrastructure areas will be the stabilisation of batters, road verges, drains, banks, and cleared areas. Disturbed areas will be re-profiled to establish geotechnically stable and self-draining areas.

All areas will be trimmed, shaped, and the proposed rehabilitation works will ensure that the final landforms at the sites are stable and non–polluting, and mimic the near-original landform for an end land use.

7.6 Topsoil Management

Where soil stripping and transportation is required, Springvale will undertake the operations in accordance with the methodologies outlined within the *Northern Coal Logistics Project Soils and Land Capability Assessment* (SLR 2014b). This assessment identifies the recommended soil stripping depths based upon the identified soil types that will disturbed during construction works.

Soil should be re-spread directly onto disturbed areas where practical. Topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Soil should be re-spread to the approximate depth from which it was stripped. Subsoil stripped from Study Area 1 may prove useful as an intermediate layer between the reject material and topsoil material in, provided appropriate amelioration techniques are employed (SLR 2014b).

Thorough seedbed preparation will be undertaken to optimise establishment and growth of vegetation. All topsoiled areas will be lightly contour-ripped (after topsoil spreading) to create a ‘key’ between the topsoil and the subsoil. Ripping will be undertaken on the contour and the tynes lifted for approximately 2 m every 200 m to reduce the potential for channelised erosion on slopes greater than 10°. Ripping will be undertaken when soil is moist and immediately prior to sowing for best results. The respread topsoil surface will be scarified prior to or during seeding to reduce runoff and increase infiltration.

If long-term stockpiling is planned (i.e. greater than 3 months), seed and fertilise stockpiles as soon as possible. An annual cover crop species that produce sterile florets or seeds should be sown. A rapid growing and healthy annual pasture sward will provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species will not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil.

Soil Amelioration

Prior to respreading soils at construction sites, sampling will be undertaken (either from the proposed source material, stockpiles or in-situ soils) to determine appropriate ameliorant application. Ameliorants will be added to soils in accordance with recommendations from a soil specialist, and will be minimised or avoided where possible. Repeat applications of ameliorants may be required to maintain nutrient levels to rapidly establish an effective ground cover and sustain plant growth prior to evidence of nutrient recycling. Ameliorants may include gypsum, lime, fertiliser and biosolids. The use of soil ameliorants is designed to balance pH, prevent surface crusting, increase moisture and organic content, and buffer surface temperatures to improve germination.

7.7 Surface Preparation

Surface preparation activities for rehabilitated areas will commence as soon as practicable once land becomes available and/or following the completion of mining activities. The surface preparation process at Springvale involves the following general steps:

- Installation of contours, drainage structures and erosion control measures;
- Light contour ripping parallel with the contour to provide for an adequate seed bed;
- Installation of habitat features (e.g. stag trees, woody debris) to augment the habitat value of the proposed vegetated corridors;
- Spreading of topsoil or suitable alternative;
- Application of soil ameliorants where appropriate;
- The respread topsoil surface will be scarified to reduce runoff and increase infiltration; and
- Revegetation.

7.8 Revegetation

Appropriate revegetation steps and selection criteria for the species mix will be undertaken to ensure a high success revegetation rate, and will comprise, but not be limited to:

- Appropriate species selection for the rehabilitation domain;
- Optimal sowing rates and species proportions;
- Seed pre-treatment; and
- Soil amelioration and fertiliser application, where required.

The species selection will focus on those species that will successfully establish on the available growth medium, bind the soil and will result in a variety of structure and food/habitat resources. The woodland seed mix will include a mix of understorey, mid-storey and over-storey species. Newstan will utilise woodland seed mixes to establish vegetation communities that are commensurate with surrounding existing vegetation. Whilst every attempt will be made to use species that existed prior to disturbance, additional species may be required to ensure suitable initial groundcover for site stabilisation and minimal soil erosion. This may include the use of short-lived annual exotic non-invasive grass species (such as shirohie millet in the Spring and Summer, and oats/barley/wheat in the Autumn and Winter), however the use of these species will be minimised or avoided where possible.

Fertiliser will be applied with seed mixes to increase the likelihood of initial revegetation success. All revegetation activities will be undertaken immediately after the landform establishment stage.

A site specific seed mix will be developed and utilised for any rehabilitation during the MOP term.

7.9 Rehabilitation Maintenance

Where rehabilitation monitoring confirms that the rehabilitation is not successful or is limited, maintenance works will be undertaken. This may include the following:

- Re-seeding and, where necessary, re-topsoiling and/or the application of specialised treatments such as composted mulch or bio-solids to areas with poor vegetation establishment;
- Installation of tree guards around planted seedlings or construction of temporary fencing suitable for excluding native and feral fauna species should grazing by animals be excessive;
- Replacement of drainage controls if they are found to be inadequate for their intended purpose, or compromised by vegetation or wildlife;
- De-silting or repair of sediment control structures; and
- Where monitoring indicates the presence of excessive weeds or the potential for noxious weed infestation, necessary precautions to prevent the development of weeds within the rehabilitated areas will be undertaken.

Monitoring results, any required maintenance activities and any refinements of rehabilitation techniques will be reported in the sites Annual Review.

7.10 Quality Assurance Process

Rehabilitation activities at Newstan Complex will be undertaken in accordance with the quality assurance process illustrated in **Figure 7.1**. This process outlines the actions to be implemented throughout the lifecycle of rehabilitation, which includes the verification of execution of procedures as well as the recording of key data at each rehabilitation phase.

Annual Rehabilitation Flowchart

	PLANNING / DESIGN SPECIFICATIONS	EXECUTION	REVIEW	RECORD KEEPING / REPORTING	SIGN OFF
Landform Establishment	Develop refined final landform design including drainage design Review approved final landform design / MOP requirements	Undertake bulk earthwork activities to approved design Construct erosion and sediment control / drainage structures to specification Complete landform shaping to final design Complete landform survey	Landform constructed to design including: • cover/capping • slope/gradient • landform/ slope height • drainage etc NO YES	Prepared "as constructed" drawings / survey report" Record key rehabilitation attributes in relevant GIS datasets and update to reflect phase change	Obtain approval and sign-off on final landform design Obtain survey sign off to verify landform has been constructed to design
Growth Medium Development	Review approval and MOP requirements for soil depths Review soil inventory and undertake soil sampling (if no data is available) to determine amelioration requirements and / or weed management in topsoil stockpiles prior to spreading	Respread available soil resources to specified depths with soil ameliorants / substitutes as required Complete landform survey	Survey verifies soil layers (subsoil and topsoil) spread to nominated depths and records show ameliorants etc applied to specification NO YES	Complete rehabilitation records and survey report to verify that growth media and ameliorants have been applied to specification Record key rehabilitation attributes in relevant GIS datasets and update to reflect phase change Soil sampling report	Obtain signoff for completion of growth medium development activities to commence seeding
Ecosystem Establishment	Review approval and MOP requirements for target plant species Review target seed mix/species list referring to annual monitoring reports	Complete seedbed preparation (ie contour rip / scarify) to specifications Undertake reseeding / planting in accordance with specified seed mix / density	Confirm seeding / planting has been undertaken to specification NO YES	Complete rehabilitation records to verify that seeding and replanting has been undertaken to specification Record key rehabilitation attributes in relevant GIS datasets and update to reflect phase change	Obtain signoff of rehabilitation records documenting that all activities have been undertaken to specifications
Ecosystem and Land Use Sustainability	MOP / Rehabilitation Monitoring Program	Undertake rehabilitation maintenance and monitoring as per requirements Implement TARP and undertake rehabilitation repairs and maintenance as required Continue annual monitoring and maintenance program until all completion criteria have been achieved and rehabilitation is deemed complete	Rehabilitation monitoring indicates rehabilitation trending to successful completion NO YES	Rehabilitation Monitoring Reports Maintain and update GIS datasets including rehabilitation phases based on annual monitoring results Maintain documentation of corrective measures required and implemented Prepare final Rehabilitation Monitoring Report	Obtain signoff from landowner and regulator that rehabilitation is complete

8 REHABILITATION MONITORING AND RESEARCH

8.1 Rehabilitation Monitoring

A commitment to effective rehabilitation involves an on-going monitoring (and concurrent maintenance as required) program. Areas of completed rehabilitation will be regularly inspected and assessed against the short-term and long-term rehabilitation objectives. As some areas of mining related disturbance at Newstan will be rehabilitated using native woodland vegetation species, rehabilitation monitoring will be closely integrated with the existing biodiversity monitoring program described in the *Northern Region Biodiversity Management Plan* (GHD 2019).

A dedicated monitoring system was established in spring 2015 to assess effectiveness of implementation of the rehabilitation measures as well as to identify the need for corrective action as soon as required. The initial scale of the monitoring program reflects the nature of current disturbance/rehabilitation at Newstan Complex, and will increase commensurately during operations to incorporate new areas of rehabilitation. The monitoring program has been developed for relevant domains, incorporating the most appropriate indicators and methods that:

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

During the MOP term the rehabilitation methodology will be revised to ensure alignment with this document and associated criteria. Rehabilitation monitoring will include analysis of:

- Rehabilitation age;
- Slope and general soil description;
- Vegetation characteristics, which includes species, count and diversity results;
- Erosion observations, which will include type and severity of erosion along a 50 m transect;
- Sustainability assessment with regards to safety, landform stability and land use; and
- Limitations to future success of rehabilitation.

Monitoring will be conducted annually by independent, suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. In addition to the rehabilitated areas, at least two reference sites will be monitored to allow a comparison of the development and success of the rehabilitation against a control. Analogue sites will be selected based on the following general criteria:

- Contain vegetation types similar to the rehabilitation sites/approval requirements;
- Secure from future mining related disturbance; and
- Contain vegetation and conditions suitable as a basis for rehabilitation performance criteria.

Data from analogue rehabilitation sites is an integral part of the monitoring procedure throughout the monitoring process, so that varying seasonal conditions ultimately result in a “band” of values that act as the long-term target for rehabilitation. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness. The outcome of these reviews will be included in the Annual Review.

Monitoring results, any required maintenance activities and any refinements of rehabilitation techniques will be reported in the sites Annual Review.

8.1.1 Rehabilitation Inspections

Following the completion of each rehabilitation campaign, an initial establishment inspection will be conducted within 6 months to determine whether issues have occurred or are emerging, which have the potential to delay revegetation establishment. Such issues may include erosion that has occurred due to storm events, failure of drainage structures and a lack of germination or establishment of ground cover etc. The objective of this process will be to identify potential issues early to minimise the extent of areas affected as well as develop mitigation strategies in a timely and cost effective manner.

As a minimum, annual inspections of rehabilitated areas will be undertaken over the life of the Project to assess soil conditions and erosion, drainage and sediment control structures, runoff water quality, revegetation germination rates, plant health and weed infestation. Outcomes of the annual rehabilitation inspection will be recorded and any required management actions that are identified as part of the inspection implemented as soon as practical as part of the rehabilitation care and maintenance program. Where necessary, rehabilitation procedures will be amended accordingly with the aim of continually improving rehabilitation standards.

8.2 Research and Rehabilitation Trials and Use of Analogue Sites

Reference/analogue sites have been established as part of the current rehabilitation monitoring program. The location of the Analogue Sites can be found on Plan 2A (refer **Appendix 2**). Monitoring of these sites commenced in 2015. During the MOP term, the suitability of these analogue sites and the rehabilitation monitoring program will be reviewed to ensure that approved post-mining land uses are appropriately reflected.

9 INTERVENTION AND ADAPTIVE MANAGEMENT

9.1 Threats to Rehabilitation

Where rehabilitation performance is not trending to the nominated completion criteria this may indicate that there is a threat to long term rehabilitation success. Threats to rehabilitation may include events such as periods of drought, bushfire events, or pressures from weeds and feral animals.

Section 3.3 provides examples of key threats to rehabilitation. Where rehabilitation monitoring indicates that there is a significant threat to rehabilitation, the Newstan Complex will undertake adaptive management in accordance with the TARP (refer **Section 9.2**).

9.2 Trigger Action Response Plan

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

The TARP is provided as **Table 9.1**, and will be reviewed and may be revised as conditions at the Newstan Complex change or new risks to rehabilitation are identified.

Table 9.1: Trigger Action Response Plan

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Demolition and Decommissioning	Public Safety	Trigger	All mine entries remain sealed and fenced and are not accessible to the public.	Either through subsidence or settlement the location of the mine entries becomes visible. Public could access them if they wanted to.	Mine entries are found to be open or sinkholes have formed that present a risk to public.
		Response	No action.	Review the site and undertake any minor security works required to secure the site	Immediately cordon off the area, erect warning signs and undertake appropriate remediation / rehabilitation works.
	Hazardous Materials	Trigger	All hazardous materials are removed and disposed of in accordance with the appropriate approval.	Material is discovered on the site that has the potential to be hazardous, but it is unknown and in small quantities.	Material is discovered on site that is likely hazardous and in significant quantities. It presents and immediate risk to the environment and/or public safety.
		Response	No action.	Take a sample of the material for analysis and if required, implement a recommended disposal program.	Immediately secure the area and erect a fence and signs as required. Undertake sampling to identify the nature of the material and then implement the recommended disposal program.
Landform stability	Slope gradient	Trigger	Rehabilitated areas have slopesthat are generally <10˚.	Rehabilitated areas have slopes >10° but <15˚.	Rehabilitated areas have slopes >15° and limited options for reducing slope angles.
		Response	No response required. Continue monitoring program.	Undertake regrading and revegetation of the area, if it is not designed to be >10°.	Undertake a review of the landform design, including survey if required. Undertake regrading and revegetation of the area, if required/possible. If regrading is not possible, engage external erosion control / landform design specialist and implement recommended remedial controls.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Landform stability	Erosion control	Trigger	No gully or tunnel erosion. No rilling present.	Minor gully or tunnel erosion present and/or rilling <200 mm deep.	Significant gully or tunnel erosion present and/or rilling >200 mm deep.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to install water management infrastructure to address erosion. Remediate as appropriate.	Undertake a review of the drainage of the area and provide recommendations to appropriately remediate the erosion. Remediate as soon as practicable.
	Drainage Condition	Trigger	Drainage condition is in accordance with the design criteria established within this document.	Landforms exhibiting minor drainage issues but does not threaten to cause rehabilitation failure.	Landforms exhibiting significant drainage issues, threatening or causing rehabilitation failure, or causing offsite impacts.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Implement downstream sediment controls, where necessary. Review drainage design (with external expert) and implement recommendations to mitigate impacts and remediate the area as soon as practicable. Report situation to RR.
	Mine Subsidence	Trigger	Subsidence within predicted levels and no significant cracking or sinkholes evident.	Surface subsidence is greater than predicted in current mining area, causing surface cracking and/ or sinkholes	Major sinkholes form in current or historical mining areas. There is a significant public safety risk
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Advise the appropriate regulators, Undertake rehabilitation in accordance with the Sinkhole Rehabilitation Plan. Remediate the site as soon as possible.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Landform stability	Settlement	Trigger	No settlement observed.	Surface settlement on the REAs is greater than predicted resulting in minor water ponding.	Landform is exhibiting permanent or significant ponding issues.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Advise the appropriate regulators. Undertake a review of the capping and drainage design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable.
Water Quality	Monitoring parameters	Trigger	Surface water quality of runoff from rehabilitation areas is within EPL criteria and rehabilitation performance criteria established within this document.	Water quality exceeds EPL or performance criteria but does not indicate a long-term rehabilitation issue.	Water quality exceeds criteria, indicating a long term rehabilitation liability. Monitoring identifies impact to rehabilitation.
		Response	No response required. Continue monitoring program.	Review and investigate water quality monitoring and management where appropriate. Implement relevant remedial measures where required.	Reporting as per PIRMP and all statutory reporting requirements. Implement relevant responses and undertake immediate review to determine source of issues and implement remediation measures identified as soon as practicable. Liaison with RR/EPA.
Spontaneous Combustion	Evidence of Spontaneous Combustion	Trigger	No evidence of spontaneous combustion in rehabilitation areas.	Isolated incidence of heating in rehabilitation areas.	Widespread or repeated incidences of ignition in rehabilitation areas.
		Response	No response required. Continue monitoring program.	Investigate sources of potential ignition. Excavate material with propensity for spontaneous combustion in proximity to rehabilitated surface. Review coarse reject emplacement practices.	Consult with regulators to develop remediation plan to mitigate spontaneous combustion such as increased capping. Review Spontaneous Combustion Management Plan and material emplacement practices.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Acid Mine Drainage (AMD)	Evidence of AMD	Trigger	No evidence of AMD in the rehabilitated areas.	Isolated incidents of AMD in the rehabilitated areas	Widespread or repeated incidence of AMD in the rehabilitated areas.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to address issues. Remediate as appropriate.	Advise the appropriate regulators. Undertake a review of the impacted site and prepare a remediation plan to manage the issue.
Soil Quality	Monitoring parameters	Trigger	Soil parameters (if locally sourced) are within 20% of analogue site, or (if imported) meet analogue site ESP, pH, EC & EAT criteria after 5 years of rehabilitation.	Soil parameters (if locally sourced) are > 20% of analogue site, or (if imported) exceed analogue site ESP, pH, EC & EAT criteria after 5 years of rehabilitation; however, area is able to sustain selected vegetation species.	Soil parameters (if locally sourced) are > 20% of analogue site, or (if imported) exceed analogue site ESP, pH, EC & EAT criteria after 5 years of rehabilitation, and the area is unable to establish or sustain selected vegetation species.
		Response	No response required. Continue monitoring program.	Investigate application of additional soil, and/or use of appropriate soil ameliorants or management options to address soil quality if deemed necessary.	Consultant engaged to conduct detailed soil analysis and devise appropriate remedial program, with plan remediated as soon as practicable. Inform RR of program progress.
Topsoil Availability	Topsoil quantity	Trigger	Sufficient topsoil or appropriate topsoil substitute material identified for rehabilitation over the MOP term and for the Life of the Mine.	Topsoil balance indicates a deficiency in topsoil available (and an alternate not available) for rehabilitation and there is a chance that the required rehabilitation outcomes may not be met.	Deficiency significant and alternate not available such that it will delay rehabilitation progression during the MOP term and the likelihood of rehabilitation success is low.
		Response	No response required.	Investigate options and alternatives (e.g. Organic Growth Medium (OGM)) to be able to meet future topsoil requirements. Continue direct seeding into material, where possible, and monitor.	Source and budget for purchasing topsoil for use in rehabilitation. Investigate use of alternatives such as OGM.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Vegetation	Ground cover	Trigger	Five years following revegetation to woodland, a minimum of 70% total ground cover (vegetation, leaf litter, mulch) is present within rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) of between 50-70% in rehabilitated areas.	Five years following revegetation to woodland, total ground cover (vegetation, leaf litter, mulch) is <50% within rehabilitated areas.
		Response	No response required. Continue monitoring program.	Implement program of supplementary vegetation establishment or soil conditioning to increase vegetation cover.	Engage external expertise to assess cause of poor groundcover, devise and implement program of remedial treatment to increase vegetation cover.
Vegetation	Weed presence	Trigger	Twelve months following revegetation, no significant weed infestations present (< 15% of groundcover in monitoring plots).	Twelve months following revegetation, >15% but <25% cover of weed species present.	Twelve months following revegetation, >25% cover of weed species present. Or weed presence is visually impeding vegetation establishment.
		Response	No response required. Continue monitoring program.	Engage weed management contractor to remove introduced species from the site.	Engage weed management contractor to remove introduced species from the site as soon as practicable. Investigate management measures to assist native plant establishment including use of ameliorants and implement as appropriate.
	Species composition	Trigger	Five years following revegetation to woodland, species composition comprises native tree and shrub species consistent with analogue site.	Five years following rehabilitation, key species are not recorded as present in one or more strata (but are present in analogue sites).	Five years following rehabilitation to woodland, no key species are recorded as present in any strata (but are still present in analogue sites).
		Response	No response required. Continue monitoring program.	Review source and quality of native seed / tubestock, and amend accordingly. Consider remedial actions such as tubestock planting or re-seeding to achieve required species composition.	A suitably experienced expert (i.e. ecologist or botanist) will investigate likely causes, and devise a remedial program to trial options for achieving the required species composition. Trials will be implemented, and results used to modify rehabilitation and land management practices.

Aspect/ Category	Key Element	Trigger Response	Condition Green	Condition Amber	Condition Red
Bushfire	Fuel Load	Trigger	Fuel loads are assessed and managed as required (including maintaining fire breaks) and there is firefighting access across rehabilitation areas and water resources available for fighting fires.	Monitoring indicates fuel loads have not been managed and fire breaks have not been maintained. In the event of a fire, this would result in firefighters not being able to access the site or water resources.	A fire on site damages rehabilitated areas.
		Response	No response required. Continue monitoring program.	Reduce fuel loads and ensure access tracks are cleared. Inspect water sources and ensure sufficient water is available.	Review and update (if required) the Bushfire Management Plan to ensure monitoring and maintenance is completed for fuel loads, access tracks, and water bodies.
Tailings	Inadequate capping	Trigger	The capped tailings landform is constructed in accordance with the approved capping design and is free-draining and no ponding is present.	Inspections indicate some temporary ponding on the tailings landform, however settlement is within the range considered in the detailed capping design.	Landform is exhibiting permanent or significant ponding issues.
		Response	No response required. Continue monitoring program.	A suitably trained person to inspect the site. Investigate opportunities to improve landform drainage. Remediate as appropriate.	Undertake a review of the capping and drainage design and provide recommendations to appropriately remediate the area. Remediate as soon as practicable.

10 REPORTING

As is currently undertaken, during the MOP term a summary of rehabilitation monitoring will be included in each Annual Review. This summary will include:

- Results of rehabilitation monitoring against key performance measures/indicators;
- Comparison of rehabilitation results against predictions presented in this MOP;
- Key trends in monitoring results and progression towards performance indicators and achievement of rehabilitation objectives;
- Reporting on discrepancies between the predicted and actual results;
- Reporting of where a TARP has been implemented to counter poor/unpredicted rehabilitation results or environmental impacts;
- Results of trials;
- Non-compliances;
- Incidents/near misses; and
- Any other requirements from the RR.

11 PLANS

The Newstan Complex is classified as a Level 1 Mine, and therefore the following Plans have been prepared for this MOP:

- **Plans 1A – 1C** show the location and pre-mining natural and physical environment of the Newstan Complex;
- **Plan 2, 2A and 2B** show the mine domains at commencement of the MOP;
- **Plans 3** shows mining and rehabilitation activities in year 1-2 of the MOP term;
- **Plan 4** shows the proposed post mining land use and landform in 2040 (five years prior to cessation of activities under the current approved NCLP consent); and
- **Plans 5** shows vertical and longitudinal cross sections.

These Plans are contained in **Appendix 2**.

12 REVIEW AND IMPLEMENTATION OF THE MOP

12.1 Review of the MOP

This section provides the Protocol for periodic review of this MOP. Reviews are conducted to assess the effectiveness of the procedures against the objectives of the MOP. The MOP may be reviewed, and if necessary revised, following the submission of an:

- Annual Review;
- Incident report;
- Audit; or
- Any modification to the conditions of the Development Consent.

This MOP may also be revised due to:

- Deficiencies being identified;
- Recommendations resulting from the monitoring and review program;
- Changing environmental requirements due to (for example) changed legislation or regulatory requirements;
- Where a risk assessment identifies the requirement to alter the MOP; and
- Change in the activities or operations.

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

12.2 Implementation

Table 12.1 defines personnel who are responsible for the monitoring, review and implementation of this MOP.

Table 12.1: Responsibilities for Implementation of the MOP

Title	Responsibility
Mine Manager	Implement the procedures referenced in this MOP. Undertake training in relevant Management Plans and procedures as required. Provide resources required to implement this MOP. Construct landforms in accordance with this MOP.
Environment and Community Coordinator	Prepare or project manage the relevant Management Plans. Implement, monitor and review the programs and procedures linked to this MOP. Consult with regulatory authorities as required. Undertake monitoring, as required. Undertake maintenance, as required. Provide measures for continual improvement to this MOP and procedures. Ensure all personnel undertaking works in relation to this MOP are trained and competent. Report the progress of any rehabilitation and monitoring in the Annual Review. Undertake site based actions to implement this MOP in cooperation with the Mine Manager. Implement the procedures referenced in this MOP. Undertake training in relevant Management Plans and procedures as required. Ensure that maintenance activities are undertaken in accordance with this MOP.

13 REFERENCES

AECOM (2011) *Phase 2 Environmental Site Assessment – Newstan Colliery, Fassifern, NSW.*

AECOM (2014) *Targeted Phase 2 Environmental Site Assessment – Awaba Colliery, Awaba, NSW.*

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Department of Industry and Investment (2010) *ESG1: Rehabilitation Cost Estimate Guidelines*.

Department of Industry, Tourism and Resources (2006) *Leading Practice Sustainable Development Program for the Mining Industry.*

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Minerals Council of Australia (2004) *Strategic Framework for Mine Closure.*

NSW Department of Trade and Investment – Mine Safety (2011) *Minerals Industry Safety and Health Risk Management Guideline (MDG1010).*

Resources Regulator (2020) *Newstan and Awaba Targeted Assessment Program – Soils and Materials Management* (letter).

RPS (2012) *Post Mining Heritage Management Plan.*

SLR (2014a) *Northern Coal Logistics Project Decommissioning and Rehabilitation Strategy.*

SLR (2014b) *Northern Coal Logistics Project Soils and Land Capability Assessment.*

SLR (2020) *Awaba Colliery Sinkhole Management Plan.*

Standards Australia (2009) *AS/NZS ISO 31000:2009 – Risk Management – Principles and Guidelines.*

Umwelt (1998) *Environmental Impact Statement. Powercoal – Newstan Colliery Life Extension Project.*

APPENDIX 1: SCHEDULE OF LANDS

Newstan Colliery

Lot Number	DP	Land holder
1	1267781	FREEHOLD
1	1199425	NSW GOVERNMENT
149	755207	NSW GOVERNMENT
142	755207	NSW GOVERNMENT
141	755207	NSW GOVERNMENT
1	833614	FREEHOLD
7053	1052818	CROWN
5	738276	FREEHOLD
82	1216846	NSW GOVERNMENT
82	1216846	NSW GOVERNMENT
82	1216846	NSW GOVERNMENT
93	755218	CROWN
102	1179827	FREEHOLD
209	755218	FREEHOLD
222	548001	FREEHOLD
1	626824	FREEHOLD
94	755218	FREEHOLD
1	34358	FREEHOLD
10	263605	FREEHOLD
221	548001	FREEHOLD
88	755218	CROWN
89	755218	CROWN
2	755218	NSW GOVERNMENT
2	755218	NSW GOVERNMENT
92	755218	CROWN
101	709415	FREEHOLD
1	502590	FREEHOLD
2	1199425	NSW GOVERNMENT
151	755207	NSW GOVERNMENT
147	755207	NSW GOVERNMENT
150	755207	NSW GOVERNMENT
146	755207	NSW GOVERNMENT
152	755207	NSW GOVERNMENT
148	755207	NSW GOVERNMENT
90	755218	CROWN
91	755218	CROWN
6	239629	FREEHOLD
8	239629	LOCAL GOVERNMENT AUTHORITY

Lot Number	DP	Land holder
7	239629	LOCAL GOVERNMENT AUTHORITY
371	723259	CROWN
1	758041	FREEHOLD
7	758041	FREEHOLD
225	755207	CROWN
221	755207	CROWN
170	755207	CROWN
166	755207	CROWN
161	755207	CROWN
219	755207	CROWN
212	755207	CROWN
9	239629	CROWN
5	239629	CROWN
1	1191531	NSW GOVERNMENT
8	758041	CROWN
1	758041	CROWN
11	758041	CROWN
9	758041	CROWN
7	758041	CROWN
6	758041	CROWN
2	758041	CROWN
213	755207	CROWN
160	755207	CROWN
7338	1170024	CROWN
7339	1170025	CROWN
7339	1170025	CROWN
7341	1169843	CROWN
4	758041	CROWN
1	758041	CROWN
6	758041	CROWN
2	758041	CROWN
1	758041	CROWN
3	758041	CROWN
12	758041	CROWN
1	758041	CROWN
168	755207	CROWN
3	758041	FREEHOLD
13	758041	FREEHOLD
5	758041	FREEHOLD

Lot Number	DP	Land holder
61	569340	FREEHOLD
2	758041	FREEHOLD
7091	1068374	CROWN
62	569340	FREEHOLD
9	758041	FREEHOLD
8	758041	FREEHOLD
11	758041	FREEHOLD
9	758041	FREEHOLD
1	758041	FREEHOLD
215	755207	CROWN
215	755207	CROWN
165	755207	CROWN
158	755207	FREEHOLD
231	755207	CROWN
231	755207	CROWN
3	758041	FREEHOLD
10	758041	FREEHOLD
71	616908	FREEHOLD
12	758041	FREEHOLD
4	758041	FREEHOLD
6	758041	FREEHOLD
31	858764	FREEHOLD
8	758041	FREEHOLD
5	758041	FREEHOLD
61	615460	FREEHOLD
A	357869	FREEHOLD
8	758041	FREEHOLD
223	755207	CROWN
157	755207	FREEHOLD
156	755207	FREEHOLD
214	755207	CROWN
216	755207	CROWN
216	755207	CROWN
216	755207	CROWN
159	755207	CROWN
10	239629	CROWN
2	758041	FREEHOLD
172	755207	CROWN
11	758041	CROWN
2	758041	CROWN

Lot Number	DP	Land holder
4	758041	CROWN
5	758041	CROWN
8	758041	CROWN
3	758041	FREEHOLD
5	758041	FREEHOLD
B	361988	FREEHOLD
3	758041	CROWN
2	758041	FREEHOLD
10	758041	CROWN
1	758041	CROWN
35	1126312	CROWN
9	758041	FREEHOLD
8	758041	FREEHOLD
11	845676	FREEHOLD
169	755207	CROWN
2	239629	CROWN
3	239629	CROWN
445	1040188	FREEHOLD
8	758041	FREEHOLD
10	758041	CROWN
1	758041	CROWN
7086	1060557	CROWN
5	758041	CROWN
4	758041	CROWN
2	758041	FREEHOLD
7307	1158738	CROWN
248	1154986	CROWN
1	1139314	LOCAL GOVERNMENT AUTHORITY
2	1139314	FREEHOLD
3	758041	FREEHOLD
10	758041	FREEHOLD
7	758041	FREEHOLD
4	758041	FREEHOLD
8	758041	FREEHOLD
4	758041	FREEHOLD
1	758041	FREEHOLD
194	755207	FREEHOLD
6	758041	FREEHOLD
9	758041	FREEHOLD

Lot Number	DP	Land holder
4	758041	FREEHOLD
7	758041	FREEHOLD
12	702043	FREEHOLD
10	758041	FREEHOLD
10	758041	FREEHOLD
2	758041	FREEHOLD
5	758041	CROWN
10	758041	CROWN
5	758041	FREEHOLD
16	758041	FREEHOLD
2	758041	FREEHOLD
14	758041	FREEHOLD
8	758041	FREEHOLD
3	758041	FREEHOLD
9	758041	FREEHOLD
7	758041	FREEHOLD
451	1033002	FREEHOLD
2	758041	FREEHOLD
41	625299	FREEHOLD
2	758041	FREEHOLD
81	519603	FREEHOLD
186	755207	FREEHOLD
5	758041	FREEHOLD
8	758041	FREEHOLD
7	758041	FREEHOLD
3	758041	CROWN
2	758041	CROWN
10	758041	CROWN
1	758041	CROWN
2	758041	CROWN
8	758041	CROWN
7	758041	CROWN
6	758041	CROWN
3	758041	CROWN
174	755207	CROWN
180	755207	CROWN
4	758041	FREEHOLD
12	758041	FREEHOLD
4	758041	FREEHOLD
32	858764	FREEHOLD

Lot Number	DP	Land holder
5	758041	FREEHOLD
187	755207	FREEHOLD
1	758041	FREEHOLD
9	758041	FREEHOLD
10	758041	FREEHOLD
4	758041	FREEHOLD
6	758041	FREEHOLD
5	758041	FREEHOLD
11	623972	FREEHOLD
10	758041	FREEHOLD
7	758041	FREEHOLD
185	755207	FREEHOLD
13	702043	FREEHOLD
5	758041	FREEHOLD
425	823739	FREEHOLD
9	758041	FREEHOLD
8	758041	FREEHOLD
8	758041	CROWN
3	758041	CROWN
10	758041	CROWN
9	758041	CROWN
5	758041	CROWN
2	758041	CROWN
7	758041	CROWN
4	758041	CROWN
6	758041	FREEHOLD
1	758041	FREEHOLD
164	755207	FREEHOLD
B	357869	FREEHOLD
11	758041	FREEHOLD
162	755207	FREEHOLD
3	758041	FREEHOLD
1	758041	FREEHOLD
2	758041	FREEHOLD
1	758041	FREEHOLD
9	758041	FREEHOLD
9	758041	FREEHOLD
10	758041	FREEHOLD
6	758041	FREEHOLD
431	1004306	FREEHOLD

Lot Number	DP	Land holder
431	1004306	FREEHOLD
1	758041	FREEHOLD
7	758041	FREEHOLD
2	758041	FREEHOLD
2	758041	FREEHOLD
397	821668	FREEHOLD
6	758041	FREEHOLD
12	758041	FREEHOLD
72	616908	FREEHOLD
11	702043	FREEHOLD
5	758041	FREEHOLD
7062	1060425	CROWN
167	755207	CROWN
10	845676	FREEHOLD
11	249535	FREEHOLD
52	622344	FREEHOLD
52	700659	FREEHOLD
1	817297	FREEHOLD
4	239629	CROWN
1	239629	CROWN
12	249535	FREEHOLD
7061	1060425	CROWN
15	249535	FREEHOLD
7089	1060558	CROWN
131	622781	FREEHOLD
92	825387	FREEHOLD
7088	1060558	CROWN
171	755207	CROWN
7087	1060557	CROWN
62	603232	FREEHOLD
7092	1060654	CROWN
7059	1060424	CROWN
32	557456	FREEHOLD
2	516039	FREEHOLD
A	371352	FREEHOLD
7064	1060437	CROWN
1	758041	CROWN
192	755207	FREEHOLD
183	755207	FREEHOLD
51	622344	FREEHOLD

Lot Number	DP	Land holder
42	625299	FREEHOLD
7060	1060424	CROWN
2	758041	FREEHOLD
91	825387	FREEHOLD
7091	1060656	CROWN
15	758041	FREEHOLD
7	758041	FREEHOLD
82	519603	FREEHOLD
3	758041	FREEHOLD
301	755207	FREEHOLD
173	755207	CROWN
175	755207	FREEHOLD
756	1243793	CROWN
756	1243793	CROWN
755	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
753	1243793	CROWN
752	1243793	CROWN
752	1243793	CROWN
752	1243793	CROWN
752	1243793	CROWN
754	1243793	CROWN
751	1243793	CROWN
750	1243793	CROWN
22	1076675	FREEHOLD
16	875748	FREEHOLD
7065	1077182	CROWN
7067	1077182	CROWN
7066	1077182	CROWN
7074	1077184	CROWN
7071	1077184	CROWN
7073	1077184	CROWN
7072	1077184	CROWN
7068	1077183	CROWN
7069	1077183	CROWN

Lot Number	DP	Land holder
7070	1077183	CROWN
4	845676	CROWN
5	845676	CROWN
115	755207	CROWN
1	758041	CROWN
116	755207	CROWN
4	758041	CROWN
207	755207	CROWN
1	758041	CROWN
1	561528	FREEHOLD
9	758041	FREEHOLD
8	758041	CROWN
7	758041	CROWN
2	561528	FREEHOLD
211	755207	CROWN
210	755207	CROWN
9	758041	CROWN
6	758041	CROWN
209	755207	CROWN
6	758041	FREEHOLD
62	615460	FREEHOLD
8	758041	FREEHOLD
426	823739	CROWN
7096	1060655	CROWN
12	623972	FREEHOLD
4	758041	FREEHOLD
A	361988	FREEHOLD
5	758041	FREEHOLD
3	758041	FREEHOLD
9	758041	CROWN
1	758041	CROWN
3	758041	CROWN
1	758041	CROWN
4	758041	FREEHOLD
7095	1060655	CROWN
3	758041	FREEHOLD
441	1040184	FREEHOLD
2	615264	FREEHOLD
1	130632	FREEHOLD
208	755207	CROWN

Lot Number	DP	Land holder
51	700659	FREEHOLD
163	755207	FREEHOLD
31	557456	FREEHOLD
132	622781	FREEHOLD
14	249535	FREEHOLD
7	845676	FREEHOLD
3	516039	FREEHOLD
1	729932	FREEHOLD
184	755207	FREEHOLD
13	249535	FREEHOLD
B	371352	FREEHOLD
102	840773	FREEHOLD
11	875748	CROWN
101	840773	FREEHOLD
114	802471	FREEHOLD
117	802471	FREEHOLD
72	554514	FREEHOLD
443	1040188	FREEHOLD
444	1040188	FREEHOLD
450	1064562	FREEHOLD
118	802471	FREEHOLD
4B	376807	FREEHOLD
10	875748	CROWN
115	802471	FREEHOLD
2	873289	FREEHOLD
1	873289	FREEHOLD
7063	1060426	CROWN
61	603232	FREEHOLD
702	1030918	CROWN
42	804985	FREEHOLD
442	1040184	FREEHOLD
41	804985	FREEHOLD
4C	376807	FREEHOLD
116	802471	FREEHOLD
7062	1060426	CROWN
71	554514	FREEHOLD
17	875748	CROWN
7090	1060656	CROWN
113	802471	FREEHOLD
4A	376807	FREEHOLD

Lot Number	DP	Land holder
7094	1060655	CROWN
7052	1057169	CROWN
7337	1170022	CROWN
230	755207	CROWN
7	758041	CROWN
5	758041	CROWN
6	758041	CROWN
3	758041	CROWN
10	758041	FREEHOLD
98	755207	CROWN
861	528641	FREEHOLD
281	755207	FREEHOLD
99	755207	CROWN
91	755207	FREEHOLD
93	1131485	CROWN
58	792783	FREEHOLD
7318	1165927	CROWN
7318	1165933	CROWN
7317	1165927	CROWN
92	755207	FREEHOLD
94	755207	CROWN
89	755207	FREEHOLD
106	1003935	FREEHOLD
433	1006267	FREEHOLD
85	1070146	FREEHOLD
87	755207	CROWN
105	1003935	FREEHOLD
9	835633	FREEHOLD
14	835633	FREEHOLD
46	835633	FREEHOLD
23	835633	FREEHOLD
51	835633	FREEHOLD
60	835633	FREEHOLD
41	835633	FREEHOLD
22	835633	FREEHOLD
11	835633	FREEHOLD
27	835633	FREEHOLD
38	835633	FREEHOLD
85	755207	CROWN
40	835633	FREEHOLD

Lot Number	DP	Land holder
21	835633	FREEHOLD
55	835633	FREEHOLD
58	835633	FREEHOLD
16	835633	FREEHOLD
37	835633	FREEHOLD
57	835633	FREEHOLD
56	835633	FREEHOLD
50	835633	FREEHOLD
54	835633	FREEHOLD
42	835633	FREEHOLD
26	835633	FREEHOLD
34	835633	FREEHOLD
8	835633	FREEHOLD
43	835633	FREEHOLD
19	835633	FREEHOLD
862	528641	FREEHOLD
10	835633	FREEHOLD
39	835633	FREEHOLD
44	835633	FREEHOLD
48	835633	FREEHOLD
25	835633	FREEHOLD
45	835633	FREEHOLD
472	860305	FREEHOLD
49	835633	FREEHOLD
20	835633	FREEHOLD
32	835633	FREEHOLD
33	835633	FREEHOLD
6	835633	FREEHOLD
247	844413	FREEHOLD
305	857889	FREEHOLD
427	1006267	FREEHOLD
312	857889	FREEHOLD
321	857889	FREEHOLD
234	844413	FREEHOLD
249	844413	FREEHOLD
205	844413	FREEHOLD
219	844413	FREEHOLD
221	844413	FREEHOLD
421	1006267	FREEHOLD
420	1006267	FREEHOLD

Lot Number	DP	Land holder
423	1006267	FREEHOLD
416	1006267	FREEHOLD
315	857889	FREEHOLD
208	844413	FREEHOLD
214	844413	FREEHOLD
212	844413	FREEHOLD
414	1006267	FREEHOLD
318	857889	FREEHOLD
7	835633	FREEHOLD
471	860305	FREEHOLD
52	835633	FREEHOLD
15	835633	FREEHOLD
53	835633	FREEHOLD
410	1006267	FREEHOLD
411	1006267	FREEHOLD
228	844413	FREEHOLD
403	1006267	FREEHOLD
425	1006267	FREEHOLD
206	844413	FREEHOLD
3	835263	FREEHOLD
405	1006267	FREEHOLD
407	1006267	FREEHOLD
331	857889	FREEHOLD
335	857889	FREEHOLD
230	844413	FREEHOLD
426	1006267	FREEHOLD
303	857889	FREEHOLD
211	844413	FREEHOLD
402	1006267	FREEHOLD
325	857889	FREEHOLD
314	857889	FREEHOLD
429	1006267	FREEHOLD
210	844413	FREEHOLD
415	1006267	FREEHOLD
333	857889	FREEHOLD
229	844413	FREEHOLD
223	844413	FREEHOLD
220	844413	FREEHOLD
434	1006267	FREEHOLD
341	857889	FREEHOLD

Lot Number	DP	Land holder
224	844413	FREEHOLD
337	857889	FREEHOLD
222	844413	FREEHOLD
309	857889	FREEHOLD
235	844413	FREEHOLD
435	1006267	FREEHOLD
239	844413	FREEHOLD
307	857889	FREEHOLD
242	844413	FREEHOLD
217	844413	FREEHOLD
310	857889	FREEHOLD
322	857889	FREEHOLD
225	844413	FREEHOLD
237	844413	FREEHOLD
227	844413	FREEHOLD
13	835633	FREEHOLD
12	835633	FREEHOLD
	50017	FREEHOLD
323	857889	FREEHOLD
215	844413	FREEHOLD
417	1006267	FREEHOLD
1	835263	FREEHOLD
245	844413	FREEHOLD
432	1006267	FREEHOLD
340	857889	FREEHOLD
430	1006267	FREEHOLD
412	1006267	FREEHOLD
327	857889	FREEHOLD
238	844413	FREEHOLD
304	857889	FREEHOLD
401	1006267	FREEHOLD
244	844413	FREEHOLD
404	1006267	FREEHOLD
308	857889	FREEHOLD
409	1006267	FREEHOLD
209	844413	FREEHOLD
328	857889	FREEHOLD
203	844413	FREEHOLD
306	857889	FREEHOLD
336	857889	FREEHOLD

Lot Number	DP	Land holder
329	857889	FREEHOLD
334	857889	FREEHOLD
226	844413	FREEHOLD
313	857889	FREEHOLD
5	835263	FREEHOLD
250	844413	FREEHOLD
311	857889	FREEHOLD
302	857889	FREEHOLD
326	857889	FREEHOLD
243	844413	FREEHOLD
424	1006267	FREEHOLD
232	844413	FREEHOLD
218	844413	FREEHOLD
330	857889	FREEHOLD
204	844413	FREEHOLD
428	1006267	FREEHOLD
408	1006267	FREEHOLD
338	857889	FREEHOLD
431	1006267	FREEHOLD
324	857889	FREEHOLD
418	1006267	FREEHOLD
406	1006267	FREEHOLD
339	857889	FREEHOLD
422	1006267	FREEHOLD
436	1006267	FREEHOLD
251	844413	FREEHOLD
231	844413	FREEHOLD
216	844413	FREEHOLD
240	844413	FREEHOLD
236	844413	FREEHOLD
316	857889	FREEHOLD
15	1031778	FREEHOLD
342	857889	FREEHOLD
3192	1218840	FREEHOLD
3191	1218840	FREEHOLD
320	857889	FREEHOLD
241	844413	FREEHOLD
413	1006267	FREEHOLD
248	844413	FREEHOLD
317	857889	FREEHOLD

Lot Number	DP	Land holder
2	835263	FREEHOLD
419	1006267	FREEHOLD
233	844413	FREEHOLD
4	835263	FREEHOLD
301	857889	FREEHOLD
332	857889	FREEHOLD
207	844413	FREEHOLD
213	844413	FREEHOLD
246	844413	FREEHOLD
17	1031778	FREEHOLD
4	46737	CROWN
66	755207	FREEHOLD
18	1031778	FREEHOLD
475	1207251	FREEHOLD
259	1139078	FREEHOLD
5	46737	CROWN
5	1031778	FREEHOLD
4	1031778	FREEHOLD
2	1031778	FREEHOLD
3	1031778	FREEHOLD
7	1031778	FREEHOLD
8	1031778	FREEHOLD
6	46737	CROWN
11	1031778	FREEHOLD
474	1207251	CROWN
234	755207	CROWN
10	1031778	FREEHOLD
9	1031778	FREEHOLD
16	1031778	FREEHOLD
6	1031778	FREEHOLD
12	1031778	FREEHOLD
13	1031778	FREEHOLD
20	1031778	FREEHOLD
1001	1265875	LOCAL GOVERNMENT AUTHORITY
3902	1230425	FREEHOLD
478	1207251	CROWN
473	1207251	CROWN
473	1207251	CROWN
100	1149240	FREEHOLD

Lot Number	DP	Land holder
100	1127677	FREEHOLD
118	755207	FREEHOLD
149	728974	CROWN
22	755207	FREEHOLD
119	755207	NSW GOVERNMENT
148	728974	FREEHOLD
33	755207	FREEHOLD
64	755207	FREEHOLD
78	755207	FREEHOLD
441	583057	FREEHOLD
441	583057	FREEHOLD
441	583057	FREEHOLD
442	583057	FREEHOLD
1	659579	FREEHOLD
27	755207	FREEHOLD
2	233639	FREEHOLD
36	755207	FREEHOLD
1	121470	FREEHOLD
C	381399	FREEHOLD
123	755207	NSW GOVERNMENT
124	755207	FREEHOLD
120	755207	FREEHOLD
140	755218	FREEHOLD
17	755218	FREEHOLD
143	755218	FREEHOLD
18	755218	FREEHOLD
21	532058	FREEHOLD
98	755218	CROWN
3	815846	FREEHOLD
96	755218	CROWN
7014	93169	CROWN
54	755218	FREEHOLD
95	755218	FREEHOLD
1	815846	FREEHOLD
2	815846	FREEHOLD
7019	1050414	CROWN
7011	1050416	CROWN
153	755207	CROWN
153	755207	CROWN
110	755207	CROWN

Lot Number	DP	Land holder
7336	1170023	CROWN
7309	1164559	CROWN
7304	1149082	CROWN
7305	1149082	CROWN
463	1138964	FREEHOLD
462	1138964	CROWN
65	1126625	FREEHOLD
1	582126	CROWN
102	755218	CROWN
100	1215739	CROWN
372	723259	FREEHOLD
464	1138964	FREEHOLD
341	44381	CROWN
97	755207	CROWN
373	723259	FREEHOLD
7319	1166061	CROWN
1	1147459	FREEHOLD
475	1138964	CROWN
465	1138964	FREEHOLD
473	1138964	CROWN
96	755207	CROWN
100	755207	CROWN
277	755207	CROWN
95	755207	CROWN
395	823682	CROWN
340	44381	FREEHOLD
58	792783	FREEHOLD
7325	1166356	CROWN
7326	1166356	CROWN
94	755207	CROWN
266	755207	FREEHOLD
1	585142	CROWN
7320	1166295	CROWN
7321	1166295	CROWN
2	585142	CROWN

Northern Coal Services

Lot	Schedule	DP
100		1149240
104		1149241
103		1149241
1		1031778
7306		1164232
UCL		418269
7306		1164232
214		755207
1		582126
65		1126625
153		755207
102		755218
7305		1149082
7304		1149082
215		755207
11		1050120
1		659579
C		381399
78		755207
27		755207
64		755207
390		1064199
591		607932
1		121470
631		816256
442		583057
148		728974
149		728974
391		1064199
443		583057
435		1111527
441		583057
186		755218
187		755218
170		755218
179		755218
173		755218
169		755218
1	A	6747

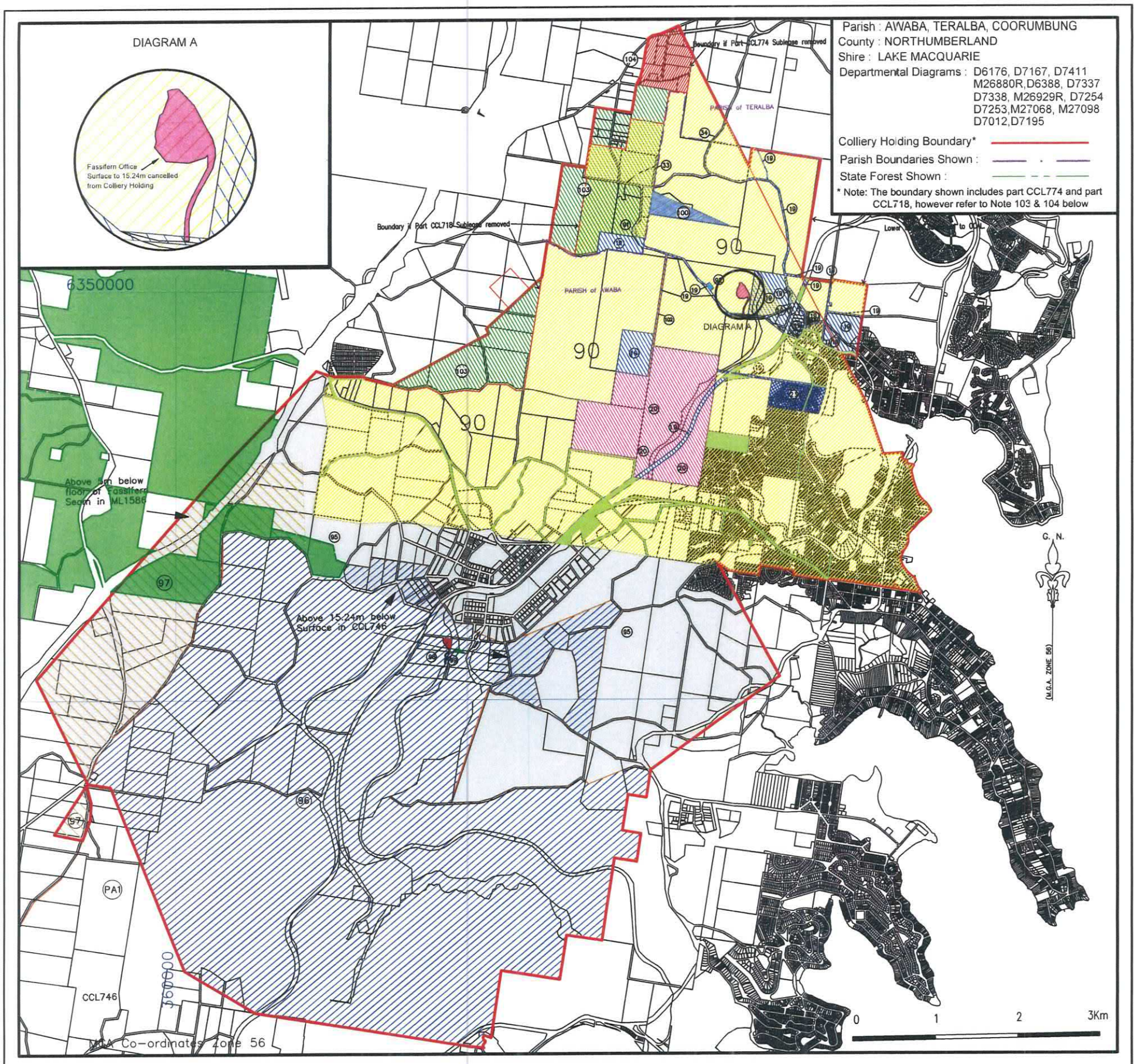
Lot	Schedule	DP
2	A	6747
171		755218
208		755207
205		755207
8		821188
8		1031859
447		1064562
12		1031859
322		39722
318		39722
155		755207
23		264502
100		1127677
101		1127677
3		1031778
2		1031778
20		1031778
15		1031778
13		1031778
6		46737
234		755207
19		1031778
102		1149241
66		755207
7		1031778
5		1031778
17		1031778
18		1031778
4		46737
5		46737
10		1031778
8		1031778
6		1031778
4		1031778
16		1031778
9		1031778
11		1031778
12		1031778
1		1108065
630		816256

Lot	Schedule	DP
259		1139078
207		755207
211		755207
206		755207
230		755207
226		755207
225		755207
224		755207
223		755207
227		755207
101		755218
20		840668
211		840670
211		702166
210		755218
20		734860
221		702167
101		828283
24		264502
1		960790
97		755218
1		817425
184		755218
21		734860
100		828283
10		1050120

Awaba Colliery

Parish	Portion/Lot No	Study Area to which this Applies	Parish	Portion/Lot No	Study Area to which this Applies
Awaba	Lot 4 DP 1031778	4	Awaba	Lot 110 DP 55207	3
Awaba	Lot 5 DP 1031778	4	Awaba	Lot 153 DP 755207	2 and 4
Awaba	Lot 12 DP 1031778	4	Awaba	Lot 155 DP 755207	4
Awaba	Lot 14 DP 1031778	4	Awaba	Lot 205 DP 755207	4
Awaba	Lot 15 DP 1031778	4	Awaba	Lot 206 DP 755207	4
Awaba	Lot 16 DP 1031778	4	Awaba	Lot 207 DP 755207	4
Awaba	Lot 19 DP 1031778	4	Awaba	Lot 211 DP 755207	4
Awaba	Lot 12 DP1031859	4	Awaba	Lot 212 DP 755207	1
Awaba	Lot 11 DP 1050120	4	Awaba	Lot 213 DP 755207	1 and 2
Awaba	Lot 447 DP 1064562	4	Awaba	Lot 214 DP 755207	1 and 2
Awaba	Lot 100 DP 1127677	4	Awaba	Lot 215 DP 755207	1
Awaba	Lot 101 DP 1127677	4	Awaba	Lot 216 DP 755207	1
Awaba	Lot 462 DP 1138964	3	Awaba	Lot 223 DP 755207	4
Awaba	Lot 7304 DP 1149082	2	Awaba	Lot 224 DP 755207	4
Awaba	Lot 7305 DP 1149082	1, 2 and 3	Awaba	Lot 225 DP 755207	4
Awaba	Lot 5 DP 239629	1	Awaba	Lot 226 DP 755207	4
Awaba	Lot 6 DP 239629	1	Awaba	Lot 230 DP 755207	4
Awaba	Lot 8 DP 239629	1	Awaba	Lot 102 DP 755218	4
Awaba	Lot 9 DP 239629	1	Awaba	Lot 619 DP 817275	4
Awaba	Lot 318 DP 39722	4	Awaba	Lot 8 DP 821188	4
Awaba	Lot 322 DP 39722	4	Awaba	Lot 100 DP 828283	4
Awaba	Lot 1 DP 582126	2	Awaba	Lot 101 DP 828283	4
Awaba	Lot 441 DP 583057	4	Awaba	Lot 211 DP 840670	4
Awaba	Lot 64 DP 755207	4	Awaba	Lot 10 DP 1031778	1

APPPENDIX 2: MOP PLANS



DETAILS OF MINING TITLES HELD UNDER THE MINING ACT

Plan Ref.	Lease Type	Lease No.	Mining Act	Registered Holder	Lease Date	Expiry Date	Mineral Area (ha) Lease	Mineral Area (ha) Holding	Surface Area (ha)	Private Royalty	Comments
90	Consolidated Coal Lease	727	1973	Centennial Newstan Pty. Limited	02-Jan-91	11-Aug-27	2188.23	2058	577.67		Fassifern Office deleted from Colliery Holding (Area = 2.33ha)
91	Mining Purposes Lease	304	1973	Centennial Newstan Pty. Limited	25-Mar-93	25-Mar-35			0.0699		
92	Mining Purposes Lease	305	1973	Centennial Newstan Pty. Limited	25-Mar-93	25-Mar-35			0.4044		
93	Mining Lease	1380	1992	Centennial Newstan Pty. Limited	18-Sep-95	18-Sep-37	78	78			
95	Mining Lease	1452	1992	Centennial Newstan Pty. Limited	06-Jul-99	06-Jul-20	1587	1587			
96	Consolidated Coal Lease	746	1973	Centennial Newstan Pty. Limited	16-May-90	31-Dec-28	3153	2510.5	1900		Note: Part CCL746 included in Holding
98	Mining Purposes Lease	327	1973	Centennial Newstan Pty. Limited	05-Aug-94	05-Aug-36			1.041		
99	Mining Purposes Lease	328	1973	Centennial Newstan Pty. Limited	05-Aug-94	05-Aug-36			0.397		
100	Mining Lease	1480	1992	Centennial Newstan Pty. Limited	28-Aug-01	20-Jul-23	14.49	14.49	14.49		
23	Private Lands Lease	497	1906	Centennial Newstan Pty. Limited	24-Aug-55	24-Aug-38	20.23	20.23			
19	Consolidated Coal Lease	764	1973	Centennial Newstan Pty. Limited	19-May-92	18-May-71	108.8	108.8	9.332	$0.40	Private Royalty refers to Land Lease Agreements
20	Consolidated Coal Lease	763	1973	Centennial Newstan Pty. Limited	19-May-92	09-Jun-22	190.9	190.9	74.57	$0.40	Private Royalty refers to Land Lease Agreements
102	Mining Lease	1587	1992	Centennial Newstan Pty. Limited	23-Oct-06	23-Oct-27	3	3	3		
97	Mining Lease	1586	1992	Centennial Newstan Pty. Limited	21-Sep-09	13-Oct-22	449.1	449.1			

DETAILS OF SUB-LEASES BENEFITING CENTENNIAL NEWSTAN PTY LIMITED

Plan Ref.	Lease Type	Lease No.	Mining Act	Registered Holder	Sub-Lease Date	Expiry Date	Mineral Area (ha) Lease	Mineral Area (ha) Holding	Surface Area (ha)	Private Royalty	Comments
103	Consolidated Coal Lease	718	1973	Oceanic Coal Australia Limited	Varies	13-Nov-10	6030	274.56			The registration of this Sublease expired 11 Feb 2014, negotiations to part transfer this area are progressing with the Holder
104	Consolidated Coal Lease	774	1973	Mount Thorley Operations	Varies	20-Jul-23	342.6	42.24			The registration of this Sublease expired 29 June 2014, however an application to part transfer the area to Centennial Newstan was lodged in 2020

DETAILS OF AGREEMENTS WITH OTHERS NOT IN COLLIERY HOLDING

Plan Ref.	Lease Type	Lease No.	Mining Act	Registered Holder/ Lessor	Agreement Date	Expiry Date	Mineral Area (ha) Lease	Mineral Area (ha) Holding	Surface Area (ha)	Royalty	Comments
PA1	Consolidated Coal Lease	746	1973	CENTENNIAL NEWSTAN PTY LTD	16-May-90	Expiry of Head Lease	3153	642.5	119.53		Sublease to Centennial Mandalong Pty Limited (Part CCL746 deleted from Newstan Holding)

HOLDING SUMMARY

Description	Area (ha)	Remarks
Total Mineral Area within Colliery Holding by Lease	0	Includes lease overlaps
Surface Area (under Mining Lease) within Colliery Holding	0	
Surface Area (Freehold) within Colliery Holding	25.63	
Total Surface Area within Colliery Holding	2606	
Total Mineral Area of Colliery Holding	**6661.70**	Excludes lease overlaps

I, Paul Craig Duncan of Centennial Coal Company Limited - ACN 003 714 536, a surveyor registered under the Surveying Act 2002, hereby certify that the information shown heron, to the best of my knowledge and belief is correctly represented.

Signed ..... Date 24/3/21

Surveyors Reference : No 8327

LOCATION	NEWSTAN
SEAM	
DRAWN	C.P.T.
CHECKED	P.C.D.
APPROVED	
SCALE	1:25000 @ A1

CENTENNIAL COAL COMPANY LIMITED

MINING LEASES

NEWSTAN COLLIERY

Sheet 1 of 4

CENTENNIAL NEWSTAN

DATE 26-10-2020 | PC1

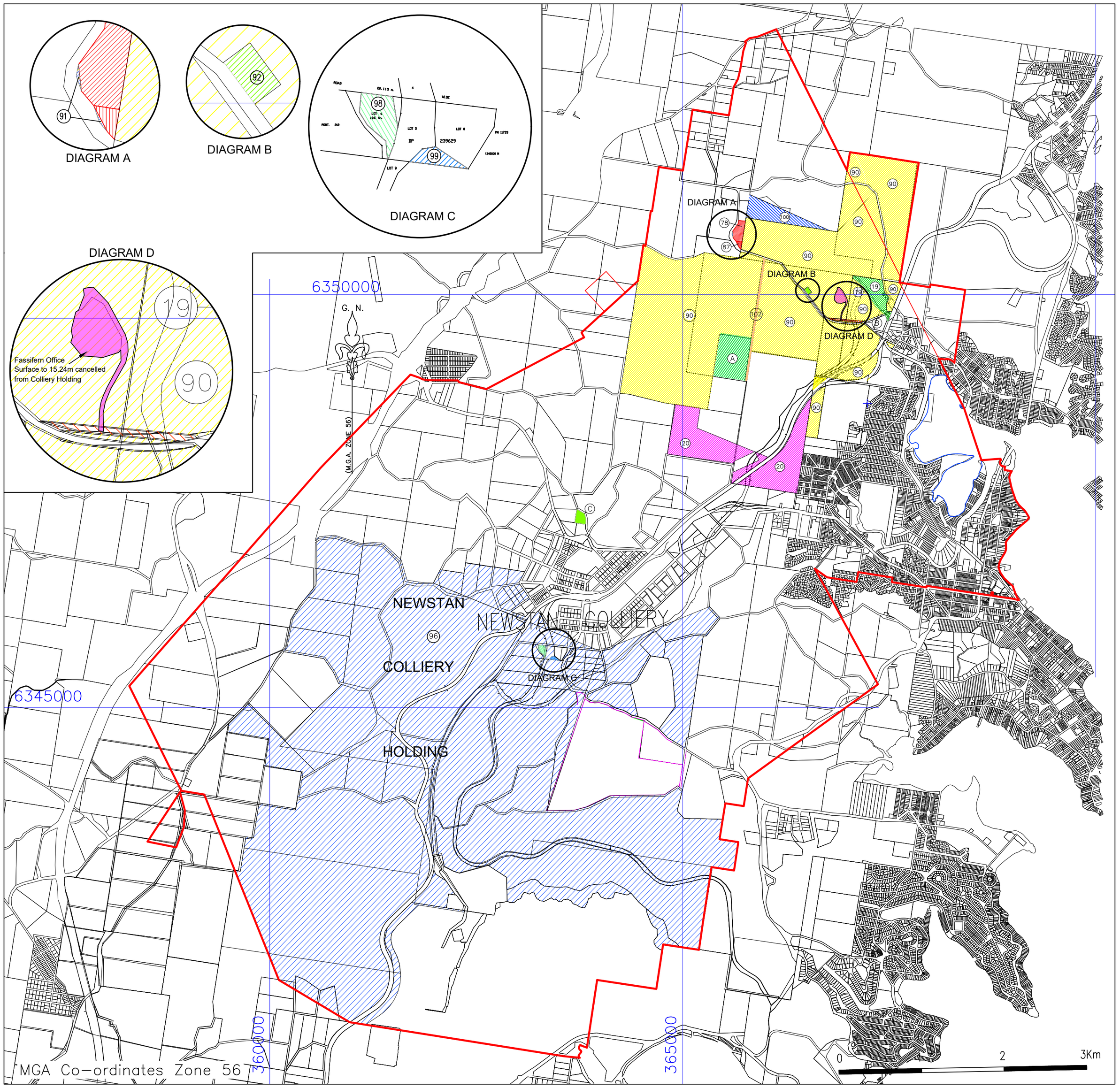
Plot File PC1 Newstan Holding Plan Sheet 1 20201026.pdf

DIAGRAM A

DIAGRAM B

DIAGRAM C

DIAGRAM D



SURFACE INCLUDED IN LEASES UNDER THE MINING ACT

Plan Ref.	Lease Type	Lease No.	Mining Act	Registered Holder/ Lessor	Lot Number	DP Number	Certificate of Title	Lease Expiry Date	Total Area (ha)	Rent $	Security	Comments
90	Consolidated Coal Lease	727	1973	Centennial Newstan Pty Limited	Various			12-Aug-27	577.67	0		Fassifern Office deleted from Colliery Holding (Area = 2.33ha)
91	Mining Purposes Lease	304	1973	Centennial Newstan Pty Limited	pt road			25-Mar-35	0.0699	25		
92	Mining Purposes Lease	305	1973	Centennial Newstan Pty Limited	Lot 1			25-Mar-35	0.4044	0		
96	Consolidated Coal Lease	746	1973	Centennial Newstan Pty Limited	Various			31-Dec-28	1900	0		
98	Mining Purposes Lease	327	1973	Centennial Newstan Pty Limited	6	239629		05-Aug-36	1.041	50		
99	Mining Purposes Lease	328	1973	Centennial Newstan Pty Limited	Pt8	239629		05-Aug-36	0.397	25		
100	Mining Lease	1480	1992	Centennial Newstan Pty Limited	Pt39	755207		20-Jul-23	14.49	0		
19	Part Consolidated Coal Lease	764	1973	Centennial Newstan Pty Limited	ML1			18-May-21	9.33	0		
20	Part Consolidated Coal Lease	763	1973	Centennial Newstan Pty Limited	PML4			09-Jun-22	74.57	0		
102	Mining Lease	1587	1992	Centennial Newstan Pty Limited	ML132			23-Oct-27	3			

SURFACE INCLUDED AS FREEHOLD TITLES

Plan Ref.	Registered Holder/ Lessor	Lot Number	DP Number	Certificate of Title	Registered in Holding (ha)		Total Title Area (ha)	Rent	Comments
					Mining Lease	Non Mining Lease			
78	Centennial Newstan Pty. Limited	C	381399	C/381399		2.959	2.959		
87	Centennial Newstan Pty. Limited	148	728924	148/728924		0.356	0.356		
A	Fassifern Colliery Pty Limited	36	755207	36/755207		20.23	20.23		Agreements Dated 10/07/2003 - Agreement continues while ever
B	Fassifern Colliery Pty Limited	17 and 18	1031778	17/1031778 and 18/1031778		0.35	0.35		Centennial Newstan hold a mining lease over the agreement area
C	Koompahtoo L.A.L.C.	194	755207	194/755207		1.73	1.73	$5,200	DA 99/02806 - Annual Rent CPI Indexed

HOLDING SUMMARY

Description	Area (ha)	Remarks
Total Mineral Area within Colliery Holding by Lease	7337	Includes lease overlaps
Surface Area (under Mining Lease) within Colliery Holding	2581	
Surface Area (Freehold) within Colliery Holding	25.63	
Total Surface Area within Colliery Holding	2606	
Total Mineral Area of Colliery Holding	**6661.70**	Excludes lease overlaps

LOCATION	NEWSTAN
SEAM	
DRAWN	D.P.
CHECKED	P.C.D.
APPROVED	
SCALE	1:25000 @ A1

CENTENNIAL COAL COMPANY LIMITED

SURFACE AREAS

NEWSTAN COLLIERY

Sheet 2 of 4

CENTENNIAL NEWSTAN

DATE 25-10-2019

PC7

Plot file PC7 Newstan Colliery Surface Areas Sheet 2 20191025.pdf

0 0.5 1 1.5 2
kilometres

Former Agreement with OCAL to
mine the West Borehole Seam
Not included in Colliery Holding

Lower Seams Subleased
to OCAL

See Diagram A
See Diagram B
See Diagram C
See Diagram D

NEWSTAN COLLIERY

6350000
6345000
360000
365000

MGA Co-ordinates Zone 56

NOTE: THIS PLAN HAS BEEN PREPARED FOR REFERENCE ONLY AND THE INFORMATION SHOWN HEREON REPRESENTS MINING TITLES OWNED OR ACQUIRED BY CENTENNIAL NEWSTAN PTY LTD. HEAD LEASES AND AGREEMENTS ARE TO BE REFERENCED FOR CONFIRMATION OF MINING CONDITIONS CONTAINED THEREIN.

MINING RIGHTS FOR LEASES HELD UNDER THE COAL MINING ACTS

- SURFACE AND LAND TO UNLIMITED DEPTH
- BELOW 5.00 METRES BELOW THE SURFACE
- BELOW 6.10 METRES BELOW THE SURFACE
- BELOW 7.62 METRES BELOW THE SURFACE
- BELOW 15.24 METRES BELOW THE SURFACE
- BELOW 20.00 METRES BELOW THE SURFACE
- BELOW 30.48 METRES BELOW THE SURFACE
- BELOW 60.96 METRES BELOW THE SURFACE
- BELOW 121.92 METRES BELOW THE SURFACE
- BELOW 152.40 METRES BELOW THE SURFACE
- BELOW 182.88 METRES BELOW THE SURFACE
- BELOW 243.84 METRES BELOW THE SURFACE
- BELOW 24.38 METRES BELOW THE SURFACE FOR CUTTING, CONSTRUCTING AND MAINTAINING TUNNELS ONLY
- EXCEPTS THE BED OF LAKE MACQUARIE AND BELOW TO A DEPTH OF 60.96 METRES
- EXCEPTS THE SURFACE AND LAND BELOW TO A DEPTH OF 15.24 METRES THEN BELOW 60.96 METRES BELOW THE SURFACE FROM 15.24 METRES TO 60.96 METRES BELOW THE SURFACE FOR CUTTING, CONSTRUCTION AND MAINTAINING TUNNELS ONLY.
- SURFACE TO 152.40 METRES BELOW THE SURFACE
- EXCLUDING THE SURFACE TO UNLIMITED DEPTH
- THE COAL ONLY TO UNLIMITED DEPTH
- THE COAL ONLY BELOW 30.48 METRES BELOW THE SURFACE
- BELOW 15.24 METRES AND ABOVE 152.40 METRES BELOW THE SURFACE
- BELOW 9.14 METRES BELOW THE SURFACE TO UNLIMITED DEPTH
- THE COAL ONLY BELOW 30.48 METRES AND ABOVE 152.40 METRES BELOW THE SURFACE
- BELOW 9.14 METRES BELOW THE SURFACE AND ABOVE 60.96 METRES AND BELOW 152.40 METRES BELOW THE SURFACE
- EXCLUDING THE SURFACE TO A DEPTH OF 152.40 METRES BELOW THE SURFACE
- BELOW 274.3 METRES BELOW THE SURFACE
- BELOW 30.48 METRES AND ABOVE 152.4 METRES BELOW THE SURFACE
- BELOW 20 METRES BELOW THE SURFACE TO 5 METRES BELOW FLOOR OF FASSIFERN SEAM
- SURFACE TO 15.24 METRES FOR CONSTRUCTING A RAILWAY OR TRAMWAY SIDING IN CONNECTION WITH MINING AND 15.24 METRES TO UNLIMITED DEPTH FOR THE EXTRACTION OF COAL
- SURFACE TO 15.24 METRES CANCELLED FROM COLLIERY HOLDING
- SURFACE TO 30.48 METRES THEN COAL ONLY BELOW 30.48 METRES

Diagram A

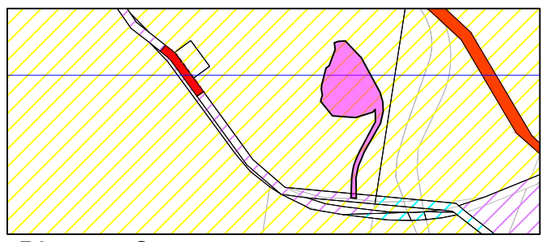


Diagram B

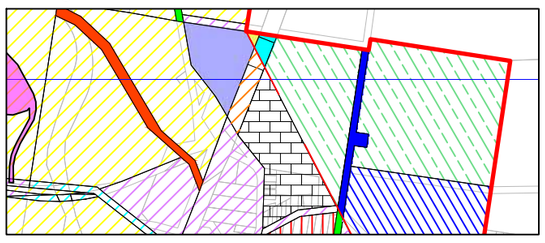


Diagram C

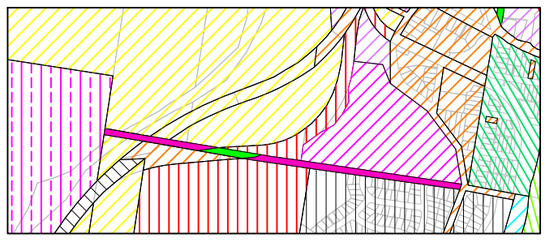


Diagram D

LOCATION	NEWSTAN
SEAM	
DRAWN	D.P.
CHECKED	P.C.D.
APPROVED	
SCALE	1:25000 @ A1

CENTENNIAL COAL COMPANY LIMITED

DEPTH RESTRICTIONS

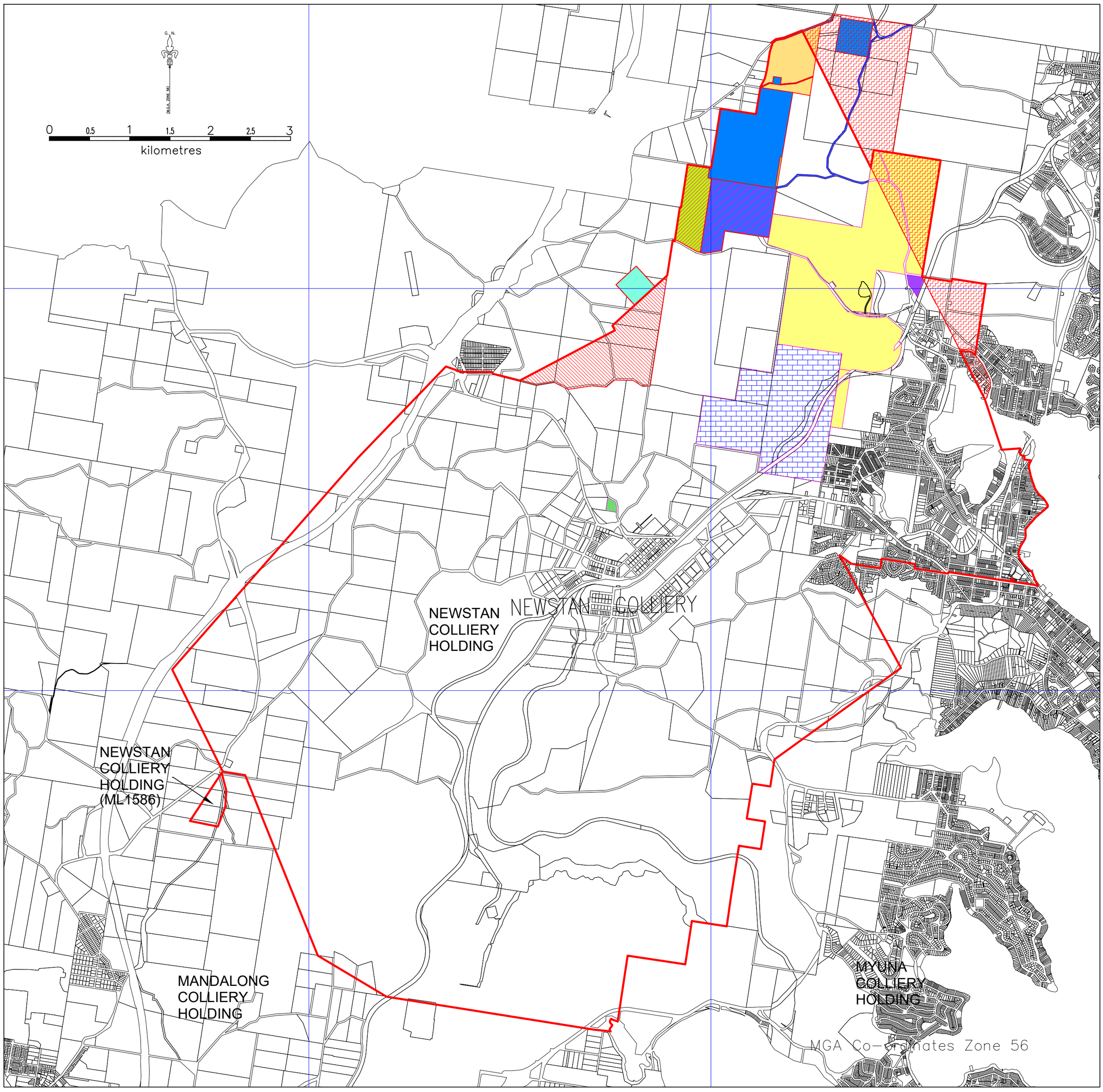
NEWSTAN COLLIERY

Sheet 3 of 4

CENTENNIAL NEWSTAN

DATE 20-02-2020 | PC6

Plot File PC6 Newstan Colliery Depth Restrictions Sheet 3 20200220.pdf



PRIVATE AGREEMENT FOR FREEHOLD AREAS

Plan Ref.	Owner	Lot No	DP No	Certificate of Title	Date of Agreement	Registration Date	Expiry Date	Private Surface Rent
PA16	Fassifern Colliery Pty Limited	Various Lots - Refer Agreement			01-07-03	19-08-05	*	397020
PA17	Croft Bros Pty Limited				01-07-03	19-08-05	*	96980
PA18	Koompatoo L.A.L.C.	194	755207	194/755207	01-12-98		30/00/19	5200
PA19	N and R Croft	591	607932	591/607932	01-07-03	19-08-05	*	26000

* Agreement continues while ever Centennial Newstan Pty Limited holds a Mining Lease over the Leased Land

DETAILS OF SUB-LEASES BENEFITING CENTENNIAL NEWSTAN PTY LIMITED

Plan Ref.	Registered Holder/ Lessor	Agreement Date	Agreement From	Agreement To	Registration Date	Description	Mineral Area (Ha)	Surface Area (Ha) Crown	Surface Area (Ha) Private	Mining Rights	Remarks
PA6	Oceanic Coal Australia Limited	02-03-81	02-03-81	30/11/10**	24-06-81	PLL489	32.37	nil	nil	West Borehole Seam only	Now Part of CCL718
PA7	R.W.Miller - Mount Thorley	20-09-78	20-09-78	30/11/10**	03-07-86	Part CCL718	165.45	nil	nil	Below 152.4 metres	Now Part of CCL718 and CCL774
				20/07/02**		Part CCL774					
PA10	R.W.Miller - Mount Thorley	13-12-76	29-10-74	20/07/02**	17-11-77	PLL891	39.88	nil	nil	Below 152.4 metres	Now Part of CCL774
PA11	R.W.Miller - Mount Thorley	10-03-80	05-02-79	20/07/02**	26-06-86	ML257	0.76	nil	nil	Below 152.4 metres	Now Part of CCL774
PA12	R.W.Miller - Mount Thorley	18-02-81	21-07-81	20/07/02**	03-07-86	PLL534	7.74	nil	nil	Below 152.4 metres	Now Part of CCL774
PA8	R.W.Miller - Mount Thorley	24-10-84	24-10-84	20/07/02**	30-11-84	PLL479 and ML1183	57.96			Below 9.14 metres and above 152.4 metres	Now Part of CCL718
PA9	Oceanic Coal Australia Limited	21-08-84	21-08-84	30/11/10**	23-10-84	PLL489	32.37			Below 15.24 metres excluding the West Borehole Seam	Now Part CCL718
PA13	Oceanic Coal Australia Limited	01-08-90	01-08-90	30/11/10**		CL81 and CL82	97.19	nil	nil	Below 152.4 metres	Now Part CCL718
						ML1171 and ML1173				Below 152.4 metres	
						CL50				Below 20 metres	
						PLL638				Below 30.48m	
PA13	Oceanic Coal Australia Limited	01-08-90	01-08-90	20/07/02**		ML223,224,233,457,1167,1192, PLL423,523	19.28	nil	nil	Below 152.4 metres	Now Part CCL764
				18/05/01**		PLL488,489,506,534, ML1192	26.586			Below 152.4 metres	Now Part CCL774
				19/08/07**		ML1336	221.374			Below 60.96 metres	Now Part CCL727
						SPML28				Below 243.84 metres	
						CL530,531				Below 152.4 metres	
PA14	Oceanic Coal Australia Limited	28-10-93	28-10-93	30/11/10**		PT CCL718	1.6	nil	nil	West Borehole Seam only	Not in Colliery Holding

** Renewal of these subleases is not required as the expiry date is subject to ongoing renewals of the Head Lease less a specified period
For confirmation and details, the relevant documents should be referenced

LOCATION	NEWSTAN
SEAM	
DRAWN	C.P.T.
CHECKED	P.C.D.
APPROVED	
SCALE	1:25000 @ A1

CENTENNIAL COAL COMPANY LIMITED

NEWSTAN COLLIERY

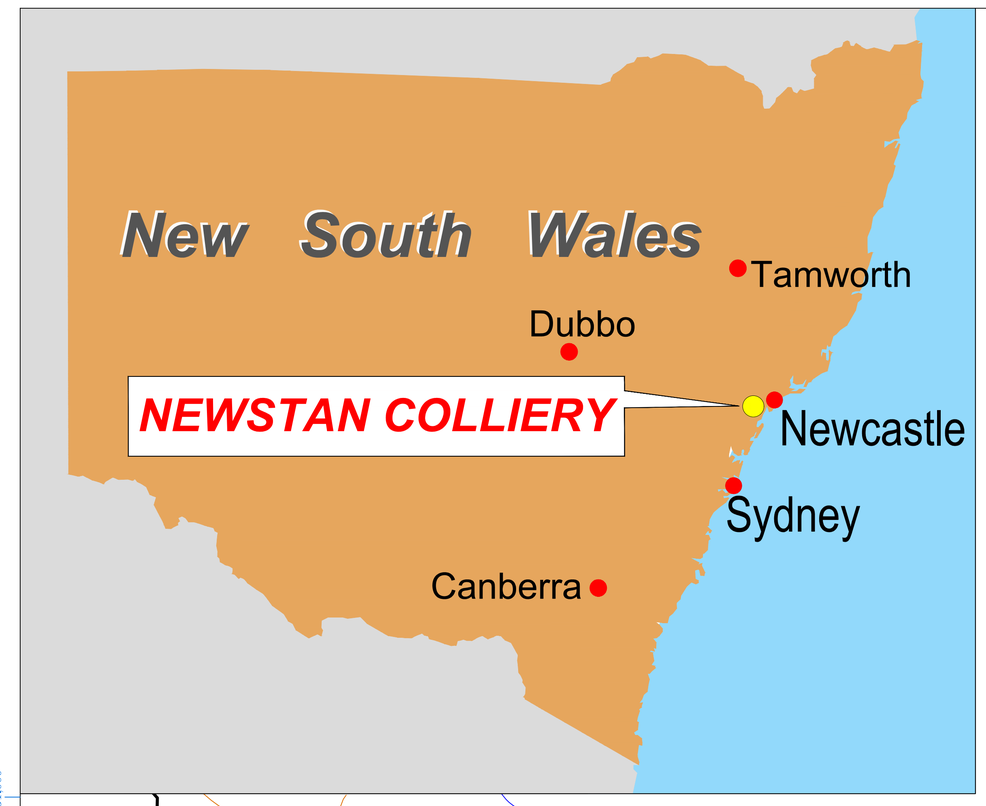
SUBLEASES and PRIVATE AGREEMENTS

Sheet 4 of 4

CENTENNIAL NEWSTAN

DATE 25-10-2019 | PC8

Plot File PC8 Newstan Colliery Subleases and Private Agreements Sheet 4 20191025.pdf



LAKE MACQUARIE LGA

FREEMANS WATERHOLE

RYHOPE

FASSIFERN

WAKEFIELD

AWABA

TORONTO

RATHMINES

ERARING

SYDNEY - NEWCASTLE M1 MOTORWAY

WAKEFIELD ROAD

MILLER ROAD

NEWSTAN PIT TOP AREA

PALMERS ROAD

FREEMANS DRIVE

CESSNOCK ROAD

PALMERS CREEK

LT CREEK

LAKE MACQUARIE

AWABA ROAD

LORDS CREEK

STONY CREEK

ERARING HAUL ROAD

AWABA PIT TOP AREA

WILTON ROAD

WANGI ROAD

KILABEN CREEK

DORRINGTON ROAD

MANDALONG HAUL ROAD

MAIN NORTHERN RAILWAY

STOCKYARD CREEK

COORANBONG PIT TOP

ERARING POWER STATION

CCL 727
ML 1452

ML 1452
CCL 746

LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Local Government Area
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- Major Roads
- Main Northern Railway
- Coal Haulage Road
- Major Creek / Water Course
- Lake Macquaire

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

New South Wales Mine Managers Certificate of Competency No. 2667

Signed : _____

Date : 26/03/2021

I, Craig Cluderay, being a Registered Mining Surveyor pursuant to the Surveying and Spatial Information Act 2002, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

New South Wales (BOSSI) Certificate of Registration Identification No. 8324

Signed : _____

Date : 26/03/2021

ENDORSEMENTS

- *For details regarding Consolidated Coal Leases held by Centennial Newstan refer to plans PC1, PC6, PC7 & PC8.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

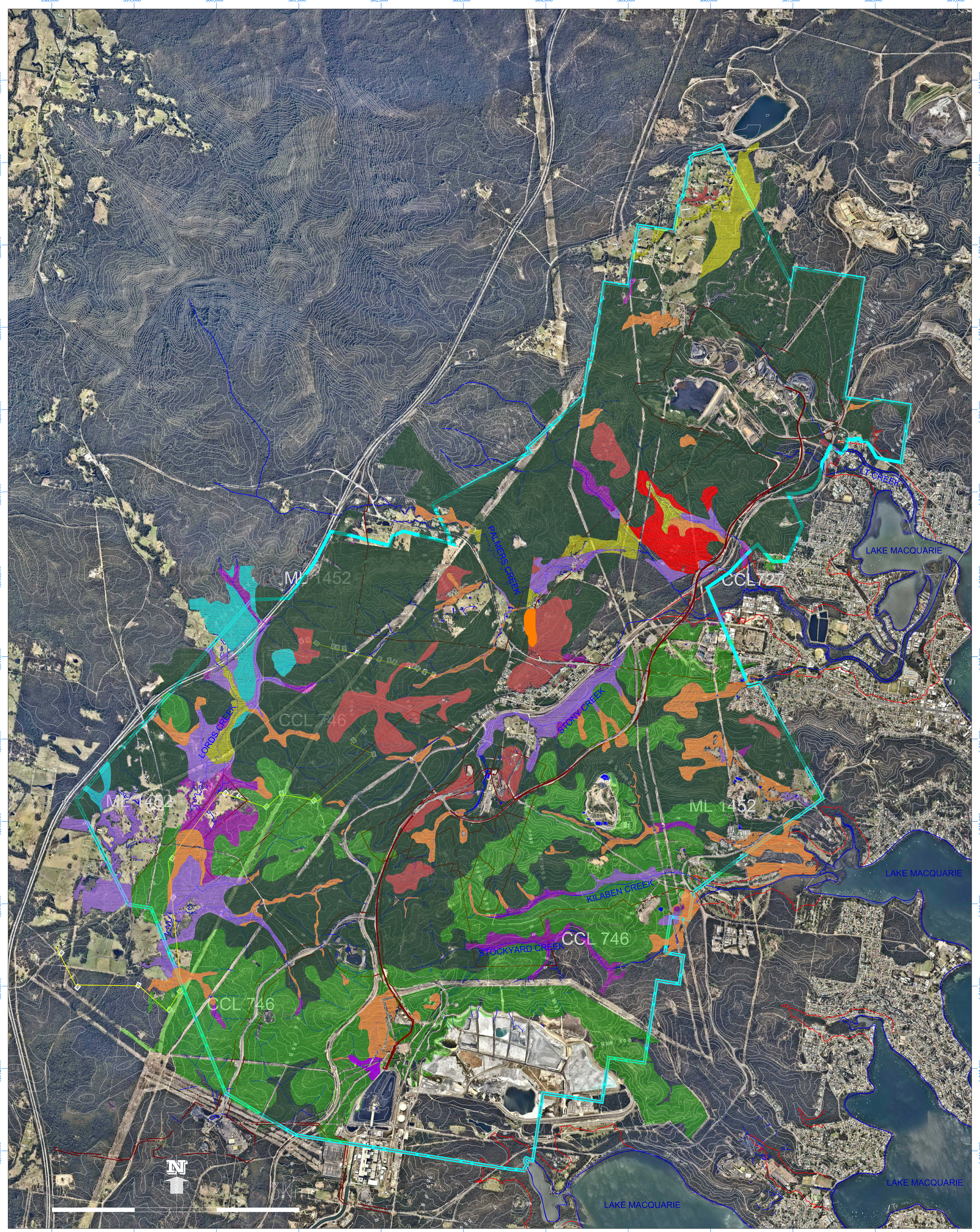
Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan
Pre-Mining Environment - Project Locality (Plan 1A)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3423_R1.pdf		
CHECKED:	SCALE: 1 : 15000		NS 3423_R1
APPROVED: T.O'Brien			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- Major Creek / Water Course
- Lake Macquarie
- 1:100 year Flood Prone Land
- Surface Contour (AHD)

Vegetation Communities
Alluvial Tall Moist Forest
Coastal Foothills Spotted Gum - Ironbark Forest
Coastal Plains Scribbly Gum Woodland
Coastal Plains Smooth-barked Apple Woodland
Coastal Ranges Open Forest
Coastal Sheltered Apple - Peppermint Forest

Vegetation Communities
Hunter Valley Moist Forest
Lower Hunter Spotted Gum - Ironbark Forest
Riparian Melaleuca Swamp Woodland
Swamp Mahogany - Paperbark Forest
Wyong Paperbark Swamp Forest

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

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Date : 26/03/2021

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New South Wales (BOSSI) Certificate of Registration Identification No. 8324

Signed : _____

Date : 26/03/2021

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 2nd September 2020.* nearmap
- *For details regarding Consolidated Coal Leases held by Centennial Newstan refer to plans PC1, PC6, PC7 & PC8.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*
- *Vegetation Communities supplied by RPS Harper Somers O'Sullivan.*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

Surface, West Borehole and Young Wallsend Seam

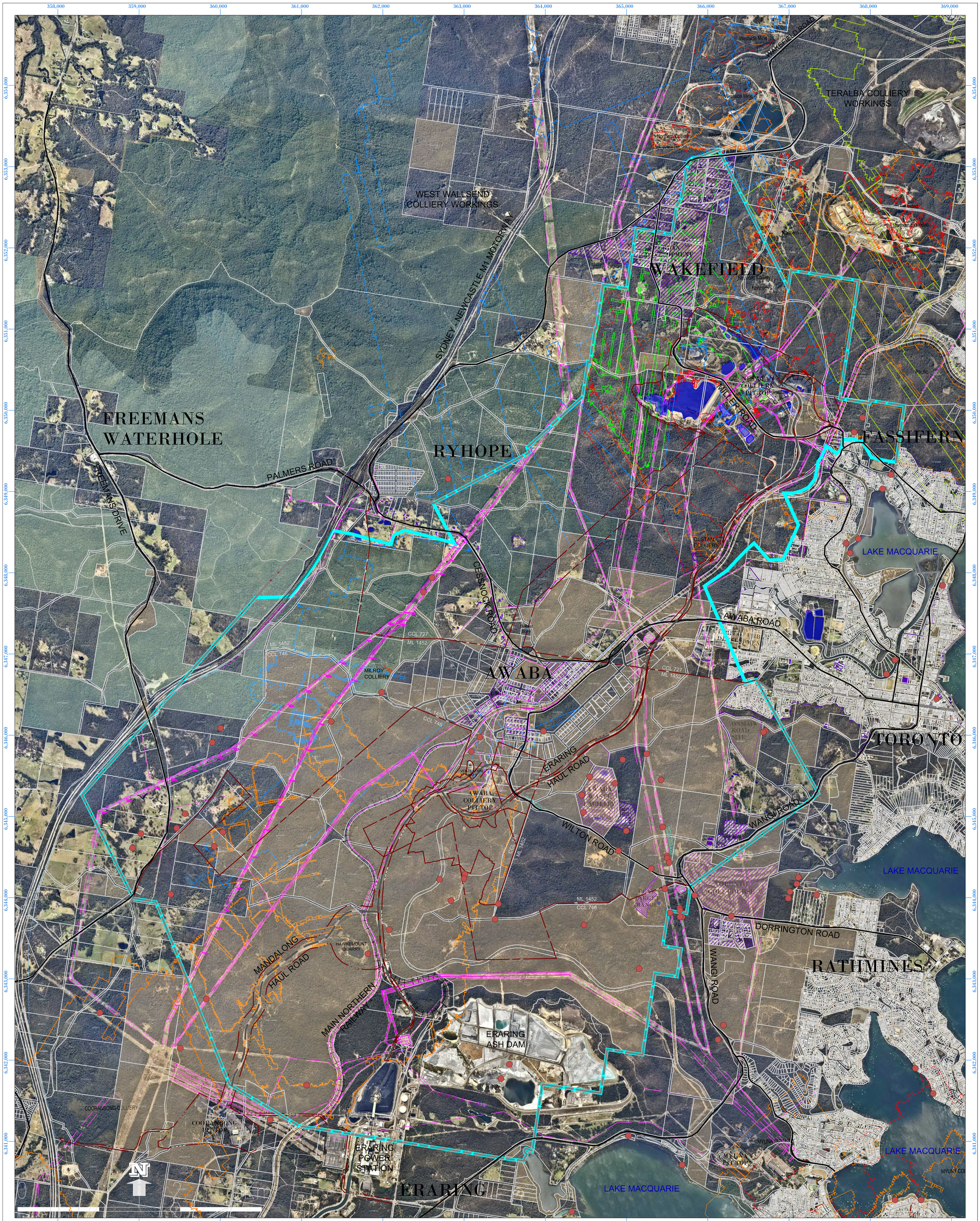
CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan

Pre-Mining Environment - Natural Environment (Plan 1B)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3424_R1.pdf		
CHECKED: A.Ryan	SCALE: 1 : 15000		NS 3424_R1
APPROVED:			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Cadastre Boundary
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- M1 Motorway
- Coal Haulage Road
- Major Roads
- Main Northern Railway
- Transmission Lines
- Optic Fibre Cable
- Building & Surface Features
- Dams & Water Storage
- Aboriginal Heritage Sites
- Great Northern Seam Workings
- Fassifern Seam Workings
- Borehole Seam Workings
- Young Wallsend Workings
- Young Wallsend / West Borehole Workings

Non-Freehold Land

- Crown Land
- National Parks
- State Forests of NSW

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

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Signed : _____

Date : 26/03/2021

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- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*
- *Cadastre Boundaries sourced from Lake Macquarie dcdb 2018-02*
- *Non-Freehold Land supplied by LPI*
- *Aboriginal Heritage Sites supplied by RPS Australia Asia Pacific dated July 2017.*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan
Pre-Mining Environment - Built Environment (Plan 1C)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3425_R1.pdf		
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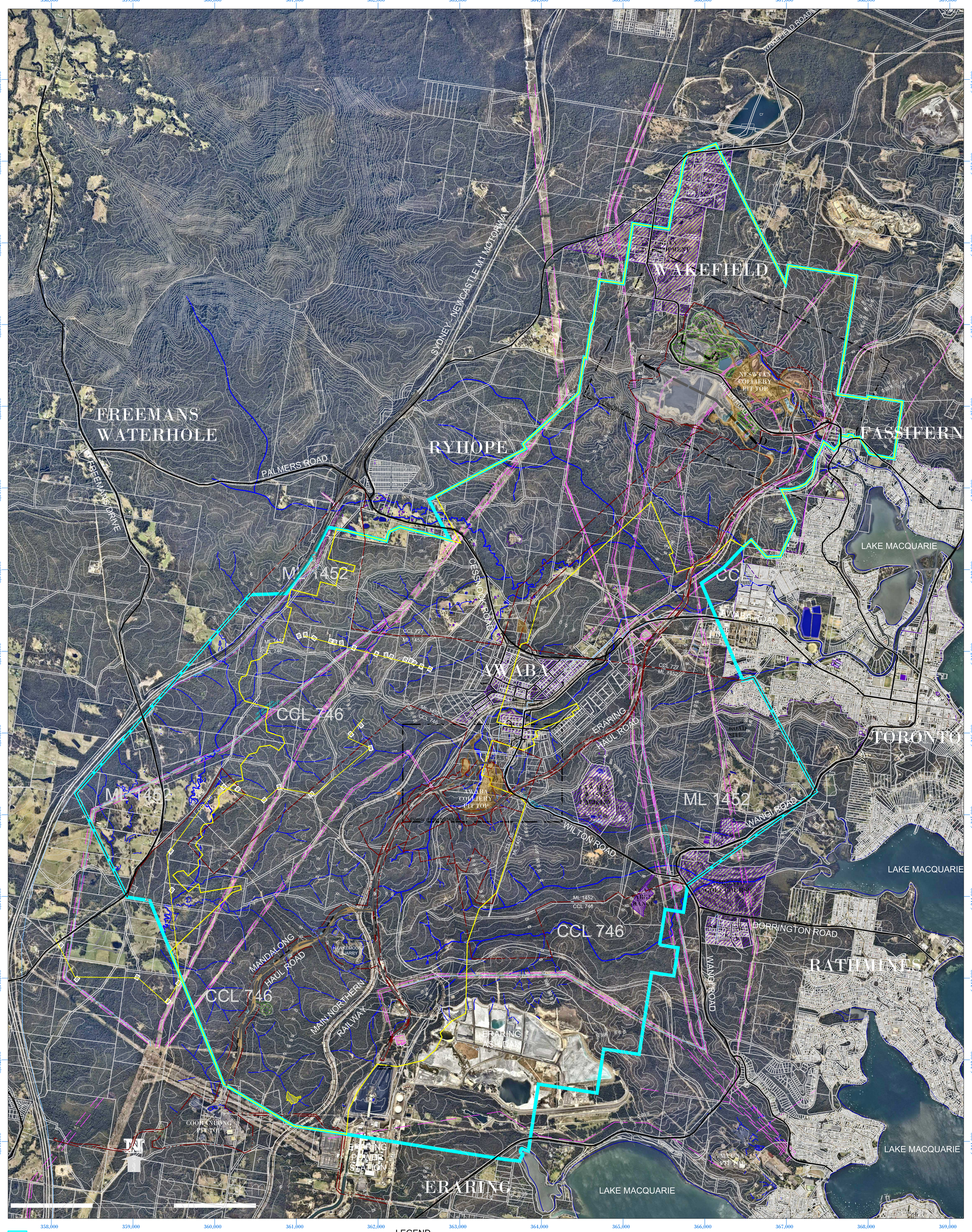
APPROVED:			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Cadastre Boundary
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- M1 Motorway
- Major Roads
- Main Northern Railway
- Coal Haulage Road
- Transmission Lines
- Optic Fibre Cable
- Building & Surface Features
- Dams & Water Storage
- Surface Contour (AHD)
- Major Creek / Water Course / Lake
- Lake Macquarie
- Awaba Seepage Area
- 2NW Project Area
- C—D Cross Section Location - (Refer to Plans NS3429_R1 & NS3430_R1 for X-Section details).
- Extents of Plans NS3426A_R1 & NS3426B_R1 - showing Pit Top Area Domains

Primary Domains

- Domain 1 - Infrastucture Areas
- Domain 2 - Tailings Storage Facility
- Domain 3 - Water Management Area
- Domain 5 - Stockpiled Material
- Domain 8 - Underground Mining Area

Secondary Domains

- Domain E - Rehabilitation Area - Woodland

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

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Signed : _____

Date : 26/03/2021

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Signed : _____

Date : 26/03/2021

ENDORSEMENTS

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- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*
- *Cadastre Boundaries sourced from Lake Macquarie dcdb 2018-02*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan
Mine Domains at Commencement of MOP (Plan 2)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3426_R1.pdf		
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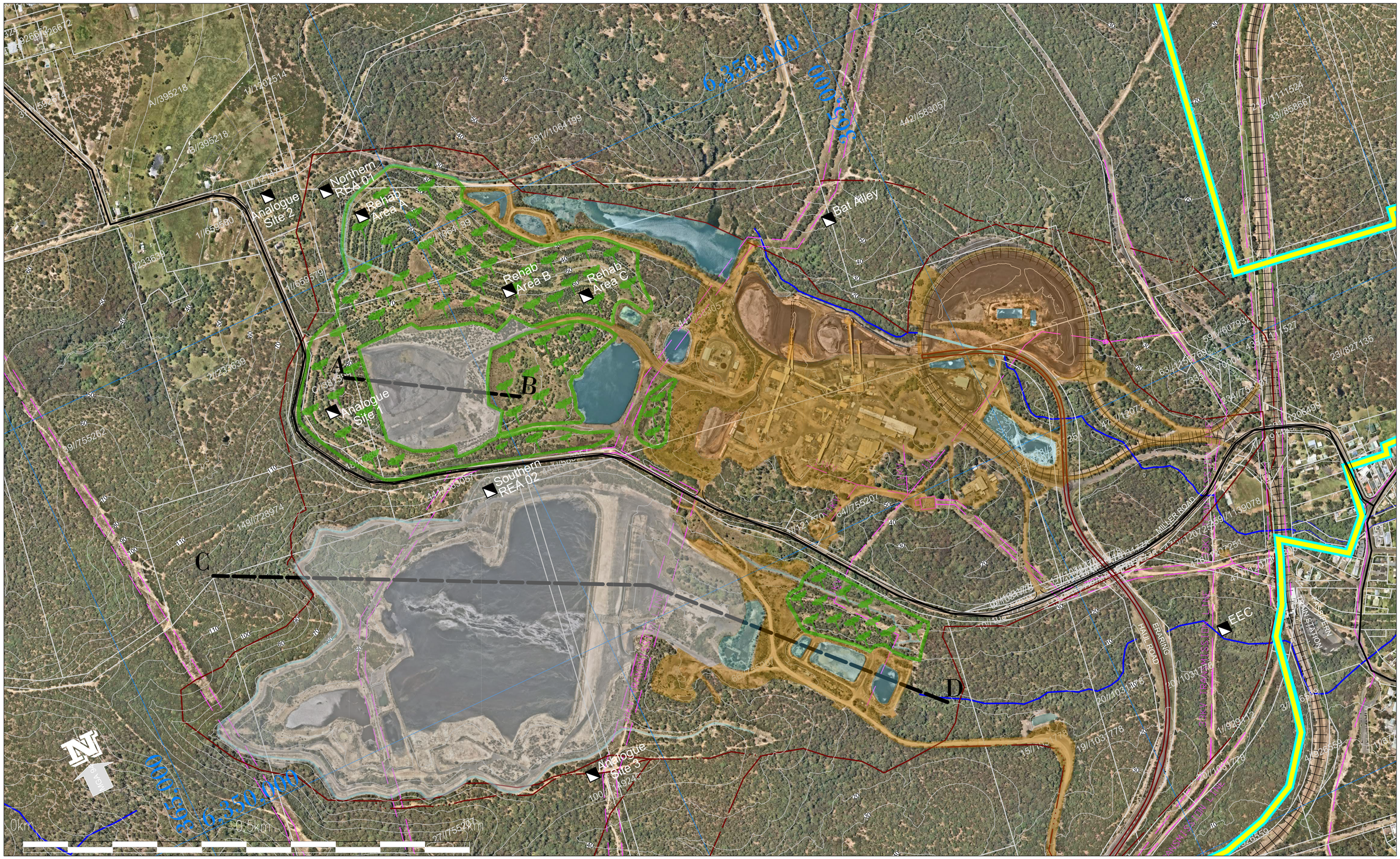

LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Cadastre Boundary
- Rehab Area A — Terrestrial Ecology Site
- Major Roads
- Main Northern Railway
- Surface Contour (AHD)
- Major Creek / Water Course / Lake
- Lake Macquarie
- Transmission Lines
- C — D Cross Section Location - (Refer to Plans NS3429_R1 & NS3430_R1 for X-Section details)

Primary Domains

- Domain 1 - Infrastucture Areas
- Domain 2 - Tailings Storage Facility
- Domain 3 - Water Management Area
- Domain 5 - Stockpiled Material
- Domain 8 - Underground Mining Area

Secondary Domains

- Domain E - Rehabilitation Area - Woodland

I hereby certify that the information shown hereon, to the best of my knowledge and belief is correctly represented.

Signed: _____ Date: 26/03/2021
C.Cluderay - Registered Mining Surveyor

Signed: _____ Date: 26/03/2021
T. O'Brien - Mining Engineering Manager

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 28th November 2020.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE: Mining Operations Plan - Newstan Pit Top Area
Domains at Commencement of MOP (Plan 2A)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A1
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3426A_R1.pdf		
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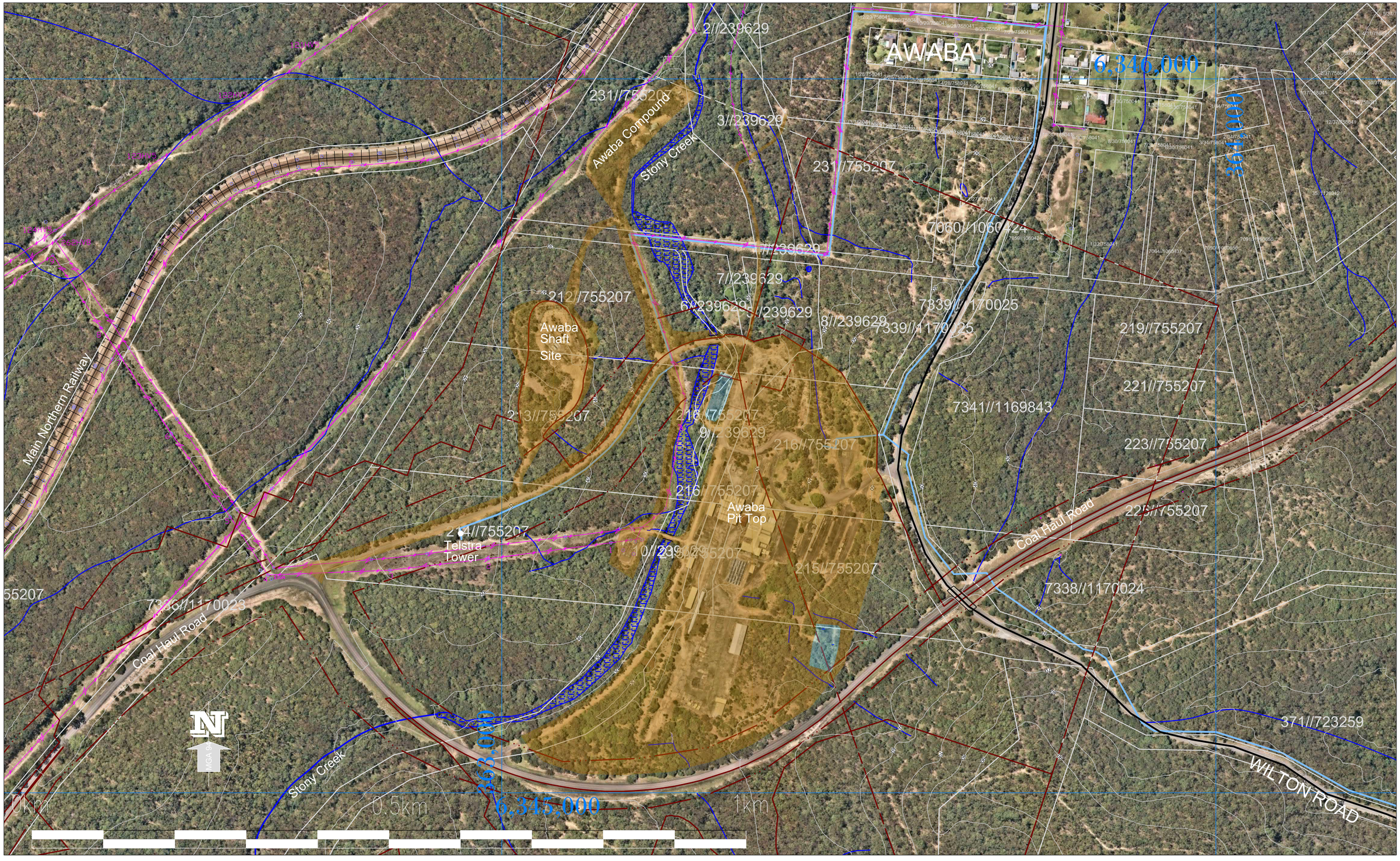
APPROVED:			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Cadastre Boundary
- Major Roads
- Main Northern Railway
- Surface Contour (AHD)
- Major Creek / Water Course / Lake
- Optic Fibre Cable
- Transmission Lines

Primary Domains

- Domain 1 - Infrastucture Areas
- Domain 3 - Water Management Area

I hereby certify that the information shown hereon, to the best of my knowledge and belief is correctly represented.

Signed: _____ Date: 26/03/2021
C.Cluderay - Registered Mining Surveyor

Signed: _____ Date: 26/03/2021
T. O'Brien - Mining Engineering Manager

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 28th November 2020.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

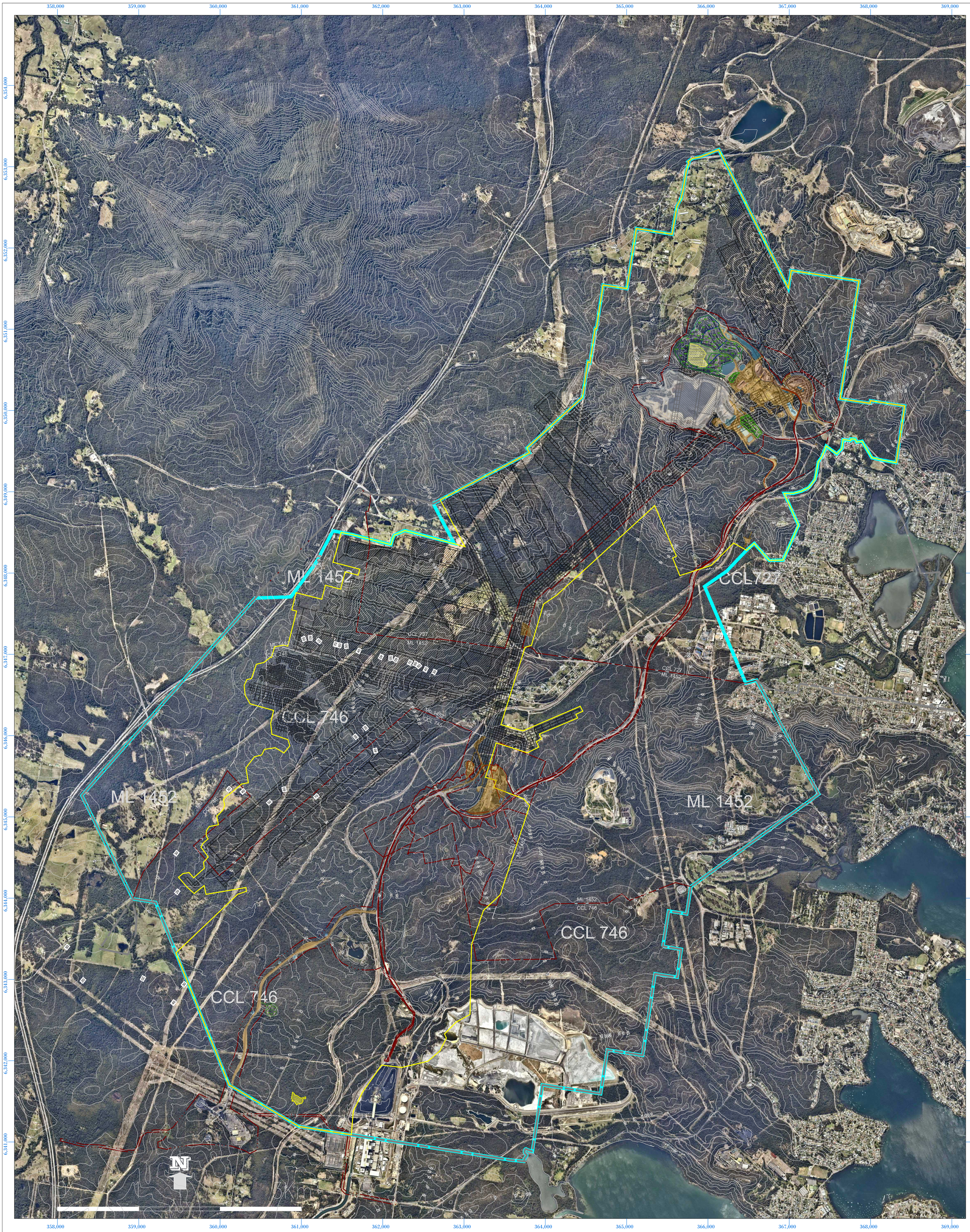
Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan - Awaba Pit Top Area
Domains at Commencement of MOP (Plan 2B)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A1
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3426B_R1.pdf		
CHECKED: A.Ryan	SCALE: 1 : 2500		NS 3426B_R1
APPROVED:			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- Newstan Colliery Young Wallsend / West Borehole Workings
- Surface Contour (AHD)
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- Awaba Seepage Area

Primary Domains

- Domain 1 - Infrastucture Areas
- Domain 2 - Tailings Storage Facility
- Domain 3 - Water Management Area
- Domain 5 - Stockpiled Material
- Domain 8 - Underground Mining Area

Secondary Domains

- Domain E - Rehabilitation Area - Woodland

MOP Year 1-2 - Rehabilitation Phases

- Landform Establishment
- Ecosystem and Landuse Establishment
- Ecosystem and Landuse Sustainability

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

New South Wales Mine Managers Certificate of Competency No. 2667

Signed : _____

Date : 26/03/2021

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Signed : _____

Date : 26/03/2021

ENDORSEMENTS

- *Aerial image referenced from NearMap 2nd September 2020.*
- *For details regarding Consolidated Coal Leases held by Centennial Newstan refer to plans PC1, PC6, PC7 & PC8.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*

NOTE:

No Planned Annual Sequence of Mining Within the Duration of this MOP

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

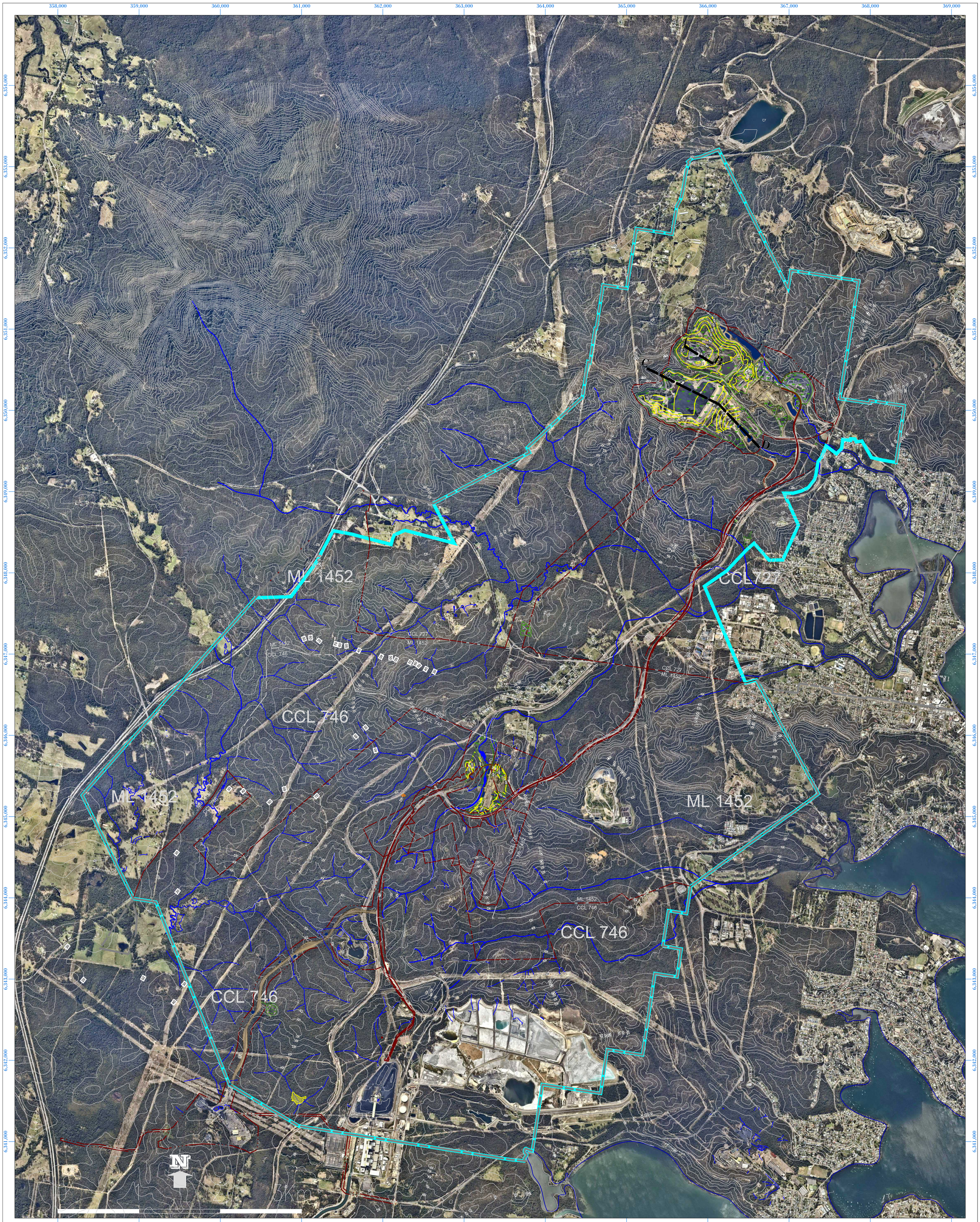
Surface, West Borehole and Young Wallsend Seam

CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan
Mining and Rehabilitation Year 1-2 (Plan 3)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3427_R1.pdf		
CHECKED: A.Ryan	SCALE: 1 : 15000		NS 3427_R1
APPROVED:			



LEGEND

- MOP June 2021 TO July 2023 Boundary
- Colliery Holding Boundary
- Lease Boundaries
- DA 73-11-98 Mod 8 - January 17th 2019
- SSD-5145 - November 29th 2015
- PA 10_0038 - May 13th 2011
- Surface Contour (AHD)
- Surface Regrade Contours (AHD)
- Dams & Water Storage
- Major Creek / Water Course / Lake
- Awaba Seepage Area

Secondary Domains

- Domain A - Infrastructure
- Domain B - Water Management Area
- Domain E - Rehabilitation Area - Woodland
- C ___ D Cross Section Location - (Refer to Plans NS3429_R1 & NS3430_R1 for X-Section details).

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

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Date : 26/03/2021

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Signed : _____

Date : 26/03/2021

ENDORSEMENTS

- *Aerial image referenced from NearMap dated 2nd September 2020.* nearmap
- *For details regarding Consolidated Coal Leases held by Centennial Newstan refer to plans PC1, PC6, PC7 & PC8.*
- *The co-ordinate system for all data shown on this plan is Map Grid of Australia 1994 (MGA94).*

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX

Surface, West Borehole and Young Wallsend Seam

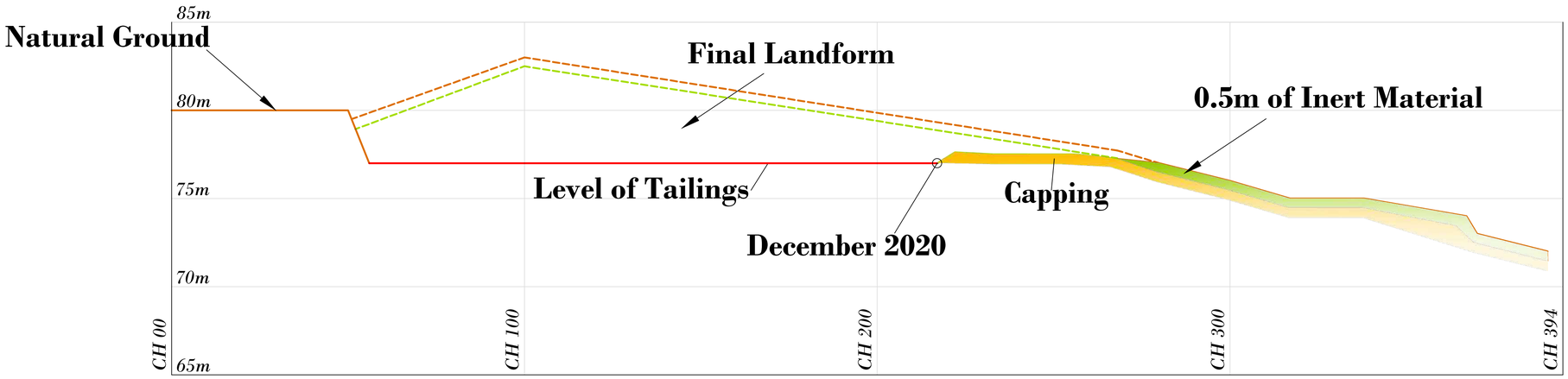
CENTENNIAL NEWSTAN

TITLE:

Mining Operations Plan
Final Rehabilitation and Post Mining Land Use - 2040 (Plan 4)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A0
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3428_R1.pdf		
CHECKED: A.Ryan	SCALE: 1 : 15000		NS 3428_R1
APPROVED:			

Cross Section - NREA



A **Vertical Scale: 5 / 1** B

Side Elevation

I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

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New South Wales (BOSSI) Certificate of Registration Identification No. 8324

Signed : _____

Date : 26/03/2021

LEGEND

Note: Refer to Plan NS3426_R1, NS3426_R1, and NS3428_R1 - for X-Section locations.

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX
Surface Plan

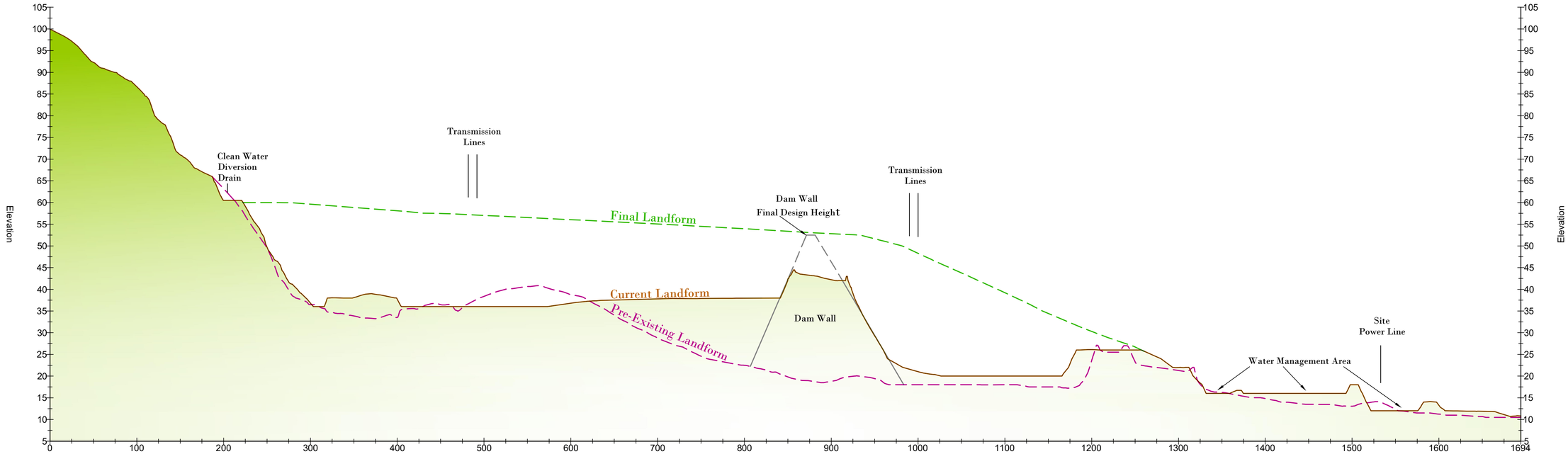
CENTENNIAL NEWSTAN

TITLE:
Mining Operations Plan
Rehabilitation and Post Mining Land Use Cross Sections (Plan 5A)

DRAWN:	C.Cluderay	REV:		All Distances are in metres unless otherwise shown.	A1
DATE:	19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3429_R1.pdf			
CHECKED:	F.Chen	SCALE: 1:750			NS3429_R1
APPROVED:	T.O'Brien				

Section C-D

Profile View of Alignment - Section Line C - D



I, Terrence John O'Brien, being a Mine Manager (Mining Engineering Manager) pursuant to the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

New South Wales Mine Managers Certificate of Competency No. 2667

Signed : _____

Date : 26/03/2021

I, Craig Cluderay, being a Registered Mining Surveyor pursuant to the Surveying and Spatial Information Act 2002, do hereby certify that to the best of my knowledge and belief, this plan conforms to the accuracy & standards required by NSW Government, Department of Regional NSW – Resources Regulator.

New South Wales (BOSSI) Certificate of Registration Identification No. 8324

Signed : _____

Date : 26/03/2021

LEGEND

Note: Refer to Plan NS3426_R1, NS3426A_R1, and NS3428_R1 - for X-Section locations.

Centennial Newstan Pty Ltd (ACN 101 508 865)

NEWSTAN COMPLEX
Surface Plan

CENTENNIAL NEWSTAN

TITLE:
Mining Operations Plan
Rehabilitation and Post Mining Land Use Cross Sections (Plan 5B)

DRAWN: C.Cluderay	REV :	All Distances are in metres unless otherwise shown.	A1
DATE: 19/03/2021	PLOT FILE: N:\Shared\Plots\Newstan\PDF\Projects\MOP 2021-2023\NS3430_R1.pdf		
CHECKED: F.Chen	SCALE: 1:2500		NS 3430_R1
APPROVED: T.O'Brien			

APPENDIX 3: RISK ASSESSMENT

NEWSTAN COMPLEX

Rehabilitation and Mine Closure Risk Assessment Report

Prepared for:

Centennial Newstan Pty Ltd

SLR Ref: -R01
Version No: -v0.1
April 2021

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Centennial Newstan Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
-R01-v0.1	1 April 2021	Chelsey Zuiderwyk	Adam Williams	Adam Williams

CONTENTS

DOCUMENT REFERENCES

TABLES

APPENDICES

1 Introduction

A risk assessment was undertaken across three days in February and March 2021 to identify the key issues that presented a risk to achieving satisfactory rehabilitation at the Newstan Complex. This risk assessment was undertaken in accordance with the *Australian Standard AS/NZS ISO 31000:2009 – Risk Management – Principles and Guidelines*, the *Risk Management Handbook for the Mining Industry (MDG1010)* and the Centennial Coal (2020) *Risk Management Standard.*

The workshops assessed 61 key rehabilitation risks which are summarised as:

- 15 risks were ranked as not applicable;
- 18 risks were ranked as low;
- 19 risks were ranked as moderate;
- 6 risks were ranked as significant;
- 3 risks were ranked as high; and
- 0 risks were ranked as extreme.

A copy of the Risk Register and Bow-Tie Diagrams developed in these workshops are attached as **Appendix A** and **B**, respectively. This Risk Assessment was also prepared to satisfy the recommendations made by the Department of Regional NSW - Resources Regulator in the *Newstan and Awaba Targeted Assessment Program – Soils and Materials Management* letter dated 1 October 2020.

2 Risk Assessment and Bow-Tie Workshop Attendance

A Risk Assessment Workshop and Bow-Tie workshop were completed for Newstan Complex on 11 and 18 February 2021 and 2 March 2021. Attendance included staff from SLR Consulting and Centennial Newstan, listed in **Table 1**, with signed attendance sheets are attached at **Appendix C**.

Table 1 Risk Assessment Workshop Attendance Summary - 11 February 2021

Attendee	Position	Company
Terry O'Brien	Mine Manager	Centennial Newstan
David Baker	Electrical & Services Coordinator	Centennial Newstan
Matthew Gilbert	NCS Manager	Centennial Newstan
Craig Cluderay	Mine Surveyor	Centennial Newstan
Clinton Brockwell	CPP Manager	Centennial Newstan
Alanna Ryan	Environment and Community Coordinator	Centennial Newstan

Attendee	Position	Company
Chelsey Zuiderwyk	Project Consultant	SLR Consulting
Adam Williams	Principal Consultant	SLR Consulting

3 Key Outcomes

A summary o the key risks identified during the WRAC workshops have been summarised in **Table 2**. Following the WRAC workshops, the main hazards were reviewed/assessed in a Bow-tie Workshop with diagrams provided as **Appendix 2**.

Table 2 Identified High Risks

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Adequacy of Current Controls	Risk ranking
59	Water	Uncontrolled discharge from Fassifern workings to Stoney Creek / Blackalls Park following closure	Rainfall infiltration to legacy void via fractures in strata. Cessation of water management infrastructure use at Newstan.	Impacts to surface water quality / quantity in creeks (previous EPA prosecution from dirty water discharge to Stoney Creek). Community reputation Legal non-compliance Inability to relinquish lease	Unsatisfactory	18
20	General	Inadequate information available for rehabilitation, closure and relinquishment	Historic records were not retained or were destroyed/damaged. Inadequate management of records for works undertaken. Age of the site (limited electronic records) or inconsistent formats.	Rework of testing Investigations required Additional costs Inability to relinquish lease	Opportunity for Improvement	17
33	Mine Subsidence	Unlocated subsidence	Historical subsidence impacts related to mining extraction methods	Injury Company reputation damage Environmental damage	Satisfactory	17

Table 3 Identified Significant Risks

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Adequacy of Current Controls	Risk ranking
51	Tailings	Inadequate volume of suitable materials for capping tailings dams	Lack of availabile quality / usable resources Lack of storage areas	Increased costs to source offsite materials Rehabilitation bond is not returned	**Opportunity for Improvement**	**14**
53	UG	Unlocated legacy shafts / mine entries	Inaccurate historical data Data not in suitable format Areas not inspected	Injury / fatality Significant cost to undertake detailed investigation across the site. Company reputation damage	**Opportunity for Improvement**	**14**
9	Biodiversity	Changes in the existing riparian community generated by discharge of mine water into ephemeral drainage line	Cessation of pumping / alternate use of mine water	Complaints Impact on environment	**Satisfactory**	**13**
34	Mine Subsidence	Known sink holes / subsidence cracks in historical workings	Excavations above old workings/ Mining under waterways Shallow depth of cover in historical mining areas/ Mining method	Failure to achieve the rehabilitation outcome prescribed in the MOP Inability to relinquish lease Ongoing costs for rehabilitation and liability. Environmental damage Damage to reputation	**Satisfactory**	**13**
48	Soil Type(s) and Suitability	Failure to achieve the rehabilitation outcome prescribed in the MOP	Current clay substitute being used is inadequate Lack of available topsoil material	Inability to reach closure and relinquish lease. Financial impact to obtain suitable material / ameliorants.	**Satisfactory**	**13**
21	General	Inadequate information recorded for future / recent rehabilitation / demolition activities to allow lease relinquishment.	No established or inadequate Rehabilitation Quality Assurance Process	Rework of testing Investigations required Additional costs Inability to relinquish lease	**Opportunity for Improvement**	**12**

APPENDIX A
RISK REGISTER

Document Owner :	Alanna Ryan
Revision Period :	TBC
Issue :	1
Last Revision Date :	10-02-2021

CENTENNIAL RISK ASSESSMENT

Risk Assessment Title:	Newstan Colliery - Mining Operations Plan Risk Assessment 2021
Objectives and Purpose of R.A.	The objectives of this Risk Assessment are: - Identify the risks associated with rehabilitation and closure of the Newstan Colliery. - Identify the controls/action plans necessary to effectively mitigate risks and/or realise them. - The risk assessment will be used to inform the development of the MOP, provide a basis to determine additional investigations and/or project works to be undertaken. - Provide the framework to satisfy relevant internal and government guidelines, requiring implementation of a risk based approach to closure. - Assist in minimising the potential for inadequate provisioning and/or cost over-run to execute the required decommissioning, rehabilitation and closure works at the planned closure of the mine.
Context and Scope	Centennial Coal received a correspondence from the Resources Regulator following a Targeted Assessment Program (TAP) undertaken in August 2020 (Ref: ASMT0008603 dated 1 October 2020). The TAP focused on progressive rehabilitation obligations as outlined in the MOP and how materials and soils on site were being managed to achieve sustainable rehabilitation outcomes. The Newstan MOP is being revised to address feedback from the Resources Regulator, which includes a specific rehabilitation risk assessment in accordance with guidance on the Regulator's website: https://www.resourcesregulator.nsw.gov.au/environment/compliance/regulating-risks-to-rehabilitation. The risk assessment is in accordance with: - Draft Centennial Coal Closure Standard (SLR 2018) - Centennial Coal Risk Management Standard (Centennial Coal 2018) - AS/NZS ISO 31000:2009 Risk Management Principles and Guidelines
Assumptions	The actions from the MOP will be implemented following consultation with the Resources Regulator. All operations undertaken in accordance with approved management plans/MOP. Monitoring and survey programs will continue. All actions identified in risk assessment will be implemented. Risk assessment is based on current approvals.

Persons Contributing	Organisational Role	Experience With Activity	Role in RA
Adam Williams	SLR - Principal Consultant	12+, G2 Certified	Facilitator
Alanna Ryan	Environment and Community Coordinator		Attendee
Clinton Brockwell			Attendee
David Baker			Attendee
Matthew Gilbert			Attendee
Terry O'Brien	Group Manager Risk, Compliance & Assurance / Mine Manager Newstan		Attendee

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
1	Aboriginal Cultural Heritage	Unintended interaction with Aboriginal site or artefact	Disturbance of Aboriginal site or artefact	Unauthorised impact to Aboriginal site or artefact.	Ground disturbance process in place No major works proposed Planned works generally to be completed in historic disturbed areas Northern Region ACHMP	Satisfactory	Legal (L)	2	d	2d	5	L	
2	Aboriginal Cultural Heritage	Native title requirements for Crown Land delays rehabilitation. Not applicable as no Crown land associated with surface infrastructure areas at Newstan and tenements pre-date Native Title.	NA	NA	NA								
3	Acid Mine Drainage	Inadequate capping performance and geochemistry	Acid Mine Drainage (AMD) Erosion of capping material Inadequate tailings strength Less than adequate consolidation Material Properties Solute transport Uncontrolled water flows	Business impact Environmental impact Long term legacy for H&S Environmental risk	No significant historical evidence of AMD Capping strategy and design for Northern Rejects Emplacement Area (NREA) Concept capping design for Southern Rejects Emplacement Area (SREA) Sampled materials including coal materials Sampling of tailings / coarse reject demonstrated low risk of acid generation Tailings Charectisation Report completed Water Management - minimise infiltration, control erosion Main perimeter diversion drains in place for SREA Water Management Plans Water quality monitoring REA Inspection Regime and TARPs in place	Satisfactory	Financial (F)	3	d	3d	9	M	
4	Air Quality	Increased Airborne dust	Drying out the tailings dams Rehabilitation / closure activities Exposed areas Rehabilitation failure Drought	Complaints Exceedence of Development Consent Requirements Exceedence of EPL Limits Prosecution and fines	Air Quality and Greenhouse Gas Management Plan Dust monitoring Rehabilitation Management Plan / MOP Environmental Management System Community Hotline and Community Consultation Committee (CCC) Environmental Inspection Program Environmental Management System Environmental Officer on-site Water cart Site specific Air Quality TARPs Progressive rehabilitation for available areas	Satisfactory	Legal (L)	2	c	2c	8	M	
5	Asset Management	Retained infrastructure poses a hazard to personnel and the public prior to final closure. Not applicable - all Newstan and NCS operational areas are secure and operating, Awaba addressed separately.	NA	NA	NA								
6	Asset Management	Mining related infrastructure retained on site belonging to other entities. Not applicable, Origin Energy Haul Road is owned and managed internally.	NA	NA	NA								
7	Asset Management	Landholder activities using retained infrastructure result in hazards. Not applicable.	NA	NA	NA								
8	Asset Management	Centennial changing expectations for achieving relinquishment and managing legacy closure	Internal management drivers (e.g. draft Closure Standard)	Additional costs for ongoing management Inability to complete required tasks Impacts upon company reputation	Business Strategy in place to address change management	Opportunity for Improvement	Financial (F)	1	b	1b	7	M	Complete gap analysis vs draft Closure Standard
9	Biodiversity	Changes in the existing riparian community generated by discharge of mine water into ephemeral drainage line	Cessation of pumping / alternate use of mine water	Complaints Impact on environment	Water Management Plans EPL Water management infrastructure on the surface e.g. water treatment plant Environmental Officer on-site Environmental Inspection Program Monitoring programs and inspections Aquatic ecology monitoring program	Satisfactory	Environment (E)	3	c	3c	13	S	Noting that if approved mine water discharge were to cease, a change of state to the original dry woodland ecosystem could take place.
10	Biodiversity	Clearing of EECs / threatened flora species during closure works	Inadequate mapping of vegetation communities and/or threatened species	Loss of biodiversity values and/or non compliance with approvals	Ecological assessments completed for Awaba, Newstan and Northern Coal Services Northern Region BMP GDP process	Satisfactory	Legal (L)	3	d	3d	9	M	
11	Biodiversity	Loss of habitat to threatened species from closure (e.g. Microbats).	Open shafts / entries	Impact upon threatened species	Northern Region Historic Heritage Management Plan Northern Region Biodiversity Management Plan Site Biodiversity Monitoring Program	Opportunity for Improvement	Legal (L)	2	d	2d	5	L	Incorporate recommendations from Biodiversity Management Plan and Historic Heritage Management Plan into Rehabilitation Management Plan / MOP.

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
12	Blasting	Not applicable to this risk assessment	NA	NA	NA								
13	Bushfire	Damage to rehabilitation areas from bushfire	Bushfire from external (regional fire / lightning) or internal source (e.g. LTA fuel management, fire caused by site activities / equipment failure)	Loss of established rehabilitation Additional costs for rework of rehabilitation Exposed areas (erosion, sediment, dust)	Bushfire Management Plan Bushfire emergency response procedure Fire fighting equipment / procedures (including water cannons) Electrical firefighting system and diesel pumps Hot work permit process Lightning warning system Firetrail maintenance APZ	Satisfactory	Financial (F)	2	d	2d	5	L	
14	Contamination/ HAZMAT	Hazardous materials and dangerous goods remaining on the site at closure	Inadequate knowledge of contamination / HAZMAT locations	Exposure and health impacts Litigation	Contamination assessments completed for all operations Asbestos register during demolition and disposal records Informal knowledge Inspections Multiple asbestos audits Phase 2 contamination assessments completed for Awaba and Newstan (including assessment of Arsenic works) Human Health Impact Assessment for Awaba being completed Hazardous Materials Management Plan Asbestos Management Plan Hazardous Substances Register Radiation licence & dangerous goods licence	Satisfactory	Financial (F)	3	e	3e	6	L	Confirm if PFAS assessment is required for Newstan Complex.
15	Drought	Drought prevents establishment of rehabilitation	Prolonged dry weather periods	Failure to meeting closure criteria objectives or delays to rehabilitation success and additional cost.	Time future works with consideration of short range forecast of meteorological conditions Monitoring programs and inspections Use of native species in rehabilitation Coastal location Clean water plant / water trucks available for watering if required Use of appropriate native species in rehabilitation	Satisfactory	Financial (F)	2	d	2d	5	L	
16	Erosion and Sediment Control	Potential failure of water storage	Erosion causing failure of water storages	Failure to achieve successful rehabilitation or impacts to surface water quality in creeks or ongoing management issues and costs.	Inspection program (daily water management and environmental weekly) Stable landform Inspections by qualified structural engineer on annual basis Erosion and Sediment Control Plan Water Management Plans	Satisfactory	Legal (L)	3	d	3d	9	M	
17	Erosion and Sediment Control	Erosion and sedimentation of disturbed areas on pit top areas and haul road	Failure of existing rehabilitation areas Less then adequate water management system and/or design Constraints on current disturbance areas	Failure to achieve the rehabilitation outcome prescribed in the MOP Impact on environment Impact on established rehabilitation.	Erosion and Sediment Control Plan Water Management Plans Water management infrastructure on the surface Sedimentation controls Environmental Management System Environmental Officer on-site Environmental Inspection Program Rehabiltation Management Plan / MOP Rehabilitation Monitoring Program	Satisfactory	Financial (F)	1	d	1d	2	L	
18	Final Landform Design	Steep slopes exceed approved final landform design criteria. Not applicable, all designed to appropriate slope.	NA	NA	NA								
19	General	Zoning not appropriate for planned industrial land use is not applicable.											
20	General	Inadequate information available for rehabilitation, closure and relinquishment	Historic records were not retained or were destroyed/damaged. Inadequate management of records for works undertaken. Age of the site (limited electronic records) or inconsistent formats.	Rework of testing Investigations required Additional costs Inability to relinquish lease	Survey records and lease information Record tracings GIS database Rehabilitation and closure risk assessment to identify potential knowledge gaps/required activities Detailed historical records Continuity in operational oversight since commencement of operation Government owned for period of time with high standard of management Baseline mapping / record tracings	Opportunity for Improvement	Financial (F)	3	b	3b	17	H	Review of sealing records to assess accuracy of sealed sites / standard. Develop a register for all sealing (current status and proposed / required works). Consolidation of all relevant data into one format. Historic records to be captured within mine workings / data review to be completed.
21	General	Inadequate information recorded for future / recent rehabilitation / demolition activities to allow lease relinquishment.	No established or inadequate Rehabilitation Quality Assurance Process	Rework of testing Investigations required Additional costs Inability to relinquish lease	Sinkhole Remediation Plan Rehabilitation Management Plan / MOP Rehabilitation Monitoring Program Engineering design for construction works Industry standards Performance meeting as above	Opportunity for Improvement	Financial (F)	2	b	2b	12	S	Rehabilitation Quality Assurance Process to be included in MOP. Review previous rehabilitation timing and approach to understand successful methods at site historically. Develop quality assurance approach for future rehabilitation / material testing / amelioration if required. Review of rehabilitation monitoring program to satisfy relevant MOP criteria
22	General	Ongoing management of the sites required for post mining land use (management in perpetuity)	Inability to meet rehabilitation criteria. Inadequate planning and practices during operations.	Additional costs Delay or inability to relinquish lease (management in perpetuity)	MOP developed in consultation with stakeholders Provision in Rehabilitation Cost Estimate (RCE) RCE provision review process No current offsets	Satisfactory	Financial (F)	3	d	3d	9	M	

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
23	General	Inadequate rehabilitation provision	Inadequate provision for rehabilitation / closure execution Lack / loss of historical documentation	Additional costs required High residual risk payment requirements Litigation Delay or inability to relinquish lease	MOP developed in consultation with stakeholders RCE provision review process Specialist assessments completed (e.g. ecological, contamination) Records of former infrastructure at Awaba (coal handling facility, truck loading bin, conveyors etc.) Provision in Rehabilitation Cost Estimate (RCE) RCE provision review process Compliance register Mine plans of Awaba Pit Top, Newstan and NCL buildings and services Newstan Services Compound Plans/services	Satisfactory	Financial (F)	3	d	3d	9	M	
24	General	Inability to reach agreement on final land use	Inadequate consultation with landowners and/or Crown Lands	Inability to relinquish lease Additional costs for ongoing management	Commitment in EIS to undertake consultation with stakeholders/landowners prior to closure.	Satisfactory	Financial (F)	3	d	3d	9	M	Confirm consultation to date vs approvals / zoning.
25	General	Proposed rehabilitation outcomes in the MOP are not accepted. MOP refused.	Inadequate consultation with regulators during MOP process Inadequate information captured	Additional costs for rehabilitation MOP not approved Delay or inability to relinquish lease	MOP developed in consultation with Resources Regulator MOP developed in consultation with stakeholders	Satisfactory	Financial (F)	1	b	1b	7	M	
26	General	Access delayed for execution of rehabilitation works	Potential lapse of access agreements and/or failure to extend access agreements	Delay to implement rehabilitation works Delay to relinquish lease	Property and titles department Property and titles database with triggers for any necessary negotiations Budget process includes renewal of agreements	Satisfactory	Financial (F)	2	d	2d	5	L	
27	Geochemistry	Significant erosion and runoff (rehabilitation commitments - safe, stable, etc.)	Inadequate surface water management Material geochemistry / characteristics	Inability to relinquish lease Company reputation damage Land contamination Surface water contamination	Water Management Plans Water management infrastructure on the surface e.g. water treatment plant Closed water management system Environmental Officer on-site Environmental Inspection Program Rehabiltation Management Plan / MOP Monitoring programs and inspections Sampled materials including coal materials Sampling of tailings/coarse reject demonstrated low risk of acid generation Water quality monitoring Tailings Charectisation Report completed EPL limits	Satisfactory	Environment (E)	2	c	2c	8	M	
28	Geochemistry	Failure to achieve the rehabilitation outcome prescribed in the MOP	Less then adequate knowledge of material and its geochemistry	Impact on environment Delay to relinquish lease Requirement to treat water long term	Water quality monitoring indicated no acid mine drainage issues Environmental monitoring Sampling of materials including coal materials Sampling of tailings / coarse reject demonstrated low risk of acid generation and spontaneous combustion. Tailings Charactisation Report completed Rehabiltation Management Plan / MOP	Satisfactory	Environment (E)	2	d	2d	5	L	
29	Greenhouse Gases, methane drainage / venting	Methane or other gas emissions to surface (e.g. fugitive emmissions resulting from fracturing etc.)	Historic workings and subsidence impacts Methane emissions from workings	Fire Injury to persons in the vicinity Impact upon rehabilitation success Inability to reach closure and relinquish lease. Impact on environment	No known reported methane emissions to surface via subsidence Security Fencing Locked sites Controlled access Methane monitoring at the ventilation fans Environmental Management System Environmental Inspection Program Subsidence Management Plans Sinkhole Remediation Plan Schedule of works in Annual Review	Satisfactory	Financial (F)	4	e	4e	10	M	To confirm methane potential based on ventilation fans / experience and inclusion in WHS process.
30	Groundwater	Boreholes used for water access from void by landholders	Shortage of surface water for use	Unregistered boreholes in use Delay to relinquishment of lease	Saline water in region, limited potential for water use (requires water treatment to meet standards for discharge) Phase 2 assessments completed for Awaba and Newstan	Satisfactory							Borehole search to check if any potential bores accessing mine water.
31	Groundwater	Contamination of groundwater from operations	Previous operations and historic use	Groundwater contamination Legal non-compliance	Historical groundwater monitoring records Assessment of groundwater quality upstream and downstream of potential contamination areas as part of assessments. Water treatment plant Phase 2 assessments completed for Awaba and Newstan Rehabilitation Management Plan / MOP (includes required closue / rehabilitation activities)	Satisfactory	Legal (L)	3	d	3d	9	M	
32	Interaction with Adjacent Operations	Regional activities / surface disturbance compromises rehabilitation. Not applicable as OCAL operations completed / closed and all other operations covered under this Complex MOP.	NA	NA	NA								

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
33	Mine Subsidence	Unlocated subsidence	Historical subsidence impacts related to mining extraction methods	Injury Company reputation damage Environmental damage	Monitoring inspections Baseline mapping / record tracings Survey programs for risk in place Sinkhole Remediation Plan Sinkhole rehabilitation included within annual budget review Mine workings allowed to fill up with water which may decrease the risk of subsidence Environmental Inspection Program Environmental Management System Community Hotline and Community Consultation Committee (CCC) Community complaints have been actioned / satisfied Mine Subsidence Board Environmental Officer on-site Subsidence risk assessment completed Subsidence assessments Subsidence Management Plans Rehabilitation Management Plan / MOP	Satisfactory	Environment (E)	3	b	3b	17	H	Work through current risk assessment actions from specific subsidence workshop. Review control implementation. Ensure subsidence risk assessment review scheduled.
34	Mine Subsidence	Known sink holes / subsidence cracks in historical workings	Excavations above old workings/ Mining under waterways Shallow depth of cover in historical mining areas/ Mining method	Failure to achieve the rehabilitation outcome prescribed in the MOP Inability to relinquish lease Ongoing costs for rehabilitation and liability. Environmental damage Damage to reputation	Schedule of planned remediation / maintenance works in the Annual Review Monitoring inspections Baseline mapping / record tracings Survey programs for risk in place Community complaints have been actioned/satisfied Sinkhole Remediation Plan Sinkhole rehabilitation included within annual budget review Mine workings allowed to fill up with water which may decrease the risk of subsidence Environmental Inspection Program Environmental Management System Community Hotline and Community Consultation Committee (CCC) Mine Subsidence Board Environmental Officer on-site Subsidence risk assessment completed Subsidence assessments Subsidence Management Plans Rehabilitation Management Plan / MOP	Satisfactory	Financial (F)	3	c	3c	13	S	
35	Noise	Increased noise during decommissioning or during rehabilitation works	Intensive earthworks at end of mining (including at elevated locations).	Complaints Exceedence of Development Consent Requirements Exceedence of EPL Limits Prosecution and fines	Noise Management Plan Noise Monitoring (including real-time) Rehabilitation Management Plan / MOP Environmental Management System Community Hotline and Community Consultation Committee (CCC) Site specific noise TARP Operations during hours specified in development consent	Satisfactory	Legal (L)	2	c	2c	8	M	
36	Overburden Characterisation	Not applicable to this risk assessment	NA	NA									
37	Rejects Emplacement Area (REA) Decommissioning & rehabilitation	Consolidation not achieving design criteria	Construction deviation to design Inadequate decanting of deposited tailings Lack of material strength testing Long term settlement Poor material properties	Financial impact to business Breach of regulated responsibility Business impact or Environmental impact. Long term legacy for H&S and environmental risk.	Rehabiltation Management Plan / MOP (Includes concept capping design for SREA) Capping strategy and design for NREA Shear vane testing and materials testing completed for SREA/NREA, demonstrating favourable consolidation for rehabilitation. Annual LIDAR survey of emplacement areas Capping design works for SREA include final landform requirements to industry standard Capping design and landform report completed for NREA Annual survey of NREA HRA process	Satisfactory	Financial (F)	3	e	3e	6	L	

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
38	Rejects Emplacement Area (REA) Design	Failure of an REA structure	Construction deviation to design Continued gully erosion Major rainfall event Earthquake Failure of clean water diversion drain Failure of spillway / drop structure Failure to detect changes Inadequate dam wall design Seepage piping Subsidence related movement from underlying workings Surface erosion leading to possible structural integrity issues Surface run off	Breach of regulated responsibility Business impact Environmental impact alth and safety impact	Main perimeter diversion drains in place for SREA Design peer reviewed by independent specialist Design in compliance with approvals, intended use and relevant guidelines such as WHS Regulation, Dam Safety Regulation 2019 and ANCOLD Rainfall monitoring. Quarterly Lidar 3D imaging survey of NREA and SREA walls Spill Ways on structures of SREA Water drop structures on NREA and SREA perimeter Appointed REA Controller Annual dam surveillance and slope stability inspections by external consultant Annual LIDAR survey Monthly REA strategy performance review meetings Five (5) yearly comprehensive dam surveillance inspection by external consultant Redundancy in NREA & SREA downstream retention cells Security signage in place on access roads and locations around site perimeter Each cell in the NREA and SREA have a specific indentifying name Contractor Management Plan requires SWMS for works and risk management processes (e.g works carried out around REAs require consideration of health & safety risks posed by REA) NCS Emergency Management Plan NCS-PLN-014 1.1.q. SREA Operation & Maintenance Manual (OMM) SREA Dam Safety Emergency Plan (DSEP) Visitors not permitted to move around site without induction and escort Warning signage installed around all tailings dams cells REA Inspection Regime and TARPs REA (covering both SREA and NREA) Inspection sheets completed daily; checking for significant rainfall events, water levels, amount of freeboard, erosion, piping, seepage, embankment damage or deterioration, cracking, integrity and condition of diversion drains. SREA embankment stability analysis has been completed Dam break failure study completed during design for SREA (all dam height stages) REA Strategy Risk analysis including FMEA on SREA	Satisfactory	Environment (E)	4	e	4e	10	M	
39	Rehabilitation	Lack of availability and/or quality of seed resources including viability, genetic integrity.	Lack of seed collection	Inability to reach closure and relinquish lease. Additional costs for rework	Seed harvesting at Northern sites Ability to purchase suitable seed	Satisfactory	Financial (F)	2	d	c			Trigger for seed collection to be included at suitable time prior to rehabilitation activities onsite.
40	Rehabilitation	Final landform unsuitable for final land use	Lack of consultation regarding final landform	Delays to relinquish lease Poor reputation	Consistent with approvals / EIS Rehabiltation Management Plan / MOP Commitment in EIS to undertake consultation with stakeholders/landowners prior to closure.	Opportunity for Improvement	Reputation (R)						Confirm consultation with landowners regarding planned post mining land use.
41	Rehabilitation	Unsealed exploration boreholes within lease areas	Failing to seal boreholes after exploration	Delays to relinquish lease Potential for public to utilise for water access.	GIS database ESF2	Opportunity for Improvement							Historic records to be captured within mine workings / data review to be completed.
42	Rehabilitation	Failure to achieve the rehabilitation commitments prescribed in the MOP	Erosion Weeds and pests LTA land management	Inability to reach closure and relinquish lease. Impacts to habitat / species and remant vegetation.	Biodiversity Management Plan Rehabilitation Management Plan / MOP Inspections Ongoing weed and pest management program Rehabilitation Monitoring Program	Satisfactory	Environment (E)	2	d	2d	5	L	Commitment to develop suitable seed mix to be included in the MOP.
43	Rehabilitation	Failure to meet rehabilitation and closure criteria objectives or ongoing management issues and resources.	Insufficient resources for or prioritisation of rehabilitation activities and maintenance activities.	Delays to site relinquishment Poor reputation Increased cost	MOP review process and risk assessment Internal budgeting process Resource allocation Provision in Rehabilitation Cost Estimate (RCE) RCE provision review process	Satisfactory	Reputation (R)	2	d	2d	5	L	
44	Rehabilitation	Unauthorised access to rehabilitation areas and potential vandalism.	Intentional unauthorised access	Minor environmental impact / financial	Fences, signage and security Inspections Repair of fencing where triggered by inspections Sinkhole Remediation Plan Maintenance program Difficult access due to habitat structures being placed around remediated sites	Satisfactory	Environment (E)	1	c	1c	4	L	
45	Slopes and Slope Management	Long-term stability failure of batters and slopes	Geotechnical failure	Additional costs for rework Inability to reach closure and relinquish lease. Safety concerns Environmental damage	Annual slope stability inspection and report by external party	Satisfactory	Business Interuption (BI)	3	d	3d	9	M	
46	Social and Community	Community values (e.g. identity or environmental qualities) are affected by closure activities or intended post-mining land uses	Conflicting closure expectations	Community complaints Poor public perception Inability to relinquish	Post mining land uses will be similar to and consider existing / surrounding / permissible land uses MOP developed in consultation with stakeholders Newstan and NCL EIS Community Hotline and Community Consultation Committee (CCC)	Satisfactory	Reputation (R)	2	d	2d	5	L	
47	Social and Community	Not meeting stakeholder expectations	Stakeholder expectations unknown Inadequate consultation	Poor public perception Community / stakeholder complaints Delays to site relinquishment	MOP developed in consultation with relevant stakeholders Community Hotline and Community Consultation Committee (CCC) Newstan and NCL EIS	Satisfactory	Reputation (R)	2	d	2d	5	L	

Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
48	Soil Type(s) and Suitability	Failure to achieve the rehabilitation outcome prescribed in the MOP	Current clay substitute being used is inadequate Lack of available topsoil material	Inability to reach closure and relinquish lease. Financial impact to obtain suitable material / ameliorants.	Trialing rehabilitation outcomes without topsoils (suitable slope) Rehabilitation Monitoring Program Rehabiltation Management Plan / MOP Environmental Management System Environmental Officer on-site Progressive rehabilitation for available areas	Satisfactory	Financial (F)	3	c	3c	13	S	Review previous rehabilitation timing and approach to understand successful methods at site historically. Develop quality assurance approach for future rehabilitation / material testing / amelioration if required. Review Rehabilitation Monitoring Program to satisfy relevant MOP criteria.
49	Spontaneous Combustion	Exposed coal seams at the surface or exposed underground coal seams. Not applicable.	NA	NA	NA								
50	Spontaneous Combustion	Spontaneous Combustion impedes rehabilitation	Bushfire Poor management of materials with propensity for Spontaneous combustion.	Cost of managing Spontaneous combustion outbreak. Impact on established rehabilitation	Bushfire Management Plan Spontaneous Combustion Management Plan Care and maintenace operations Low to medium rating from R70 tests Environmental Inspection Program Stockpile Management Plan (including spon com management)	Satisfactory	Environment (E)	2	d	2d	5	L	
51	Tailings	Inadequate volume of suitable materials for capping tailings dams	Lack of availabile quality / usable resources Lack of storage areas	Increased costs to source offsite materials Rehabilitation bond is not returned	Capping design works for SREA include final landform requirements to industry standard Capping design and landform report completed for NREA Provision in Rehabilitation Cost Estimate (RCE) RCE provision review process Progressive capping strategy Coarse reject emplacement storage and supply from related Centennial operations will continue to provide resources for capping	Opportunity for Improvement	Financial (F)	4	d	4d	14	S	Inventory to be developed for SREA and NREA capping to final landform, including coarse rejects.
52	Transport	Potential amenity impacts upon receptors (e.g. noise, dust, traffic)	Transport of materials for rehabilitation / capping to sites	Complaints Amenity impacts Company reputation impacts	Experience with Mandalong South spoil Activities planned outside of peak traffic Licenced contractors used as required Short-term construction period Community Hotline and Community Consultation Committee (CCC) Environmental Officer on-site	Satisfactory	Reputation (R)	1	b	1b			
53	UG	Unlocated legacy shafts / mine entries	Inaccurate historical data Data not in suitable format Areas not inspected	Injury / fatality Significant cost to undertake detailed investigation across the site. Company reputation damage	Detailed historical records Continuity in operational oversight since commencement of operation Government owned for period of time with high standard of management Baseline mapping / record tracings	Opportunity for Improvement	Personal Injury (PI)	4	d	4d	14	S	Review of sealing records to assess accuracy of sealed sites / standard. Develop a register for all sealing (current status and proposed / required works). Consolidation of all relevant data into one format.
54	UG	Mine entries improperly sealed and do not meet current regulatory requirements	Inadequate sealing	Failure of seal Increased cost of rework Non-compliance with MDG6001 Delays / inability to relinquish Company reputation damage Regulatory action Personal injury	Sealing records to standard at time (noting mine operating since 1887). Activities in accordance with MDG6001 (where not pre-dating) Signage for MDG6001 sites Security Fencing Locked sites Controlled access	Satisfactory	Personal Injury (PI)	4	e	4e	10	M	Review of sealing records to assess accuracy of sealed sites / standard. Develop a register for all sealing (current status and proposed / required works).
55	UG	Ventilation shaft / entries open	Open shafts / entries (still in use)	Inability to relinquish Company reputation damage Regulatory action Settling of fill material under capping Personal injury	Security Fencing Locked sites Controlled access Surveyed locations of open shafts / entries on mine survey plan	Satisfactory	Personal Injury (PI)	4	e	4e	10	M	
56	Visual and Lighting	Some rehabilitation and closure works at elevated locations or adjacent to public access areas	Exposed areas visible	Complaints	Rehabiltation Management Plan / MOP Earthworks only undertaken during working hours Environmental Management System Community Hotline and Community Consultation Committee (CCC)	Satisfactory	Reputation (R)	1	c	1c	4	L	
57	Waste	Waste remaining at site	Mining waste remaining onsite (e.g. minor scrap material)	Increased cost of rework Company reputation damage	Stakeholder consultation Excess plant removed / sold Partially completed demolition at Awaba Progressive rehabilitation for available areas Waste management contract	Satisfactory	Reputation (R)	2	d	2d	5	L	
58	Waste	Inadequate capacity of local landfills to accept benign wastes	Waste beyond landfill capacity from mine	Increased cost	Licenced waste contract Provision in Rehabilitation Cost Estimate (RCE) RCE provision review process Waste management contract HAZMAT / contamination surveys Multiple landfills within local vicinity Local construction material recyclers (e.g. bricks and concrete)	Satisfactory	Financial (F)	2	d	2d	5	L	
59	Water	Uncontrolled discharge from Fassifern workings to Stoney Creek / Blackalls Park following closure	Rainfall infiltration to legacy void via fractures in strata. Cessation of water management infrastructure use at Newstan.	Impacts to surface water quality / quantity in creeks (previous EPA prosecution from dirty water discharge to Stoney Creek). Community reputation Legal non-compliance Inability to relinquish lease	Water management system Water treatment plant Water Management Plans Stoney Creek pipeline infrastructure Discussions with potential future users of water management infrastructure/water resources	Unsatisfactory	Financial (F)	4	c	4c	18	H	Investigate options for active management (ongoing plant operation) or passive management. Investigate further options for alternate post mining users of infrastructure / resources. Assuming cost to run plant if not alternative users / managers or alternative passive solutions found.

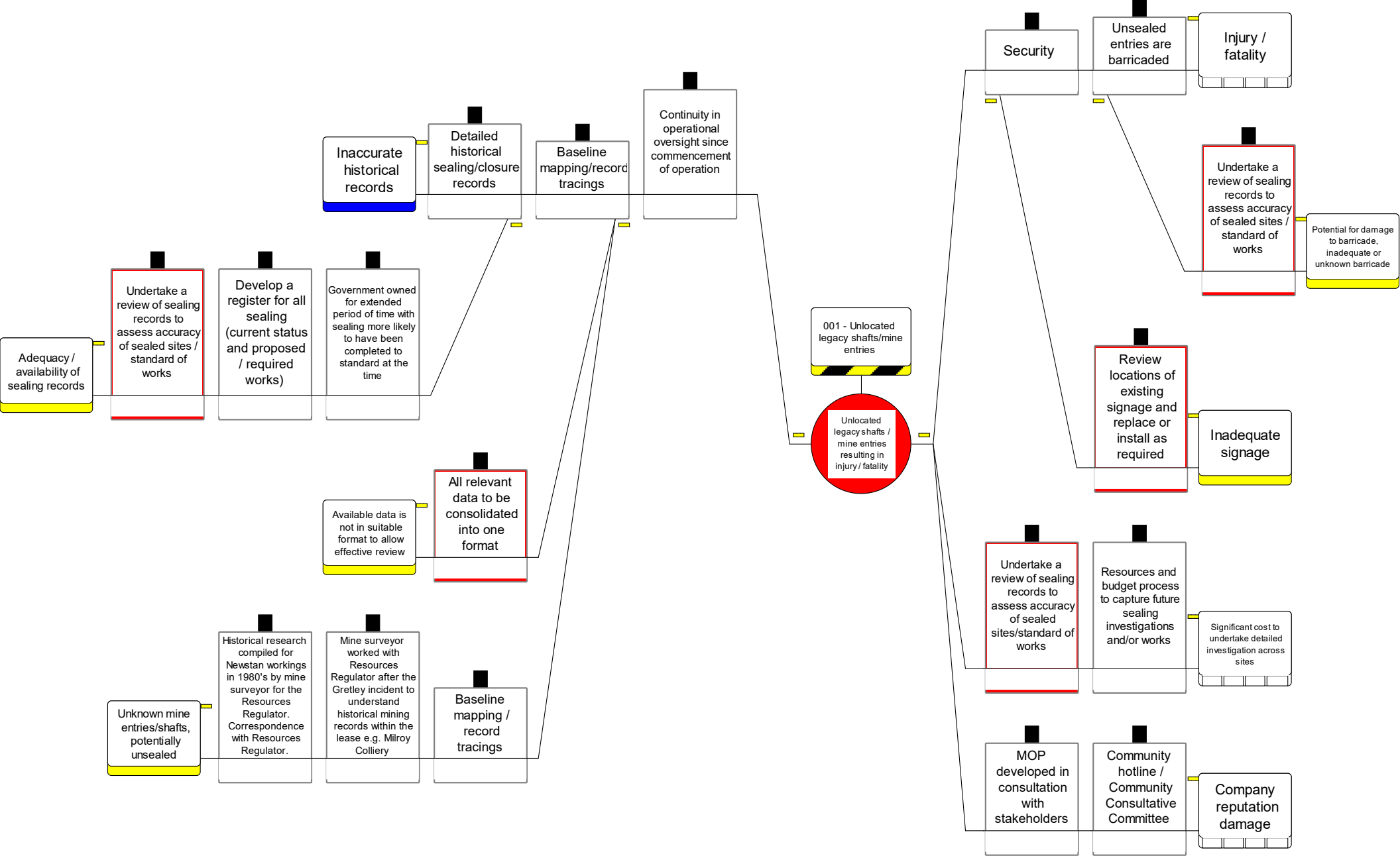
Risk ID	Step	Description of Risk	Cause	Potential Consequence / Impact	Current Controls	Adequacy of Current Controls	Consequence Category	Current Risk Ranking					Proposed Additional Controls
								C	L	R			
60	Water	High rainfall events Inadequate drainage Inadequate storage	Inappropriate surface water management	Impacts to surface water quality / quantity in creeks Community reputation Legal non-compliance	Vegetation establishment Inspections Dams designed in accordance with industry standard Water Management Plans Water infrastructure allows transfer of water internally and monitoring Dams dewatered regularly Water treatment plant	Satisfactory	Environment (E)	2	c	2c	8	M	
61	Water	Impact on Surface water quality	Acid Mine drainage Ground water / water flows Inadequate surface water management Design and construction Exposed material	Impacts to surface water quality / quantity in creeks Community reputation Legal non-compliance	Rehabiltation Management Plan / MOP (Includes final landform plan) Capping strategy and design for NREA Rehabiltation Management Plan / MOP (Includes concept capping design for SREA) Water Management Plans Water Management - minimise infiltration, control erosion Clean water treatment plant Closed water management system Sampled materials including coal materials Sampling of tailings/coarse reject demonstrated low risk of acid generation Water quality monitoring Tailings Charectisation Report completed EPL limits	Satisfactory	Environment (E)	2	c	2c	8	M	Revised landform to be included in Rehabiltation Management Plan / MOP

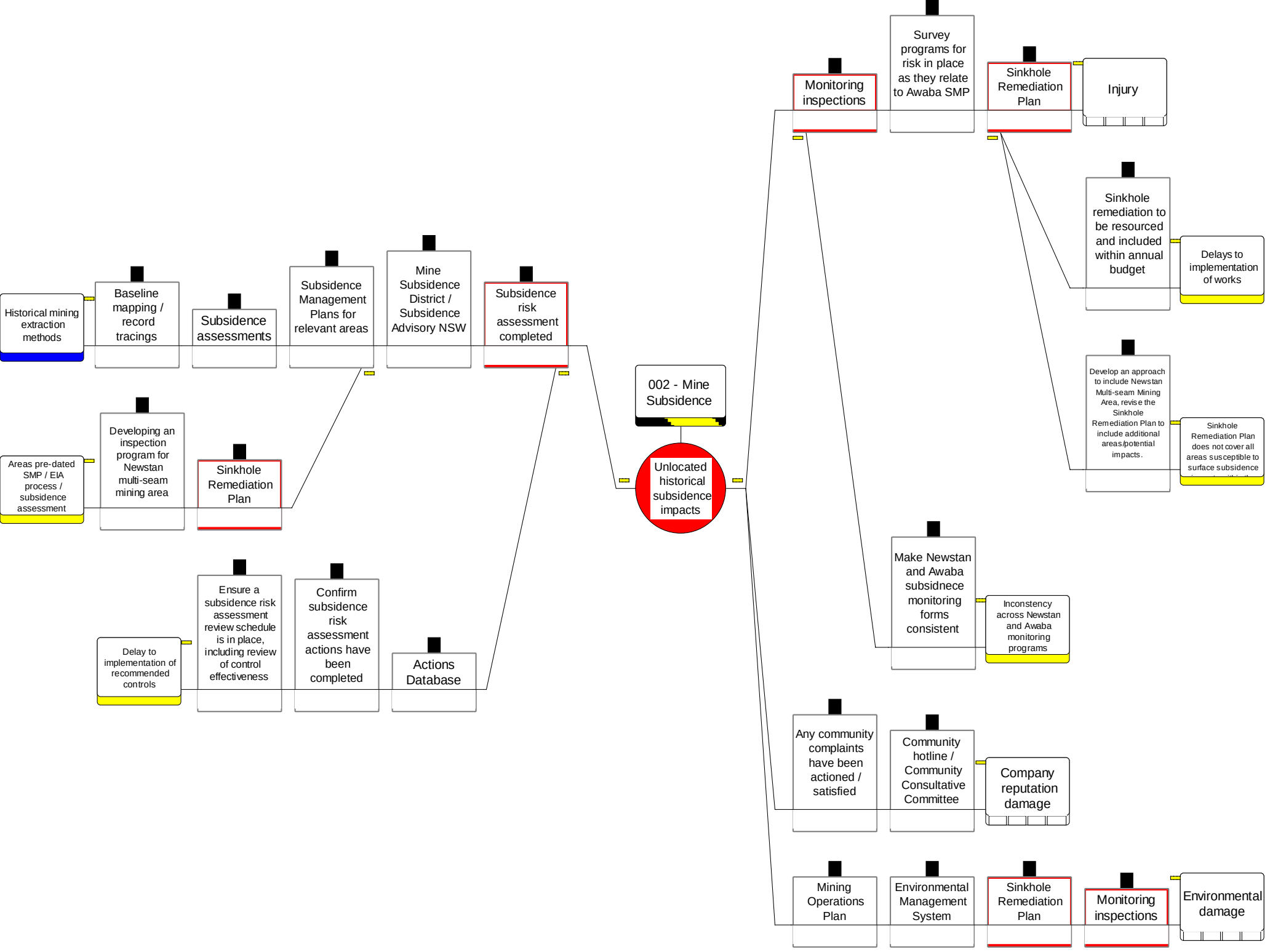
CENTENNIAL RISK and OPPORTUNITY MATRIX

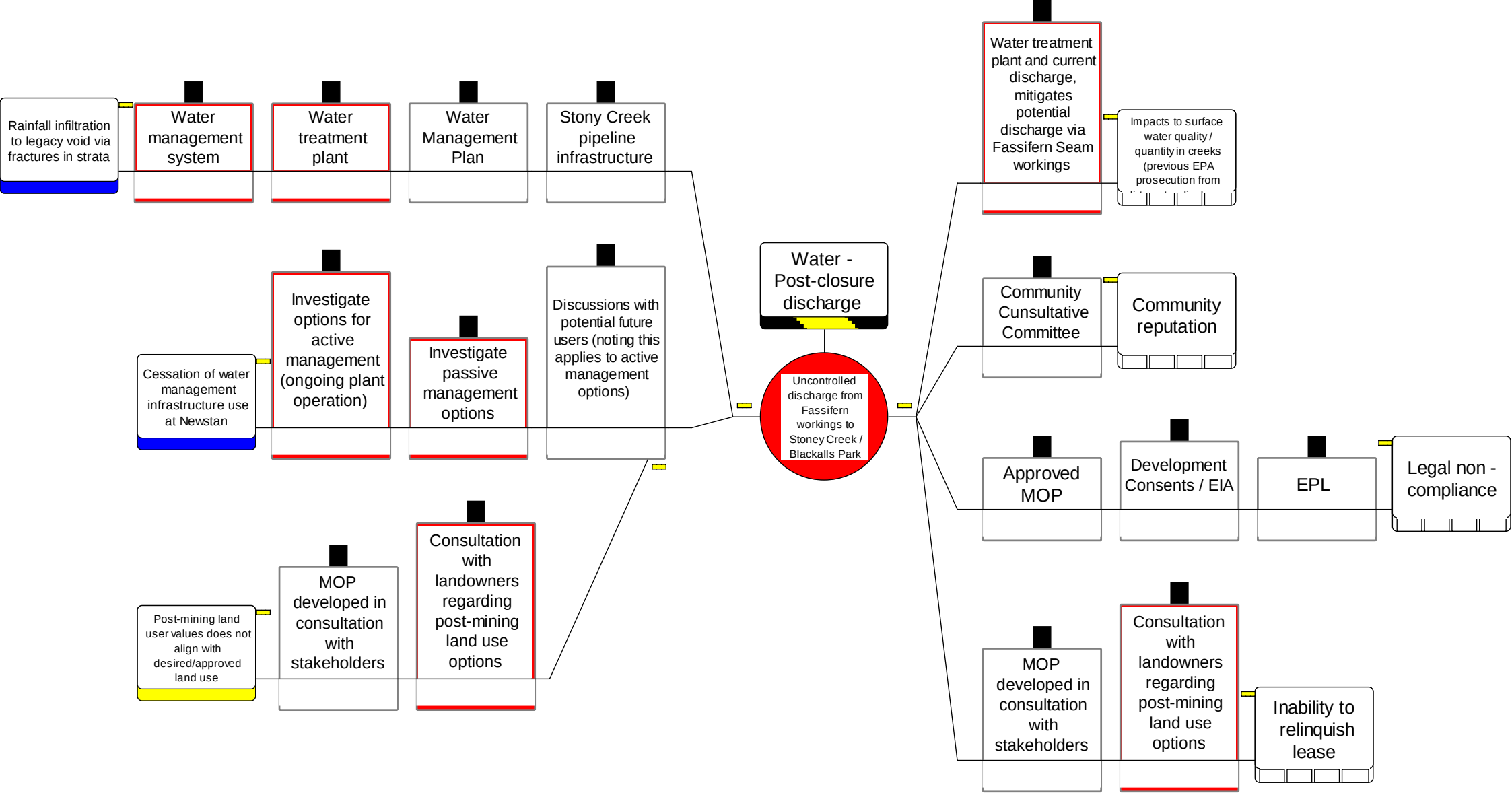
Rating	Consequence Note: Consequence may result from a single event or may represent a cumulative impact over a period of 12 months. Use the worst case reasonable consequence if there is more than one.						Likelihood A	B	C	D	E	Description (D)
							Common	Has Happened within Centennial"	Could Happen has happened in non-CEY	Not Likely	Practically impossible	Probability (Pb)
	Financial Impact to Annual Business Plan (F)	Personal Injury (PI)	Business Interruption (BI)	Legal (L)	Reputation (R)	Environment (E)	Frequent incidents	Regular incidents	Infrequent incidents	Unlikely to occur. Very few recorded or known	May occur in exceptional circumstances. Almost no recorded	Incident Frequency (IF)
							Operations – within 3 months	Operations – within 2 years	Operations – within 5 years	Operations – within 10 years	Operations – within 30 years	Operations (Op)
							Project – Every project	Project – Every 2 projects	Project – Every 5 projects	Project – Every 10 projects	Project – Every 30 projects	Project (Pr)
5. Catastrophic	>$50m	Multiple Fatalities	> 1month	Prolonged litigation, heavy fines,	Prolonged International media attention	Long term impairment habitats/	25 (E)	24 (E)	21 (H)	19 (H)	15 (S)	
4. Major	$10m - $50m	Single Fatality	1 week to 1 month	Major breach/ major	International media attention	Long term effects of ecosystem	23 (E)	22 (E)	18 (H)	14 (S)	10 (M)	
3. Moderate	$1m - $10m	Serious/ Disabling Injury	1 day to 1 week	Serious breach of regulation	National media attention	Serious medium term environmental	20 (H)	17 (H)	13 (S)	9 (M)	6 (L)	
2. Minor	$100k - $1m	Lost Time Injury	12 hrs to 1 day	Non-compliance, breaches in	Adverse local public attention	Minor effects to physical environment	16 (S)	12 (S)	8 (M)	5 (L)	3 (L)	
1. Insignificant	<$100k	First Aid Treatment Only	< 12 hrs	Low level compliance issue	Local complaints	Limited physical damage	11 (S)	7 (M)	4 (L)	2 (L)	1 (L)	
-1 Insignificant	<$100k profit p.a.		< 12 hrs p.a.		Local compliments		-11 (S)	-7 (M)	-4 (L)	-2 (L)	-1 (L)	
-2 Minor	$100k - $1m profit p.a.		12 hrs to 1 day p.a.		Positive local public attention		-16 (S)	-12 (S)	-8 (M)	-5 (L)	-3 (L)	
-3 Average	$1m - $10m profit p.a.		1 day to 1 week p.a.		Positive national media attention		-20 (H)	-17 (H)	-13 (S)	-9 (M)	-6 (L)	
-4 Productive	$10m - $50m profit p.a.		1 week to 1 month		Positive international media attention		-23 (E)	-22 (E)	-18 (H)	-14 (S)	-10 (M)	
-5 Unlimited	>$50m profit p.a.		> 1month p.a.		Prolonged +ve international media attention		-25 (E)	-24 (E)	-21 (H)	-19 (H)	-15 (S)	

Risk Rating	Risk Category		Generic Management Actions
22 to 25	E	Extreme	Action is required to eliminate or reduce the risk. If the risk is considered to be ALARP then the decision to accept the risk is to be made by the relevant Centennial Coal Executive General
17 to 21	H	High	Action is required to eliminate or reduce the risk. If the risk is considered to be ALARP then the decision to accept the risk is to be made by the relevant Mine Manager or General
11 to 16	S	Significant	Action is required to eliminate or reduce the risk. If the risk is considered to be ALARP then the decision to accept the risk is to be made by the relevant Mine Manager or General Manager
7 to 10	M	Moderate	If the risk is considered to be ALARP then the decision to accept the risk is to be made by the risk assessment owner
1 to 6	L	Low	If risk is considered to be ALARP then no further action is required
-1 to -6	L	Low	
-7 to -10	M	Moderate	
-11 to -16	S	Significant	
-17 to -21	H	High	
-22 to -25	E	Extreme	

APPENDIX B
BOW-TIE DIAGRAMS


Adequacy / availability of sealing records
Undertake a review of sealing records to assess accuracy of sealed sites / standard of works
Develop a register for all sealing (current status and proposed / required works)
Government owned for extended period of time with sealing more likely to have been completed to standard at the time
Inaccurate historical records
Detailed historical sealing/closure records
Baseline mapping/record tracings
Continuity in operational oversight since commencement of operation
Available data is not in suitable format to allow effective review
All relevant data to be consolidated into one format
Unknown mine entries/shafts, potentially unsealed
Historical research compiled for Newstan workings in 1980's by mine surveyor for the Resources Regulator. Correspondence with Resources Regulator.
Mine surveyor worked with Resources Regulator after the Gretley incident to understand historical mining records within the lease e.g. Milroy Colliery
Baseline mapping / record tracings
001 - Unlocated legacy shafts/mine entries
Unlocated legacy shafts / mine entries resulting in injury / fatality
Security
Unsealed entries are barricaded
Injury / fatality
Undertake a review of sealing records to assess accuracy of sealed sites / standard of works
Potential for damage to barricade, inadequate or unknown barricade
Review locations of existing signage and replace or install as required
Inadequate signage
Undertake a review of sealing records to assess accuracy of sealed sites/standard of works
Resources and budget process to capture future sealing investigations and/or works
Significant cost to undertake detailed investigation across sites
MOP developed in consultation with stakeholders
Community hotline / Community Consultative Committee
Company reputation damage


Historical mining extraction methods
Baseline mapping / record tracings
Subsidence assessments
Subsidence Management Plans for relevant areas
Mine Subsidence District / Subsidence Advisory NSW
Subsidence risk assessment completed
Areas pre-dated SMP / EIA process / subsidence assessment
Developing an inspection program for Newstan multi-seam mining area
Sinkhole Remediation Plan
Delay to implementation of recommended controls
Ensure a subsidence risk assessment review schedule is in place, including review of control effectiveness
Confirm subsidence risk assessment actions have been completed
Actions Database
002 - Mine Subsidence
Unlocated historical subsidence impacts
Monitoring inspections
Survey programs for risk in place as they relate to Awaba SMP
Sinkhole Remediation Plan
Injury
Sinkhole remediation to be resourced and included within annual budget
Delays to implementation of works
Develop an approach to include Newstan Multi-seam Mining Area, revise the Sinkhole Remediation Plan to include additional areas/potential impacts.
Sinkhole Remediation Plan does not cover all areas susceptible to surface subsidence
Make Newstan and Awaba subsidnece monitoring forms consistent
Inconstency across Newstan and Awaba monitoring programs
Any community complaints have been actioned / satisfied
Community hotline / Community Consultative Committee
Company reputation damage
Mining Operations Plan
Environmental Management System
Sinkhole Remediation Plan
Monitoring inspections
Environmental damage


Water - Post-closure discharge
Uncontrolled discharge from Fassifern workings to Stoney Creek / Blackalls Park
Rainfall infiltration to legacy void via fractures in strata
Water management system
Water treatment plant
Water Management Plan
Stony Creek pipeline infrastructure
Cessation of water management infrastructure use at Newstan
Investigate options for active management (ongoing plant operation)
Investigate passive management options
Discussions with potential future users (noting this applies to active management options)
Post-mining land user values does not align with desired/approved land use
MOP developed in consultation with stakeholders
Consultation with landowners regarding post-mining land use options
Water treatment plant and current discharge, mitigates potential discharge via Fassifern Seam workings
Impacts to surface water quality / quantity in creeks (previous EPA prosecution from
Community Cunsultative Committee
Community reputation
Approved MOP
Development Consents / EIA
EPL
Legal non - compliance
MOP developed in consultation with stakeholders
Consultation with landowners regarding post-mining land use options
Inability to relinquish lease

APPENDIX C
WORKSHOP ATTENDANCE SHEETS

Centennial Risk Assessment

Sign On Sheet

ATTENDEE	POSITION	COMPANY	SIGNATURE
Adam Williams	Principal Consultant	SLR	
MATTHEW GILBERT	NCS MANAGER	CENTENNIAL	
CLINTON BRODHEAD	CPP MANAGER	CENTENNIAL	
Hanna Ryan	Env Comm Coord	centennial	
TOBIAS	Mine Manager	CENTENNIAL	

Centennial Risk Assessment

Sign On Sheet

ATTENDEE	POSITION	COMPANY	SIGNATURE
David Baker	Electrical & services coordinator	Newstan	
Craig Cuderay	Mine Surveyor	Newstan (centennial)	
CLINTON BRACKWELL	CPP MANAGER	CENTENNIAL	C. Brackwell.
Alanna Ryan	env. coordinator	Newstan	
Chelsey Zuideruy	Project Consultant	SLR	
Adam Williams	Principal Consultant	SLR	

Centennial Risk Assessment

Sign On Sheet

ATTENDEE	POSITION	COMPANY	SIGNATURE
CLINTON BRACKWELL	CPP MANAGER	CENTENNIAL COAL	C. Brackwell
MATTHEW GIBBINS	NCJ MANAGER	"	M. Gibbins
Adam Williams	Principal Consultant	SLR	
Alanna Ryan	Env Comm Coord	Centennial	
Terry Sellen	Mine Manager	CENTENNIAL	
Craig Clarke	Mine Surveyor	Centennial	C. Clarke
David Baker	Electrical Services Coordinator	Centennial	

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APPENDIX 4: REGULATORY REQUIREMENTS

Approval	Rehabilitation Requirements	Section Addressed
Authorisations		
CCL727, CCL746, CCL763, CCL764, Condition 2	The leaseholder shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.	This MOP.
CCL727, CCL746, CCL763, CCL764, Condition 5	The EMR must: (a) report against compliance with the MOP; (b) report on progress in respect of rehabilitation completion criteria; (c) report on the extent of compliance with regulatory requirements; and (d) have regard to any relevant guidelines adopted by the Director-General.	Section 10
CCL727, CCL746, CCL763, CCL764, Condition 7	Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the Director-General.	Section 4
MPL327, MPL328, Condition 10	(a) The lease holder shall each year once operations have commenced, submit for the Minister's approval an "Annual Environmental Management Report" relating to the operations of the lease holder on the subject area. (b) The date by which the Report must be submitted will be determined by the Minister after consulting with the lease holder. (c) The Report shall comprise: i. a plan showing short, medium and long term mining plans; ii. a rehabilitation report (in respect of open cut operations) and/or a surface environmental management report (in respect of underground operations); iii. a review of performance in terms of Environment Protection Authority and Department of Water Resources licence and approval conditions (related to the Clean Air Act 1961, the Clean Waters Act 1970, the Noise Control Act 1975, the Environmentally Hazardous Chemical Act 1985, the Pollution Control Act 1970 and the Water Act 1912) applicable to the subject area; iv. a review of performance in terms of Development Consent conditions for the subject area; v. a listing of any variations obtained to approvals applicable to the subject area during the previous year. (d) The Minister may, by notice in writing, direct the lease holder to undertake any operations or remedial actions in such manner and within such period as may be specified in that notice so as to ensure that operations on the subject area conform to the requirements of relevant stator approvals or licences. (e) The lease holder shall conduct operations on the subject area in accordance with an "open cut application" approved by the Minister and any conditions contained in the Minister's approval of that application. Where the lease holder is of the opinion that the approved operations should be amended the lease holder shall submit an amendment for the Minister's approval.	Section 10
ML1587 Condition 13	(f) 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: i. there is no adverse environmental effect outside the disturbed area and that the land is properly drained and protected from soil erosion. ii. the state of the land is compatible with the surrounding land and land use requirements.	Sections 4 and 7

Approval	Rehabilitation Requirements	Section Addressed
	iii. the landforms, soils, hydrology and flora require no greater maintenance than that in the surrounding land. iv. in cases where revegetation in 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. v. If the original vegetation was not native, any re-established vegetation must be appropriate to the area and at an acceptable density. vi. the land does not pose a threat to public safety. (g) Any topsoil that is removed must be stored and maintained in a manner acceptable to the Director-General.	
ML1587 Condition 14	The lease holder must comply with any direction given by the Director-General regarding the stabilisation and revegetation of any mine residues, tailings or overburden dumps situated on the lease area.	Noted
ML1480 Condition 15	The registered holder shall comply with any direction, given or which may be given by the Minister, including directions regarding the stabilisation and revegetation of any dumps of coal, minerals, mine residues or tailings situated on the subject area.	Noted
ML1587 Condition 20	Access tracks must be kept to a minimum and be positioned so that they do not causeany unnecessary damage to the land. Temporary access tracks must be ripped, topsoiled and revegetated as soon as possible after they are no longer required for mining operations. The design and construction of access tracks must be in accordance with specifications fixed by the Department of Infrastructure, Planning andNatural Resources.	Section 6
ML1480 Condition 21 MPL327, MPL328 Condition 11	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 operations hereby authorised.	Noted
ML 1480 Condition 22 MPL305 Condition 37 MPL327, MPL328 Condition 12	Upon completion of operations on the surface of the subject area or upon the expiry or sooner determination of this concession or authorisation, as the case may be, or any renewal thereof, the registered 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.	If in the event that a suitable industrial land use is not found, infrastructure will be removed in accordance with the NCLP EIS.
MPL304, MPL305 Condition 36 MPL327, MPL328 Condition 13	If so directed by the Minister the registered/lease holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister anylands within the subject areas which may have been disturbed by mining or prospecting operations whether such operations were or were not carried out by the registered holder.	Noted
CCL727, CCL746, CCL763, CCL764 Condition 18 ML1587 Condition 16	Prevention of Soil Erosion and Pollution Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution (including sedimentation) or soil contamination or erosion, unless otherwise authorized by a relevant approval, and in accordance with a Mining Operations Plan. For the purpose of this condition, water shall be taken to include any watercourse, waterbody or groundwaters. The lease holder must observe and perform any instructions given by the Director-General in this regard.	Sections 3.3.6 and 7
ML1480	Soil Erosion The lease holder shall conduct operations in such a manner as not to cause or aggravate soil erosion and the lease	Sections 3.3.6

Approval	Rehabilitation Requirements	Section Addressed
Condition 30	holder shall observe and perform any instructions given or which may be given by the Minister with a view to minimising or preventing soil erosion.	and 7
MPL304, MPL305 Condition 16 MPL327, MPL328 Condition 23	The registered/lease holder shall conduct operations in such a manner as not to cause or aggravate soil erosion and the registered holder shall observe and perform any instructions given or which may be given by the Minister (or the Director-General) with a view to minimising or preventing soil erosion.	Sections 3.3.6 and 7
MPL304, MPL305 Condition 3	If so directed by the Minister and at any time or times as may be stipulated by the Minister the registered holder shall lodge for the Minister's approval a management plan comprising such details as he may specify including detailed proposals for rehabilitation of the subject area and erosion and pollution control. The Minister may at any time amend any such plan and the registered holder shall conduct operations in accordance with any such management plan as may be approved or amended by the Minister.	Noted
MPL304, MPL305 Condition 14	The registered holder shall observe any instruction given or which may be given by the responsible authority with the view to the eradication of noxious weeds within the subject area.	Noted
MPL304, MPL305 Condition 19	The registered holder shall ensure that any topsoil which may be disturbed during operation shall be removed separately for replacement as far as may be practicable.	Section 7.6
MPL327, MPL328 Condition 24	The lease holder shall ensure that any topsoil or other materials suitable for topdressing purposes which may be disturbed during operations shall be removed separately for replacement as far as may be practicable and the lease holder shall plant or sow such grasses, shrubs or trees in the replaced surface material as may be considered necessary by the Minister to control or prevent soil erosion.	Section 7
MPL327, MPL328 Condition 25	In the event of any excavations being made the lease holder shall ensure that such are refilled and the topsoil previously removed is replaced and levelled. All such refilling and levelling shall be done to the satisfaction of the Minister.	Noted
MPL304, MPL305 Condition 30	If directed so to do by the Minister the registered holder shall plant such grasses, trees or shrubs or such other vegetation as may be required by the Minister and care for same during the currency of this lease.	Section 7
MPL327, MPL328 Condition 20	The lease/registered holder shall plant such grasses, trees or shrubs or such other vegetation as may be required by the Minister and care for same during the currency of this authority of any renewal thereof, to the satisfaction of the Minister.	Section 7
MPL304, MPL305 Condition 32	If so directed by the Minister the registered holder shall cover the topsoil, to the Minister's satisfaction, such parts of the subject area as may be stipulated by the Minister and shall plant and maintain, to the Minister's satisfaction, such grasses, trees or shrubs or such other	Section 7
MPL327, MPL328 Condition 22	The lease holder shall cover with top dressing material, to the Minister's satisfaction, such parts of the subject area as may be stipulated by the Minister and shall plant and maintain, to the Minister's satisfaction, such grasses, trees or shrubs or such other vegetation as may be required by the Minister.	Section 7
MPL304, MPL305 Condition 33	The registered holder shall ensure that any topsoil which may be disturbed during operations shall be removed separately for replacement as far as may be practicable.	Section 7

Approval	Rehabilitation Requirements	Section Addressed
MPL304, MPL305 Condition 34	The registered shall plant or sow such grasses, shrubs or trees in the replaced surface material as may be considered necessary by the Minister to control or prevent erosion.	Section 7
MPL304, MPL305 Condition 35	If so directed by the Minister the registered holder shall rehabilitate to the satisfaction of the Minister and within such time as may be allowed by the Minister any land within the subject area which may have been disturbed by the operations hereby authorized.	Noted
MPL340, MPL305 Condition 38	On completion of operations the registered holder shall rehabilitate all areas disturbed as a result of operations having been carried out within the subject area and shall ensure that such areas are adequately maintained for such a period as is necessary to satisfy the Minister that long term rehabilitation standards and environmental safeguards have been fulfilled.	This MOP
MPL327, MPL328 Condition 8	Subject to any specific condition of this authority providing for rehabilitation of any particular part of the subject area affected by mining or activities associated therewith, the lease holder shall; (a) shape and revegetate to the satisfaction of the Minister, any part of the subject area that may, in the opinion of the Minister have been damaged or deleteriously affected by mining operations and ensure such areas are permanently stabilised, and, (b) reinstate and make safe, including sealing and/or fencing, any excavation within the subject area.	Section 7
Development Consents		
DA 73-11-98		
Schedule 2, Condition 1	**General** There is an obligation on the Applicant to prevent and minimise harm to the environment throughout the life of the project. This requires that all practicable measures are to be taken to prevent and minimise harm that may result from the construction, operation and, where relevant, decommissioning of the development.	Section 1.2.1
Schedule 2, Condition 3.2(b)	The Environmental Management Strategy shall include: (iii) overall environmental management objectives and performance outcomes, during construction, mining and decommissioning of the mine, for each of the key environmental elements for which management plans are required under this consent;	Section 1.2.1
Schedule 2, Condition 3.6	**Site Rehabilitation Management** The Applicant shall carry out rehabilitation of all mine areas in accordance with the requirements of any Mining Lease	Section 1.2.1
Schedule 2, Condition 3.12	**Subsidence Management in the Main West Mining Area** The applicant shall: (c) remediate any unpredicted subsidence impacts on the 330 kV power transmission lines and towers in the Main West Mining Area, to the satisfaction of TransGrid.	Section 1.2.1
Schedule 2, Condition 3.13	**Subsidence Management in the Newstan MOD 8 Area** The Applicant must: (b) remediate any subsidence impacts to the land, ensuring that public safety is maintained at all times	Section 1.2.1
SSD 5145		
Schedule 2, Condition 1	**Obligation to Minimise Harm to the Environment** In addition to meeting the specific performance measures and criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the	This MOP

<table>
<tr><th>Approval</th><th>Rehabilitation Requirements</th><th>Section Addressed</th></tr>
<tr><td></td><td>construction, operation, or rehabilitation of the development.</td><td></td></tr>
<tr><td>Schedule 3, Condition 27</td><td>Rehabilitation Objectives
The Applicant must rehabilitate the site to the satisfaction of DRG. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EIS, and comply with the objectives in Table 6.
Table 6: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Site (as a whole)</td><td>• Safe, stable and non-polluting.</td></tr>
<tr><td>Surface infrastructure</td><td>• To be decommissioned and removed, unless DRG agrees otherwise.
• NCSS, CES, Hawkmount Quarry and Reject Emplacement areas to be made safe and hydraulically and geotechnically stable.
• NCSS and CES to be rehabilitated for use as light industrial areas; or revegetated with suitable local native plant species to a landform consistent with the surrounding environment.</td></tr>
<tr><td>Rehabilitation materials</td><td>• Materials from areas disturbed under this consent (including topsoils, substrates and seeds) are to be recovered, managed and used as rehabilitation resources.</td></tr>
<tr><td>Reject Emplacement Areas</td><td>• Hawkmount Quarry and the Reject Emplacement Area sites to be revegetated with suitable local native plant species, and to a landform consistent with the surrounding environment.
• Capping materials (including depth of application) to be approved by DRG prior to capping.</td></tr>
<tr><td>Revegetated final landforms</td><td>• Stable and sustain the intended land use.
• Consistent with surrounding topography to minimise visual impacts.
• Incorporate relief patterns and design principles consistent with natural drainage.</td></tr>
<tr><td>Native flora and fauna</td><td>• Flora species used in rehabilitation selected to re-establish and complement local and regional biodiversity.
• Rehabilitated areas contribute to achieving self-sustaining biodiversity habitats.</td></tr>
<tr><td>All watercourses subject to mine-water discharges</td><td>• Hydraulically and geomorphologically stable, with aquatic ecology and riparian vegetation that is the same or better than prior to grant of this consent.</td></tr>
<tr><td>Water quality</td><td>• Water retained on site is fit for the intended post mining land use(s).
• Water management is consistent with the regional catchment management strategy.</td></tr>
<tr><td>Community</td><td>• Ensure public safety.
• Minimise the adverse socio-economic effects of mine closure.</td></tr>
</table></td><td>Section 4</td></tr>
<tr><td>Schedule 3, Condition 28</td><td>Progressive Rehabilitation
The Applicant shall rehabilitate the site progressively, that is, as soon as is practicable following disturbance to the satisfaction of DRG.</td><td>Section 12.2.9</td></tr>
<tr><td>Schedule 3, Condition 29</td><td>Rehabilitation Management Plan
The Applicant must prepare a Rehabilitation Management Plan for the development, to the satisfaction of the Secretary and DRG. This plan must:
(a) be prepared consultation with DRG, OEH, CLWD, LMCC and the CCC;</td><td>This MOP</td></tr>
</table>

<table>
<tr><th>Approval</th><th>Rehabilitation Requirements</th><th>Section Addressed</th></tr>
<tr><td></td><td>(b) be submitted to the Secretary and DRG for approval prior to clearing any native vegetation, or as otherwise agreed by the Secretary;
(c) be prepared in accordance with relevant guidelines and consistent with the rehabilitation objectives in the EIS and in Table 6;
(d) describe how the performance of the rehabilitation would be monitored and assessed against the objectives in Table 6;
(e) provide for detailed development closure planning, including measures to minimise socio-economic effects associated with mine closure, to be developed prior to the site being placed on care and maintenance; and
(f) be integrated with the other management plans required under this consent.
The Applicant must implement the plan as approved by the Secretary.</td><td></td></tr>
<tr><td colspan="3">PA 10_0080</td></tr>
<tr><td>Schedule 2, Condition 1</td><td>Obligation to Minimise Harm to the Environment
The Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the project.</td><td>This MOP</td></tr>
<tr><td>Schedule 2, Condition 28</td><td>Rehabilitation Objectives
The Proponent shall rehabilitate the site to the satisfaction of the ExecutiveDirector Mineral Resources.
This rehabilitation must be generally consistent with the proposed rehabilitationstrategy described in the EA, and comply with the objectives in Table 6.
Table 6: 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.
Final land use compatible with surrounding land uses.</td></tr>
<tr><td>Any plug failure</td><td>Filled with earth materials to the natural land surface and compacted so as to prevent any significant ingress of surface waters to the mine.
Revegetated in a manner consistent with surrounding land.</td></tr>
<tr><td>Project surface infrastructure.</td><td>To be decommissioned and removed, unless the Executive
Director Mineral Resources agrees otherwise.</td></tr>
<tr><td>Watercourses of 2nd order or higher to be undermined.</td><td>Hydraulically and geomorphologically stable.</td></tr>
<tr><td>Built Features.</td><td>Repair to pre-mining condition or equivalent unless:
– the owner agrees otherwise; or
– the damage is fully restored, repaired or compensated for under the Mine Subsidence Compensation Act 1961.</td></tr>
<tr><td>Community.</td><td>Ensure public safety.
Minimise the adverse socio-economic effects associated with mine closure.</td></tr>
</table></td><td>Section 4</td></tr>
<tr><td>Schedule 2, Condition 29</td><td>Progressive Rehabilitation
The Proponent shall carry out the rehabilitation of the site progressively, that is, assoon as reasonably practicable following disturbance.</td><td>Section 2.2.9</td></tr>
<tr><td>Schedule 2,</td><td>Rehabilitation Management Plan</td><td>This MOP</td></tr>
</table>

Approval	Rehabilitation Requirements	Section Addressed
Condition 30	The Proponent shall prepare and implement a Rehabilitation Management Planfor the project to the satisfaction of the Executive Director Mineral Resources. This plan must: (a) be prepared in consultation with the Department, OEH, NOW, Council and the CCC; (b) be prepared in accordance with any relevant DRG guideline; (c) provide for detailed mine closure planning, including measures to minimise socio- economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance; (d) build, to the maximum extent practicable, on the other management plans required under this approval; and (e) be submitted to the Department and the Executive Director Mineral Resources within 12 months of this approval.	
Environmental Assessments		
Newstan Colliery Life Extension Project EIS (1998)		
NREA – the following is a summary of the proposed rehabilitation of the NREA: • Placement in this area is to fill the Northern area to a level of approximately the final landform of existing emplacement, that is an approximate height of RL 80 m; • Material to be compacted to an 80-90% compaction level; • Final landform batters will have a general maximum grade of 1 vertical: 4 horizontal in order to facilitate a stable, revegetated final land surface; • Final landform is capped with inert material with a minimum depth of 500mm; • Revegetation of the final landform with native species must occur following capping. SREA – the following is a summary of the proposed rehabilitation of the SREA: • The fine tailings will be capped with approximately 1.5 metres of coarse reject material • Material to be compacted to an 80-90% compaction level; • Capping of reject with 500mm of inert material; • Revegetation of the final landform with native species. • The conceptual final landform emplacement makes provision for the progressive filling of the northern side of the valley to an elevation of 60m AHD to 62m AHD. Once finally shaped and vegetated, all rehabilitation areas will be maintained until stable, non-eroding, landform and self sustaining vegetative cover is achieved.	Section 2.2.5
A northern extension to the existing reject emplacement area is proposed to be utilised for the initial four to six years of the Life Extension Project before its final rehabilitation to natural bushland. It will enable stabilisation of the banks on the northern side of the existing emplacement area. This area does not have sufficient capacity to accommodate all of the reject that may be generated by the Life Extension Project. Consequently, it is proposed to establish further reject emplacement in an area referred to as the Southern Reject Emplacement Area. This area is located within a valley on the southern side of Fassifern Road. Reject would be sequentially placed in this area in a series of cells to enable progressive rehabilitation of the completed cells. Detailed flora, fauna, air quality and noise assessment of the proposed reject emplacement is currently being completed	Section 7
Re-use of plant material removed from the disturbance areas (except weeds). This material will be chipped and used in site rehabilitation works, or should be spread into surrounding bushland. This retains a store of local seed which can replenish the soil seed-bank.	No longer consistent with best practice.
The use of flora species which are native to the region in rehabilitation and replanting regimes (e.g. on the completed waste emplacements). Where possible, seed and cuttings from the threatened plant species (*Tetratheca juncea*), and the regionally significant *Hakea bakeriana*, should be collected and used in rehabilitation works. A rehabilitation plan will be prepared for the waste emplacement areas, including protocols for preparing a suitable landform and substrate for the re-planting of native plant species.	Noted
Thus, like topsoils in the Southern Reject Emplacement Area, the topsoils in the Northern	Completed

Approval	Rehabilitation Requirements	Section Addressed
Reject Emplacement Area should be stripped and stockpiled for subsequent use in rehabilitation.		
Newstan Colliery Main West Mining Project Environmental Assessment (2011) (MOD 4)		
Rehabilitation at the Newstan Colliery is undertaken in accordance with the Newstan Colliery Land Management Plan (LMP) dated May 2010 and the Centennial Newstan Rehabilitation Strategy dated March 2007. The Centennial Newstan Rehabilitation Strategy was approved in February 2011 by DTIRIS. The primary objective for the rehabilitation strategy is to return disturbed areas to a natural land use that is consistent with its pre-mining land use, and a standard that is acceptable to the DTIRIS Minerals Resources, the land owners and other relevant government agencies. Land management and rehabilitation contained within the LMP and rehabilitation strategy has split the area for management into six separate domains for detailed descriptions of the varying management practices. Progressive rehabilitation is focused on the actions within the following domains: • Domain 4 (NREA) – The NREA has been progressively rehabilitated. Newstan Colliery plans to continue shaping, capping and seeding of the remaining areas of coarse reject material and to continue progressing the capping of the tailings storage facility during the care and maintenance phase; • Domain 5 (SREA) – The SREA has been designed to be progressively developed in stages. Progressive rehabilitation works have been undertaken in this area and will continue where possible; and • Domain 6 (Surface Areas External to Newstan Pit Top) – This domain includes surface infrastructure that has been previously rehabilitated. It also includes areas that may be subject to subsidence, and where required subsidence remediation and rehabilitation works will be undertaken including rehabilitation of surface cracks by (ripping/excavating and backfilling and reseeding), minor erosion/sediment control works and minor remedial drainage earthworks.		Section 4
Environmental Assessment – Newstan Colliery, Modification of Development Consent Boundary, Section 75W Modification to Development Consent DA 73-11-98 (2013) (MOD 5)		
Post Mining Closure and Rehabilitation In accordance with Condition 3.6 (Site Rehabilitation Management) and Condition 3.9 (Land Management) of Development Consent DA 73-11-98, rehabilitation at the Newstan Colliery is undertaken in accordance with the approved Newstan Colliery Land Management Plan (LMP) dated May 2010 and the Centennial Newstan Rehabilitation Strategy (Rehabilitation Strategy) dated March 2007. The primary objective of the Rehabilitation Strategy is to return disturbed areas to natural land uses that are consistent with the pre-mining land uses, and to a standard that is acceptable to the Department of Trade, Investment, Regional Infrastructure and Services' (DTIRIS) Division of Resources and Energy (DRE), the landowners and other relevant government agencies. The LMP and Rehabilitation Strategy split the Newstan Colliery holding into six separate management domains. Progressive rehabilitation is focused on the actions within the following domains: • Domain 4 (NREA) - The NREA has been progressively rehabilitated. Rehabilitation includes shaping, capping and seeding of the remaining areas of coarse reject material, as well as progressive capping of the tailings storage facility; • Domain 5 (SREA) - The SREA has been designed to be progressively developed and rehabilitated in stages; and • Domain 6 (Surface Areas External to Newstan Colliery Surface Site) - This domain includes surface infrastructure that has been previously rehabilitated. It also includes areas that may be subject to subsidence, and where required subsidence remediation and rehabilitation works are undertaken.		Section 4
Newstan Colliery Development Consent Modification – Environmental Assessment (2018) (MOD 8)		
The primary objective for rehabilitation of Newstan Colliery is to return areas to a natural land use that is consistent with the area's pre-mining land use and/or to some form of beneficial land use (for example, industry) that is acceptable to relevant stakeholders. There would be no change to the closure and rehabilitation requirements at Newstan		Section 4

Approval	Rehabilitation Requirements	Section Addressed
Colliery as a result of the proposed modification.		
Northern Coal Logistics Project Environmental Impact Statement (GSSE 2014)		
Preserve downstream water quality The quality of surface and ground waters that leave the lease areas will be adequate to maintain environmental values and beneficial uses downstream of the Project Application Area.		Section 4
Domain Rehabilitation Objectives • Dirty water runoff from disturbance areas will be captured and diverted to retention dams; • Dirty water will be treated before discharge from site in accordance with regulatory requirements; • Decommission and remove all unwanted built infrastructure prior to closure unless otherwise approved; • Retain a safe and stable landform that will pose no long-term environmental hazard; • Create final landforms suitable for the nominated end land use being native vegetation; • Form stable landforms that will pose no long-term environmental hazard; • Establish native vegetation communities compatible with the immediate surrounds; • Contribute to the development of wildlife corridors; • Remove any unwanted plant, equipment and buildings; • Retain access, power and related services to facilitate attractiveness of site for a future industrial land use; • Retain surface water management systems; • Make safe and seal all mine entries; • Identify and remove all hazardous materials from the site (including asbestos); and • Investigate and remediate all contamination to a standard suitable for an industrial land use.		Section 4.3
Northern Coal Logistics Project – Decommissioning and Rehabilitation Strategy (SLR 2014)		
The water supply, quality monitoring and management infrastructure at Newstan Colliery Surface Site and the mine dewatering infrastructure at the Cooranbong Entry Site (including all LDPs) will be decommissioned and the land rehabilitated to native bush land and mixed native grasses to be consistent with surrounding land use. It is likely that the existing potable water supply infrastructure to the Cooranbong Entry Site will remain in situ to service any future land use.		Section 6
The post-mining land use for the tailings and rejects storage areas is intended to be a combination of native bushland and mixed native grasses commensurate with the pre-mining conditions. In view of the relatively small surface disturbance areas associated with the rejects emplacement areas, consideration of the potential for integration with other rehabilitation and off-set strategies is minimal.		Section 4
During closure planning Centennial will liaise with stakeholders to identify a suitable alternative use(s) for the haul roads, which may include use by industry and/or use as public roads. In the event that an alternative post disturbance use is not identified and agreed with relevant stakeholders, the haul roads will be rehabilitated to native bush land and mixed native grasses. Due to the elongated nature of the domain, the post-mining land use is proposed to be consistent with surrounding land use at the time of decommissioning.		Section 4
It is acknowledged that there are some elements at both sites that are specifically related to underground coal mining and coal handling/processing and these will need to be decommissioned and removed from the site before it could be used for some other beneficial land use. To address this requirement, a decommissioning and demolition strategy will form an integral part of the detailed closure planning to be undertaken as the Project approaches five years from the planned closure. This will include engaging structural engineers and appropriate technical experts with experience in demolition and the application of relevant Australian Standards and guidelines. A detailed investigation of all structures will be completed at this stage to determine the appropriate techniques,		Noted

Approval	Rehabilitation Requirements	Section Addressed
	equipment required, and the sequence for decommissioning and removal required to execute the demolition activities safely. Prior to commencement of demolition, an asset register will be distributed to all other Centennial sites to ascertain whether any of the key assets can be reused within the Centennial business.	
	A site investigation will be completed during for the decommissioning and demolition phase for mining infrastructure.	Noted
	Site Preparation Prior to the commencement of any demolition activities the following tasks will be undertaken: • All sumps will be dewatered; • All items will be decommissioned, de-oiled, depressurised and isolated; and • All hazardous materials will be removed and transported to appropriately licensed disposal facilities.	Section 5.2
	Contamination Further to this, Centennial will undertake additional contamination assessments and, if needed, remediation activities, at the Newstan Colliery Surface Site and Cooranbong Entry Site well in advance of final closure. Where possible all identified sources of contamination will be remediated during the operational phase of the Project. In some cases, however, this may not be possible (for example, under existing slabs, and workshops) and in these circumstances the remediation will be undertaken following closure and during decommissioning.	Section 3.3.10
	Hazardous Materials Prior to the demolition of any structures, a hazardous materials assessment will be undertaken to determine whether there are any hazardous materials present, including asbestos. Where hazardous materials are identified, they will be assessed and quantified to enable appropriate safety measures to be implemented during removal by a licensed contractor. All hazardous material removed will be recorded and disposed of at an approved waste management facility.	Section 3.3.11
	Site Services All services, including power, water, data and telephone, that are not required for some other commercial post disturbance land use will be safely isolated, disconnected and terminated. Generally all underground services will be made safe and left buried in-situ. Overhead power lines will be removed and the materials, including poles and wire, recovered for potential re-sale or recycling where practicable. Where they are retained the site services plans will be updated to ensure all services are adequately recorded. Where also practicable, pipelines and cables will be capped and remain in-situ. This is due to the risk of disturbing the re-established vegetation by excavation and removal. The location of pipelines that are to remain in-situ and that are not required for some other land use will be recorded in an abandoned services register and signs will be erected where appropriate.	Section 2.4
	Equipment and Buildings All demountable/transportable buildings not required for some other commercial post disturbance land use will be removed from the surface facility sites. All remaining permanent buildings, including the CHP, CPP and associated coal chain infrastructure will then be demolished, with the component materials being recycled or re-sold where practicable. Any materials not recycled or re-sold will be disposed of in a suitable location either on-site or off-site at a licensed waste management facility. Opportunities for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible. Material assessed as “not hazardous or contaminated” by a suitably qualified person will be crushed and disposed of within associated portal entries or placed as fill into shafts. Concrete footings and pads will be broken up and removed. Options for the re-use of this material (for example, crushed and used for road and track stabilisation) will be investigated as the Project approaches closure. If re-use or recycling opportunities are not available or viable, all non-contaminated waste material will be disposed of in a suitable	Section 2.4

Approval	Rehabilitation Requirements	Section Addressed
	location on-site, filling nearby drifts, or off-site at an approved waste management facility. All sumps will be de-watered and de-silted prior to the commencement of demolition. In addition, all items of equipment will be de-oiled, degassed, depressurised and isolated, and all hazardous materials will be removed from the Project Application Area. All recoverable scrap steel will be sold and/or recycled. Prior to disposal, all wastes will be assessed and classified in accordance with the relevant regulatory requirements. Where structures are removed, the associated concrete slabs will also be removed, with all areas will then be reshaped, deep ripped, topsoiled and seeded. Where suitable quantities of topsoil material is not available at the site, the use of other organics such as bio-solids and/or compost will be assessed as an appropriate addition to enable the establishment of an appropriate vegetation cover.	
	Reclaim Tunnels Where practicable the material overlaying the reclaim tunnels will be removed to expose the roof of the tunnels. Once the roof is exposed the concrete will be broken up and placed back into the tunnel or disposed of in a suitable location on-site, filling nearby drifts/shafts or off-site at an approved waste management facility. These works will aim to leave minimal cavities prior to backfilling the tunnel. Once the reclaim tunnels are backfilled, a geotechnical assessment will be undertaken to determine whether the areas can be built over or whether they should be quarantined from future development.	Section 2.4
	Bitumen Roads, Tracks and Hardstand Areas Roadways and/or tracks may be required to remain to provide access to some other post disturbance land use as well as being required for the on-going access for monitoring and maintenance activities. Alternatively, roads and/or tracks may remain on-site if agreed in writing by the landowner. Access roads, tracks, car parks and hard stand areas that are not required will be scalped to remove stabilised and compacted material. The inert waste will be disposed of in a suitable location on-site or offsite at an approved waste management facility. Material assessed as “not hazardous or contaminated” by a suitably qualified person can be crushed and disposed of within associated portal entries or placed as fill into the shafts. Minor reshaping work may be undertaken to ensure surface level consistency with the surrounding areas and rehabilitated. Any creek crossings (such as culverts) will be removed and the pre-existing drainage line re-instated.	Section 2.4
	Fuel Farms and Chemical Storage Areas Prior to closure any remaining fuel and/or chemicals will be recycled or disposed of at an appropriately licensed facility. All items of equipment will be de-oiled, degassed, depressurised and isolated, and all hazardous materials removed from the site. All infrastructure associated with fuel farms and chemical storage areas will be demolished and disposed of off-site at a licensed waste management facility. Opportunities for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible. Concrete footings and pads will be broken up and removed. Options for the re-use of this material (for example, crushed and used for road and track stabilisation) will be investigated as the operation approaches closure. If re-use or recycling opportunities are not available or viable, all non-contaminated waste material will be disposed of in a suitable location on-site or off-site at an approved waste management facility. Material assessed as “not hazardous or contaminated” by a suitably qualified person can be crushed and disposed of within the associated portal entries or placed as fill into shafts	Section 2.4
	Conveyors All conveyors will be dismantled and removed from site. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Over-head conveyors will be dismantled and lowered to the ground before being cut up. On ground conveyors will be cut up in-situ. All gearboxes and other vessels will be drained of oil and depressurised to remove any potential for contamination prior to demolition. The carbonaceous material below and in the vicinity of the surface conveyors will be stripped. Where possible the material will be considered for reprocessing. If this is not possible, it will be pushed up and stockpiled to be used to backfill portals or shafts, or to be placed against the cuttings and highwalls as a buttress	Section 2.4
	Stockpile Areas The carbonaceous material will be stripped and where possible the material will be	Section 2.4

Approval	Rehabilitation Requirements	Section Addressed
considered for reprocessing. If this is not possible, it will be pushed up and stockpiled to be used to backfill portals or shafts, or to be placed against the earthworks cuttings and highwalls as a buttress. All areas should then be reshaped, deep ripped, topsoiled and seeded.		
Rail Loading Infrastructure The rail loading facilities with be removed only if they are not required for some other beneficial land use. The rail track will be reused or recycled and ballast material will be used to backfill portals or shafts, or to be placed against the earthworks cuttings and highwalls as a buttress. Opportunities, for the sale and/or re-use of assets and recycling of scrap steel will be maximised where possible.		Section 2.4
Old Mine Drift Entrance and Associated Shaft (Bat Alley) Prior to sealing the old drift entrance referred to as Bat Alley, either during operations or during detailed closure planning, a detailed strategy will be developed in consultation with relevant government agencies, including the Office of Environment and Heritage (OEH) and DRE (Mine Safety). Suitably qualified experts will also be consulted during the preparation of the old drift entrance sealing strategy. Primary consideration will be given to ensuring that the old drift entrance is made safe and does not pose a potential risk to human health. However, the on-going access of bats to the workings via the old drift entrance will also be given consideration. For example, the practicability of sealing the old drift access with a grate that prohibits public access but allows the bats to enter the workings will be considered, along with any on-going maintenance requirements. The old drift entrance sealing strategy will consider: • Sealing method that facilitates bat movement; • The extent of the workings and the potential for toxic gases to accumulate, such as methane, and the propensity for spontaneous combustion; • Water management requirements, including surface water diversions to prevent surface water draining into the workings; • Fencings and signage to prevent public access within 50 metres of the old drift entrance; and • On-going management requirements. Studies will also be undertaken to provide detailed information regarding the bat populations and support the sealing strategy, including: • Number and species of bats roosting in the workings; • Estimate bat population; • Roosting type, including maternity and over-wintering; and • Other habitat in the area, including both natural and man-made.		Section 3.3.7
Cuttings and Highwalls There are some earthworks cuttings and highwalls adjacent to the workshop within the Newstan Colliery Surface Site and the rail loop areas that will be retained. Where possible clean fill material will be benched against the walls to provide buttressing to ensure they are long-term stable. If this is not possible a suitably qualified geotechnical engineer will be engaged to inspect the walls at closure and provide a suitable long-term engineering treatment to ensure the benches/highwalls are stable and do not present a safety hazard. This may include, but not be limited to, rock bolting and shot-creting. Where a highwall face of greater than 5 metres is retained, the top of the will be fenced and sign-posted to limit access and advise of the hazard.		Section 6
Water Management Facilities *Water Management Dams* All water management infrastructure will be removed unless it is required for on-going water management, (for example to prevent erosion and to ensure runoff does not cause off-site contamination). Generally, a water management infrastructure will be made safe and left buried in-situ. The location of water management infrastructure that is to remain in-situ will be recorded in an abandoned services register and signs will be erected where appropriate.		Section 2.4

Approval	Rehabilitation Requirements	Section Addressed
	Pipelines located in critical locations, for example infrastructure crossings of environmentally sensitive areas and/or riparian zones, will be filled with inert a material (such as concrete) to avoid additional disturbance of the environment. *Surface Water Infrastructure* Where practicable, contour banks, berms and other structures installed as part of the surface water management system will be re-contoured to be aligned with the surrounding environment. Concrete structures will be broken and removed.	
	LT Creek Piping If an industrial-type development is progressed as the post-operational land use, the lengths of LT Creek piped through the Newstan Colliery Surface Site will be retained and left in-situ. If the site is to be rehabilitated back to native vegetation, as assessment will be undertaken to determine if the pipework should be removed and the natural regime of the creek re-established or whether this would cause unnecessary disturbance and impact to the aquatic environment and, as such, whether the pipework should remain. If the decision is made to remove the pipework, a suitably qualified consultant will be engaged to design the re-establishment of the natural creek channel. The decommissioning and rehabilitation activities associated with the re-establishing LT Creek as a natural waterway (i.e. not piped) will include: • Re-instatement of the creek channel in accordance with designs developed by a suitably qualified expert during detailed closure planning; • Installing rock armouring where necessary, for example at significant bends; and • Installing rock drains where drainage lines enter the creek to minimise scouring and to assist dissipation of run-off.	Section 6
	All above ground pipes and pumps dispatching tailings shall be removed and disposed of appropriately. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Generally all underground services will be made safe and left buried in-situ. The location of pipelines that are to remain in-situ will be recorded in an abandoned services register.	Section 2.4
	With the exception of LDPs within the Project Application Area, there will not be any significant infrastructure located within Domain 3 that will require decommissioning. The infrastructure within Domain 3 that would require some consideration includes: • Tracks and access roads; • Laydown areas; • Cooranbong Private Haul Road; • Awaba Private Haul Road; and • All infrastructure associated with these two haul roads, including culverts, signage, water management infrastructure and fauna crossings. Given the proximity of the Project Application Area to populated areas and infrastructure (for example, local power stations and the M1 Pacific Motorway), there is a high potential that all, or part of, the haul roads will be used either as public roadways or by industry. These options will be considered further during detailed closure planning. Once the final future use for the haul roads is identified, consultation with the relevant stakeholders will be undertaken. In the unlikely event that an ongoing use of the private haul roads is not identified, or a suitable agreement cannot be reached, the haul roads and associated infrastructure will be decommissioning and rehabilitated as outlined below.	Section 5.1
	Haul Roads In the situation where the private haul roads require removal and rehabilitation (either in part or in full) the following decommissioning and rehabilitation activities will occur: • Remove bitumen layer including scraping any stabilised material and excess carbonaceous material and dispose of in an appropriate location. It is recommended that at least the wearing course, base layer and sub-base layer be removed; and • Establish erosion deflection berms to prevent erosion. All crossings, including bridges and culverts, will be removed. Any cuttings will be assessed by a qualified geotechnical engineer and appropriate treatments applied (where required). In addition, all creek crossings will be reinstated, with any culverts removed and riparian	Section 5.1

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	vegetation re-established. Additional care will be required when decommissioning the bridge over the north-south Main Northern Railway Line to ensure that the rail service is not disrupted. Appropriately qualified personnel, for example geotechnical engineers and structural engineers, will be engaged during the preparation of the dismantling strategy for the bridge. Where practicable, all associated infrastructure, including fencing and signage, water management infrastructure and fauna crossings will be removed. Re-use and/or recycling opportunities will be investigated, or alternately all "non-contaminated" waste material will be disposed of in a suitable approved location.	
	Mining Infrastructure It is intended that Domain 1 will generally be retained for some future post-mining industrial land use, and on this basis the need for significant landform establishment is expected to be limited. For the areas where the mine–related infrastructure is to be decommissioned, there will be a requirement to undertake some re-profiling including establishing final landform drainage features. This will also include hazardous material encapsulation and earthworks to achieve safe and stable slopes with the desired gradients and landscape characteristics	Section 4.2
	Southern Rejects Emplacement Area The SREA has been designed to be developed in a series of stages to minimise the land area that needs to be cleared and disturbed at any one time. This sequential development also allows a free draining and stable final landform to be achieved if emplacement in this area ceases at any stage of the development. The closure plan for the SREA will require consultation with technical specialist to design and implement an appropriate closure strategy. The operational performance of the SREA and decant water management will have a significant influence on the final strength and consolidation properties of the materials. Strategies that will be further considered during development of rehabilitation plans will include: • On-going monitoring and maintenance of the final landform to assess the rate of on-going settlement and to maintain the surface integrity of the landform; and • Design the landform to the approved average finished landform level of 50 m AHD whilst maintain a surface that promotes sheet flow of surface water to eliminate the need for engineered drainage structures across the final landform surface t. . Progressive rehabilitation will continue to be undertaken as the SREA is developed in stages, and the volume of the tailings dam will be progressively increased by lifts of the dam wall. Rehabilitation of the dam will only start once the tailings discharge operation is complete and sufficient drying is achieved to allow the placement of permanent capping material. During detailed closure planning for the SREA a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include: • Providing a stable landform; • Providing a landform surface that is resistant to erosion; • Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and • Minimises the risk of environmental harm from seepage. Detailed mine closure planning will include a materials balance to determine the volumes of capping material and select fill required to encapsulate the rejects and construct a free draining landform. Prior to the re-establishment of vegetation, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials in accordance with "Blue Book" requirements and the approved Erosion and Sediment Control Plan.	Section 2.2.5 and 5.2
	Northern Reject Emplacement Area The NREA is nearing capacity and on-going progressive rehabilitation is being undertaken. The closure of the NREA will require consultation with technical specialist to design and	Section 2.2.5 and 5.2

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	implement an appropriate closure strategy. All above ground pipes dispatching tailings shall be removed and disposed of appropriately. Opportunities for the sale and/or re-use of assets and recycling of materials will be maximised to the extent practicable. Generally all underground services will be made safe and left buried in-situ. The location of pipelines that are to remain in-situ will be recorded in an abandoned services register. During detailed closure planning for the NREA a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include: • Providing a stable landform; • Providing a landform surface that is resistant to erosion; • Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and • Minimises the risk of environmental harm from seepage. The capping of the NREA will be designed and constructed so that the surface will be free draining. Topsoil will be used to resurface the area which will then be revegetated. This will inhibit the ponding and infiltration of surface water and minimise the potential for leachate. Rock armouring will also be considered if required to prevent excessive slope erosion.	
	Hawkmount Quarry Progressive rehabilitation of Hawkmount Quarry will be required during operation as possible. During detailed closure planning for the Hawkmount Quarry a specific closure strategy will be developed in consultation with the State regulators and regulatory guidelines. Key objectives of the closure strategy will include: • Providing a stable landform; • Providing a landform surface that is resistant to erosion; • Providing a surface cover that minimises the risk of infiltration, promotes shedding of surface water and promotes growth of vegetation; and • Minimises the risk of environmental harm from seepage. The capping of the Hawkmount Quarry will be designed and constructed so that the surface will be free draining. Topsoil will be used to resurface the area which will then be revegetated. This will inhibit the ponding and infiltration of surface water and minimise the potential for leachate. Rock armouring will also be considered if required to prevent excessive slope erosion. Detailed mine closure planning will include a materials balance to determine the volumes of capping material and select fill required to encapsulate the rejects and construct a free draining landform. Prior to the re-establishment of vegetation, temporary control measures will be utilised for erosion and sediment control. These measures may include the use of sediment fences for non-channelised flow over disturbed areas, sand bags, rip rap, or any combination of those materials in accordance with “Blue Book” requirements and the approved Erosion and Sediment Control Plan.	Section 2.2.5
	It is intended that the Cooranbong and Awaba Private Haul Roads will be retained and therefore there is no requirement for landform establishment. However in the unlikely event where the private haul roads are required to be rehabilitation (either in part or in full) the following landform establishment activities will occur: • Reshaping to be commensurate with the surrounding landform; • Ensure the final profile of the fill is convex so that drainage occurs radially outwards; and • Rip and scarify the road alignment, verges and berms, etc. Further to the haul roads, all the LDPs within the Project Application Area will be removed and the disturbance footprints reshaped to be commensurate with the surrounding landform.	Section 5.1
	Progressive Rehabilitation Due to the nature of operations proposed as part of the Northern Coal Logistics Project, including the minor areas of surface disturbance, the ability to undertake progressive rehabilitation, particularly revegetation, will be relatively limited compared to extractive	Section 2.2.9

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mining operations. However, Northern Coal Services will adopt a progressive approach to rehabilitation (as needed) in accordance with a series of approved management plans, including on-going maintenance of all previously rehabilitated areas within the Project Application Area.		
Soil Re-Spreading and Seedbed Preparation Soil should be re-spread directly onto stripped areas where practical. As recommended by SLR (2014), topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, where possible, to reduce the potential for topsoil loss to wind and water erosion. Soil should be re-spread to the approximate depth from which it was stripped. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation. All topsoiled areas should be lightly contour ripped (after topsoil spreading) and, where possible, ripped when the soil is moist and immediately prior to sowing. If required, the re-spread topsoil surface should be scarified prior to, or during seeding, to reduce run-off and increase infiltration.		Section 7.6
A revegetation strategy will be developed for the Project and documented in the MOP to meet the post-mining land-use objectives and maintain effective erosion and weed controls. Revegetation activities will be scheduled to occur promptly following the completion of topsoil spreading and drainage works. Where possible, the timing of seeding will coincide with the preferred native grass and tree seasonal sowing periods in autumn or spring. On prepared surfaces, selected tree, shrub and pasture species will be sown using seed stock and/or planted depending on the species, slope gradients and area to be revegetated. Tree and shrub species will be established at a density and richness consistent with the nominated post-mine ecosystem		Section 7.8
Species to be used for Revegetation Species selection for areas to be rehabilitated to native bushland and mixed grasses will focus on those species that will successfully establish on the available growth medium, bind the soil and result in a variety of structure and food/habitat resources. Whilst every attempt will be made to use species that existed prior to the commencement of mining, some additional species may be required to ensure suitable initial groundcover for site stabilisation. Deep rooting native trees will generally not be used on the REAs, instead they will be revegetated with native shrubs and native grasses. A combination of native trees and grasses will be used for all other areas with a native bushland proposed post-mining land use. A combination of native and introduced pasture species may be used on the disturbance areas to ensure the quick establishment of a continuous groundcover, thereby reducing the risk of erosion. Legumes may also be selected to assist in the supply of bio-available nitrogen to the soil.		Section 7.8
Rehabilitation Monitoring and Maintenance Areas being rehabilitated will be regularly inspected and assessed against the long and short-term rehabilitation objectives. A dedicated monitoring system will be established in order to assess effectiveness of implementation of the rehabilitation measures as well as to identify the need for corrective action as soon as required. The monitoring program will be developed for each closure domain, incorporating the most appropriate indicators and methods that: • Provide a measure of completion criteria to be assessed in accordance with the defined rehabilitation objectives; • Are reproducible; • Utilise scientific recognised techniques; and • Are cost-effective.		Section 7.9
Awaba Colliery Environmental Assessment (September 2010)		
All rehabilitation will continue to be undertaken in accordance with the site's existing Life of Mine Plan.		Noted
Progressive Rehabilitation The approved Life of Mine Plan for Awaba Colliery provides the overall strategy and methods for undertaking rehabilitation within the Awaba Colliery. During the life of the		Section 2.2.9 and 7

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	Project small portions of the 17 hectares used for services and infrastructure are to be decommissioned and rehabilitated progressively as deemed appropriate. The details for the progressive rehabilitation of the surface facilities, during the decommissioning of the Awaba Colliery, are provided within the approved Life of Mine Plan. This progressive rehabilitation will be carried out in four stages and generally, involve the following: • Stage 1 – Sealing of shafts and boreholes – There are two shafts, one upcast and one downcast that will require to be filled. An independent consulting firm will be engaged to supply engineering details of the Shaft Capping with plans to be prepared in consultation with the District Inspector. Boreholes will be sealed in accordance with Clause 137 of the Coal Mines Regulation Act 1982 No. 67, at such time they are no longer required for the Awaba Colliery operations. • Stage 2 – Sealing of drift entries – There are four drift entries that require filling, as above, sealing plans will be prepared in consultation with the District Inspector. • Stage 3 – Demolition and removal of surface infrastructure – There are a number of buildings on the surface that will either be demolished or removed from site. This is inclusive of hard stand areas and car parking areas. All bitumen from roads and car parks and any other hard stand areas will be recycled by the contractor. Recycling of building materials will be maximised and documented by the contractor for report in the AEMR. Some of the surface infrastructure at the Awaba Colliery is in excess of 50 years age. A heritage assessment, including consultation with the Heritage Office, will be undertaken to assess the significance of the pit top buildings, determine heritage listing and appropriate action prior to works commencing. • Stage 4 – Surface contouring and revegetation – Final contouring will be undertaken to provide a landform near as practicable to the original contours of the land. Rehabilitation will be undertaken using flora species commensurate with the surrounding landscape.	
	Rehabilitation and Final Landform Progressive rehabilitation will continue to be undertaken in accordance with the approved Life of Mine Plan described in Section 3.11 and obligations of Consolidated Coal Lease CCL746. During the life of the Project small portions of the 17 hectares used for services and infrastructure are to be decommissioned and rehabilitated progressively as deemed appropriate. Following the completion of mining within the proposed areas for the Project, Awaba Colliery will be placed into care and maintenance until a final life of mine strategy can be developed in consultation with relevant stakeholders. It is also noted that other areas of historical existing workings within the Consolidated Coal Lease and beyond the Application Area (dating back to 1947) will continue to be managed and rehabilitated post-mining (where required) in accordance with the requirements of the Life of Mine Plan and CCL746 in consultation with I&I, with measures including (but not necessarily limited to) the following: • Ongoing quarterly subsidence inspections; • Any subsidence identified will be managed in accordance with the Awaba Colliery Public Safety Management Plan and the Watercourse Management Plan, which include remediation strategies; • I&I to be notified upon identification of subsidence; • Rehabilitation of subsidence will be reported in the AEMR; and • Security deposit is held by I&I for the ongoing implementation of rehabilitation within the historical workings. Notwithstanding the above, the following specific obligations under CCL746 will be completed prior to relinquishment of the lease following mine closure: • Rehabilitation of surface of any lands disturbed by mining operations and associated activities to the satisfaction of the Minister (of I&I) (in accordance with Section 20); • Upon completion of operations on the surface or expiry of the lease, buildings, machinery, plant, equipment, constructions and works as may be directed by the Minister shall be removed and the surface rehabilitated and left in a clean, tidy and safe condition to the satisfaction of the Minister (I&I) (Section 25); • Where rehabilitation is required, in accordance with Section 26, Centennial shall: - Reinstate, level, regrass, reforest, and recontour areas that have been damaged or	Sinkhole Rehabilitation Plan, Section 6

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	deleteriously affected by mining operations and ensure such areas are permanently stabilized to the satisfaction of the Minister; - Fill in, seal or fence any excavation within CCL746 to the satisfaction of the Minister.	
	Conceptual Post-Mining Land Use The final land use will be dependent on a number of potential requirements including,but not limited to, the potential use of the Awaba Colliery surface facilities for the ongoing operations associated with Newstan Colliery and/or other possible industrial or commercial users, and the potential heritage significance of some of the pit top buildings (which will be subject to a heritage assessment of significance prior to decommissioning). Where practicable and appropriate, options for potential ongoing utilisation of useful assets (such as relevant buildings) may also be considered, as outlined further in the EA. However, it is proposed that the final land use of the majority of the Awaba Colliery lease area will include bushland made up of predominantly endemic species. This involves the decommissioning and removal of relevant buildings and other surface infrastructure, the installation of appropriate long term surface water management structures and revegetation of all disturbed areas. Returning the disturbed land to native bushland is, at this point in time, the preferred option. There may be additional appropriate land use options at mine closure and in consultation with stakeholders at that time, any such options will need to be assessed as appropriate. In terms of post-mining land use(s), options were provided for a Heritage Area, Industrial Area, and Potential Mining use(s), the following potential options may also be considered: a) Heritage Area Prior to the decommissioning of any of the pit top buildings, the Awaba Colliery will undertake a heritage assessment of significance. Specific land use options will be developed depending on the outcomes of this assessment. Should the heritage assessment of significance identify the Awaba Colliery pit top buildings as having a high archaeological value, the final land use would need to be developed in accordance with relevant stakeholders (including the Lake Macquarie City Council) and the NSW Heritage Office. b) Industrial Area The workshops, store, bathhouse and offices may also provide for a light industrial land use such as an engineering/workshop complex, or, as a bulk storage/container/internodal facility. This post-mining land use option would need to be developed in consultation with the Lake Macquarie City Council to ensure that the appropriate zoning is applied to the land to allow for a light industrial land use. c) Potential Mining Use The administration buildings, workshop, CPP, associated stockpile and haul truck loading facility could be maintained for coal preparation or other mining related activities.	Section 4.2
	Conceptual Post-Mining Landform The post-mining landform will be dependent on the final land use. The existing Life of Mine Plan shows the proposed final landform, which has been designed to mimic the surrounding topography to provide, to as best as possible, a landform commensurate with that prior to the establishment of the Awaba Colliery. However, this design will be reviewed and updated, if required, to ensure the final landform suits the requirements for the final land use. The final landform would also incorporate contour/graded banks installed during the development of the final landform. The spacing and ultimate dimensions of these structures would be a function of the final slope and catchment area and, consequently, would be determined at the time of installation. On the steeper slopes, bank spacing should generally range between 50 and 80 metres, however, all permanent contours and water management structures will be developed in accordance with the recommendations of the *Managing Urban Stormwater: Soils and Construction* (Vol 2E), or other relevant guidelines. Other features forming part of the final landform within the Awaba Colliery will be the use of rock-lined drop structures and sediment basins used for surface water management and erosion and sediment control. These structures will be maintained until a stable vegetated surface is established.	Section 4.2