

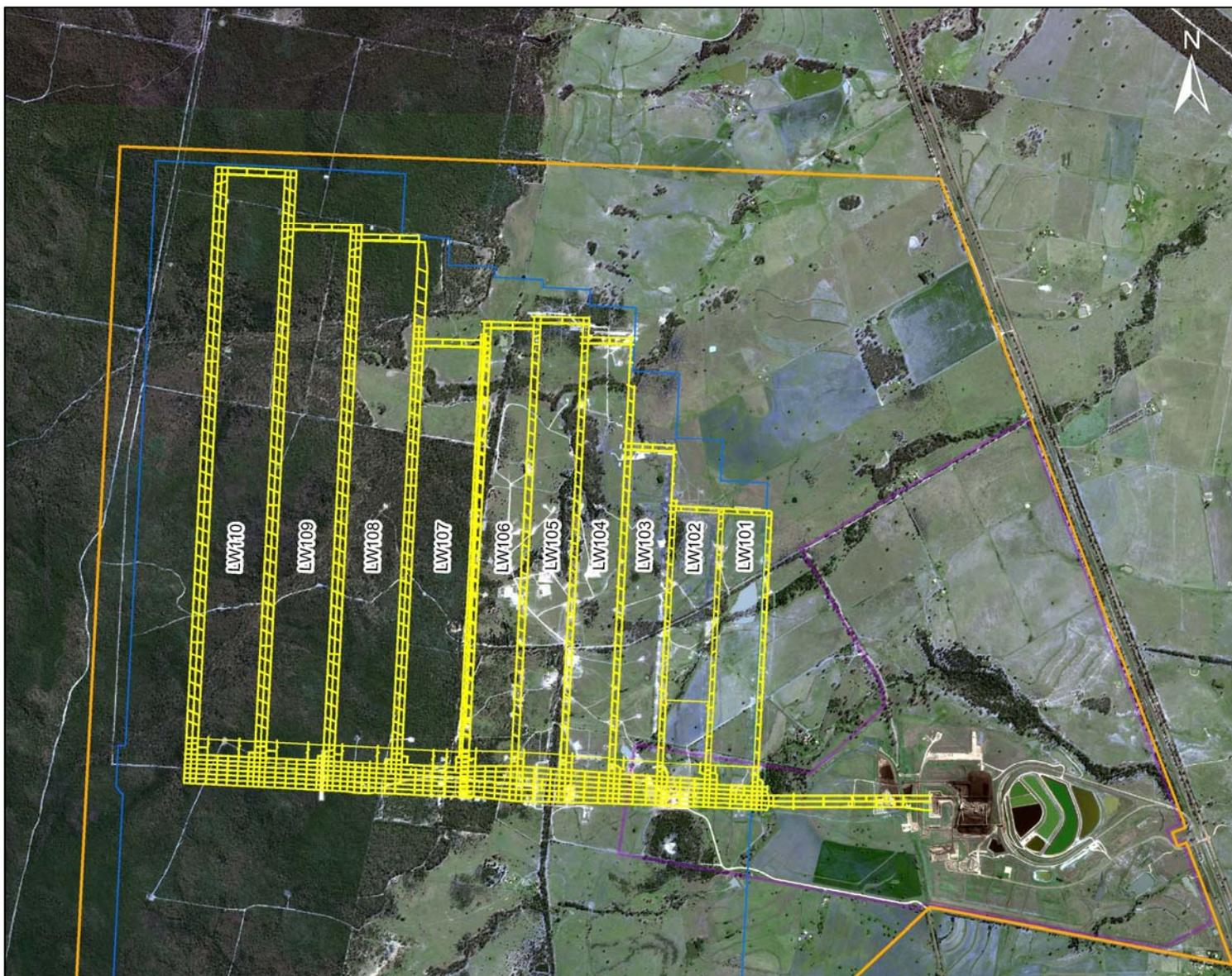


Narrabri Mine

Landscape Management Plan (LW101 to LW110)

Prepared for
Narrabri Coal Operations Pty Ltd

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Abbreviations

ABBREVIATION	DESCRIPTION
DPI Water	Department of Primary Industries – Water
ELA	Eco Logical Australia Pty Ltd
EMS	Environmental Management System
LSMP	Landscape Management Plan
MCP	Mine Closure Plan
ML	Mining Lease
MOP	Mine Operations Plan
Mt	million tonnes
Mtpa	million tonnes per annum
NSC	Narrabri Shire Council
OEH	Office of Environment and Heritage
PA	Project Approval
RMP	Rehabilitation Management Plan
ROM	Run-of-mine

1 Introduction

The Narrabri Mine is located approximately 28 km south-east of Narrabri and approximately 10 km north-west of Baan Baa in north-western New South Wales (Figure 1). Narrabri Mine is owned and operated by Narrabri Coal Operations Pty Ltd (NCOPL), which is a joint venture between Narrabri Coal Pty Ltd (70%), Upper Horn Investments (Australia) Pty Limited (7.5%), J-Power Australia Pty Limited (7.5%), POSCO Daewoo International Narrabri Investment Pty Limited and Kores Narrabri Pty Limited (7.5%), EDF Trading Australia Pty Limited (7.5%), in which Narrabri Coal Pty Ltd is an owned subsidiary of Whitehaven Coal Limited (WCL).

Narrabri Mine covers an area of approximately 5,298 ha within the Kurrajong and Pine Creek tributary catchments of the Namoi River Catchment. Narrabri Mine is located within an area of mainly freehold agricultural and forested land, with small sections located within the Pilliga East and Jacks Creek State Forests.

Narrabri Mine is located within Mining Lease (ML) 1609, which is held by WCL and has been in operation since 2008. Mining at the site is being undertaken in two stages, during which the mine progressed from a 2.5 Million tonnes per annum (Mtpa) continuous miner operation (Stage 1) to an 11 Mtpa longwall mining operation (Stage 2).

Stage 1 (project approval for Stage 1 (PA 05_0102) was issued on 13 November 2007) involved the establishment of surface facilities to support the underground operations using underground continuous miner methods. As a requirement of PA 05_0102, a Landscape Management Plan (LSMP) was prepared for Stage 1 by Eco Logical Australia (ELA) in 2009 (ELA 2009), which covers the construction of surface infrastructure associated with the mine, a box cut and pit bottom area and the infrastructure associated with the underground mining area. Stage 1 of the project covers a combined surface area of 255 ha designated for all surface infrastructure associated with this mine.

Stage 2, (project approval for Stage 2 (PA 08_144) was issued on the 26th July 2010), involved converting the existing mining operations to longwall mining of 20 longwall panels. As a requirement of the Project Approval (PA) for Stage 2 of the Narrabri Coal Mine operations, the existing LSMP for Stage 1 was revised to encompass all proposed mining activities and potential impacts associated with the landscape management for the site (Stages 1 and 2).

Schedule 5, Condition 3 of the Stage 2 approval required the preparation of a LSMP to the satisfaction of the Secretary and the Division of Resources and Energy (DRE). The two key components of the LSMP were:

- A Rehabilitation Management Plan (RMP)
- A Mine Closure Plan (MCP).

The original LSMP was revised in February 2016 to include LW106 based on the detailed Mine Subsidence Assessment for the Proposed Addition to Longwall 106 to the Longwall 101 to 105 Extraction Plan by Ditton Geotechnical Services Pty Ltd (DGS 2015).

This revision to the Stage 2 LSMP includes detailed information on LW107 to LW110 based on the Mine Subsidence Assessment for the LW107 to LW110 Extraction Plan by Ditton Geotechnical Services Pty Ltd (DGS 2016). This revision is for submission with the Extraction Plan for LW107 to LW110.

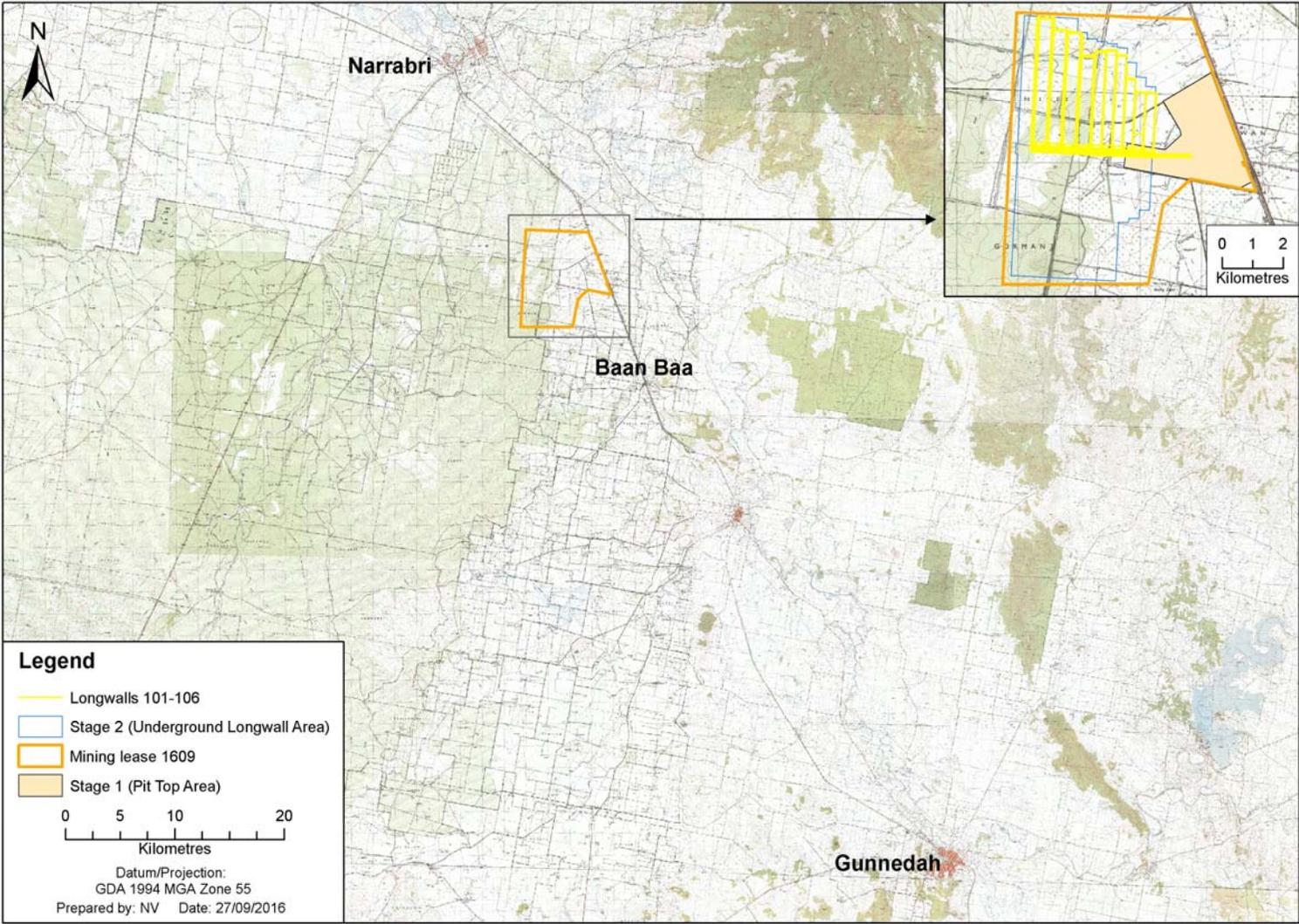


Figure 1: Location of the Narrabri Coal Mine

2 Background

Prior to Narrabri Mine, no mining activities have been undertaken on the site. Following mining surveys in the 1980's, a 6.5 m intersection of high quality coal at a depth of 167 m was identified (R. W. Corkery & Co Pty Ltd 2007). An Exploration License (EL 6243) was granted to NCOPL in May 2004. A 229 Million tonne (Mt) coal resource was identified and the decision to proceed with the project was made in late 2005. The preparation of a number of environmental studies was undertaken, with the Environmental Assessment submitted to the Department of Planning in August 2006 for Stage 1 of the mine and in November 2009 for Stage 2 of the mine.

Stage 1 of the mine project (PA 05_0102) was approved on 13 November 2007. Stage 1 covered the site establishment of infrastructure associated with the mine and its operation. During this time a maximum of 2.5 Mtpa of coal was produced by continuous mining methods.

Stage 2 of the mine project (PA 08_0144) was approved on 26th July 2010. The MOP (NCOPL 2011) for Stage 2 of the mine project is in effect until the 31st December 2017, when a revision of the MOP will be undertaken. Stage 2 covers the progression from mining by continuous miner (open cut) to longwall mining, construction and use of mine ventilation and gas drainage infrastructure, mine dewatering and other associated infrastructure. During this stage, the mine has progressed from a 2.5 Mtpa continuous miner operation, to an 11 Mtpa longwall mining operation.

The total area of the Mining Lease (ML 1609) covers 5,298 ha (Figure 2). This includes 457.4 ha for the construction and operation of all mine surface facilities (NCOPL 2011). Infrastructure associated with the mine is located in the Pit Top Area (Stage 1). The Pit Top Area covers an area of approximately 255 ha. Surface facilities include materials handling and processing, train loading, a rail loop, administration facilities and water management. Construction of surface infrastructure associated with the mine began in early 2008. The construction of the box cut began in May 2008.

The coal resource is contained within the Hoskissons Coal Seam at a depth of 160 - 170 m (Belford Dome Resource Assessment 2007). The coal seam is between 8 – 10 m thick in the western half of the ML 1609. The eastern half of the ML 1609 is cut off at approximately 160 m by the overlying Digby formation (Belford Dome Resource Assessment 2007). The coal seam generally strikes north-south and dips gently to the west. It has been calculated that there are approximately 230 Mt of coal resource, of which 160 Mt are recoverable (Belford Dome Resource Assessment 2007).

Access to the coal mine is from the Kamilaroi Highway and all associated infrastructure is located approximately 1 km west of the highway. Transportation of the mined coal to the Run of Mine (ROM) stockpile is by underground conveyers (R. W. Corkery & Co Pty Ltd 2007). From here the coal is crushed/resized/washed and stored in the Product Stockpile before being loaded to rail for transportation to Newcastle (R. W. Corkery & Co Pty Ltd 2007).

The Project Approvals (PA 05_0102 and PA 08_0144) were issued under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and include several conditions, including the development of a LSMP for Stage 1 (Schedule 3, Condition 29) and the revision of the LSMP for Stage 2 (Schedule 5, Condition 3). The conditions of PA 08_0144 and the sections in this document where they are addressed in the LSMP are shown in Table 1.

This version of the LSMP has been revised in accordance with Schedule 3, Condition 4(g) which requires appropriate revisions to the LSMP be prepared and submitted with each Extraction Plan for

second workings (the extraction of coal using longwall methods). These revisions have been prepared based on the revised subsidence predictions prepared by Ditton Geotechnical Services (DGS 2016).

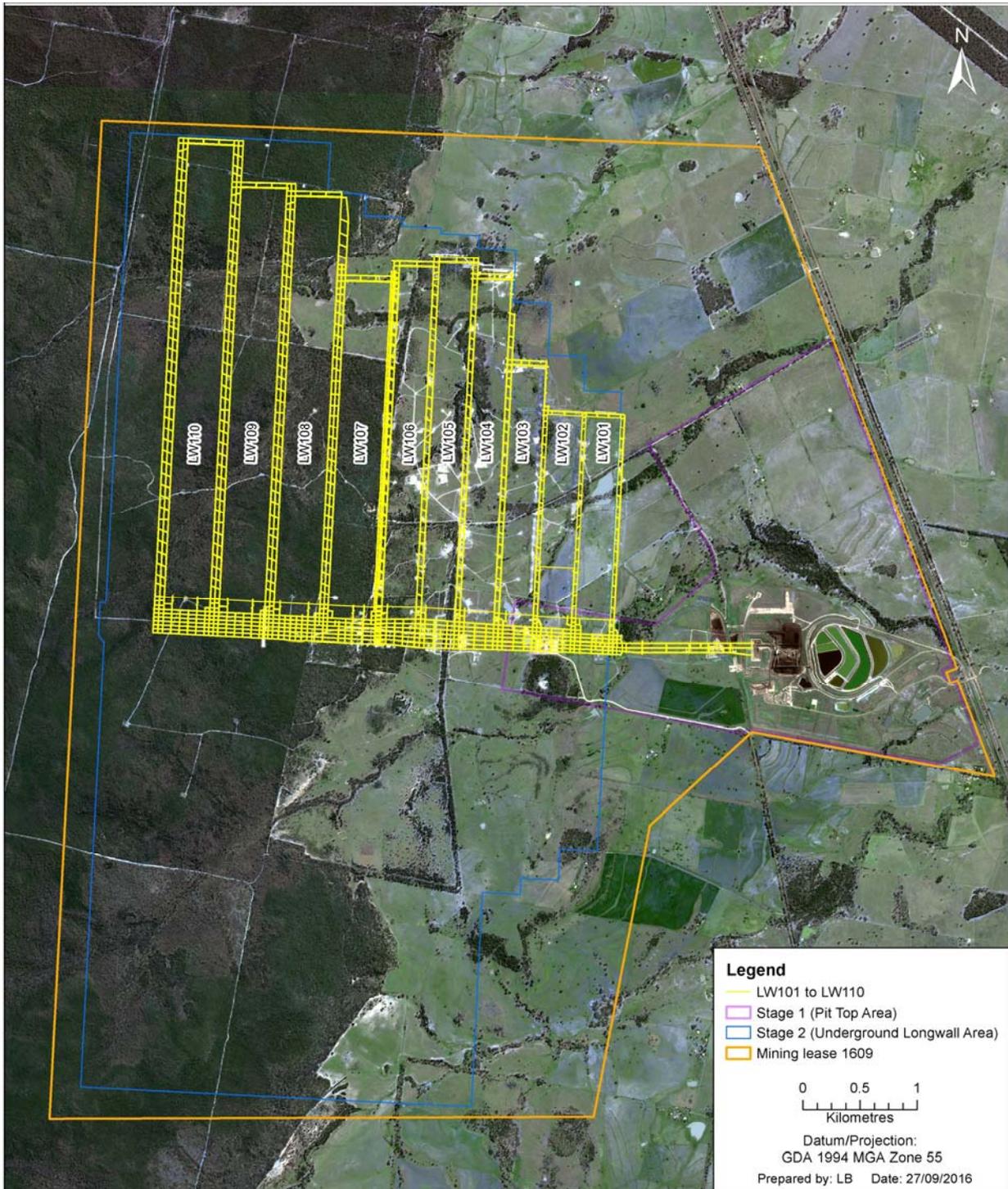


Figure 2: Area of the Mining Lease, Pit Top Area (Stage 1) and Underground Longwall Area (Stage 2)

Table 1: Conditions of consent associated with PA 08_0144 which are relevant to this LSMP

Condition Number	Condition Requirement	Relevant Section of this Report
Schedule 3 Condition 4	<p>The proponent shall prepare and implement Extraction Plans for any second workings to be mined to the satisfaction of the Secretary. Each Extraction Plan must:</p> <p>g) Include the following to the satisfaction of DRE:</p> <ul style="list-style-type: none"> • Appropriate revisions to the Landscape Management Plan required under Condition 3 of Schedule 5; 	This document version and Appendix A and B
Schedule 5 Condition 3	<p>The proponent shall revise the Landscape Management Plan for the Stage 1 project to encompass all proposed and potential impacts associated with landscape management for the site (Stages 1 and 2), and will subsequently implement this revised version of the Landscape Management Plan to the satisfaction of the Secretary and DRE. This plan must:</p> <p>a) Be submitted to the Secretary for approval</p> <p>b) Be prepared by suitably qualified expert/s whose appointments have been endorsed by the Secretary</p> <p>c) Be prepared in consultation with DPI Water, OEH and NSC</p> <p>d) Include a:</p> <ul style="list-style-type: none"> • Rehabilitation Management Plan • A Mine Closure Plan 	Appendix A Appendix B
Schedule 5 Condition 4	<p>The Rehabilitation Management Plan must include:</p> <p>a) The rehabilitation objectives for the site</p> <p>b) A strategic description of how the rehabilitation of the site would be integrated with the surrounding land use</p> <p>c) A general description of the short and long term measures that would be implemented to rehabilitate the site</p> <p>d) A detailed description of the measures that would be implemented to remediate predicted subsidence impacts under individual Extraction Plans</p> <p>e) A detailed description of the measures that would be implemented to minimise environmental impacts of mining operations, and to rehabilitate the site, including measures to be implemented for:</p> <ul style="list-style-type: none"> • Managing the remnant vegetation and habitat on site • Minimising impacts on fauna • Minimising visual impacts • Conserving and reusing topsoil • Controlling weeds, feral pests, and access • Managing bushfires • Managing any potential conflicts between rehabilitation works and Aboriginal Cultural Heritage 	Appendix A

Condition Number	Condition Requirement	Relevant Section of this Report
	<ul style="list-style-type: none"> f) Detailed performance and completion criteria for the rehabilitation of the site g) A detailed description of how the performance of the rehabilitation works would be monitored over time, to achieve the stated objectives and against the relevant performance and completion criteria h) Details of who is responsible for monitoring, reviewing and implementing the plan 	
<p>Schedule 5</p> <p>Condition 5</p>	<p>The Mine Closure Plan must:</p> <ul style="list-style-type: none"> a) Define the objectives and criteria for mine closure b) Investigate options for the future use of the site c) Provide a detailed methodology for decommissioning the sites evaporation/storage ponds and the treatment of any accumulated salt within and around these ponds d) Investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment levels e) Describe the measures that would be implemented to minimize or manage the on-going environmental effects of the project f) Describe how the performance of the measures would be monitored over time 	<p>Appendix B</p>

3 Purpose and Objectives

The purpose of the LSMP is to:

- Address legislative requirements and guidelines relevant to the LSMP and related RMP and MCP
- Provide NCOPL with a clear and concise description of their responsibilities in relation to the LSMP (including the RMP and MCP) during the operation and subsequent closure of the Narrabri Mine.

4 Structure of the Landscape Management Plan

In accordance with the requirements of Schedule 5, Condition 3(d) and Schedule 6, Condition 2 of PA 08_0144, the LSMP is to be made up of two plans; a RMP; and a MCP. The relationship between these plans and the NCOPL Environmental Management System (EMS) is shown in Figure 3.

An additional aim of the LSMP is to state how the objectives for the completion criteria of the final rehabilitation of the mine will be achieved. Further details of this are provided in the RMP and MCP. Completion criteria for the long term rehabilitation of the mine are largely conceptual, as the life of the mine will exceed 15 years. Long term final rehabilitation objectives have been outlined in the Stage 1 MOP (R.W. Corkery & Co. Pty Ltd 2007) and Stage 2 MOP (NCOPL 2011) and relate closely to the rehabilitation criteria in Section 5 of the Stage 1 and Stage 2 MOP's. Completion criteria include:

- The creation of low maintenance, geo-technically stable, safe and well vegetated landform which blends with the surrounding natural landscape
- Backfilling of the box cut and blending of the final landform with the surrounding topography such that the visual impact of the post-mining landform is minimised
- Decommissioning and removal of all project related infrastructure not required for the future use of the site
- Remediating any land contaminated by accumulated salts or hydrocarbon spills / leaks
- Re-establishment of agricultural land of comparable land capability to that of the pre-disturbance environment i.e. Class III.

The following is a summary of the key aspects addressed in both of the RMP and MCP. Further details of each individual plan can be seen in Appendix A and Appendix B, respectively.

4.1 Rehabilitation Management Plan

The RMP is to:

- Define rehabilitation objectives for the site
- Describe how the rehabilitated site would be integrated with the surrounding land use
- Provide short and long term measures to be implemented to rehabilitate the site
- Provide a detailed description of the measures that would be implemented to remediate predicted subsidence impacts under individual extraction plans
- Provide a detailed description of the measures that would be implemented to rehabilitate the site, including measures for:
 - Managing remnant vegetation and habitat on site
 - Minimising impacts on fauna
 - Minimising visual impacts

- Conserving and reusing topsoil
- Controlling weeds, feral pests and access
- Managing bushfires
- Managing any potential conflicts between the rehabilitation works and Aboriginal Cultural Heritage
- Detail performance criteria
- Provide a detailed monitoring program over time to meet the stated objectives and against relative performance and completion criteria
- Provide details of who is responsible for monitoring, reviewing and implementing the plan.

4.2 Mine Closure Plan

The MCP is to:

- Provide an overall framework for mine closure including rehabilitation and decommissioning strategies. In this regard a Mine Closure Plan should be considered a template on which future activities should be based
- Ensure that adequate financial provision is made available to cover the cost of decommissioning, final rehabilitation and any other post closure costs related to the closure of the Narrabri Mine
- Establish clear and agreed criteria with all relevant stakeholders, which can be used to provide the standard to which the final mine rehabilitation and post mining land use can be assessed against
- Reduce or eliminate adverse environmental effects once the mine ceases operation
- Ensure closure is completed in accordance with good industry practice as well as meeting the statutory requirements that may be applicable
- Ensure the closed mine does not pose an unacceptable risk to public health and safety (SLR 2016).

4.3 Revision of Plan

This revision of the LSMP is aimed at incorporating LW107 to LW110. The rehabilitation domains used within the original LSMP have been retained for this LSMP.

Table 2 below provides a summary of the Domains and the nomenclature used throughout the RMP and MCP.

Table 2: Domain used throughout RMP and MCP

Domains
Domain 1 - Workshop, offices, bath house, car parking, access road, rail crossings, rail loop, and rail load out bin
Domain 2 - Crushing and sizing equipment and coal stock piles
Domain 3 - Box cut and transport, conveyor and ventilation drifts
Domain 4 - Evaporation ponds and water storage dams
Domain 5 - Other lands in the Pit Top Area (excluding Kurrajong Creek);
Domain 6 - Underground Longwall Area and wider mining lease
Domain 7 - Brine Storage Dams (BR1 – BR5)
Domain 8 - Rejects Emplacement Area and all weather unsealed road access.

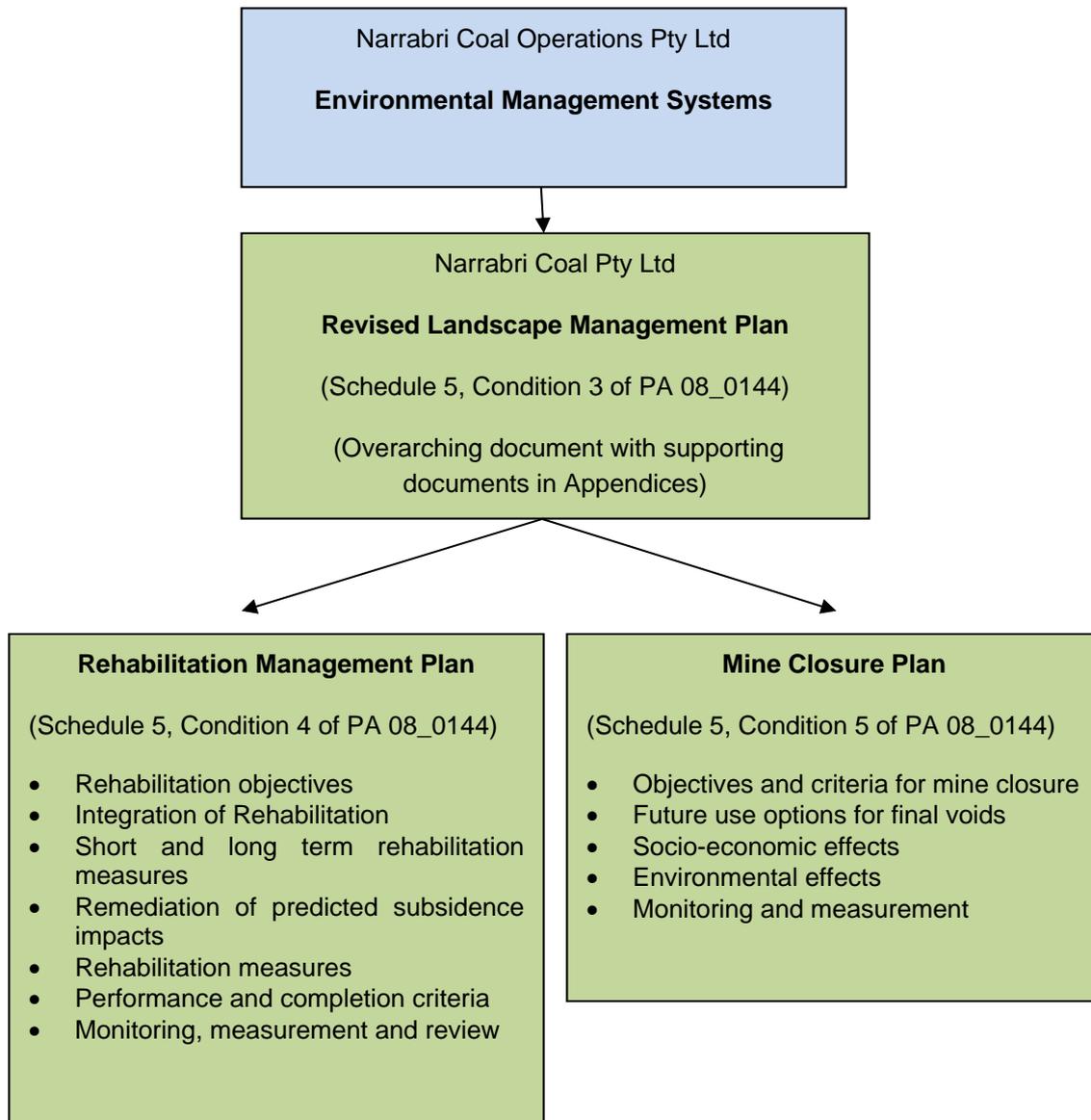


Figure 3: Structure of the Landscape Management Plan

5 Reporting and Reviewing

5.1 Reporting

All internal and external reporting will be undertaken in accordance with the Narrabri Mine EMS, which includes reporting within the Annual Review.

Specific individual reporting requirements are indicated in both the RMP and MCP. The reporting requirements identified in each of these plans are identified below in Table 3.

Table 3: Reporting Requirements of the Rehabilitation Management Plan and Mine Closure Plan

Plan	Reporting Requirements	Responsibility
Rehabilitation Management Plan	5 year Review	Narrabri Coal
Mine Closure Plan	5 year Review	Narrabri Coal

5.2 Reviewing

The Narrabri Mine has an operational life of more than 15 years using continuous and longwall mining techniques. During the life of the mine, the mine plan may change depending on operational circumstances. The LSMP and its individual components will be required to be updated where needed to capture any mine plan changes. Three years prior to mine closure the LSMP will be reviewed to address the final mine plan and any changes that have occurred since the LSMP was last updated.

Schedule 6, Condition 3 of PA 08_0144 requires reviews of this LSMP, and if necessary revisions, to be undertaken within three months of the following:

- Completion of an independent environmental audit required by Schedule 6, Condition 7;
- Submission of an Incident Report required by Schedule 6, Condition 4;
- Submission of an Annual Review Report required by Schedule 6, Condition 6; and
- Any modification to the conditions of this approval.

In addition to the above, each Extraction Plan prepared for the longwall panels will require the revision of the LSMP to the satisfaction of the Secretary.

References

Belford Dome Resource Assessment (2007) *Narrabri Coal Project, Geological Assessment*. Prepared for Narrabri Coal Pty Ltd. Prepared by Belford Dome Resource Assessment, Pty Ltd

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SLR (2016) *Narrabri Coal Mine – Revised Conceptual Mine Closure Plan for Stage 2 Longwall Operations*. Prepared by SLR Consulting Australia Pty Ltd

R. W. Corkery & Co Pty Ltd (2007) *Mine Operations Plan for the Construction and Continuous Development of Stage 1 of the Narrabri Coal Mine for the period ending 31 December 2011*. R. W. Corkery and Co. Pty Ltd

Appendix A Rehabilitation Management Plan

Appendix B Mine Closure Plan

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