NARRABRI MINE

EXTRACTION PLAN

LW 203 – LW 206

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WHC_PLN_NAR_EXTRACTION PLAN - LW 203 - LW 206

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Acronyms and abbreviations

Acronym	Description
°	degree
%	percent
AoD	angle of draw
CCC	Community Consultative Committee
CF	Cut and flit
CO_2-e	Carbon dioxide equivalent
Cwlth	Commonwealth
DGS	Ditton Geotechnical Services Pty Ltd
DPE	NSW Department of Planning and Environment
EA	Environmental Assessment
EP 203-206	The Extraction Plan for LW 203 to LW 206
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPL	environment protection licence under the POEO Act
ha	hectare
IEA	Independent Environmental Audit
km	kilometre
LiDAR	light detection and ranging
LW	longwall panel
m	metre
M^3	cubic metres
ML	mining lease
mm	millimetre
mm/m	millimetre per metre
MOD 5	Modification 5
MOD 7	Modification 7
Mt	million tonnes
Mtpa	million tonnes per annum
NCOPL	Narrabri Coal Operations Pty Ltd
PED	personal emergency device (communications system)
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
ROM	run of mine
SoC	Statement of Commitments
S_{max}/T	Maximum subsidence prediction

Acronym	Description
t	tonnes
TARP	trigger action response plan
TOC	Total Organic Carbon
TSS	Total Suspended Solids
U95%CL	upper 95 % confidence level
W/H	width to height (ratio)
WHC	Whitehaven Coal Limited

Executive Summary

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. It is located approximately 25 kilometres south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area in New South Wales. The Narrabri Mine includes an underground coal mine, a coal handling and preparation plant and associated rail siding and surface infrastructure.

The Project Approval (PA 08_0144) includes a series of conditions relating to the management of subsidence impacts and environmental consequences of underground coal mining. This includes the preparation and approval of a suite of management plans prior to the commencement of any longwall mining, generally referred to as second workings. The Extraction Plan for LW 203 to LW 206 has been prepared in accordance with Schedule 3 Condition 4 of the Project Approval and the NSW Department of Planning and Environment *Draft Extraction Plan Guideline* (DPE 2022). This Extraction Plan has been prepared by a team of suitably qualified and experienced persons in accordance with the Project Approval Schedule 3 Condition 4(a). A draft (Revision A) of the Extraction Plan and all key sub-plans was submitted for consultation purposes on 8 November 2022.

The approved LW 203 to LW 206 are located south of the existing underground main headings. The four longwall panels will be between 2.89 km to 3.63 km long and extracted from south to north. The panel extraction sequence will occur from east to west. The longwall panels will cover depths ranging from 185 m to 330 m, with void widths ranging from 395.3 m to 402.8 m.

The predicted vs measured subsidence effects for LW 101 to LW 109 have been reviewed as part of the Mine Subsidence Assessment for LW 203 to LW 206 (DGS 2022) to demonstrate the current robustness of the prediction model. The subsidence prediction model used for LW 101 to LW 105 had an estimated maximum subsidence of 2.44 m or 0.58T. Several prediction exceedances were observed above LW 101 to LW 103 that resulted in several updates to the model for LW 104 to LW 106 and LW 107 to LW 110.

Revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings are provided in full in the Mine Subsidence Assessment Report (DGS 2022), provided as an appendix to this Plan.

The Project Approval defines several subsidence impact performance measures for the management of natural and built features. Management measures have been developed to manage any subsidence effects and ensure the appropriate remediation and rehabilitation is conducted in response to subsidence impacts. Each key sub plan includes additional management measures to address residual environmental consequences associated with the secondary workings within the Extraction Plan Area, along with a Trigger Action Response Plan to ensure compliance with the relevant performance measures. The Subsidence Monitoring Program provides the objectives and the proposed monitoring program for monitoring subsidence impacts to natural and build features, provided as an appendix to this Plan.

The Extraction Plan for LW 203 to LW 206 also includes information pertaining to incidents, complaints, notification to agencies, plan review and roles and responsibilities.

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1. Introduction

1.1 Background

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. It is located approximately 25 kilometres (**km**) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area in NSW (Figure 1-1). The Narrabri Mine includes an underground coal mine, a coal handling and preparation plant and associated rail siding and surface infrastructure.

The Narrabri Mine is operated by Narrabri Coal Operations Pty Ltd (**NCOPL**), on behalf of the Narrabri Mine Joint Venture, which consists of Whitehaven Coal Limited (**WHC**) wholly owned subsidiaries Narrabri Coal Pty Ltd (NCPL) (70 per cent [%]) and Narrabri Coal Australia Pty Ltd (7.5%), Upper Horn Investments (Australia) Pty Ltd (7.5%), J-Power Australia Pty Limited (7.5%), Posco International Narrabri Investment Pty Ltd (5%) and Kores Narrabri Pty Limited (2.5%). The underground mine is covered by Mining Lease (**ML**) 1609 across an area of 5,298 hectares (ha) for the predominant purpose of mining for coal from the Hoskissons Coal Seam.

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

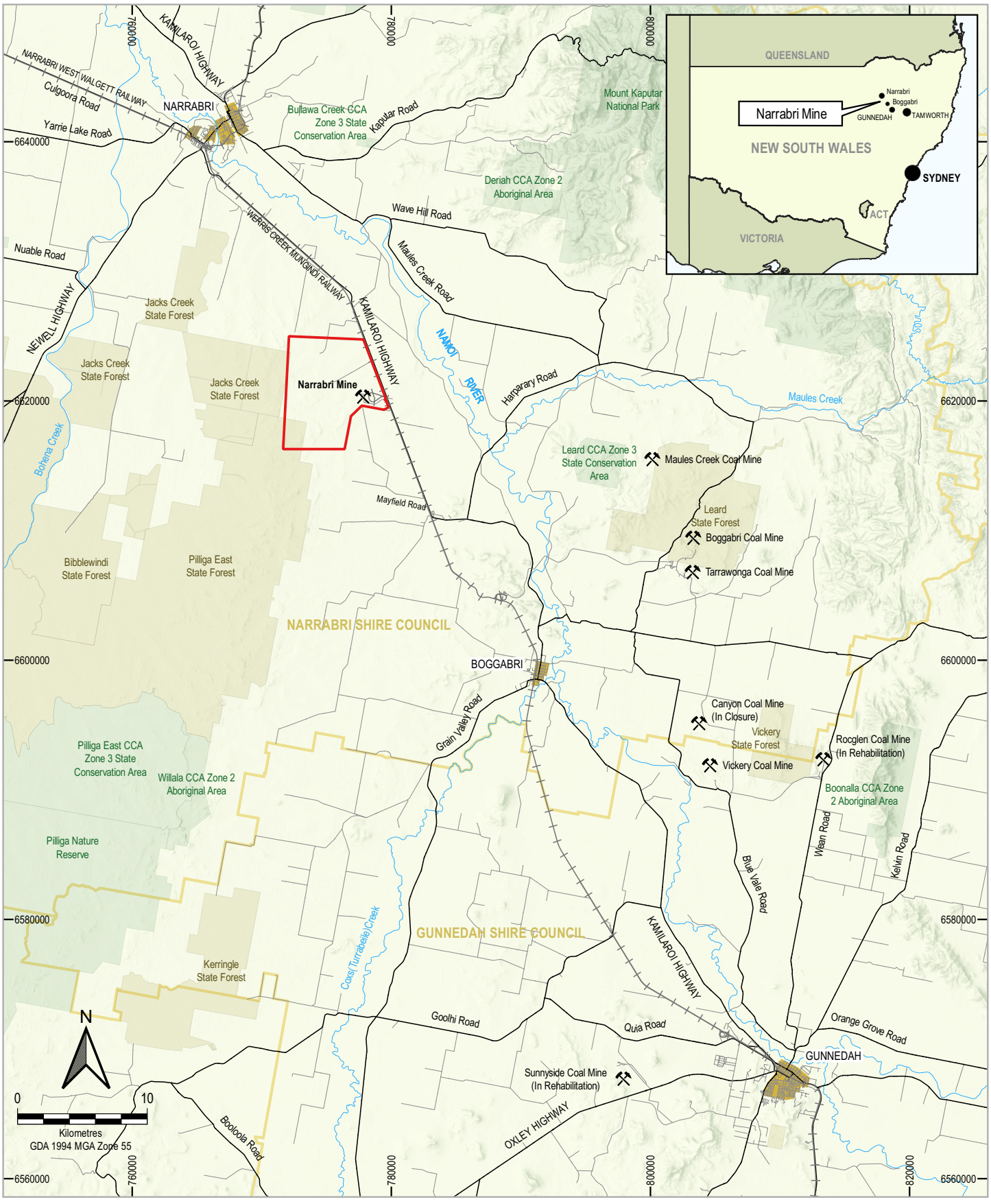
The Project Approval has subsequently been modified on a number of occasions. The environmental assessment for Modification 5 (Resource Strategies 2015) (**MOD 5**), approved in December 2015, changed the mine geometry by reducing the number of longwall (**LW**) panels from 26 to 20, increased some LW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

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

Table 1-1 summarises the Project Approvals and associated modifications for the Narrabri Mine issued under the EP&A Act.

Table 1-1 Summary of Project Approvals and associated modifications

Approval	Details	Approval date
PA 05_0102	Stage 1 of the Narrabri Mine was approved under Part 3A of the EP&A Act. Stage 1 included site establishment and the construction of coal processing infrastructure, with production using continuous miner mining methods up to 2.5 Mtpa.	November 2007
PA 08_0144	Determination of the Stage 2 EA and the Narrabri Mine converted to a longwall mining operation. Increase in ROM coal production to 8.0 Mtpa. PA 05_0102 was surrendered.	July 2010
MOD 1	Updates to subsidence management conditions.	March 2011
MOD 2	Allowed for a one-off road transport of coal to WHC's Tarrawonga Coal Mine.	December 2011
MOD 3	Emergency road transport of coal (application withdrawn).	N/A
MOD 4	Extension of ROM and product coal stockpiles.	September 2015
MOD 5	Reduced the number of longwall panels from 26 to 20; increased the longwall panel widths for LW 107 to LW 120 from approximately 295 m to approximately 400 m; extended the western footprint approximately 60 m; and increased the maximum ROM coal processing rate from 8 Mtpa to 11 Mtpa.	December 2015
MOD 6	Administrative modification, aligning the reporting period of the Annual Review to a calendar reporting period.	January 2017
MOD 7	Change in mining method within the extent of the previously approved LW 201 and LW 202 and allows for up to 0.7 Mtpa via bord and pillar extraction at pillar reduction panels CF 201 to CF 205.	November 2021



Source: Geoscience Australia (2011); NSW Spatial Services (2019)

LEGEND

- NSW Major Operating Mines
- Mining Lease (ML 1609)
- Local Government Boundary
- State Forests
- State Conservation Area, Aboriginal Area

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NARRABRI COAL MINE

Figure 1-1 Narrabri Mine Regional Location

1.2 Purpose and scope

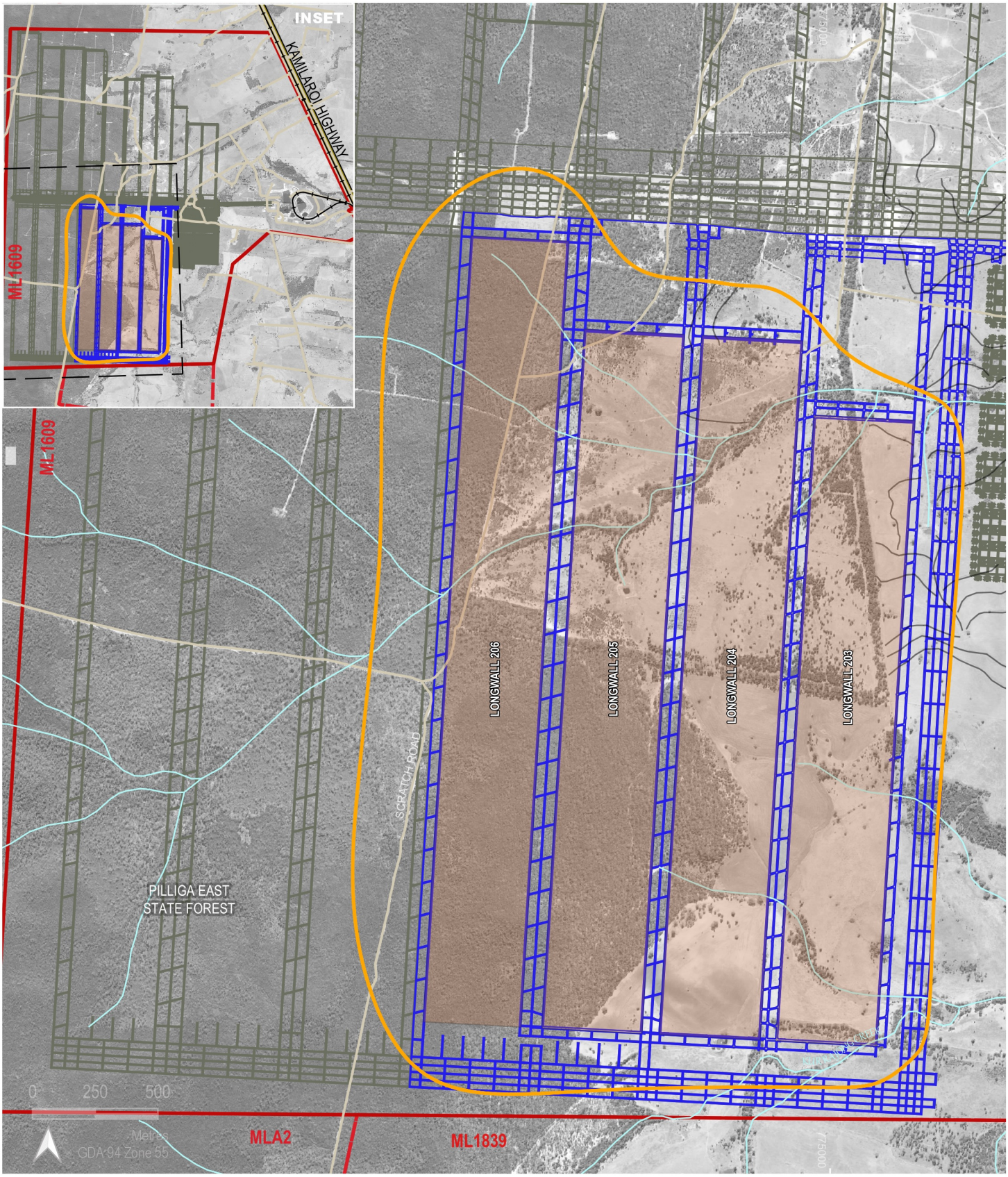
The Project Approval includes a series of conditions relating to the management of subsidence impacts and environmental consequences of underground coal mining. This includes the preparation and approval of a suite of management plans prior to the commencement of any longwall mining, generally referred to as second workings. Specifically, Schedule 3 Condition 4 of the Project Approval states that NCOPL must prepare and implement Extraction Plans for any second workings to be mined to the satisfaction of the Secretary.

The Extraction Plan for LW 203 to LW 206 (**EP 203-206** or **Plan**) has been prepared in accordance with Schedule 3 Condition 4 of the Project Approval and the NSW Department of Planning and Environment (**DPE**) *Extraction Plan Guideline* (**Extraction Plan Guideline**) (DPE 2022), as required under Schedule 6 Condition2.

As stated in the Extraction Plan Guideline, the purpose of the EP 203-206, together with the associated sub-plans listed in section 1.3, is to manage subsidence associated with the extraction of coal from LW 203 to LW 206 (herein referred to as the **Extraction Plan Area**[1]) (Figure 1-2).

The Ditton Geotechnical Services Pty Ltd (**DGS**) Mine Subsidence Assessment Report for LW 203 to LW 206 (DGS 2022) (**Mine Subsidence Assessment Report**) has been used as a basis for developing the performance measures and management actions in response to the predicted subsidence impacts on natural and built features within the Extraction Plan Area.

[1] The area located within the 45° Angle of Draw (AoD) as shown on Figure 1-2.



WHITEHAVEN COAL

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LEGEND

- ML1609
- ML1839
- MLA2
- Underground mining layout
- Longwalls 203 to 206
- Proposed longwall voids (LW203-206)
- 45 degree angle of draw
- Road
- Watercourse
- Contour bank

NARRABRI MINE

FIGURE 1-2

Extraction Plan Area and Underground Mining Layout for LW 203 to LW 206

1.3 Plan structure

This EP 203-206 forms part of Narrabri Mine's Environmental Management System, which includes the full suite of environmental management plans related to the operation and management of the Narrabri Mine. This Plan provides an overview of the proposed mine plan, predicted subsidence and resulting environmental consequences. This Plan also provides an overview of the proposed monitoring and management measures, which are provided in detail in the relevant sub plans. In summary, this document includes the following information:

- Section 1 - Provides the background to the Narrabri Mine, including a summary of the various Project Approvals and modifications, the scope and structure of the Plan, and a description of the supporting figures required under the Extraction Plan Guideline.
- Section 2 - Summarises the relevant statutory requirements for the preparation of this Plan and the processes taken by NCOPL in its development including consultation with the relevant agencies and key stakeholders, detail on the independent consultants engaged to prepare the Plan and any supporting specialist assessments. In addition, this section includes a review of previous subsidence predictions and previous and current risk assessments conducted to assist in the development of this Plan.
- Section 3 - Summarises the results of recent subsidence assessment and outlines the predicted environmental consequences.
- Section 4 - Outlines the subsidence and environmental monitoring program to be implemented to support the predicted subsidence impacts and environmental consequences.
- Section 5 - Covers the requirements for management, mitigation, remediation, and reporting. It includes:
  - an outline of the performance measures, management and remediation activities that are proposed to mitigate predicted subsidence impacts and confirm that subsidence and its consequences are within the predicted ranges;
  - the proposed contingency response in the event that subsidence impacts exceed (or are considered likely to exceed) the adopted performance measures; and
  - details of the protocols surrounding incident and non-compliance investigation and notification, complaint management, reporting, and auditing respectively.
- Section 6 - Details the review of other management plans as well as the review and evaluation period for this Plan along with improvement measures, access to information and the responsibilities of NCOPL personnel under this EP 203-206.
- Sections 7, 8 and 9 - Provide respectively the references, glossary of terms and review history of this Plan.

The Extraction Plan also consists of a number of key sub-plans and other documentation as summarised below:

- Attachment 1 - Master Trigger Action Response Plan (**TARP**)
- Appendix A - Water Management Plan
- Appendix B - Land Management Plan
- Appendix C - Biodiversity Management Plan
- Appendix D - Heritage Management Plan

- Appendix E - Built Features Management Plan
- Appendix F - Public Safety Management Plan
- Appendix G - Coal Resource Recovery Plan
- Appendix H - Plans 1-7
- Appendix I - Subsidence Risk Assessment
- Appendix J - Mine Subsidence Assessment Report for LW 203-206
- Appendix K - Subsidence Monitoring Program

1.4 Plans of the approved development

As required by the Extraction Plan Guideline, the information contained within this Plan is supported by and presented in a series of detailed figures. These figures are presented in Appendix H (A0 format). The figures include the following information:

- Plan 1 - Existing, proposed and future workings, including dimensions of all voids and pillars.
- Plan 2 - All natural and man-made surface features that may be affected by the proposed mining operations and surface contours.
- Plan 3 - Overburden thickness, seam thickness, and any known geological structures.
- Plan 4 - Existing and/or planned future workings in seams above and/or below the proposed workings.
- Plan 5 - Details of mining titles and land ownership.
- Plan 6 - Representative geological sections and/or borehole illustrations of the overburden strata.
- Plan 7 - Details the subsidence monitoring network, authorised by the registered mine surveyor.
- Plan 8 - Aerial image including existing and proposed workings.

2. Plan development and consultation

2.1 Statutory requirements

2.1.1 Project Approval

As previously stated in section 1.2, this Plan has been developed in accordance with Schedule 3 Condition 4 of the Project Approval which requires NCOPL to prepare an Extraction Plan for all second workings within the area of the Approved Mine Plan (Appendix H) to the satisfaction of the Secretary.

Project Approval Schedule 6 Condition 2 lists the requirements for the preparation of management plans which must be prepared in accordance with any relevant guidelines (section 1.2) and include details of the relevant approval, licence, or lease conditions. Attachment 2, Table A2-1 provides a summary of the Project Approval conditions relevant to this Plan and outlines the section of the EP 203-206 in which each of these conditions have been addressed.

In accordance with Schedule 3 Condition 4(b) of the Project Approval, this EP 203-206 must be approved by the Secretary prior to NCOPL carrying out any second workings under this Plan. In accordance with Schedule 3 Condition 4(a) of the Project Approval, the EP 203-206 must be prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Secretary (section 2.2.1 and Attachment 3).

2.1.2 Statement of Commitments

The Statement of Commitments (**SoCs**) for site operations and management is contained as Appendix 3 to the Project Approval, combining all revised environmental commitments from the EA, dated May 2010. Table A2-2 in Attachment 2 details the SoCs relating to subsidence with a cross reference to where these SoCs have been addressed.

2.1.3 EPBC Act approval

The Narrabri Mine is subject to EPBC 2009/5003 issued under the EPBC Act. Approval Condition 2 of EPBC 2009/5003 requires the development and implementation of an Extraction Plan according to the NSW Secretary's Assessment Report and approval conditions.

In accordance with Condition 3 of EPBC 2009/5003, a copy of the Extraction Plan will be provided to the Commonwealth Department of Climate Change, Energy, the Environment and Water (formerly the Commonwealth Department of Agriculture, Water and Environment), once approved.

Table A2-3 in Attachment 2 details the condition, along with a cross reference to where this condition has been addressed.

2.1.4 Mining lease

NCOPL are the holder of ML 1609 issued under the *Mining Act 1992* in January 2008 (as varied). NCOPL are required to 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.

2.1.5 Environment Protection Licence

'Coal works' and 'Mining for coal' are scheduled activities listed in Schedule 1 of the NSW *Protection of the Environment Operations Act 1997* (**POEO Act**). Under Section 48 of this Act, all premise-based scheduled activities are required to hold an Environment Protection Licence (**EPL**). EPL 12789 is held for coal works and mining for coal to >5 tonne annual handling capacity and more than 5 tonne annual production capacity. There are no conditions in EPL 12789 that apply specifically to the Extraction Plan or any of the sub-plans. The EPL conditions and requirements predominantly relate to the suite of environmental management plans required under Schedule 4 of the Project Approval, including but not limited to the management of noise, soil and water, air quality, heritage, waste, transport, and visual amenity. These management plans do not form part of this Plan.

2.1.6 Coal Mine Subsidence Compensation Act 2017

The NSW *Coal Mine Subsidence Compensation Act 2017* provides for a fair, efficient and sustainable compensation framework for dealing with the impacts of coal mine subsidence. The object of the Act is to provide a scheme for the provision of compensation for damage caused by subsidence resulting from coal mine operations, and the assessment and management of risks associated with subsidence resulting from coal mine operations.

Compensation required under Schedule 3 Condition 2 of the Project Approval includes any compensation payable under this Act.

2.1.7 Work health and safety legislation

This Plan has been developed to comply with the NSW work health and safety legislation including but not limited to:

- *Work Health and Safety Act 2011*;
- Work Health and Safety Regulation 2017;
- *Work Health and Safety (Mines and Petroleum Sites) Act 2013*; and
- Work Health and Safety (Mines and Petroleum Sites) Regulation 2022.

2.2 Specialist assessments

2.2.1 Consultant suitability and endorsement

In accordance with Schedule 3 Condition 4(a), the EP 203-206 was prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Secretary (Attachment 3). Table 2-1 details the suitably qualified and experienced persons and their relevant experience. The appropriate signatures are provided at the beginning of this Plan and within each key sub plan as part of the document completion process.

Table 2-1 Extraction Plan development team

Company	Key personnel	Qualifications	Years of experience	Tasks
Onward Consulting	Mike Gale	Bachelor of Engineering (Environmental) (Hons) (UON)	20	Preparation of the main Extraction Plan document and non-specialist management and monitoring plans including: • Coal Resource Recovery Plan Management of other specialist consultants to prepare management plans.
	Servaes van der Meulen	Master of Science (Env. Tech) (WUR, The Netherlands)	25	
	Linden Burch	• Bachelor of Natural Resources (Hons1) / Bachelor of Urban and Regional Planning (UNE) • Graduate Diploma in Rural Science (UNE) • Master of Science in Agriculture (UNE) (In Prep)	5	Preparation of the main Extraction Plan document and non-specialist management and monitoring plans including: • Biodiversity Management Plan • Built Features Management Plan • Land Management Plan • Public Safety Management Plan • Subsidence Monitoring Program
	Carmen Osborne	• Bachelor of Applied Science (QUT) • Master of Environmental Management and Sustainability (UON)	9	
Ditton Geotechnical Services	Steven Ditton	Bachelor of Engineering (Civil/Hons), 1990 (UNSW)	30+	Subsidence predictions for LW 203-LW 206 and proposed monitoring.
Australasian Groundwater and Environmental Consultants (AGE)	Keith Phillipson	• Bachelor of Science (Geography) with Honours, University of Bristol, UK • Master of Science (Water Resource Systems Engineering), University of Newcastle, UK	25+	Extraction Plan - Water Management Plan (groundwater).
	Pieter Labuschagne	• MSc in Hydrogeology (Cum Laude) • BSc Honours in Hydrogeology and Hydrology • Master of	20+	

Company	Key personnel	Qualifications	Years of experience	Tasks
		Environmental Management • Bachelor in Geography and Business Economics, University of the Free State, South Africa.		
ATC Williams	Anthony Marszalek	• Master of Engineering Science (UQ) • Bachelor of Engineering (Civil) (Hons 1) (UQ)	35	Extraction Plan - Water Management Plan (surface water).
	Dr Camilla West	• PhD Environmental Engineering, (UQ) • Bachelor of Environmental Science (Hons), (GU)	16	
	Lee Rigley	• Bachelor of Environmental Engineering (Hons), (UQ) • Master of Engineering Studies, (UQ)	24	
	Kimberley McNamara	BEng (Agriculture) (Hons)	13	
Whincop Archaeology	Dr Matthew Whincop	• Doctor of Philosophy (PhD) Archaeology • Master of Arts (UMelb) Archaeology (Hons 1) • Bachelor of Arts (B.A.) Classics and Archaeology (Hons 1)	12	Extraction Plan - Heritage Management Plan.

2.2.2 Review of previous subsidence predictions

As described in the Mine Subsidence Assessment Report, the predicted vs measured subsidence effects for LW 101 to LW 109 have been reviewed as part of the Mine Subsidence Assessment for LW 203 to LW 206 (DGS 2022) to demonstrate the current robustness of the prediction model. The subsidence prediction model used for LW 101 to LW 105 had an estimated maximum subsidence of 2.44 m or 0.58T. Several prediction exceedances were observed above LW 101 to LW 103 that resulted in several updates to the model for LW 104 to LW 106 and LW 107 to LW 110.

The changes were made to ensure the actual Upper 95% Confidence Limits (**U95%CLs**) of the predictions were consistent with the statistical definitions. In regard to the maximum subsidence predictions, the following changes were made to the original model:

- Single maximum S_{max}/T has been increased from 0.58 to 0.60.
- First maximum S_{max}/T has been increased from 0.58 to 0.63.
- Final maximum S_{max}/T has been increased from 0.58 to 0.64.

The results from review work indicate that the measured maximum subsidence effect values have been increasing as mining has progressed. This is especially apparent as the wider longwalls were introduced after LW 101 to LW 106 with several significant strain, angle of draw and crack width prediction exceedances above LW 107 to LW 109.

The outcome of the review work was that it was considered necessary to update the maximum subsidence, curvature, strain and angle of draw models for future mining areas to the south (i.e. LW 203 to LW 206). The latest version of the model developed for the LW 203 to LW 206 assessment includes adjustments made where considered necessary as presented in Appendix J.

2.3 Risk assessment

A subsidence risk assessment has been undertaken to identify the risks associated with subsidence at the Narrabri Mine. It builds on previous risk assessments completed for LW 101 to LW 110 and Panels 201 to 202 and is presented as Appendix I. The updated risk assessment for LW 203 to LW 206 identified one high-risk item (i.e. Mayfield GG1) above LW 205. All other risks within the Extraction Plan Area have been assessed as low to moderate.

The potential subsidence impacts and environmental consequences are summarised in section 3 and detailed within each key sub plan.

2.4 Preparation and consultation

In accordance with the Project Approval Schedule 3 Condition 4(h), a number of key sub-plans, including the Water Management Plan (Appendix A), Land Management Plan (Appendix B), Biodiversity Management Plan (Appendix C), and Heritage Management Plan (Appendix D) have been prepared in consultation with one or more NSW Government departments and/or agencies. Other key sub plans, including the Public Safety Management Plan (Appendix F), Coal Resource Recovery Plan (Appendix G), and the Subsidence Monitoring Program (Appendix K) do not require specific consultation with Government departments and/or agencies, as per Schedule 3 Condition 4(g) of the Project Approval, with the exception of the Built Features Management Plan (Appendix E) which has been prepared following appropriate consultation with the owner/s of potentially affected features. Applicable consultation records and comment reconciliation tables are provided in each sub-plan to this EP 203-206, where relevant.

A draft (Revision A) of the Extraction Plan and all key sub-plans was submitted for consultation purposes on 8 November 2022 to the respective NSW Government departments and/or agencies. NCOPL also held briefing sessions with the Independent Advisory Panel for Underground Mining (**IAPUM**) on 30 November 2022 (Attachment 3 provides evidence of this consultation with a cross reference table [Table A3-1] in response to the Request for Information dated 16 December 2022) and the Resources Regulator on 2 December 2022 (Attachment 3 of this Plan provides evidence of the consultation process). There were no specific actions required by the Resources Regulator to update the EP 203-206 or sub plans following the briefing session on 2 December 2022.

The Extraction Plan Guideline also prescribe consultation with other key stakeholders, such as the owners and/or operators of both publicly and privately-owned land and infrastructure, and with the community through the mine's Community Consultative Committee (**CCC**). Considering the Extraction Plan Area encompasses land exclusively owned by NCOPL, there are no other public or private landholders.

3. Subsidence assessment

3.1 Description of underground mining

The approved LW 203 to LW 206 are located south of the existing underground main headings. The four longwall panels will be between 2.89 km to 3.63 km long and extracted from south to north. The panel extraction sequence will occur from east to west. The cover depths over the proposed longwall panels will range from 185 m to 330 m, with void widths[2] ranging from 395.3 m to 402.8 m.

Three heading gate-roads are planned to be formed between LW 203 and LW 206 with two rows of diamond-shaped chain pillars with an acute rib-rib angle of 70º. The pillars will have minimum 'solid' widths ranging from 29.4 m to 39.5 m with lengths of 144.3 m. The distance between the pillar reduction panels to the east of the proposed longwall panels will be 266 m where the cover depth is 200 m. Gate roads will be approximately 3.7 m high and 5.4 m wide. Main headings roadways will be approximately 5.4 m or 6.0 m, wide depending on operational requirements.

The proposed chain pillar geometries[3] will be squat with width to height ratios (**w/h**) ranging from 7.9 to 10.7. The W/H at the centre of the panels would range from 1.27 to 2.01, indicating supercritical subsidence behaviour. The end-of-panel barriers for LW 203 to LW 206 will be effectively 159 m at the starting ends and range from 103 m to 770 m wide at the finishing ends. The barriers are designed to protect the main headings from abutment loading conditions adjacent to the longwall goaf. The finishing end barriers for LW 203 to LW 205 are significantly wider than LW 206 due to geological structure.

3.2 Subsidence predictions

In accordance with Schedule 3 Condition 4(e) of the Project Approval, revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings are provided in the Mine Subsidence Assessment Report, presented in full in Appendix J.

The Mine Subsidence Assessment Report has been used as a basis for developing the performance measures and management actions in response to the predicted impacts from subsidence within the Extraction Plan Area, and provides an assessment on the following:

- Pre-mining condition of natural surface features and existing development within the Extraction Plan Area.
- Overview of the local landscape (including geomorphology and geology).
- Predicted mine subsidence effects for the proposed mining areas, based on measured subsidence data for LW 101 to LW 109.
- Predicted impacts on:
  - surface features (e.g. cracking, heaving, ponding, gradient changes and erosion/sedimentation);
  - natural features (e.g. topography, creek beds/banks, steep slopes);
  - built features (e.g. dwellings, buildings, farm dams, powerlines, roads, fences, contour banks and other rural infrastructure);
  - Aboriginal heritage (e.g. grinding groves); and

[2] Width is inclusive of the nominal gate road width of 5.4 m.

[3] Pillar geometries are expressed as lower case 'w' for width and 'h' for height, whereas upper case 'W' and 'H' refer to panel void width and cover depth.

  - water supply and groundwater (e.g. casing and screens), and
- Impact remediation and adaptative management strategies to limit the long-term degradation of the environment.

The main findings and conclusions are provided within the each of the relevant sub plans (Appendix A to Appendix F).

3.3 Potential environmental consequences

The environmental consequences of subsidence effects on natural and built features are detailed within each of the relevant sub plans (Appendix A to Appendix F).

4. Subsidence monitoring and management

4.1 Subsidence monitoring program

The Subsidence Monitoring Program presented as Appendix K to this Plan provides the objectives and the proposed subsidence monitoring program. The Subsidence Monitoring Program is a collation of the monitoring programs documented in each relevant sub plan which include detailed information including:

- detailed performance measures and indicators;
- monitoring methods, parameters, location, timing, and frequency;
- proposed procedures to record and report on the monitoring results; and
- the capacity of the program to detect early warning of deviations from the performance measures and associated performance indicators.

Key features requiring monitoring are detailed within the following sub plans:

- Surface water flows and quality - Water Management Plan (Appendix A);
- Groundwater flows and quality - Water Management Plan (Appendix A);
- Landforms - Land Management Plan (Appendix B);
- Biodiversity - Biodiversity Management Plan (Appendix C);
- Heritage features - Heritage Management Plan (Appendix D); and
- Infrastructure and other built features - Built Features Management Plan (Appendix E) and Public Safety Management Plan (Appendix F).

4.2 Baseline data

Light detection and ranging (**LiDAR**) data has been collected over the Narrabri approved mining area and used to identify the extent of steep slopes and cliffs and subsidence contours for all previously extracted longwalls to-date. The measured subsidence contours were derived from the December 2019 and December 2020 LiDAR level surveys.

Subsidence monitoring lines have been installed above LW 101 to LW 109 and have been used to calibrate the subsidence model for the Extraction Plan Area. The subsidence lines consist of star pickets driven to refusal at 10 m spacing. The star pickets are surveyed using total station with static point control before and after mining effects. The surveys to-date indicate systematic errors between surveys ranging from -20 millimetres (**mm**) to +45 mm, which are mainly due to seasonal clayey soil moisture changes.

Ground truthing of the LiDAR-based subsidence contours was conducted from the survey lines. Observed surface cracking was recorded with GPS and plotted to obtain baseline data for the LW 203 to LW 206 prediction model. Surface monitoring to-date has been conducted in relatively cleared grazing areas above the eastern portion of the Narrabri Mine. Future mining will be extended below natural woodland areas that would require clearing to install survey monitoring lines over LW 206.

A transverse subsidence line across the longwall panels is proposed to be installed along an existing access track above LW 203 to LW 205. The line will be installed into the next adjacent longwall before undermining occurs and will be discontinued in areas where movement has ceased. It is also proposed to install a longitudinal line extending in-bye and out-bye from the longwall panel starting points where it is feasible (i.e.

does not require clearing of native vegetation) for a minimum distance equal to the cover depth, both at starting and finishing points. Plan 7 of Appendix H details the location of the proposed survey lines.

Where the longitudinal lines cannot be installed due to native vegetation clearing restrictions, the lines will be monitored via remote sensing only.

Visual inspections and mapping of surface impacts will continue to be conducted before and after each longwall is extracted. Non-conventional monitoring techniques such as cliff line reflectometry and/or drone surveys of minor cliff faces and crack location detection above the woodland areas may be implemented as required.

The proposed Subsidence Monitoring Program (Appendix K) has been designed to collect sufficient baseline data for future Extraction Plans.

5. Management, mitigation, remediation and reporting measures

5.1 Performance measures and indicators

The Project Approval defines several subsidence impact performance measures for the management of natural and built features. It also notes that other performance measures and performance indicators may require further definition under the key sub plans.

The performance measures listed under Schedule 3 Condition 1 and Condition 2 of the Project Approval require that NCOPL ensure the following:

- Great Artesian Basin: Any loss of water flow into the Great Artesian Basin aquifers will be managed, licensed, or offset.
- Flora and fauna: Clearing and disturbance of vegetation above the mining area is minimised.
- Built features: Any infrastructure affected by subsidence will be maintained as always safe. Where possible, serviceability will be maintained, and any loss of serviceability will be compensated. Damage will be fully repaired, or else replaced or fully compensated.
- Public safety: No additional public safety risk will be posed as a result of subsidence.

The performance measures listed above are documented in the relevant sub plans along with applicable performance indicators and any additional performance measures and indicators as defined by NCOPL.

5.2 Subsidence management measures

In accordance with Schedule 2 Condition 1 of the Project Approval, NCOPL will implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation activities at the Narrabri Mine.

Management measures have been developed to manage any subsidence effects and ensure the appropriate remediation and rehabilitation is conducted in response to subsidence impacts. The following sections detail the proposed management measures for subsidence.

Each key sub plan includes additional management measures to address any additional environmental consequences associated with the secondary workings within the Extraction Plan Area.

5.2.1 Surface cracking

Minor cracks (i.e. less than 50 mm wide) are not expected to require remediation as geomorphological processes would likely result in these cracks filling naturally over time. However, if larger surface cracks (i.e. more than 50 mm wide) have not self-corrected within two months, remediation will be required. Remediation of larger surface cracks will generally be undertaken using conventional earthmoving equipment (such as backhoe or grader) and will involve ground disturbance associated with in-filling by cultivation of the ground surface or in-filling with suitable soil or other material.

The measures for managing surface cracks are (in order of increasing impact to mining):

- Conduct visual inspections of the surface during active subsidence.

- Repair larger surface cracks (more than 50 mm) following active subsidence (rip or grade where necessary).
- Surface cracks that cannot be filled by surface ripping or grading will be filled using subsoil stockpile material from stockpiles maintained at nearby gas drainage or ventilation sites, or material from within the footprint of the Reject Emplacement Area.
- Leave a barrier pillar or increase set-back distances from a sensitive area or restrict mining.

Prior to any remediation, NCOPL will undertake a review of environmental impacts that may result from the remediation at the specific location and consider whether remediation will create an increased impact (e.g. clearing native vegetation to enable machinery access or major drainage works that will cause a greater impact from excavation). If the assessment concludes that there may be the potential to increase impacts on biodiversity, alternative methods of remediating the crack are warranted (e.g. without machinery).

After surface cracks have been remediated, NCOPL will conduct an inspection within three months to identify if further remediation is required in accordance with the Subsidence Monitoring Program (Appendix K).

5.2.2 Sub-surface cracking

The standard management measures for controlling sub-surface fracturing include:

- Monitoring rainfall deficit and underground water during longwall mining to detect surface to seam connectivity.
- Repairing surface cracks following active subsidence in accordance with section 5.2.1.
- Installing borehole extensometer and piezometers above LW 203 to monitor the height of fracturing development after supercritical conditions develop (refer to the Water Management Plan [Appendix A]).

5.2.3 Steep slopes

To minimise the hazards associated with steep slope instability, the following management strategies will be implemented:

- Conduct surface slope displacement monitoring above LW 204 (combined with general subsidence monitoring). Cracking impacts will be visually and spatially mapped (start and end coordinates, width, depth, length, and photographed) after subsidence development has ceased via LiDAR.
- In-fill surface cracking to prevent excessive ingress of run-off into the slopes by backfilling the cracks with either durable, free-draining gravel or sand with erosion control measures such as re-vegetation. Repairs to cracks may require additional vegetation clearing and non-conventional repair methods (due to poor access for conventional equipment). Methods such as remote pumping of sands (sluicing) and/or cementitious grout may be needed and would require environmental spill and safety management controls.
- Areas that are significantly affected by erosion following mining may need to be repaired and protected with mitigation works such as re-grading, installation of new contour banks and re-vegetation of exposed areas.

In the unlikely event of large-scale slope instability, erosion stabilisation will be undertaken. Such actions will include:

- Installation of deep sub-surface drainage trenches and the construction of catch drains along slope crests so that surface run-off is controlled.
- Stabilisation works undertaken along sections of bank which are damaged or steeply eroded. These works would be conducted in accordance with the Erosion and Sediment Control Plan which forms part of the Water Management Plan for the site.

5.2.4 Erosion

The classification system for gully erosion will be commensurate with the depth and width as presented in Table 5-1.

Table 5-1 Gully erosion rating

Gully depth	Associated rating
Cracks	A
<0.5 m deep, <0.5 m wide	B
0.5 – 1 m deep, <1 m wide	C
>1 m deep, >1.5 m wide	D

For gully erosion rated A or B, management measures are commensurate with the measures for surface crack remediation as detailed in section 5.2.1.

For gully erosion rated C or D, the following measures may be considered:

- grade banks to stop the upslope concentration of flow and stabilise through revegetation:
  - graded bank diversionary structures may need to be installed on a suitable grade to ensure flows that are diverted away from the gullies with consideration of ground surface, soil type and design flows; and
  - sow perennial pasture species in accordance with the site Rehabilitation Management Plan.
- fill using rocks or rubble sourced from site or reshape using an excavator, or a combination of both. After filling, it is recommended that they be dressed with topsoil to encourage rapid establishment of vegetation; or
- diversion banks to convey flows to a safe disposal area where water will naturally spread and not concentrate into erosive volumes and velocities. Where safe disposal areas are not available, the construction of a suitable drop structure to safely convey diverted flows into creek lines will need to be considered.

Depending on the nature of the soils and the availability and quality of topsoil, consideration should be given to the use of soil ameliorants to improve the soil structural stability. This will improve rehabilitation and revegetation outcomes. Soils may respond particularly well to the use of gypsum to address the highly dispersible soils. Temporary sediment fencing should be installed below any areas to be disturbed and be maintained until such time as disturbed areas have revegetated. Erosion and sediment controls will be implemented in accordance with the Erosion and Sediment Control Plan which forms part of the Water Management Plan for the site.

5.2.5 Valley closure and uplift

The impact of upsidence and valley bending effects along creek lines will continue to be managed as follows:

- Conduct a creek line monitoring program (Refer to the Extraction Plan – Land Management Plan).
- Review the predictions of 'upsidence' and valley crest movements after each longwall is mined.
- Assess whether repairs (i.e. cementitious grouting or crushed rock) to cracking (as a result of 'upsidence') or gully stabilisation works are required to minimise the likelihood of long-term degradation or risks to personnel and the general public.

5.2.6 Ponding

The standard management measures for the remediation of subsidence induced ponding are:

- Ponding located in areas where vegetation is not affected, will be allowed to self-correct.
- Ponding located in areas with affected vegetation, or if ponding significantly alters or affects flows, will be assessed and remedial actions (that present the lowest environmental impact) developed in consultation with a geomorphologist.
- if Endangered Ecological Communities or Aboriginal heritage sites are impacted, or downstream water quality analysis indicates an exceedance (refer to the Water Management Plan [Appendix A]), the ponding will be assessed, and remediation options will be developed to afford the maximum practical protection to the affected feature.

5.3 Trigger Action Response Plan

Each key sub plan includes a TARP to ensure compliance with the relevant performance measures under the Project Approval and specific performance measures set by NCOPL. Each TARP is presented in table form and includes:

- relevant performance measures and performance indicators;
- multilevel triggers;
- containment and remediation measures; and
- actions that will be implemented in response to any triggers (including adaptive management measures).

The TARPs specific to each key sub plan are presented in Attachment 1 (Table A1-1 to Table A1-6).

5.4 Adaptive management

NCOPL will implement the following adaptive management strategies for the Extraction Plan Area:

- Ongoing review of predicted subsidence impacts against observed impacts.
- Conservative longwall setback distances in lieu of uncertain monitoring data outcomes.
- Ongoing crack mapping to improve predictions for cracking areas above future longwalls.

5.5 Contingency planning

In the event that a non-compliance against a specific performance measure has occurred, or is likely to occur, NCOPL will:

1. Report the non-compliance as soon as practicable to the relevant agencies in accordance with section 5.7.
2. Identify and implement an appropriate course of action with respect to the non-compliance in consultation with a suitably qualified person/s and the relevant Government agencies.
3. Review the effectiveness of the relevant management measures in accordance with section 6.1.

5.6 Incidents, complaints, exceedances and non-compliances

5.6.1 Incident notification

An incident is defined under the Project Approval as *a set of circumstances that causes or threatens to cause material harm, and/or breaches or exceeds the limits of performance measures/criteria*. Material harm to the environment is defined under the Project Approval as *involving actual or potential harm to the health or safety of human beings or to the environment that is not trivial.* This definition excludes “harm” that is authorised under the Project Approval or any other statutory approval (e.g. EPL).

In the event of any exceedance of the performance criteria, NCOPL will advise the Secretary and any other relevant agencies as soon as practicable after becoming aware of the incident, in accordance with Schedule 6 Condition 4. Within 7 days of the event, NCOPL will also provide the Secretary and any relevant agencies a detailed report which will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

Notifications to the NSW Environment Protection Authority will be made by contacting the Environment Line on 131 555 and written details of the notification will be provided within 7 days of the date on which the incident occurred.

Incident reporting and emergency response is further described in NCOPLs Environmental Management Strategy.

5.6.2 Non-compliance notification

In accordance with Schedule 6 Condition 2, where a non-compliance with a statutory requirement/s or an exceedance of the relevant criteria or performance measures has occurred, NCOPL will, at the earliest opportunity, take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur. Once this has been achieved, all reasonable and feasible options for remediation (where relevant) will be considered.

In accordance with Schedule 6 Condition 4, within seven days of becoming aware of a non-compliance, NCOPL will notify DPE of the non-compliance[4]. The notification will be made in writing via the Major Projects website and identify the development (including the development application number and name), set out the condition or requirement that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

NCOPL will implement any reasonable remediation measures as directed by the Secretary, to the satisfaction of the Secretary.

5.6.3 Complaints management

Any complaints received in relation to Extraction Plan Area will be managed in accordance with the complaints management protocol as follows:

- Publicly advertised telephone complaints line, 1800WHAVEN, will be in place to receive complaints.
- Each complaint received will be recorded in a Complaints Register, which will include the following details:
  - date and time of complaint;
  - method by which a complaint was made;
  - personal details the complainant wishes to provide or, if no such details are provided, a note to that effect;
  - nature of the incident that led to the complaint;
  - action taken by NCOPL in relation to the complaint (i.e., any required remedial actions), including any follow-up contact with the complainant; and
  - if no action was taken, the reason why no action was taken.
- The Environmental Superintendent will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational or outside of usual business hours).
- Once the identified measures are undertaken, the Environmental Superintendent will sign off on the relevant complaint within the Complaints Register.
- If necessary, follow-up monitoring will take place to confirm the source of the complaint is adequately mitigated.
- A summary of the complaints will be maintained by NCOPL and made available to the Community Consultative Committee, the complainant (on request) and on the WHC website. A summary of complaints received every 12 months will be provided in the Annual Review.

In the event that any complainant considers that NCOPL has not adequately addressed their concerns, the NCOPL representative will convene additional meetings with the complainant.

[4] A non-compliance which has been notified as an incident under section 5.7.1 does not need to also be notified as a non-compliance under section 5.7.2.

5.7 Reporting, review and auditing

5.7.1 Annual review

In accordance with Project Approval Schedule 6 Condition 6, an Annual Review will be prepared and submitted to the Secretary that reviews the environmental performance of the Narrabri Mine. Relevant to this Extraction Plan and to the management of subsidence, this will include:

(a) works carried out in the past year, and works planned to be carried out in the next year;

(b) comprehensive review of monitoring results and complaints records over the past year, including a comparison of results to:

- relevant statutory requirements, limits and performance measures/criteria;
- baseline data and monitoring results of previous years; and
- relevant predictions in the EA and Extraction Plan.

(c) identification of any non-compliance and what actions are being undertaken to ensure compliance;

(d) discussion of any trends in monitoring data over the life of the Narrabri Mine;

(e) identification of any discrepancies between predicted and actual impacts of the Narrabri Mine and analyse the potential cause of any significant discrepancies; and

(f) describe any measures to be implemented over the next year to improve the environmental performance of the Narrabri Mine.

The Annual Review will be made available on the WHC website.

5.7.2 Independent environmental audits

Prior to 13 September 2010, and every 3 years thereafter, unless the Secretary directs otherwise, NCOPL will commission and pay the full cost of an Independent Environmental Audit (**IEA**) of the development (Stages 1 and 2), to be conducted in accordance with the requirements of Schedule 6 Condition 7.

The audit team will be led by a suitably qualified auditor and the IEA will be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary.

5.7.3 Improvement measures

Project Approval Schedule 6 Condition 2(f) requires this Plan to include a program to investigate and implement ways to improve the environmental performance of the development over time. Improvement measures may be investigated through review of the following:

- monitoring data, and any assessment of trends;
- audit outcomes, including audits of the subsidence management measures; and
- incident reports, including any community complaints.

Reasonable and feasible improvement measures will be implemented and documented as a management measure in a revision to the Plan as described in section 6.1.

In accordance with Schedule 6 Condition 2(g) a protocol for periodic review of this Plan has been addressed under section 6.1.

6. Plan administration and responsibilities

6.1 Review of management plans

The EP 203-206 and all other site environmental management plans approved under the Project Approval will be reviewed and updated as required by Schedule 6 Condition 3, within three months of any of the following:

- completion of an IEA (as required by Schedule 6 Condition 7);
- submission of an Incident Report (as required by Schedule 6 Condition 4);
- submission of an Annual Review (as required by Schedule 6 Condition 6); and
- any modification to the conditions of the Project Approval (unless the conditions require otherwise).

NCOPL will then review, and if necessary, revise this EP 203-206 and its sub plans to ensure that the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the Narrabri Mine operations.

Condition 3 of Schedule 6 further states that if the review determines that this EP 203-206 requires revision, then this will be completed to the satisfaction of the Secretary. A dedicated review register will be maintained which will provide the details of the review of all relevant strategies, plans and programs that need to be reviewed as required under Schedule 6 Condition 3 of the Project Approval. The revision status of this EP 203-206 is indicated in section 9.

6.2 Access to information

In accordance with Schedule 6 Condition 5 of the Project Approval, NCOPL will provide regular reporting on the environmental performance of the project on the WHC website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of the Project Approval, and to the satisfaction of the Secretary.

In accordance with Schedule 6 Condition 10 of the Project Approval, NCOPL will:

- make copies of the following publicly available on its website:
  - the documents referred to in Condition 2 of Schedule 2;
  - all current statutory approvals for the project;
  - all approved strategies, plans and programs required under the conditions of this approval;
  - a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
  - a complaints register, updated on a monthly basis;
  - minutes of CCC meetings;
  - the annual reviews of the project;
  - any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;
  - any other matter required by the Secretary; and
- keep this information up-to-date, to the satisfaction of the Secretary.

Note that any printed copies of this EP 203-206 are uncontrolled.

6.3 Key responsibilities

During the operational phases of the development, the Narrabri Mine will be managed by the General Manager who will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals. Table 6-2 outlines the roles and responsibilities associated with this EP 203-206.

Table 6-2 Roles and responsibilities

Roles	Responsibilities
General Manager	• Ensure that adequate resources are available to NCOPL personnel to facilitate the completion of their responsibilities under this EP 203-206.
Mine Manager	• Ensure all contractors, sub-contractors and service-personnel are appropriately qualified, competent, and licensed to undertake the required work under this EP 203-206 and have a good environmental performance record. • Ensure the subsidence monitoring program is implemented and adhered to. • Responsible for decision making in relation to the activation of TARP responses and/or contingency planning.
Environmental Superintendent	• Ensure that all environmental monitoring and reporting is undertaken in accordance with this EP 203-206 and various approval requirements, and is checked, processed, and filed appropriately. • Responsible for decision making in relation to the activation of TARP responses and/or contingency planning. • Communicate with statutory agencies and departments, public authorities, and the community. • Advise on matters identified in all approval, permit, licence, and consent documents and ensure all operations are conducted in compliance with those conditions, and all other environmental obligations. • Liaise with stakeholders regarding subsidence impact management. • Manage incident, non-compliance and other reporting requirements. • Review and authorisation of changes to this EP 203-206.
Surface Operations Manager	• Provides notification to all mine personnel advising of potential subsidence hazards and impacts.
Civil Services Coordinator	• Manages the condition and safety of roads and tracks around the mine site. • Remediates subsidence impacts to maintain trafficability of access roads and tracks. • Maintains access to critical infrastructure and facilitates inspections and remedial works. • Designs and installs PED cables (personal emergency device communications system).
Technical Services Manager	• Decommissions Surface to Inseam (SIS) drainage sites and structures prior to subsidence impacts.
Registered Mine Surveyor	• Ensure that all subsidence monitoring is carried out in accordance with the Subsidence Monitoring Program to the accuracy required, within the specified timeframes and are checked, processed and filed appropriately.

7. References

Department of Planning and Environment (October 2022). *Extraction Plan Guideline*

Ditton Geotechnical Services (2022) *Mine Subsidence Assessment for Longwalls LW203 to LW206 at the Narrabri Underground Mine.* Prepared for Narrabri Coal Operations Pty Ltd.

NSW Department of Planning, Industry and Environment (November 2021). *Project Approval Narrabri Coal Project – Stage 2*

Palaris (2022). *Gas Emission Review for Longwall 203 to Longwall 206*. Prepared for Narrabri Coal Operations Pty Ltd.

Resource Strategies (2015) *Narrabri Mine Modification 5 - Environmental Assessment*. Prepared for Narrabri Coal Operations Pty Ltd.

Resource Strategies (2021) *Narrabri Mine Modification 7 - Environmental Assessment*. Prepared for Narrabri Coal Operations Pty Ltd.

RW. Corkery & Co. Pty. Limited. (2009). *Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project.* Prepared for Narrabri Coal Operations Pty Ltd.

8. Glossary

Term	Definition*
Active subsidence	The period of time that movement of the ground can occur after underground mining.
Angle of draw	The angle with the vertical, made by a straight line extending away from the limits of extraction at seam level to the ground surface, spanning the horizontal distance in which subsidence may occur.
Applicant	Narrabri Coal Operations Pty Ltd.
Chain pillar	The pillar(s) of coal left between adjacent longwall panels. This forms a barrier that allows the goaf to be sealed off and facilitates tailgate roof stability.
Compressive strain	A decrease in the distance between two points on the surface. This can cause shear cracking or steps at the surface if > 3 millimetres per metre (mm/m).
Cover depth	The depth of coal seam from the ground surface (metres).
Department	Planning and Assessment Group within the NSW Department of Planning and Environment (DPE).
Development	The Stage 2 development described in the EA as modified by the Project Approval.
Environmental consequences	The environmental consequences of subsidence impacts including: damage to built features; loss of surface flows to the subsurface; loss of standing pools; adverse water quality impacts; development of iron bacterial mats; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts to aquatic ecology; ponding.
Extraction Plan Area	The area predicted to be affected by the proposed secondary extraction of the approved longwall panels LW 203 to LW 206.
Far-field subsidence	Mining-induced movements of the ground surface in areas where vertical subsidence is less than 20mm.
First workings	Development of the main headings and gate roads to establish access to the coal in the mining area.
Goaf	The mined-out area into which the immediate roof strata breaks.
Groundwater	Water contained in the interconnected pore spaces and voids of the saturated zone of sediments and rocks.
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits of performance measures/criteria in the Project Approval.
Material harm	Material harm to the environment is defined in section 147 of the POEO Act.
Minimise	Implement all reasonable and feasible mitigation measures to reduce the impacts of the Narrabri Mine.
Mining operations	The extraction, processing and transportation of coal on the site, including the formation of mine access drifts and associated surface infrastructure such as gas and water drainage facilities.
MOD 5	Reduced the number of longwall panels from 26 to 20; increased the longwall panel widths for LW 107 to LW 120 from approximately 295 m to approximately 400 m; extended the western footprint approximately 60 m; and increased the maximum ROM coal processing rate from 8 Mtpa to 11 Mtpa.

Term	Definition*
MOD 7	Describes the change in mining method within the extent of the previously approved LW 201 and LW 202 and allows for up to 0.7 Mtpa via bord and pillar extraction at pillar reduction panels CF 201 to CF 205.
Narrabri Mine	The development approved under the Project Approval 05_0102 and Project Approval 08_0144.
Non-compliance	An occurrence, set of circumstances or development that is a breach of the conditions of the statutory approvals.
Plan	Extraction Plan for longwalls 203-206.
Pollution incident	Has the same meaning as in the POEO Act.
Project Approval	Development consent (PA 08_0144) issued on 26th July 2010 under Section 75J of the *Environmental Planning and Assessment Act 1979* by the Department of Planning & Infrastructure (as modified).
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment including the remediation of impacts.
Second workings	Extraction of coal from longwall panels, mini-wall panels, or pillar extraction.
Secretary	Planning Secretary under the EP&A Act, or nominee
Stage 1	The project approval granted by the Minister Planning for the Narrabri Coal Project, dated 14 November 2007.
Stage 2	Narrabri Mine Stage 2 approved under Project Approval 08_0144.
Statement of Commitments	The Proponent's revised commitments in Appendix 3 of the Project Approval, dated May 2010.
Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences of subsidence impacts.
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, including both vertical and horizontal displacement, tilt, strain and curvature.
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs.
Tailgate	Refers to the tunnels or roadways down the side of a longwall block which provides a ventilation pathway for bad or dusty air away from the longwall face. It is usually located on the side of the longwall panel adjacent to extracted panels or goaf.
Tensile strain	An increase in the distance between two points on the surface. This is likely to cause cracking at the surface if it exceeds 2 mm/m. Tensile strains are usually associated with convex (hogging) curvatures near the sides (or ends) of the panels.
the Proponent	Narrabri Coal Operations Pty Ltd
Tilt	The rate of change of subsidence between two points (A and B), measured at set distances apart (usually 10m). Tilt is plotted at the mid-point between the points and is a measure of the amount of differential subsidence
Upsidence	Relative vertical upward movements of the ground surface associated with

Term	Definition*
	subsidence.
Valley closure	The inward (or outward) movement of valley ridge crests due to subsidence trough deformations or changes to horizontal stress fields associated with longwall mining. Measured movements have ranged between 10 mm and 400 mm in the NSW Coalfields and are usually visually imperceptible.
Valley uplift	The phenomenon of upward movements along the valley floors due to Valley Closure and buckling of sedimentary rock units. Measured movements have ranged between 10 mm and 400 mm in the NSW Coalfields and may cause surface cracking in exposed bedrock on the floor of the valley (or gorge).
Vertical subsidence	Vertical downward movements of the ground surface caused by underground coal mining.
Watercourse	A river, creek or other stream, including a stream in the form of an anabranch or tributary, in which water flows permanently or intermittently, regardless of the frequency of flow events: In a natural channel, whether artificially modified or not, or in an artificial channel that has changed the course of the stream. It also includes weirs, lakes and dams

9. Review history

Table 9-1 provides the EP 203-206 document review history.

Table 9-1 Document review history

Revision	Comments	Author	Authorised by	Date

Attachment 1 Master Trigger Action Response Plan

Table A1-1 Water Trigger Action Response Plan

<table>
<tr><th>Method</th><th>Status</th><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td colspan="5">Water quality watercourse</td></tr>
<tr><td rowspan="2">To identify potential surface water quality impacts as a result of mining activities (e.g. via run off, subsidence cracking, ponding, erosion, changes in water course morphology).

Sites:
• KC1TOP, KC1US, KCTOP, KCUS.

Parameters:
• Field - EC, pH
• Laboratory - TSS, TOC

Frequency:
• Quarterly.
• During flow event (as practical).

Analysis:
• Comparison of water quality records during operations with the SSGVs for KCUS and KC1US.</td><td>Normal</td><td>The water quality trigger levels are not exceeded and performance measures met.</td><td>None required.</td><td>• Continue to implement surface water management measures in accordance with this Plan.
• Continue routine surface water monitoring and evaluation of results.</td></tr>
<tr><td>Level 1</td><td>• Less than pH 6.5 or greater than pH 8.0 for one monitoring event.
• EC, TSS and TOC exceeding Stage 1 trigger for one monitoring event.
<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Trigger</th><th colspan="4">Monitoring location</th></tr>
<tr><th>KCUS</th><th>KC1US</th><th>KCTOP</th><th>KC1TOP</th></tr>
<tr><td>EC (µs/cm)</td><td>Stage 1</td><td>721</td><td>210</td><td rowspan="3">N/A</td><td rowspan="3">N/A</td></tr>
<tr><td>Total suspended solids (mg/L)</td><td>Stage 1</td><td>708</td><td>653</td></tr>
<tr><td>Total organic carbon (TOC)</td><td>Stage 1</td><td>15</td><td>16</td></tr>
</table></td><td>Conduct preliminary quality assurance of data to confirm an exceedance.</td><td>For a single exceedance, the exceedance will be recorded, with no further contingency or notification measures required. If pH or a Stage 1 trigger is exceeded at the same location for three consecutive sampling events, then the actions required for Level 2 will be implemented.</td></tr>
</table>

<table>
<tr><th>Method</th><th>Status</th><th>Trigger</th><th>Action</th><th>Response</th></tr>
<tr><td></td><td>Level 2</td><td>

Less than pH 6.5 or greater than pH 8.0 for three consecutive monitoring events.
EC, TSS and TOC exceeding Stage 1 trigger for the same parameter exceeded at the same location for three consecutive monitoring events.
EC, TSS and TOC exceeding Stage 2 trigger for one monitoring event.

<table>
<tr><th rowspan="2">Parameter</th><th rowspan="2">Trigger</th><th colspan="4">Monitoring location</th></tr>
<tr><th>KCUS</th><th>KCIUS</th><th>KCTOP</th><th>KC1TOP</th></tr>
<tr><td rowspan="2">EC (µs/cm)</td><td>Stage 1</td><td>721</td><td>350</td><td rowspan="6">N/A</td><td rowspan="6">N/A</td></tr>
<tr><td>Stage 2</td><td>847</td><td>220</td></tr>
<tr><td rowspan="2">Total suspended solids (mg/L)</td><td>Stage 1</td><td>708</td><td>653</td></tr>
<tr><td>Stage 2</td><td>860</td><td>1,018</td></tr>
<tr><td rowspan="2">Total organic carbon (TOC)</td><td>Stage 1</td><td>15</td><td>16</td></tr>
<tr><td>Stage 2</td><td>17</td><td>17</td></tr>
</table>
</td><td>

Conduct preliminary quality assurance of data to confirm an exceedance.
Environmental Superintendent to implement contingency and notification measures as per section 8.

</td><td>

Hydrologist (or similar specialist) to review sampling and climate data and compare to upstream value to confirm likely mining impact or otherwise. If mine related, undertake physical inspection of affected surface and creeks to identify potential source of water quality degradation.
Implement appropriate management or contingency response (i.e. repair of subsidence cracking, remediation of ponding, erosion control works and rehabilitation).

</td></tr>
<tr><td colspan="5">Vegetation health (ponding)</td></tr>
<tr><td rowspan="2">To ensure that surface water ponding does not result in adverse impacts to vegetation health.

Sites:
P13-P16 and other ponded areas identified above LW203-206, as necessary (identified through visual inspection and survey, see ‘Changes to Watercourse Morphology’ TARP).
Parameters:
Ponding - GPS location, width, depth, area, significant vegetation.
Vegetation monitoring in accordance with the Extraction Plan - Biodiversity Management Plan.
Frequency:
As per ‘Changes to Watercourse Morphology’ TARP
Annual multi-spectral imaging.</td><td>Normal</td><td>No adverse impacts on vegetation observed.</td><td>None required.</td><td>Continue to implement surface water management measures in accordance with this Plan.
Continue routine surface water ponding monitoring and evaluation of results.</td></tr>
<tr><td>Level 1</td><td>Adverse impacts on vegetation identified.</td><td>Record visual observations, including photographs.</td><td>Investigate options to dewater the ponded area to limit further impacts on vegetation health and implement identified adaptive management measures.</td></tr>
</table>

Method	Status	Trigger	Action	Response
• LiDAR survey every three years. • Vegetation monitoring in accordance with the Extraction Plan - Biodiversity Management Plan. **Analysis**: • Assessment of changes in topography and associated potential ponding. • Vegetation health assessment in accordance with the Extraction Plan - Biodiversity Management Plan.	**Level 2**	Significant impacts to vegetation identified (e.g. canopy dieback, tree death).	Record visual observations, including photographs.	• If vegetation will be at risk, undertake a geomorphological assessment to determine options to have the subsidence ponded area freely drain. • Undertake survey to identify vegetation community and impacted area. The disturbance will be recorded in the site clearing register.
Changes in watercourse morphology				
To identify subsidence effects to the morphology of creeks. This may occur in the channel and/or floodplain. **Sites:** • Reaches of Kurrajong Creek Tributary 1 and Kurrajong Creek which traverse the Extraction Plan Area. **Parameters:** • Channel width, depth, area and bank full level. • Erosion and sediment deposition. • Extent of ponding. **Frequency:** • During active subsidence (within the active subsidence zone) - monthly and following a significant rainfall event (defined as a 5-day 90th percentile rainfall event, equal to 38.4 mm over 5 consecutive days). • Creek line - baseline and quarterly for a period of two years during mining. • Geomorphology and channel survey – baseline and annually for two years. • Field survey if changes detected following remote sensing. **Analysis:** • Comparison of baseline, during mining and post-mining conditions.	**Normal**	No identified impacts on water course morphology.	None required.	• Continue to implement surface water management measures in accordance with this Plan. • Continue routine creek line monitoring program and evaluation of results.
	Level 1	Identified changes in channel cross-section, bed erosion, incision and deposition identified.	Record observations, including photographs.	• Contract a qualified geomorphologist to develop an action plan which may involve further monitoring or remediation (with consideration given to application of the River Style Framework for classifying channel condition and recovery). • Implement geomorphology action plan. • Implement contingency measures and notify relevant stakeholders.
	Level 2	Further monitoring identifies remediation works are not performing (i.e. ineffective control measure).	Record observations, including photographs.	• As for Level 1 • If implemented erosion control measures are found to be ineffective, identify cause and rectify or replace with effective measures. Continue monitoring.

Method	Status	Trigger	Action	Response
Groundwater levels (non Pilliga Sandstone bores)				
To provide baseline water level data and to identify water level impacts in comparison to predicted drawdown considering natural variations. To verify that impacts on aquifers are consistent with model predictions. **Sites:** • P8, P9, P10 and P11. **Parameters:** • Water level. **Frequency:** • Quarterly manual monitoring of groundwater levels and automatic groundwater level monitoring via VWPs (downloaded quarterly).	**Normal**	Routine monitoring indicates water level below trigger levels.	None required	Continue routine groundwater monitoring and evaluation of results.
	Level 1	One exceedance above a Stage 1 trigger (Table 6-5).	Conduct preliminary quality assurance of data to confirm an exceedance.	The exceedance will be recorded, with no further contingency or notification measures required. If a water level trigger is exceeded at the same location for three consecutive sampling events, then the actions required for Level 2 will be implemented.
	Level 2	Three consecutive exceedances above a Stage 1 trigger OR one exceedance above a Stage 2 trigger (Table 6-5).	• Conduct preliminary quality assurance of data to confirm an exceedance. • Environmental Superintendent to implement contingency and notification measures as per section 8.	• Engage hydrogeologist to undertake assessment and report on any identified changes/likely causes and recommendations. • Implement contingency responses as agreed with government agencies and in accordance with hydrogeologist recommendations.

Method	Status	Trigger	Action	Response
Groundwater levels (Pilliga Sandstone bores only)				
To provide baseline water level data and to identify water level impacts in comparison to predicted drawdown considering natural variations. To verify that impacts on aquifers are consistent with model predictions. **Sites:** • P7 **Parameters:** • Water level. **Frequency:** • Quarterly manual monitoring of groundwater levels and automatic groundwater level monitoring via VWPs (downloaded quarterly).	**Normal**	Routine monitoring indicates water level below trigger levels.	• None required	• Continue routine groundwater monitoring and evaluation of results.
	Level 1	Stage 1 (>5m below baseline level) (Table 6-5)	• Conduct preliminary quality assurance of data to confirm an exceedance. • Environmental Superintendent to implement contingency and notification measures as per section 8.	• Engage hydrogeologist to undertake assessment and report on any identified changes/likely causes and recommendations. • Implement contingency responses as agreed with government agencies and in accordance with hydrogeologist recommendations. Recommendations should be clear and detailed mitigation actions should consider: ▪ review and calibration of numerical model and update predictions; ▪ review allocated licensed units; ▪ consider adjusting mine plan (i.e. reduce mining heights to that originally approved for Stage 2). This would reduce the vertical fracturing and extent of depressurisation into the Pilliga Sandstone; ▪ report in Annual Review; and ▪ review and if necessary revise the EP-WMP.

Method	Status	Trigger		Action	Response
		Level 2	Stage 2 (>10 m below baseline level) (Table 6-5)*	• Conduct preliminary quality assurance of data to confirm an exceedance. • Determine if an incident has occurred. • Environmental Superintendent to implement contingency and notification measures as per section 8.	• The decline beyond the Level 1 trigger will be assessed by a hydrogeologist as soon as it is confirmed that the trend continues beyond the Level 1 trigger. The investigation will confirm if the bore trigger is isolated or of regional scale west of the mine panels as a result of mining. • Assess risk of environmental harm, take all preventative measures to prevent or minimise environmental harm. • Submit a detailed report to the relevant Government agencies within seven days. • Priority actions will include groundwater isolation contingency plans or modification of mining operations based on the risk to the environment and likelihood of a repeat incident. • Monitor the implementation of actions to ensure they have been effective. • Review and if necessary revise the EP-WMP.
Groundwater quality					
To assess performance of water management infrastructure. **Sites:** • P7, P8, P9, P10 and P11. **Parameters:** • EC and pH **Frequency:** • Quarterly		**Normal**	Routine monitoring indicates water quality below the EC or pH trigger value (Table 6-4).	No action	Continue routine groundwater monitoring and evaluation of results.
		Level 1	Routine monitoring indicates water quality exceeds the EC or pH trigger value (single exceedance) (Table 6-4).	Conduct preliminary quality assurance of data to confirm an exceedance.	For a single exceedance, the exceedance will be recorded, with no further contingency or notification measures required. If a water level trigger is exceeded at the same location for three consecutive sampling events, then the actions required for Level 2 will be implemented.

Method	Status	Trigger		Action	Response
		Level 2	Routine monitoring indicates water quality exceeds the EC or pH trigger value over three consecutive monitoring events (Table 6-4).	• Conduct preliminary quality assurance of data to confirm an exceedance. • Environmental Superintendent to implement contingency and notification measures as per section 8.	• Engage hydrogeologist to undertake assessment and report on any identified changes/likely causes and recommendations. • Implement contingency responses as agreed with government agencies and in accordance with hydrogeologist recommendations.

Note: * Level 2 at >10m drawdown in the Pilliga Sandstone would account for the fact that drawdown will be 10 m greater than what has been predicted in the Stage 2 Mod 5 approval.

Table A1-2 Land Trigger Action Response Plan

Aspect	Performance measure	Response	
		Trigger	**Action**
Remediation of surface cracks	Surface cracks are remediated within two months of identification or when safe to do so.	**Level 1** • Surface cracks >50 mm but <320 mm present. and/or • Erosion as a result of cracking identified.	**Level 1** • Provide safety fencing and signage if required. • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include ripping of surface cracks, filling of cracks with grout, spoil or other suitable material. • Implement appropriate erosion control measures as outlined in the site Erosion and Sediment Control Plan. • Monitor remediated surface cracks within 3 months following remediation.
		Level 2 • Surface cracks >320 mm and/or crack widths more than predicted for specific soil type or natural feature.	**Level 2** • As for Level 1 • Make area safe. • Investigate the reasons for exceedance of predictions. • Review and update predictions and assessment of potential impacts. • On-going review and appraisal of any significant changes to surface slopes such as cracking along ridges, increased erosion down slopes, foot slope seepages and drainage path adjustments observed after each longwall is extracted.
Sediment and erosion controls	No ongoing or significant erosion.	**Level 1** • Evidence of active rill erosion, gully erosion <200 mm in depth or slumping.	**Level 1** • Document occurrence. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Evidence of active rill or gully erosion >200 mm in depth or significant slumping/slope instability.	**Level 2** • As per Level 1 • Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a specialist if ongoing erosion/slope instability is observed following repair and implementation of additional controls. • On-going review and appraisal of any significant changes to surface slopes such as cracking along ridges, increased erosion down slopes, foot slope seepages and drainage path adjustments observed after each longwall is extracted.
Creek line monitoring program	Change to overall drainage pattern is not more than predicted and detected alteration in channel dimensions or processes within normal range compared to baseline data.	**Level 1** • Field survey indicates <20% increase in length of eroding creek line. and/or • Surface drainage pattern is unchanged.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Monitoring indicates >20% increase in length of eroding creek line. and/or • Surface drainage pattern is significantly altered.	**Level 2** • Relevant agencies to be notified and actions discussed. • Consult with a geomorphologist or other appropriately qualified and experienced specialist to determine the extent of the impact, identify

Aspect	Performance measure	Response	
		Trigger	**Action**
			contributing factors and determine appropriate remediation measures. • Review and implement contingency measures required by other plans as relevant (e.g. the Subsidence Monitoring Program). • Review monitoring program as required.
Topography and landscape morphology form	Detected alteration in channel dimensions or topography/landscape morphology within normal range compared to baseline data.	**Level 1** • Surface gradient change as detected by LiDAR is >1.5% and <3%.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Surface gradient change as detected by LiDAR is >3% and <5%.	**Level 2** • As for Level 1 • Consult geomorphologist or other appropriately qualified and experienced specialist to review DEM and conduct site investigation to assess changes and provide recommendations for remediation which may include re-establishing drainage pathways with earthworks and implementation of erosion control measures. • Notify relevant agencies if in-stream works are to be undertaken.

Table A1-3 Biodiversity Trigger Action Response Plan

Aspect	Performance measure	Response	
		Trigger	Action
Vegetation Clearance Protocol	No vegetation clearance outside of approved areas.	**Level 1** • Clearing within the delineated area.	**Level 1** • No action required.
		Level 2 • Clearing outside the delineated area.	**Level 2** • Environmental Superintendent to inform the General Manager. • Investigate reasons for exceedance. • Relevant agencies to be notified and actions discussed.
Remediation of surface cracks	Surface cracks are remediated within two months of identification or when safe to do so.	**Level 1** • Surface cracks >50 mm but <320 mm present. and/or • Erosion as a result of cracking identified.	**Level 1** • Provide safety fencing and signage if required. • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include ripping of surface cracks, filling of cracks with grout, spoil or other suitable material. • Implement appropriate control measures as outlined in the Extraction Plan - Water Management Plan. • Monitor remediated surface cracks within 3 months following remediation.
		Level 2 • Surface cracks >320 mm and/or crack widths more than predicted for specific soil type or natural feature.	**Level 2** • As for Level 1 • Make area safe. • Investigate the reasons for exceedance of predictions. • Review and update predictions and assessment of potential impacts.
Sediment and erosion controls	No ongoing or significant erosion.	**Level 1** • Evidence of active rill erosion, gully erosion <200 mm in depth or slumping.	**Level 1** • Document occurrence. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Evidence of active rill or gully erosion >200 mm in depth or significant slumping.	**Level 2** • As per Level 1 • Review adequacy of existing erosion and sediment controls. • Undertake repairs and implement additional controls as required. • Engage a specialist if ongoing erosion is observed following repair and implementation of additional controls.
Creek line monitoring program	Change to overall drainage pattern is not more than predicted and detected alteration in channel dimensions or processes within normal range compared to baseline data.	**Level 1** • Field survey indicates <20% increase in length of eroding creek line. and/or • Surface drainage pattern is unchanged.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.

Aspect	Performance measure	Response	
		Trigger	**Action**
		Level 2 • Monitoring indicates >20% increase in length of eroding creek line. and/or • Surface drainage pattern is significantly altered.	**Level 2** • Consult with a geomorphologist or other appropriately qualified and experienced specialist to determine the extent of the impact, identify contributing factors and determine appropriate remediation measures. • Review and implement contingency measures required by other plans as relevant (e.g. the Subsidence Monitoring Program). • Review monitoring program as required. • Relevant agencies to be notified and actions discussed.
Topography and landscape morphology form	Detected alteration in channel dimensions or topography/landscape morphology within normal range compared to baseline data.	**Level 1** • Surface gradient change as detected by LiDAR is >1.5% and <3%.	**Level 1** • Document observed changes. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Surface gradient change as detected by LiDAR is >3% and <5%.	**Level 2** • As for Level 1 • Consult geomorphologist or other appropriately qualified and experienced specialist to review DEM and conduct site investigation to assess changes and provide recommendations for remediation which may include re-establishing drainage pathways with earthworks and implementation of erosion control measures. • Notify relevant agencies if in-stream works are to be undertaken.
Native vegetation	No ongoing or significant surface cracking, erosion, or slumping impacting native vegetation.	**Level 1** • NDVI monitoring identifies no change (i.e., within +/- 1 std dev from average) in an area that exceeds 0.1 ha. • Canopy is unchanged from that observed in baseline monitoring (with consideration given to natural variation) • No declining trend observable in comparison to control sites • Increase in weed cover from previous monitoring event is <10%.	**Level 1** • No action required, continue monitoring.
		Level 2 • NDVI monitoring identifies change > +/- 2 std dev from average in an area that exceeds 0.1ha. • Canopy change is greater than that observed in baseline monitoring (with consideration given to natural variation). • Definable trend of decline observable in comparison to control sites. • Increase in weed cover from previous monitoring event is >10%.	**Level 2** • Conduct site investigation to determine the cause of change and appropriate management response which may include planting of endemic species, or additional weed control. • Review monitoring program as required.
Ponding (riparian vegetation)	No ponding impacting native vegetation.	**Level 1** • Ponding occurs in areas where the vegetation is not affected.	**Level 1** • Allow ponding to self-correct and continue to monitor.
		Level 2 • Monitoring detects a decline in vegetation health.	**Level 2** • Investigate options to dewater the ponded area to limit further impacts on vegetation health and implement identified adaptive management measures. • If vegetation will be at risk, undertake a geomorphological assessment to determine options to have the subsidence ponded area freely drain.

Aspect	Performance measure	Response	
		Trigger	**Action**
			• Undertake survey to identify vegetation community and impacted area. The disturbance will be recorded in the site clearing register.
Weed management	High Threat Weeds identified during monitoring have been controlled.	**Level 1** • Increase in High Threat Weeds > 20% compared to baseline dataset.	**Level 1** • Undertake additional monitoring. • Increase or review/amend weed control methods. • Undertake follow up targeted control.
		Level 2 • Increase in High Threat Weeds > 40% compared to baseline dataset.	**Level 2** • As per Level 1 • Review the weed management program to identify the key priority areas and investigate alternative methods for control of target species.
Animal pest management	Pest animals identified during monitoring have been controlled.	**Level 1** • Monitoring indicates pest animals impacting on native vegetation.	**Level 1** • Increase the frequency or extent of pest animal control based on advice from a suitably qualified person.

Table A1-4 Heritage Trigger Action Response Plan

Aspect	Performance measure	Response	
		Trigger	Action
Surface cracking, vertical displacement, or erosion	Surface cracking, vertical displacement or erosion does not compromise Aboriginal objects or cultural heritage values.	**Level 1** • Surface cracks <50 mm present within 50 m of a cultural heritage site, and no erosion identified.	**Level 1** • Document occurrence of surface cracks. • Continue monitoring. • Summarise occurrence in relevant reports.
		Level 2 • Surface cracks >50 mm present within 50 m of a cultural heritage site. and/or • Erosion as a result of cracking identified.	**Level 2** • As for Level 1 • Provide safety fencing and signage if required. • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include salvage of cultural heritage, ripping of surface cracks, filling of cracks with grout, spoil or other suitable material.
Ponding	Ponding does not compromise Aboriginal objects or cultural heritage values.	**Level 1** • No ponding areas identified, or ponding occurs in areas with no cultural heritage present.	**Level 1** • Continue monitoring.
		Level 2 • Ponding areas identified in proximity to areas with cultural heritage present.	**Level 2** • Advise relevant stakeholders. • Implement remediation measures as appropriate. These may include salvage of cultural heritage or channel earthworks to mitigate ponding.
Remediation of surface cracking or ponding	Remediation works do not compromise Aboriginal objects or cultural heritage values.	**Level 1** • Preliminary assessment of proposed remediation works concludes that works will not impact cultural heritage.	**Level 1** • Implement repair in accordance with the Permit to Work procedure^.
		Level 2 • Preliminary assessment of proposed remediation works concludes that works have the potential impact to cultural heritage.	**Level 2** • As for Level 1 • Implement procedure for subsidence repair*. • Consider appropriate remediation methods to mitigate impacts. • Salvage cultural heritage if impacts cannot be avoided.

Notes:
^WHC-PRO-NAR- PTW – SURFACE DISTURBANCE/PENTRATION WORK.
* WHC-PRO-NAR-SUBSIDENCE REPAIR IN ACH SITES.

Table A1-5 Built Features Trigger Action Response Plan

Monitoring	Trigger	Action
Water storage dams and soil conservation banks		
Condition		
To document pre- and post-subsidence condition and allow identification of required remedial works. **Sites:** All dams **Parameters** Obtain xyz coordinates along water storage dam embankments/spillways and along contour banks. Photographic records. **Analysis:** Pre- and post-mining comparison **Frequency:** Pre- and post-subsidence	**Level 1** • Post-subsidence survey identifies that spillway and dam wall not likely to operate as intended (i.e. spillway no longer lowest point on wall). or • Post-subsidence survey identifies that contour bank not likely to operate as intended (i.e. damaged due to cracking, areas no longer able to drain, or lengths with increased slope).	**Level 1** • Notify Environmental Superintendent. • Reduce stored water level (if not already reduced), assess and undertake repairs to wall or spillway as required. • Reconstruct or repair as required.
Dam failure		
To observe possible subsidence effects to dam wall and identify potential risk of impending dam failure. **Sites**: All dams **Parameters**: Visual inspections noting their condition, water level, cracking, or recent erosion of earth embankment. **Analysis**: Visual identification of changes. **Frequency**: Daily during undermining of structure.	**Level 1** • Minor superficial surface cracking observed – no apparent water leaking through wall.	**Level 1** • Notify Environmental Superintendent. • Continue to monitor.
	Level 2 • Sudden drop in water level noted that it is not attributable to other recent activities or use. or • Deep cracking observed and water seepage through wall is visible (i.e. damp areas or signs of increased grass growth within embankment or immediately downstream) or severe cracking and visible signs of water discharging through earth embankment.	**Level 2** • As for Level 1 • Restrict access to the area. • Reduce stored water level by pumping water out (release downstream) and maintain lowered water level until post-subsidence assessment and repairs can be carried out.
Roads and access tracks		
To note any subsidence impacts that require remediation or implementation of additional traffic controls. **Sites:** Visual monitoring of affected roads and tracks. **Parameters:** Note any damage to roads that may cause traffic hazard (i.e. cracks, compression humps, ponded water on road surface). **Analysis:** Visual identification. **Frequency:** As required whilst active subsidence is affecting the road(s) and until any required remediation works are completed.	**Level 1** • If inspections note that road is no longer trafficable or safe.	**Level 1** • Implement appropriate traffic control (may include hazard signs or temporary road closure). • Notify mine personnel. • Review potential detour options and provide alternative access (if available). • Initiate road repairs/reconstruction to restore affected section to a trafficable standard.
	Level 2 • If vehicle accident occurs.	**Level 2** • As for Level 1. • Apply appropriate emergency/first aid treatment (if required). • Record and report incident in accordance with Narrabri Mine Health and Safety protocols. • Identify cause of accident. If subsidence impact related, review the effectiveness of the management/monitoring actions under this EP-BFMP and revise accordingly (if required).
Property and livestock fences		
To note the condition and functionality of affected fences to ensure effective exclusion of stock from active subsidence area. **Sites**: All panels (LW 203 to LW 206) **Parameters**: Visual inspections of fences and gates/cattle grids within active subsidence area. **Analysis**: Visual observation. **Frequency**: On an as needed basis.	**Level 1** • Damage observed to fences that can be attributed to subsidence movements.	**Level 1** • Notify Environmental Superintendent. • Undertake repairs as required.

Monitoring	Trigger	Action
Residential dwellings and machinery sheds		
Harmful substances		
To identify the presence of potentially harmful substances that may be released as a consequence of subsidence. **Sites**: All subsidence-affected buildings and structures. **Parameters**: Hazardous materials assessment. **Analysis**: Potentially affected building(s) to identify the presence of asbestos or other hazardous building materials/substances unable to remain in situ. **Frequency**: Prior to subsidence.	**Level 1** • Survey reveals presence of asbestos or other hazardous material within the buildings or surrounds that is considered a potential risk to the environment and/or personnel health in the event of subsidence damage.	**Level 1** • Notify Surface Operations Manager. • Remove or 'make safe' (demarcate) any potentially hazardous building materials that may potentially pose a health or environmental threat as a result of subsidence impacts (i.e. damage to asbestos) prior to subsidence impacts.
Post-subsidence condition		
To assess post-subsidence condition of structure and determine if repair is practicable, cost-effective, and safe. **Sites**: All subsidence-affected buildings and structures. **Parameters**: Post-subsidence structural assessment. **Analysis**: Assessment of structural stability. **Frequency**: Post subsidence.	**Level 1** • Structure collapses or is considered to be uneconomic to repair.	**Level 1** • Notify Surface Operations Manager. • Maintain safety fencing/exclusion of property to prevent access. • Demolish structure(s) and recycle/dispose of materials to a licensed waste facility.
Mine infrastructure		
SIS gas drainage wells		
To confirm site has been decommissioned and is stable and safe.	**Level 1** • Not fully decommissioned or considered unsafe to people or livestock.	**Level 1** • Notify Technical Services Manager. • Undertake additional works as required to remove remaining structures and rehabilitate. • Repair post-subsidence cracking or identified impacts as required.
PED Cable		
Maintain communications	**Level 1** • No longer operational.	**Level 1** • Notify Technical Services Manager/Civil Services Coordinator. • Inspect to locate site of damage and replace or repair as required.
Groundwater monitoring bores		•
Reinstatement of water bores.	**Level 1** • Groundwater monitoring bores predicted to have a 'high' risk of significant impact to well casing.	**Level 1** • Reinstate groundwater monitoring bores following significant groundwater recovery has occurred after mining. • Additional monitoring bores may be required to replace the function of impacted monitoring bores (if necessary).
Survey marks		
Pre- and post-mining notifications for impacts.	**Level 1** • Notify impacts to Survey marks 14 days prior to impact.	**Level 1** • Registered Surveyor to update details following mining.

Table A1-6 Public Safety Trigger Action Response Plan

Monitoring	Trigger	Action
Roads and access tracks		
To note any subsidence impacts that require remediation or implementation of additional traffic controls. **Sites:** Visual monitoring of affected roads and tracks. **Parameters:** Note any damage to roads that may cause traffic hazard (i.e. cracks, compression humps, ponded water on road surface). **Analysis**: Visual identification **Frequency:** As required whilst active subsidence is affecting the road(s) and until any required remediation works are completed.	**Level 1** • If inspections note that road is no longer trafficable or safe.	**Level 1** • Implement appropriate traffic control (may include hazard signs or temporary road closure). • Notify mine personnel. • Review potential detour options and provide alternative access (if available). • Initiate road repairs/reconstruction to restore affected section to a trafficable standard.
	Level 2 • If vehicle accident occurs	**Level 2** • As for Level 1. • Apply appropriate emergency / first aid treatment if required. • Record and report incident in accordance with Narrabri Mine Health and Safety protocols. • Identify cause of accident. If subsidence impact related, review the effectiveness of the management/monitoring actions under this EP-PSMP and revise accordingly if required.
Water storage dams and soil conservation banks		
Condition		
To document pre- and post-subsidence condition and allow identification of required remedial works **Sites:** All dams **Parameters** Obtain xyz coordinates along of water storage dam embankments/spillways and along contour banks. Photographic records. **Analysis:** Pre- and post-mining comparison **Frequency:** Pre- and post-subsidence	**Level 1** • Post-subsidence survey identifies that spillway and dam wall not likely to operate as intended (i.e. spillway no longer lowest point on wall); or • Post-subsidence survey identifies that contour bank not likely to operate as intended (i.e. damaged due to cracking, areas no longer able to drain, or lengths with increased slope).	**Level 1** • Notify Environmental Superintendent. • Reduce stored water level (if not already reduced), assess and undertake repairs to wall or spillway as required. • Reconstruct or repair as required.
Dam failure		
To observe possible subsidence effects to dam wall and identify potential risk of impending dam failure **Sites**: All dams **Parameters**: Visual inspections noting their condition, water level, cracking or recent erosion of earth embankment. **Analysis**: Visual identification of changes **Frequency**: Daily during undermining of structure	**Level 1** • Minor superficial surface cracking observed – no apparent water leaking through wall.	**Level 1** • Notify Environmental Superintendent. • Continue to monitor.
	Level 2 • Sudden drop in water level noted that it is not attributable to other recent activities or use. or • Deep cracking observed and water seepage through wall is visible (i.e. damp areas or signs of increased grass growth within embankment or immediately downstream) or severe cracking and visible signs of water discharging through earth embankment.	**Level 2** • As for Level 1 • Restrict access to the area • Reduce stored water level by pumping water out (release downstream) and maintain lowered water level until post-subsidence assessment and repairs can be carried out.
Property and livestock fences		

Monitoring	Trigger	Action
To note the condition and functionality of affected fences to ensure effective exclusion of stock from active subsidence area. **Sites**: All panels (LW 203 to LW 206) **Parameters**: Visual inspections of fences and gates/cattle grids within active subsidence area. **Analysis**: Visual observation. **Frequency**: On an as needed basis.	**Level 1** • Damage observed to fences that can be attributed to subsidence movements.	**Level 1** • Notify Environmental Superintendent. • Undertake repairs as required.
Residential dwellings and machinery sheds		
Harmful substances		
To identify the presence of potentially harmful substances that may be released as a consequence of subsidence. **Sites**: All subsidence-affected buildings and structures. **Parameters**: Hazardous materials assessment. **Analysis**: Potentially affected building(s) to identify the presence of asbestos or other hazardous building materials/substances unable to remain in situ. **Frequency**: Prior to subsidence.	**Level 1** • Survey reveals presence of asbestos or other hazardous material within the buildings or surrounds and that is considered a potential risk to the environment in the event of subsidence damage.	**Level 1** • Notify Surface Operations Manager. • Remove or 'make safe' (demarcate) any potentially hazardous building materials that would potentially pose a health or environmental threat as a result of subsidence impacts (i.e. damage to asbestos) prior to subsidence impacts.
Post-subsidence condition		
To assess post-subsidence condition of structure and determine if repair is practicable, cost-effective and safe **Sites**: All subsidence-affected buildings and structures **Parameters**: Post-subsidence structural assessment **Analysis**: Assessment of structural stability. **Frequency**: Post-subsidence	**Level 1** • Structure collapses or is considered to be uneconomic to repair.	**Level 1** • Notify Surface Operations Manager. • Maintain safety fencing / exclusion of property to prevent access. • Demolish structure(s) and recycle/dispose of materials to a licensed waste facility.
Mine infrastructure		
Surface to inseam gas drainage wells		
To confirm site has been decommissioned and is stable and safe	**Level 1** • Not fully decommissioned or considered unsafe to people or livestock.	**Level 1** • Notify Technical Services Manager. • Undertake additional works as required to remove remaining structures and rehabilitate. • Repair post-subsidence cracking or identified impacts as required.
PED Cable		
Maintain communications	**Level 1** • No longer operational.	**Level 1** • Notify Technical Services Manager/Civil Services Coordinator. • Inspect to locate site of damage and replace or repair as required.
Unauthorised access		
Limited occurrences of unauthorised site access.	**Level 1** • Evidence of unauthorised access.	**Level 1** • Review and update site induction and security controls as required. • Review fencing and signage and undertake maintenance and improvements as required.

Attachment 2 Compliance conditions relevant to this Plan

Table A2-1 Project Approval conditions relevant to this Plan

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
Schedule 2 Condition 1	The Proponent 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 project.	Section 5.2 Section 5.3
Schedule 2 Condition 11	With the approval of the Secretary, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis. ***Note**: The conditions of this approval require certain strategies, plans, and programs to be prepared for the project. They also require these documents to be reviewed and audited on a regular basis to ensure they remain effective. However, in some instances, it will not be necessary or practicable to prepare these documents for the whole project at any one time, particularly as these documents are intended to be dynamic and improved over time. Consequently, the documents may be prepared and implemented on a progressive basis, subject to the conditions of this approval. In doing this however, the Proponent will need to demonstrate that it has suitable documents in place to manage the existing operations of the project.*	No staging of EP 203-206 proposed.
Schedule 3 Condition 1	The Proponent shall ensure that mine subsidence does not cause any exceedances of the performance measures in Table 1. *Table 1: Subsidence Impact Performance Measures* **Water Resources** Great Artesian Basin: The Proponent shall ensure that, within 5 years of the date of this approval, any loss of water flow into the Great Artesian Basin aquifers (equal to the maximum predicted impact, or the measured impact of the project, whichever is the greater), is managed, licensed or offset (including the possibility of injection of raffinate) to the satisfaction of DPIE Water. **Biodiversity** Flora and Fauna: The Proponent shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Secretary. *Note: The Proponent may be required to define other performance measures and performance indicators in management plans required under this approval (see eg condition 3 below).*	Section 5.1
Schedule 3 Condition 2	The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 2, to the satisfaction of Resources Regulator. *Table 2: Subsidence Impact Performance Measures* **Built Features** All built features: Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated. **Public Safety** Public Safety: No additional risk	Section 5.1

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	Notes: *1) The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 4 below).* *2) Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.* *3) Compensation required under this condition includes any compensation payable under the Mine Subsidence Compensation Act 1961 and/or the Mining Act 1992.*	
Schedule 3 Condition 4	NCOPL shall prepare and implement Extraction Plans for any second workings to be mined to the satisfaction of the Secretary. Each Extraction Plan must:	
	(a) be prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;	Section 2.2.1 Attachment 3
	(b) be approved by the Secretary before NCOPL carries out any of the second workings covered by the plan;	Section 2.1.1
	(c) include detailed plans of the proposed first and second workings and any associated surface development;	Appendix H
	(d) include detailed performance indicators for each of the performance measures in Tables 1 and 2 (as included in Schedule 3 Condition 2 of the Project Approval);	Section 5.1
	(e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;	Section 3 Appendix J
	(f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 1 and 2, and manage or remediate any impacts and/or environmental consequences;	Section 5.2 Appendix A to Appendix G
	(g) include the following to the satisfaction of the Resources Regulator:	
	• a Coal Resource Recovery Plan that demonstrates effective recovery of the available resource;	Appendix G
	• a Subsidence Monitoring Program to: ▪ provide data to assist with the management of the risks associated with subsidence; ▪ validate the subsidence predictions; and ▪ analyse the relationship between the subsidence effects and impacts under the plan and any ensuing environmental consequences;	Appendix K

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	• a Built Features Management Plan to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which: ▪ addresses in appropriate detail all items of public infrastructure and all classes of other built features; and ▪ has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;	Appendix E
	• a Public Safety Management Plan to ensure public safety in the mining area; and	Appendix F
	• appropriate revisions to the Landscape Management Plan required under Condition 3 of Schedule 5; and	No revisions to the Landscape Management proposed under this EP 203-206
	(h) include a:	
	• Water Management Plan, which has been prepared in consultation with EPA and DPE Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on surface water resources, groundwater resources and flooding, and which includes: ▪ surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality; ▪ a program to monitor and report groundwater inflows to underground workings; and ▪ a program to manage and monitor impacts on groundwater bores on privately-owned land;	Appendix A
	• Biodiversity Management Plan, which has been prepared in consultation with BCS and the Resources Regulator, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna;	Appendix C
	• Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;	Appendix B
	• Heritage Management Plan, which has been prepared in consultation with Heritage NSW and relevant stakeholders for Aboriginal heritage, to manage the potential environmental consequences of the proposed second workings on heritage sites or values; and	Appendix D

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	(i) include a program to collect sufficient baseline data for future Extraction Plans.	Section 4.2 Appendix K
	Notes: *Management plans prepared under condition 4(h) should address all potential impacts of proposed underground coal extraction on the relevant features. Other similar management plans required under this approval (eg under conditions 13 and 23 of schedule 4 or condition 3 of schedule 5) are not required to duplicate these plans or to otherwise address the impacts associated with underground coal extraction.*	
Schedule 3 Condition 5	NCOPL shall ensure that the management plans required under condition 4(h) above include:	
	(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval;	Appendix A Appendix B Appendix C Appendix D
	(b) a detailed description of the measures that would be implemented to remediate predicted impacts; and	
	(c) a contingency plan that expressly provides for adaptive management.	
Schedule 6, Condition 2	NCOPL shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:	
	(a) detailed baseline data;	Section 4.2
	(b) a description of:	
	• the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2.1
	• any relevant limits or performance measures/criteria;	Section 5.1
	• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures	
	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria:	Section 5
	(d) a program to monitor and report on the:	
	• impacts and environmental performance of the project;	Section 4.1
	• effectiveness of any management measures (see (c) above);	
	(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 5.4 Section 5.6

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
	(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 5.8.3
	(g) a protocol for managing and reporting any;	
	• incidents;	Section 5.7.1
	• complaints;	Section 5.7.3
	• non-compliances with statutory requirements; and	Section 5.7.2
	• exceedances of the impact assessment criteria and/or performance criteria; and	Section 5.4 Section 5.6
	(h) a protocol for periodic review of the plan.	Section 6.1
Schedule 6 Condition 3	Within 3 months of the submission of an:	
	(a) audit under condition 7 of Schedule 6;	
	(b) incident report under condition 4 of Schedule 6; and	
	(c) annual review under condition 5 of Schedule 6; and	
	(d) any modification to the conditions of this approval (unless the conditions require otherwise),	
	NCOPL shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary.	
Schedule 6 Condition 4	The Proponent shall notify the Secretary in writing via the Major Projects website and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident.	Section 5.7.1
Schedule 6 Condition 5	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Secretary.	Section 5.8 Section 6.2
Schedule 6 Condition 6	By the end of March each year, the Proponent must submit a review of the environmental performance of the project for the previous calendar year to the satisfaction of the Secretary.	Section 5.8.1
Schedule 6 Condition 7	Prior to 13 September 2010, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project (Stages 1 and 2).	Section 5.8.2

Project Approval 08_0144 conditions		Document reference
Condition	**Requirement**	
Schedule 6 Condition 10	The Proponent shall: (a) make copies of the following publicly available on its website: • the documents referred to in Condition 2 of Schedule 2; • all current statutory approvals for the project; • all approved strategies, plans and programs required under the conditions of this approval; • a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs; • a complaints register, updated on a monthly basis; • minutes of CCC meetings; • the annual reviews of the project; • any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; • any other matter required by the Secretary; and	Section 6.2
	(b) keep this information up-to-date, to the satisfaction of the Secretary.	Section 6.2

Table A2-2 Relevant Statement of Commitments

SoC requirements		Document Reference
SoC	**Summary of the requirement**	
5.1	Inspect the identified 'cracking zones' above each longwall panel to identify occurrence of cracks.	Section 4.1
5.2	Rip the surface over cracks not filled in by natural processes.	Section 5.2.1
5.3	For larger cracks for which surface ripping will not completely fill, fill with subsoil material sourced from stockpiles maintained at nearby gas drainage or ventilation sites, or within the footprint of the Reject Emplacement Area.	Section 5.2.1
5.4	Undertake a detailed condition assessment of the 3rd order waterways within the predicted subsidence zone to enable assessment of changes post mining.	Section 5.2.5 Appendix B Appendix K
5.5	Inspect local drainage lines above the active and completed longwall panels. Monitoring should assess any restriction of flows and hence restriction of fish passage to facilitate appropriate restorative measures.	Section 5.2.5 Appendix B Appendix K
5.6	Undertake water quality sampling from watercourses within the impact zone to determine any impacts on sediment loading and other parameters including salt loads.	Appendix A Appendix K
5.7	Note the effects of any ponding and commission a hydrologist or ecologist to recommend remedial actions should the area of ponding encroach upon sites of conservation or heritage significance.	Section 5.2.6
5.8	Inspect areas of the Mine Site susceptible to landslip or accelerated erosion, eg. drainage lines and steeply sloped areas of exposed Purlawaugh Formation derived subsoils.	Section 5.2.3 Section 5.2.4 Appendix B Appendix K
5.9	(In the event of large-scale slope instability), undertake appropriate stabilisation works, eg. installation of deep sub-surface drainage trenches or construction of strategic catch drains along slope crests.	Section 5.2.3 Section 5.2.4
5.10	(In the event of erosion within Mine Site watercourses), stabilise the damaged or eroded banks (in accordance with an Erosion and Sediment Control Plan for the Longwall Project).	Section 5.2.3 Section 5.2.4
5.11	Establish survey lines along ephemeral drainage gullies and along gully crests and monitor during and after mining of each longwall panel to identify any signs of cracking or 'upsidence'.	Section 4.2 Appendix B Appendix K
5.12	Review predictions of 'upsidence' and valley crest movements after each longwall is completed.	Section 2.2.2 Section 5.5
5.13	(In the event that 'upsidence' results in surface cracking or erosion), undertake remedial works identified by Commitments 6.1 to 6.8.	Section 5.2.1 Section 5.2.5
5.14	Sample ponded water to determine if there is any increase in salinity.	Appendix A
5.15	Inspect the watercourses over the subsidence zone to identify the location and extent of ponding.	Section 4.1 Appendix A Appendix K
5.16	For ponding where there is little or no vegetation of conservation significance) monitor the location and extent of ponding. (If ponded area continues to increase in area, encroaches on vegetation of conservation significance or there is an increase in water salinity), excavate a channel to reduce the gradient change over the retained chain pillars. The excavation will be undertaken in accordance with an Aboriginal Cultural Heritage Management Plan and vegetation clearing procedures.	Section 5.2.6

SoC requirements		Document Reference
SoC	**Summary of the requirement**	
5.17	Monitor surface features (such as culverts) within 800m of the eastern edge and 1.5km of the western edge of the Mining Area.	Appendix E Appendix K
5.18	(In the event of damage to surface structures such as pipes, culverts, water tanks, dams or other soil or water conservation structures), repair the damaged infrastructure or provide appropriate compensation.	Appendix E
5.19	Commission a dilapidation survey and inspection of all structures on non-project related land within the Mine Site by a qualified building consultant.	Appendix E
5.20	Use the dilapidation survey and subsequent report in an individual property subsidence management plans (IPSMP) prepared for each property to be impacted (to provide fair and reasonable outcomes between the affected property owner and the Proponent).	Appendix E
5.21	Each IPSMP will address the following issues. • Timing and scale of predicted impacts. • Monitoring on the affected property during mining. • Timing for any remaining disconnection of services. • Post-mining inspection and reporting.	Appendix E
5.22	Prepare a Subsidence Monitoring Program which includes the following elements. • A transverse subsidence line across the northern and southern panels. The lines will be installed to at least the middle of the next adjacent longwall before undermining occurs. • A longitudinal line extending in-bye and out-bye from the starting and finishing point of each panel, for a minimum distance equal to the cover depth. • A survey line along the riparian management zone of Kurrajong and Pine Creeks and their tributaries over the Mine Site. • A minimum of three monitoring pegs spaced 10m apart in a line or triangle at any feature of interest, eg. dam walls, archaeological sites, to measure subsidence, tilt and strain. • Visual inspections and mapping of damage before, during and after mining.	Appendix K
5.23	Place monitoring survey pegs between 10m and 20m apart with a minimum of two baseline surveys of subsidence and strain completed before mine subsidence effects occur.	Section 4.2
5.24	Prepare and implement an Extraction Management Plan to manage subsidence impact to the satisfaction of the DII and DoP	Section 1.2

Table A2-3 Relevant EPBC 2009/5003 requirements

EPBC 2009/5003 conditions		Document reference
Condition	**Requirement**	
Condition 3	In order to minimise potential impacts on EPBC Act listed threatened species and communities within the mine site, prior to any Works commencing and in accordance with the NSW Director General's Assessment Report and approval conditions (26 July 2010), NCOPL must develop and implement an Extraction Plan. The final version of this plan must be submitted to DAWE.	Section 2.1.3

Attachment 3 DPE endorsement and consultation correspondence

Department of Planning and Environment

Our ref: 08_0144-PA-38

Mr Brent Baker
Environmental Superintendent
Narrabri Coal Operations

07/11/2022

Subject: Appointment of Experts – Extraction Plan for Longwalls 203-206

Dear Mr Baker

I refer to your request for the endorsement of a suitably qualified and experienced team to prepare the Extraction Plan for Longwalls 203-206 for Narrabri Coal Mine Stage 2, in accordance with Condition 4(a), Schedule 3 of project approval 08_0144.

The Department has reviewed the nominations and information you have provided and is satisfied that these experts are suitably qualified and experienced. Accordingly, I can advise that the Planning Secretary approves the appointment of the following team:

- Mr Mike Gale, Mr Servaes van der Meulen, of Onward Consulting to prepare the main extraction plan document and coal resource recovery plan as well as the administrative and non-specialist management and monitoring plans;
- Ms Linden Burch and Ms Carmen Osborne of Onward Consulting to prepare the subsidence monitoring program, built features, land, public safety and biodiversity management plans, as well as the main extraction plan document and administrative and non-specialist management and monitoring plans;
- Mr Steven Ditton of Ditton Geotechnical Services to undertake subsidence modelling and predictions;
- Mr Keith Phillipson and Mr Pieter Labuschagne of Australasian Groundwater and Environmental Consultants to prepare the ground water component of the Water Management Plan;
- Mr Anthony Marszalek, Dr Camilla West, Mr Lee Rigley and Ms Kimberley McNamara of ATC Williams to prepare the surface water component of the Water Management Plan; and
- Dr Matthew Whincop of Whincop Archaeology to prepare the Aboriginal Heritage Management Plan.

Further, given that commencement of Stage 3 has been delayed and that you will be commencing longwall extraction in the southern panels, the Department requests that the Extraction Plan includes further consideration/ update of minimisation of fugitive emissions in accordance with Schedule 3 Conditions 31 and 32 – Gas Drainage, and Schedule 3 Condition7 – implementation of reasonable and feasible measures to miniise the release of greenhouse gas emissions. You should utiise the services of suitably qualified and experienced persons to provided advice in this respect.

If you wish to discuss the matter further, please contact Philip Nevill on 82751036.

Yours sincerely

Stephen O'Donoghue
Director
Resource Assessments
As nominee of the Planning Secretary

MINUTES

Narrabri Coal Extraction Plan LW 203-206 Resources Regulator Briefing

Date	2 December 2022
Time	11:00am
Venue	Videoconference
Attendees	Brent Baker (NCOPL), Shane Rily (NCOPL), Mark Vile (Onward Consulting), Carmen Osborne (Onward Consulting), Matthew Newton (Resources Regulator), Christine Fawcett (Resources Regulator), Steve Ditton (Ditton Geotechnical Services)
Apologies	Ray Ramage (Resources Regulator), Mark Buchan (Resources Regulator)
Distribution	NCOPL, Resources Regulator (RR), Onward

A draft (Revision A) of the Extraction Plan and all key sub-plans was submitted to the Resources Regulator on the 8 November 2022 for review and comment in accordance with Schedule 3 Condition 4(g) and Condition 4(h) of the Stage 2 Project Approval (PA 08_0144). The Resources Regulator noted the submission of the draft Extraction Plan (9 November 2022) and stated that they will review and comment on the Extraction Plan when it is formally submitted as a final copy to the Department of Planning and Environment for approval.

There were no specific actions required by the Resources Regulator to update the EP 203-206 or its sub plans as part of this consultation held on 2 December 2022.

Item	Agenda	Comments
Briefing presentation given by Brent Baker (NCOPL)		
1.	**Portal document lodgement**	MN advised NCOPL to lodge EP 203-206 via the Planning Portal and noted that the RR are not resourced to review the draft and final plan. The RR appreciate the consultation via a briefing meeting for the draft plan. The final plan will be received by the RR once with DPE via the Planning Portal.
2.	**Consultation**	
2.1	Plans provided to NSW Local and State Government agencies for consultation: – Narrabri Shire Council – Registered Aboriginal Parties – Heritage NSW – Biodiversity & Conservation Division – DPE Water – Resources Regulator – Environment Protection Agency	Nil

Item	Agenda	Comments
2.2	Resources Regulator are required to review the following plans in accordance with Schedule 3 Condition 4(g) and Condition 4(h) of PA 08_0144: – Extraction Plan for LW 203-206: ▪ Coal Resource Recovery Plan ▪ Subsidence Monitoring Program ▪ Built Features Management Plan ▪ Public Safety Management Plan ▪ Biodiversity Management Plan	Nil
3.	**Coal Resource Recovery Plan**	
3.1	Coal resource at the Narrabri Mine consists of the Hoskissons Seam, which strikes generally north south and dips gently to the west. Thickness ranges from 4.5 to 9.5 m with coal extraction from the lower 4.3 m.	MN requested the length of time required to extract from each longwall. BB advised that each longwall would take approximately 12 months to extract. NCOPL are currently completing extraction from LW 110 with a 6-week longwall miner move to LW 203. Mining of LW 203 is expected to commence in April 2023.
4.	**Risk Assessment**	
4.1	The risk assessment for LW 203 to LW 206 did not identify any high-risk items. Risks associated with subsidence impacts were assessed as low to moderate.	RR did not raise any significant issues regarding the risk assessment during the briefing presentation. BB advised that the risk assessment builds on previous risk assessments developed for LW 101 to LW 110 and cut and flit panels 201 and 202.
5.	**Subsidence Assessment**	
	Ditton Geotechnical Services Pty Ltd provided subsidence modelling and predictions in the Subsidence Assessment Report for LW 203-206.	
	Summary of subsidence impacts to natural features such as steep rocky slopes and built features such as gravel access tracks, NCOPL owned dwellings, farm dams, fencing, groundwater bores and bridges and culverts.	MN asked if subsidence has been within predicted limits for previous longwalls. BB advised that subsidence has been less than predicted. SD advised that subsidence is minimal and has been within the modelled predictions. The modelling for LW 203-206 is considered to be conservative. RR asked for information on any built features that will be impacted. BB advised that surveys have been completed on the NCOPL owned dwellings and that these. dwellings are inhabitable. BB advised that all utility infrastructure is NCOPL owned and that an application to damage or remove is to be submitted to the Surveyor General in relation to a single State Survey Mark located in the Extraction Plan area.

Item	Agenda	Comments
		MN asked how long the application process is expected to take. BB was not familiar of the specific timeframe for the application process. CO advised that the required submission must be made a minimum of 14 days prior to impact. BB advised that NCOPL groundwater monitoring bores would be reinstated within 3 months of subsidence impact to ensure continuation of monitoring program. BB advised that no publicly owned surface features are located within the zone of subsidence.
6.	**Built Features Management Plan**	
	– Water storage dams and soil conservation contour banks, roads, access tracks, power, and telecommunications – Survey marks – Property and livestock fences – Dwellings and machinery sheds – Mine infrastructure	BB noted that all property within the EP area is NCOPL owned. MN asked about impacts to farm dams and the process for reinstatement. BB advised that some land is leased for cattle grazing And that NCOPL assess each farm dam prior to mining to determine need to drain (fully or partially). and determine if any modifications or remediation works are required following subsidence. NCOPL reconstruct contour banks (if required). BB emphasised the following: – access is restricted to NCOPL personnel only within mining area – signage and road repairs are undertaken to remediate subsidence – applications will be made to Surveyor General in relation to a single State Survey Mark – stock are excluded from active subsidence areas
7.	**Public Safety Management Plan**	
	Management controls consistent with the Built Features Management Plan	Nil
8.	**Biodiversity Management Plan**	
	– Negligible impact on flora and fauna – Erosion and sediment control plan – Weed and pest animal monitoring and control program – Floristic based subsidence monitoring program in place including riparian vegetation – Six potential ponding locations	MN asked if the EP includes a description on surface disturbance / clearing. BB advised that NCOPL have a vegetation clearing protocol for surface vegetation clearing required for gas drainage, telecommunications etc. No impact other than the occasional tree fall is expected. MN asked about management of ponding. BB/CO/SD advised that five of the potential ponding areas already exist along the watercourses and dams. Existing ponds are expected to extend laterally from the

Item	Agenda	Comments
		watercourses for distances ranging from 50 m to 410 m. Existing ponded areas extend up to 270 m, indicating a potential lateral increase of up to 140 m.
9.	**Subsidence Management Measures**	
	– Surface cracks – Sub-surface cracking – Ponding	BB advised that visual inspections are conducted and surface cracks greater than 50 mm repaired following active subsidence. BB/SD/CO advised that a subsidence calibration borehole, VWPs and extensometer are proposed over LW 203. CO advised that contingency plans are outlined within all management plans e.g. trigger for specialist assessment in ponded areas if vegetation or flows are affected. BB advised that NCOPL conduct remotes sensing over subsidence zone to detect changes in vegetation cover or erosion and a creek line monitoring program is established to assess changes to creek morphology and gully erosion.
10.	**Subsidence Monitoring Program**	
	– Built features and public safety – Surface water – Groundwater – Biodiversity – Land – Heritage	BB confirmed the continuation of previous subsidence monitoring programs. SD noted that subsidence monitored to date has been within predicted limits and is typically less impact than predicted.

NCOPL to distribute briefing presentation to the Resources Regulator for any additional feedback.

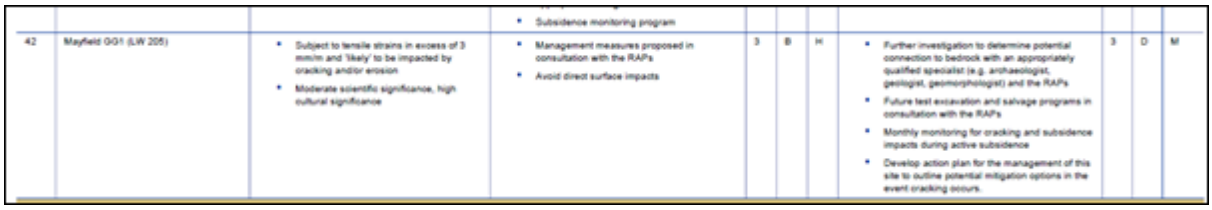
Questions for Whitehaven – Narrabri Underground Longwalls 203-206

Groundwater – Rae Mackay

1. Can you please provide detailed information on how exceedance of triggers for groundwater level declines occurring beyond the end of mining will be managed given the long time delays in predicted peak groundwater level declines and changing groundwater conditions due to climate variability?
2. When will the installation of the new monitoring VWP borehole above longwall 203 take place relative to the completion of mining of longwall 203?
3. Please provide the available data to show the relationship between the monitoring of the Namoi aquifer upstream of the key monitoring boreholes in the Namoi aquifer and how it has been demonstrated that comparisons of water level variations upstream of the Namoi aquifer monitoring locations with the key monitoring locations are adequate to assess impacts of mining on the aquifer relative to other impacts such as extraction and climate variations.

Subsidence – Jim Galvin

1. Can NCOPL please provide the Panel with photographs of Aboriginal cultural heritage site Mayfield GG1 (AHIMS 19-6-0192 - the site of 48 grinding grooves)?
2. What performance measures have been endorsed and by whom for Mayfield GG1?
3. When will it be established if the grinding grooves are located in bedrock or on 'loose' boulders?
4. Re the following extract from Appendix I – Risk Assessment.



			• Subsidence monitoring program								
42	Mayfield GG1 (LW 205)	• Subject to tensile strains in excess of 3 mm/m and 'likely' to be impacted by cracking and/or erosion • Moderate scientific significance, high cultural significance	• Management measures proposed in consultation with the RAPs • Avoid direct surface impacts	3	B	H	• Further investigation to determine potential connection to bedrock with an appropriately qualified specialist (e.g. archaeologist, geologist, geomorphologist) and the RAPs • Future test excavation and salvage programs in consultation with the RAPs • Monthly monitoring for cracking and subsidence impacts during active subsidence • Develop action plan for the management of this site to outline potential mitigation options in the event cracking occurs.	3	D	M

   a. What specific additional controls cause the likelihood rating of cracking of the grinding grooves to decrease from 'B (likely)' to 'D (unlikely)'?
   b. How are these ratings influenced by whether the grinding grooves are located in bedrock or on 'loose' boulders?

Surface Water – Neil McIntyre

1. p23 of Water Management Plan: What is the expected total net increase in surface water ponding area for LW203-206? If this is different from that estimated in the Stage 3 EIS for LW203-206, what is the reason?
2. p29 of the Water Management Plan: What types of remedial action will be considered for ponding on vegetated areas? What is meant by "in areas with no vegetation" (from available images, vegetation of some type is present almost everywhere, so is this a moot point or are some types of vegetation excluded)? What type of remedial actions are available if ponding significantly alters or affects flows?

3. p32 of the Water Management Plan: Is continuous monitoring of water levels, pH and EC in one or more ponds practicable (i.e. in periods when a significant pond exists)?
4. p33 of the Water Management Plan: What methods of measuring and/or predicting creek flows will be under consideration, and will any baseline period measurements be required? When will the channel geomorphology baseline surveys and proposed locations for 100m reaches be available?
5. In Table 6.3 of the Water Management Plan, a significant rainfall event is defined as "a rainfall event >38.4 mm over 5 consecutive days" What is the average recurrence interval (ARI) of such an event; and why is this specific definition used rather than allowing for alternative durations of events of the same ARI?

Greenhouse Gas – Ray Williams

1. Further Report Requests
    a. Moreby, 2009a, *Narrabri Project – Greenhouse Gas Emission Mitigation Strategy*, Roy Moreby, March 2009.
    b. Moreby et al, 2010, *Strategic Review Of Gas Management Options For Reduced GHG Emissions*, Roy Moreby et al, May 2010
    c. Palaris report WHC4940-1 on LW109 modelling
    d. NGE reports for 2018/19, 2019/20, 2020/21, 2021/22
    e. Latest GHG Management Plan
2. Recent Mining
    a. Gas make data in EXCEL form for LW108, LW109 showing breakdown between return gas in ventilation and goaf well gas (if any goaf wells). Also breakdown between CH_4 and CO_2. Average gas values on a daily basis including tonnes of coal mined.
    b. Plan showing existing predrainage borehole plots for both UIS and SIS
    c. Are UIS boreholes drilled downdip? If so are they actively dewatered?
    d. Selection of predrainage boreholes in LW108, 109, 110 showing gas flow rates tracking CO_2, CH_4 gas composition over time.
    e. Is there currently any goaf well production? If so, plan showing locations of numbered goaf wells drilled. Also schematic of goaf well design showing diameter, section cemented, section perforated casing, distance above HSK seam working horizon. Goaf well production data including gas composition (CO_2, CH_4, O_2, N_2).
    f. Any data on the gas content and composition of the coal as it exits the mine and the site?
    g. How evenly is gas predrainage across the height of the HSK seam. Does banding inhibit predrainage of the upper section of the seam? In achieving a quoted 3.5 m^3/t remaining gas, does this value apply to the whole seam or just the lower half?
    h. The forward predictions (Palaris WHC5175) appear to assign gas to the Digby Conglomerate and Arkarula Formation (included in history matching LW108/109). Can Palaris provide of pie chart or table listing the gas reservoir sizes of the stratigraphic elements and their respective degrees of emission. Does the Arkarula and Digby Conglomerate need to be included to model the level of gas observed?
3. For LW203-206
    a. Are any goaf wells planned? If so locations and design.
    b. Provide a map showing planned location of pre-drainage boreholes (SIS and UIS). Is the whole of the HSK seam predrained to 3.5 m3/t in the modelling.

c. The predrainage stream is a relatively small proportion of the total GHG emissions. Although CO_2 is challenging to pre-drain especially at low gas contents, does the mine see any scope to optimise predrainage operations – eg improved well completion, dewatering, well operation, application of higher negative pressure at the well head, tighter well spacing? Would a higher level of predrainage take out higher CH_4 quantities from the ventilation stream?
d. As per point h. previous section but showing the modelled contributions of the various stratigraphic elements for LW203-206.

Greenhouse Gas - Dianne Wiley

* Please provide the following reports:

- WHC 5733-01 Narrabri Gas Flare Position report.

- WHC-PLN-NAR-Outburst Principal Hazard Management Plan

- JCM, 2011 Energy Savings Action Plan

* In the various reports provided to date, is it correct to assume that 'emissions' should be interpreted as 'emissions to atmosphere'? If not, please clarify the difference preferably with graphs over time for the different types of emissions.

• For the Gas Reservoir and Emission Assessment WHC5175 dated 14 Feb 2020, the appendices show emission for CH4. Is there similar data for CO2?

* Are there any updates to the Greenhouse Gas Minimisation Plan 601.11062-R1 dated 7 June 2012? If so please provide all updated versions.

* In relation to the 2012 GHGMP:

- Which options for minimising GHG emissions are being progressed further? Please provide details across all of the categories in the different categories in Section 4 including a current status for actual or planned implementation.

- Similarly for the research program presented in section, please provide details of current status for different aspects of the research plan.

* What consideration has been given to minimising CO2 emissions during Stage 2? Please provide copies of any reports or plans for this.

* Please provide a figure similar to figure 7.2 in the Greenhouse Gas Emissions Forecast (Appendix B) of the Stage 3 extension project, showing anticipated reduction in GHG emissions to atmosphere (both CH4 and CO2) for the Stage 2 project on an annual basis over the anticipated time frame of the project.

* What measures are planned to minimise GHG measures on mine closure and how the performance of these measures will be monitored over time? (not sure if this is relevant for now).

Table A3-1 IAPUM RFI responses

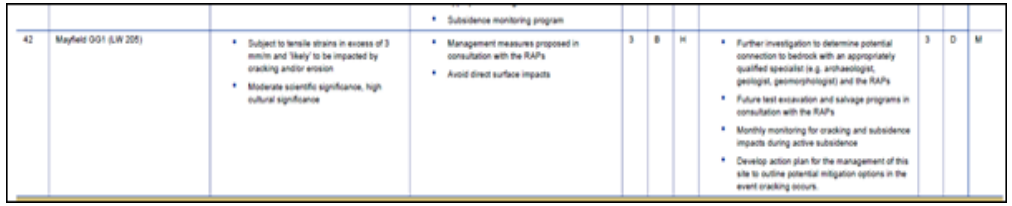
Consultation feedback	Outcome	Document reference
Groundwater – Rae Mackay		
1. Can you please provide detailed information on how exceedance of triggers for groundwater level declines occurring beyond the end of mining will be managed given the long time delays in predicted peak groundwater level declines and changing groundwater conditions due to climate variability?	Table 6-5 in the Extraction Plan 203-206 Water Management Plan (EP-WMP) (Appendix A) details the groundwater level triggers to 2031 (i.e. mine life approved under the Stage 2 Project Approval PA 08_0144) for those bores associated with LW 203 to LW 206. The trigger action response plan for groundwater in Table 7-2 of the EP-WMP outlines the response actions to be carried out in the event of groundwater level triggers being exceeded during the Extraction Plan period. Management of groundwater level declines occurring beyond the end of mining is included in the latest revision of the Site WMP (not yet approved) which includes the following key aspects: • Water licensing for post-mining water take: The groundwater model will be updated every five years to provide more accurate predictions of groundwater drawdown and water take, including beyond the end of mining. NCOPL will maintain appropriate water access license entitlement for post-mining water take. • Impacts on privately-owned water supply bores: The current groundwater model for the Narrabri Mine identifies nine private landholder bores that are predicted to exceed the AIP 2 m minimal impact criterion. NCOPL has committed to make good measures at all nine privately owned bores where the	Table 6-5 and Table 7-2 of the EP-WMP (Appendix A)

Consultation feedback	Outcome	Document reference
	AIP's 2 m minimal impact criterion may be exceeded. Make good provisions and contingency measures will be applied in accordance with the terms of any formal make-good agreement. The above aspects are outside the scope of this Extraction Plan. Management of post-mining groundwater impacts will also be addressed in the Mine Closure Plan.	
2. When will the installation of the new monitoring VWP borehole above longwall 203 take place relative to the completion of mining of longwall 203?	The purpose of this new VWP (i.e. subsidence calibration borehole) is to assess actual vs predicted sub surface fracturing impacts. As presented in section 6.2.1 and Table 6-4 of the EP-WMP, there will be two boreholes drilled, one for the multi-level VWP (for monitoring water level) and the other for a deep wireline extensometer (for monitoring displacement). The requirements for monitoring of these new boreholes will also be incorporated in the Site WMP following their construction. The additional groundwater monitoring bores will be installed prior to the commencement of secondary workings to obtain sufficient baseline data.	Section 6.2.1 and Table 6-4 of the EP-WMP (Appendix A)
3. Please provide the available data to show the relationship between the monitoring of the Namoi aquifer upstream of the key monitoring boreholes in the Namoi aquifer and how it has been demonstrated that comparisons of water level variations upstream of the Namoi aquifer monitoring locations with the key monitoring locations are adequate to assess impacts of mining on the aquifer relative to other impacts such as extraction and climate variations.	As presented in section 9.3 of the EP-WMP, NCOPL will engage a suitably qualified expert hydrogeologist to collate and review monitoring data collected for the previous calendar year. The Narrabri Coal Mine Annual Groundwater Review 2021 (Groundwater Exploration Services Pty Ltd, 2022) (provided to IAPUM as part of the request for documentation) provides an assessment of the impacts from mining on the alluvium. The key monitoring bores located within the alluvium associated with the Namoi River are:	Section 6.2.1 and section 9.3 of the EP-WMP

Consultation feedback	Outcome	Document reference
	• WB3a and WB3b – located approximately 7 km northeast of the NM lease. • WB4 – located approximately 5 km northeast of the NM lease. • WB5a and WB5b – located approximately 9.5 km east of the NM lease. • WB6a and WB6b – located approximately 11 km southeast of the NM lease. • WB7 – located approximately 6.5 km east of the NM lease. There has been no observed impact on these bores from mining activities during the reporting period. Bores WB3a and b, WB4, WB5a and b, and WB6a all show gradual groundwater level decline within the three years between 2017 and 2020 and this can be correlated with below average rainfall trends. During the past two years, the above average rainfall trends have resulted in groundwater level recoveries. Hydrographs are shown in Figure 5 of the review (Groundwater Exploration Services Pty Ltd, 2022) along with the rainfall residual mass curve. Monitoring results of the Namoi aquifer upstream of the key monitoring bores are also presented in section 5.1 and section 5.2 of the review (Groundwater Exploration Services Pty Ltd, 2022). In addition, NCOPL have committed to installing additional primary early warning monitoring bores (P62 to P64, P68 to P70, P71 to P73 and P74 to P76) located upstream and downstream of the mine on Pine Creek, Kurrajong Creek, and Tulla Mullen/Sandy Creeks (section 6.2.1 of the EP-WMP). Trigger levels will be established for these bores according to the maximum	

Consultation feedback	Outcome	Document reference
	predicted drawdown at these locations and following the collection of baseline data over six to eight monitoring events. Monitoring data from these additional bores will also be incorporated in the Narrabri Coal Mine annual groundwater review (section 9.3 of the EP-WMP).	
Subsidence – Jim Galvin		
1. Can NCOPL please provide the Panel with photographs of Aboriginal cultural heritage site Mayfield GG1 (AHIMS 19-6-0192 - the site of 48 grinding grooves)?	Current photographs of Mayfield GG1 have been provided to IAPUM as part of the request for documentation.	N/A
2. What performance measures have been endorsed and by whom for Mayfield GG1?	NCOPL received endorsement from DPE (letter dated 7 November 2022) for the Extraction Plan - Heritage Management Plan (EP-HMP) (p.g. i) to be prepared by Dr Matthew Whincop of Whincop Archaeology. The EP-HMP developed by Matthew Whincop includes the specific performance measure 'Surface cracking, vertical displacement or erosion does not compromise Aboriginal objects or cultural heritage values' as presented in the TARP (Table 6-1 of the EP-HMP). This performance measure has also been included in Table 4-1 of the EP-HMP. The EP-HMP also includes management measures for protecting Mayfield GG1 from the impacts of subsidence as stated in section 4.5 of the plan. These measures include: • undertaking further investigation prior to mining to determine the potential connection to bedrock with an appropriately qualified specialist (e.g. archaeologist, geologist, geomorphologist) and the RAPs. • If the investigations determine that the site is connected to bedrock, additional management measures will be determined in consultation with the appropriately qualified specialist and the RAPs. Measures may include:	Section 1.6, Table 4-1, section 4.5 and Table 6-1 of the EP-HMP

Consultation feedback	Outcome	Document reference
	○ use of electronic monitoring equipment ○ regular inspections by the RAPs, and/or ○ potential relocation of the grinding grooves to a suitable location. The *Mine Subsidence Assessment for Longwalls LW203 to LW206 at the Narrabri Underground Mine* (DGS, 2022) (Appendix J of EP 203-206) suggests that partial soil excavation around each slab with hand tools may reduce strain transfer into the slabs during subsidence and reduce the potential for cracking. This measure has been added to section 4.5 of the EP-HMP. In addition, an action plan will be developed for the management of this site within 6 months of approval of the EP-HMP which will include the outcomes of the investigation as stated above and will outline the mitigation options determined in consultation with the RAPs (section 4.5 of EP-HMP). NCOPL will monitor Mayfield GG1 on a monthly basis to assess potential cracking and subsidence impacts. The measures stated above have been reviewed by the RAPs via the formal consultation process as stated in section 1.6 of the EP-HMP. One comment was received in relation to the grinding grooves as follows: "With the grinding grooves they are very significant as it shows where people would use areas of significance, this area should be protected as due to the rarity of the site. Once it is fully assessed a decision will be made by all RAPS." As previously stated, this has been addressed in section 4.5 of the plan which reads "NCOPL will undertake	

Consultation feedback	Outcome	Document reference
	further investigation prior to mining to determine the potential connection to bedrock with an appropriately qualified specialist (e.g. archaeologist, geologist, geomorphologist) and the RAPs. If the investigations determine that the site is connected to bedrock, additional management measures will be determined in consultation with the appropriately qualified specialist and the RAPs." "An action plan will be developed for the management of this site within 6 months of approval of this EP-HMP which will include the outcomes of the investigation and will outline the mitigation options determined in consultation with the RAPs."	
3. When will it be established if the grinding grooves are located in bedrock or on 'loose' boulders?	As stated in section 4.5 of the EP-HMP, NCOPL will undertake further investigation within 6 months of approval of the EP-HMP (and prior to the commencement of secondary workings) to determine the potential connection to bedrock with an appropriately qualified specialist (e.g. archaeologist, geologist, geomorphologist) and the RAPs.	Section 4.5 of the EP-HMP
4. Re the following extract from Appendix I – Risk Assessment.  a. What specific additional controls cause the likelihood rating of cracking of the grinding grooves to decrease from 'B (likely)' to 'D (unlikely)'? b. How are these ratings influenced by whether the grinding grooves are located in bedrock or on 'loose' boulders?	The Mine Subsidence Assessment Report (DGS, 2022) (Appendix J of EP 203-206) assessed Mayfield GG1 as being located on sandstone bedrock or possibly partially buried 'loose' boulders which could be prone to cracking. The predicted mean and worst-case final subsidence, tilt and horizontal strain (U95%CL values) were derived from the predicted subsidence effect contours. It was assessed that Mayfield GG1 is expected to be subject to transient tensile strains of up to 5 mm/m and final compressive strains of 5 mm/m. It is 'possible' to 'likely' that the grooves may be impacted by cracking in their current location. Based on the above assessment, and the existing and additional controls, the residual risk for Mayfield GG1 has	Section 1.5 of the EP-HMP Section 4 of the Risk Assessment (Appendix I)

Consultation feedback	Outcome	Document reference
	been amended to a likelihood rating of 'B' making this a 'high' risk item (section 4 of the Risk Assessment [Appendix I to EP 203-206]). Section 1.5 of the EP-HMP has been updated to reflect the amendment.	
Surface Water – Neil McIntyre		
1. p23 of Water Management Plan: What is the expected total net increase in surface water ponding area for LW203-206? If this is different from that estimated in the Stage 3 EIS for LW203-206, what is the reason?	The Mine Subsidence Assessment Report (DGS, 2022) (Appendix J of EP 203-206) predicted the maximum changes in pond area (where positive represents an increase in pond area) to range from -0.42 ha to 2.92 ha. The Stage 3 EIS does not provide predictions of surface water ponding area, however does include predictions of post-mining pond depths. For surface water ponding areas within the LW 203-206 panels, the Stage 3 EIS predicts post-mining pond depths will range from 0.4 m to 1.7 m, which correspond to a maximum change (where positive represents an increase in pond depth) ranging from 0.1 m to 0.5 m (average of 0.22 m). The Mine Subsidence Assessment Report for EP 203-206 (DGS, 2022) predicts post-mining pond depths will range from 0.1 m to 1.3 m, which correspond to a maximum change (where positive represents an increase in pond depth) ranging from -0.04 m to 1.3 m (average of 0.47 m). These predictions are based on a refinement of the subsidence prediction model. The EP 203-206 has therefore been developed using the latest subsidence assessment predictions for these panels (section 3.2.2 of the EP-WMP). In addition, the mining dimensions have been refined since the Stage 3 EIS assessment, meaning the total net increase in surface water ponding	Section 3.2.2 of the EP-WMP

Consultation feedback	Outcome	Document reference
	area will be slightly different to the predictions presented in the EIS. **Note**: the EP 203-206 has been developed as a Stage 2 (PA 08_0144) plan and has only included information from the Stage 3 EIS where relevant.	
2. p29 of the Water Management Plan: What types of remedial action will be considered for ponding on vegetated areas? What is meant by "in areas with no vegetation" (from available images, vegetation of some type is present almost everywhere, so is this a moot point or are some types of vegetation excluded)? What type of remedial actions are available if ponding significantly alters or affects flows?	The first bullet point in section 5.1.2 of the EP-WMP has been amended to state: "ponding located in areas where vegetation is not affected, will be allowed to self-correct". The above measure has also been amended in all other relevant EP sub plans. Section 7 of the EP-WMP details a contingency plan that expressly provides for adaptive management in respect to ponding in vegetated areas. Remedial actions include: • Investigate options to dewater the ponded area to limit further impacts on vegetation health and implement identified adaptive management measures (TARP Level 1). • If vegetation will be at risk, undertake a geomorphological assessment to determine options to have the subsidence ponded area freely drain (TARP Level 2). • Undertake survey to identify vegetation community and impacted area. The disturbance will be recorded in the site clearing register (TARP Level 2). If ponding significantly alters or affects flows, the ponding will be assessed, and remedial actions (that present the lowest environmental impact) developed in consultation with a geomorphologist. Ponding that significantly alters	Section 5.1.2 and section 7 of the EP-WMP

Consultation feedback	Outcome	Document reference
	or affects flows is managed under the contingency plan (section 7 of EP-WMP) for changes in watercourse morphology. Remedial actions include: **Level 1:** • Contract a qualified geomorphologist to develop an action plan which may involve further monitoring or remediation (with consideration given to application of the River Style Framework for classifying channel condition and recovery). • Implement geomorphology action plan. • Implement contingency measures and notify relevant stakeholders. **Level 2:** • As for Level 1 • If implemented erosion control measures are found to be ineffective, identify cause and rectify or replace with effective measures. Continue monitoring.	
3. p32 of the Water Management Plan: Is continuous monitoring of water levels, pH and EC in one or more ponds practicable (i.e. in periods when a significant pond exists)?	NCOPL are not proposing to conduct continuous monitoring of water levels, pH and EC in ponds. The surface water monitoring program as detailed in section 6.1.3 of the EP-WMP (Table 6-2) proposes to collect grab samples from the nominated surface water monitoring points (KC1TOP, KC1US, KCTOP, KCUS) each quarter provided there is flow during the quarter. NCOPL will also record streamflow characteristics at each monitoring point at the time the grab samples are collected.	Section 6.1.3 and Table 6-2 of the EP-WMP
4. p33 of the Water Management Plan: What methods of measuring and/or predicting creek flows will be under consideration, and will any baseline period measurements be required? When will the channel geomorphology baseline surveys and proposed locations for 100m reaches be available?	Currently, there is no established method for measuring creek flows due to the nature of the creeks being ephemeral. Therefore, NCOPL are proposing to investigate alternatives to measuring or predicting creek flows for the purpose of supporting water take licensing, to improve understanding of the hydrology, and to	Section 6.1.4 and section 6.1.5 of the EP-WMP

Consultation feedback	Outcome	Document reference
	interpret water quality and erosion observations (section 6.1.4 of the EP-WMP). Section 6.1.4 of the EP-WMP has been amended to state, "An assessment will be conducted by a surface water specialist prior to any surface cracking occurring (within the Extraction Plan Area) to consider alternative methodologies to measure and/or predict creek flows. Following the assessment, the appropriate method (if feasible) for formally recording creek flow conditions, and contingency measures will be incorporated into the Site WMP". The channel geomorphology baseline surveys and proposed locations for the 100m reaches will be conducted prior to the commencement of secondary workings (section 6.1.5 of the EP-WMP).	
5. In Table 6.3 of the Water Management Plan, a significant rainfall event is defined as "a rainfall event >38.4 mm over 5 consecutive days" What is the average recurrence interval (ARI) of such an event; and why is this specific definition used rather than allowing for alternative durations of events of the same ARI?	The definition of a rainfall event >38.4 mm over 5 consecutive days under Condition L2.5 of EPL 12789 equates to the 5-day 90th %ile rainfall depth for Gunnedah sourced from Table 6.3a *Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition*, March 2004. This is also referenced in the Stage 3 EIS and forms the basis of surface water management at the Narrabri Mine. This definition has been adopted across multiple management plans to maintain consistency (section 6.1.5, Table 6-3 of the EP-WMP). There is no equivalent ARI corresponding to this significant rainfall event criteria. The onsite weather monitoring station recognised under EPL12789 as W1 has been set up to send an automatic	Section 6.1.5 and Table 6-3 of the EP-WMP

Consultation feedback	Outcome	Document reference
	alarm via SMS and email (when this rainfall event occurs) to a specific contact list to trigger additional management actions.	
Greenhouse Gas – Ray Williams		
1. Further Report Requests: a. Moreby, 2009a, *Narrabri Project – Greenhouse Gas Emission Mitigation Strategy,* Roy Moreby, March 2009. b. Moreby et al, 2010, *Strategic Review of Gas Management Options for Reduced GHG Emissions,* Roy Moreby et al, May 2010. c. Palaris report WHC4940-1 on LW109 modelling. d. NGE reports for 2018/19, 2019/20, 2020/21, 2021/22. e. Latest GHG Management Plan	The following reports have been provided to IAPUM as part of the request for documentation: a. Moreby, 2009a, *Narrabri Project – Greenhouse Gas Emission Mitigation Strategy,* Roy Moreby, March 2009 b. Unknown and cannot be located c. 200428 WHC4940-01 *Narrabri LW109 Modelling* FINAL d. (i) WHC EERS FY19 Report_NCO (ii) WHC EERS FY20 Report_NCO (iii) WHC EERS FY21 Report_NCO (iv) WHC EERS FY22 Report_NCO e. WHC_PLN_NAR_*Greenhouse Gas Minimisation Plan* (2017) Please note that NCOPL are currently updating the Greenhouse Gas Minimisation Plan (GHGMP) with the assistance of Palaris for the continuation of mining under the Stage 2 Project Approval (08_0144).	N/A

Consultation feedback	Outcome	Document reference
2. Recent Mining a. Gas make data in EXCEL form for LW108, LW109 showing breakdown between return gas in ventilation and goaf well gas (if any goaf wells). Also breakdown between CH4 and CO2. Average gas values on a daily basis including tonnes of coal mined. b. Plan showing existing predrainage borehole plots for both UIS and SIS c. Are UIS boreholes drilled downdip? If so are they actively dewatered? d. Selection of predrainage boreholes in LW108, 109, 110 showing gas flow rates tracking CO2, CH4 gas composition over time. e. Is there currently any goaf well production? If so, plan showing locations of numbered goaf wells drilled. Also schematic of goaf well design showing diameter, section cemented, section perforated casing, distance above HSK seam working horizon. Goaf well production data including gas composition (CO2, CH4, O2, N2). f. Any data on the gas content and composition of the coal as it exits the mine and the site? g. How evenly is gas predrainage across the height of the HSK seam. Does banding inhibit predrainage of the upper section of the seam? In achieving a quoted 3.5 m3/t remaining gas, does this value apply to the whole seam or just the lower half? h. The forward predictions (Palaris WHC5175) appear to assign gas to the Digby Conglomerate and Arkarula Formation (included in history matching LW108/109). Can Palaris provide of pie chart or table listing the gas reservoir sizes of the stratigraphic elements and their respective degrees of emission. Does the Arkarula and Digby Conglomerate need to be included to model the level of gas observed?	a. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) and the Excel spreadsheet titled '*GHG 2a - Longwall 108 and 109 Gas Make Data 17Jan23*' b. Refer to drawing titled '*GHG 2b. Predrainage boreholes UIS and SIS LW 101 to LW 206'* c. UIS boreholes are drilled down dip. There is no active dewatering (no conduit in holes). In the northern mine panels, SIS gas drainage was conducted on the adjacent gate road and this acted to dewater on the down dip side. d. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) e. No active goaf wells f. There is no available data on the gas content and composition of the extracted coal. g. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) h. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023)	N/A
3. For LW203-206 a. Are any goaf wells planned? If so locations and design. b. Provide a map showing planned location of pre-drainage boreholes (SIS and UIS). Is the whole of the HSK seam predrained to 3.5 m^3/t in the modelling. c. The predrainage stream is a relatively small proportion of the total GHG emissions. Although CO2 is challenging to pre-drain especially at low gas contents, does the mine see any scope to optimise predrainage operations – eg improved well completion, dewatering, well operation, application of higher negative pressure at the well head, tighter well spacing?	a. No goaf wells planned. b. Refer to drawing titled '*GHG 3b. Predrainage boreholes (SIS and UIS) LW203-LW206'* and as provided in the EP 203-206 as Attachment 4 b. All modelling completed for Longwall 203-206 assumes that the entire Hoskissons Seam is pre-drained to 3.5 m^3/t (Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023)	3c. Section 5.3 of EP 203-206

Consultation feedback	Outcome	Document reference
c. Would a higher level of predrainage take out higher CH4 quantities from the ventilation stream? d. As per point h. previous section but showing the modelled contributions of the various stratigraphic elements for LW203-206.	c. NCOPL are currently working with Palaris to develop a Decarbonisation Pathway. c. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) d. Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) ***Response above has been superseded in Rev 0A (dated 9 May 2023) with the removal of background information and management measures relating to greenhouse gas emissions.*** Section 2.2.3, Section 5.3 and Appendix J [*Gas Emission Review for Longwall 203 to Longwall 206* (Palaris 2022)] have been removed.	
Greenhouse Gas - Dianne Wiley		
* Please provide the following reports: - WHC 5733-01 Narrabri Gas Flare Position report. - WHC-PLN-NAR-Outburst Principal Hazard Management Plan - JCM, 2011 Energy Savings Action Plan	The following reports have been provided to IAPUM as part of the request for documentation: • WHC5733-01 Narrabri Gas Flare Position Paper Report 9feb21 final • WHC-PLN-NAR-OUTBURST PRINCIPAL MINING HAZARD • NAR-MP-Energy Savings Action Plan (Advitech 2014)	N/A
* In the various reports provided to date, is it correct to assume that 'emissions' should be interpreted as 'emissions to atmosphere'? If not, please clarify the difference preferably with graphs over time for the different types of emissions.	Emissions is referenced as 'fugitive emissions' throughout the Extraction Plan for LW 203-206 which corresponds to 'emissions to atmosphere'.	N/A
For the Gas Reservoir and Emission Assessment WHC5175 dated 14 Feb 2020, the appendices show emission for CH4. Is there similar data for CO2?	Refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023).	N/A

Consultation feedback	Outcome	Document reference
* Are there any updates to the Greenhouse Gas Minimisation Plan 601.11062-R1 dated 7 June 2012? If so please provide all updated versions.	The GHGMP was updated in 2017 and has been provided to IAPUM as part of the request for documentation: • WHC_PLN_NAR_Greenhouse Gas Minimisation Plan (2017) Please note that NCOPL are currently updating the GHGMP with the assistance of Palaris for the continuation of mining under the Stage 2 Project Approval (08_0144).	N/A
* In relation to the 2012 GHGMP: - Which options for minimising GHG emissions are being progressed further? Please provide details across all of the categories in the different categories in Section 4 including a current status for actual or planned implementation. - Similarly for the research program presented in section, please provide details of current status for different aspects of the research plan.	• Pending update to the GHGMP. • Section 5.3 of EP 203-206 details the decarbonisation pathway (research program) which is currently being addressed by Palaris. This pathway will identify GHG emissions abatement measures for all fugitive emissions. Details of the outcomes of the decarbonisation pathway will be included in the revised GHGMP. ***Response above has been superseded in Rev 0A (dated 9 May 2023) with the removal of background information and management measures relating to greenhouse gas emissions.*** Section 2.2.3, Section 5.3 and Appendix J [*Gas Emission Review for Longwall 203 to Longwall 206* (Palaris 2022)] have been removed.	Section 5.3 of EP 203-206
* What consideration has been given to minimising CO2 emissions during Stage 2? Please provide copies of any reports or plans for this.	Section 5.3 of the EP 203-206 outlines all current reasonable and feasible measures implemented at the Narrabri Mine to minimise the release of GHGE. Section 5.3 also details the decarbonisation pathway and abatement measures and technologies currently being investigated.	Section 5.3 of EP 203-206

Consultation feedback	Outcome	Document reference
	The Stage 2 GHGMP has also been provided to IAPUM as part of the request for documentation: • WHC_PLN_NAR_Greenhouse Gas Minimisation Plan (2017) Please note that NCOPL are currently updating the GHGMP with the assistance of Palaris for the continuation of mining under the Stage 2 Project Approval (08_0144).	
	Response above has been superseded in Rev 0A (dated 9 May 2023) with the removal of background information and management measures relating to greenhouse gas emissions. Section 2.2.3, Section 5.3 and Appendix J [*Gas Emission Review for Longwall 203 to Longwall 206* (Palaris 2022)] have been removed.	
* Please provide a figure similar to figure 7.2 in the Greenhouse Gas Emissions Forecast (Appendix B) of the Stage 3 extension project, showing anticipated reduction in GHG emissions to atmosphere (both CH4 and CO2) for the Stage 2 project on an annual basis over the anticipated time frame of the project.	Please refer to the document titled '*WHC6420-03 RFI Responses Narrabri Underground Longwalls 203-206 Narrabri Coal - Final'* (Palaris, January 2023) which provides a yearly breakdown of each emission stream for the period of the project (i.e. the Extraction Plan period).	N/A
* What measures are planned to minimise GHG measures on mine closure and how the performance of these measures will be monitored over time? (not sure if this is relevant for now).	Measures to minimise GHG emissions on mine closure and monitoring required will be documented in the Mine Closure Plan. These measures are not relevant to the EP 203-206.	N/A

Appendix A Water Management Plan

Appendix B Land Management Plan

Appendix C Biodiversity Management Plan

Appendix D Heritage Management Plan

Appendix E Built Features Management Plan

Appendix F Public Safety Management Plan

Appendix G Coal Resource Recovery Plan

Appendix H Plans 1 to 7

Appendix I Subsidence Risk Assessment

Appendix J Mine subsidence assessment report for LW 203-206

Appendix K Subsidence Monitoring Program