ASHTON COAL PROJECT

COAL RESOURCE RECOVERY PLAN
UPPER LIDDELL SEAM
LONGWALLS 1 - 8

Version Date: 01/08/2012

EXTRACTION PLAN ULD 1-8

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Version History

Version	Status	Details	Authors	Authorised/Approved for Issue	
				Name/Position	Date
01/08/2012	Final	Approved	ACOL & AECOM	P. Fletcher, Technical Services Manager	01/08/2012
17/07/2012	Draft	For Approval	ACOL & AECOM	P. Fletcher, Technical Services Manager	17/07/2012
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External Approval Register

Org.	Nominated Rep.	Version	Date Issued	Date Approved
DP&I	Howard Reed	17/07/2012	18/07/2012	27/07/2012
DRE	Brad Mullard	17/07/2012	18/07/2012	31/07/2012

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1 INTRODUCTION

This Coal Resource Recovery Plan has been prepared to demonstrate effective recovery of available resources obtained through underground mining activities at the Ashton Coal Project (ACP).

The Ashton Coal Environmental Management Strategy (EMS) (see **Figure 1** of the Extraction Plan) provides the strategic context for the environmental management of the ACP. The Extraction Plan forms part of the EMS and is required by the ACP development consent. The Extraction Plan provides a framework for the management of subsidence impacts associated with Ashton Coal Operations' Pty Ltd (ACOL) underground mining activities and details the proposed workings, including dimensions, overburden depth and mining schedule.

This Coal Resource Recovery Plan is a sub-set to the Extraction Plan and has been prepared in accordance with condition 3.12 of the development consent (309-11-2001-i):

> *3.12 The Applicant shall prepare and implement an Extraction Plan for the second workings within each seam to be mined to the satisfaction of the Director General. Each Extraction Plan must:*
> *(g) Include to the satisfaction of DRE*[1]
>
> - *A coal resource recovery plan that demonstrates the effective recovery of the available resource.*

This plan has also been prepared to meet (in part) the conditions of the ACP Mining Lease with regard to the preparation and approval of a Subsidence Management Plan (SMP).

Therefore, this report provides a description of the:

- Coal resource available within the ACP area;
- Proposed mining method, schedule and mine plan;
- Resource recovery and effects on future mining; and
- Justification for the mine plan.

Plans 1-6 and the **Approved Plan** (included in **Appendix A**) provide supporting information and provide details of coal resource, existing and proposed workings, and impacted surface features. The plans have been prepared in accordance with the Division of Resources and Energy's (DRE) *Guideline for Applications for Subsidence Management Approvals* (Department of Mineral Resources, 2003).

1.1 SCOPE

The scope of this Coal Resource Recovery Plan includes Longwalls (LW) 1-8 in the Upper Liddell (ULD) Seam.

Plans 1-2 and the **Approved Plan** (**Appendix A**) show the proposed mine plan, Extraction Plan boundary and surface features associated with these longwall panels, while **Plan 5** shows the current mining titles and land ownership.

[1] Division of Resources and Energy, part of the Department of Trade & Investment, Regional Infrastructure & Services

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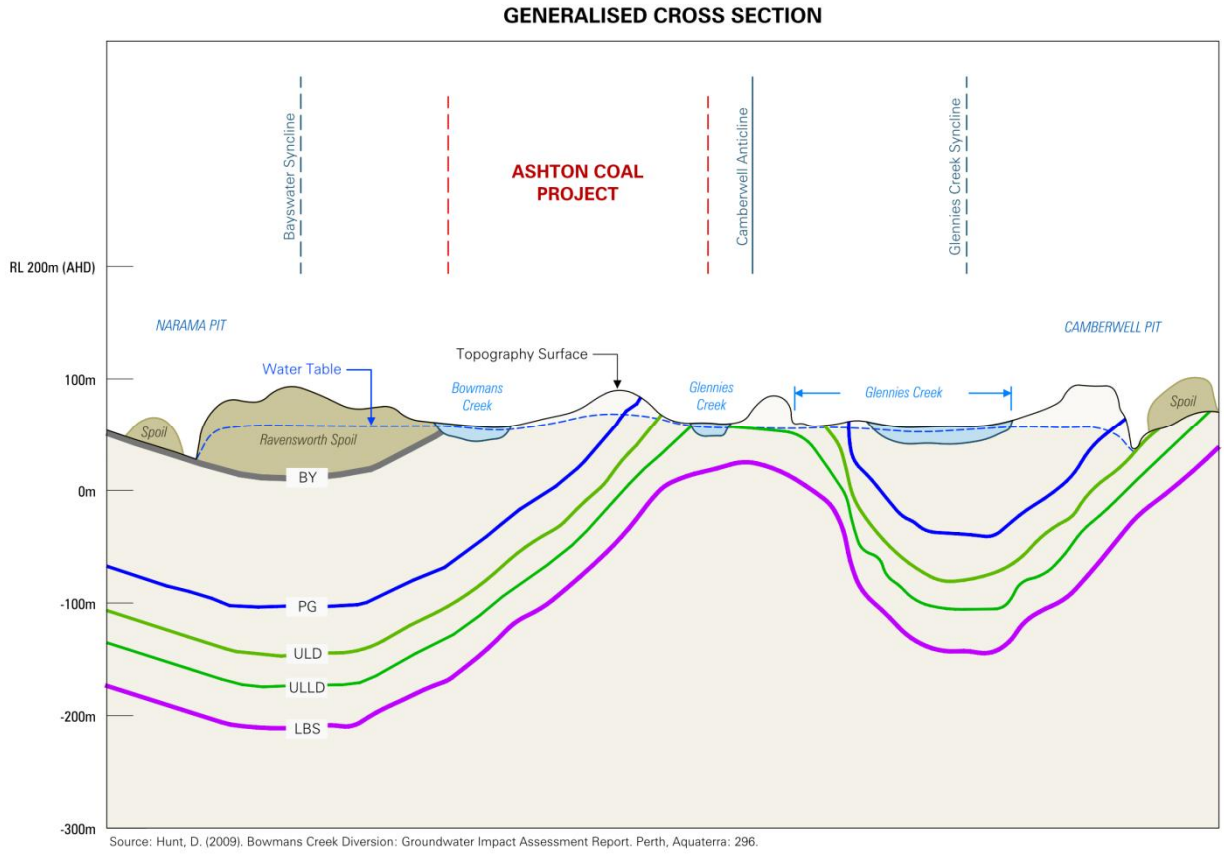
2 RESOURCE DESCRIPTION

2.1 SITE CONDITIONS

The ACP is located within the Hunter Coalfields of the Sydney basin. The coal seams and surrounding strata are assigned to the Foybrook Formation which is a stratigraphical unit of the Late Permian Singleton Supergroup. This formation is part of the Vane Subgroup within the Whittingham Coal Measures and is the basal coal bearing sequence of the Singleton Supergroup.

The current study area is located on the western limb of the Camberwell Anticline (see **Figure 1**) which is the principal structural feature of the project area. The axis of this structure trends along the eastern boundary of Exploration Lease 4918 which coincides with a sub crop of the coal seams of principal interest. These sub crops define the westerly dipping limb of the Camberwell Anticline. The stratum consists of a mix of sandstone, shale, and interbedded to finely laminated sandstone/shale with a number of coal seam splits between.

Figure 1 Generalised Cross Section

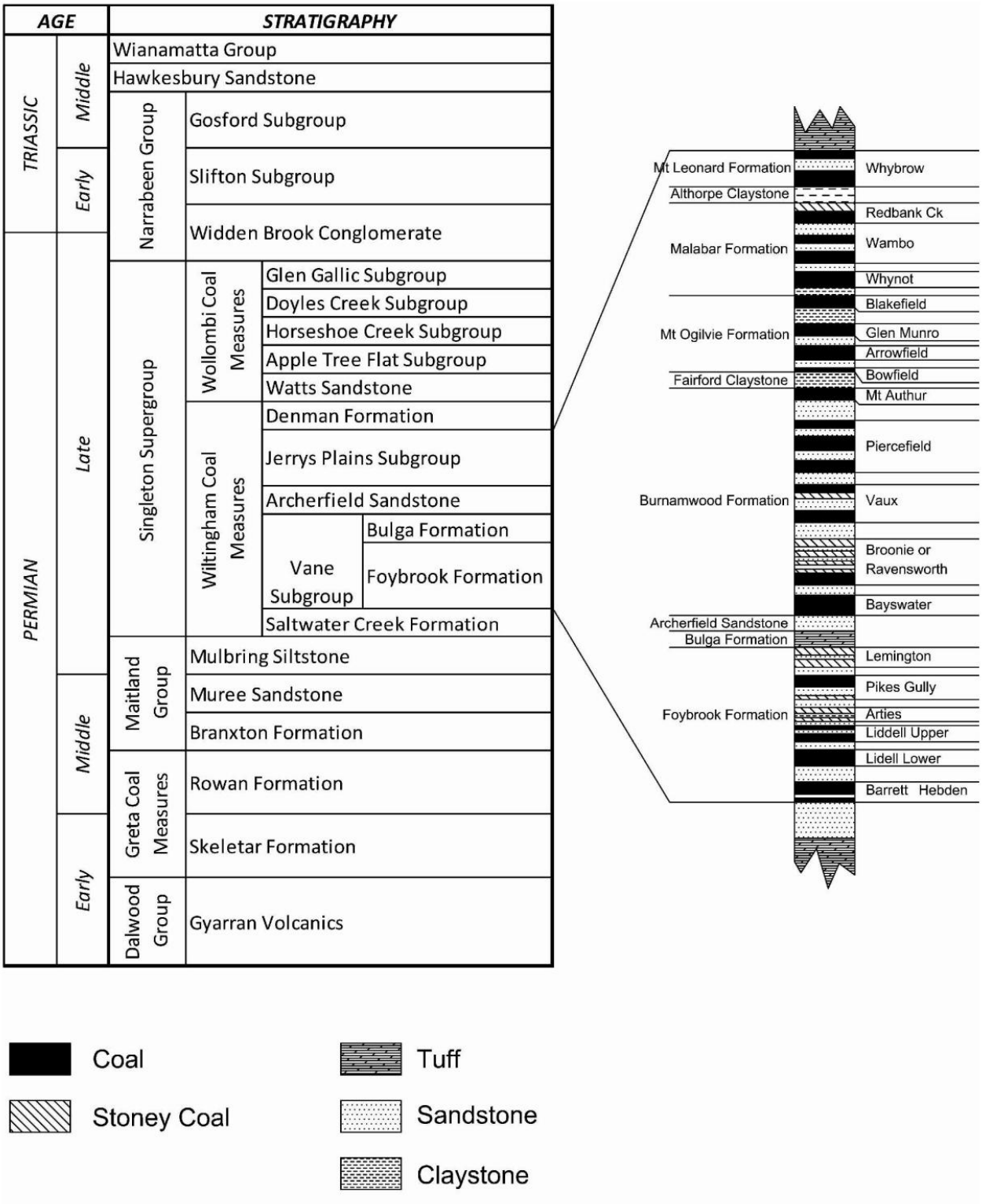


Source: Hunt, D. (2009). Bowmans Creek Diversion: Groundwater Impact Assessment Report. Perth, Aquaterra: 296.

The Foybrook Formation contains at least six named coal seams (see **Figure 2**) which commonly split and coalesce. Within ACOL's mining lease, the economically viable seams proposed for extraction include, in descending order (see **Figure 3**):

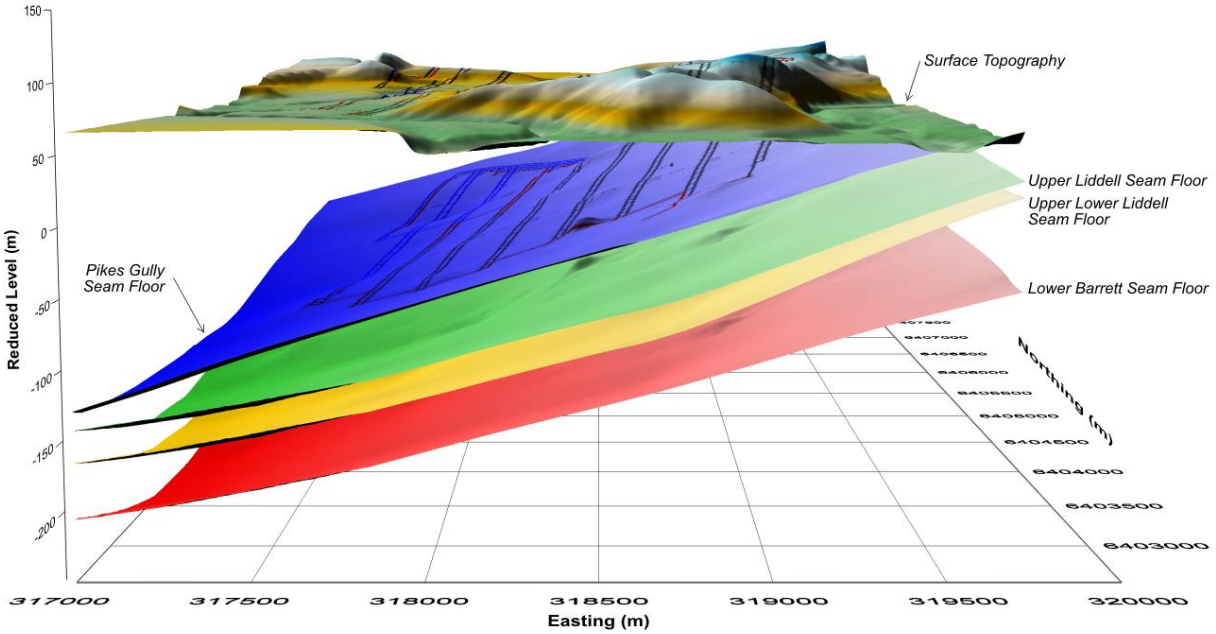
- Pikes Gully Seam (PG);
- Upper Liddell Seam (ULD);
- Upper Lower Liddell Seam (ULLD); and
- Lower Barrett Seam (LB).

Figure 2 Stratigraphy



Ref : Ashton Coal A-9410 (10/02/2010)

Figure 3 Overview of Topography and Seam Floors (vertical exaggeration x4) SCT (2011)



The ACP underground mining operation primarily produces a semi-soft coking coal for the export market. The Foybrook Formation coals at ACP are bituminous, high-volatile, low sulphur, vitrinite rich and low in other elements such as chlorine and phosphorous. Ash content of run of mine coal at the ACP is variable and ranges between 18% and 32% (HLA, 2001). Raw coal is processed in the Ashton Coal Handling and Preparation Plant (CHPP) and a low ash product (8.5% average) with strong coking properties is recovered. This places the resource at ACP at the upper end of the rank profile for the Hunter Valley.

2.2 OVERBURDEN STRATIGRAPHY

The stratum within the Foybrook Formation is deltaic in origin and comprises, in order of predominance: fine to coarse grained sandstone, siltstone, conglomerate, mudstone, shale and coal. The top of this formation corresponds with the base of the overlying Bulga Formation which is in turn overlain by the Archerfield Sandstone and Jerrys Plains Subgroup respectively. The Bulga Formation and Archerfield Sandstone are marine sandstones or laminates. The Jerrys Plains Subgroup includes the Bayswater Seam which has been mined (open cut methods) in the adjacent Ravensworth development and only a remnant portion of it exists in the far western part of the ACP. In-situ coal attributed to the Bayswater Seam does not form part of the ACP. Conglomerates outcrop at several locations along the natural channel of Bowmans Creek (i.e. near the New England Highway Bridge and the NSW Office of Water (NoW) stream gauging station).

2.3 LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS (OVERBURDEN)

The PG-ULD Seam interburden comprises sandstone and minor siltstone units. These sandstone units are variable in nature, and range from coarse-grained, bedded to massive, with zones of sub-vertical jointing.

Plan 6 (**Appendix A**) provides geological strata sections within the ACP. The principle features of the overburden are:

- Mudstone or sandstone units are consistently within the roof bolting horizon providing a competent roof; and
- Regional trends in the sandstones suggest the presence of channels, this has been confirmed in the existing underground operations.

Within the extraction area the ULD Seam is on average between 2.2 m and 3.0 m thick. The seam thickness across the ACP is shown in **Plan 3** (**Appendix A**).

2.4 LITHOLOGICAL AND GEOTECHNICAL CHARACTERISTICS (ROOF AND FLOOR STRATA)

Based on observations during first workings for ULD LW 1-3, the immediate roof (first metre) is comprised of mudstone/siltstone before grading to variable sandstone units (Strata Engineering, 2011). These sandstone units are categorised as being moderate to strong in terms of their structural competency (with associated UCS values of generally >60 MPa) and are largely self-supporting during gateroad drivage. Therefore while some weaker mudstone may need to be cut down the roof is anticipated to be generally competent.

Observations to date (Strata Engineering, 2011) have found that the floor generally consists of mudstone grading down to siltstone and fine grained sandstone. The floor, while moderately strong, is generally less favourable than the PG seam reporting initial UCS values ranging between 15-20 MPa on average before increasing with depth to >50 MPa. Floor strength appears weakest in the northwest and increases to the south. While trafficability issues are not expected at >10 MPa, strengths of 10-15 MPa, as recorded in some areas, may require active management (to be detailed in the Strata Failure Management Plan).

2.5 EXISTENCE AND CHARACTERISTICS OF GEOLOGICAL STRUCTURE

Exploration of the underground area has been ongoing since the commencement of operations, primarily with a combination of surface and some long hole drilling. Mining development provides additional geological information which has been incorporated into the modelling. Structural geological mapping is an integral part of the understanding of the framework of the sedimentological and tectonic characteristics of the deposit. An aeromagnetic survey was undertaken of the underground area in early 2008, with no magnetic anomalies detected.

While this data provides confidence that there are no major structures within the current extraction area, minor structures were encountered during the previous PG Seam longwall panels. At present, it is anticipated that these structures will also be present in the ULD Seam. Minor structures encountered in the PG Seam include:

1. A north-south trending dolerite dyke was intersected at 7 cut through in Maingate 2 development and again in the LW 2 installation road. The dyke in both places was less than 1 m thick with approximately 0.50 m of cindered coal on either side. Some clay alteration had occurred and strength testing determined a maximum compressive strength of 80 MPa. Long hole drilling was undertaken from Maingate 2 which confirmed the dyke's presence along the block. As the longwall production progressed,

a zone of thicker (up to 4 m), fresher and harder dyke was encountered. Underground blasting and excavation was required to enable the longwall to progress through this localised hard zone. Additional long hole drilling has determined the continuation of the dyke in the underlying ULD Seam and future drilling will be used to determine the thickness and strength of the dyke in the ULD Seam.

2. A small north-south trending graben fault structure was intersected in the installation road of LW 3, the initial displacement was downthrown 0.80 m to the east followed by an upthrow of 1.80 m to the east 20 m away. Both surface and long hole drilling has determined this structure decreases in displacement to the north and will have relatively minimal impact on production.

3. Minor north south normal faulting had been intersected during the drivage of the final 200 m of Maingate 5 development. Two small faults with a cumulative down throw to the west of 0.35 m had been mapped. During the development of both the installation and back road for LW 5 further normal faulting was intersected.

   The structure was a typical north south tension zone of relatively small normal faults, displacements ranged from 2.50 m down to the west to 0.15 m down to the east. Overall displacement of the five major faults was 3.30 m down to the west. The zone of faulting was approximately 180 m across.

   As production from the longwall progressed the faults converged and decreased in displacement and essentially vanished within 250 m.

4. A small thrust fault was intersected in the north west mains development around 27 cut through, total displacement was measured at approximately 1 m. The structure dipped gently to the west and preferentially followed a small claystone band within the PG Seam forming a de'coullemnt surface within the band. Minor rib instability was associated with the surface in some locations. The structure trends north south and dips across the remaining long wall blocks.

2.6 STABILITY OF UNDERGROUND WORKINGS

Underground workings in the PG Seam have typically proven to be highly stable during both development and extraction, with very low levels of roof displacement and very little rib or floor deformation. This reflects both the general competency of the strata and the low levels of in situ stress associated with mining depths of less than 160 m. Rib deterioration is anticipated to be consistent with PG workings at increased depths, but is expected to manifest itself largely as increased skin deterioration only (i.e. loosening of the first 0.5 m of the rib), which can be readily addressed with appropriately matched levels of rib bolting. Minor levels of roof deformation have been associated with anomalies (primarily seam split zones), which have warranted increased levels of support.

Ashton uses external geotechnical experts to provide advice on strata control. The stability of the underground workings is assessed in a range of specific reports which address:

- Gateroad drivage,
- Pillar, roof and rib stability,
- Secondary support requirements,
- Install road support requirements, and
- LW take-off support requirements.

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3 MINING SYSTEM AND RESOURCE RECOVERY

3.1 MINING GEOMETRY

Design of the proposed mining geometry was informed by number of sources, including an assessment by SCT (2010) of mine plan options within the four seams approved for extraction at the ACP. This assessment used computer modelling of the following layout options:

- A stacked layout whereby panels were placed directly underneath overlying panels
- An offset layout whereby panels were offset by approximately 60m such that the gateroads were located under the overlying goaf; and
- A stacked layout in the ULD and PG seams undermined by an offset layout of 60m in the ULLD and LB.

The aim of the study was to assess the comparative merits of the layout and provide a recommendation as to the best option (geotechnically).

The SCT (2010) study found that from a geotechnical perspective, the layout with the greatest long term stability and optimum gateroad conditions was the offset layout where roadways are offset approximately 60m. This recommendation was adopted as the basis of the mine design for the ULD workings, with the ULD layout offset 60m to the west compared to the overlying PG workings.

The relationship of the existing PG workings to the proposed ULD workings can be seen in the cross-section of LW1 / LW101 in **Figure 4**.

The layout of LW 1-8 in the ULD Seam is shown in **Plan 1** (**Appendix A**). A summary of proposed longwall panel dimensions is provided in **Table 1**.

Table 1 Proposed ULD Longwall Panel Dimensions

Panel	Gate Roads (nominal) (m)	Tailgate Pillar Width Rib to Rib (m)	LW Void Width (m) (ribline of goaf edge)	LW Length (m)
LW1	5.4	25	216	2471
LW2	5.4	25	216	2245
LW3	5.4	25	216	2464
LW4A	5.4	25	216	1680
LW4B	5.4	85	156	896
LW5	5.4	25	216	1381
LW6A	5.4	25	216	1352
LW6B	5.4	25	216	1065
LW7A	5.4	25	161	1353
LW7B	5.4	25	161	1146
LW8	5.4	20	124	1203

3.2 DEPTH OF COVER

Depth of cover is variable and increases in the direction of seam dip (to the southwest). The depth of cover ranges from approximately 80 m at the northern end of LW 1 to a maximum of ~210 m at the southern end of LW 7.

The depth of cover contours to the ULD Seam and seam thicknesses are shown in **Plan 3** (**Appendix A**).

3.3 MINING METHOD

The ACP uses retreating longwall methods for secondary extraction. Construction of development main headings, maingates and tailgates is undertaken using continuous miners.

Within the extraction area, the ULD Seam ranges in thickness from 2.2 m to 3.0 m (refer to **Plan 3**) (SCT 2011). ACOL's longwall equipment is capable of operating within a height range of 1.8 to 3.1 m and therefore the full seam thickness will be extracted.

3.4 SCHEDULE

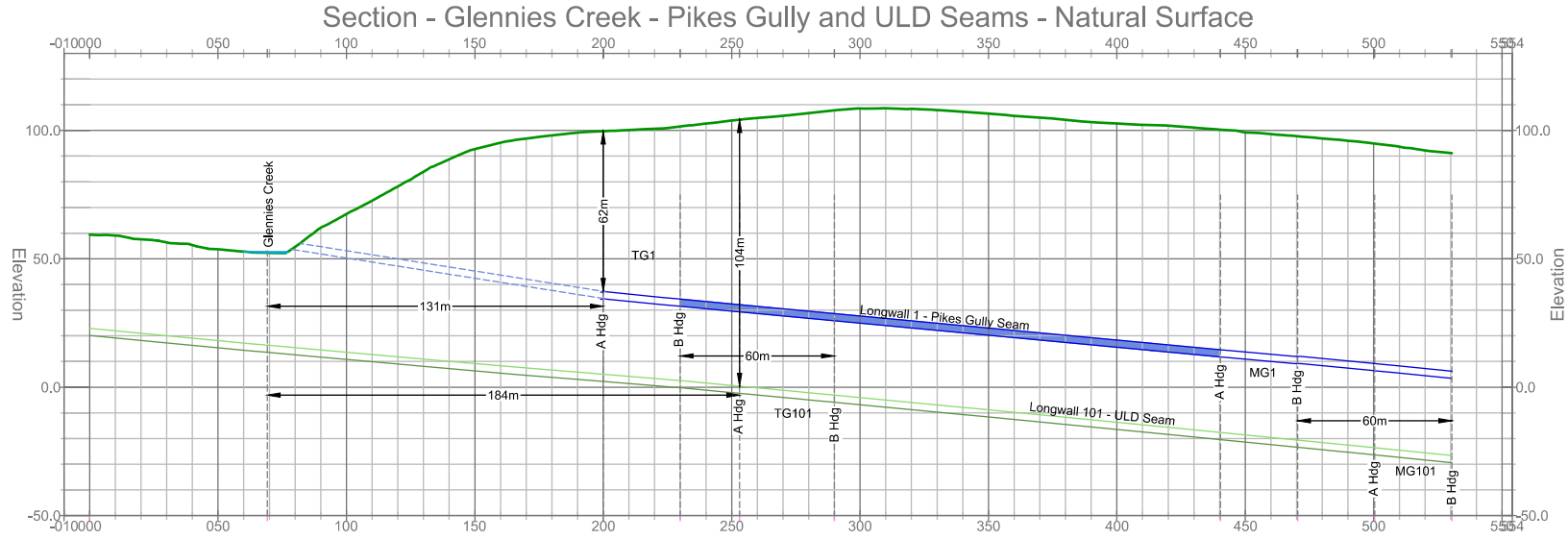
ACOL's underground mine operates five to seven days a week, 24 hours a day on a rotating shift basis. At present, ACOL's mining schedule in the PG Seam is subject to/affected by subordinate approvals. However based on various approval scenarios, the start date and subsequent mining schedule is shown in **Table 2**. At the date of this report, extraction of LW 6A was complete.

The preferred sequence of mining will be PG LW 7B, PG LW 8 then ULD LW 1. Anticipated start and completion dates are summarised in **Table 2**, dependent on relevant mining constraints and status of subordinate approvals.

Table 2 Proposed Mining Schedule (Secondary Extraction ULD Seam)

Panel	Start Date	Duration	Completion Date
ULD LW 1	July 2012	6 months	January 2012
PG LW6B*	March 2013	4 months	June 2013
ULD LW 2	July 2013	6 months	February 2013
ULD LW 3	March 2014	7 months	September 2014
ULD LW 4A	October 2014	4 months	February 2014
ULD LW 4B	March 2015	2 months	May2015
ULD LW 5	June 20115	3 months	September 2015
ULD LW 6A	October 2015	4 months	February 2015
ULD LW 6B	March 2016	4 months	July 2016
ULD LW 7A	July 2016	4 months	October 2016
ULD LW 7B	October 2016	4 months	February 2016
ULD LW 8	March 2016	4 months	July 2017

* Extraction of PG LW6B is subject to completion of the Bowmans Creek eastern diversion. If construction completed in time, PG LW 6B may be mined out of sequence (subject to EP/SMP approvals).



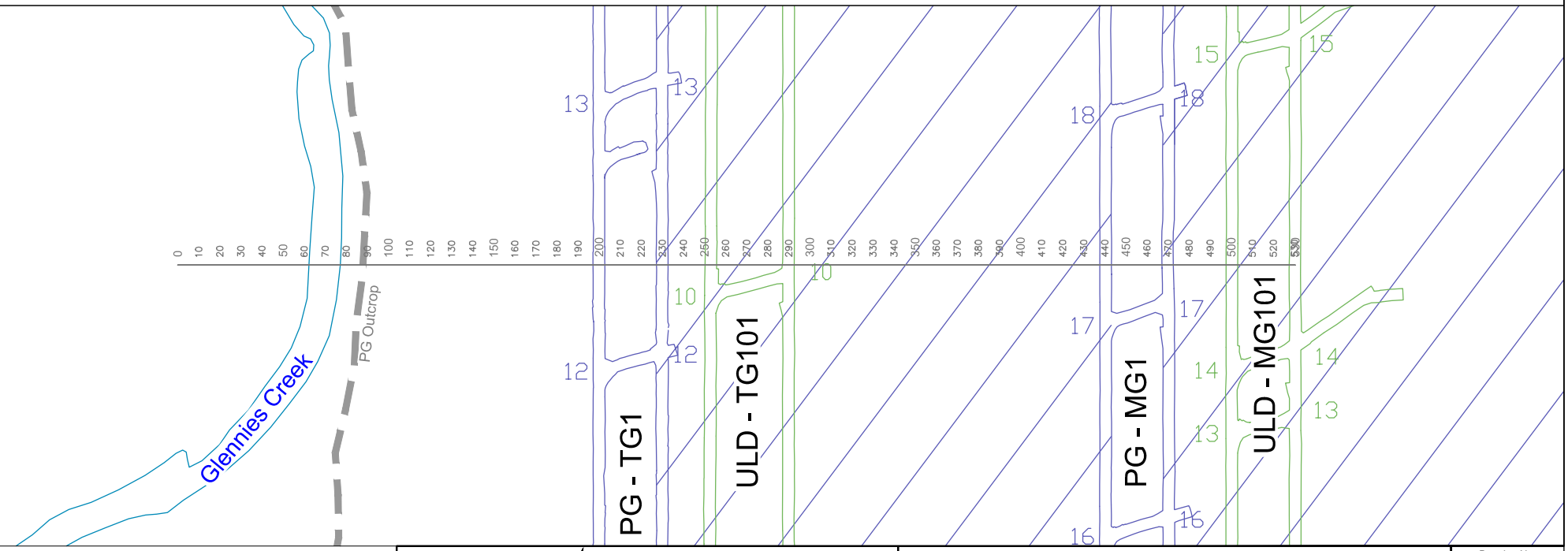


Figure 4

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ASHTON UNDERGROUND MINE
Glennies Creek - TG1 Pikes Gully Seam
TG101 ULD Seam and Natural Surface

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3.5 FUTURE MINING

Extraction of LW 1-8 in the ULD Seam will complete the proposed extraction of coal in the ULD Seam within the current ACP Mining Lease. To the west of LW 8, Ravensworth Underground Mine proposes to extract coal using retreating longwall methods within the PG Seam, as well as lower seams (Ravensworth Underground mains headings line up parallel to ACOL's LW 8 maingate).

The ACP is approved as a descending, multi-seam longwall operation. Therefore following completion of LW 8 in the ULD Seam, mining will progressively access the reserves within the ULLD and LB Seams as approved under the development consent. Indicative future workings in these seams, along with cover depth and seam thicknesses are shown in **Plans 4a – 4c** respectively.

3.6 RESOURCE RECOVERY

The ULD Seam mining layout has been optimised to maximise resource recovery within the lease boundary. No other mining method is likely to achieve greater recovery with the subsidence constraints applied.

Resource estimates and proposed recovery has been estimated to industry standards and is summarised below (refer **Table 3** and **Table 4**). Based on the footprint of the mine plan, and given the physical and environmental constraints, resource recovery of the planned layout is estimated at approximately 60% of the available resource within the ULD Seam for LW 1-8.

Table 3 Estimate of Total Resources Available

	Resources (Tonnes/Million)
Measured	16.36
Indicated	4.17
Inferred	0.96
Total	**21.49**

Table 4 Estimate of Total Reserves Recoverable

	Reserves (Tonnes/Million)
Proven	10.92
Probable	2.85
Total	**12.87**

As a result of secondary extraction of coal within the ULD Seam, there will be some subsidence impacts on the overlying strata. However, the overlying strata contain no currently identified viable coal seams within the geographical and depositional constraints of the deposit.

Some stress-related impacts on the strata immediately below the floor of the ULD Seam may occur as a result of longwall extraction; however this will not impact the ability of lower seams to be extracted in the future.

Consideration of multi-seam extraction has been included in the mine plan design. In particular, modelling the subsidence behaviour of proposed future mining in the ULLD Seam was used to identify potential issues relating to the stability of chain pillars and the layout of the longwall panels (i.e. stacked vs offset layouts).

3.7 JUSTIFICATION

Detailed information, monitoring results and project justification are provided in the Bowmans Creek Diversion Environmental Assessment (Evans & Peck, 2009). The current mine plan is consistent with the mine plan approval as included in the approval documents.

Since the beginning of the project an improved understanding of groundwater and surface water systems and their response to mining has enabled ACOL to develop an underground mine plan that will result in acceptable environmental impacts while providing resource optimisation together with business and employment security.

The layout, as indicated on the **Approved Plan** (**Appendix A**), has been developed based on extensive drilling, groundwater modelling, environmental investigation and assessment and consultation with relevant authorities. The vertical alignment of LW 1- 8 in the ULD Seam is horizontally offset from the overlying PG Seam mine workings by approximately 60m to the west. The ULD mine plan has been informed by detailed analysis of the predicted subsidence behaviour and groundwater impacts to Glennies Creek and Bowmans Creek alluvium.

The longwall panel lengths are constrained by the mining lease boundary and:

- Mining Lease boundary and New England Highway to the north;
- Bowmans Creek (existing retained creek channel) to the south;
- Hunter River and associated alluvial aquifer to the south; and
- Glennies Creek to the east.

The subsidence monitoring program contained within the Extraction Plan summarises the overall monitoring of mining impacts on the natural and built environments, with management actions detailed in the relevant environmental management plan(s) or Built Features Management Plan (refer to **Figure 2** of the Extraction Plan for the content and structure of the ACOL Environmental Management Strategy).

4 REFERENCES

Department of Mineral Resources (2003) **Guideline for Applications for Subsidence Management Approvals** (EDG17)

Evans and Peck (2009) **Bowmans Creek Diversion Environmental Assessment**. Evans and Peck, Newcastle, NSW, Australia

HLA (2001) **Environmental Impact Statement Ashton Coal Project,** HLA Envirosciences, Newcastle, NSW, Australia

SCT (2010) **Assessment of Multi Seam Layout Options for Longwalls 1 to 4**, SCT Operations Pty Ltd, Wollongong, NSW, Australia

SCT (2011) **Ashton Multi-Seam Subsidence Predictions 3D Extrapolation**, SCT Operations Pty Ltd, Wollongong, NSW, Australia

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APPENDIX A – PLANS 1 – 6 AND APPROVED PLAN

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Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam

Ravensworth Underground - Pikes Gully Seam

SMP Boundary LW1 to 9

Ravensworth No. 2 Opencut Mined Extent - Bayswater Seam For More Information Refer to Record Tracing No RT722 & RT722A

RAVENSWORTH VOID No.5

Prescibed Dam Notification Area

Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam For More Information Refer to Record Tracing No RT722 & RT722A

NARAMA Prescibed Dam Notification Area

ML 1623

ML 1529

ML 1533

Hunter No. 1 Colliery For More Information Refer to Record Tracing No RT721

Ashton Opencut Mined Extent - Barrett Seam For More Information Refer to Record Tracing No RT815

CHPP AREA

OPEN CUT AREA

OPEN CUT MINING APPROVAL

LW 108

LW 107B

LW 106B

LW 104B

LW 107A

LW 106A

LW 105

LW 104A

LW 103

LW 102

LW 101

1202.5 123.6 1146.1 160.8 215.8 1065.4

896.2 155.8

1352.9 160.8 1351.9 215.8 1381 215.8 1679.7 215.8 2463.8 215.8 2245.3 215.8 2471.3

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N 6 403 500

E 317 000

E 317 500

E 318 000

E 318 500

E 319 000

E 319 500

E 320 000

N

W

E

S

Legend

- Extraction Plan Area - Proposed
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Development Consent (Mod. 8) Limit of Workings
- Open Cut Mining Approval
- Lease Boundary
- Prescribed Dam Notification Area
- Ashton Open Cut (Barrett Seam)
- Hunter No.1 Colliery workings (Pikes Gully Seam)
- Ravensworth No. 2 Opencut (Bayswater Seam)
- Ravensworth No.2 Opencut (Ravensworth Seam)

- Pillar Dimensions are Centreline distances
- Void Dimensions are from ribline of goaf edge

NOTE: Application area lies wholly within Patrick Plains Mine Subsidence District

I, David Gibson, certify that the information shown on this plan is a true indication of the proposed development.

....
Manager of Mining Engineering Date

I, Jeffrey Peck, certify that to the best of my knowledge this plan conforms to the accuracy standards required by the Department of Industry and Investment, NSW

....
Mine Surveyor Date

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

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ASHTON UNDERGROUND MINE
LW101 TO LW104 - UPPER LIDDELL SEAM
EXTRACTION PLAN AREA - PROPOSED - APPROVED PLAN

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Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam

Ravensworth Underground - Pikes Gully Seam

SMP Boundary LW1 to 9

Ravensworth No. 2 Opencut Mined Extent - Bayswater Seam For More Information Refer to Record Tracing No RT722 & RT722A

RAVENSWORTH VOID No 5

Prescibed Dam Notification Area

Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam For More Information Refer to Record Tracing No RT722 & RT722A

NARAMA Prescibed Dam Notification Area

ML 1623

LW 108

LW 107B

LW 106B

LW 104B

LW 107A

LW 106A

LW 105

LW 104A

LW 103

LW 102

LW 101

ML 1533

ML 1529

Hunter No. 1 Colliery For More Information Refer to Record Tracing No RT721

Ashton Opencut Mined Extent - Barrett Seam For More Information Refer to Record Tracing No RT815

CHPP AREA

OPEN CUT AREA

OPEN CUT MINING APPROVAL

N 6 407 500

N 6 407 000

N 6 406 000

N 6 405 500

N 6 405 000

N 6 404 500

N 6 404 000

N 6 403 500

E 317 000

E 317 500

E 318 000

E 318 500

E 319 000

E 319 500

E 320 000

N

W

E

S

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

Legend

- Extraction Plan Area - Proposed
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Development Consent (Mod. 8) Limit of Workings
- Open Cut Mining Approval
- Lease Boundary
- Prescribed Dam Notification Area
- Ashton Open Cut (Barrett Seam)
- Hunter No.1 Colliery workings (Pikes Gully Seam)
- Ravensworth No. 2 Opencut (Bayswater Seam)
- Ravensworth No.2 Opencut (Ravensworth Seam)

- Pillar Dimensions are Centreline distances
- Void Dimensions are from ribline of goaf edge

NOTE: Application area lies wholly within Patrick Plains Mine Subsidence District

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ASHTON UNDERGROUND MINE
LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.1A - Extraction Area Boundary - Proposed

Drawing No.	Revision No.
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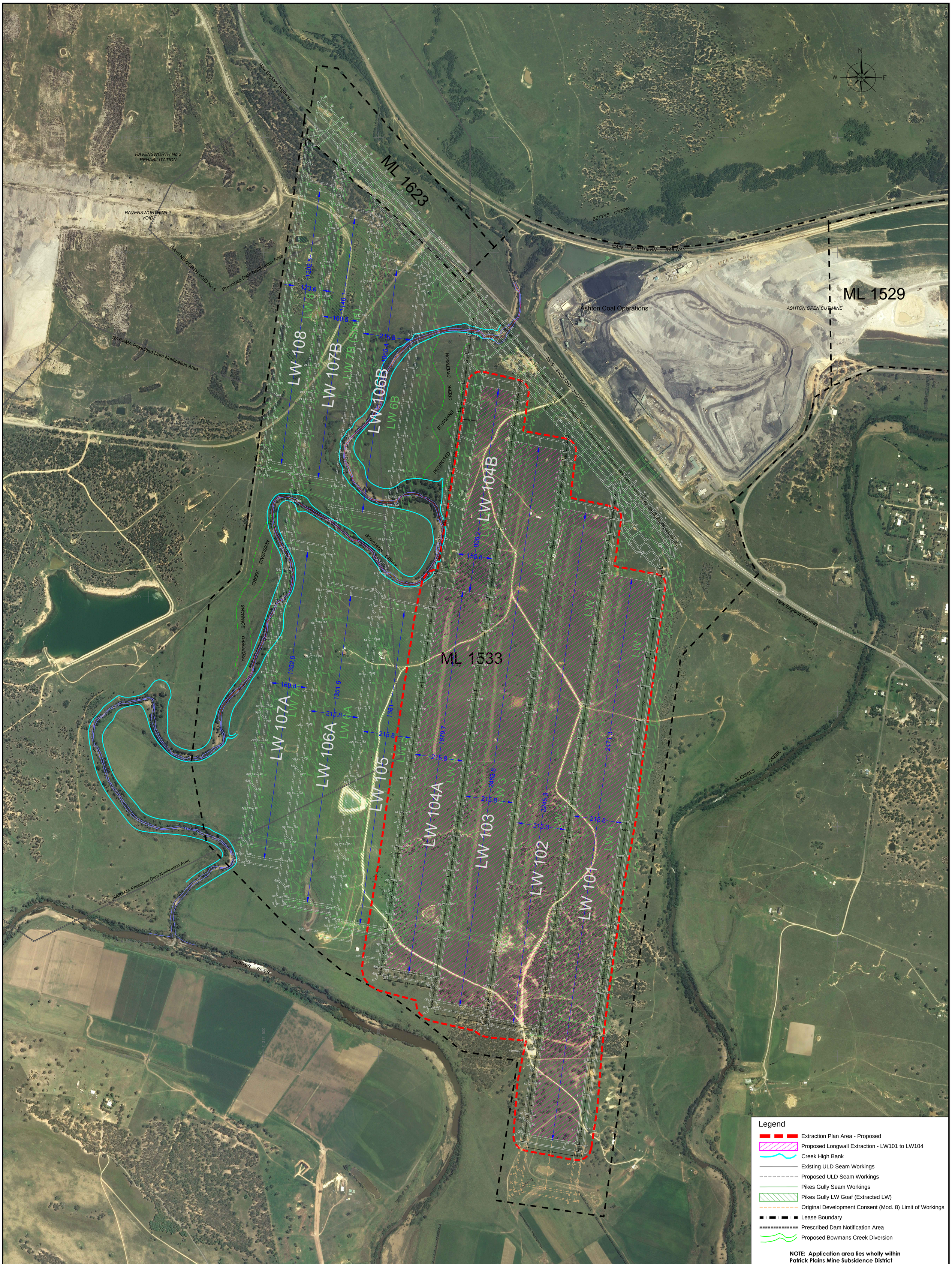

Legend

- Extraction Plan Area - Proposed
- Proposed Longwall Extraction - LW101 to LW104
- Creek High Bank
- Existing ULD Seam Workings
- Proposed ULD Seam Workings
- Pikes Gully Seam Workings
- Pikes Gully LW Goaf (Extracted LW)
- Original Development Consent (Mod. 8) Limit of Workings
- Lease Boundary
- Prescribed Dam Notification Area
- Proposed Bowmans Creek Diversion

NOTE: Application area lies wholly within Patrick Plains Mine Subsidence District

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

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ASHTON UNDERGROUND MINE
LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.1B - Aerial Photograph & Proposed Extraction Boundary

Drawing No.	Revision No.
B–4003–1B	4

Date	Scale:	Drawn	Checked	Approved	Sheet Size
13/07/12	1:5000	JIP	PF	DG	A0

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W E

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Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam

Ravensworth Underground - Pikes Gully Seam

SMP Boundary LW1 to 9

Ravensworth No. 2 Opencut Mined Extent - Bayswater Seam For More Information Refer to Record Tracing No RT722 & RT722A

RAVENSWORTH VOID No 5

Prescibed Dam Notification Area

Ravensworth No. 2 Opencut Mined Extent - Ravensworth Seam For More Information Refer to Record Tracing No RT722 & RT722A

NARAMA Prescibed Dam Notification Area

ML 1623

ML 1529

Hunter No. 1 Colliery For More Information Refer to Record Tracing No RT721

Ashton Opencut Mined Extent - Barrett Seam For More Information Refer to Record Tracing No RT815

CHPP AREA

OPEN CUT AREA

OPEN CUT MINING APPROVAL

ML 1533

LW 108 LW 8 1202.5 123.6 160.8 1146.1 LW 107B LW 7B (Short) 215.8 1065.4 LW 106B LW 6B LW 105 LW 5 LW4 LW 104B 896.2 156.8 LW 3 LW 2 LW 1

LW 107A LW 7A 1352.9 160.8 LW 106A LW 6A 1351.9 215.8 LW 105 LW 5 1381 215.8 LW 104A LW 4 1679.7 215.8 LW 103 LW 3 2463.8 215.8 LW 102 LW 2 2245.3 215.8 LW 101 LW 1 2471.3

N 6 407 500

N 6 407 000

N 6 406 000

N 6 405 500

N 6 405 000

N 6 404 500

N 6 404 000

N 6 403 500

E 317 000

E 317 500

E 318 000

E 318 500

E 319 000

E 319 500

E 320 000

Legend

- Extraction Plan Area - Proposed
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Development Consent (Mod. 8) Limit of Workings
- Open Cut Mining Approval
- Lease Boundary
- Prescribed Dam Notification Area
- Pikes Gully Seam Workings
- Pikes Gully Seam - LW Extraction
- Ashton Open Cut (Barrett Seam)
- Hunter No.1 Colliery workings (Pikes Gully Seam)
- Ravensworth No. 2 Opencut (Bayswater Seam)
- Ravensworth No.2 Opencut (Ravensworth Seam)

- Pillar Dimensions are Centreline distances
- Void Dimensions are from ribline of goaf edge

NOTE: Application area lies wholly within Patrick Plains Mine Subsidence District

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

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ASHTON UNDERGROUND MINE
LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.1C - Extraction Area Boundary - Pikes Gully Seam Workings

Drawing No.	Revision No.
B-4003-1C	3

Date	Scale:	Drawn	Checked	Approved	Sheet Size
18/05/12	1:5000	JIP	PF	DG	A0

ML 1484

CL 380

ML 1623

ML 1529

ML 1533

Proposed Lemington Rd
- New England Highway
Intersection Upgrade

Proposed
Flyash
Pipeline

Proposed Ash
Dam Wall

Proposed Fan Shaft Site -
Ravensworth Underground

Proposed Runoff
Easement

Proposed 330kV
(Ravensworth)

Proposed MacGen Gas
Pipeline Easement

Brunkers Lane
(overlaid with proposed
Lemington Rd Re-alignment)

Proposed
Lemington Rd
Re-alignment

LW 108
LW 8
LW 107B
LW 7B
LW 106B
LW 6B
LW 107A
LW 7A
LW 106A
LW 6A
LW 105
LW 5
LW 104B
LW 4B
LW 104A
LW 4A
LW 103
LW 3
LW 102
LW 2
LW 101
LW 1

GW17
GW15
GW07
GW06
GW03
GW05
GW02
GW04
GW01

MAIN NORTHERN RAILWAY
NEW ENGLAND HIGHWAY
DIVERSION CREEK
BOWMANS CREEK
PROPOSED BOWMANS CREEK DIVERSION
CREEK DIVERSION
OPEN CUT AREA
GLENNIES CREEK
HUNTER RIVER

N 6 407 500
N 6 407 000
N 6 406 500
N 6 406 000
N 6 405 500
N 6 405 000
N 6 404 500
N 6 404 000
N 6 403 500
E 317 000
E 317 500
E 318 000
E 318 500
E 319 000
E 319 500
E 320 000

N
W
E
S

Legend

- Extraction Plan Area - Proposed
- Proposed Longwall Extraction - LW101 to LW104
- Existing ULD Seam Workings
- Proposed ULD Seam Workings
- Pikes Gully Seam Workings
- Pikes Gully LW Goaf (Extracted LW)
- Original Development Consent (Mod. 8) Limit of Workings
- Lease Boundary
- Proposed Bowmans Creek Diversion
- Power Pole
- GAS — MacGen Gas Pipeline (proposed)
- GW0X — Pikes Gully Goaf Drainage Bore (Existing)
- 11kV Powerline
- 33kV Powerline
- 66kV Powerline
- 132kV Powerline
- Telstra Cable
- Optic Fibre Cable
- Water Pipeline
- Fence
- Surface Contour (5m)
- Dam
- Water Course
- Gravel Track
- Building

Application area lies wholly within
Patrick Plains Mine Subsidence District

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

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ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.2 - Surface Features

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
B-4004	4	13/07/2012	1:5000	JIP	PF	DG	A0

N

W E

S

ML 1623

ML 1529

ML 1533

LW 108

LW 107B

LW 106B

LW 104B

LW 107A

LW 106A

LW 105

LW 104A

LW 103

LW 102

LW 101

Hunter No. 1 Colliery
For More Information Refer to
Record Tracing No RT721

CHPP AREA

OPEN CUT AREA

OPEN CUT MINING APPROVAL

N 6 407 500

N 6 407 000

N 6 406 500

N 6 406 000

N 6 405 500

N 6 405 000

N 6 404 500

N 6 404 000

N 6 403 500

E 317 000

E 317 500

E 318 000

E 319 500

E 320 000

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

Legend

- Extraction Plan Area - Proposed - ULD Seam
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Development Consent (Mod. 8) Limit of Workings
- Open Cut Mining Approval
- Lease Boundary
- Prescribed Dam Notification Area
- Hunter No.1 Colliery workings (Pikes Gully Seam)
- 2.0 Upper Liddell Seam Thickness Contours
- 60 Upper Liddell Depth of Cover contours

NOTE: Application area lies wholly within Patrick Plains Mine Subsidence District

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ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
Plan No.3 - Upper Liddell - Seam Thickness & Depth of Cover Contours

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
B-4005	3	18/05/2012	1:5000	JIP	PF	DG	A0

N

W E

S

ML 1623

ML 1529

ML 1533

LW 8

LW 7B (Short)

LW 6B

LW 4

LW 3

LW 2

LW 1

LW 7A

LW 6A

LW 5

OPEN CUT AREA

OPEN CUT MINING APPROVAL

N 6 407 500

N 6 407 000

N 6 406 500

N 6 406 000

N 6 405 500

N 6 405 000

N 6 404 500

N 6 404 000

N 6 403 500

E 317 000

E 317 500

E 318 000

E 318 500

E 319 000

E 319 500

E 320 000

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

Legend

- Extraction Plan Area - Proposed - ULD Seam
- Existing Workings - Pikes Gully Seam
- Open Cut Mining Approval
- Lease Boundary
- 2.75 Pikes Gully Seam Thickness Contours
- 125.00 Pikes Gully Seam Depth of Cover Contours
- Dyke - Pikes Gully Seam
- Fault - Pikes Gully Seam

Application area lies wholly within
Patrick Plains Mine Subsidence District

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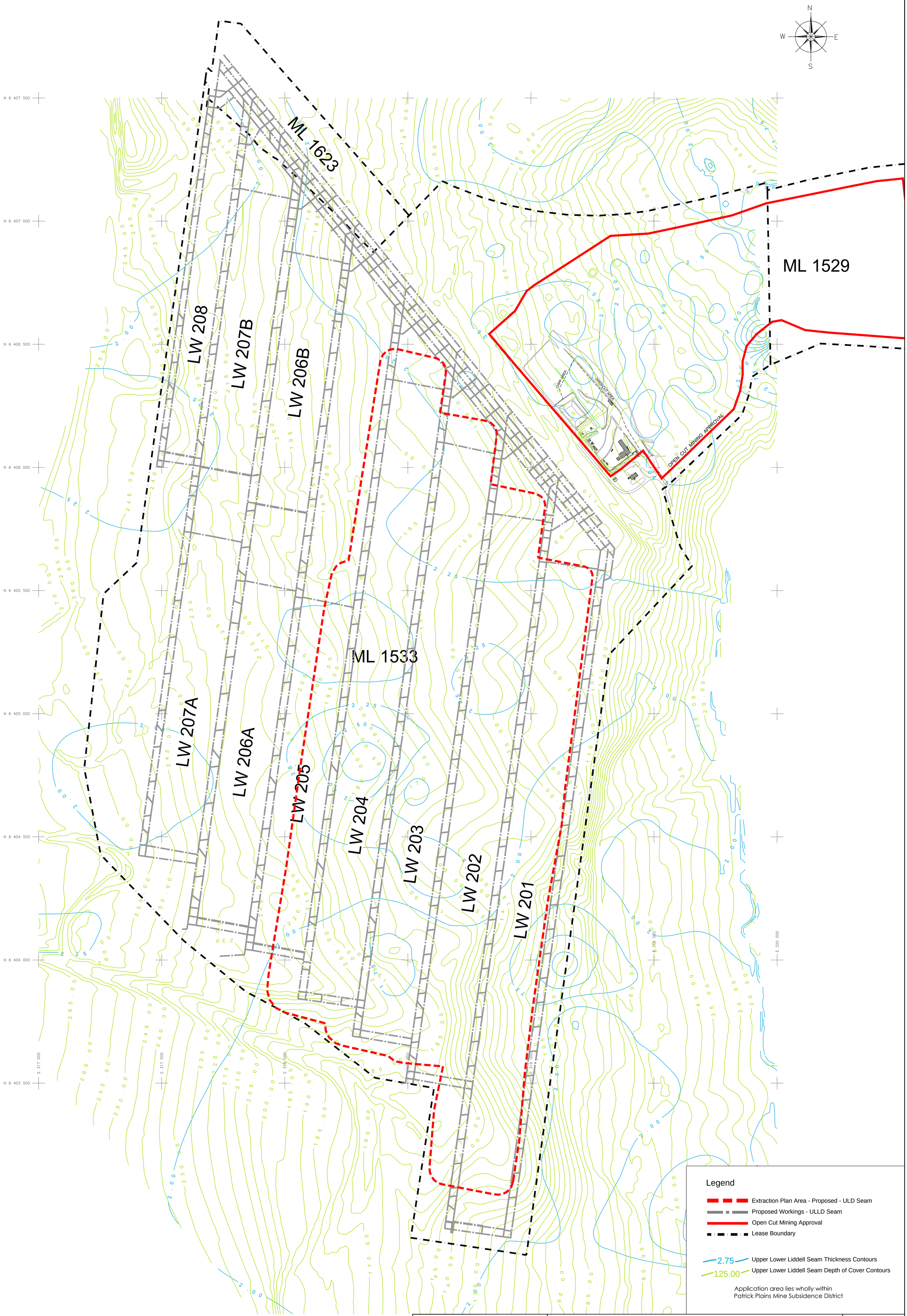
ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.4a - Pikes Gully Seam Thickness & Depth of Cover Contours

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
B–4006	3	18/05/2012	1:5000	JIP	PF	DG	A0



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ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.4b - Upper Lower Liddell Seam Thickness & Depth of Cover Contours

Drawing No.	Revision No.	Date	Scale:	Drawn	Checked	Approved	Sheet Size
B–4007	3	18/05/2012	1:5000	JIP	PF	DG	A0

N

W E

S

ML 1623

ML 1529

ML 1533

LW 308

LW 307B

LW 306B

LW 304B

LW 307A

LW 306A

LW 305

LW 304A

LW 303

LW 302

LW 301

CLIFF AREA

OPEN CUT AREA

OPEN CUT MINING APPROVAL

N 6 407 500

N 6 407 000

N 6 406 500

N 6 406 000

N 6 405 500

N 6 405 000

N 6 404 500

N 6 404 000

N 6 403 500

E 317 000

E 317 500

E 318 000

E 318 500

E 319 000

E 319 500

E 320 000

200 160 120 80 40 0 200 400 600 800 1000

All measurements are in metres

Legend

- Extraction Plan Area - Proposed - ULD Seam
- Proposed Lower Barrett Seam Workings
- Lease Boundary
- 2.75 Barrett Seam Thickness Contours
- 125.00 Barrett Seam Depth of Cover Contours

Application area lies wholly within
Patrick Plains Mine Subsidence District

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ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.4c - Lower Barrett Seam Thickness & Depth of Cover Contours

Drawing No.	Revision No.
B–4008	3

Date	Scale:	Drawn	Checked	Approved	Sheet Size
18/05/2012	1:5000	JIP	PF	DG	A0

ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.5 - Mining Titles and Land Ownership

ML 1623
ML 1529
ML 1533
MAIN NORTHERN RAILWAY
NEW ENGLAND HIGHWAY
New England Highway
BRUNKERS LANE
GLENNIES CREEK
HUNTER RIVER
Ashton Coal Operations
OPEN CUT MINING APPROVAL
CHPP AREA
OPEN CUT AREA
LW 107B
LW 106B
LW 104B
LW 107A
LW 106A
LW 105
LW 104A
LW 103
LW 102
LW 101
Property 130

N 6 407 500
N 6 407 000
N 6 406 500
N 6 406 000
N 6 405 500
N 6 405 000
N 6 404 500
N 6 404 000
N 6 403 500
E 317 000
E 317 500
E 318 000
E 318 500
E 319 000
E 319 500
E 320 000

31//585169
32//585169
2//1089848
1//774682
1//823148
167//2328
166//2328
165//2328
164//2328
142//2328
141//2328
136//2328
1//940619
PT1//940619
58//752499
1//745488
1//745496
1//1056200
104//633131
102//738182
2//1114623
3//1114623
1//264089
2//264089
3//264089
10//877004
2//876447
PT10//1107705

Legend

- Extraction Plan Area - Proposed - ULD Seam
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Limit of Workings and LW101
- Open Cut Mining Approval
- Lease Boundary
- Land with Residence
- Glendell Land Leased to ACML
- Ravensworth Operations Pty Limited
- Coal & Allied Operations Pty Limited
- Crown Land
- Freehold Land
- Glendell Tenements Pty Limited
- Savage Mineral Limited & Enex Foydell Limited
- Macquarie Generation
- Renison Limited - Ravensworth Operations Pty Limited
- Singleton Council
- Ashton Coal Operations Pty Ltd

Application area lies wholly within
Patrick Plains Mine Subsidence District

200 160 120 80 40 0 200 400 600 800 1000
All measurements are in metres

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Drawing No.	Revision No.
B–4009	3

Date	Scale:	Drawn	Checked	Approved	Sheet Size
18/05/2012	1:5000	JIP	PF	DG	A0

Ravensworth No. 2
Opencut
Mined Extent -
Ravensworth Seam

Ravensworth No. 2 Opencut
Mined Extent - Bayswater Seam

Ravensworth No. 2 Opencut
Mined Extent - Ravensworth Seam

Ravensworth Underground - Pikes Gully Seam
SMP Boundary LW1 to 9

New England Highway

E 317 000
E 317 500
E 318 000
E 318 500
E 319 000
E 319 500
E 320 000

N 6 407 500
N 6 407 000
N 6 406 500
N 6 406 000
N 6 405 500
N 6 404 000

N
W
E
S

ML 1623

ML 1529

ML 1533

Hunter No. 1 Colliery
For More Information Refer to
Record Tracing No RT721

Ashton Coal Operations

Ashton Opencut
Mined Extent - Barrett Seam
For More Information Refer to
Record Tracing No RT815

CHPP AREA
OPEN CUT AREA
OPEN CUT MINING APPROVAL

LW 108
LW 107B
LW 106B
LW 104B
LW 107A
LW 106A
LW 105
LW 104A
LW 103
LW 102
LW 101

WML25

WML35

WML008

WML005

WMLC335

WML25

ULD

WML35

ULD

WML008

ULD

WML005

ULD

WMLC 335

0 200 400 600 800 1000

All measurements are in metres

Legend

- Extraction Plan Area - Proposed - ULD Seam
- Proposed Longwall Extraction - LW101 to LW104
- Existing Workings
- Proposed Workings
- Original Limit of Workings and LW101
- Open Cut Mining Approval
- Lease Boundary
- Borehole (WML008)
- Dyke - Pikes Gully Seam
- Fault - Pikes Gully Seam
- Hunter No.1 Colliery Workings (Pikes Gully Seam)
- Ravensworth No. 2 Opencut (Bayswater Seam)
- Ravensworth No.2 Opencut (Ravensworth Seam)

Application area lies wholly within
Patrick Plains Mine Subsidence District

Strata Legend

- NO SAMPLE
- SANDSTONE
- SILTSTONE
- SHALE
- COAL Undifferentiated
- CLAYSTONE
- COAL Dull and bright
- CARB MUDSTONE
- COAL Bright banded
- MUDSTONE
- COAL Bright
- CORE LOSS
- COAL Dull banded
- CONGLOMERATE
- COAL Stony
- SIDERITE
- COAL Dull

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ASHTON UNDERGROUND MINE
PROPOSED LW101 to LW104 - UPPER LIDDELL SEAM
PLAN No.6 - Geological Strata Sections

Drawing No.	Revision No.
B–4010	3

Date	Scale:	Drawn	Checked	Approved	Sheet Size
18/05/2012	1:5000	JIP	PF	DG	A0