

METROPOLITAN COAL LONGWALLS 301-303

COAL RESOURCE RECOVERY PLAN





METROPOLITAN COAL

METROPOLITAN COAL

LONGWALLS 301-303

COAL RESOURCE RECOVERY PLAN

Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DRE Satisfaction/ DP&E Approval Date
All	CRRP-R01-A	Original	DP&E, DRE	-

October 2016

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	PURPOSE AND SCOPE	1
2	CRRP REVIEW AND UPDATE	1
2.1	DISTRIBUTION REGISTER	6
3	MINING GEOMETRY	6
3.1	DEPTH OF COVER	8
3.2	BULLI SEAM GEOMETRY	8
3.3	GEOLOGICAL DETAILS	8
4	RESOURCE RECOVERY	9
4.1	MINING METHOD	9
4.2	MINE PLAN	9
4.2.1	Justification	9
4.2.2	Mining Schedule	9
4.2.3	Future Mine Plans	10
4.2.4	Effects on Future Resource Recovery	10

LIST OF TABLES

Table 1	Summary of Longwall Dimensions for Longwalls 301-303
Table 2	Provisional Extraction Schedule

LIST OF FIGURES

Figure 1	Project Longwalls 20-27 and Longwalls 301-317 Layout
Figure 2	Longwalls 301-303 Layout
Figure 3	Project Longwalls 20-27 and Longwalls 301-317 Layout – Aerial Photograph
Figure 4	Environmental Management Structure

LIST OF ATTACHMENTS

Attachment 1	Plans 1, 2, 3, 5 and 6 in accordance with the Department of Planning and Environment and Division of Resources and Energy (2015) <i>Guidelines for the Preparation of Extraction Plans</i>
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1 INTRODUCTION

Metropolitan Coal is a wholly owned subsidiary of Peabody Energy Australia Pty Ltd (Peabody). Metropolitan Coal was granted approval for the Metropolitan Coal Project (the Project) under section 75J of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 22 June 2009. A copy of the Project Approval is available on the Peabody website (<http://www.peabodyenergy.com>).

The Project comprises the continuation, upgrade and extension of underground coal mining operations and surface facilities at Metropolitan Coal. The underground mining longwall layout is shown on Figure 1. Following the anticipated completion of Longwall 27 in 2017, Longwalls 301, 302 and 303 (herein referred to as Longwalls 301-303) define the next mining sub-domain within the Project underground mining area (Figures 1 to 3).

1.1 PURPOSE AND SCOPE

In accordance with Condition 6(e), Schedule 3 of the Project Approval, this Coal Resource Recovery Plan (CRRP) has been prepared as a component of the Metropolitan Coal Longwalls 301-303 Extraction Plan to demonstrate effective recovery of the available resource.

The relationship of this CRRP to the Metropolitan Coal Environmental Management Structure and to the Metropolitan Coal Longwalls 301-303 Extraction Plan is shown on Figure 4.

The following graphical plans (Attachment 1) have been prepared in accordance with Department of Planning and Environment (DP&E) and Division of Resources and Energy (DRE) (2015) *Guidelines for the Preparation of Extraction Plans*:

- Plan 1 Longwalls 301-303 Proposed Extraction.
- Plan 2 Natural and Man-Made Surface Features.
- Plan 3 Geological and Seam Data.
- Plan 5 Mining Titles and Land Ownership.
- Plan 6 Geological Section and Geotechnical Log.

As there are currently no existing and/or planned future workings in seams above and/or below the proposed workings, Plan 4 referred to in the DP&E and DRE (2015) *Guidelines for the Preparation of Extraction Plans* has not been included in this CRRP. Plan 7 (Subsidence Monitoring Locations) is included in the Metropolitan Coal Longwalls 301-303 Subsidence Monitoring Program.

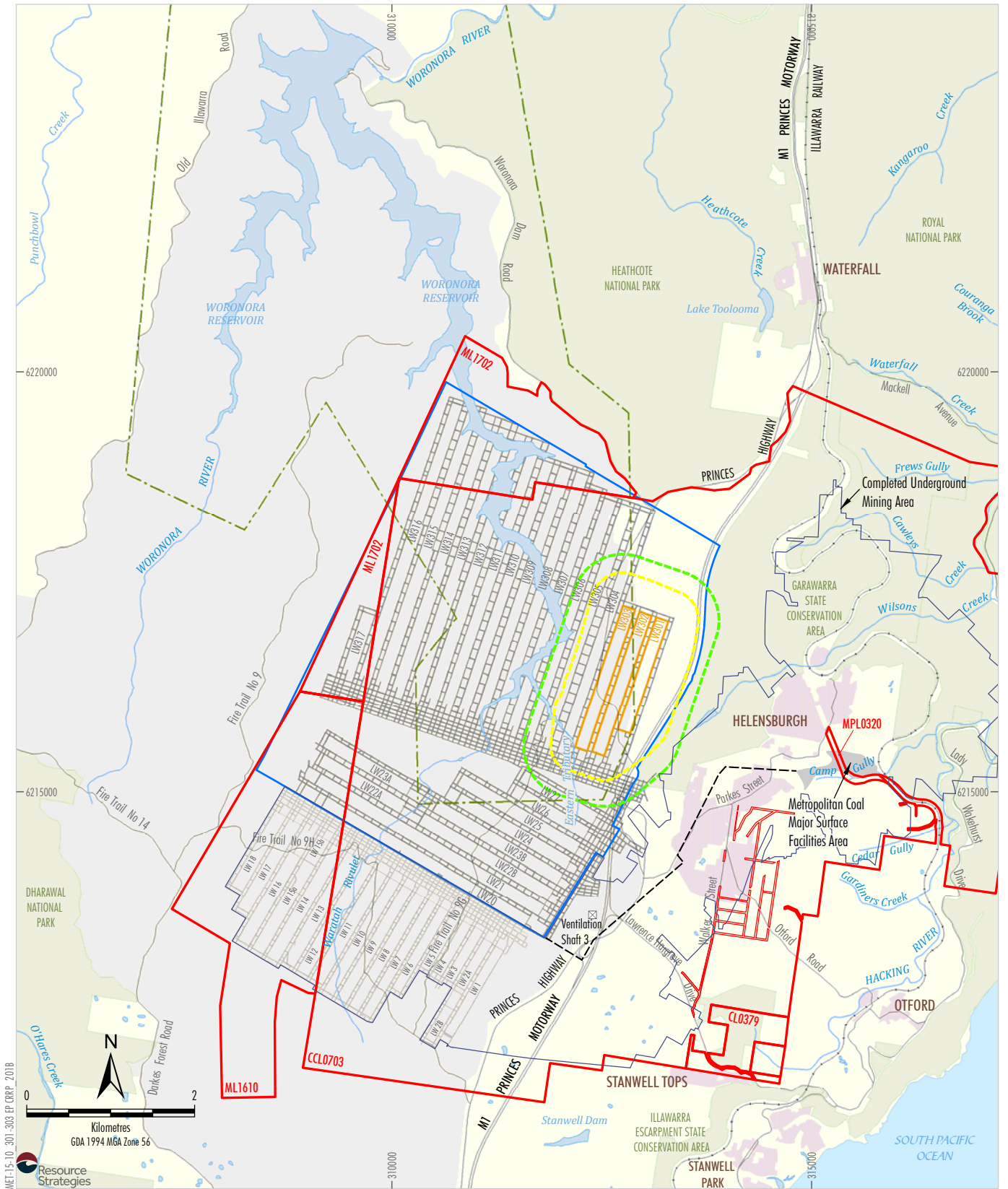
2 CRRP REVIEW AND UPDATE

In accordance with Condition 4, Schedule 7 of the Project Approval, this CRRP will be reviewed within three months of the submission of:

- an audit under Condition 8, Schedule 7;
- an incident report under Condition 6, Schedule 7;
- an annual review under Condition 3, Schedule 7; and

if necessary, revised to the satisfaction of the Director-General (now Secretary) of the DP&E.

Metropolitan Coal – Coal Resource Recovery Plan		
Revision No. CRRP-R01-A		Page 1
Document ID: Coal Resource Recovery Plan		



MEF-15-10-301-303 EP CRPP 2018

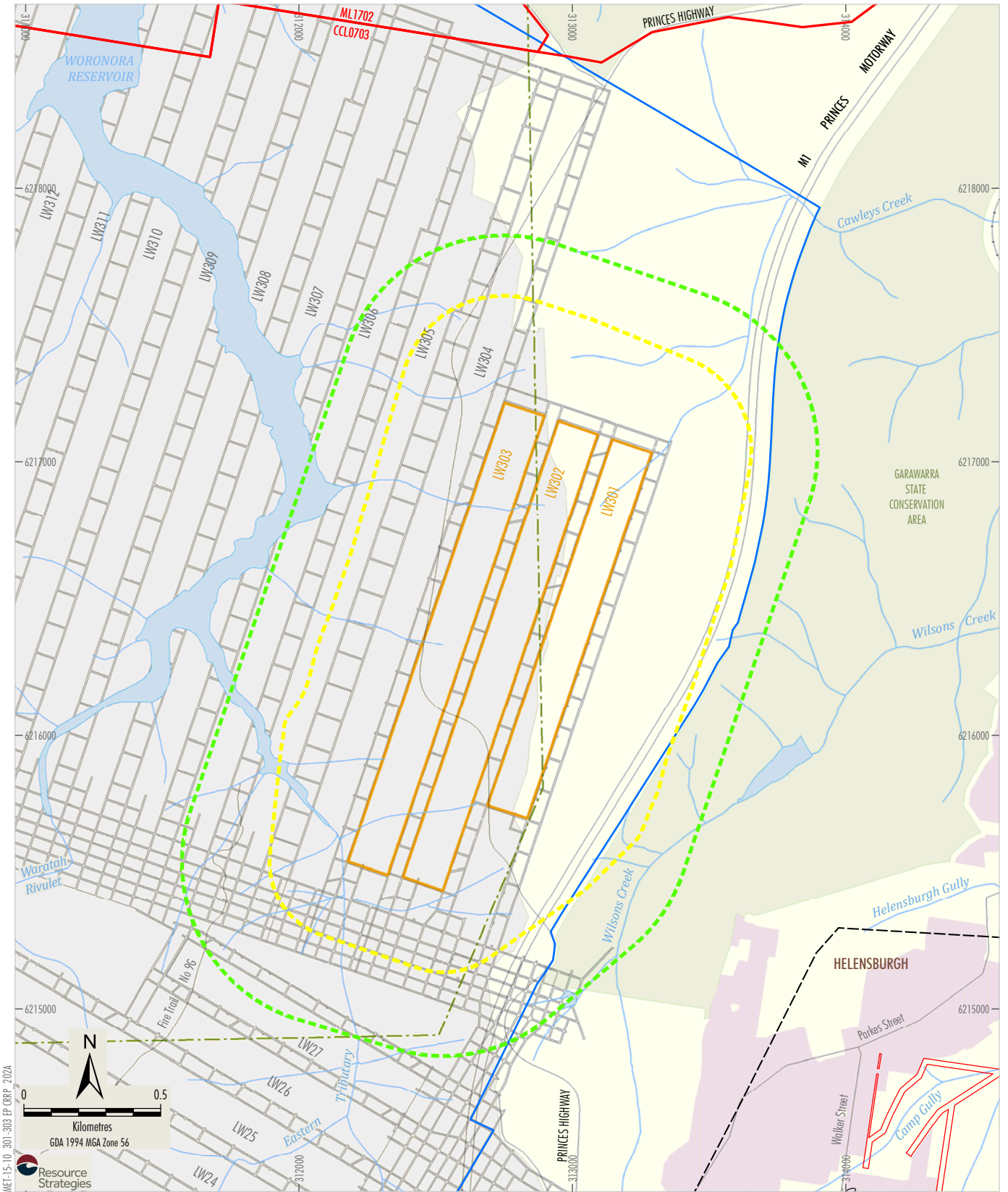
- LEGEND**
- Mining Lease Boundary
 - Woronora Special Area
 - Railway
 - Project Underground Mining Area
 - Longwalls 20-27 and 301-317
 - Longwalls 301 - 303 Secondary Extraction
 - 35° Angle of Draw and/or Predicted
 - 20 mm Subsidence Contour
 - 600 m from Secondary Extraction of Longwalls 301-303
 - Woronora Notification Area
 - Existing Underground Access Drive (Main Drift)

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2016); MSEC (2016)



METROPOLITAN COAL
 Project Longwalls 20 - 27 and
 Longwalls 301 - 317 Layout

Figure 1



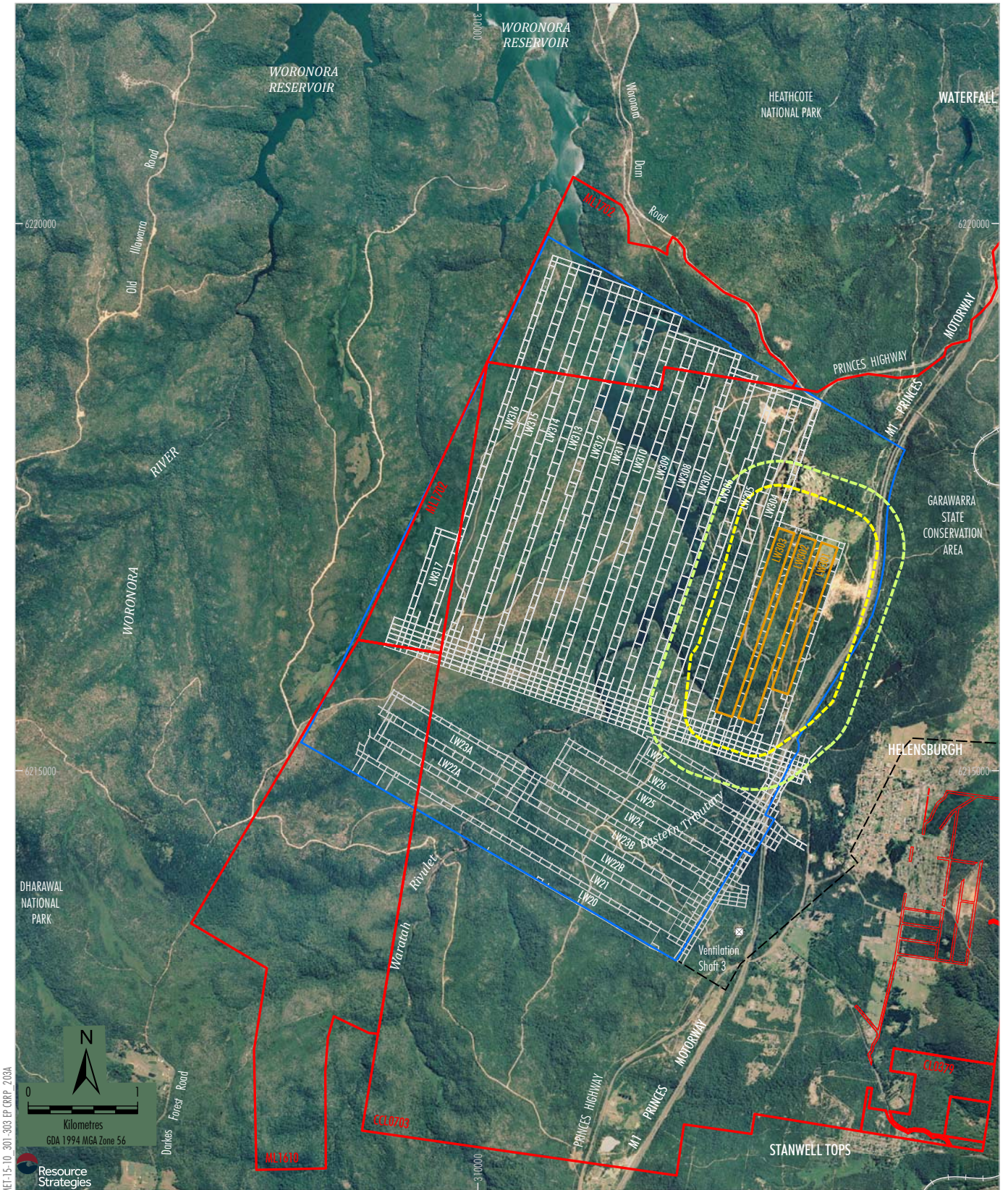
MEF-15-10-301-303 EP CRPP 202A

- LEGEND**
- Mining Lease Boundary
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Longwalls 20-27 and 301-317
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Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2016); MSEC (2016)


METROPOLITAN COAL
 Longwalls 301 - 303 Layout

Figure 2



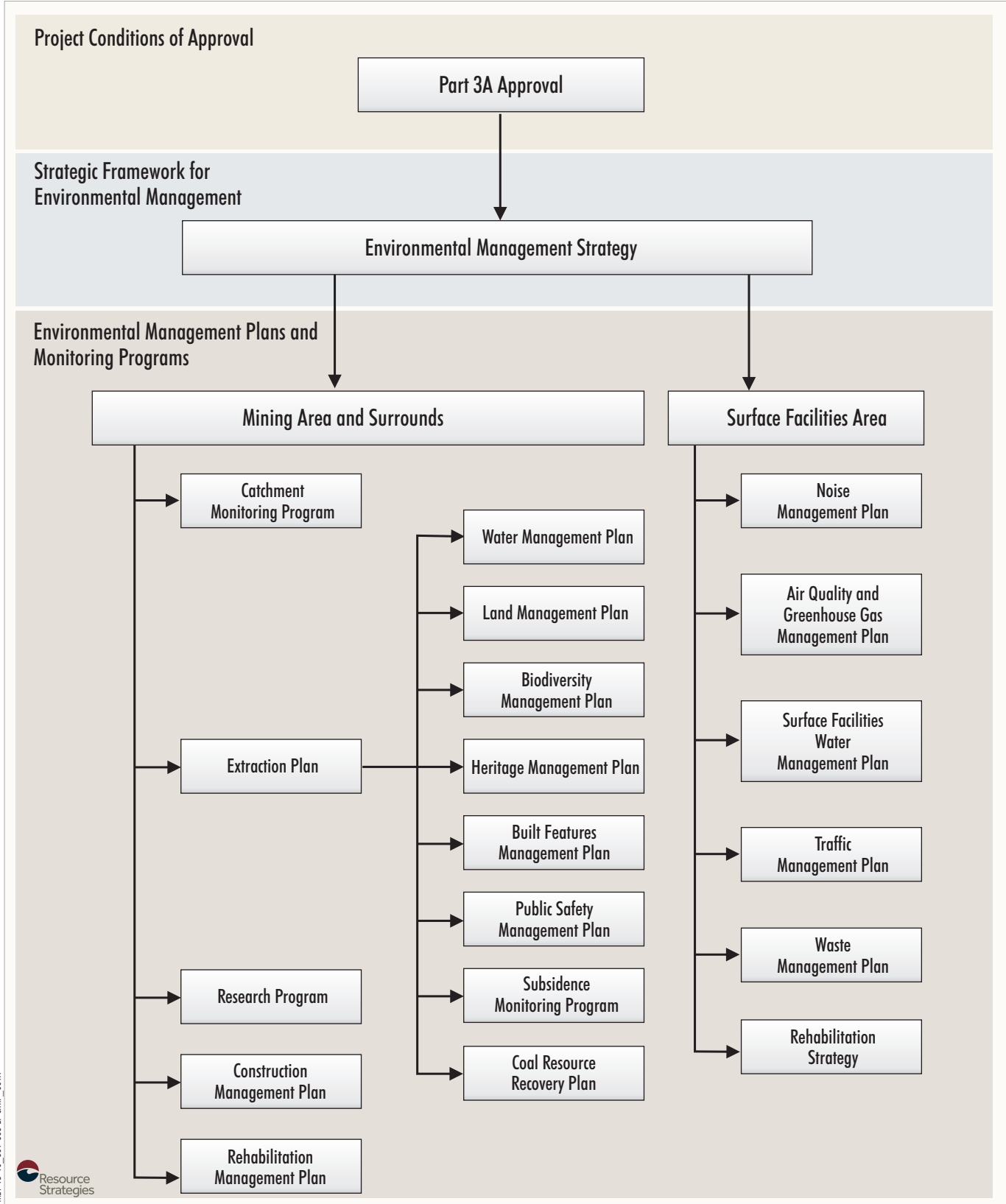
- LEGEND**
- Mining Lease Boundary
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Longwalls 20-27 and 301-317
 - Longwalls 301 - 303 Secondary Extraction
 - 35° Angle of Draw and/or Predicted
20 mm Subsidence Contour
 - 600 m from Secondary Extraction of
Longwalls 301-303
 - Existing Underground Access Drive (Main Drift)

Source: Land and Property Information (2015); Date of Aerial Photography 1998;
Department of Industry (2015); Metropolitan Coal (2016); MSEC (2016)

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ENERGY

METROPOLITAN COAL
Project Longwalls 20 - 27 and
Longwalls 301 - 317 Layout -
Aerial Photograph

Figure 3



ME1-15-10-301-303 EP GRIP_001A



METROPOLITAN COAL
Environmental Management
Structure

Figure 4

The CRRP will also be reviewed within three months of approval of any Project modification and if necessary, revised to the satisfaction of the DP&E.

The revision status of this CRRP is indicated on the title page of each copy. The distribution register for controlled copies of the CRRP is described in Section 2.1.

Revisions to any documents listed within this CRRP will not necessarily constitute a revision of this document.

2.1 DISTRIBUTION REGISTER

In accordance with Condition 10, Schedule 7 of the Project Approval 'Access to Information', Metropolitan Coal will make the CRRP publicly available on the Peabody website. A hard copy of the CRRP will also be maintained at the Metropolitan Coal site.

Metropolitan Coal recognises that various regulators have different distribution requirements, both in relation to whom documents should be sent and in what format. An Environmental Management Plan and Monitoring Program Distribution Register has been established in consultation with the relevant agencies and infrastructure owners that indicates:

- to whom the Metropolitan Coal plans and programs, such as the CRRP, will be distributed;
- the format (i.e. electronic or hard copy) of distribution; and
- the format of revision notification.

Metropolitan Coal will make the Distribution Register publicly available on the Peabody website.

Metropolitan Coal will be responsible for maintaining the Distribution Register and for ensuring that the notification of revisions is sent by email or post as appropriate.

In addition, Metropolitan Coal employees with local computer network access will be able to view the controlled electronic version of this CRRP on the Metropolitan Coal local area network. Metropolitan Coal will not be responsible for maintaining uncontrolled copies beyond ensuring the most recent version is maintained on Metropolitan Coal's computer system and the Peabody website.

3 MINING GEOMETRY

During the NSW Government's assessment phase of the Metropolitan Coal Project Environmental Assessment (Project EA) (Helensburgh Coal Pty Ltd [HCPL], 2008), and in recognition of concerns raised by key stakeholders during the formal Planning Assessment Commission (PAC) assessment process, Metropolitan Coal (previously HCPL) considered it appropriate to reduce the proposed extent of the original Project longwall mining area (i.e. Longwalls 20-44).

Metropolitan Coal was granted Project Approval (08_0149) by the Minister for Planning on the 22 June 2009. The Project Approval included a layout for Longwalls 301 to 317 referred to as the Preferred Project Layout (as described in the Preferred Project Report [HCPL, 2009]). Longwalls 302 and 303 based on the Preferred Project Layout comprised 163 metres (m) panel widths (void) with 45 m pillars (solid) beyond 500 m from the Woronora Reservoir, and 138 m panel widths (void) with 70 m pillars (solid) within 500 m of the Woronora Reservoir.

Metropolitan Coal – Coal Resource Recovery Plan		
Revision No. CRRP-R01-A		Page 6
Document ID: Coal Resource Recovery Plan		

Following further mine planning investigations, Metropolitan Coal identified that significant operational efficiencies and consequently a significant economic benefit would be achieved by rotating the first workings of Longwalls 301-317 to be square with the 300 Mains (a rotation of approximately six degrees). The Secretary of the DP&E approved the revised first workings in accordance with Condition 5, Schedule 3 of the Project Approval in April 2015.

In May 2016, Metropolitan Coal requested the approval of the Secretary of the DP&E to further amend the first workings layout for Longwalls 301-303. The proposed changes to the first workings layout for Longwalls 301-303 were as follows:

- Longwall 301 – reduce the panel void length from 1,680 m to 1,428 m, with no change to the tailgate pillar dimensions.
- Longwall 302 – reduce the panel void length from 2,637 m to 1,954 m, with a reduction in the tailgate pillar width by 25 m for approximately 608 m of the panel length.
- Longwall 303 – reduce the panel void length from 2,760 m to 2,122 m, with a reduction in the tailgate pillar width by 25 m for approximately 728 m of the panel length.

The commencing (i.e. northern) ends of Longwalls 301 to 303 were proposed to be shortened based on geological considerations. The finishing end of Longwall 301 was determined in consultation with the Roads and Maritime Services based on the presence of Bridge 2 (M1 Princes Motorway), which is located approximately 330 m to the south-east of the end of Longwall 301 and which is sensitive to small differential movements. The changes to the first workings layout for Longwalls 301-303 described above were approved by the Secretary of the DP&E in June 2016.

During the preparation of the Metropolitan Coal Longwalls 301-303 Extraction Plan, Metropolitan Coal further shortened the commencing ends of Longwalls 302 and 303 to reduce subsidence impacts to the Garrawarra Centre Complex, such that they have the same alignment with the commencing end of Longwall 301. The panel void length of Longwall 302 was reduced from 1,954 m to 1,775 m, and the panel void length of Longwall 303 was reduced from 2,122 m to 1,788 m.

The proposed layout of Longwalls 301-303 is shown on Plan 1 in Attachment 1. Longwall extraction will occur from north to south. A summary of the longwall dimensions for Longwalls 301-303 is provided in Table 1. The longwall layout includes 163 m panel widths (void) with 45 m pillars (solid).

Table 1
Summary of Longwall Dimensions for Longwalls 301-303

Longwall	Longwall Length (m)	Total Void Width (m)	Tailgate Chain Pillar Width (m)
LW301	1,428	163	0
LW302	1,775	163	45
LW303	1,788	163	45

m = metres.

Plan 1 in Attachment 1 shows existing Metropolitan Coal longwalls located within 500 m of Longwalls 301-303, as well as future longwalls (i.e. Longwall 304 on). Figure 1 also shows previous mining areas at Metropolitan Coal.

Longwalls 301-303 and the area of land within 600 m of Longwalls 301-303 secondary extraction are shown on Figures 1 to 3. Plan 2 in Attachment 1 shows the natural and man-made surface features proximal to Longwalls 301-303.

3.1 DEPTH OF COVER

The surface level contours and depth of cover contours to the Bulli Seam are shown on Plan 3 in Attachment 1. The depth of cover within the 35 degree (°) angle of draw and/or 20 mm subsidence contour varies between a minimum of 395 m (in the base of the Eastern Tributary) and a maximum of 555 m at the northern end of Longwall 303.

3.2 BULLI SEAM GEOMETRY

The seam floor within the 35° angle of draw and/or 20 mm subsidence contour area generally dips from the south-east to the north-west. The seam thickness within the Longwalls 301-303 goaf areas varies between a minimum of 2.7 m in the west and a maximum of 2.9 m in the south-east. The proposed longwalls will extract the full height of the seam, with localised extraction up to 3.2 m around development headings. The seam floor contours and seam thickness contours are shown on Plan 3 in Attachment 1.

3.3 GEOLOGICAL DETAILS

Metropolitan Coal is located within the Southern Coalfield, within the southern part of the Sydney Basin, which is infilled with sedimentary rocks of Permian age (<270 million years ago) and of Triassic age (<225 million years ago) (HCPL, 2008).

Three formally named coal seams of the Illawarra Coal Measures are present in the Southern Coalfield, namely the Bulli, Balgownie and Wongawilli Seams (HCPL, 2008).

Immediately overlying the Bulli Coal unit of the Illawarra Coal Measures are sandstones and claystones of the Narrabeen Group. The Narrabeen Group contains the Newport Formation (sometimes referred to as the Gosford Formation), the Bald Hill Claystone (also referred to as Chocolate Shale), the Bulgo Sandstone, the Stanwell Park Claystone/Shale, the Scarborough Sandstone, the Wombarra Shale and the Coal Cliff Sandstone.

At the top of the sequence in the area of interest is the Hawkesbury Sandstone (HCPL, 2008).

The major geological features at seam level are shown on Plan 3 in Attachment 1. The nearest longwall is located approximately 500 m from the Metropolitan Fault. The Metropolitan Fault has a north-west to south-east strike and dips to the north-east. The Powell Fault has been projected into the 35° angle of draw and/or 20 mm subsidence contour area, but not above Longwalls 301-303. Most of the faults have been identified at seam level.

The sedimentary stratigraphic section at Borehole S225 is shown on Plan 6 in Attachment 1. The location of the borehole is also shown on Plan 6 in Attachment 1. The sandstone and shale units vary in thickness from a few metres to over 160 metres. The major sandstone units are interbedded with other rocks and, though shales and claystones are quite extensive in places, the sandstone predominates.

Metropolitan Coal – Coal Resource Recovery Plan		
Revision No. CRRP-R01-A		Page 8
Document ID: Coal Resource Recovery Plan		

4 RESOURCE RECOVERY

4.1 MINING METHOD

Longwalls 301-303 will be extracted using retreating longwall mining methods for secondary extraction of panels with a 163 m void width. The longwall panels will be formed by driving two sets of gate roads (the tailgate and maingate roads). Each gate road requires two roadways (headings) to be driven parallel to each other. The two roadways will be used for ventilation purposes, with one of the roadways utilised as a transport road and the other roadway used to convey the coal that will be mined back to the main conveyors. Construction of development main headings and gateroads are mined using continuous miners.

The dimensions of the headings will be approximately 5.2 m wide and 3.2 m in height. The headings are connected approximately every 120 m by driving a cut-through from one heading to another which forms pillars of coal along the length of the gate road. The tailgate and maingate roads are separated by the 158 m wide longwall panel (measured between roadway centrelines). The maingate roads and tailgate roads are then linked together by driving an installation road and bleeder road at the top end of the longwall panels. ROM coal will be conveyed by the maingate conveyor to the main conveyor which will carry coal to the surface of the mine.

4.2 MINE PLAN

4.2.1 Justification

As described in Section 3.2, the seam thickness within the Longwalls 301-303 goaf areas varies from 2.7 m to 2.9 m. Longwalls 301-303 will extract the full height of the seam, with localised extraction up to 3.2 m around development headings. Using the proposed mining method, the recovery of run-of-mine (ROM) coal from the Bulli Seam in Longwalls 301-303 is estimated to be 61 percent. The total amount of ROM coal anticipated to be extracted is estimated to be approximately 3.345 million tonnes (Mt).

Subsequent to the Project Approval, the length of Longwalls 301-303 has been constrained by the Metropolitan Fault to the north-east, the Garrawarra Centre Complex to the north, and the presence of Bridge 2 (M1 Princes Motorway) to the south-east. Metropolitan Coal considers the layout of Longwalls 301-303 to provide the most efficient resource recovery given the constraints.

4.2.2 Mining Schedule

Metropolitan Coal operates seven days a week, 24 hours a day on a rotating shift basis. The extraction of Longwalls 1 to 26 is complete, with extraction of Longwall 27 underway.

The proposed sequence of mining for Longwalls 301-303 and anticipated start and completion dates are summarised in Table 2.

Table 2
Provisional Extraction Schedule

Longwall	Estimated Start Date	Estimated Duration	Estimated Completion Date
Longwall 301	April 2017	6 months	September 2017
Longwall 302	November 2017	7 months	May 2018
Longwall 303	June 2018	7 months	December 2018

Metropolitan Coal – Coal Resource Recovery Plan		
Revision No. CRRP-R01-A		Page 9
Document ID: Coal Resource Recovery Plan		

4.2.3 Future Mine Plans

Longwalls 301-303 form the first block of longwalls within the 300 longwall series. The layout for Longwalls 301-303 (i.e. 163 m panel widths [void] and 45 m pillars [solid]) will be trialled to build on the experience and dataset obtained from Longwalls 20-27. The outcomes of the trial will be used to inform the potential for a similar mine layout to be applied to the next Extraction Plan (i.e. Longwall 304 onwards). The current layout of Longwalls 304-317 is shown on Figures 1 and 3, and on Plan 1 in Attachment 1.

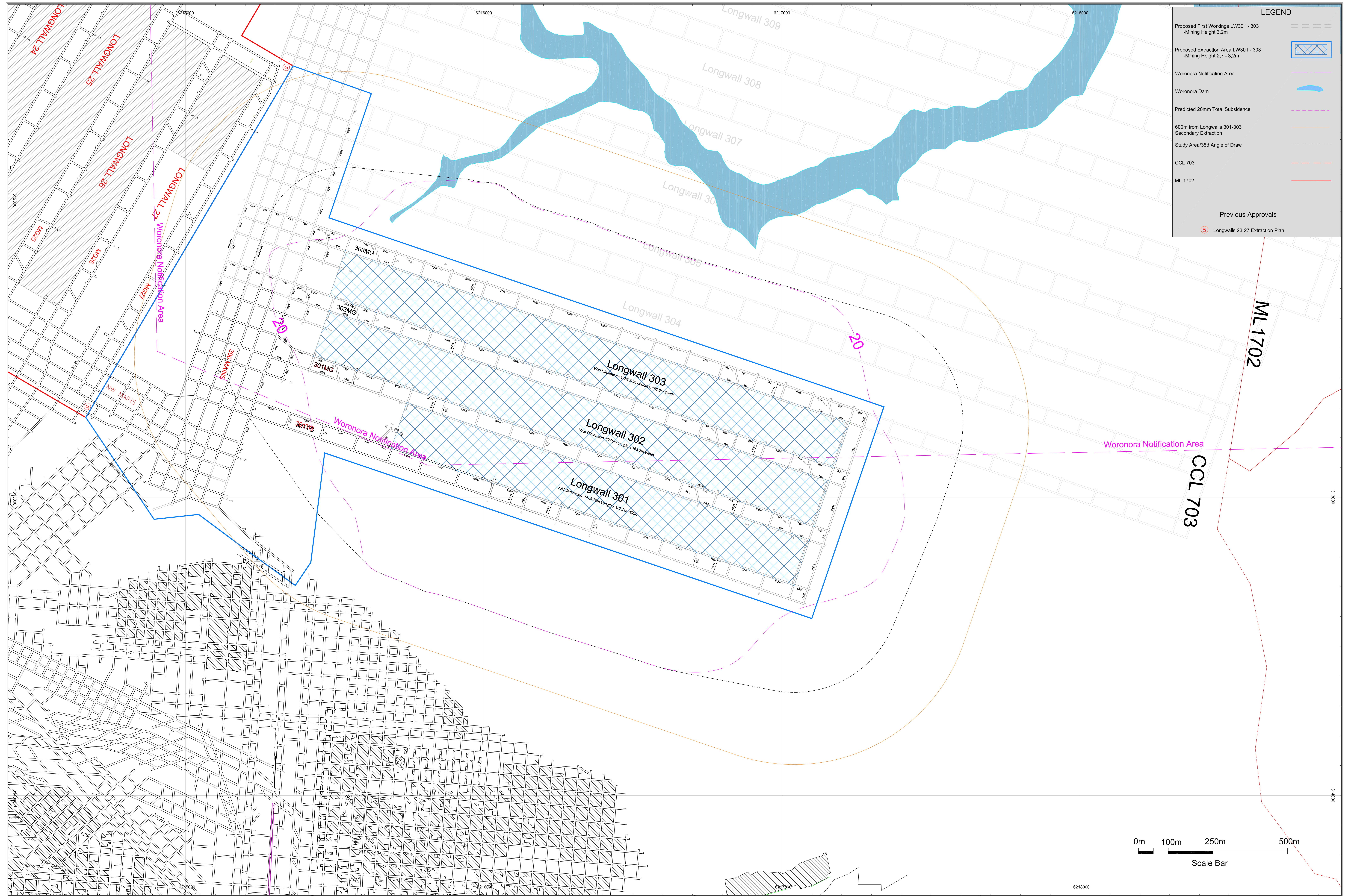
4.2.4 Effects on Future Resource Recovery

The Bulli Seam is the upper seam of the Illawarra Coal Measures of the Southern Coalfields. The interburden thickness between the base of the Bulli Seam and the top of the seam below (Balgownie Seam) varies between 7.9 m and 13.9 m. The planned mining of Longwalls 301-303 is not expected to impede on any future mining of the lower seams. Currently there are no plans for mining of these seams within the Longwalls 301-303 mining area.

ATTACHMENT 1

PLANS 1, 2, 3, 5 AND 6 IN ACCORDANCE WITH THE
DEPARTMENT OF PLANNING AND ENVIRONMENT AND
DIVISION OF RESOURCES AND ENERGY (2015)
GUIDELINES FOR THE PREPARATION OF EXTRACTION PLANS

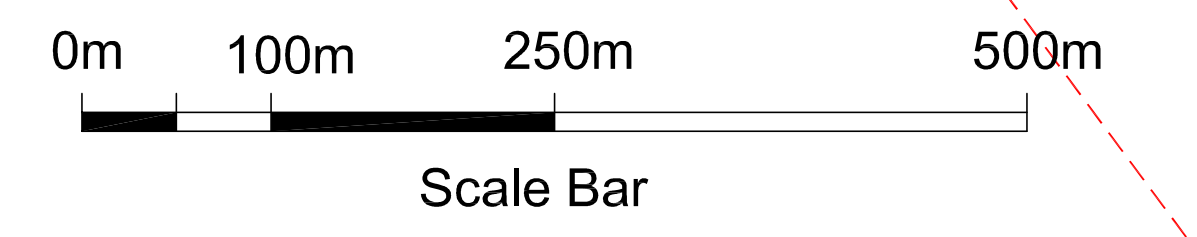
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Document ID: Coal Resource Recovery Plan		



LEGEND

- Proposed First Workings LW301 - 303 - Mining Height 3.2m
- Proposed Extraction Area LW301 - 303 - Mining Height 2.7 - 3.2m
- Woronora Notification Area
- Woronora Dam
- Predicted 20mm Total Subsidence
- 600m from Longwalls 301-303 Secondary Extraction
- Study Area/35d Angle of Draw
- CCL 703
- ML 1702

Previous Approvals
 ⑤ Longwalls 23-27 Extraction Plan



MCA
 Mining Engineering Manager Date
 Registered Mine Surveyor Date

CLIENT/PROJECT
Peabody ENERGY
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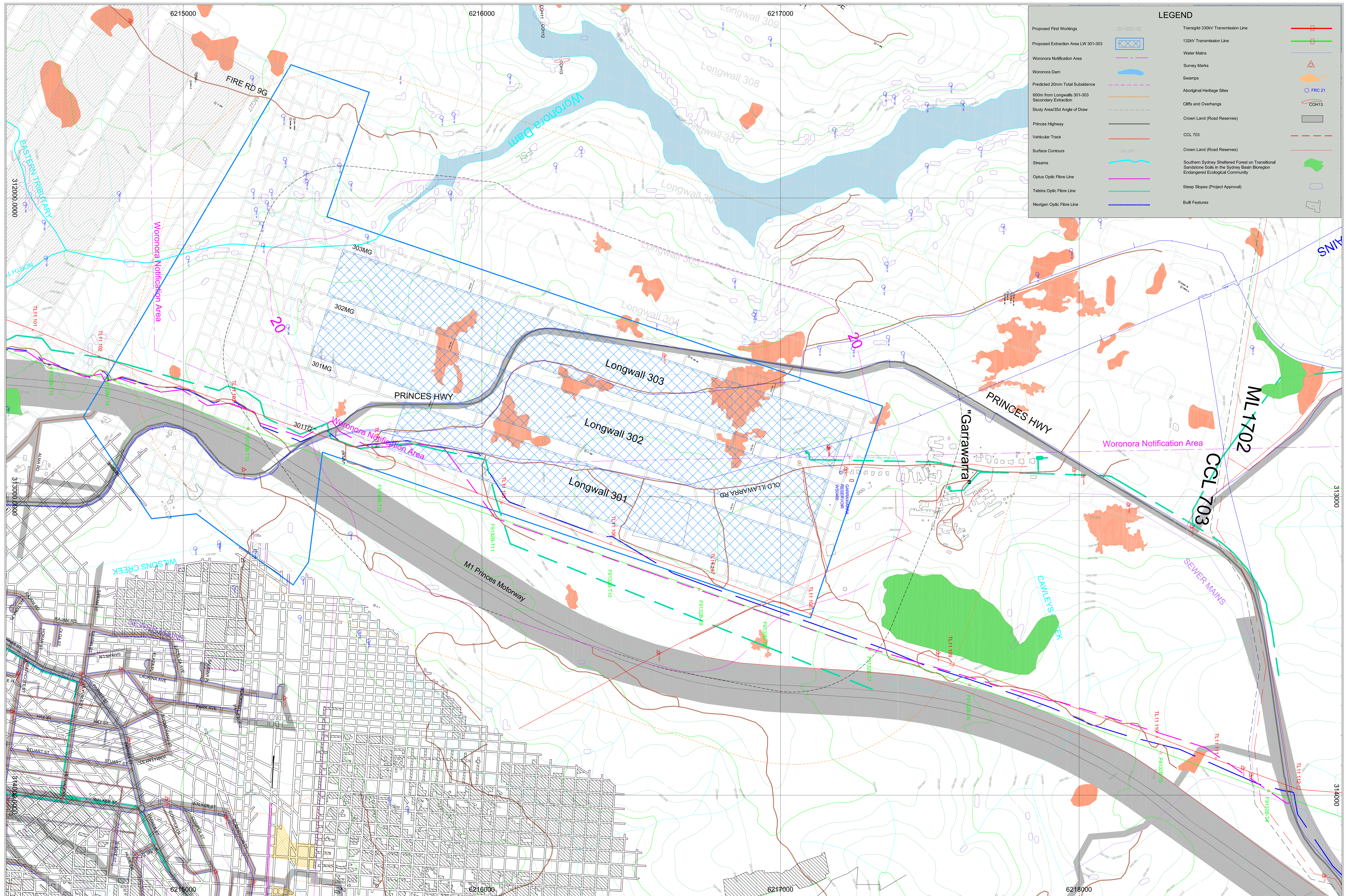
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 AUTHORISED

DRAWING No **M160718 PA Rev3**

Metropolitan Mining Plan MGA PLANS/Extractor Plans LW301-303 June 2011/2016 Adv Extraction Plans 1/09/Part 1 - Approved Extraction LW301-303 Plan Job 2016/04

DATE	DRAWN	SHEET	OF	SCALE
14/11/2016	Survey Dept.	1	1	1:4000

METROPOLITAN MINE
 Longwalls 301-303 Extraction Plan: Plan 1
 Existing, Proposed and Future Workings



LEGEND	
Proposed First Workings	Transgrid 330kV Transmission Line
Proposed Extraction Area LW 301-303	132kV Transmission Line
Woronora Notification Area	Water Mains
Woronora Dam	Survey Marks
Predicted 20mm Total Subsidence	Swamps
600m from Longwalls 301-303 Secondary Extraction	Aboriginal Heritage Sites
Study Area/35d Angle of Draw	Cliffs and Overhangs
Princes Highway	Crown Land (Road Reserves)
Vehicular Track	CCL 703
Surface Contours	Crown Land (Road Reserves)
Streams	Southern Sydney Sheltered Forest on Transitional Sandstone Soils in the Sydney Basin Bioregion Endangered Ecological Community
Optus Optic Fibre Line	Sleep Slopes (Project Approval)
Telstra Optic Fibre Line	Built Features
Nextgen Optic Fibre Line	

Mining Engineering Manager Date

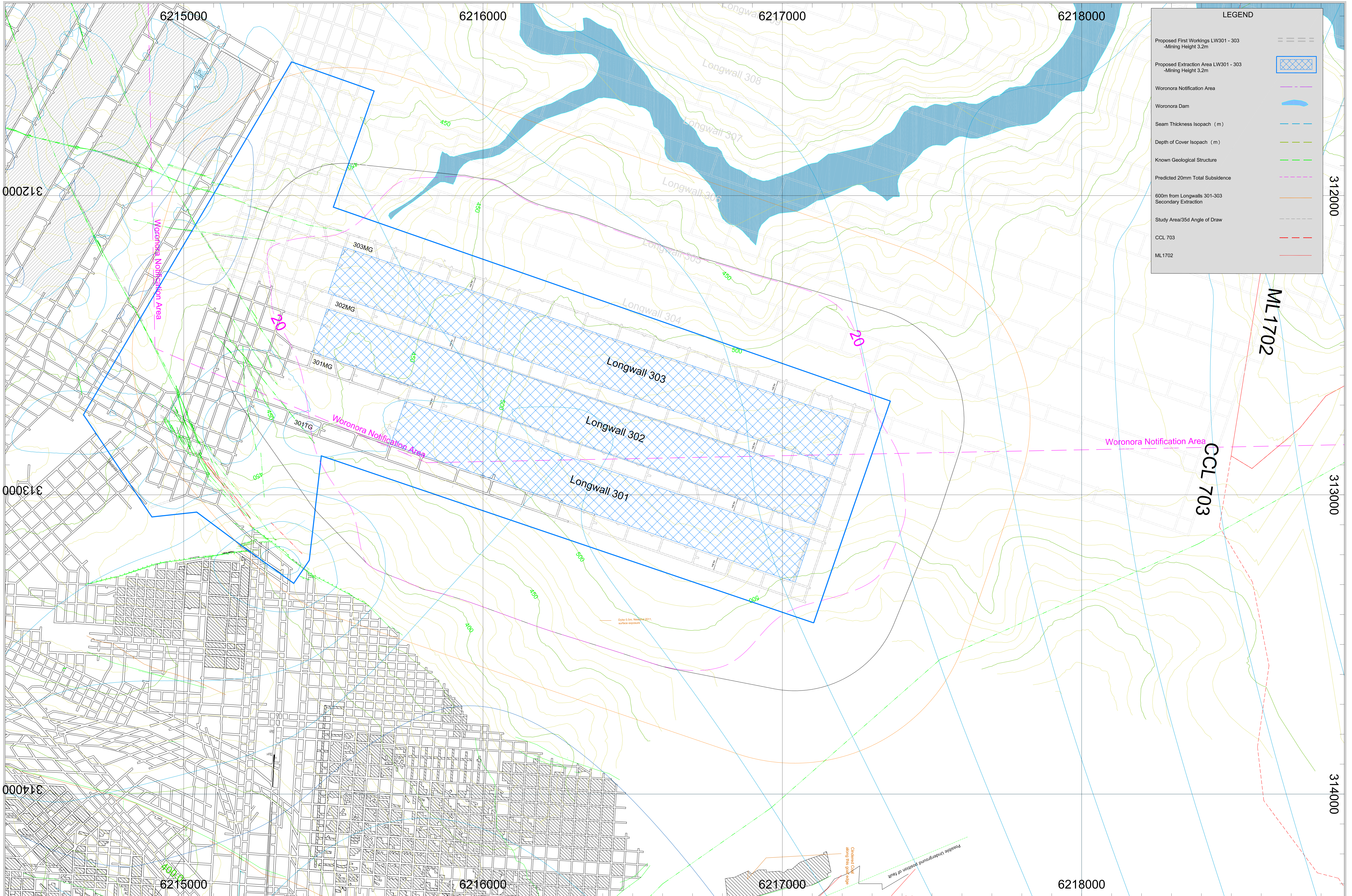
CLIENT/PROJECT
Peabody ENERGY
 METROPOLITAN COAL PTY LTD
 METROPOLITAN MINE
 PO BOX 402
 HELENSBURGH 2508

SURV'D/DESC'D
 CHECKED
 AUTHORISED

DRAWING No **M160718 P2 Rev3**

DATE	DRAWN	SHEET	OF	SCALE
14/11/2016	Survey Dept.	1	1	1:4000

METROPOLITAN MINE
 Longwalls 301-303 Extraction Plan:
 Plan 2 - Longwalls 301-303 Surface Features



LEGEND

- Proposed First Workings LW301 - 303
-Mining Height 3.2m [Symbol: Dashed line]
- Proposed Extraction Area LW301 - 303
-Mining Height 3.2m [Symbol: Blue cross-hatch]
- Woronora Notification Area [Symbol: Pink dashed line]
- Woronora Dam [Symbol: Blue irregular shape]
- Seam Thickness Isopach (m) [Symbol: Blue dashed line]
- Depth of Cover Isopach (m) [Symbol: Green dashed line]
- Known Geological Structure [Symbol: Green dashed line]
- Predicted 20mm Total Subsidence [Symbol: Purple dashed line]
- 600m from Longwalls 301-303
Secondary Extraction [Symbol: Orange dashed line]
- Study Area/35d Angle of Draw [Symbol: Blue solid line]
- CCL 703 [Symbol: Red dashed line]
- ML1702 [Symbol: Red solid line]

Mining Engineering Manager Date

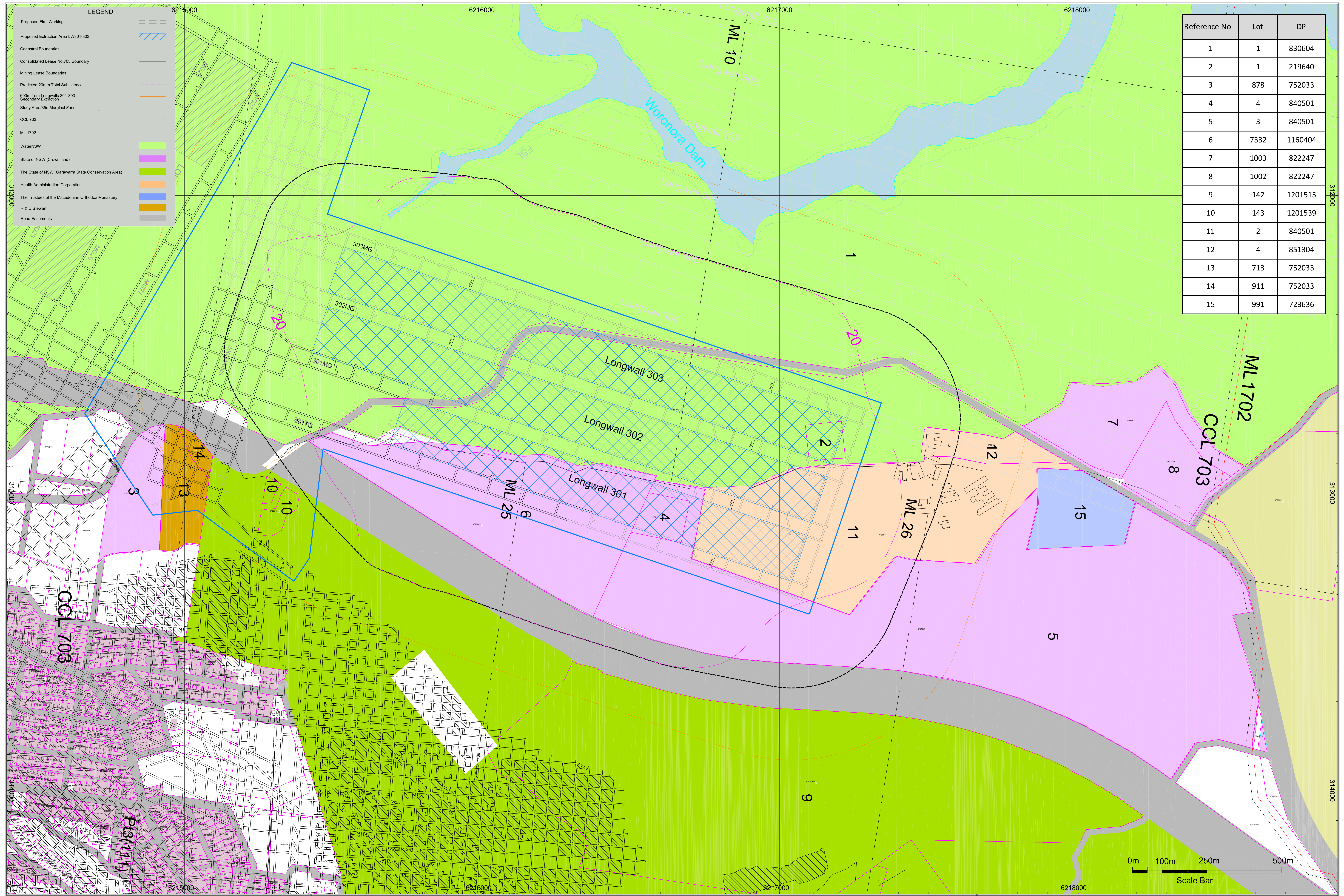
CLIENT/PROJECT **Peabody ENERGY** METROPOLITAN COAL PTY LTD
 METROPOLITAN MINE
 PO BOX 402
 HELENSBURGH 2508

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DRAWING No M160718 P3 Rev2

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14/11/2016	Survey Dept.	1	1	1:4000

METROPOLITAN MINE
 Longwalls 301-303 Extraction Plan: Plan 3
 Geological and Seam Data



Reference No	Lot	DP
1	1	830604
2	1	219640
3	878	752033
4	4	840501
5	3	840501
6	7332	1160404
7	1003	822247
8	1002	822247
9	142	1201515
10	143	1201539
11	2	840501
12	4	851304
13	713	752033
14	911	752033
15	991	723636

LEGEND

- Proposed First Workings
- Proposed Extraction Area LW301-303
- Cadastral Boundaries
- Consolidated Lease No.703 Boundary
- Mining Lease Boundaries
- Predicted 20mm Total Subsidence
- 600m from Longwalls 301-303 Secondary Extraction
- Study Area/35d Marginal Zone
- CCL 703
- ML 1702
- WaterNSW
- State of NSW (Crown land)
- The State of NSW (Garrawarra State Conservation Area)
- Health Administration Corporation
- The Trustees of the Macedonian Orthodox Monastery
- R & C Stewart
- Road Easements

Mining Engineering Manager Date

CLIENT/PROJECT
Peabody ENERGY
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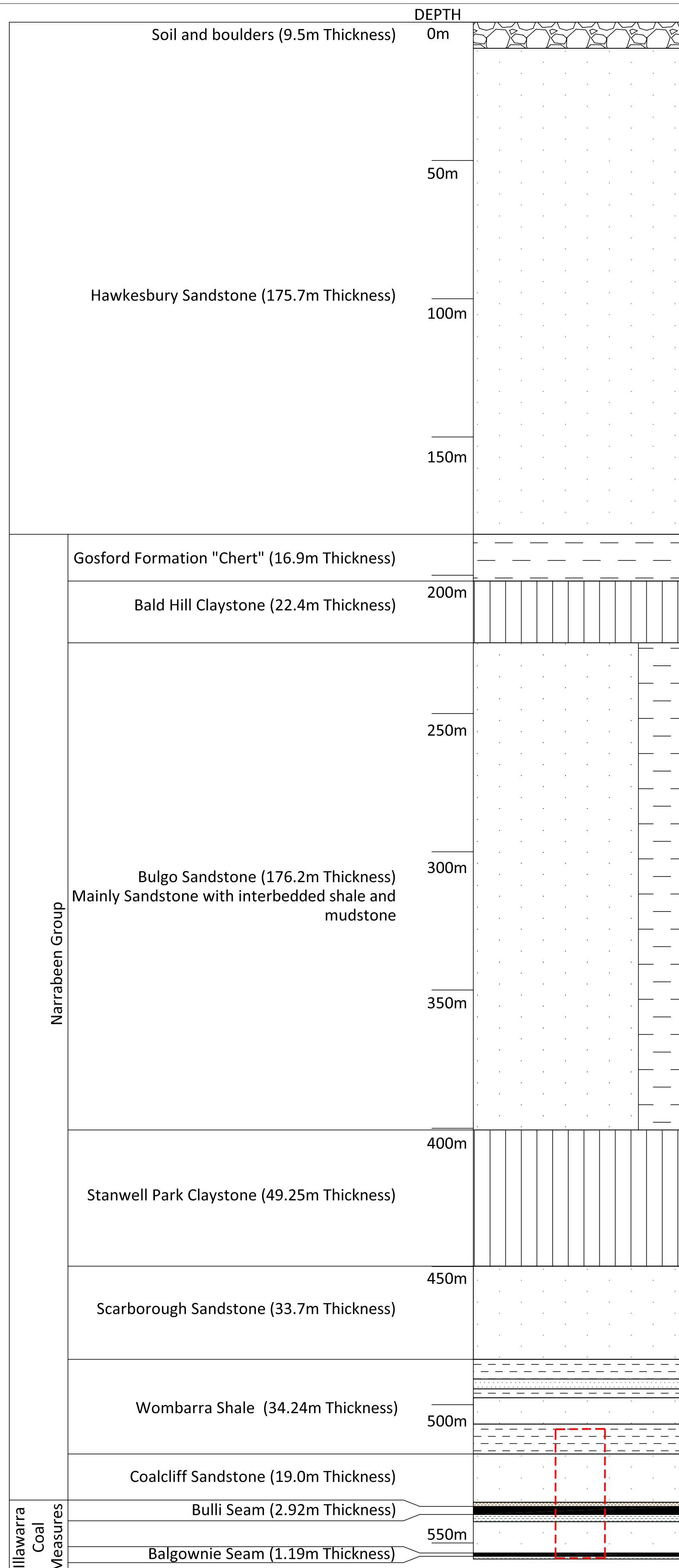
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DRAWING No **M160718 P5 Rev2**
 S:\Metropolitan Drawing File\MGA PLANS\Extraction Plans LW301-303 June 2011\2016 July Extraction Plans 1-5\Plan 5 - Land Ownership LW301-303.dwg

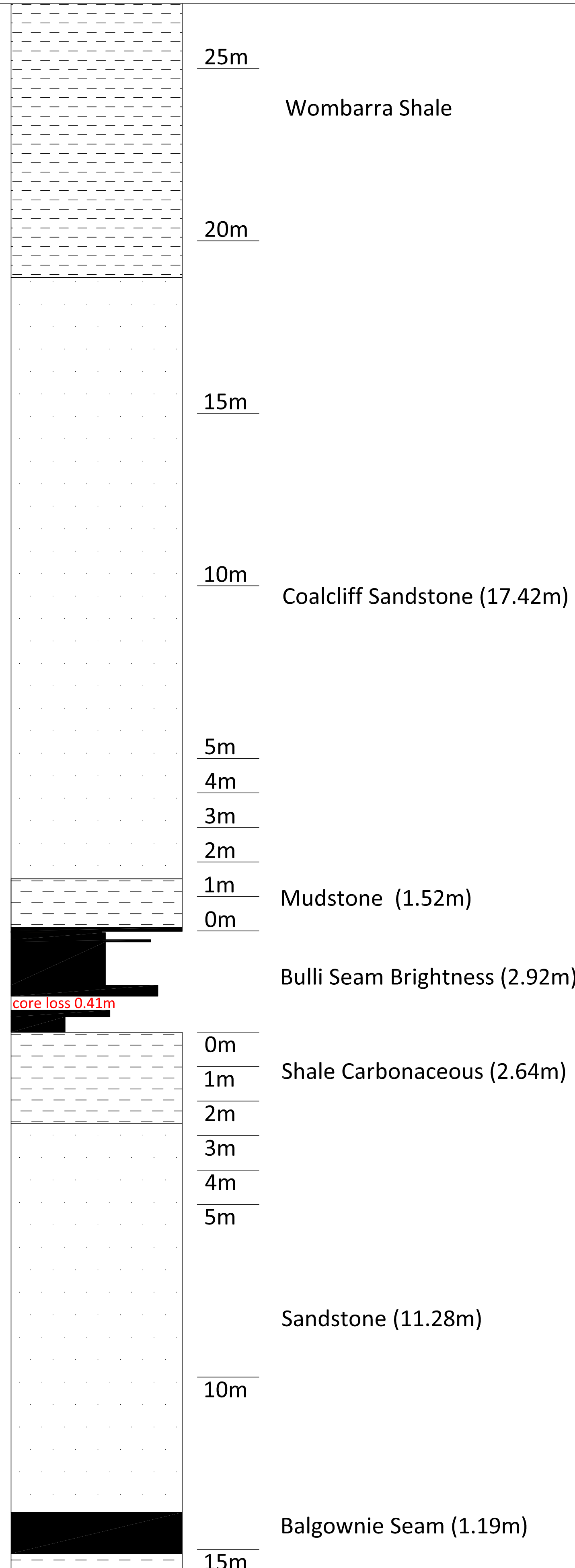
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14/11/2016	Survey Dept	1	1	1:4000

METROPOLITAN MINE
 Longwalls 301-303 Extraction Plan: Plan 5
 Longwalls 301-303 Mining Titles and Land Ownership

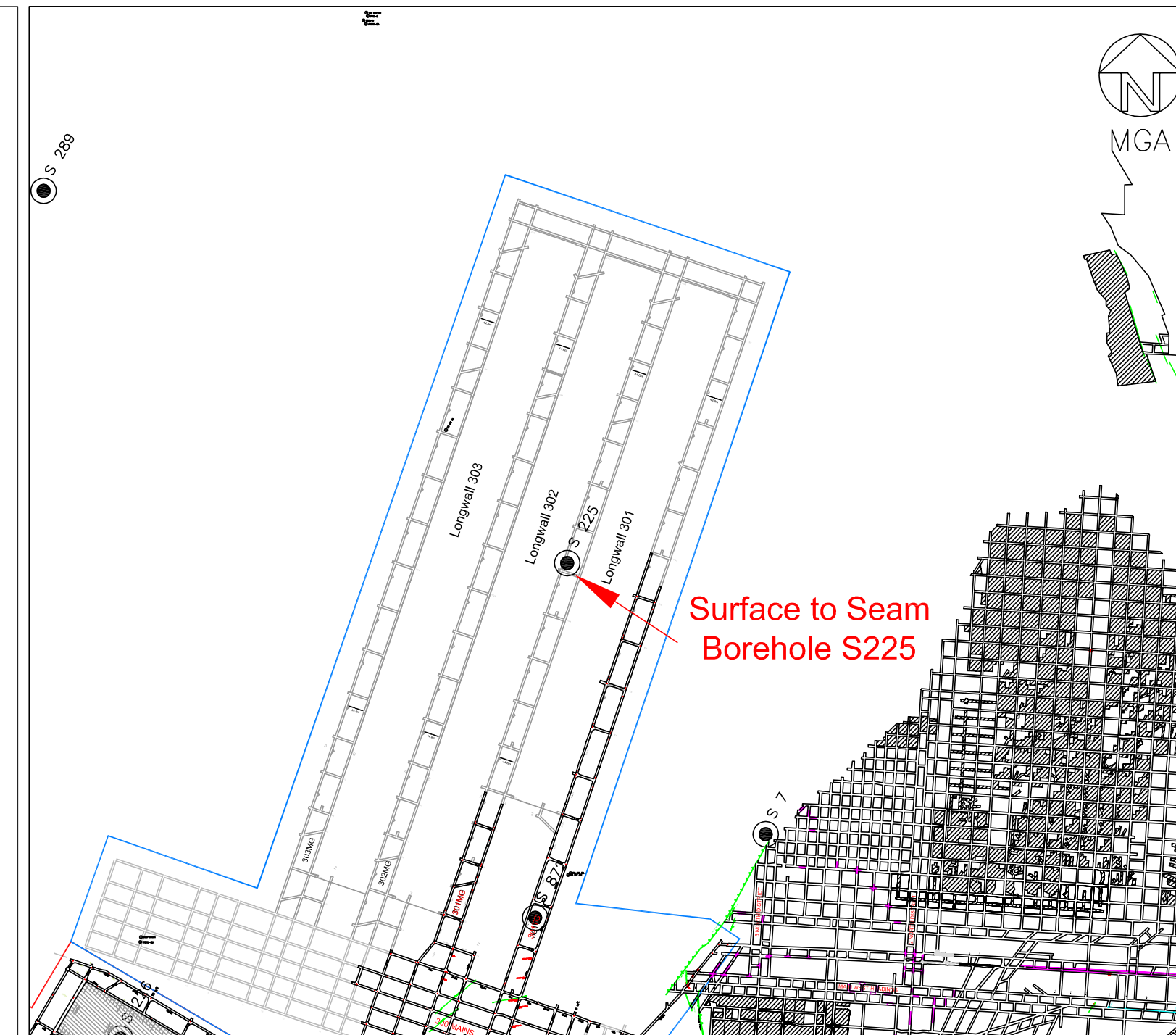
Vertical Log of Bore S225



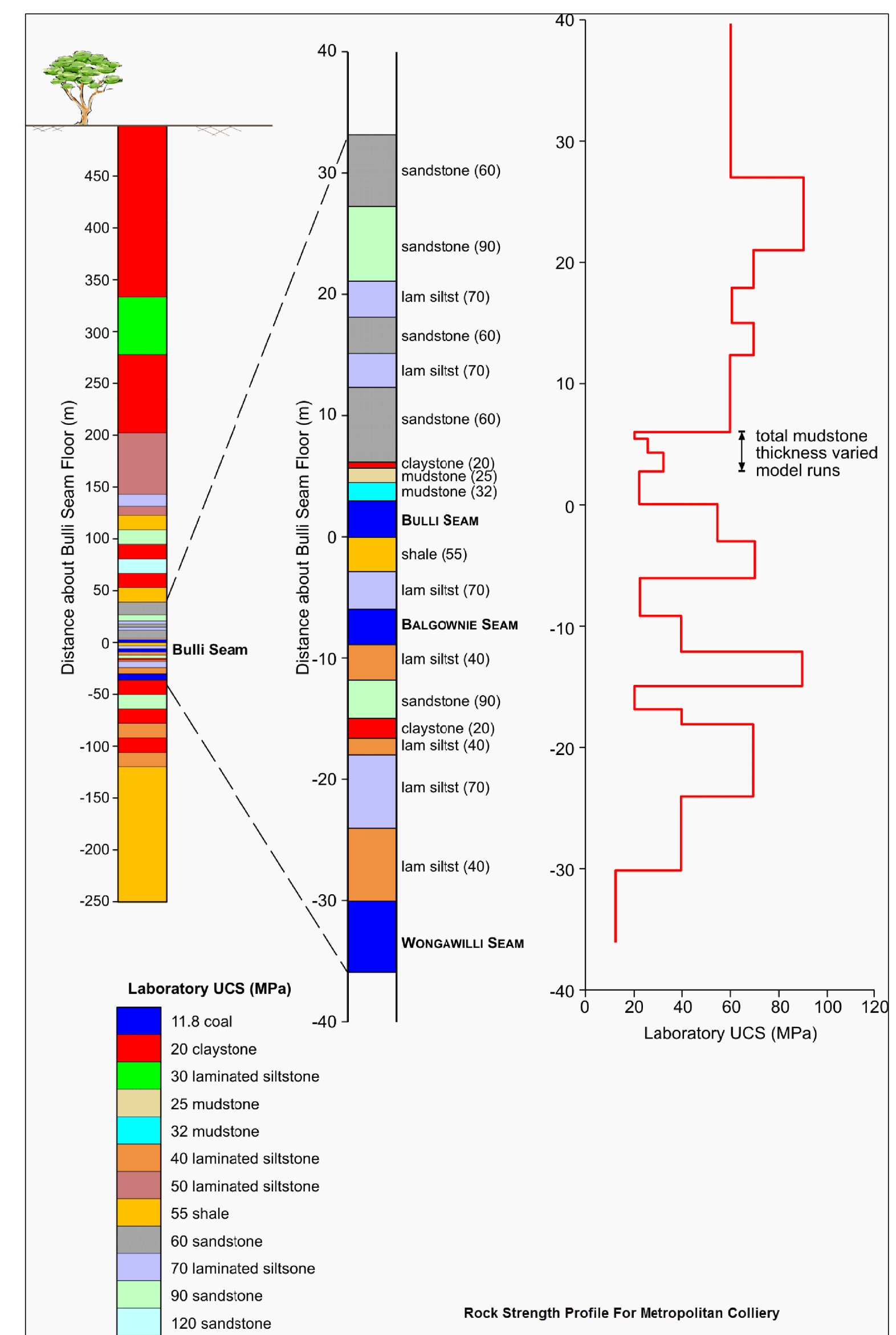
Inset of Vertical Log Bore S225



Location Plan

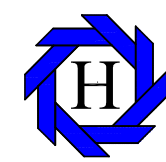


Geotechnical Log



Mining Engineering Manager Date

CLIENT/PROJECT



METROPOLITAN COAL PTY LTD
METROPOLITAN MINE

PO BOX 432
HELSBURGH 2508

DRAWING No M160718 P6 Rev4 date 31-10-16

DATE	DRAWN	SHEET	OF	SCALE
14/11/2016	S.Kornek	1	1	NTS

METROPOLITAN MINE

Longwalls 301-301 Extraction Plan

Plan 6 - Longwalls 301-303 Geological Section and Geotechnical Logs