

# METROPOLITAN COAL    LONGWALLS 301-303

## COAL RESOURCE RECOVERY PLAN





**METROPOLITAN COAL**

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### **LONGWALLS 301-303**

### **COAL RESOURCE RECOVERY PLAN**

#### **Revision Status Register**

<b>Section/Page/ Annexure</b>	<b>Revision Number</b>	<b>Amendment/Addition</b>	<b>Distribution</b>	<b>DRE Satisfaction/ DP&amp;E Approval Date</b>
All	CRRP-R01-A	Original	DP&E, DRE	11 May 2017*
All	CRRP-R01-B	Revised Longwalls 301-303 Extraction Plan	DP&E, DRG	-

\* The approval allows for the extraction of Longwalls 301 and 302 only.

**September 2018**

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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 (Longwalls 20-27 and Longwalls 301-317) and surface facilities at Metropolitan Coal (Figure 1). Longwalls 301, 302 and 303 (herein referred to as Longwalls 301-303) are situated to the north of completed Longwalls 20-27 and define the next mining sub-domain within the Project underground mining area (Figures 1 to 3). Longwalls 304 on will be subject to future Extraction Plans.

### 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.

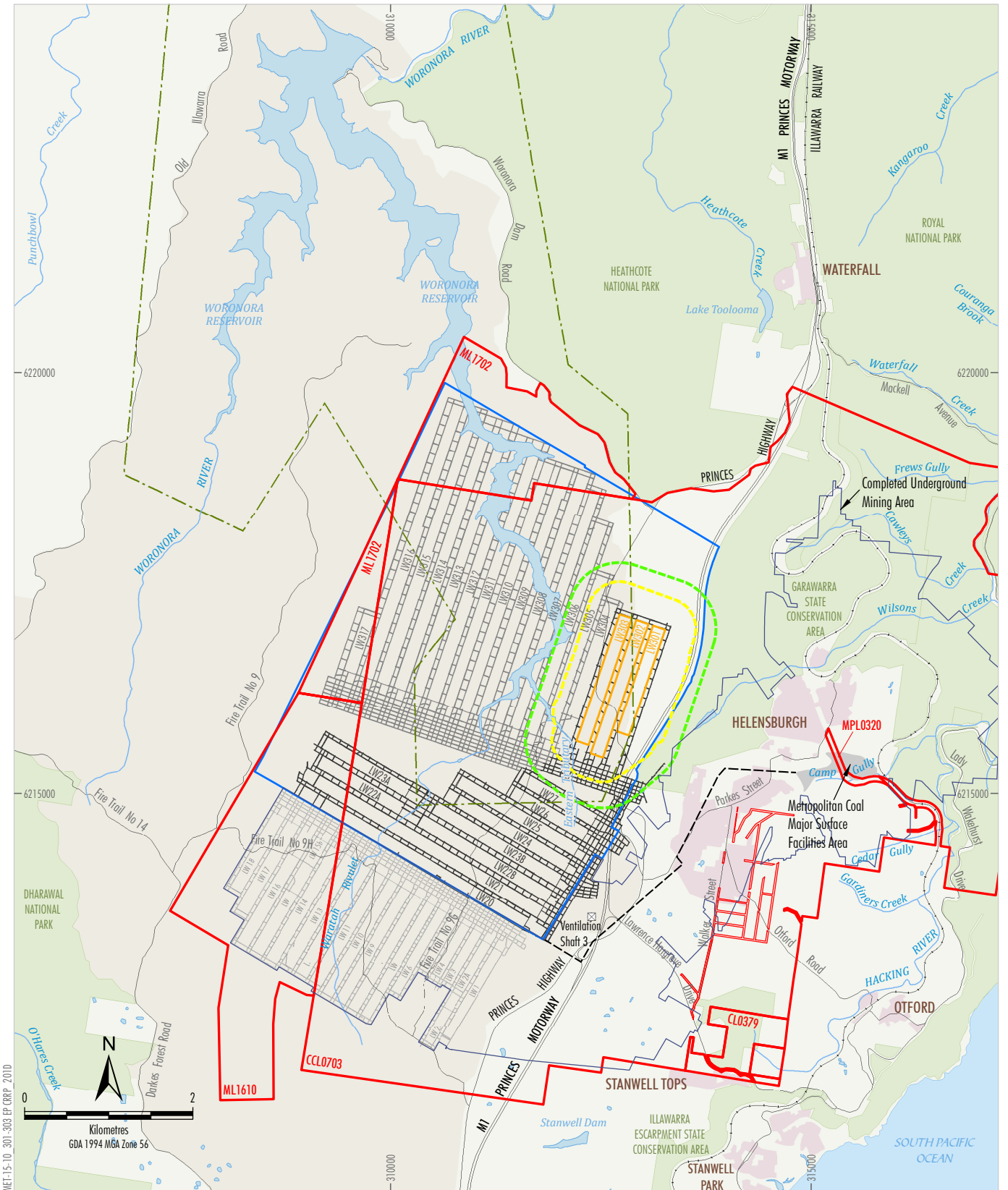
## 2 CRRP REVIEW AND UPDATE

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.

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MEF-15-10-301-303 EP CRPP 2010

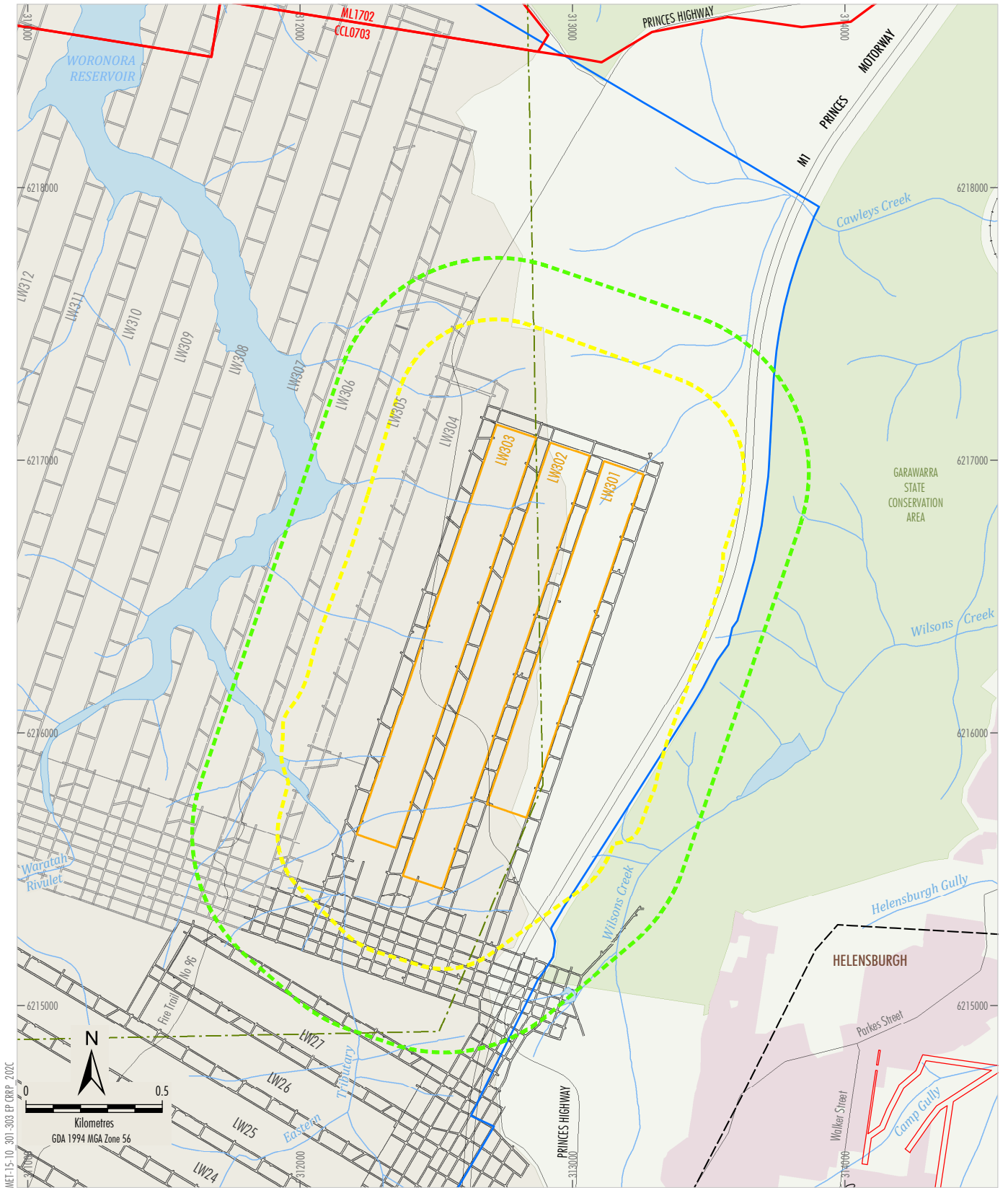
Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2018); MSEC (2018)

- 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)

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METROPOLITAN COAL  
Longwalls 301 - 303 and  
Project Underground Mining Area

**Figure 1**



**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
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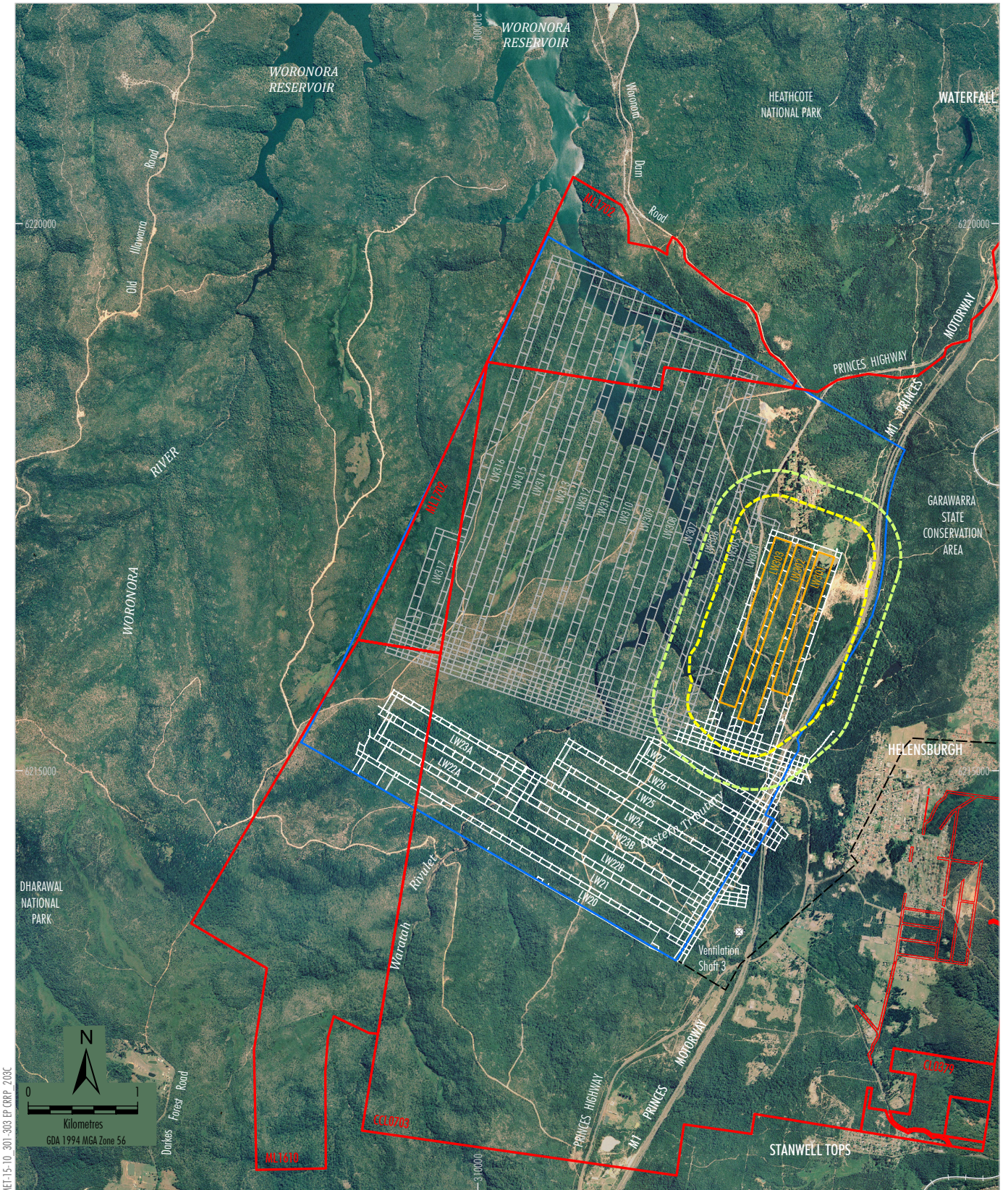
Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2018); MSEC (2018)

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Longwalls 301 - 303 Layout

**Figure 2**



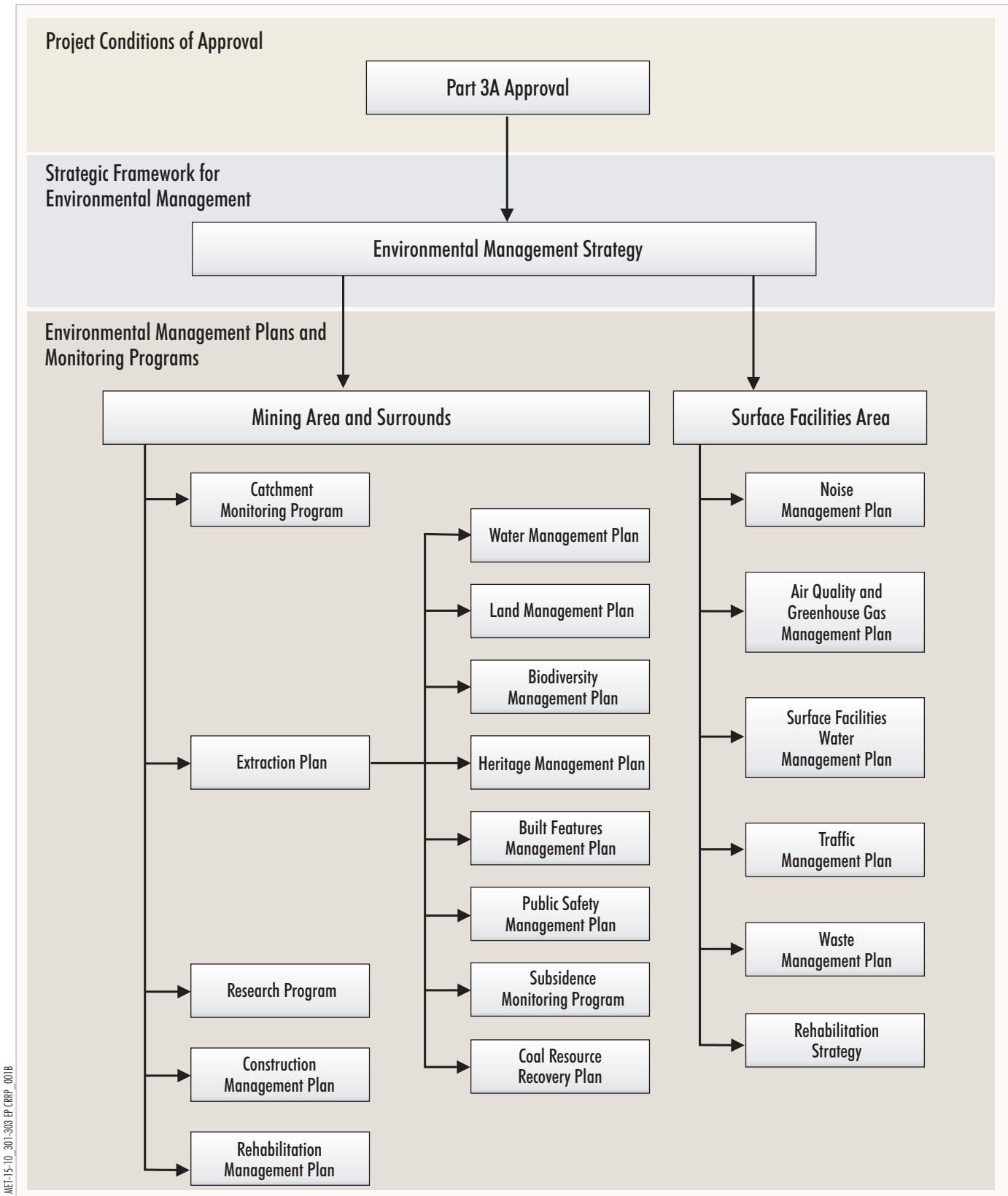
MET-15-10-301-303 EP CRPP 203C

Source: Land and Property Information (2015); Date of Aerial Photography 1998;  
Department of Industry (2015); Metropolitan Coal (2018); MSEC (2018)

- LEGEND**
- Mining Lease Boundary
  - 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
  - Existing Underground Access Drive (Main Drift)

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Longwalls 301 - 303 and  
Project Underground Mining Area  
Aerial Photograph

**Figure 3**



ME1-15-10\_301-303 EP CORR\_001B

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.

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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 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.

Further geological considerations with diminishing seam height below 2.5 m, combined with prohibitive carbon dioxide gas content at the northern end of the longwalls necessitated the reduction of Longwall 301 to 1,338 m, Longwall 302 to 1,684 m and Longwall 303 to 1,698 m and for environmental reasons the shortening of the finishing end of Longwall 303 by 98 m adjacent to the Eastern Tributary resulting in a Longwall 303 extraction length of 1,600 m.

The 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)	Reduction in Length (m)	Reduction % (from PPL)	Total Void Width (m)	Tailgate Chain Pillar Width (m)
LW301	1,338	-342	20%	163	0
LW302	1,684	-953	36%	163	45
LW303	1,600	-1,160	42%	163	45

PPL - Preferred Project Layout

Plan 1 in Attachment 1 shows existing Metropolitan Coal longwalls located within 500 m of Longwalls 301-303 (i.e. Longwalls 20-27), as well as future longwalls (i.e. from Longwall 304 on). Metropolitan Coal has submitted a first workings application to the DP&E for the layout of Longwalls 304-306. This layout is shown on Plan 1. 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. 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 590 m from the Metropolitan Fault. The Metropolitan Fault has a north-west to south-east strike and dips to the north-east.

Drilling in advance of mine development and roadway development has found no evidence of some geological features previously interpolated as possible faults in the Project EA (e.g. the Mini Sosie Fault, Fault A, Fault Y and Fault Z). Such features are therefore no longer included in Plan 3 in Attachment 1 of Appendix H.

Similarly, the nature and extent of some faults have been determined subsequent to preparation of the Project EA through roadway development and Metropolitan Coals annual drilling program.

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For example, the Long Hole Fault (identified on Plan 3 in Attachment 1 of Appendix H as F-0008) has been identified as a strike slip fault and the orientation is materially different to that shown in the Project EA. The Powell Fault, originally projected into the 35° angle of draw of Longwalls 301-303, has been found to be terminated by the Mains West Fault (F-0001) that tracks obliquely 500 m south of Longwall 301.

In addition, while surface lineaments are documented in a geological register as a possible indicator of an underlying structure, their presence on the surface does not necessarily translate to a physical feature in the coal seam. Surface lineaments are therefore not shown on Plan 3 in Attachment 1 of Appendix H. They are, however, incorporated into subsidence modelling as changes in topographical features.

Note in 2017 Metropolitan Coal drilled some 113 km of in-seam exploration holes ahead of development, all designed to either confirm or dismiss the presence of structures. Metropolitan Coals 2018 drilling program is targeting 120 km and then stepping upwards to greater than 140 km per annum from 2019 onwards to enable timely planning decisions.

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.

## 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.

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## 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 a minimum of 2.8 m, including dilution where seam thinning occurs below 2.8 m and otherwise the full height of the seam up to 3.2 m. 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 58 percent. The total amount of ROM coal anticipated to be extracted is estimated to be approximately 3.457 million tonnes (Mt) including stone dilution.

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, the Eastern Tributary to the south 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 Longwall 301 is complete, with extraction of Longwall 302 underway.

The 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	28 June 2017	8 months	4 February 2018
Longwall 302	29 March 2018	8 months	October 2018
Longwall 303	November 2018	8 months	June 2019

### 4.2.3 Future Mine Plans

Longwalls 301-303 form the first block of longwalls within the 300 longwall series. Metropolitan Coal has submitted a first workings application to the DP&E for Longwalls 304-306 which includes the narrowing of chain pillars consistent with the Longwalls 301-303 layout. The proposed layout in the Longwalls 304-306 first workings application is shown on Figures 1 and 3, and on Plan 1 in Attachment 1. The layout of Longwalls 304-306 will however be subject to further review as a component of the Longwalls 304-306 Extraction Plan process. The current layout of Longwalls 307-317 is also shown on Figures 1 and 3, and on Plan 1 in Attachment 1, however will also be subject to further review.

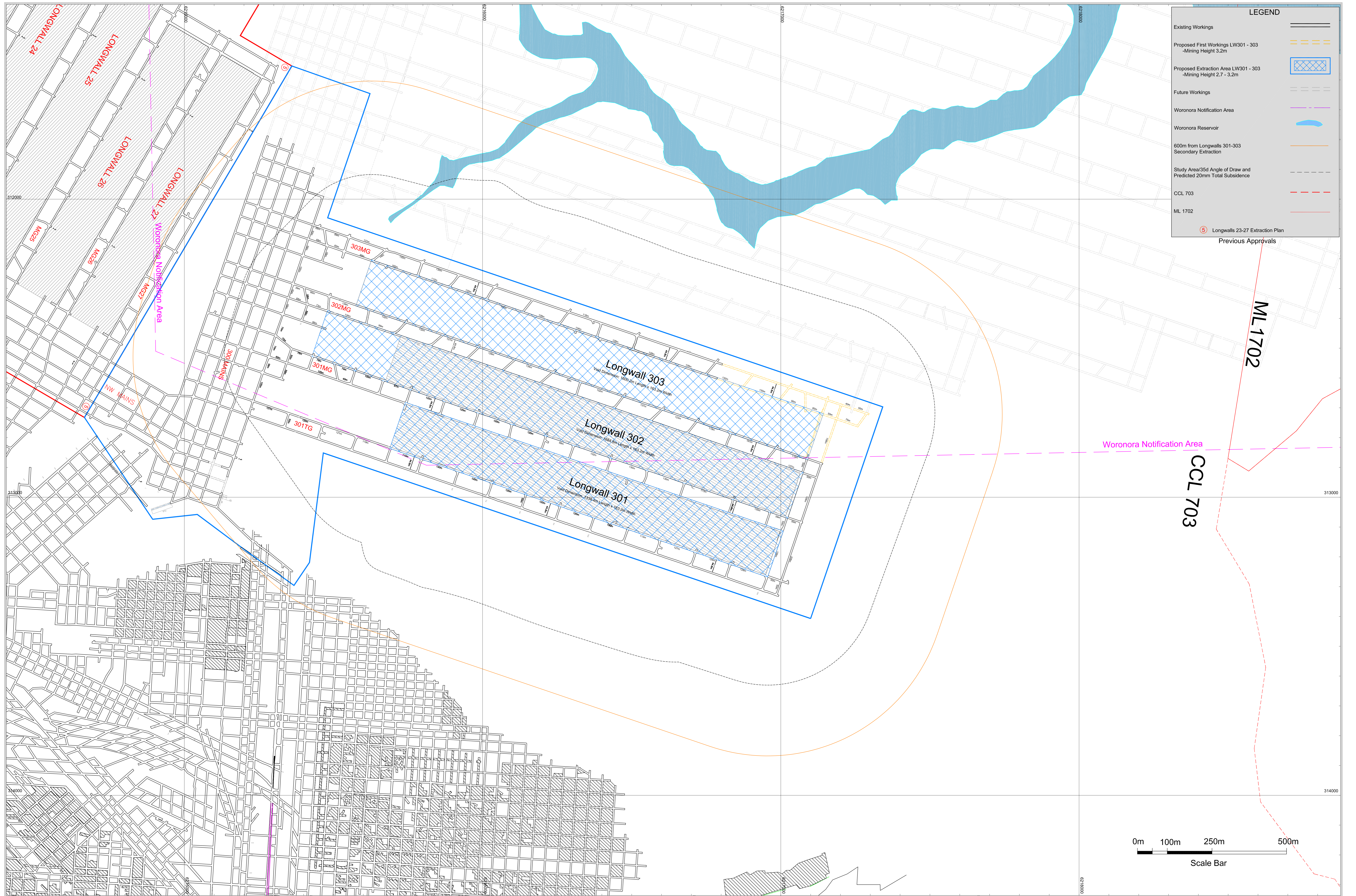
### 4.2.4 Effects on Future Resource Recovery

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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LEGEND	
Existing Workings	
Proposed First Workings LW301 - 303 -Mining Height 3.2m	
Proposed Extraction Area LW301 - 303 -Mining Height 2.7 - 3.2m	
Future Workings	
Woronora Notification Area	
Woronora Reservoir	
600m from Longwalls 301-303 Secondary Extraction	
Study Area/35d Angle of Draw and Predicted 20mm Total Subsidence	
CCL 703	
ML 1702	
Longwalls 23-27 Extraction Plan Previous Approvals	

MCA

Mining Engineering Manager Date \_\_\_\_\_  
Registered Mine Surveyor Date \_\_\_\_\_

SURV'D/DES'G'D \_\_\_\_\_ CHECKED \_\_\_\_\_ AUTHORISED \_\_\_\_\_

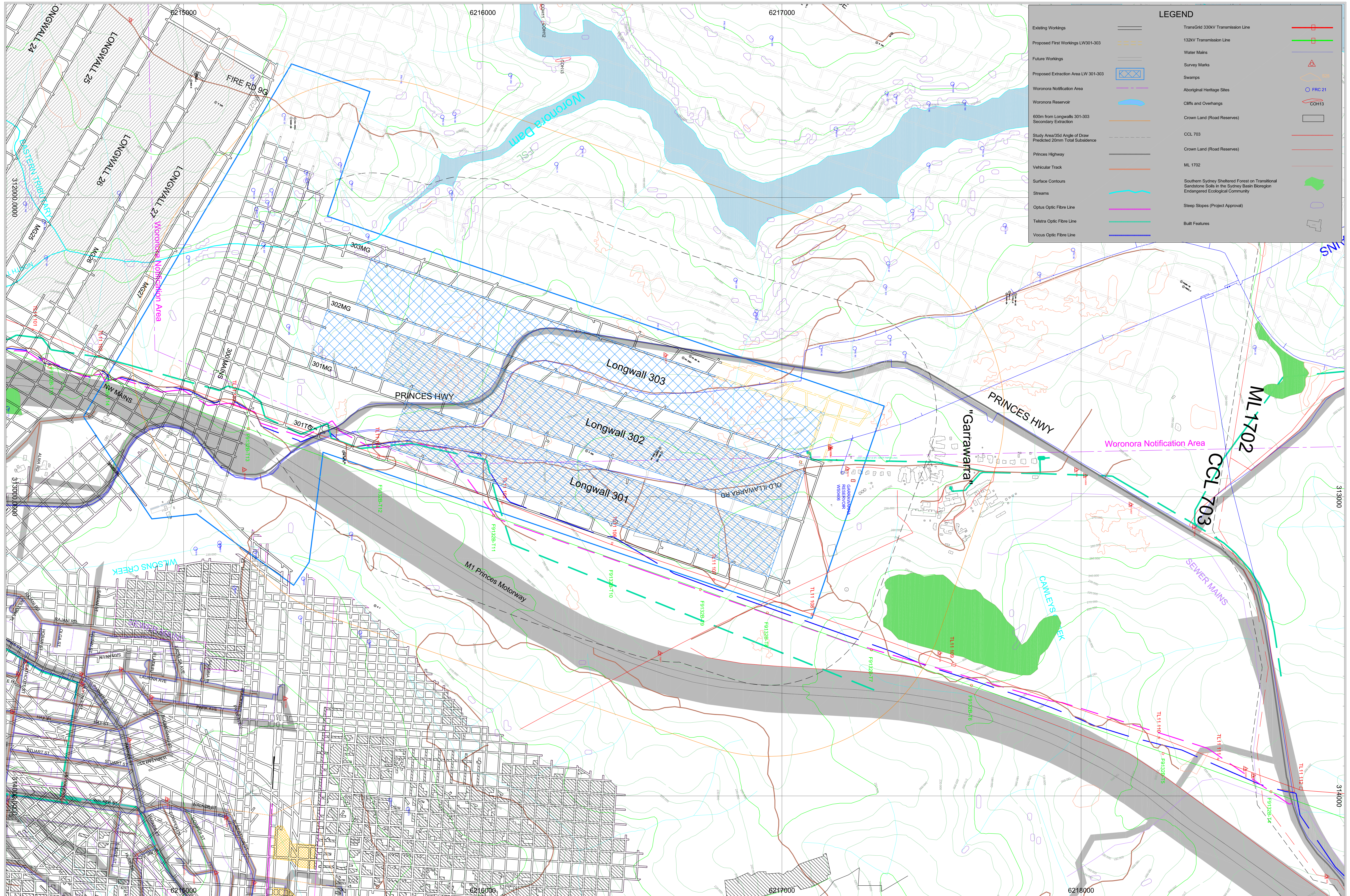
CLIENT/PROJECT

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METROPOLITAN MINE  
PO BOX 402  
HELENSBURGH 2508

DRAWING No <b>M180829 PA</b> <b>Rev4</b>				
DATE	DRAWN	SHEET	OF	SCALE
29/08/2018	Survey Dept.	1	1	1:4000

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



**LEGEND**

Existing Workings		TransGrid 330kV Transmission Line	
Proposed First Workings LW301-303		132kV Transmission Line	
Future Workings		Water Mains	
Proposed Extraction Area LW 301-303		Survey Marks	
Woronora Notification Area		Swamps	
Woronora Reservoir		Aboriginal Heritage Sites	
600m from Longwalls 301-303 Secondary Extraction		Cliffs and Overhangs	
Study Area/35d Angle of Draw Predicted 20mm Total Subsidence		Crown Land (Road Reserves)	
Princes Highway		Crown Land (Road Reserves)	
Vehicular Track		ML 1702	
Surface Contours		Southern Sydney Sheltered Forest on Transitional Sandstone Soils in the Sydney Basin Bioregion Endangered Ecological Community	
Streams		Steep Slopes (Project Approval)	
Optus Optic Fibre Line		Built Features	
Telstra Optic Fibre Line			
Vocus Optic Fibre Line			

MCA

Mining Engineering Manager Date

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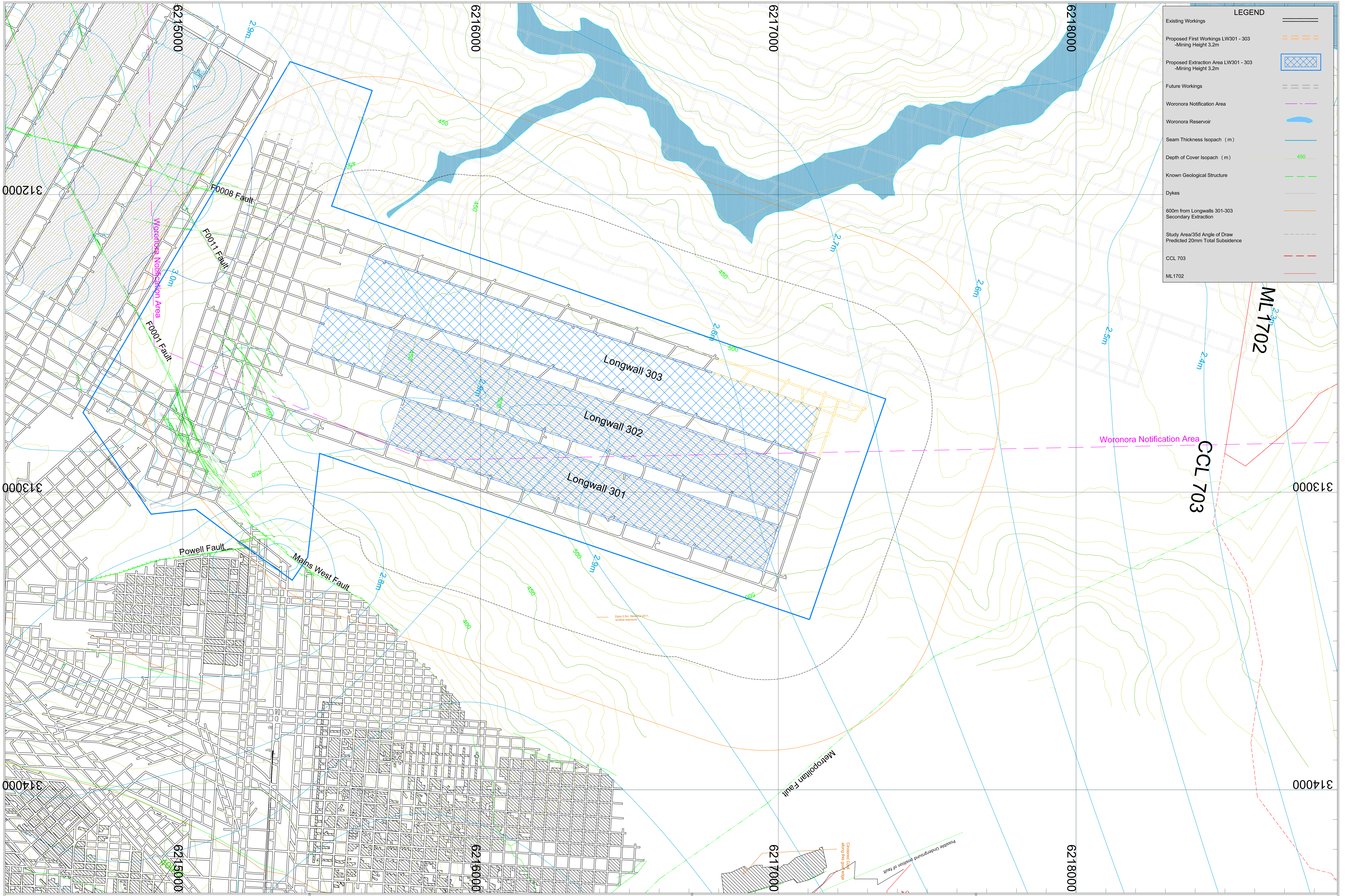
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© Mineplan Drawing File/MSA PLANS/Extraction Plans/LW301-303 August 2018/Plan 2 - Surface Features/LW301-303 Extraction - Aug 2018.dwg

DATE	DRAWN	SHEET	OF	SCALE
31/08/2018	Survey Dept.	1	1	1:4000

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





**LEGEND**

- Existing Workings
- Proposed First Workings LW301 - 303  
-Mining Height 3.2m
- Proposed Extraction Area LW301 - 303  
-Mining Height 3.2m
- Future Workings
- Woronora Notification Area
- Woronora Reservoir
- Seam Thickness Isopach (m)
- Depth of Cover Isopach (m)
- Known Geological Structure
- Dykes
- 600m from Longwalls 301-303  
Secondary Extraction
- Study Area/35d Angle of Draw  
Predicted 20mm Total Subsidence
- CCL 703
- ML1702

CLIENT/PROJECT  
SURV'D/DES'G'D

Mining Engineering Manager Date



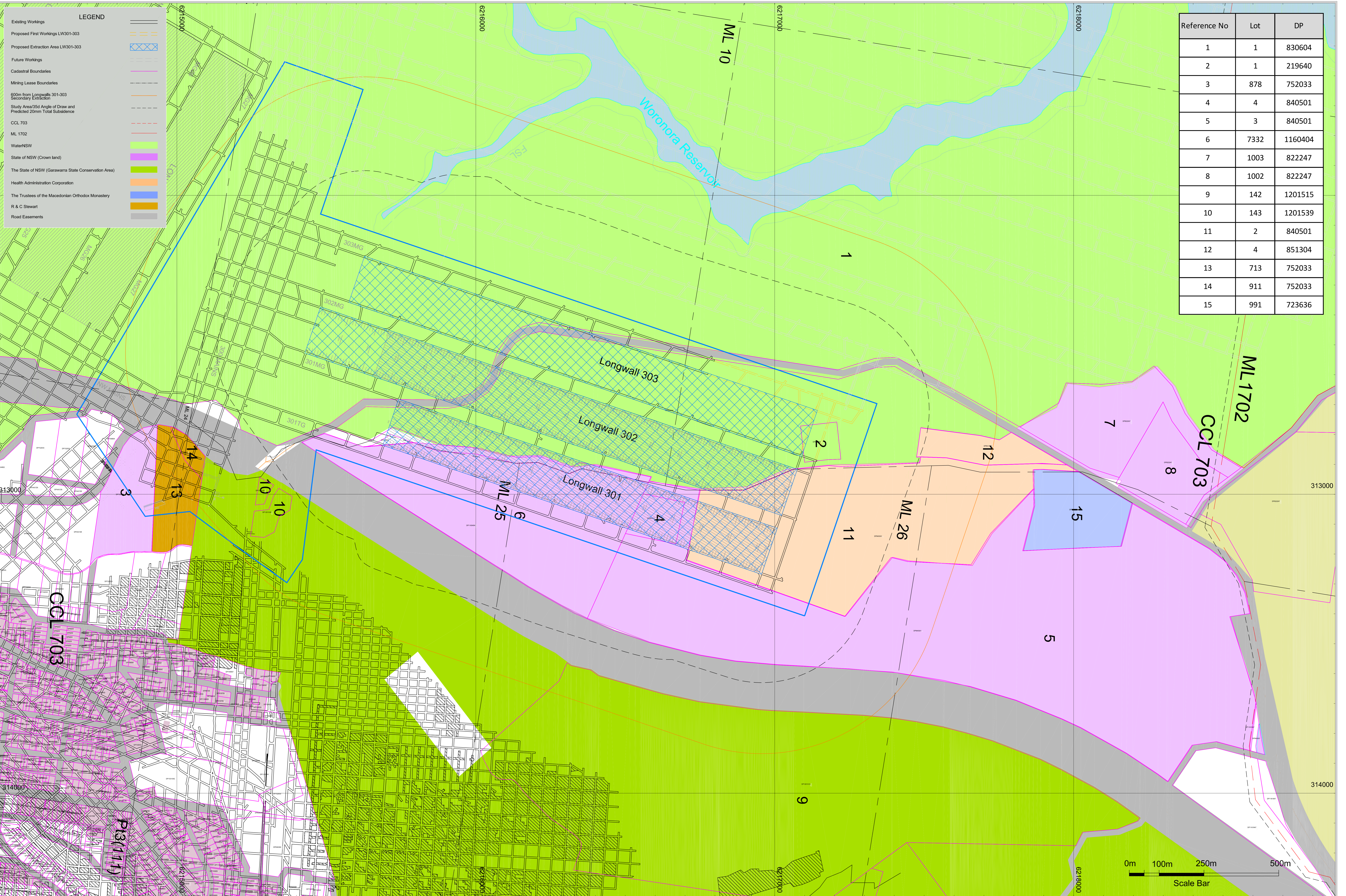
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METROPOLITAN MINE  
PO BOX 402  
HELLENBURGH 2508

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**DRAWING No M180929 P3 Rev4**

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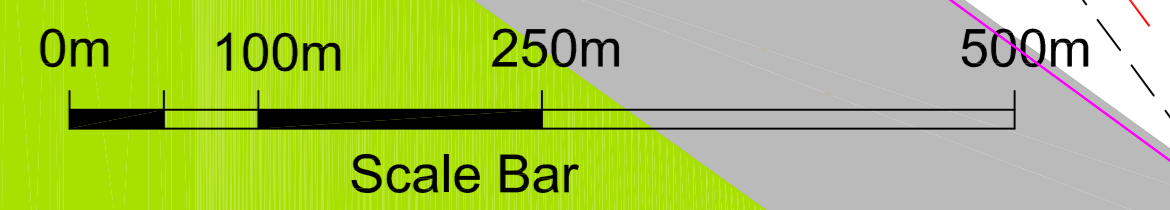
**METROPOLITAN MINE**  
**Longwalls 301-303 Extraction Plan: Plan 3**  
**Geological and Seam Data**



**LEGEND**

- Existing Workings
- Proposed First Workings LW301-303
- Proposed Extraction Area LW301-303
- Future Workings
- Cadastral Boundaries
- Mining Lease Boundaries
- 600m from Longwalls 301-303 Secondary Extraction
- Study Area/35d Angle of Draw and Predicted 20mm Total Subsidence
- 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

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



Mining Engineering Manager    Date

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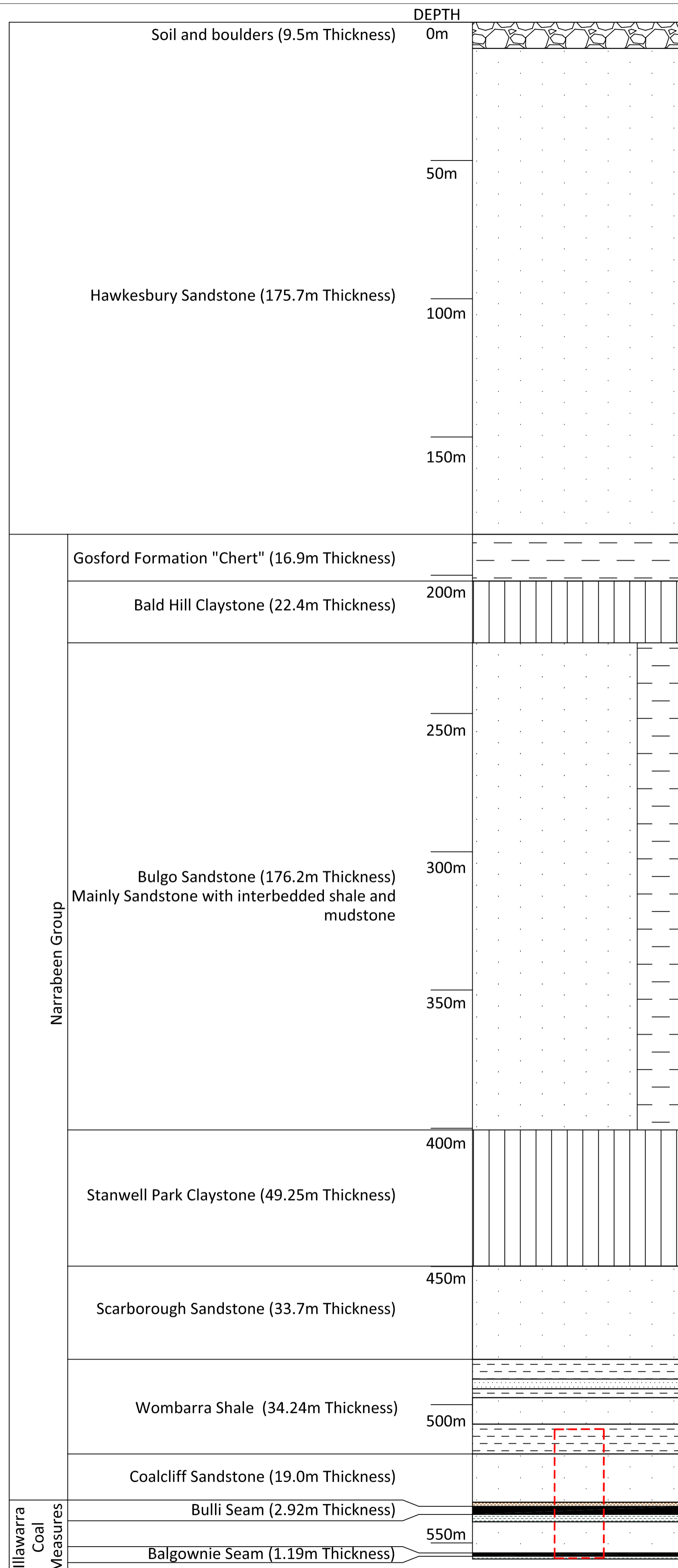
DRAWING No **M180829 P5 Rev4**

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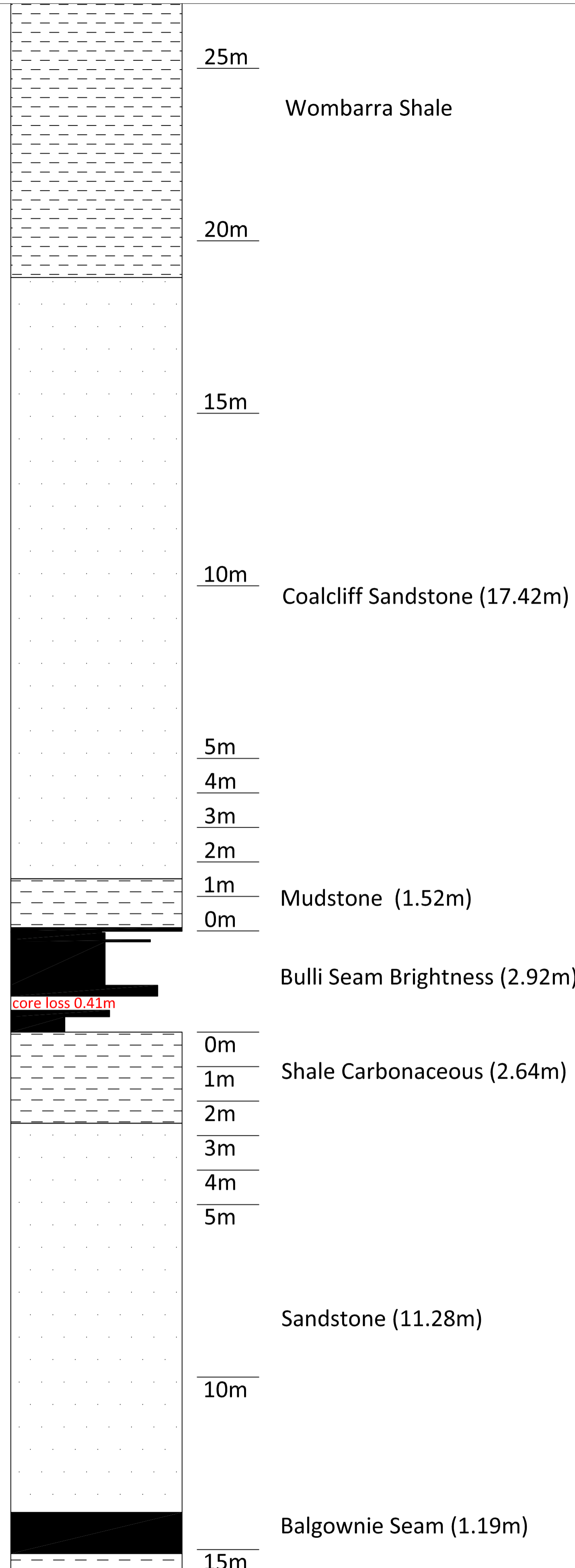
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03/09/2018	Survey Dept	1	1	1:4000

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

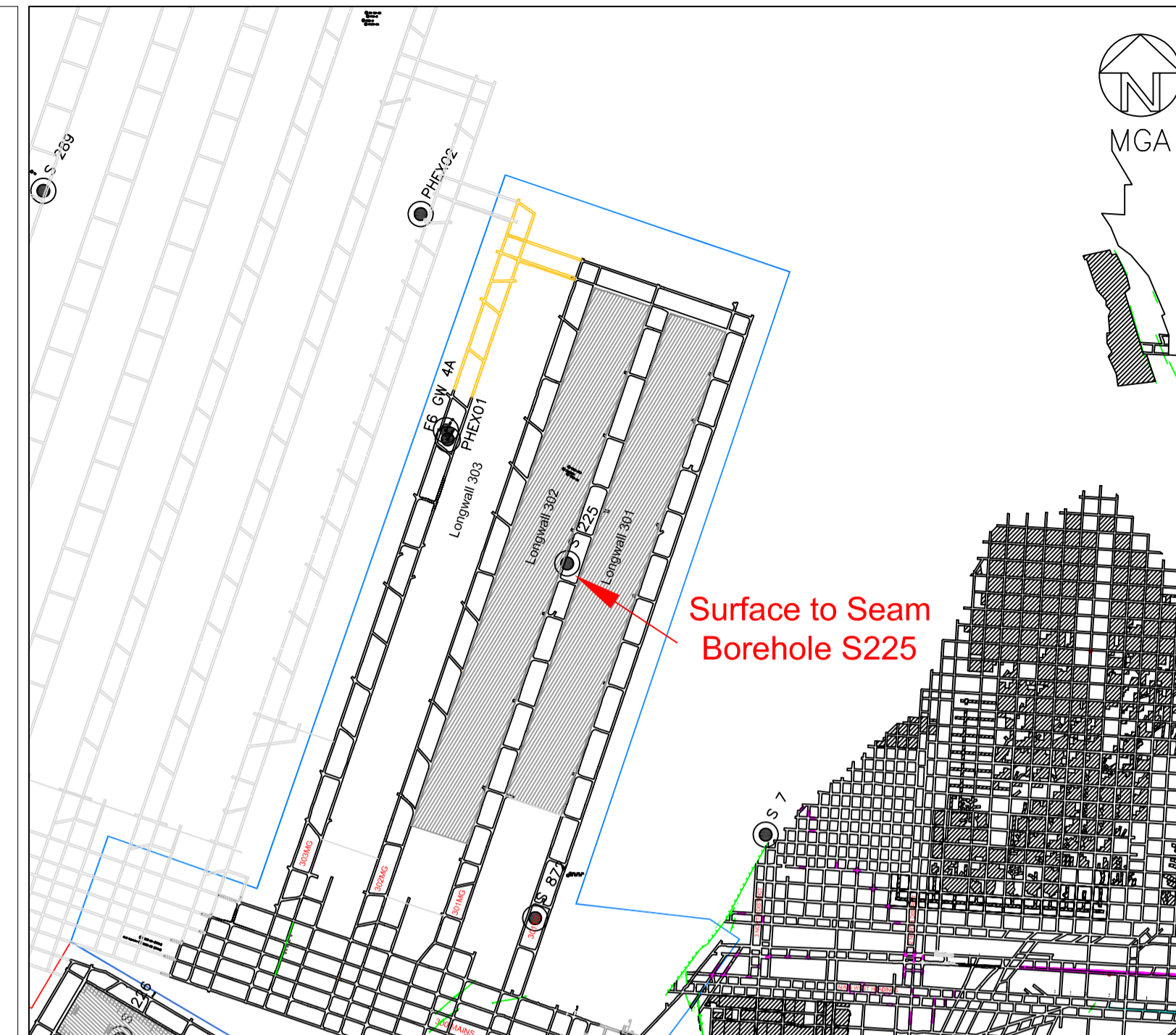
Vertical Log of Bore S225



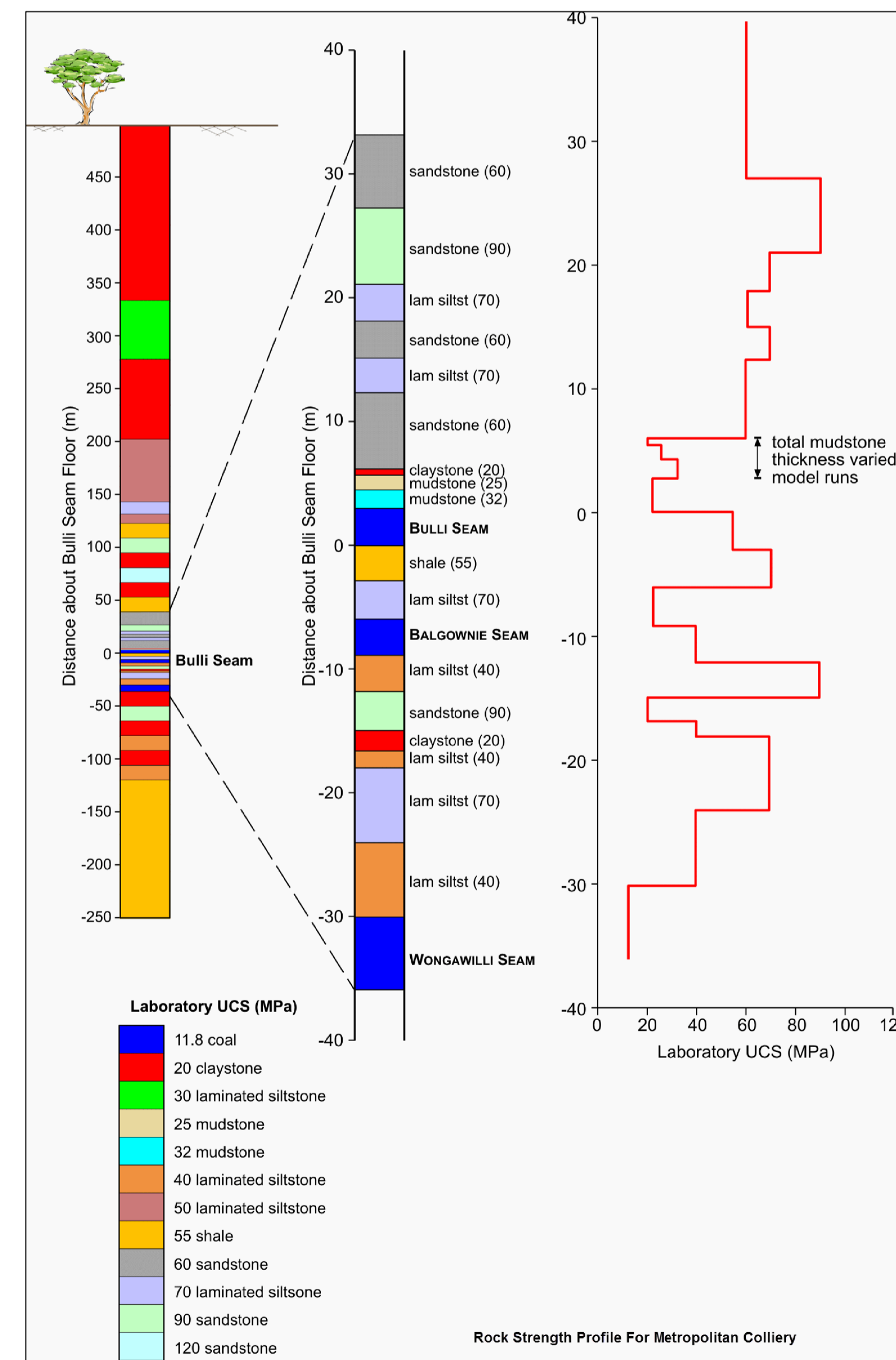
Inset of Vertical Log Bore S225



Location Plan

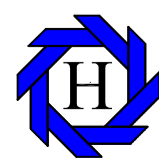


Geotechnical Log



Mining Engineering Manager Date

CLIENT/PROJECT



METROPOLITAN COAL PTY LTD  
METROPOLITAN MINE  
PO BOX 402  
HELENSBURGH 2508

DRAWING No M180829 P6 Rev4

DATE	DRAWN	SHEET	OF	SCALE
03/09/2018	S.Kornek	1	1	NTS

METROPOLITAN MINE

Longwalls 301-301 Extraction Plan

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