

From: [Alan Lindsay](#)
To: [Casey Joshua](#)
Cc: [John Conolly](#); [Peter Martin](#)
Subject: Hume Project
Date: Wednesday, 30 June 2021 9:49:24 AM
Attachments: [Len Diekman presentation.pdf](#)

Casey,

Thanks for your assistance during yesterday evening's Zoom meeting.

You will recall that Professor Clark asked a question about the seismic data I presented, and its proximity to the proposed mining area. The data came from a report produced by Cockatoo Coal (as operator of the then Hume JV) to justify the relinquishment of part of the A349 lease area. That seismic data was enhanced and interpreted by consultant geologist Len Diekman for CFSH and was presented to the first IPC panel. Len's report is attached, and the seismic lines are shown on Page 2.

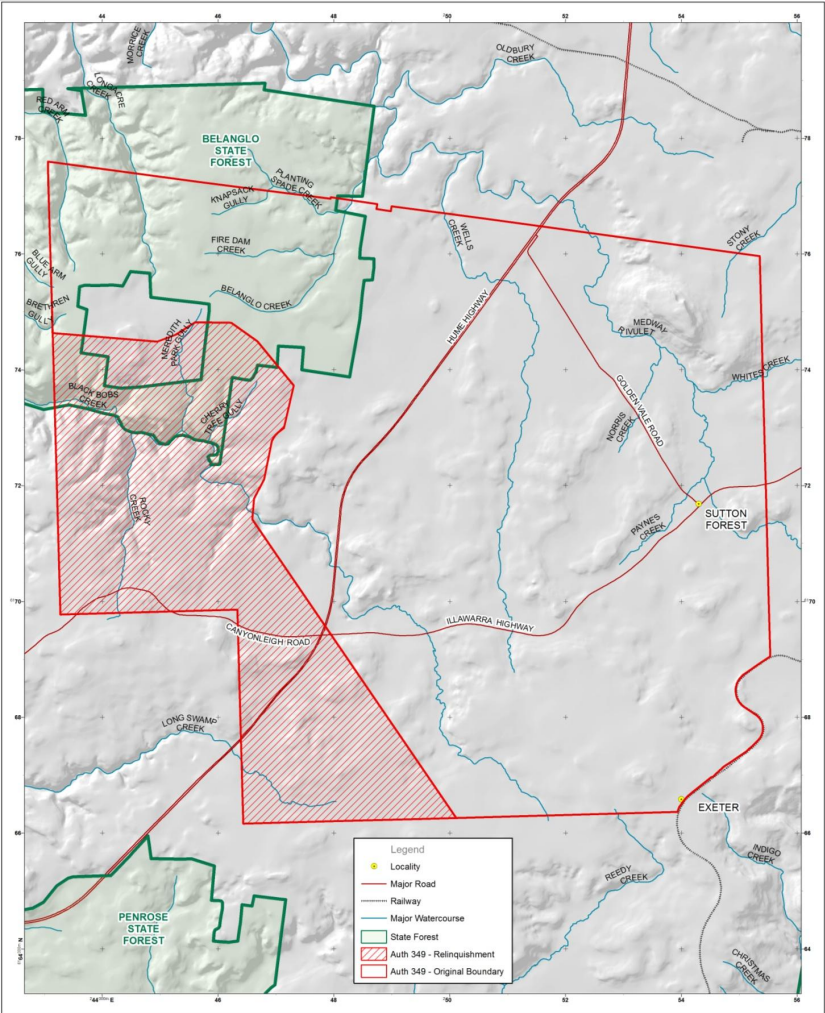
At the time of the presentation of this material we were unaware that Hume had 35 km of seismic data in a section of the mine area where high volume bores were present. My point yesterday was that if this data had been made available for interpretation there would be clarity on the fractured nature of the sandstone strata overlying the coal.

Regards

Alan Lindsay

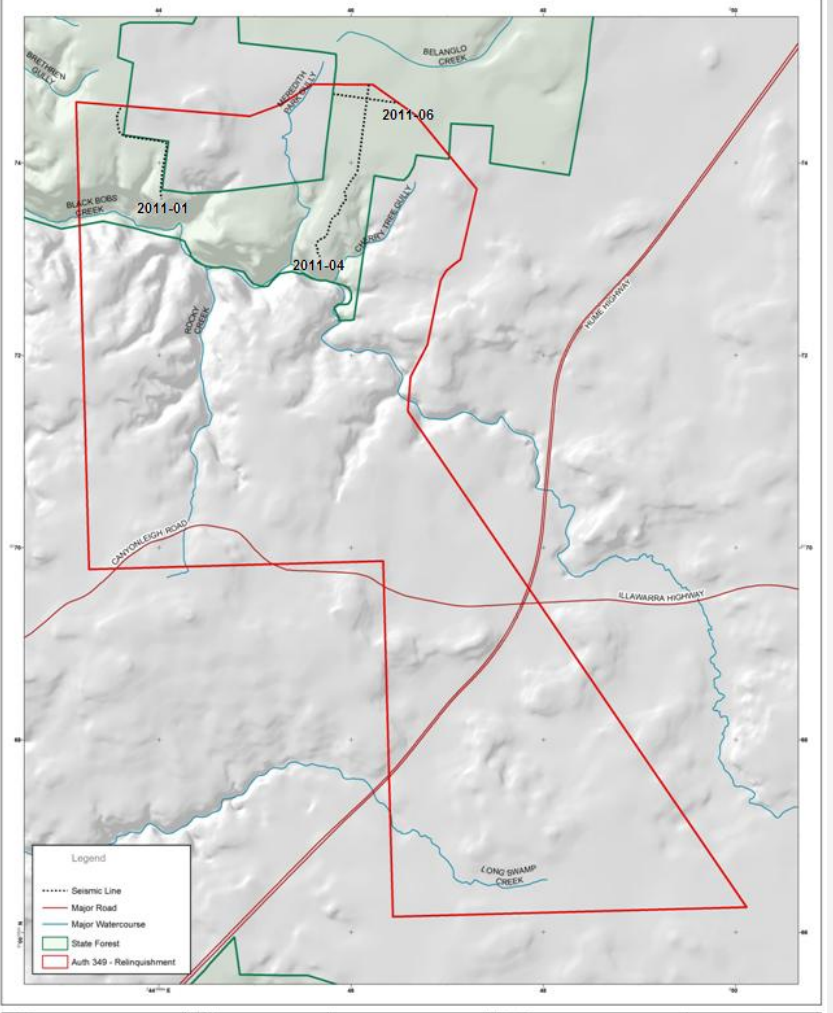
Geological Considerations and Consequences for Mine Development

Including environmental impacts of geology



PROJECT Hume Coal Project		DISCLAIMER Coalbrook Coal Ltd has exercised all due care in the preparation of this map. However, Coalbrook Coal Ltd makes no warranty or representation in respect of the information contained in this map, particularly with regard to any commercial or financial decision made on the basis of this map. Use of this map in the event of such parties shall be at their own risk, and the map is accurate based on data as published with the permission of Coalbrook Coal Ltd.		DATA SOURCES © DEEDS & PROPERTY INFORMATION © NEW LAND & PROPERTY INFORMATION © STATE OF NEW SOUTH WALES THROUGH DEPARTMENT OF TRADING AND INVESTMENT, REGIONAL INFRASTRUCTURE AND SERVICES PUBLICLY ACCESSIBLE DATA HAS BEEN INCORPORATED INTO THIS MAP AND WHERE NECESSARY, COASTAL CONTOUR PROVIDES AN INDICATION OF THE ACCURACY COMPLETED ON CURRENTITY OF THIS DATA.		 HUME COAL	
TITLE	REV	DESCRIPTION	DATE	SCALE	CURRENT ISSUE	SIGNATURES	STATUS
	0	Original map output	13/04/2012	1:50,000	A3	DRAWN	SLG
					GDA 94	CHECKED	
					MGA ZONE 56	APPROVED	

FIGURE 1 PARTIAL RELINQUISHMENT AREA LOCATION



PROJECT Hume Coal Project		DISCLAIMER Coalbrook Coal Ltd has exercised all due care in the preparation of this map. However, Coalbrook Coal Ltd makes no warranty or representation in respect of the information contained in this map, particularly with regard to any commercial or financial decision made on the basis of this map. Use of this map in the event of such parties shall be at their own risk, and the map is accurate based on data as published with the permission of Coalbrook Coal Ltd.		DATA SOURCES © DEEDS & PROPERTY INFORMATION © NEW LAND & PROPERTY INFORMATION © STATE OF NEW SOUTH WALES THROUGH DEPARTMENT OF TRADING AND INVESTMENT, REGIONAL INFRASTRUCTURE AND SERVICES PUBLICLY ACCESSIBLE DATA HAS BEEN INCORPORATED INTO THIS MAP AND WHERE NECESSARY, COASTAL CONTOUR PROVIDES AN INDICATION OF THE ACCURACY COMPLETED ON CURRENTITY OF THIS DATA.		 HUME COAL	
TITLE	REV	DESCRIPTION	DATE	SCALE	CURRENT ISSUE	SIGNATURES	STATUS
	0	Original map output	16/04/2012	1:35,000	A3	DRAWN	SLG
	1	Update seismic lines	16/04/2012		GDA 94	CHECKED	
					MGA ZONE 56	APPROVED	

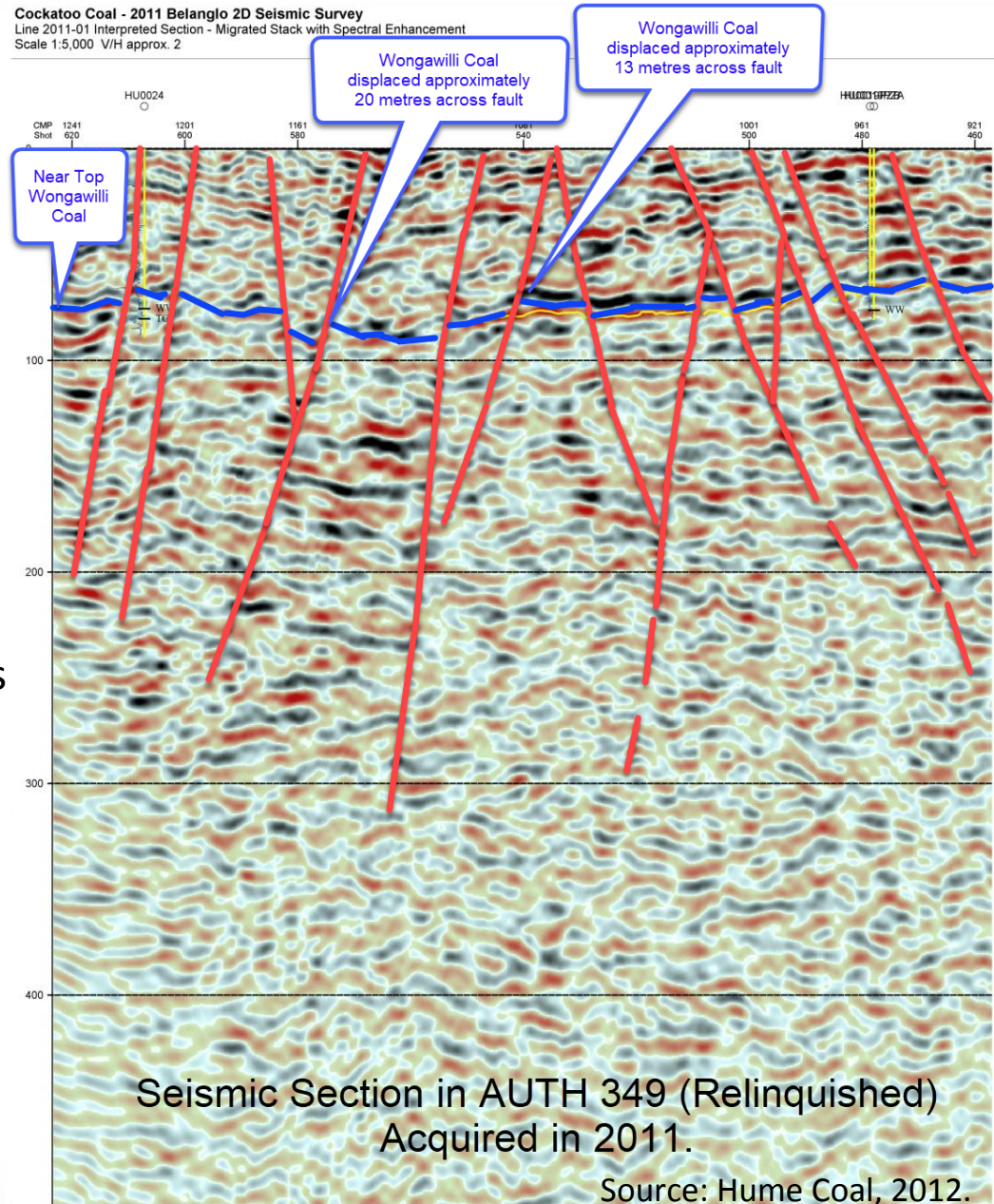
FIGURE 18 2011 2D SEISMIC SURVEY LINE LOCATIONS

Geological Complexity

- Seismic Data demonstrates that:
 - faulting places the Hawkesbury Sandstone horizontally against the Wongawilli Coal
 - The structure of the top of the Wongawilli coal does not “...dip gently from west to east...at...a grade of 1 in 100” (Fitzsimmons & Doyle, 2017). Rather, it is faulted and is involved in both anticlinal and synclinal features
 - The Wongawilli Coal is highly fragmented into separate and non-contiguous bodies across faults.

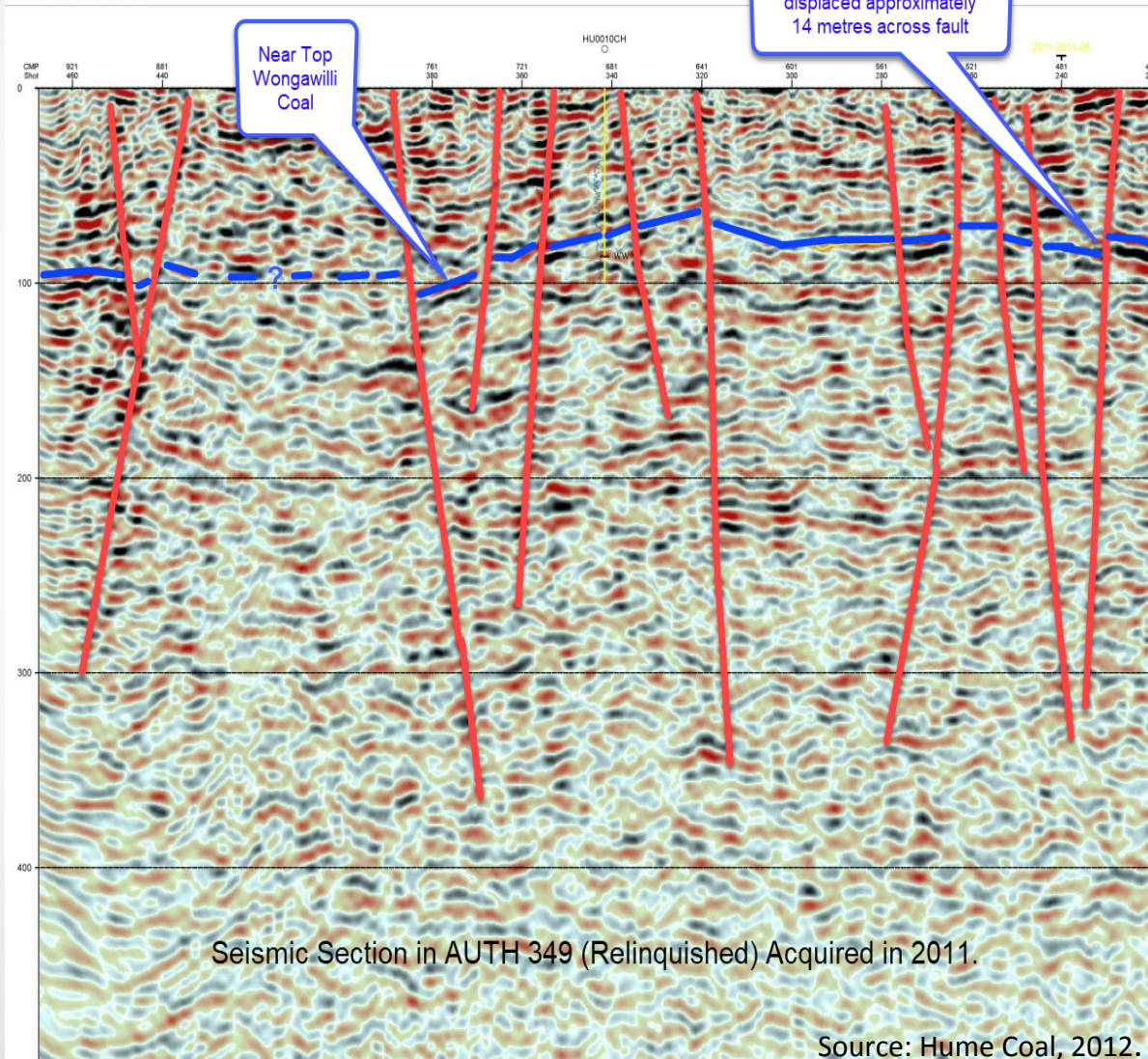
CONCLUSION:

- Geological structure within AUTH 349 is much more complex than the Operator has portrayed in the proposals.

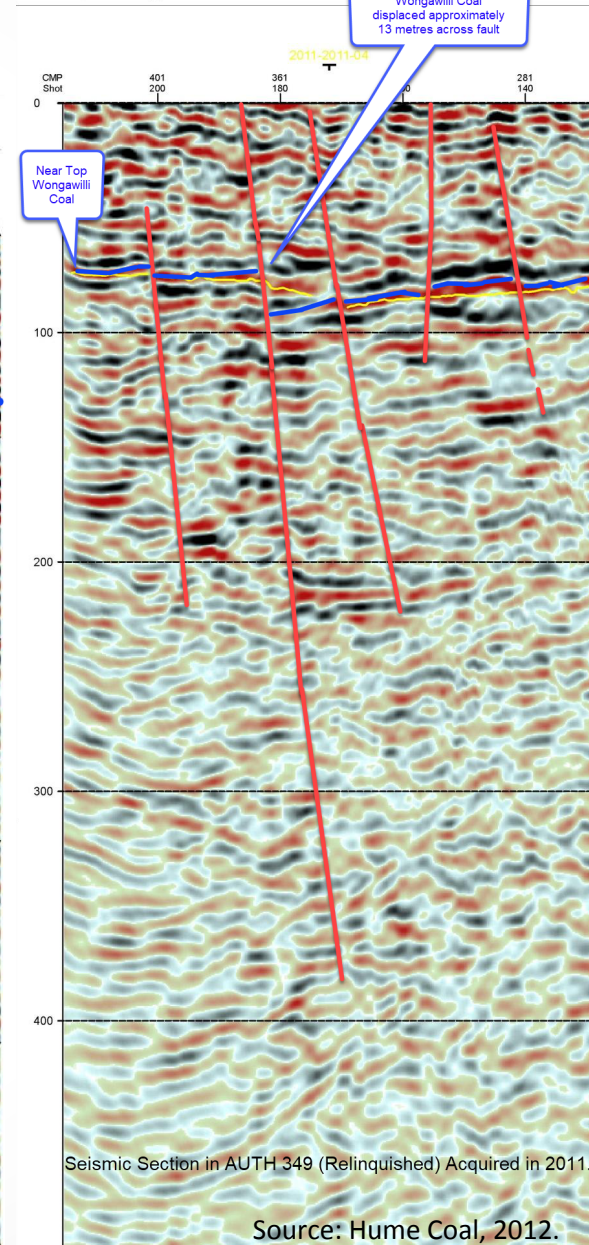


Additional seismic lines demonstrating faulted geological structure

Cockatoo Coal - 2011 Belanglo 2D Seismic Survey
Line 2011-04 Interpreted Section - Migrated Stack with Spectral Enhancement
Scale 1:5,000 V/H approx. 2



Cockatoo Coal - 2011 Belanglo 2D Seismic Survey
Line 2011-06 Interpreted Section - Migrated Stack with Spectral Enhancement
Scale 1:5,000 V/H approx. 2



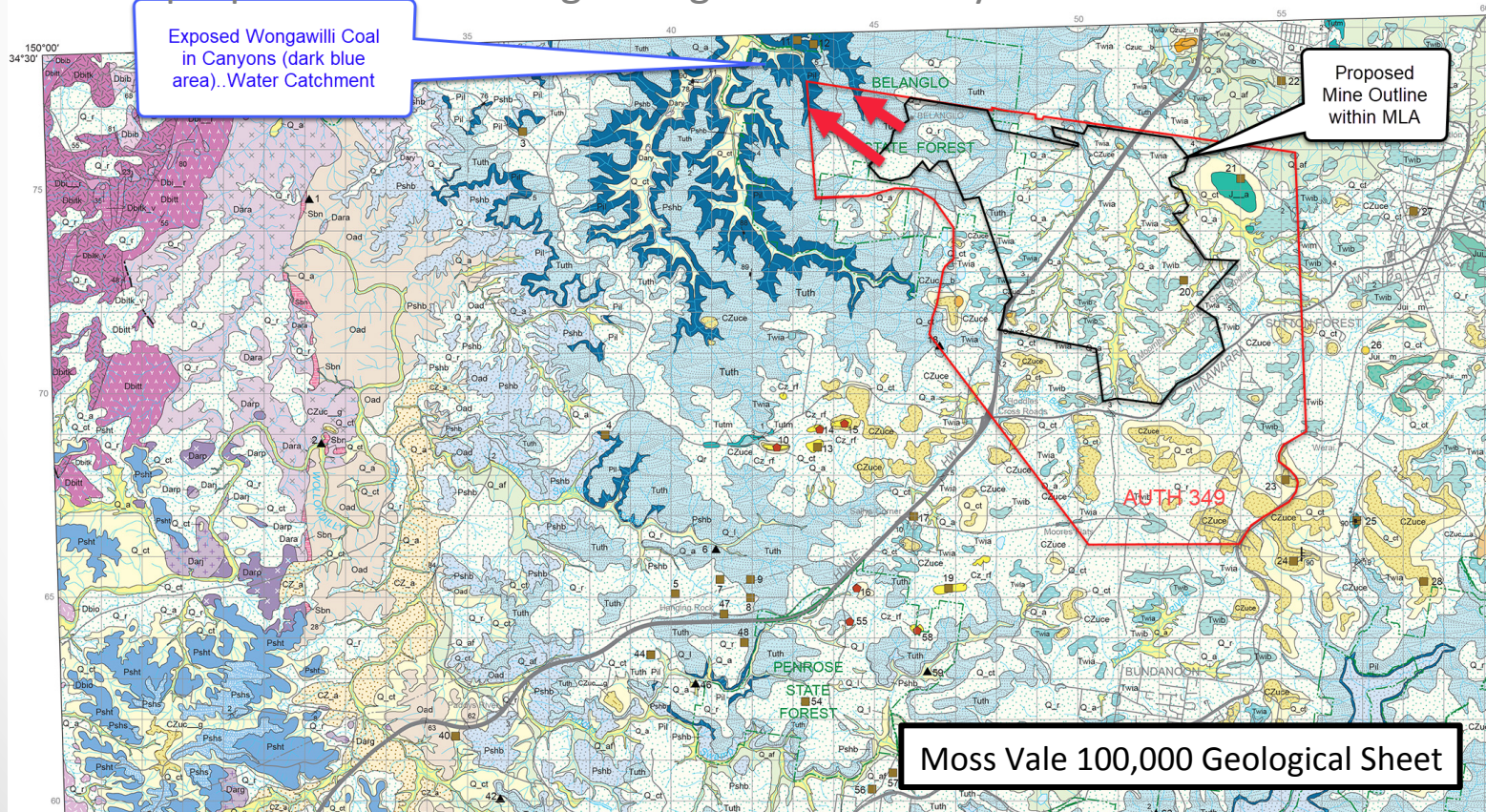
Consequences of Geological Complexity

1. The Wongawilli Coal is highly fragmented into separate and non-contiguous bodies across faults. Consequently, the proposed mine layout would not be able to follow the coal seam so resource recoveries would be below expectations.
2. The operator's proposal for the presence of a widespread aquitard isolating the Hawkesbury Sandstone aquifer from the Wongawilli Coal is invalid because fault throws of up to 18 metres not only fragment the aquitard, they horizontally juxtapose the Wongawilli Coal and the Hawkesbury Sandstone.
3. The mine process, as proposed would pass from the mined coal seam directly into the Hawkesbury Sandstone aquifer across fault planes resulting in the Hawkesbury Sandstone aquifer becoming a receptor for in-mine contaminants.
4. The presence of a multitude of igneous dykes and diatremes reported by Fitzsimmons & Doyle (2017) and others (refer following map) reduces resource recoveries.

Burraborang water catchment is a receptor for the proposed mine contaminants

The Wongawilli Coal is exposed in gorges of Wingecarribee River tributaries (which flow into the Wollondilly River of the Burraborang Water Catchment) in and around the north-western part of AUTH 349.

Consequently, the Lake Burraborang Water Catchment is a receptor to contaminants from the proposed mine through the ground water system



Quoted References & Sources

Ben Fitzsimmons and Rod Doyle, Hume coal – An overview, in Naj Aziz and Bob Kininmonth (eds.), Proceedings of the 17th Coal Operators' Conference, Mining Engineering, University of Wollongong, 8-10 February 2017, 90-98.

Hume Coal Pty Ltd. AUTH 349 Partial Relinquishment Report to Coal Advice, May 2012.

Geological Survey of New South Wales, Moss Vale 1:100,000 scale Geological Sheet.