House Standing Committee on Rural Affairs and Transport Australia

Inquiry into The Management of the Murray-Darling Basin

Submission by Caroona Coal Action Group – December 2010

Compiled by Timothy Duddy

Committee Secretary
Senate Standing Committee on Rural Affairs and Transport
PO Box 6100
Parliament House
Canberra ACT 2600

Introduction

The Caroona Coal Action Group is a volunteer community group comprised of residents of the Caroona district on the Liverpool Plains, as well as members of the wider community. CCAG was formed and incorporated in April 2006 following the grant of a five year coal Exploration Licence (Caroona EL6505) by the New South Wales Minister for Mineral Resources to Coal Mines Australia Limited (CMAL), a wholly owned subsidiary of BHP Billiton. The company paid the NSW Government a sum of $100 million for the licence. BHP Billiton proposes to continue exploration activities that include drilling over 300 exploration boreholes until 2011 - a period that has now been extended - after which they intend to apply for a mining lease. In November 2008, Shenhua Watermark Coal Pty Ltd was granted an Exploration Licence (Watermark EL7223) over the Watermark Exploration Area for a record $300 million. The NSW Government has stated that it is considering offering further exploration licenses in the area.

Background

The Caroona EL covers an area of 344 km^2, while the Watermark EL covers an area of 195 km^2. Both exploration licences are located on the Liverpool Plains within the Upper Namoi Catchment, approximately 300 kilometres north-northwest of the Port of Newcastle, to which they are linked by rail and road. The Liverpool Plains spreads 12 000 km^2, with a climate, soils and unique groundwater that make it one of the most fertile and drought-resistant agricultural areas in Australia. Figures from the Australian Bureau of Agricultural Research indicate that the Liverpool Plains produces on average 40 per cent above the national average for cereal cropping.

Water from this region forms part of the headwaters of the Murray-Darling Basin – the Mooki River drains northward to the Namoi River, progressing by way of the Barwon, to the Darling, right to the mouth of the Murray at Goolwa. This is a riverine system stretching approximately 3,330 km. The groundwater aquifers and surface water flows of the Upper Namoi Catchment provide stock, domestic, irrigation and town water supplies for Caroona and neighbouring towns including Quirindi, Gunnedah, Breeza, Curlewis, Spring Ridge, Tambar Springs, Premer and the Walhallow Aboriginal Community. The area of the Upper Namoi Catchment referred to covers an area of 5,621 $km^{2.}$

All the water from this area flows past the Breeza Mountain across a plain that is 8.4 km wide (see **Appendix A**). If the proposed mining developments take place, 20 million tonnes of coal would be extracted annually from the outcrop ridges to the North and South above this floodplain, bringing to the surface heavy metals, salts and other pollutants that would be stored adjacent to this important water resource.

As the driest inhabited continent on earth, with only an estimated 6 per cent of arable land across Australia the preservation of these productive lands and finite water systems is clearly of national significance.

Water security

While CCAG holds broader concerns for the cultural, environmental, and health impacts that may result from mining on the Liverpool Plains, and stresses the desirability of improved governance and regulation standards, our main concern continues to be the potential damage to the region's natural waterways particularly to the significant and complex underground alluvial aquifers that lie beneath the flood plain.

Since it was announced that exploratory drilling was to commence in the area, CCAG has consistently maintained that an independent and comprehensive water study of the area is an essential and sensible

prerequisite to such activity. While stakeholders, including the Federal and State Governments and BHP Billiton, have committed to a full study of the Namoi Catchment area, extensive exploratory drilling has already been undertaken - and continues – posing an unacceptable and ongoing potential risk to the water resources of the region. CCAG also considers that current exploratory drilling methods used in the area are inappropriate and pose a danger to the security of these water resources. CCAG has consistently asked that these practices be revised and improved to take into account the delicate nature of the complex aquifer structure in this region. In proceedings before the NSW Mining Wardens Court 2008/57,58,59,60, evidence was presented to the court by a former driller on serious shortcomings in the drilling methods employed by BHP Billiton, however the Mining Warden refused to rule on any of this evidence.

In July 2009, after months of negotiation, the NSW Government appointed Mr Mal Peters as Chair of the Ministerial Oversight Committee to facilitate the full commissioning of a water study of the Namoi Catchment area. It has now reached the end of Stage 1 at November 2010. We welcome BHP Billiton's commitment to provide some funding for this study, as well as their undertaking to incorporate the findings of the study as part of any environmental assessment undertaken in the future. The NSW Minister for Primary Industries Ian Macdonald also recently announced that BHP Billiton had assented to amendments to the Special Conditions of EL6505, preventing BHP Billiton from applying for a mining lease that includes any of the following in the Caroona Exploration Licence Area:

- Long wall mining underneath the deep alluvial irrigation aquifers;
- Long wall mining underneath the floodplain; and
- Open cut mining.

We note that Shenhua has made no such commitment, and has stated publicly that it intends to conduct open cut mining in the Watermark area.

While these undertakings are very welcome, CCAG remains cautious in accepting their efficacy and scope. CCAG questions whether alternative types of mining other than long wall or open cut are, or may be, available in the future to mine these areas, and queries to what extent these amendments will restrain future mining activities. It has been standard industry practice to apply for variations to the mine approval condition - including environmental constraints - even before mining begins; whereupon many of the environmental conditions are no longer enforced.

We also emphasise the critical importance of the ridge formations around the flood plain and their contribution to the recharge of the underground aquifer and surficial aquifer. As the attached report, **'**Deep Drainage and Runoff Estimates for Coal Exploration Leases EL6505 and EL7223' shows, should these areas be mined, water run off to the rivers and aquifers will be greatly impaired and will still be subject to other impacts that are experienced in every mining region around the country. This will undoubtedly have a profound influence on the Upper Namoi Catchment's contribution to the Murray Darling System.

CCAG urges the Government to act decisively to remove any and every doubt that mining will ever occur on the Liverpool Plains. Mining activities in the area of the Liverpool Plains must be excised by statute and be designated a prohibited land use on any alluvial floodplain at a slope of less than 2%.

Maintaining and managing the integrity and quality of water resources has been a major project in the Liverpool Plains region. Since large-scale irrigation for agriculture commenced in the 1960s, water policy has evolved significantly.

When, in May 1980, the Minister for Mineral Resources first granted an authorisation to prospect for coal in the Caroona area, pursuant to the *Coal Mining Act 1973*, water security did not appear on the mainstream environmental or political agenda. Rather, water resources were seemingly abundant and largely unregulated. Widespread and severe drought in the 1980s in particular raised awareness of the issue prompting concern that the area could not sustain the historical level of water extraction. In 2000, the NSW Government acted by introducing the *Water Management Act 2000*, with the intention to provide for the protection, conservation and ecologically sustainable development of the water resources of the State. This had the effect of reducing the water entitlements of users in Zones 1 – 12 of the Namoi Valley catchment by 62 per cent in order to attain sustainable yields. The Department of Infrastructure Planning and Natural Resources calculated the sustainable yield at 201,443 ML per year (see **Appendix B**).

Such a drastic reduction indicates the concern for water resources that were, quite rightly, held at that time. In stark contrast though, we draw your attention to the fact that the NSW *Mining Act 1992* does not recognise the vital importance of water resources and, in fact, does not even mention the word 'water' once anywhere in the legislation. The grant of exploration or mining licenses in the Caroona area without proper regard for these same water resources is wholly inconsistent and irresponsible consequent management allowing mining companies to explore the resources of the region without a proper understanding of the spatial relationship between coal and water resources.

Access to a reliable source of water is an essential requirement for coal mining, used variously to drill for the coal, to wash the product, to manage dust, and so on. Current reports provide statistics showing that at least 200 litres of water can be consumed for every tonne of coal produced, however this may vary according to operation practice and circumstance, and may be as high as 1000 litres. This represents a huge volume of water that is removed from the Murray Darling Basin, while remaining water may be irretrievably damaged through salinity, subsidence and cross-contamination.

Report - 'Deep Drainage and Runoff Estimates for Coal Exploration Leases EL6505 and EL7223'

The attached report, 'Deep Drainage and Runoff Estimates for Coal Exploration Leases EL 6505 and EL 7223', by former Department of Soil Conservation scientist Robert Banks, was commissioned by CCAG to determine the overall contribution to the waters of the Murray Darling System by two areas on the Liverpool Plains currently under exploration licenses issued by the NSW Government – the Caroona Exploration License (EL6505), and Watermark Exploration License (EL7223).

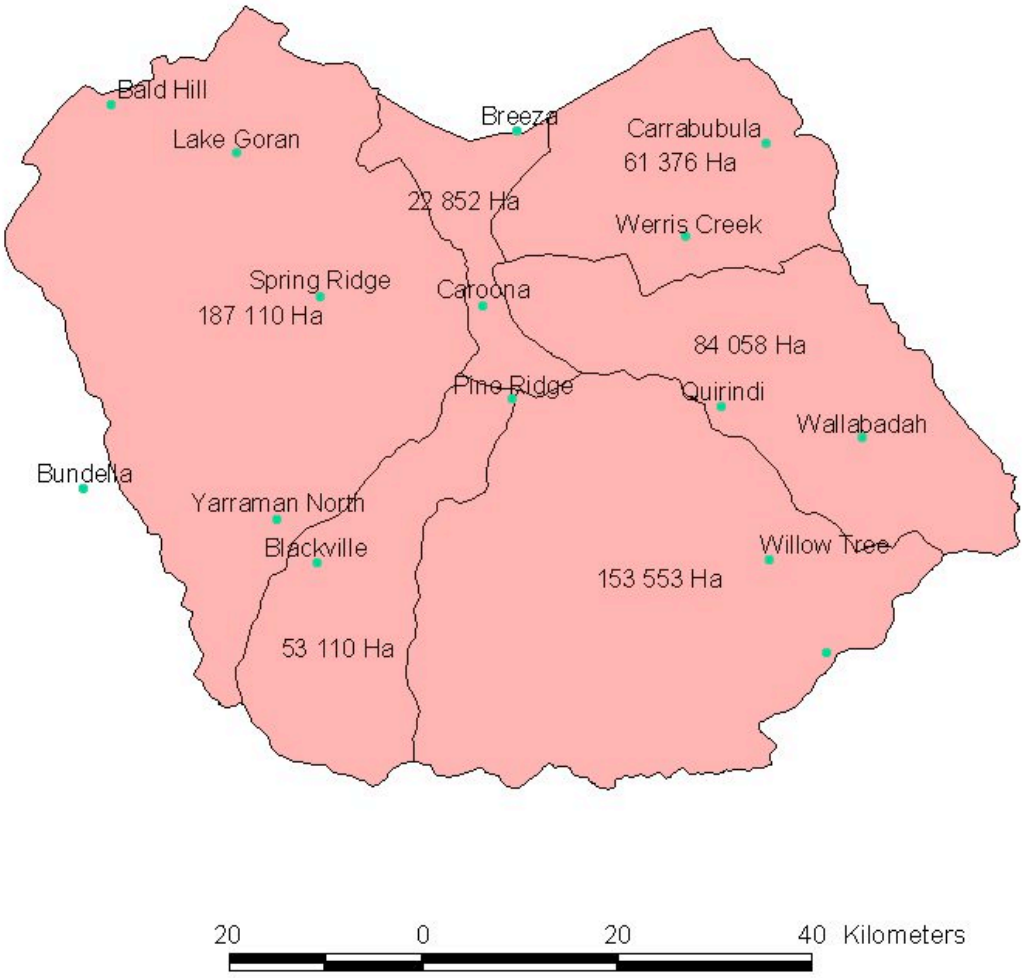
The report demonstrates that estimated annual flow of the Mooki River, based on the median flow, is 3.6 GL per year, measured at Gunnedah (DIPNR, 2004). The combined estimated runoff from the area of coal exploration leases EL6505 and EL7223 is 15.7 GL. It is probable that a substantial portion of this runoff is entering groundwater systems further down-slope from the points where this has been estimated, rather than entering the Mooki River. Runoff generated within EL6505 and EL7223, is shown to represent 436% of the median flow of the Mooki River.

Given the magnitude of the above estimates, and as Robert Banks states in it is strongly recommended that any significant proposed land use changes within either exploration lease area be seriously weighed up and concomitant losses to surface and groundwater be taken into account prior to any approvals being granted. It is apparent that the land within the exploration leases has significant input to both surface and groundwater flows in the region. Significant changes of land use within the areas of the exploration leases could cause highly significant reductions to both surface and groundwater flows, as well as posing a significant risk of damage to the irrigation aquifers themselves and thereby threatening the entire basin system.

In the context of the draft Murray Darling Basin plan, "The Plan" fails to make provision for changes in land use by Mining and Extractive industries. There is no scope for quantifying the interception to ground and surface water that are direct result of these changes. Nor is there any scope for accounting for social and economic losses imposed upon Regional Australia by this lack of accountability of the Mining and Extractive industry's impact on these water resources.

APPENDIX A

Catchments Feeding Breeza Gap



Total Area = 562 059 Ha
or 5 621 sq km

APPENDIX B

Upper & Lower Namoi Valley Groundwater Sources
Water Reform Entitlement cutbacks by zone

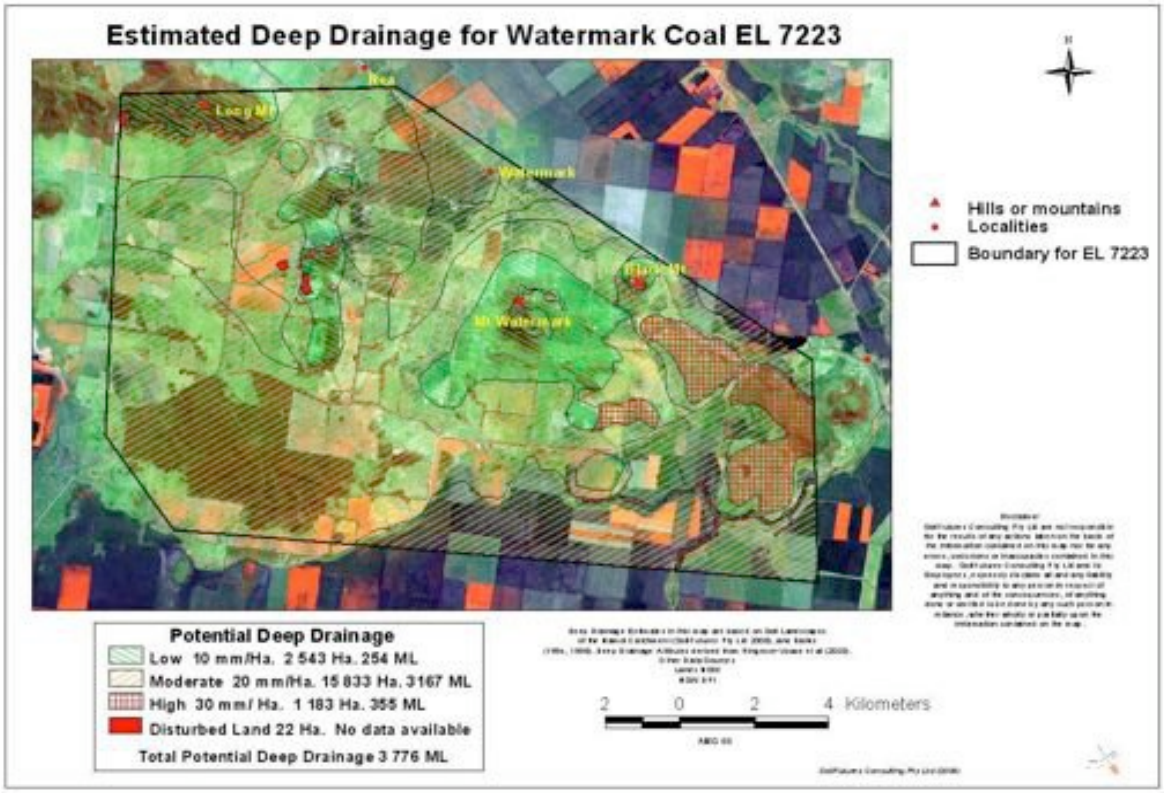
Location		Licensed Entitlement	Sustainable Yield	Entitlement **To be removed To reach sustainability**
		ML	ML	ML
	Upper Namoi			
Quirindi area	Zone 1	8,659	873	7,786
Mullaley to Boggabri area	Zone 2	23,501	7,141	16,360
Breeza to Gunnedah area	Zone 3	55,997	17,140	38,857
Gunnedah to Boggabri	Zone 4	82,777	21,040	61,737
Boggabri to Narrabri area	Zone 5	35,909	20,000	15,909
Quirindi area	Zone 6	11,435	14,000	-
Spring Ridge area	Zone 7	6,121	3,700	2,421
Quirindi to Breeza area	Zone 8	47,883	15,950	31,933
Tambar Springs area	Zone 9	11,542	11,303	239
Willow Tree to Quirindi	Zone 10	1,420	4,500	-
Maules Creek area	Zone 11	8,500	2,200	6,300
Kelvin area	Zone 12	7,487	2,000	5,487
	Total Upper Namoi	301,231	119,847	187,029
Narrabri to Walgett area	**Lower Namoi**	170,592	81,596	88,996
	Total Namoi	**471,823**	**201,443**	**276,025**

Source of Data
Sustainable yield and entitlement information as per the water sharing plan gazetted 27.12.02

Usage information provided by DIPNR. Usage shown is only up to 1997 when voluntary cutbacks were implemented in some zones. The current usage is higher than the 1997 levels shown.

SoilFutures Consulting Pty Ltd

Deep Drainage and Runoff Estimates for Coal Exploration Leases EL6505 and EL 7223



Prepared for the Caroona Coal Action Group

September 2009

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The findings and opinions in this report are based on research undertaken by Mr Robert Banks (BSc (Hons), CPSS, Dip Bus) of SoilFutures Consulting Pty Ltd as independent consultants, and do not purport to be those of the client.

Table of Contents

1.0 Introduction

1.1 Background

This report has been prepared in response to a request from the Caroona Coal Action Group to provide slope information and estimate potential deep drainage and runoff for the areas included within BHP-Billiton's Caroona Coal Exploration Lease 6505 (EL6505) and the Shenhua Watermark Exploration Lease 7223 (EL7223). The extent of these mining leases is given in Appendices 1 and 2.

This report gives an estimate of the status quo for localised runoff and groundwater recharge within the exploration lease areas. Mining as an activity in a biodiverse and productive agricultural landscape with high yielding groundwater supplies, could cause disruptions to agriculture through dewatering of the landscape. This report provides simple estimates of potential recharge to groundwater systems through deep drainage and runoff generated within the EL6505 and EL 7223. Deep drainage and runoff from one landscape to another may be considered ultimately as sideslope recharge for potable irrigation aquifers within the coal exploration lease areas.

The methodology used in this report also allows for further estimates of potential losses to both groundwater and runoff thorough mining activities if coal mining commences within EL6505 and EL 7223

1.2 Objectives

The main objectives of this report are:

1 To provide maps to showing existing NSW Department of Infrastructure, Planning and Natural Resources (DIPNR) data which defines areas of EL6505 and EL7223 which have a slope of <2%. Slopes of <2% are used to define areas of floodplain which extend between Blackville and Caroona under Part 8 of the NSW Water Act (DIPNR, 2003).

2 Using published environmental data from the Namoi Catchment Management Authority (Namoi CMA), NSW Department of Environment, Conservation and Climate Change (DECC), CSIRO, and NSW Department of Primary Industries (NSW DPI) to calculate estimates of deep drainage and runoff for EL6505 and EL7223.

3 To calculate total potential recharge and runoff values for EL6505 and EL7223 and present these spatially as maps, showing how deep drainage and runoff potential varies across the landscape.

4 To provide the community with recommendations so precautionary actions can be taken to maintain groundwater resources in these important agricultural areas.

2.0 Methods

2.1 Delineation of Areas Less than 2% in EL6505 and EL7223

The areas of slope both greater and less than 2% have been defined and mapped by the DIPNR (2003), as a means of defining floodplains. The 2% slope map for the

Liverpool Plains Catchment was clipped to EL6505 and EL7223 (DIPNR, 2003). Slopes <2% are considered to be floodplain. The maps are presented in Appendices 3 and 4.

2.2 Use of Soil Landscape Maps

Published Soil Landscapes for the area from Banks (1995), Banks (1998) and SoilFutures (2008) exist for the whole of the Namoi Catchment. Soil Landscapes were clipped to the boundaries of the EL6505 and EL7223 (NSW DPI, 2006, 2008). The Soil Landscape information provides a practical way to group different soils and landscapes by their recharge, runoff and land use characteristics according to the methods used in Ringrose-Voase *et al* (2003).

EL6505 contains 13 individual Soil Landscapes, whilst EL7223 has 17 Soil Landscapes. Soil landscapes within the EL6505 and EL7223 are presented in Appendices 5 and 6.

2.3 Grouping of Soil Landscapes by into Land Management Units

Soil Landscapes have been grouped into Land Management Units (LMU's) in SoilFutures (2008) using the method developed by URS (2001). LMU's are lands which have similar characteristics in terms of slope, drainage, and land use potential. The LMU map was clipped to the boundaries of the EL6505 and EL7223. Each LMU was assessed and given rankings of Low, Moderate and High both deep drainage and runoff, based on individual LMU soil properties, using the data found in Ringrose-Voase et al (2003) and URS (2001).

2.4 Estimation of Total Potential Recharge within EL 6505 and EL7223

Total potential recharge values for both EL6505 and EL7223 were estimated using the most conservative values for catchment recharge available based on modeling and measurements of deep drainage provided in Ringrose-Voase et al (2003). It should be stressed that these values are not absolute; these are best estimates based on available data and simple modeling based on measurements performed on dominant soil types within a Land Management Unit. The modeling in Ringrose-Voase et al (2003) was done using long term climate records and represent long term average potential values for different soil types.

The calculation made in this exercise do not take any account of water entering groundwater via inflow from within the aquifers upstream of the Exploration Lease areas. It also does not adequately address in-stream recharge, which according to Coram (1998) are very variable.

2.5 Estimation of Total Potential Runoff within EL 6505 and EL7223

Total potential runoff which potentially feed groundwater in the exploration lease areas was calculated using the most conservative values available for catchment runoff based on modeling and measurements provided in Ringrose-Voase et al (2003).

3.0 Results

3.1 Total Potential Recharge Values within EL 6505 and EL7223

Figures used to estimate potential recharge are summarised below.

Table 3.1: Estimation of Deep Drainage for EL6505 (Caroona)			
Ranking	Value (mm/yr)	Area of Contribution (Ha)	Potential Contribution to Recharge through Deep Drainage (ML)
Low	10	395	40
Moderate	20	16 235	3 247
High	30	17 864	5 359
Disturbed Land	No value ascribed	15	No Value
	Total	34 510	8 646 ML

Table 3.2: Estimation of Deep Drainage for EL7223 (Watermark)			
Ranking	Value (mm/yr)	Area of Contribution (Ha)	Potential Contribution to Recharge through Deep Drainage (ML)
Low	10	2543	254
Moderate	20	15833	3167
High	30	1183	355
Disturbed Land	No value ascribed	22	No Value
	Total	19580 Ha	3776 ML

The above calculations have been projected spatially as maps showing Low, moderate and high recharge areas. The maps show areas which contribute relatively to potential sideslope recharge through deep drainage. Note that no attempt has been made to estimate potential in-flows of groundwater from areas adjacent to the Exploration Leases and concentrate purely on that amount of potential recharge generated within the lease areas. These maps are presented in Appendices 7and 8.

3.2 Total Potential Runoff Values within EL 6505 and EL7223

Figures used for runoff are summarised below.

Table 3.3: Estimation of Runoff for EL6505 (Caroona)			
Ranking	Value (mm/yr)	Area of Contribution (Ha)	Potential Runoff (ML)
Low	15	24 971	3 746
Moderate	45	9 079	4 086
High	80	445	356
Disturbed Land	No value ascribed	15	0
	Total	34 510	8 187 ML

Table 3.4: Estimation of Runoff for EL7223 (Watermark)			
Ranking	Value (mm/yr)	Area of Contribution (Ha)	Potential Runoff (ML)
Low	15	5044	757
Moderate	45	14019	6309
High	80	495	396
Disturbed Land	No value ascribed	22	0
	Total	19580	7 461 ML

The above calculations have been projected spatially as maps showing Low, moderate and high runoff areas. The maps show areas which contribute relatively to potential sideslope recharge and surface waters through runoff. Note that no attempt has been made to estimate potential run-on from areas adjacent to the Exploration Leases and concentrate purely on that amount of potential runoff within the Exploration Lease areas. These maps are presented in Appendices 9 and 10.

4.0 Discussion of Results

The total estimated recharge and runoff for EL6505 is 8.6 GL and 8.2GL respectively, a total of 16.8 GL. Total estimated recharge and runoff for EL7223 is 3.8 GL and 7.5 GL respectively, a total of 11.3 GL.

The above method of calculation used to estimate potential deep drainage and runoff values for EL6505 and EL7223, could be used to calculate impacts of proposed mining within EL6505 and EL7223. For example a reduction in the area of land with moderate deep drainage potential, through open cut mining, in either EL6505 or EL7223 by 1000 Ha could reduce input to aquifers by 200 ML; and a 1000 Ha reduction within the area of moderate runoff would see a reduction in run off to the catchment of 453 ML.

EL6505 and EL7223, potentially feed groundwater zones which are used for irrigated agriculture. Namoi Groundwater Zones 3, 7 and 8 are adjacent or partially included within the coal exploration leases EL6505 and EL7223 (Appendix 11).. The sustainable yield for these zones is as follows: Zone 3, 17.3 GL, Zone 7, 3.7 GL and Zone 8, 16 GL DNR (2006). The combined sustainable yield of groundwater zones 3, 7 and 8 is 37 GL. The combined contribution directly to aquifer recharge through EL6505 and EL 7223 through deep drainage is 12.4 GL. This represents 33.5% of total sustainable groundwater yield.

The estimated annual flow of the Mooki River based on the median flow is 3.6 GL per year, measured at Gunnedah (DIPNR, 2004). The combined estimated runoff from coal explorations leases EL6505 and EL7223 is 15.7 GL. It is probable that a substantial portion of this runoff is entering groundwater systems further down-slope from the points where it has been estimated, rather than entering the Mooki River. Runoff generated within EL6505 and EL7223, represents 436% of the median flow of the Mooki River.

5.0 Conclusions

Given the magnitude of the above estimates, it is strongly recommended that any significant proposed land use changes in within either exploration lease area be seriously weighed up and concomitant losses to surface and groundwater be taken into account. It is apparent that the land within the exploration leases has significant input to both surface and groundwater flows in the region. Significant changes of land use within the areas of the exploration leases could cause very highly significant reductions in both surface and groundwater flows without consideration of damage to the irrigation aquifers themselves.

6.0. References

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NSW DPI 2008 Diagram of Exploration Licence No 7223. NSW Department of Primary Industries, Maitland

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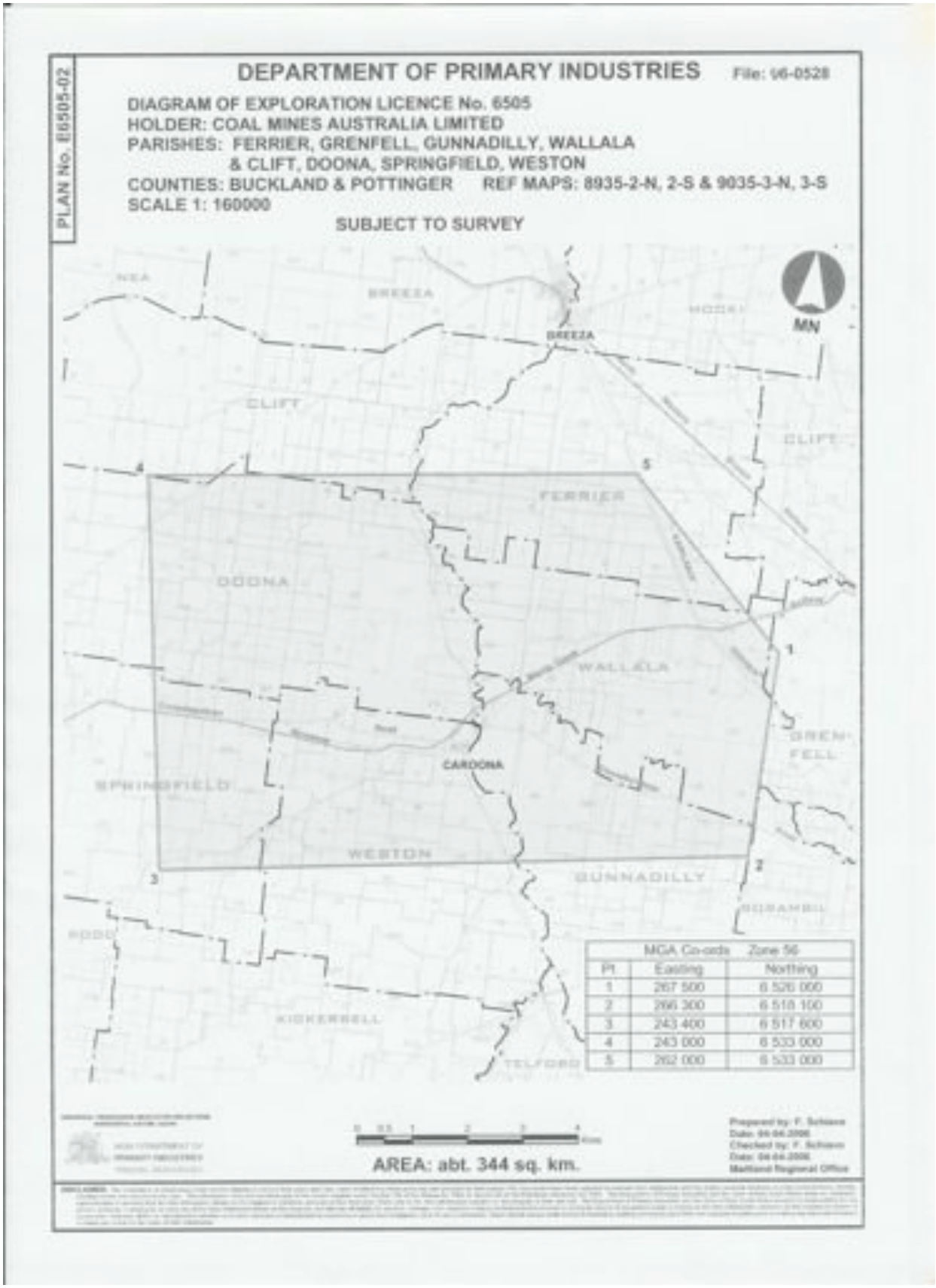
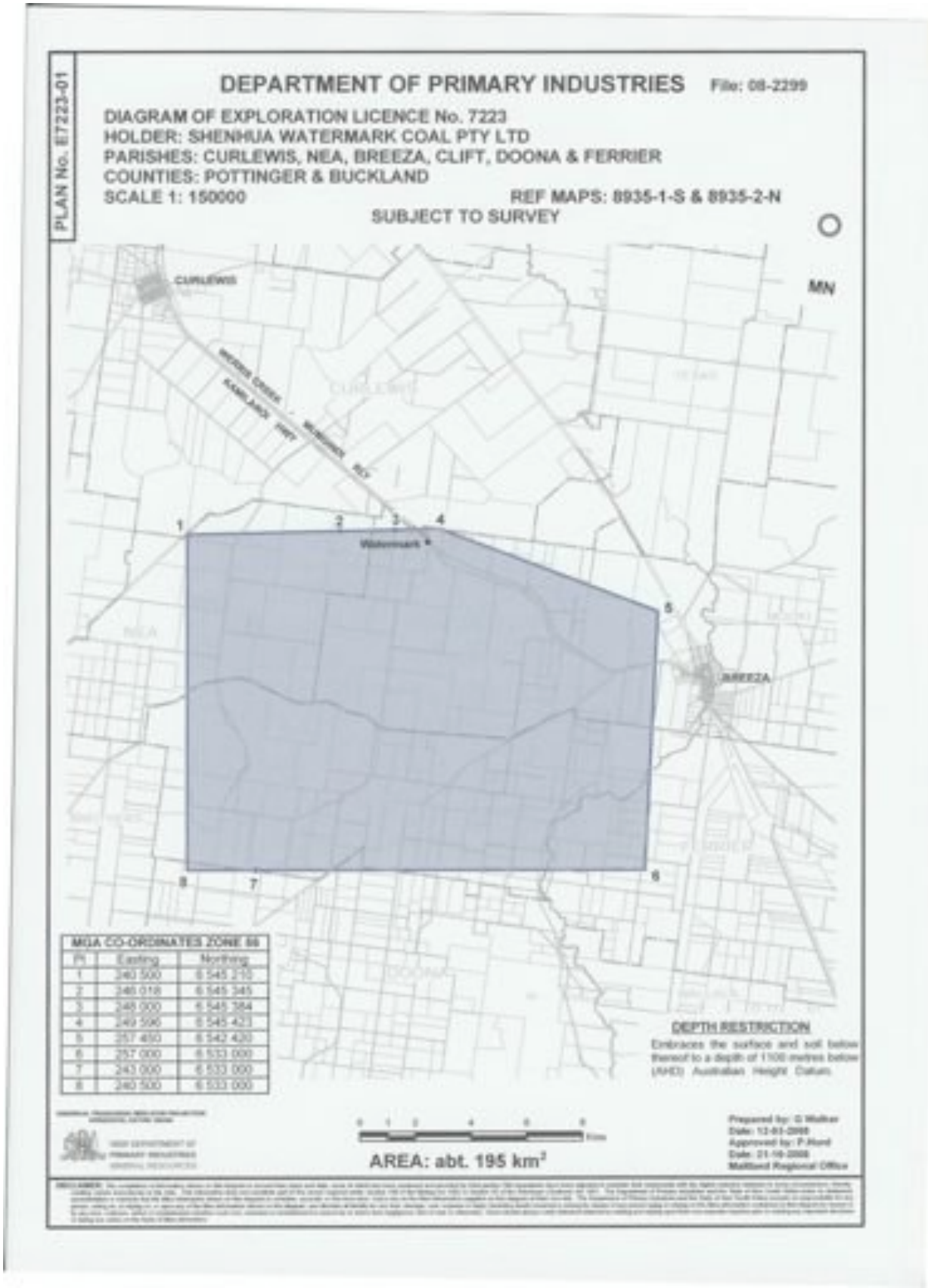
Appendix 1: Location of EL6505

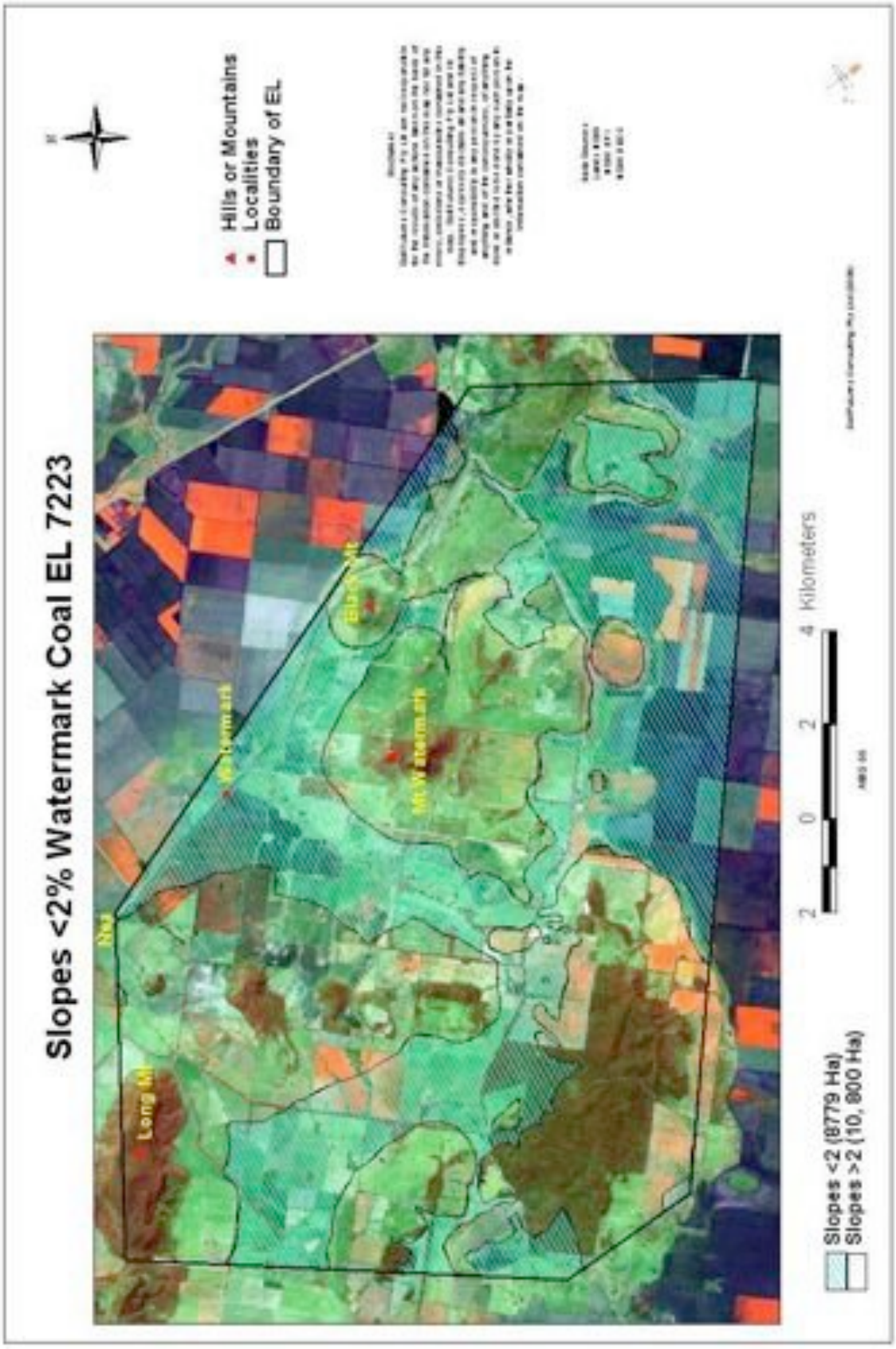


Appendix 2: Location of EL7223

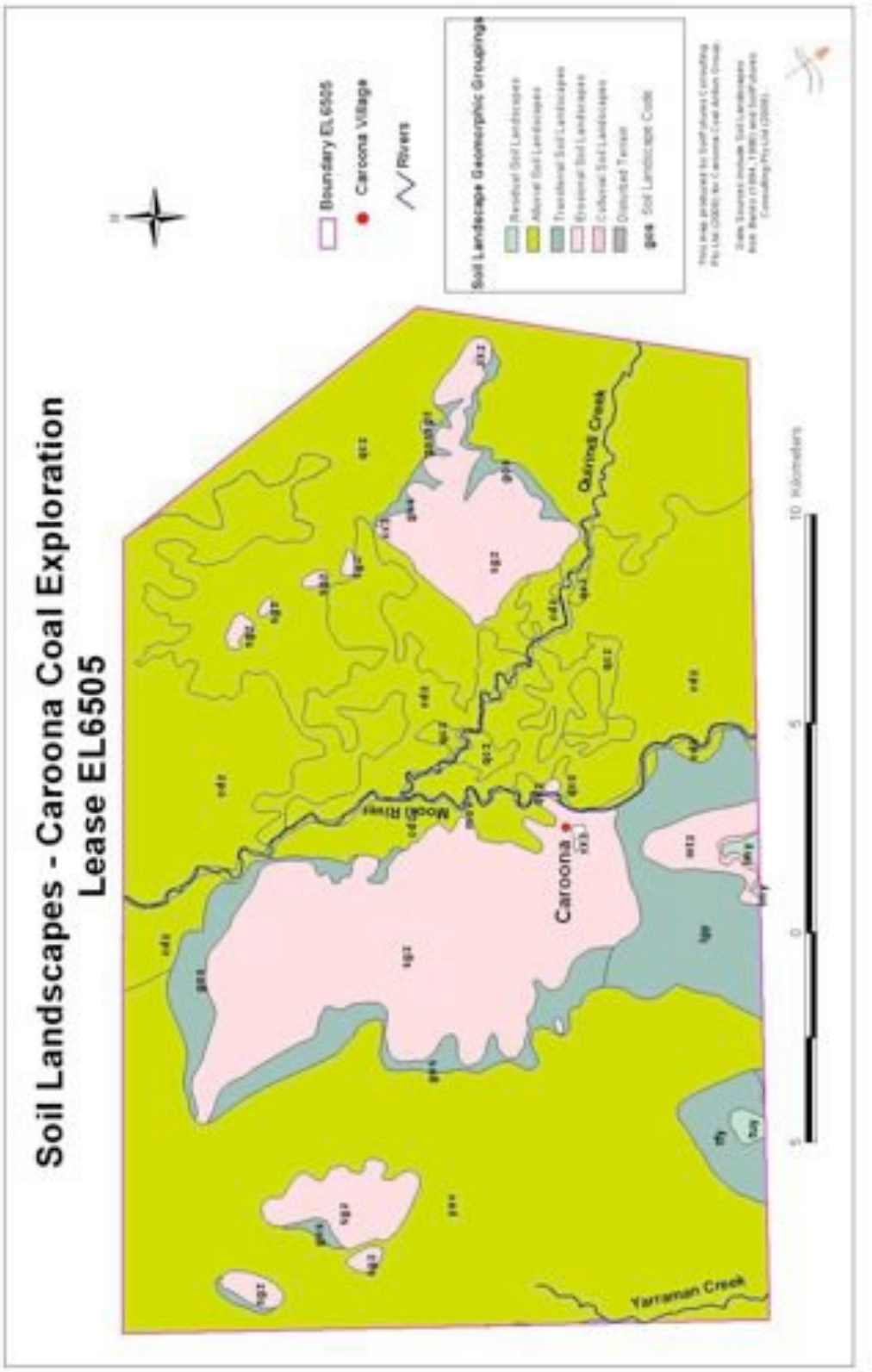


Appendix 3: Slope< 2% EL6505

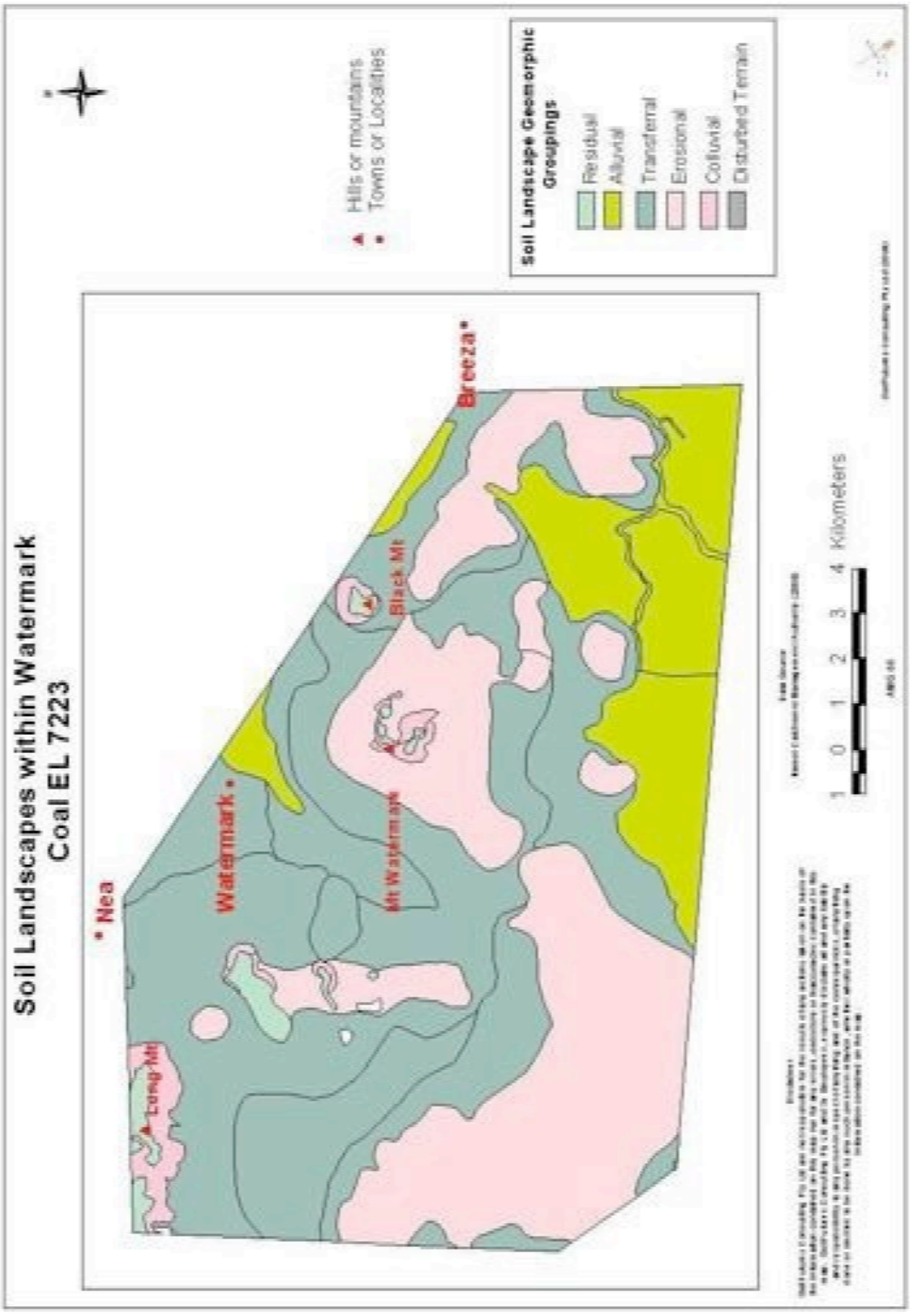
Appendix 4: Slope <2% EL7223



Appendix 5: Soil Landscapes of EL 6505

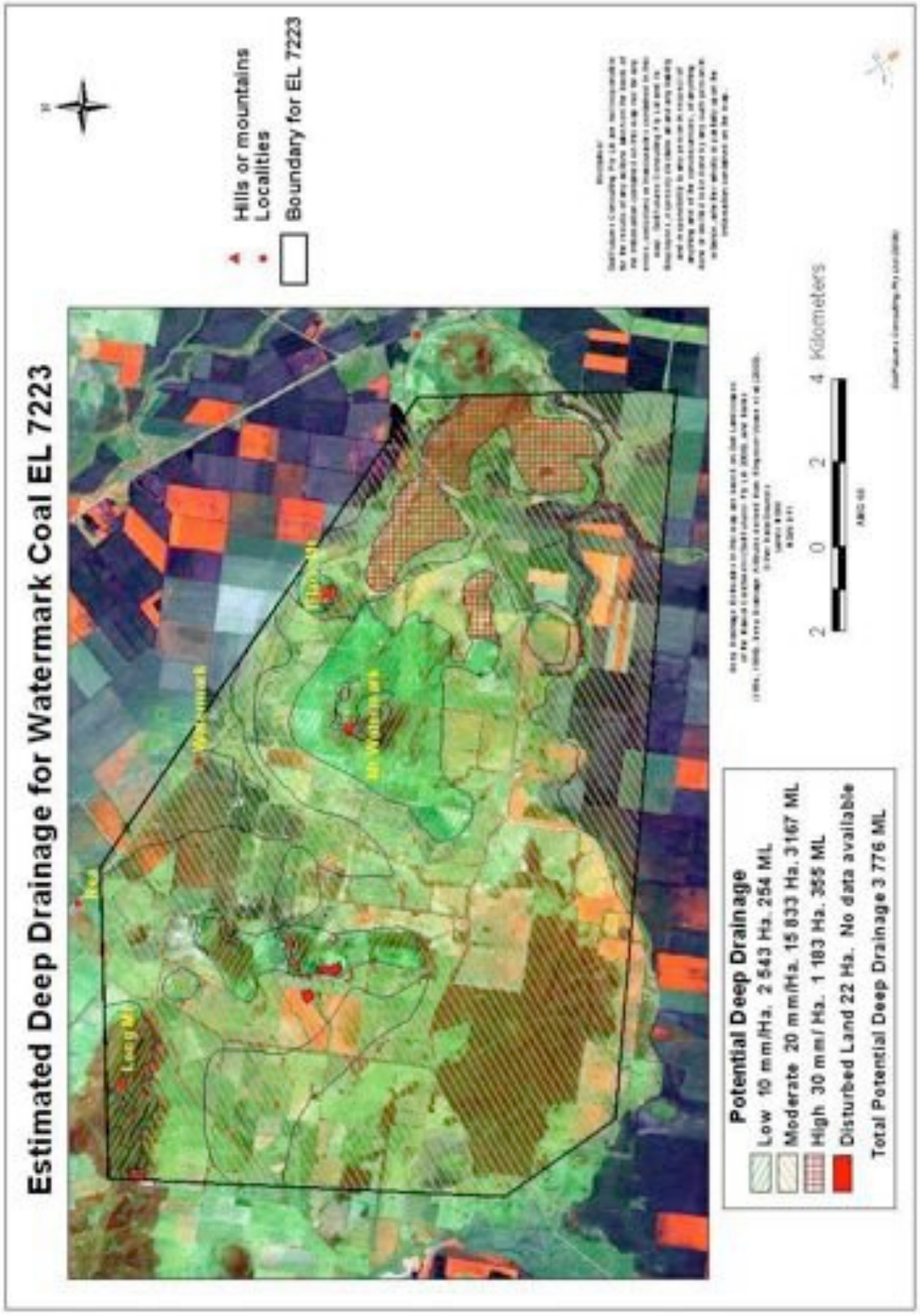


Appendix 6: Soil Landscapes of EL7223



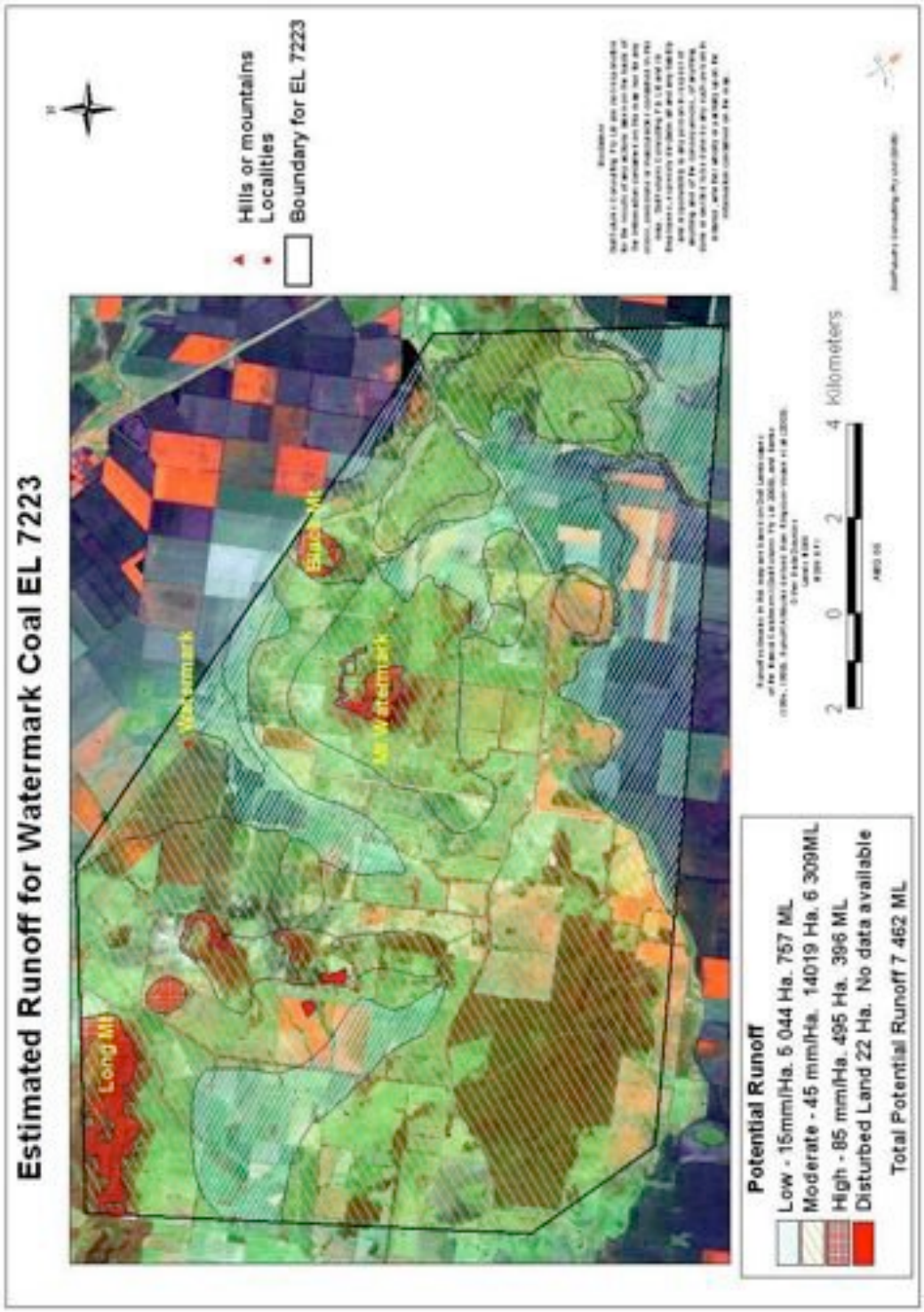
Appendix 7: Deep Drainage Estimates EL6505

Appendix 8: Deep Drainage Estimates EL7223



Appendix 9: Runoff Estimates EL6505

Appendix 10: Runoff Estimates EL7223



Appendix 11: Groundwater Zones near EL6505 and EL7223