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Economic impact of the proposed Drayton South Open-cut Coal Mine development on the Hunter Valley Thoroughbred Industry

Report prepared for Coolmore Australia and Darley Australia

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The Hunter Valley is the capital of Australia's thoroughbred breeding operations. The estimated income from stallion service fees in the Hunter Valley was $185 million, representing three quarters of the national total of $249 million, in 2011.

Hunter Valley thoroughbred operations are a critical part of a vertically integrated and interdependent regional and national industry. The regional industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region but for the stallion farms. Nationally, the Australian racing industry has 50,000 employees and 381 clubs which conduct 19,168 races each year. These clubs produce $5 billion in gross domestic product per annum.

Coolmore Australia and Darley Australia businesses (located across the road from the proposed Drayton South coal mine development) are Australia's largest thoroughbred breeding studs. In 2011, Coolmore Australia and Darley Australia's combined stallion fee earnings of $100 million (in the Hunter Valley) was greater than the total stallion fees earned by studs located outside of the Hunter Valley ($64 million) and all other studs in the Hunter Valley ($85 million).

Coolmore Australia and Darley Australia believe the proposed mine development will dramatically impact their business operations. The mine will probably force them to relocate either to inter-state or overseas, because (amongst other reasons):

- the industry is based on the international reputation that the Hunter has acquired for producing premium quality stock;
- this production capacity is based on key environmental attributes including clean air, clean water and green rolling hills; and
- the high net worth individuals in whose hands the top breeding stallions are concentrated are potentially very mobile.

Marsden Jacob Associates economic assessment finds that if the Drayton South coal mine is developed it will result in a net economic loss to the NSW economy of between $89 and $318 million (in net present value terms).

If Coolmore Australia and Darley Australia were to move to Victoria, their departure would reverse a trend over the last two decades which has seen the thoroughbred breeding industry move from Victoria to New South Wales. Analysis based on NIEIR estimates (using input-output modelling) finds that their departure would put over 640 jobs at risk in the Hunter Valley.

Executive Summary

Marsden Jacob Associates (Marsden Jacob) has been commissioned by Darley Australia and Coolmore Australia to review and remodel the economic assessment of the Drayton South coal mine.

Project Context

Gillespie Economics has prepared an economic assessment of the Drayton South coal mine: Drayton South Economic Impact Assessment by Gillespie Economics, August 2012.

The Gillespie Economics economic assessment has been remodelled by Marsden Jacob, working with the National Institute of Economic and Industry Research (NIEIR), as the current analysis under-estimates the costs and over-estimates the benefits of the Drayton South coal mine.

Hunter Valley Thoroughbred Industry

The Hunter Valley has been identified with the thoroughbred industry for more than a century. Industry growth has been particularly strong since the 1990s, following the alignment of the Australian industry taxation regime with that in New Zealand. The growth has also been fuelled by the outstanding performance of Hunter Valley thoroughbreds in races and in the sales ring.

The NSW Government Planning Assessment Commission has previously recognised the significant contribution that the thoroughbred industry in the Hunter Valley makes to regional, state and national economics and its incompatibility with coal mining. In 2010, the NSW Government Planning Assessment Commission report on the Bickham Coal Project found:

> *"The thoroughbred industry in the Upper Hunter Valley is a very significant contributor to the regional, state and national economies and a major source of employment. The structure of the industry makes it particularly vulnerable to threats based on image and the introduction of coal mining to the Upper Hunter Valley is strongly identified as such a threat. The available evidence supports the view that open-cut coal mining and a viable international-scale thoroughbred breeding enterprise are incompatible land-uses" (Planning Assessment Commission, 2010, p vi).*

Three quarters of Australia's thoroughbred breeding (by value) occurs in the Hunter Valley

In 2011, the estimated income from stallion service fees in the Hunter Valley was $185 million, representing three quarters of the national total of $249 million. As a result, the Hunter Valley thoroughbred industry is a critical input into the $5 billion dollar racing industry, with NSW contributing more than half of all Group 1 race winners in Australia.[1][2]

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1 Australian Racing Board, A Guide to the Racing Industry in Australia 2011-2012, http://www.australianracingboard.com.au/factbook, accessed 19 June 2013

2 IER 2007.

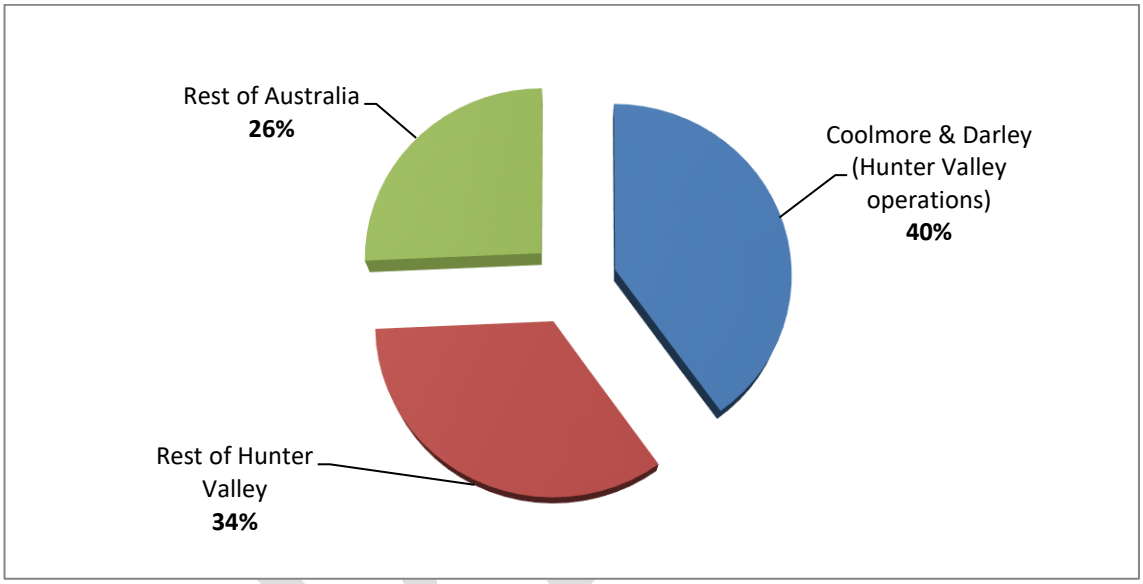
Coolmore Australia and Darley Australia (located across the road from the proposed Drayton South coal mine development) businesses are Australia's largest thoroughbred breeding studs.

As Michael Ford, Keeper Australian Stud Book, states:

> *"The stand-out fact is that Coolmore and Darley produce 40% of the estimated income earned in Australia, while the Hunter Valley produces 74% leaving only 2% for the rest of New South Wales, and 24% for all the other states" (email 27 March 2013).*

It must also be noted that Darley Australia is the top racing breeder in the nation.

Figure 1: Stallion Fees (2011)



Source: Stud Book, 2011

The thoroughbred industry is a critical source of employment and economic diversification in the Hunter Valley

Hunter Valley thoroughbred operations are a critical part of a vertically integrated and interdependent regional and national industry. The regional industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region but for the stallion farms.

Recent analysis by Marsden Jacob for the Australia Government highlights the critical importance of economic diversification in regional economies.[3] Without economic diversification, regional economies are highly vulnerable to shocks that are outside of their control, such as climatic events (e.g. drought or flood events) and commodity price changes.

A wide range and large number of local businesses depend on the thoroughbred industry, including farriers, horse transportation, vets (and the Scone Equine Hospital) and tourism.

A recent survey by Ernst & Young (2009) found that thoroughbred industry income was $298 million. This is nearly double the gross value of irrigated agricultural production for the

[3] http://www.marsdenjacob.com.au/cms/index.php?option=com_content&task=view&id=157&Itemid=82, accessed 20 June 2013

Hunter-Central Rivers region of $155 million (excluding the thoroughbred industry), based on ABS data. The next biggest sectors are dairy ($65 million), meat cattle ($30 million), hay ($7 million) and grapes ($4 million).[4]

Stakeholder interviews, undertaken by Marsden Jacob, confirm the importance of the thoroughbred industry to their economic viability. The sectors interviewed included: veterinary, electrical, timber, transport, capital equipment, hospitality and construction. Universal themes from these stakeholder interviews were:

- They do not provide services to the minerals industry.
- They are increasingly dependent on the thoroughbred industry. The dairy and viticulture markets are contracting and have entirely left some areas of the Hunter Valley, where previously they were important industries.
- The Hunter Valley thoroughbred industry is either their first or second most important client. Where the thoroughbred industry ranked second, the most important client was local government.
- If Coolmore Australia and Darley Australia were to move to Victoria the impacts on the Hunter Valley economy would be enormous. A number of interviews pointed to the economic downturn during the Equine Influenza outbreak in 2007. They noted that the economic impacts of the Equine Influenza outbreak would be small compared to Coolmore Australia and Darley Australia leaving the Hunter Valley.

Coolmore Australia and Darley Australia are major contributors to regional employment

If Coolmore Australia and Darley Australia were to move to Victoria, their departure would reverse a trend over the last two decades which has seen the thoroughbred breeding industry move from Victoria to New South Wales. Analysis by NIEIR estimates (using input-output modelling) that their departure would put over 640 jobs at risk in the local economy and strip over $120 million per annum in gross regional production from the local economy.

The regional economic benefits from the thoroughbred industry are substantial.

- A 2006 survey indicates that full time employment on studs increased from 325 FTE in 2000 to 738 FTE in 2006.[5]
- A 2009 survey by Ernst & Young found that the economic value may now be up to double the 2006 figures, with direct employment of over 1,000 FTE on the studs and broodmare farms, and further substantial flow-on effects in both the Hunter and beyond.

The full impact could be far greater than that modelled by NIEIR because, when 50% of the market departs, the knock-on effects on the industry cluster would be immense. In contrast, the mine's workforce appears to largely reside outside of the region. The Drayton South Response to Submissions states that only *"139 employees (26%) live within the catchment area of the Muswellbrook sewerage treatment facility"* (p248).

[4] 4610.0.55.008 - Gross Value of Irrigated Agricultural Production, 2010-11, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4610.0.55.0082010-11?OpenDocument

[5] http://www.htba.com.au/uploadimg/Final%20PAC%20PDF%20Report%20for%20Bickham%20030510.pdf

Cost-Benefit Analysis

As previously discussed, the Gillespie Economics economic assessment over-estimates the benefit and under-estimates the cost impacts of the proposed Drayton South coal mine. Key deficiencies with the analysis include:

- elevated coal prices; and
- the assumption that Coolmore Australia and Darley Australia are not impacted.

While our assessment focuses on these key deficiencies, it must be noted that other potential deficiencies, including visual amenity, water quality, air quality, health, transport and water management, could further increase the net economic loss to the NSW economy.

Scenarios

The cost-benefit analysis (CBA) models three scenarios and a 'business as usual' base case. Estimation of the base case is required as the CBA measures the costs and benefits incrementally to the base case (counterfactual case).

Table 1: CBA scenarios

Option Cases	Description
Drayton South is not developed (Base Case)	Coolmore Australia and Darley Australia thoroughbred studs operate in perpetuity (conservatively modelled as 50 years). Drayton South coal mine is not developed. Coal mining at the Drayton North Mine ceases in 2017.
Coolmore and Darley relocate overseas (Scenario 1)	Coolmore Australia and Darley Australia relocate their thoroughbred studs operations overseas in 2015. Drayton South coal mine is developed.
Coolmore and Darley relocate to Victoria (Scenario 2)	Coolmore Australia and Darley Australia relocate their thoroughbred studs' operations inter-state (to Victoria) in 2015. Drayton South coal mine is developed.
Gillespie Economics Assumptions (Scenario 3)	Coolmore Australia and Darley Australia thoroughbred studs are unaffected by the development of Drayton South coal mine. Drayton South coal mine is developed.

Source: Marsden Jacob analysis

Scenarios 1 and 2 have been assessed as Coolmore Australia and Darley Australia believe the proposed Drayton South coal mine will dramatically impact their business operation and will probably force them to relocate either inter-state or overseas.

Results

Under the base assumptions used in the analysis, the project results in a net economic loss of between $89 and $318 million (see Table 2).

Table 2: Summary Results

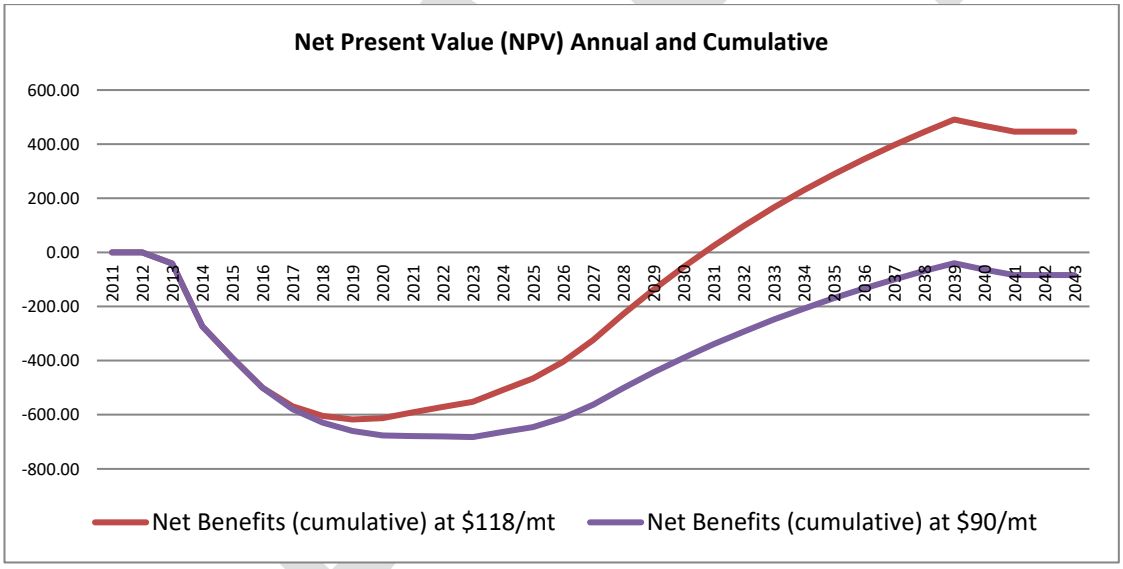
	Net Present Value (NPV)
Coolmore and Darley relocate overseas (Scenario 1)	-$153 million
Coolmore and Darley relocate to Victoria (Scenario 2)	-$318 million
Gillespie Economics Assumptions (Scenario 3)	-$89 million

Source: Marsden Jacob analysis

Note: The base assumptions include: 7% discount rate, 50 year analysis period and $90 per mt coal price

Illustrating the importance of coal price assumptions, even if impacts on Coolmore Australia and Darley Australia are not included (Scenario 3), our analysis finds the proposed mine never reaches economic breakeven when a realistic coal price of $90 per metric tonne (mt) is used instead of $118 per mt. This result demonstrates the mine is not economically beneficial, even before the impacts on Coolmore Australia and Darley Australia are considered.

Figure 2: Annual and Cumulative Net Present Value ($118 and $90 per mt)



Source: Marsden Jacob analysis[6]

Price of Thermal Coal

The price of thermal coal used in this analysis is conservatively assumed to be $90 per mt. The price of thermal coal is the most important driver of the CBA outcome.

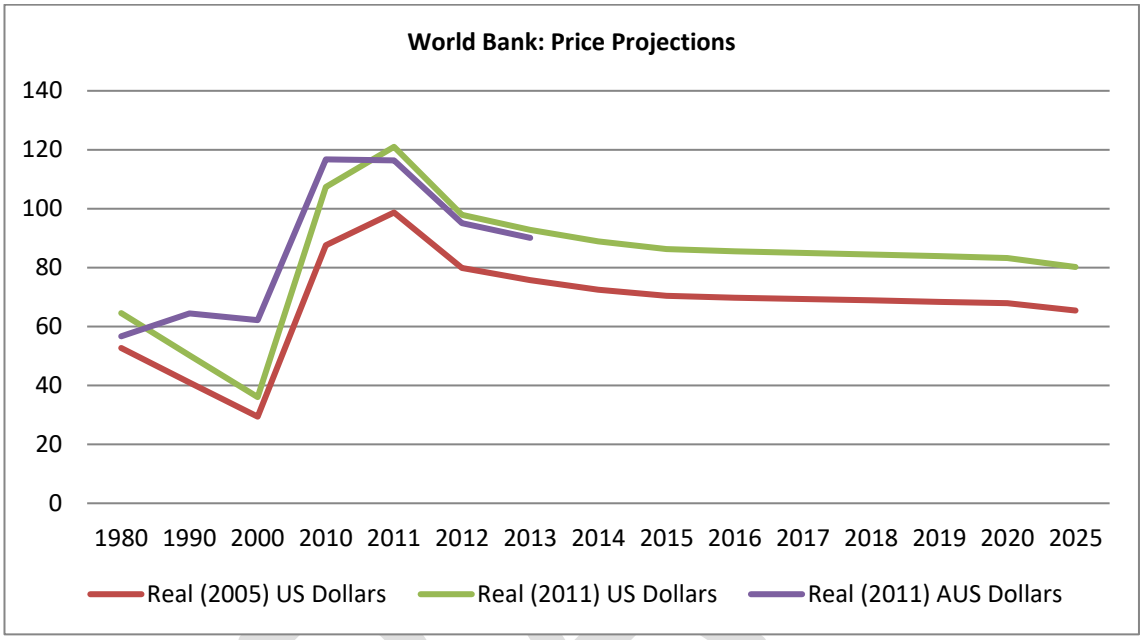
The Gillespie Economics analysis assumes a thermal coal price of $118 per mt. This price is unrealistically high and artificially elevates the economic benefits from the proposed coal mine

[6] Note: This is just one of a series of scenarios that were developed based on several key constraints: maximum ROM coal production of 7mtpa, production ceases in 2030 and NPV of revenue is $4,046 million at $118 per mt coal price. Scenarios included front-loading and back-loading productions schedules. All of the scenarios arrived at the same outcome: at a coal prices of $90 per mt the project delivers a net loss to the NSW economy.

development. The price is considerably higher than both forecasts by respected sources and other recent economic assessments undertaken by Gillespie Economics.

The World Bank (authoritative source for commodity prices) forecast in January 2013 that the price of Australian thermal coal would fall to around US$90 per mt in 2015 and then continue to fall to around US$65 per mt by 2025 (in real 2005 dollars). [7] Converting these values to 2011 dollars, thermal coal prices are forecast to be US$80 per mt by 2025; see Figure 3.

Figure 3: World Bank price projections



Source: World Bank 2013, Marsden Jacob analysis

Recent economic assessments undertaken by Gillespie Economics have been based on a thermal coal price of $89 per mt.

Table 3: Thermal Coal Prices (Gillespie Economics)

Project Name	Proponent	Assumed Thermal Coal Price	
Chain Valley Colliery	Lake Coal Pty Ltd	**$89 per tonne**	Gillespie Economics, March 2013
Mangoola Coal Modification 6	Xstrata Mangoola Pty Limited	**$89 per tonne**	Gillespie Economics, May 2013
Moolarben Coal Project Stage 1 Optimisation Modification	Moolarben Coal Operations Pty Limited	**$85 per tonne (US$)** **$84-95 per tonne (AUS$)**	Gillespie Economics, May 2013

Source: NSW Planning and Infrastructure, Major Project Assessments, http://majorprojects.planning.nsw.gov.au/

[7] http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1304428586133/Price_Forecast.pdf

Conclusions

This analysis reveals that:

- The Drayton South coal mine will result in a net economic loss to the NSW economy of between $89 and $318 million (net present values).
- The thoroughbred industry makes a very substantial economic contribution to the Hunter Valley economy. Production income of $298 million far exceeds the next largest agricultural sector, dairy, at $65 million.
- Regional economic diversification appears to be declining in the Hunter Valley. Interviews with key suppliers to Coolmore Australia and Darley Australia revealed that previously they were supplying the equine, dairy, viticultural and local government sectors. However, in recent years they have witnessed a decline in the dairy and viticultural sectors so they are increasingly reliant on the thoroughbred sector. These key suppliers do not supply services or products to the mining industry.
- If Coolmore Australia and Darley Australia were to relocate to Victoria nearly 640 jobs could be put at risk.
- There is a very real risk that if the Hunter Valley were to lose the top end of the thoroughbred breeding industry (Coolmore Australia and Darley Australia) then there would be material and irreversible repercussions that would be felt throughout the thoroughbred breeding, racing and service industries. A potential outcome is that the Hunter Valley could lose its title and status as an International Centre of Thoroughbred Breeding Excellence and NSW could lose one of its highest value, largest employment and most internationally reputed industries.

1. Introduction and Background

Marsden Jacob Associates (Marsden Jacob) has been commissioned by Darley Australia and Coolmore Australia to review and remodel the economic impact assessments for the Drayton South coal mine.

1.1 Drayton South coal mine

Anglo American is the proponent seeking development approval for the Drayton South coal mine. The Drayton South coal mine involves the development of open-cut and highwall mining operations for a period of 27 years.

The project is located approximately 10 km north west of Jerrys Plains and approximately 13 km south of Muswellbrook. The project is predominantly in the Muswellbrook Shire Local Government Area, with the south west portion falling within the Singleton Local Government Area.

The project is directly across the road from two top-end stallion and racing farms owned and operated by Darley Australia (Woodlands) and Coolmore Australia.

The Drayton South Mine is a new mine, but it is being promoted as an extension of the Drayton North Mine. The Drayton North Mine is managed by Anglo Coal (Drayton Management) Pty Ltd which is owned by Anglo American. The Drayton North Mine commenced production in 1983 and currently holds a project approval which expires in 2017 (Project Approval 06_0202, dated 1 February 2008).

The Drayton South open- cut coal mine application claims to extend the life of the mine beyond 2017 by developing new open-cut and high-wall mining operations within the Drayton South mining area. The Gillespie Economics report on the project states that it comprises the:

- *"continuation of the operations of the Drayton North Mine as presently approved with minor additional mining areas in the East, North and South Pits;*
- *development of an open-cut and highwall mining operation extracting up to 7Mtpa ROM (run of mine) coal over a period of 27 years;*
- *utilization of the existing Drayton [North] Mine workforce and equipment fleet (with an addition of a highwall miner and coal haul fleet);*
- *Drayton [North] Mine fleet consists of at least a dragline, excavators , fleet of haul trucks, dozers, graders, water carts and associated supporting equipment;*
- *use of the Drayton [North] Mine existing voids for rejects and tailings disposal and water storage to allow for optimization of the Drayton [North] Mine final landform;*
- *utilisation of the existing Drayton [North] Mine infrastructure including the Coal Handling and Preparation Plant (CHPP), rail loop and associated loadout infrastructure, workshops, bath houses and administration offices;*
- *construction of a transport corridor between Drayton South and Drayton Mine;*
- *utilisation of the Antiene Rail Spur off the Main Northern Railway to transport product coal to the Port of Newcastle for export;*
- *realignment of a section of the Edderton Road; and*

- *installation of water management (including a licence water discharge point and pumping station adjacent to the Hunter River) and power reticulation infrastructure at Drayton South"* (p7).

1.2 Drayton South coal mine development: NSW Government assessment

1.2.1 Director General's Requirements

The Drayton South Coal Project was placed on exhibition (from 7 November to 21 December 2012) by the NSW Government, Department of Planning and Infrastructure. The project is a controlled project under Part 3A of the *Environmental Planning and Assessment Act 1979*.

In October 2011, Part 3A of the *Environmental Planning and Assessment Act 1979* was repealed. However, the project was granted the benefit of transitional provisions and so is a development controlled by Part 3A.

The Director General's Requirements for Drayton South Coal Project (ll_0062) were issued on 3 August 2011 and Supplementary Requirements were issues on 30 April 2012. Three requirements have particular relevance to the economic assessments (see Table 4). Most critically, the mine proponent was required to pay *"particular attention to the thoroughbred breeding industry"*.

Table 4: Director General's Requirements

Director General's Requirements	
Section 75F of the Environmental Planning and Assessment Act 1979	
Social and Economic	1. A detailed assessment of the potential impacts of the project on the local and regional community, paying particular attention to the thoroughbred breeding industry and the demand it may generate for the provision of additional infrastructure and services; and 2. A detailed assessment of the costs and benefits of the project as a whole, and whether it would result in a net benefit for the NSW community.
Section 75 of the Environmental Protection and Biodiversity Conservation Act 1999	
Economic and social matters	1. A description of the short-term and long-term social and economic implications and/or impacts of the project.

Source: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4814

1.2.2 Planning Assessment Commission

On 16 March 2013, the Minister for Planning and Infrastructure requested that the Planning Assessment Commission review the Drayton South Coal project, under section 23D of the *Environmental Planning and Assessment Act 1979* and Clauses 268R and 268V of the *Environmental Planning and Assessment Regulation 2000*.

In particular, the Minister required that the review:

> *"1(b) assess the project as a whole, paying particular attention to the:*

- *impacts of the project on strategic agricultural land, as identified in the Upper Hunter Strategic Regional Land Use Plan, and in particular the Coolmore and Woodlands Studs, which form part of a defined Equine Critical Industry Cluster (CIC)". ...*

"1(d) provide advice on the suitability of the site for the project and whether the project is in the public interest"[8]

On 21 May 2013, the Minister for Planning and Infrastructure wrote to the independent Planning Assessment Commission (PAC) requesting that it defer its review of the proposed open-cut mine to allow the Department of Planning and Infrastructure to undertake further work on concerns raised in public submissions.

Public hearings for the project were due to commence in June.

"The Department is currently in the process of reviewing the submissions received during the project's public exhibition late last year, including detailed submissions from both the Coolmore and Darley studs," Mr Hazzard said.

"I've written to the acting chair of the PAC stating that the Department is concerned the proposal does not adequately address impacts on the studs.

"To ensure a thorough review of all issues can take place, I've asked the PAC to postpone its review of the project.

"Once the Department has considered the response from the mining company, I will be in a position to advise the PAC how to proceed further."

Mr Hazzard said the adjacent horse studs form part of the Upper Hunter's Equine Critical Industry Cluster (CIC), as identified in the Government's Strategic Regional Land Use Policy.

The region's thoroughbred industry is one of two CICs identified for heightened protection from mining and other resources activities, along with the winemaking industry. (Media Release, Minister B Hazzard MP, 21 May 2013)

1.3 The current economic assessment is deficient

Gillespie Economics has prepared two economic assessments of the Drayton South coal mine: a cost benefit analysis (CBA) and an input-output based economic impact assessment. These assessments were prepared to inform decision making under Part 3A of the *Environmental Planning and Assessment Act 1979*. Specifically, their report is titled "Drayton South Economic Impact Assessment by Gillespie Economics, August 2012".

The Gillespie Economics economic assessment has been remodelled by Marsden Jacob, working with the National Institute of Economic and Industry Research (NIEIR), as the current analysis:

[8] https://majorprojects.affinitylive.com/public/5ff0e1a7c954e056441f12c4fe0f87e1/Drayton%20South%20-%20Terms%20of%20Reference%20PAC%20Review.pdf, accessed 20 June 2013

- does not properly address the Director-General's requirements, as the analysis simplistically assumes that open-cut coal mining and thoroughbred breeding studs are compatible operations;
- over-estimates the benefits from the Drayton South coal mine, as the analysis assumes an inflated thermal coal price of $118 per metric tonne (mt); and
- does not comply with the NSW Government's guidelines as the analysis period is only 33 years.

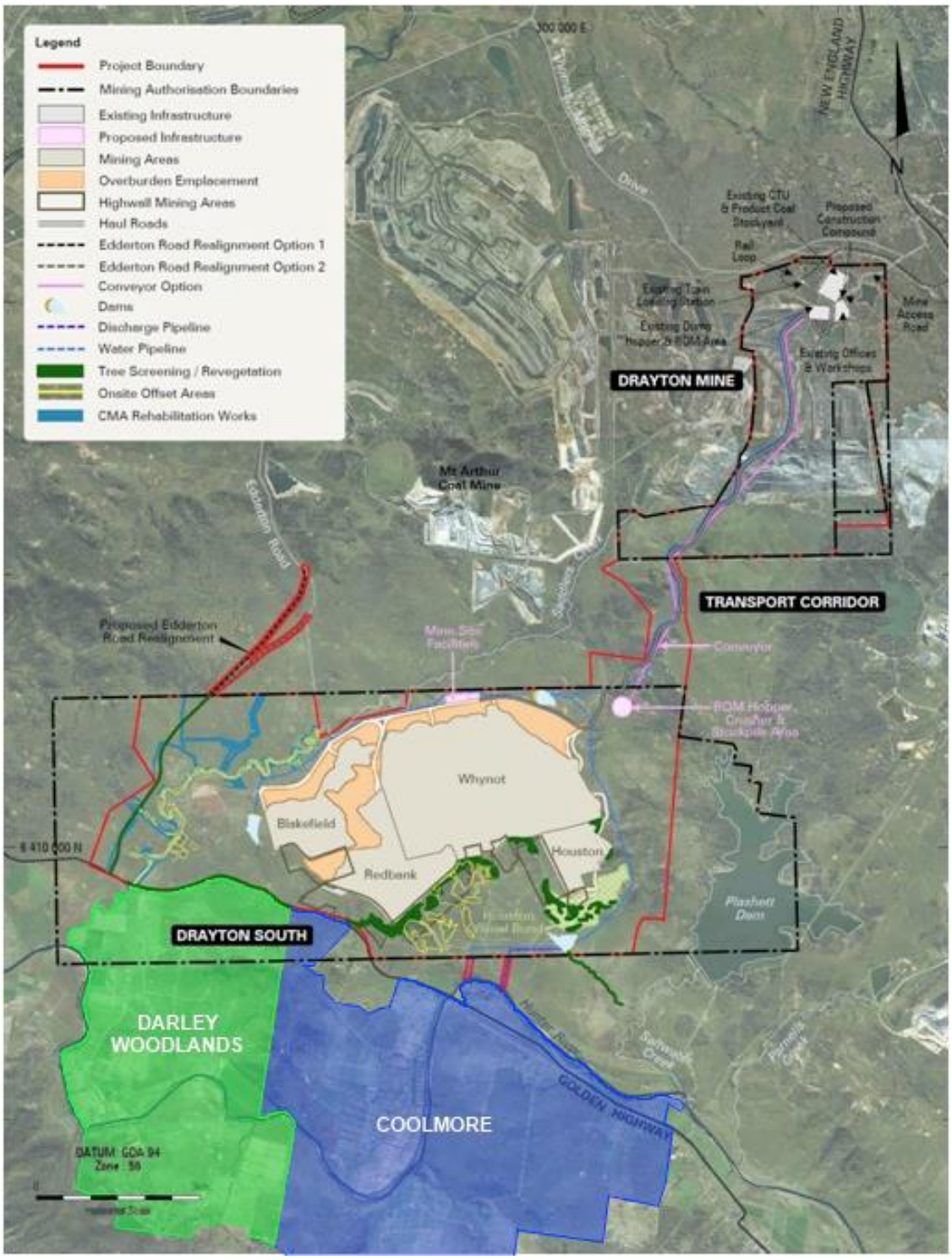
This is despite the NSW Planning Assessment Commission having previously recognised that coal mining and thoroughbred industries are not compatible. In 2010, the NSW Government Planning Assessment Commission report on the Bickham Coal Project in 2010 found:

> *"The thoroughbred industry in the Upper Hunter Valley is a very significant contributor to the regional, state and national economies and a major source of employment. The structure of the industry makes it particularly vulnerable to threats based on image and the introduction of coal mining to the Upper Hunter Valley is strongly identified as such a threat. The available evidence supports the view that open-cut coal mining and a viable international-scale thoroughbred breeding enterprise are incompatible land-uses" (Planning Assessment Commission, 2010, p vi).*

1.4 Coolmore Australia and Darley Australia: Location

Coolmore Australia and Darley Australia's Woodlands studs are located across the road from the proposed Drayton South coal mine development (Figure 4) and within the mining authorisation boundary.

Figure 4: Coolmore and Darley in relation to Drayton South



Source: Hunter Thoroughbred Breeders Association

1.5 This Report

The structure of this report is as follows:

- Executive Summary: Summarises the key findings from the analysis
- Section 1 Introduction and Background: Discusses the Drayton South coal mine and Director General's Requirements
- Section 2 Importance of the Thoroughbred Industry in the Hunter Valley
- Section 3 Cost-Benefit Analysis: Results
- Attachment A: Hunter Valley Thoroughbred Industry
- Attachment B: Darley Australia and Coolmore Australia
- Attachment C: Cost-Benefit Analysis Methodology and Assumptions
- Attachment D: Economic Impact Analysis
- Attachment E: Discount Rates
- Attachment F: Cost-Benefits Analysis Results

Coolmore Australia

2. Importance of the Thoroughbred Industry

The Hunter Valley is the capital of Australia's thoroughbred breeding operations and is recognised as one of only three International Centres of Thoroughbred Breeding Excellence. The Hunter Valley thoroughbred breeding industry is a critical source of:

- **Employment: stallion farms, broodmare farms and sophisticated local network of support and supply businesses. These businesses would not be based in the Hunter Valley without the breeders in the Hunter Valley;**
- **Race horses: nationally, the Australian racing industry has 50,000 employees and 381 clubs which conduct 19,168 races each year. These clubs produce $5 billion in gross domestic product per annum;**
- **Export income: the Hunter Valley is the largest exporter of premium thoroughbreds and the market is forecast to expand into the Asia-Pacific market.**

Coolmore Australia and Darley Australia businesses (located across the road from the proposed Drayton South coal mine development) are Australia's largest thoroughbred breeding studs. In 2011, Coolmore Australia and Darley Australia's combined stallion fee earnings of $100 million (in the Hunter Valley) was greater than the total stallion fees earned by studs located outside of the Hunter Valley ($64 million) and all other studs in the Hunter Valley ($85 million).

This chapter highlights: the critical contribution that the thoroughbred industry makes to the Hunter Valley economy and Australia's racing industry; and the market importance of Coolmore Australia and Darley Australia.

2.1 Economic Diversification: The thoroughbred industry is the largest agricultural sector in the Hunter Valley

The Hunter Valley thoroughbred industry is a critical part of a vertically integrated and interdependent regional and national industry. The Hunter Valley industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region in the absence of the stallion farms.

Within the Hunter Valley, which extends from Newcastle to Murrurundi, it is estimated that there are approximately:

- 75 studs standing stallions; and
- 100 broodmare farms.[9]

The thoroughbred industry is the biggest agricultural sector in the Hunter Valley. Thoroughbred industry income (studs and broodmare farms) was conservatively estimated to be $298 million in 2009. This is nearly double the gross value of irrigated agricultural production for the Hunter-Central Rivers region of $155 million (excluding the thoroughbred industry).

[9] Planning Assessment Commission, 2010, p 37, http://www.htba.com.au/uploadimg/Final%20PAC%20PDF%20Report%20for%20Bickham%20030510.pdf, accessed 20 June 2013

The next biggest agricultural sectors are dairy ($65 million), meat cattle ($30 million), hay ($7 million) and grapes ($4 million).[10]

The NSW Government already recognises the importance of the thoroughbred industry. The NSW Government's Strategic Regional Land Use Plan: Upper Hunter (2012) identifies that the Upper Hunter economy is:

> *"currently underpinned by the main industries of coal mining, agriculture (particularly dairy and beef cattle and pasture production) and associated service industries, horse breeding, electricity production, tourism, viticulture and wine making." (p12).*[11]

The thoroughbred industry is recognised as a critical industry cluster in the NSW Government's Strategic Regional Land Use Plan: Upper Hunter (2012), which notes that:

> *"The horse breeding cluster includes a highly integrated concentration of horse breeding facilities and related infrastructure covering thoroughbred and stock horse breeding centres and numerous other equine developments and support services, such as a specialised veterinary centre 5. In 2009 - 2010 the region provided 80 to 90 per cent of the total value of stud horses exported by Australia. It is also the headquarters for the NSW Stockhorse Society.*
>
> *The attraction for equine interests to the region lies in its combination of a temperate climate, protected aspect and varied terrain combined with a lack of tropical diseases and accessibility to Sydney. The breeders are supported by the aggregation of equine industry infrastructure and good transport routes." (page 22)*

Any contraction in the size of the thoroughbred industry represents a critical risk to the residents and businesses in the Upper Hunter Valley. Recent analysis by Marsden Jacob for the Australia Government highlights the critical importance of economic diversification in regional economies.[12] The analysis found that without economic diversification, regional economies are highly vulnerable to shocks that are outside of their control, such as climatic events (e.g. drought or flood events) and commodity price changes.

2.2 Coolmore Australia and Darley Australia: the biggest thoroughbred studs in Australia

Coolmore Australia and Darley Australia are the biggest thoroughbred studs in Australia (see Figure 4). As Michael Ford, Keeper Australian Stud Book, recently stated:

> *"The stand-out fact is that Coolmore and Darley produce 40% of the estimated income earned in Australia, while the Hunter Valley produces 74% leaving only 2% for the rest of New South Wales, and 24% for all the other states" (email 27 March 2013).*

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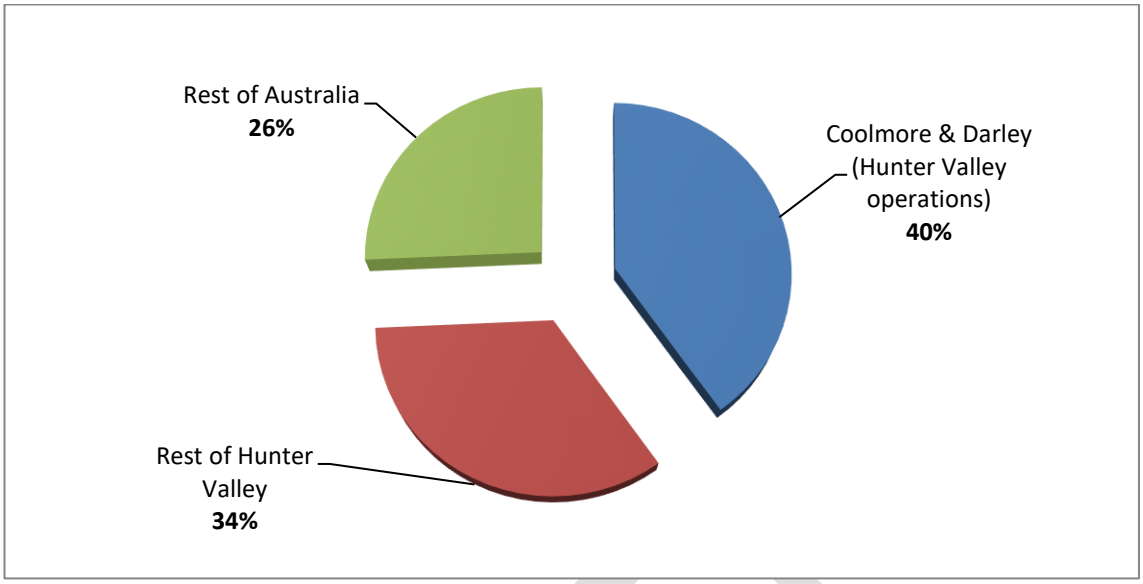
10 4610.0.55.008 - Gross Value of Irrigated Agricultural Production, 2010-11, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4610.0.55.0082010-11?OpenDocument

11 http://www.nsw.gov.au/sites/default/files/uploads/common/UpperHunterSLUP_SD_v01.pdf, accessed 21 June 2013

12 http://www.marsdenjacob.com.au/cms/index.php?option=com_content&task=view&id=157&Itemid=82, accessed 20 June 2013

Figure 5: Stallion Fees[13] (2011)



Source: Stud Book, 2011

If Coolmore Australia and Darley Australia were to leave the Hunter Valley and move to Victoria—a likely scenario which has been modelled in the cost-benefit analysis in Section 3—it would have a massive impact on the thoroughbred breeding industry and related industries, both within the Hunter Valley and NSW. Coolmore Australia and Darley Australia are premium stallion farms. Collectively:

- they earned over 50% of service fees in the Hunter Valley and NSW;
- they earned over 40% of service fees in Australia; and
- their average service fees were over $40,000, nearly double the average for the Hunter Valley ($23,413), more than treble the NSW average ($11,507) and nearly 700% higher than the national average ($6,110).

Table 5: Stud Book data on Coolmore and Darley, 2011

	Coolmore & Darley	% of Hunter Valley	% of NSW
Stallions covering mares	30	28.8%	12.6%
Mares covered	3,419	40.1%	32.7%
Live foals	2,249	40.4%	33.7%
Average service fee	$40,828	-	-
Estimated income from service fees	$99.6M	53.8%	52.5%

Source: Stud Book 2011

Coolmore Australia and Darley Australia's market dominance has resulted from the success of their leading stallions. At the top of Coolmore's stallion roster are Fastnet Rock, Encosta Del Lago and High Chapparal. In 2011-12, Fastnet Rock was Australia's leading sire (see Table

[13] Service fees are paid by a mare owner to a stallion owner for the right to breed to it. Service fees are a key source of income for stallion farms. Other income sources include yearling sales, agistment of pregnant mares and stallion standing fees.

14). At the top of Darley's stallion roster are Lonhro, Street Cry and Exceed and Excel. In 2011-12, Lonhro was Australia's second placed sire (see Table 6).

Table 6: Top Ten Sires (2011-12 season)

Rank	Stallion	Runners	Winners	Stakes Winners	Group 1 Winners	Earnings	Stud
1	**Fastnet Rock**	**273**	**130**	**16**	**4**	**$12,683,189**	**Coolmore**
2	**Lonhro**	**273**	**129**	**8**	**1**	**$9,391,368**	**Darley**
3	Redoute's Choice	267	131	12	1	$8,648,647	
4	More Than Ready	238	99	9	2	$7,841,145	
5	**Commands**	**289**	**137**	**10**	**0**	**$7,197,975**	**Darley**
6	Bel Esprit	285	127	2	1	$6,575,510	
7	**Encosta de Lago**	**297**	**131**	**10**	**0**	**$6,227,297**	**Coolmore**
8	**Exceed and Excel**	**257**	**121**	**7**	**1**	**$6,156,460**	**Darley**
9	Snitzel	119	65	6	1	$5,792,904	
10	Testa Rossa	274	122	7	1	$5,457,320	

Source: Stallions[14]

2.3 Employment: The thoroughbred industry is an important source of employment in the Hunter Valley

The thoroughbred industry is a major employer in the Hunter Valley.

A survey of the industry found that the Hunter Valley breeding industry (defined as stallion farms and broodmare farms) directly employs 1,061 full time equivalents (FTEs), consisting of 708 FTEs employed directly by the stallion industry and 353 directly employed by the broodmare industry.[15]

Over 640 jobs at risk: if Coolmore Australia and Darley Australia were to leave the Hunter Valley

If Coolmore Australia and Darley Australia were to move to Victoria, their departure would likely reverse a trend over the last two decades which has seen the thoroughbred breeding industry move from Victoria to New South Wales.

[14] www.stallions.com.au/statistics/sirelists/index_2012.php, accessed 17 May 2013

[15] Ernst and Young (2010)

NIEIR estimates (using input-output modelling) their departure would put over 640 jobs at risk in the local economy and strip over $120 million per annum in gross regional production from the local economy.

The full economic impact would probably be far greater if Coolmore Australia and Darley Australia were to move elsewhere. Coolmore Australia and Darley Australia's breeding operations comprise 50% of the breeding market in the Hunter Valley. If Coolmore Australia and Darley Australia were to move interstate the economic impact on the regional thoroughbred industry and economy would be immense.

2.4 Economic Outlook: Thoroughbred Industry

Over the next five years, IBISWorld forecasts that the Australian thoroughbred industry will grow by over 5 percent per annum. This growth means the economic contribution of the thoroughbred industry to the Hunter Valley is anticipated to increase considerably over the coming years.

> *"The industry is expected to benefit from growth in the horseracing sector, which is expected to be buoyed by the economic recovery and forecast increases in prize money and average earnings. As already witnessed in 2011-12 (the last period for which data is available), the average value of yearlings is expected to increase over the next five years, along with an increase in service fee revenue. Further, as global economic conditions gradually improve exports of horses for racing or to the public for recreational purposes is also expected to trend upwards. To this end, IBISWorld estimates that industry revenue will increase by an annualised 5.0% over the five years through 2017-8 to total $951.1 million."*[16]

If Coolmore Australia and Darley Australia move to Victoria then the New South Wales economy will miss out on this growth opportunity. Two decades ago, Victoria was centre of thoroughbred breeding industry in Australia. Over the past two decades it has lost this title to the Hunter Valley. A 2006 Victorian Parliamentary Inquiry noted with concern the shift of the industry to NSW and its loss from Victoria.[17] It commented on the relative strength of the Hunter Valley industry, which attracts the majority of Australian and international investment in the thoroughbred breeding industry. Particularly important was the 'stallion profile' of the Hunter Valley, with submissions to the inquiry commenting that:

> *"Victorian breeders feel that they are unable to match the quality of stallions standing in the Hunter Valley, as a result of the superior levels of capital investment in the Hunter Valley ... Witnesses before the Committee also spoke of the difficulty in addressing broodmare owners' perceptions that stallions standing in the Hunter Valley are superior to those standing in Victoria".*

The inquiry noted that a useful guide to the relative weakness of Victoria's stallion profile was found in the Inside Racing Sires Supplement (Inside Breeding). The stallion listings by service fee (2005 supplement) indicated that 25 of the top 27 stallions were located in the Hunter Valley. Only two of the stallions were located in Victoria. Thus, the Inquiry aimed to

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16 http://clients1.ibisworld.com.au/reports/au/industry/keystatistics.aspx?entid=25, accessed 25 June 2013

17 Parliament of Victoria, Economic Development Committee (2006), Inquiry into the Viability of the Victorian Thoroughbred/Standardbred Breeding Industries: Report on the Thoroughbred Breeding Industry.

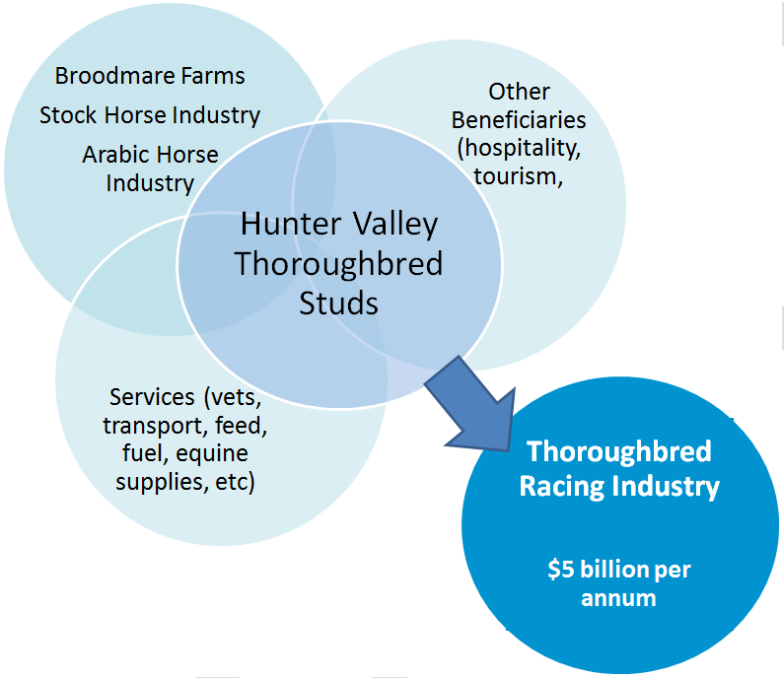
investigate options to encourage the Victorian industry, noting the benefits that were now accruing to NSW instead of Victoria.

2.5 Service industries

As previously discussed, the Hunter Valley thoroughbred industry is more than just stud and broodmare farms. The industry is a critical part of a vertically integrated and interdependent regional and national industry. The Hunter Valley industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region but for the stallion farms.

Support and service industries have been drawn to the Hunter Valley region because of the internationally recognized thoroughbred industry. Service industries include veterinary, suppliers, hospitality, transport, and others (**Error! Reference source not found.**).

Figure 6: The Hunter Valley Thoroughbred Breeding Industry



Source: Marsden Jacob analysis

This growth in the thoroughbred industry services sector arises from the fact that the thoroughbred breeding industry is highly service intensive and thus is very closely linked to the regional economy. It is estimated that 85% of their operational expenditure occurs within the local region.[18,19]

Stakeholder interviews undertaken by Marsden Jacob confirmed the importance of the thoroughbred industry to the economic viability of the support and service industries. The sectors interviewed included: veterinary, electrical, timber, transport, capital equipment, hospitality and construction. Universal themes that emerged from these stakeholder interviews were:

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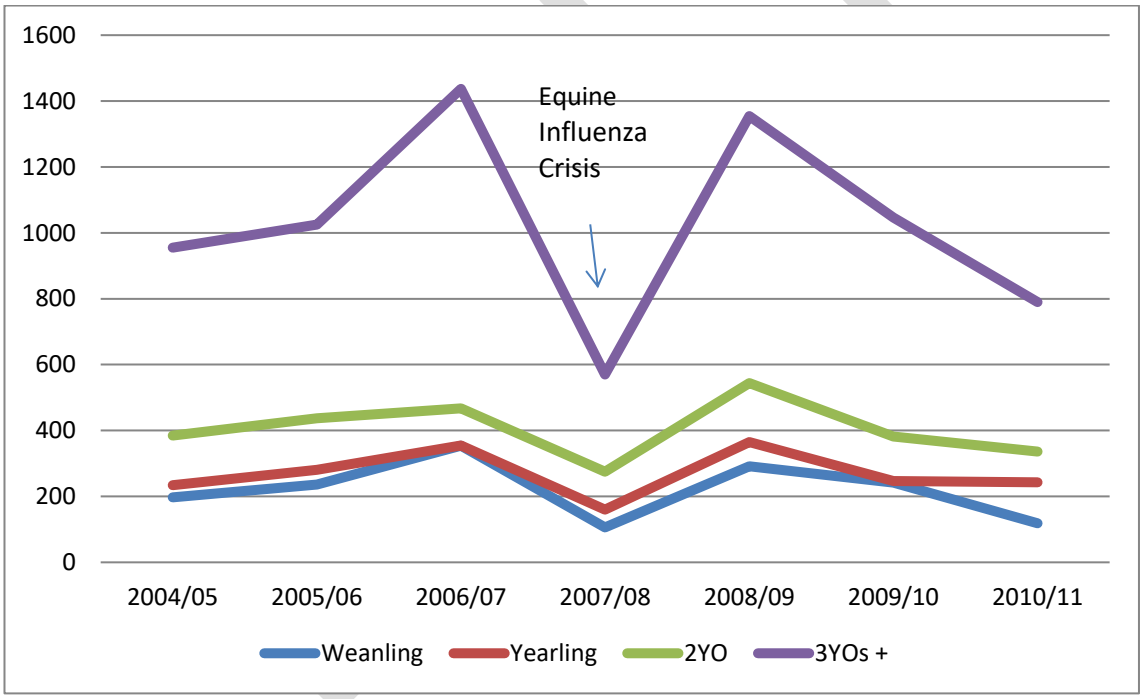
18 HTBA website; and NSW Dept of Planning.

19 www.planning.nsw.gov.au/LinkClick.aspx?fileticket=mp_IJN9ss64%3D&tabid=299&language=en-AU, accessed 6 May 2013

- They do not provide services to the minerals industry.
- They are increasingly dependent on the thoroughbred industry. The dairy and viticulture markets are contracting and have entirely left some areas in the Hunter Valley, where previously they were important industries.
- The Hunter Valley thoroughbred industry is either their first or second most important client. Where the thoroughbred industry ranked second, the most important client was local government.
- If Coolmore Australia and Darley Australia were to move to Victoria the impacts on the Hunter Valley economy would be immense. A number of interviews pointed to the economic downturn during the Equine Influenza outbreak in 2007. They noted that the economic impacts of the Equine Influenza outbreak would be small compared to Coolmore Australia and Darley Australia leaving the Hunter Valley.

As previously discussed, the Equine Influenza outbreak significantly reduced the amount of thoroughbred breeding because restrictions were place on the movement of horses. Illustrating the impact, information from the Thoroughbred Breeders Australia identifies that the number of thoroughbred exports halved in the 2007/08 season (1 September to 31 August).

Figure 7: Thoroughbred Exports (by season)



Source: Thoroughbred Breeders Australia

2.6 Racing: The national racing industry depends on the progeny from the Hunter Valley

Nationally, the Australian racing industry depends on the progeny of the Hunter Valley. The 2011-12 Australian Racing Fact Book identifies that the Australian racing industry has 50,000 employees and 381 clubs which conduct 19,168 races each year. These clubs produce $5 billion in gross domestic product per annum.[20]

[20] http://www.australianracingboard.com.au/factbook, accessed 20 June 2013

The race horses produced in the Hunter Valley are the dominant participants in both the NSW and Australian racing industry. IER (2007) in their report on *The Economic Impact of Racing* noted that almost half (31) of the 66 Group One events in Australia were won by NSW trained horses.

Coolmore Australia and Darley Australia progeny are major participants in the international racing industry. For instance, of the 1,449 stakes (top tier) races in Australia, New Zealand, South Africa, Hong Kong, Malaysia, Singapore and Macau between 1 January 2012 and 1 May 2013, 377 (26%) were won by the progeny of Darley Australia or Coolmore Australia sires. The total prize money from these wins was $54.7 million.[21]

Darley Australia breeds both to race and to sell. Darley's race horse operation is Australia's leading thoroughbred race horse breeder. In 2012-13 Darley has won more stakes races than any other breeder; see Table 17. Note that while Coolmore Australia does some limited racing, it is predominantly a thoroughbred breeding business.

Table 7: Darley Black Type events (2012-13)

Name	State	G1	G2	G3	L	Total
Darley	**NSW**	**9**	**10**	**15**	**19**	**53**
Mr G Harvey	NSW	2	1	4	8	15
Corumbene Stud	NSW	1	2	0	4	7
Arrowfield Pastoral Pty Ltd	NSW	0	2	4	1	7
Strawberry Hill Stud	NSW	1	2	1	2	6

Source: Thoroughbred Breeders Australia

[21] Information sourced from www.thoroughbredinternet.com (without subscription) or www.bloodhound.net.au (with subscription).

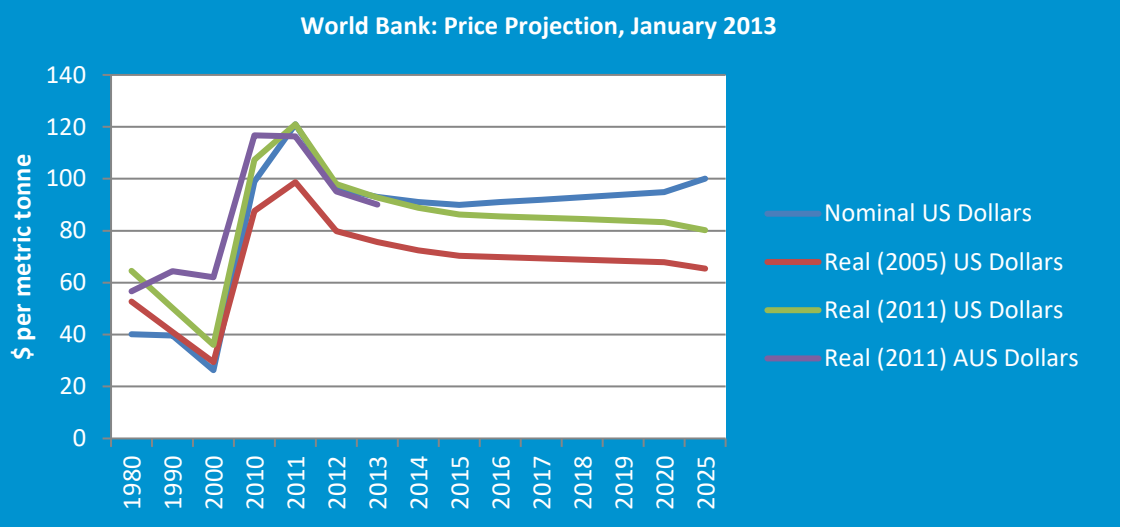
3. Cost-Benefit Analysis

Net Economic Loss to NSW: The development of Drayton South Coal Mine will result in a net economic loss to the NSW economy.

The Marsden Jacob analysis finds that the project results in a net economic loss to NSW under all three scenarios in the base analysis. The net economic loss is estimated at between $89 and $318 million (in net present value terms). The base analysis assumes a thermal coal price of $90 per metric tonne (mt) and a 50 year analysis period.

The analysis reveals numerous deficiencies with the previous CBA

For instance, the Gillespie Economics analysis assumed no impact on the thoroughbred industry and a thermal coal price of $118 per mt. Authoritative sources on thermal coal prices, such as the World Bank and Bureau of Resource Economics, are forecasting that prices will gradually fall over the medium term. The World Bank's most recent forecast is that thermal coal prices will be $80 per mt in 2025 (in real 2011 US Dollars).



CBA is a preferred framework and technique to inform decision-making on development applications. As the NSW Government Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals (Nov 2012) states: *"[CBA] allows decision-makers to consider trade-offs and decide whether the community as a whole is better or worse off as a result of the proposal"* (p1).[22]

CBA is intended to measure the net social welfare outcome from the community from a project. To achieve this outcome a CBA needs to take into account the *"full range of potential benefits and costs of particular actions, including environmental, health and other social impacts as well as economic impacts of particular proposals. It is not appropriate to examine only some types of impacts in isolation"* (p1).

[22] www.planning.nsw.gov.au/LinkClick.aspx?fileticket=1IW95ZTjemY%3D&tabid=205&mid=1081&language=en-AU

3.1 Cost-Benefit Analysis: Results

This section details the results from the CBA; the assumptions underpinning the CBA are discussed in Attachment C.

3.1.1 Scenarios

The analysis models three scenarios and a 'business as usual' base case. Estimation of the base case is required as the CBA measures the costs and benefits incrementally to the base case (counterfactual case).

Table 8: CBA scenarios

Option Cases	Description
Drayton South is not developed (Base Case)	Coolmore Australia and Darley Australia thoroughbred studs operate in perpetuity (conservatively modelled as 50 years). Drayton South coal mine is not developed. Coal mining at the Drayton North Mine ceases in 2017.
Coolmore and Darley relocate overseas (Scenario 1)	Coolmore Australia and Darley Australia relocate their thoroughbred studs operations overseas in 2015. Drayton South coal mine is developed.
Coolmore and Darley relocate to Victoria (Scenario 2)	Coolmore Australia and Darley Australia relocate their thoroughbred studs' operations inter-state (to Victoria) in 2015. Drayton South coal mine is developed.
Gillespie Economics Assumptions (Scenario 3)	Coolmore Australia and Darley Australia thoroughbred studs are unaffected by the development of Drayton South coal mine. Drayton South coal mine is developed.

Source: Marsden Jacob analysis

Scenarios 1 and 2 arise from the proposed project because Darley Australia and Coolmore Australia believe they will be critically impacted by the development of the proposed Drayton South coal mine. The structure and nature of the thoroughbred industry means that it is linked to high net worth clients who are highly mobile, so reputation is fundamental to success.

Consequently, Darley Australia and Coolmore Australia have advised that if the coal mine were developed they would probably be forced to move their stud operations, either interstate or overseas.[23] They would not move their stud operations to somewhere else in the Hunter Valley or NSW, because of the risk of future mine development undermining their investment decisions.

3.1.2 Base Analysis: Results

Under the base case assumptions used in the analysis (7% discount, 50 year analysis and $90 per mt coal price) the project delivers a net economic loss for all scenarios. The results of the analysis are summarised in Table 9.

[23] Neither Coolmore Australia or Darley Australia have decided whether they would move overseas or inter-state, so both scenarios have been modelled.

Table 9: Base Analysis Results (NPV, 50 years, 7% discount rate, $90 per mt coal price)

	NPV
Scenario 1 (Move Overseas)	-$153 million
Scenario 2 (Move to Victoria)	-$318 million
Scenario 3 (Gillespie Economics assumptions)	-$89 million

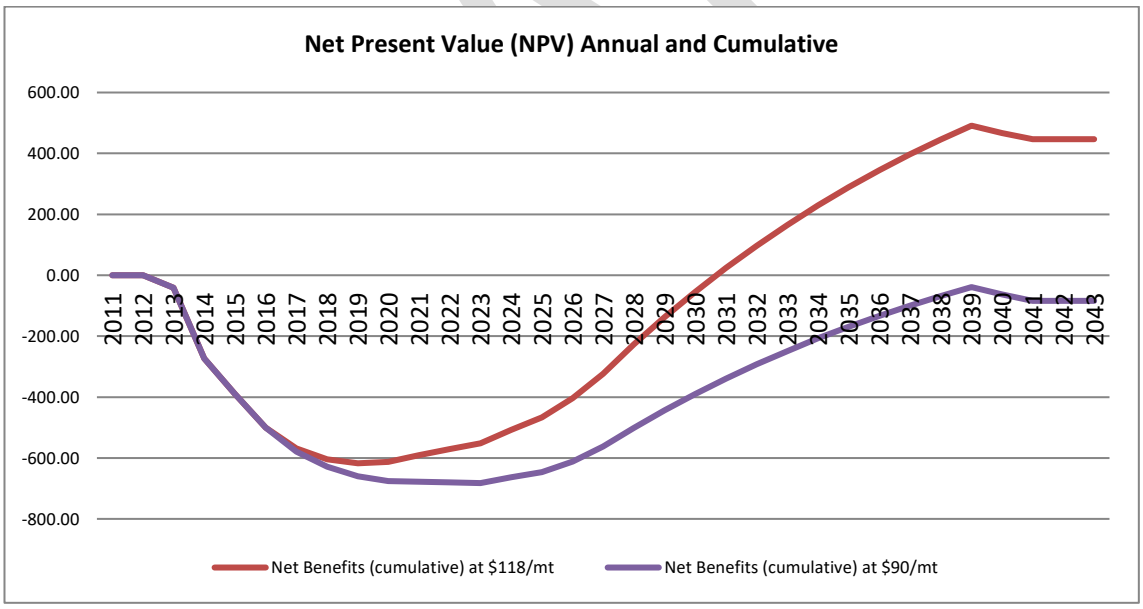
Sources: Marsden Jacob analysis

Scenario 3 result reveals the importance of the coal price assumption

The importance of the coal price is revealed in Scenario 3. Using all the assumptions in the Gillespie Economics CBA and a more realistic coal price (sourced from the World Bank, Bureau of Energy and Resource Economics), the project no longer delivers a net economic benefit to the NSW economy.

The Gillespie Economics CBA uses a 'spot price' for thermal coal of $118 per mt and found the project deliver a $443 million economic benefit. The Gillespie Economics report identifies that projected prices for thermal coal were provided by Anglo American and *"averaged $118 per tonne"* (Gillespie Economics 2012 p13). When a more realistic coal price of $90 per mt is used the project never reaches breakeven from an economic perspective, see Figure 8.

Figure 8: Annual and Cumulative Net Present Value ($118 and $90 per mt)



Source: Marsden Jacob analysis

3.2 Sensitivity Analysis

A series of sensitivity tests on key parameters have also been undertaken. Sensitivity tests are important to understand how the results vary with changes in one or more key parameters or assumptions. We have undertaken sensitivity analysis for the following key variables (more sensitivity test results are presented in Attachment F):

- coal prices;
- discount rates; and
- analysis period.

The coal price sensitivity test includes both

3.2.1 Sensitivity Analysis: Results

The sensitivity tests show that the:

- mine only delivers a positive net public benefit outcome if elevated coal prices are used;
- outcome is sensitive to different discount rates being applied. Changing the discount rate on the thoroughbred operations from 7% to 4% reduces the net present value outcome by over $140 million, under Scenario 2;
- outcome is highly sensitive to coal price and exchange rate assumptions. However, even when US Dollars are used the mine still results in a net economic loss of $147 million if Coolmore Australia and Darley Australia move to Victoria; and
- outcome is moderately sensitive to the analysis timeframe that is used.

Table 10: Net Present Value outcomes

	Base Analysis	Discount Rates	Coal Price (US$)	Gillespie Coal Price and analysis timeframe
Coal Price	**$90/mt**	$90/mt	See note	$118/mt
Discount Rate: Mining Industry	**7%**	7%	7%	7%
Discount Rate: Thoroughbred Industry	**7%**	4%	7%	7%
Analysis Period	**50 years**	50 years	50 years	33 years
Scenario 1 (Move Overseas)	**-$ 153**	-$ 198	-$ 2	$ 378
Scenario 2 (Move to Victoria)	**-$ 318**	-$ 457	-$ 167	$ 211
Scenario 3 (Replication of Gillespie Economics analysis)	**-$ 89**	-$ 89	$62	$ 441

Source: Marsden Jacob analysis

Note: The United States dollar coal price sensitivity test assumes: World Bank coal price forecasts (see Attachment C) and the Australian:United States exchange rate declines in the medium term to 81.6cents.

To test the impact of different discount rates, we modelled the impact of differential discount rates for the mining and thoroughbred industries. Using differential discount rates is an accepted practice in CBA where different cost and benefit streams are related to different activities. In the case of this analysis, there are two discrete and different activity types with very different project timeframes:

- Finite project life of 27 years: Drayton South Coal Mine; and
- Sustainable project with an infinite time horizon: Thoroughbred Stallion farms.

For the purpose of this analysis, the discounts rates tested are 7% for the mining sector (the NSW Government's preferred central rate) and 4% for the thoroughbred industry (the NSW Government's preferred lower bound).

3.2.2 Threshold Tests

Because the results are highly sensitive to a number of key parameters we have tested the threshold points on key parameters, namely coal prices and discount rates. The findings of this analysis are:

- The coal price has to be over $108 per mt for the proposed coal mine to deliver a break even present value and thus balance the economic loss that results from Darley Australia and Coolmore Australia relocating to Victoria. This coal price is significantly above current projections by the World Bank and the Bureau of Resource Economics. It is also well above more recent prices used by Gillespie Economics for other thermal coal projects. For instance, the base coal price used in the Gillespie Economics assessment of the Mt Arthur coal mine is $97 per mt.
- The threshold discount rate is 3.6%. At a coal price of $118 per mt the net present value outcome is zero, if a discount rate of 3.6% is used for the thoroughbred industry (based on a 50 year analysis). This demonstrates that the analysis is highly sensitive to the discount rate.

3.3 Conclusions

Net Economic Loss to NSW: The development of Drayton South Coal Mine will result in a net economic loss to the NSW economy.

The project results in a net economic loss to NSW under all three scenarios in the base analysis. The net economic loss is between $89 and $318 million (net present values). The base analysis assumes (thermal coal price of $90 per metric tonne (mt) and 50 year analysis period).

A number of sensitivity test have also been undertaken, but the result remains the same. The mine would result in a net economic loss to the NSW economy.

The analysis reveals numerous deficiencies with the previous CBA

Marsden Jacob's analysis has identified a number of critical deficiencies with the Gillespie Economics analysis. The deficiencies mean the economic benefit of the proposed Drayton South coal mine are materially over-stated. These deficiencies include:

Coal prices: the assumption that coal mining and thoroughbred breeding are compatible neighbours; a 'spot price' for thermal coal has been used in the analysis; and other first-order (direct) impacts on health, economic infrastructure, environmental values are only partially assessed.

The price of thermal coal used in the analysis is well above both long-term historical (real) values of thermal coal (from Indexmundi) and price projections by the World Bank and Bureau of Resource Economics.

Coal mining and thoroughbred breeding are compatible: The CBA and regional economic impact assessment assumes that open-cut coal mining and thoroughbred breeding studs are compatible operations. So, it is assumed that the development of the mine will have no impact on the neighbouring thoroughbred farms. This is despite the NSW Planning Assessment Commission having previously recognised that they are not compatible.

The thoroughbred breeding industry is barely discussed and no impacts are factored into the Gillespie Economics analysis, yet Coolmore Australia and Darley Australia (Australia's premier thoroughbred studs) are located on the opposite side of the Golden Highway to the proposed Drayton South Mine development. Coolmore Australia and Darley Australia are:

- market leaders in both the Hunter and Australian thoroughbred breeding industry;
- owners of high value land and bloodstock assets. For instance, in May 2008 Darley Australia purchased Woodlands for nearly $500 million;[24]
- employment intensive businesses that have close links to the regional economy (85% of operational expenditure is within the local region); and
- important and sustainable contributors to the regional economy.

[24] www.abc.net.au/local/audio/2011/09/27/3326603.htm

Attachment A: Hunter Valley Thoroughbred Industry

This attachment presents statistical information on the Hunter Valley thoroughbred industry.

Hunter Valley Thoroughbred Industry

Hunter Valley thoroughbred industry is a critical part of a vertically integrated and interdependent regional and national industry. The Hunter Valley industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region but for the stallion farms.

Within the Hunter Valley, which extends from Newcastle to Murrurundi, it is estimated that there are approximately:

- 75 studs standing stallions, but the majority of the top stallions are concentrated on a small number of studs; and
- 100 broodmare farms. These act as specialist nurseries and provide care for mares throughout pregnancy and for foals up to preparation for sale as a yearling. Approximately 50% of mares are managed in this way with the other 50% resident on the studs. [25]

Stallion Services

Stallion services statistics are a key indicator of the significance of the thoroughbred industry in the Hunter Valley. The Australian Stud Book collects information on the number of stallions covering mares, mares covered, live foals, service fees and estimated income from service fees.

The Hunter Valley is the most important thoroughbred breeding region in NSW and Australia (see Table 11 and Table 12).

- The Hunter Valley accounts for over **95%** of the estimated NSW income from thoroughbred stallion service fees, throughout the period 2005-11;
- In 2011, stallion service fees in the Hunter Valley accounted for **74%** of national earnings;
- The average stallion service fees in the Hunter ($23,413) are almost **four times** those of the national average ($6,110) and more than double those for NSW as a whole ($11,507);
- Hunter Valley stallions covered over **80%** of mares in NSW, despite being only 43.5% of the stallions (by number) in NSW; and
- Hunter Valley stallions covered over **74%** of mares in Australia, despite being only 13.2% of the stallions (by number) in Australia. This reflects the premier quality and reputation of the bloodstock.

[25] Planning Assessment Commission, 2010, p 37, http://www.htba.com.au/uploadimg/Final%20PAC%20PDF%20Report%20for%20Bickham%20030510.pdf, accessed 20 June 2013

Table 11: Estimated income from service fees, 2005-11

Year	Estimated income				
	Hunter Valley ($M)	as % of NSW	as % of National	NSW	National
2011	184.98	97.5%	74.2%	189.79	249.29
2010	212.74	97.4%	75.0%	218.39	283.70
2009	207.87	96.3%	73.3%	215.80	283.44
2008	295.71	96.4%	77.3%	306.70	382.57
2007	224.78	95.3%	71.2%	235.77	315.72
2006	234.44	95.4%	74.4%	245.77	315.17
2005	207.09	96.7%	74.7%	214.14	277.19

Source: Stud Book, 2011.

Table 12: Thoroughbred breeding industry, 2011

		Hunter Valley as % of NSW	as % of Australia	NSW	Australia
Stallions covering mares	104	43.5%	13.2%	239	787
Mares covered	8,517	81%	37.8%	10,456	22,517
Live foals	5,565	83%	39.9%	6,674	13,930
Average service fee	$23,413	-	-	$11,507	$6,110
Estimated income from service fee	$185.0M	97.5%	74.2%	$189.8 M	$249.3M

Source: Stud Book 2011.

Stallion fees are a key source, but not the only source, of stud farm revenue.[26] Other key sources of income include yearling sales as well as fees for services (agistment, farrier and veterinary services). A recent industry survey, undertaken by Ernst and Young (which was provided to Marsden Jacob by the Hunter Thoroughbred Breeders Association) identified that yearling sales income in 2009 was estimated to be $86 million[27].

The thoroughbred industry is a critical source of economic diversification in the Upper Hunter

Hunter Valley thoroughbred operations are a critical part of a vertically integrated and interdependent regional and national industry. The regional industry includes stallion farms, broodmare farms and a sophisticated network of support and supply industries that would not be in the region but for the stallion farms.

The thoroughbred industry is the biggest agricultural sector in the Hunter Valley. Thoroughbred industry income (studs and broodmare farms) was estimated to be $298 million in 2009 by Ernst and Young. This is nearly double the gross value of irrigated agricultural production for the Hunter-Central Rivers region of $155 million (excluding the thoroughbred

[26] Other significant sources of revenue include yearling sales and agistment fees.

[27] Ernst and Young (2010) Hunter Valley Thoroughbred Breeding Industry – Size and Scope Study

industry). The next biggest agricultural sectors are dairy ($65 million), meat cattle ($30 million), hay ($7 million) and grapes ($4 million).[28]

The thoroughbred industry is a major employer in the Upper Hunter

The thoroughbred industry is a major employer in the Hunter Valley.

IER (2007) estimated the participants employed in producing racing thoroughbreds (see Table 13), as a component of the racing industry. They estimated around 370 full-time paid staff in the NSW industry, with a further 2,400 part-time paid staff.

Table 13: Participants in thoroughbred racing (NSW)

Participants	Metro	Non-metro	Total
Breeders	633	2,648	3,281
Owners	9,967	11,870	21,837
Trainers	125	1,154	1,279
Employees	1,440	6,178	7,619
Total participants in producing racing thoroughbreds	12,166	21,851	34,016

Source: IER 2007

A survey of the industry by Ernst and Young (2010) found that the breeding industry directly employs 1,061 full time equivalent (FTEs), consisting of 708 FTEs employed directly by the stallion industry and 353 directly employed by the broodmare industry; and a further 199 FTEs for related / linked services.

Direct Spending

Direct spending is another important measure of the regional economic contribution from the Hunter Valley thoroughbred industry.

RIRDC (2001)[29] estimated that expenditures on breeding nationally totalled $742 million (which included husbandry, stabling, feed, supplies and training).[30]

In their review of the economic impact of racing, IER estimated direct spending by breeders in non-metro areas of NSW to be in the region of $218.8 million per annum.[31] It is safe to assume that this expenditure would primarily relate to the Hunter Valley which accounts for 97% of the NSW breeding industry.

A survey of broodmare and stallion farms in the Hunter Valley by Ernst and Young (2010) produced a similar estimate of expenditures ($225.4 million per annum), with salaries and wages being the largest component of expenses for both broodmare farms (33.1%) and stallion farms (29.3%).

[28] 4610.0.55.008 - Gross Value of Irrigated Agricultural Production, 2010-11, http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4610.0.55.0082010-11?OpenDocument

[29] RIRDC (2001) The Horse Industry Contributing to the Australian economy

[30] This includes all breeding, not just thoroughbreds.

[31] IER 2007, p.29.

Attachment B: Coolmore Australia and Darley Australia

What sets the Hunter Valley apart is the number of large international scale breeding interests, which are investing significant amounts of capital in the industry. This investment has led to rapid expansion over the few decades.[32]

Coolmore Australia and Darley Australia

Coolmore Australia and Darley Australia are international studs that operate at the very top end of Australia's thoroughbred industry. Coolmore originates from Ireland and has large studs in Ireland and Kentucky as well as the Hunter Valley. Coolmore is renowned for its shuttle stallions that cover mares in either Ireland or Kentucky in the northern breeding season and Argentina and Australia in the southern breeding season.[33] At the top of Coolmore's stallion roster are Fastnet Rock, Encosta Del Lago and High Chapparal. In 2011-12, Fastnet Rock was Australia's leading sire (see Table 14).

Darley Stud is an international breeding and racing business which stood 17 stallions in the Hunter Valley in 2011.[34] At the top of Darley's stallion roster are Lonhro, Street Cry and Exceed and Excel. In 2011-12, Lonhro was Australia's second placed sire (see Table 14).

Table 14: Top Ten Sires (2011-12 season)

Rank	Stallion	Runners	Winners	Stakes Winners	Group 1 Winners	Earnings	STUD
1	**Fastnet Rock**	**273**	**130**	**16**	**4**	**$12,683,189**	**Coolmore**
2	**Lonhro**	**273**	**129**	**8**	**1**	**$9,391,368**	**Darley**
3	Redoute's Choice	267	131	12	1	$8,648,647	
4	More Than Ready	238	99	9	2	$7,841,145	
5	**Commands**	**289**	**137**	**10**	**0**	**$7,197,975**	**Darley**
6	Bel Esprit	285	127	2	1	$6,575,510	
7	**Encosta de Lago**	**297**	**131**	**10**	**0**	**$6,227,297**	**Coolmore**
8	**Exceed and Excel**	**257**	**121**	**7**	**1**	**$6,156,460**	**Darley**

32 IER 2007, p.29.

33 Note that artificial insemination is not permitted for thoroughbred breeding, hence the necessity for the horses to travel.

34 Parliament of Victoria, Economic Development Committee (2006)., Inquiry into the Viability of the Victorian Thoroughbred/Standardbred Breeding Industries: Report on the Thoroughbred Breeding Industry. And Australian Stud Book data.

9	Snitzel	119	65	6	1	$5,792,904
10	Testa Rossa	274	122	7	1	$5,457,320

Source: Stallions[35]

Coolmore Australia and Darley Australia's properties are within the mining authorisation boundary

Coolmore Australia and Darley Australia's Woodlands studs are located across the road from the proposed Drayton South coal mine development (Figure 9) **Error! Reference source not found.** and within the mining authorisation boundary. Some of their concerns are highlighted in Box 1.

Box 1: Coolmore Australia and Darley Australia (Woodlands) thoroughbred studs

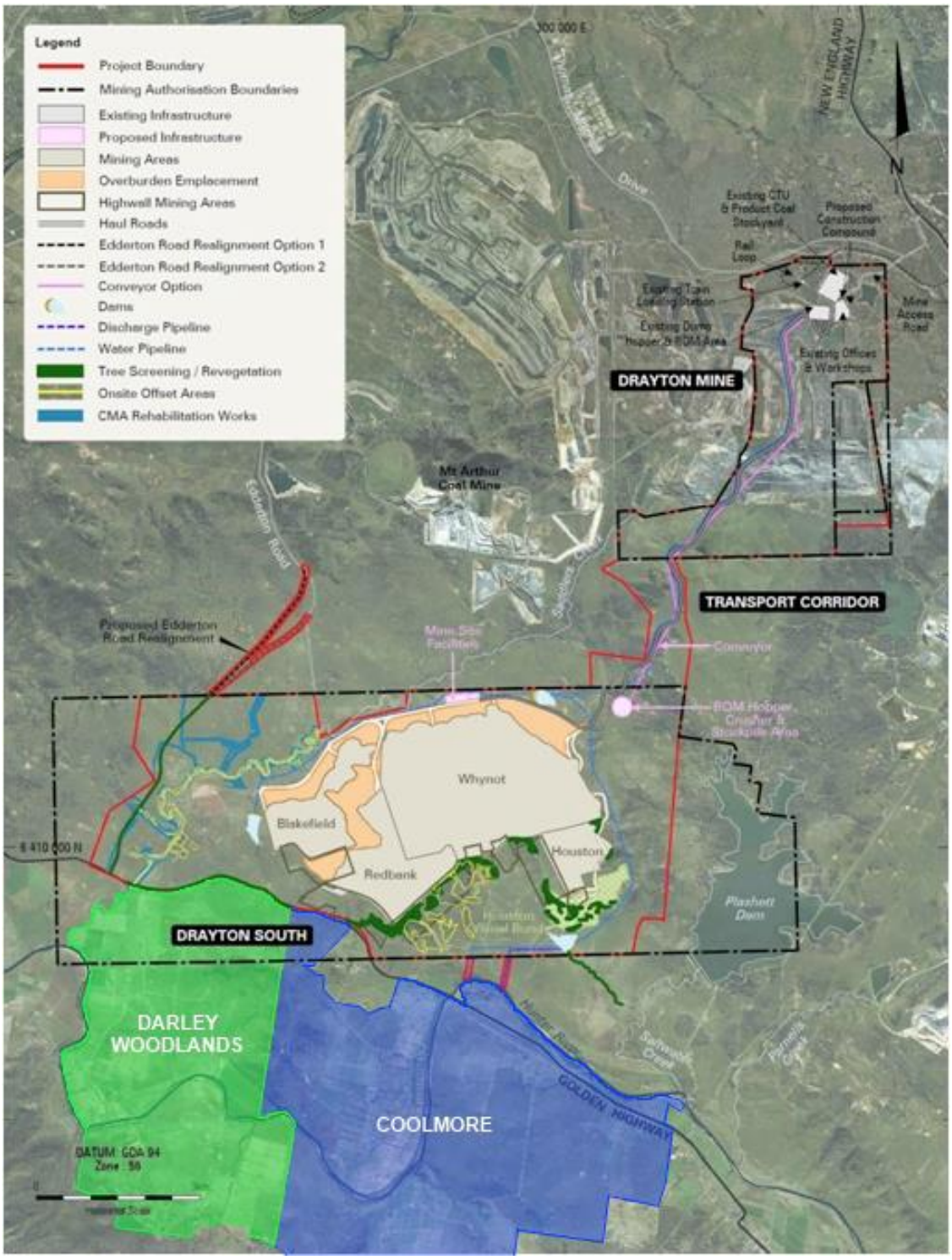
Coolmore*:* Coolmore thoroughbred breeding stud is located immediately south of the Project, within 1 kilometre of the Project's proposed operational area. The Coolmore business is concerned that the close proximity of the full operational area of the Drayton South open-cut coal mine will be immediately and highly visible to the many visitors to Coolmore who arrive by air, and the Housten and Whynot pits will be readily visible at ground level. Horses are stabled at the property for periods ranging from a day, to several months, and customers may visit Coolmore numerous times during this period.

Darley (Woodlands)*:* Darley (Woodlands) thoroughbred stud is located immediately south west of the Project, and within 1 kilometre of the Project's proposed operational area. Darley is an integrated breeding and race horse training business with two properties in the Hunter Valley. Darley is concerned that the close proximity of the full operational area of the Drayton South open-cut coal mine will be immediately and highly visible to the many visitors to the Woodlands property who arrive by air, and the Redbank and Blakefields pits will be readily visible at ground level.

Source: Coolmore Australia and Darley Australia submissions

35 www.stallions.com.au/statistics/sirelists/index_2012.php, accessed 17 May 2013

Figure 9: Coolmore and Darley in relation to Drayton South



Source: Hunter Thoroughbred Breeders Association

Stallion Services: Coolmore Australia and Darley Australia

Coolmore Australia and Darley Australia (located across the road from the proposed Drayton South coal mine development) businesses are Australia's largest thoroughbred breeding studs.

Coolmore Australia and Darley Australia Studs stood 30 stallions in 2011 (around 30% of the Hunter Valley stallions covering mares) and they were responsible for covering 40% of the Hunter Valley mares and producing 40% of its live foals (Table 15).

Table 15: Stud Book data on Coolmore and Darley, 2011

	Coolmore & Darley	% of Hunter Valley	% of NSW
Stallions covering mares	30	28.8%	12.6%
Mares covered	3,419	40.1%	32.7%
Live foals	2,249	40.4%	33.7%
Average service fee	$40,828	-	-
Estimated income from service fees	$99.6M	53.8%	52.5%

Source: Stud Book 2011

Employment: Darley Australia and Coolmore Australia

Over 220 people are employed at both Coolmore Australia and Darley Australia studs in the breeding season. Nearly two-thirds of this workforce permanently resides on the two properties (see Table 16).

Table 16: Employees at Darley (Woodlands) and Coolmore

Breeding stud	Employees
Coolmore	
- Stud season	150 (80 permanent staff, 70 seasonal)
- Outside of stud season	80
Darley (Woodlands)	
- Stud season	74 (64 permanent, 10 seasonal)
- Outside of stud season	64
TOTAL (stud season)	**224**

Source: Coolmore Australia and Darley Australia

Racing Industry: Coolmore Australia and Darley Australia

Nationally, the Australian racing industry depends on the progeny of the Hunter Valley. The 2011-12 Australian Racing Fact Book identifies that the Australian racing industry has 50,000 employees and 381 clubs which conduct 19,168 races each year. These clubs produce $5 billion in gross domestic product per annum.[36]

Coolmore Australia and Darley Australia progeny are major participants in the international racing industry. For instance, of the 1,449 stakes (top tier) races in Australia, New Zealand, South Africa, Hong Kong, Malaysia, Singapore and Macau between 1 Jan 2012 and 1 May

[36] http://www.australianracingboard.com.au/factbook, accessed 20 June 2013

2013, 377 (26%) were won by the progeny of Darley Australia or Coolmore Australia sires. The total prize money from these wins was $54.7 million. [37]

Darley Australia is Australia's leading thoroughbred race horse breeder. In 2012-13 Darley has won more than three times the number of stakes (black type) races than any other breeder, including 9 Group 1 races (Table 17).

Table 17: Darley Black Type events (2012-13)

Name	State	G1	G2	G3	L	Total
Darley	**NSW**	**9**	**10**	**15**	**19**	**53**
Mr G Harvey	NSW	2	1	4	8	15
Corumbene Stud	NSW	1	2	0	4	7
Arrowfield Pastoral Pty Ltd	NSW	0	2	4	1	7
Strawberry Hill Stud	NSW	1	2	1	2	6

Source: Thoroughbred Breeders Australia

Note, while Coolmore Australia does some limited racing it is predominantly a thoroughbred breeding business.

Tourism: Stallion Day parades

During the stallion day parades (last weekend of August) some 5,000 people (clients, investors, and tourists) visit the Hunter Valley to view the season's stallions. A number of these visitors travel to Coolmore Australia and Darley Australia's operations to view the Group 1 stallions, breeding and training operations.

In addition, racing events also draw tourists and related expenditure. For example, within the Hunter Valley, the Scone Cup race carnival in May generates spending on-course and off-course. These visitors make an important contribution to the local economy as they eat at the local restaurants, stay at local accommodation and purchase products from local shops.

[37] Information sourced from www.thoroughbredinternet.com (without subscription) or www.bloodhound.net.au (with subscription).

Attachment C: CBA Methodology and Assumptions

This CBA was developed using the guidelines that have been issued by the NSW Government:

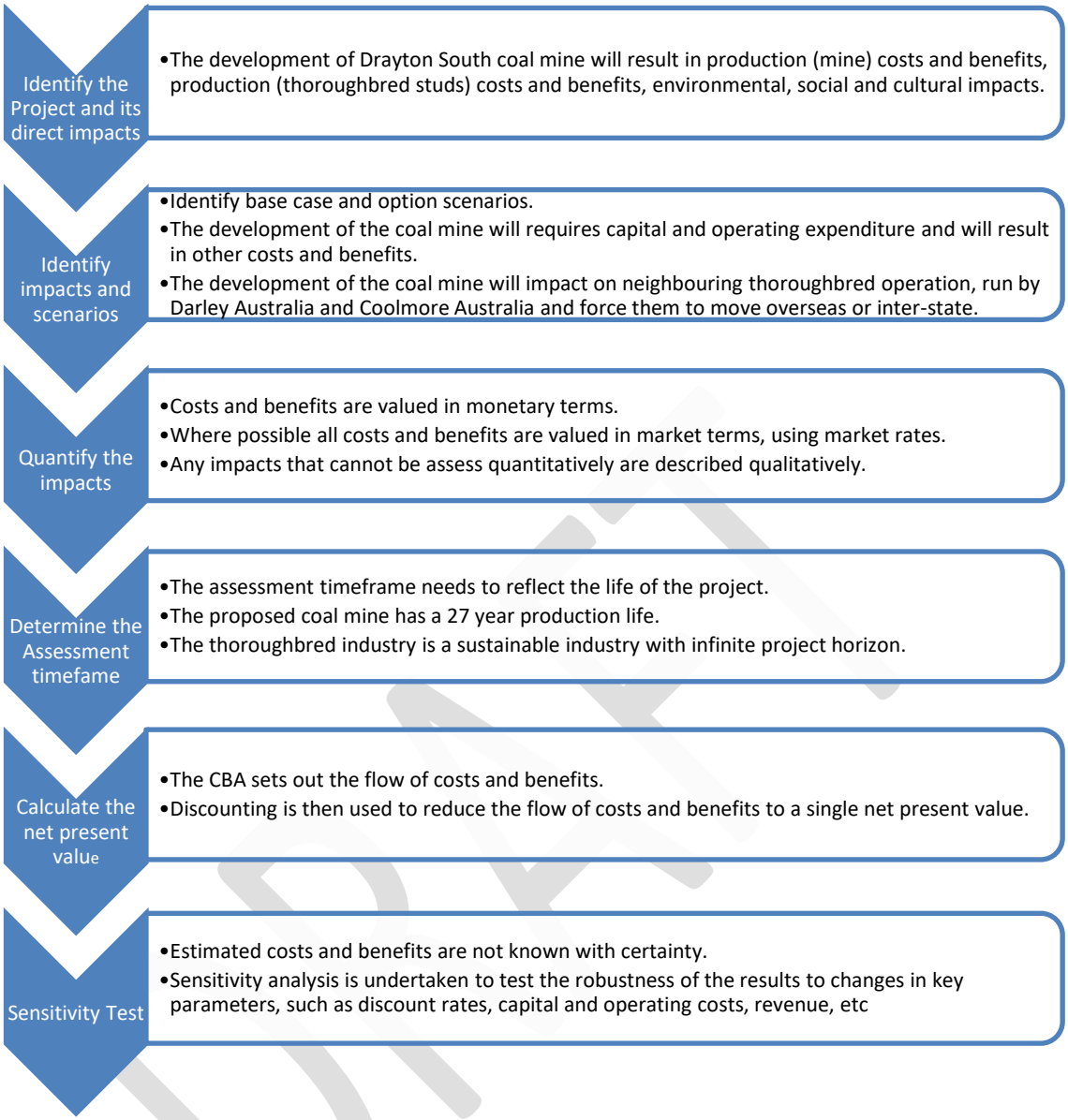
- Guideline for the use of Cost Benefit Analysis in mining and coal seam gas proposals, November 2012;[38] and
- NSW Government Guidelines for Economic Appraisal, July 2007.[39]

The Marsden Jacob approach to the CBA is summarised in Figure 10.

[38] www.planning.nsw.gov.au/LinkClick.aspx?fileticket=1IW95ZTjemY%3D&tabid=205&mid=1081&language=en-AU

[39] www.treasury.nsw.gov.au/__data/assets/pdf_file/0016/7414/tpp07-5.pdf

Figure 10: Cost Benefit Analysis process



Source: Marsden Jacob

Cost and Benefit: Assumptions

The purpose of the cost benefit analysis is to assess whether, relative to the base case, the Project delivers a net public benefit and which of the options is welfare maximising. As stipulated in the NSW Government guidelines, the costs and benefits included in this analysis include *"all first round (primary) impacts both direct and indirect but not secondary impacts"*. The costs and benefits considered in this analysis are summarised in Table 18.

Table 18: Incremental Economic Costs and Benefits of the Project

Category	Costs	Benefits
Production (mine)	Opportunity cost of capital Opportunity cost of land Capital cost of development Operating cost of mine including mitigation measures Rehabilitation and decommissioning costs	Avoided decommissioning and rehabilitation costs in 2017 Value of coal production Residual value of capital and land at end of project life
Production (thoroughbred studs)	Capital cost of land acquisition and development Opportunity cost of land (unable to be used for premium thoroughbred stud operations) Reduced land and bloodstock asset values Relocation costs	Sale value of agricultural land Sale value of bloodstock
Environmental, Social and Cultural Impacts	Ecology Aboriginal heritage Historic heritage Surface and groundwater Visual amenity Air quality Noise and blasting Greenhouse gases and energy Traffic Local Government Infrastructure	Value of ecological offset

Source: Marsden Jacob analysis

Note: Modelling has been undertaken separately using asset value changes and opportunity cost of land.

Base Case and Scenarios

The analysis models three scenarios and a 'business as usual' base case. Estimation of the base case is required as in the CBA the costs and benefits of the different scenarios are measured incrementally to the base case (counterfactual case).

Table 19: CBA scenarios

Option Cases	Description
Base Case (No Mine)	Coolmore Australia and Darley Australia thoroughbred studs operate in perpetuity (conservatively modelled as 50 years). Drayton South coal mine is not developed. Coal mining at the Drayton North Mine ceases in 2017.
Scenario 1 (Relocate Overseas)	Coolmore Australia and Darley Australia relocate their thoroughbred studs operations overseas in 2015. Drayton South coal mine is developed.
Scenario 2 (Relocate to Victoria)	Coolmore Australia and Darley Australia relocate their thoroughbred studs' operations inter-state (to Victoria) in 2015. Drayton South coal mine is developed.
Scenario 3 (Gillespie Economics Assumptions)	Coolmore Australia and Darley Australia thoroughbred studs are unaffected by the development of Drayton South coal mine. Drayton South coal mine is developed.

Source: Marsden Jacob analysis

Scenarios 1 and 2 arise from the proposed project, because Darley Australia and Coolmore Australia believe they will be critically impacted by the development of the proposed Drayton South coal mine. The structure and nature of the thoroughbred industry means that it is linked to high net worth clients so reputation is fundamental to success. They believe clients are unlikely to bring their high value mares (the progeny of which they are hoping to either turn into successful race horses or to sell at the thoroughbred markets) if there is a large coal mine directly across the road.

Consequently, Darley Australia and Coolmore Australia have advised that if the coal mine were developed they would probably be forced to move their stud operations, either interstate or overseas.[40] They would not move their stud operations to somewhere else in the Hunter Valley or NSW, because of the risk of future mine development undermining their investment decisions.

Geographic scope

Regarding the geographic scope of this CBA, as the NSW Government is the approval authority we have measured the economic costs and benefits from the perspective of the NSW economy. This will reveal whether the proposed project delivers a net public benefit outcome for NSW.

Discount Rates

The choice of discount rate is an important issue as it can have a significant impact on the ranking of options. Discounting reflects the time preference of money.

Real discount rates were used in the analysis. The base discount rate is 7%. In accordance with the NSW Government guidelines (2007), all costs and benefits are measured using 2011 Australian Dollars. 2011 Australian Dollars have been used to enable comparison with the

[40] Neither Coolmore Australia or Darley Australia have decided whether they would move overseas or inter-state, so both scenarios have been modelled.

previous analysis undertaken by Gillespie Economics. Costs and benefits are valued in real terms (constant dollars) so price increases due to inflation are not included in the values placed on future benefits and costs.

As recommended in the NSW Government guidelines, while there is a preferred central discount rate and range (above), if discounting has a material impact on the ranking of project then the CBA must identify the threshold discount rate:

> *"a standard set of real discount rates of 4 per cent, 7 per cent and 10 per cent to see if the outcome is sensitive to such variations and, if it is, to make the critical 'break-even' rate clear in the analysis results"* (2007 p52).

We identify the threshold discount rate in the sensitivity test section of this report. This test is important, as higher discount rates tend to favour projects that have front loaded net benefits, because the higher the discount rate the more net benefits in the future are downgraded in present value terms relative to net benefits closer to hand.

Assessment Timeframe

The choice of analysis timeframe can materially affect the analysis outcomes. In line with the NSW Government guidelines we have used a 50 year timeframe for the base analysis. The Gillespie Economics assessment is based on a 33 year timeframe.

> *"costs and benefits should be estimated over the timescale of the impacts of a project. Where a project has environmental impacts (positive or negative), the impacts may continue well after the productive life of the project under consideration. It is recommended that long-term projects should use a 50 year time-frame and where applicable a residual value for impacts beyond that time-period. However, where predictable and material, a longer time-frame can be adopted"* (p8).

Production Costs and Benefits: Proposed Drayton South Mine

In the analysis we have used the following production costs (based on the Gillespie Economics analysis).

Table 20: Production Costs and Benefits

	Description
COSTS	
Opportunity cost of land and capital for the mine site	$6m for the land and $54m for the capital equipment.
Capital cost of the mine	$485m in capital costs over the life of the mine.
Annual operating cost of the mine	$278m per annum for the 27 year life of the mine (excluding depreciation and royalties41).
Rehabilitation and decommissioning costs	$32m when the project ceases
BENEFITS	
Avoided rehabilitation and decommissioning costs	$32m in 2017 (base case) $32m in 2040 (project case)
Residual values for capital equipment and land	$0m

Source: Gillespie Economics

Based on the Gillespie Economics analysis, we have assumed that a proportion (approximately 55%) of the net production benefits from the Drayton South coal mine accrue to Australia (or NSW more specifically). Reflecting Drayton's foreign ownership the balance of the net production benefits are exported.

Price of Thermal Coal

The price of thermal coal is the key driver of the CBA. The benefit attributed to the sale of coal is over $4 billion in present value terms, based on an assumed price of $118 per metric ton (mt) for thermal coal. Our review of Australian and international price forecasts finds that the price used by Gillespie Economics price is unrealistically high and thus it artificially elevates the economic benefits from the proposed coal mine development. The thermal coal price is significantly higher than others used by Gillespie Economics, see Table 21.

[41] Royalties have not been included in the analysis. Royalties are a component of the overall producer surplus from the mine development, that are transferred to government and redistributed. Consequently, royalties have no place in the cost-benefit analysis.

Table 21: Thermal Coal Prices used by Gillespie Economics (2010-2012)

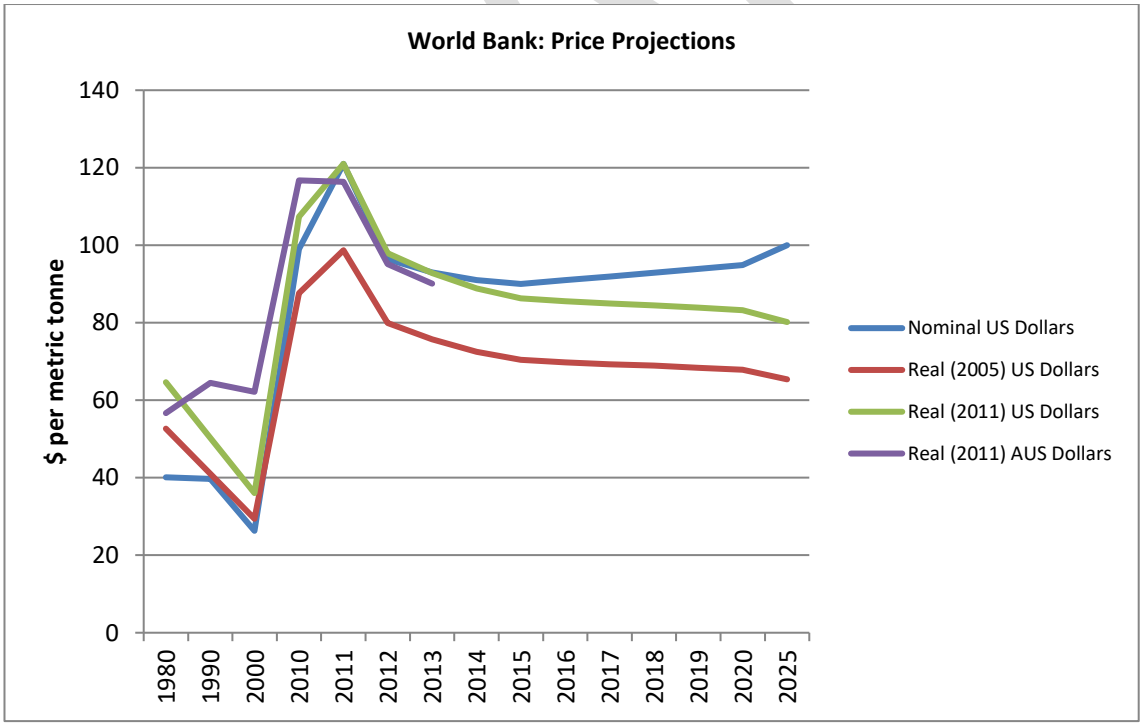
Project Name	Proponent	Coal Price
Chain Valley Colliery	Lake Coal Pty Ltd	$89 per tonne
Mangoola Coal Modification 6	Xstrata Mangoola Pty Limited	$89 per tonne
Moolarben Coal Project Stage 1 Optimisation Modification	Moolarben Coal Operations Pty Limited	$85 per tonne (USD) $84-95 per tonne (AUSD)
Wallarah 2 Coal Project	Wyong Areas Coal Joint Venture	$99 per tonne
Maules Creek Coal Project	Aston Resources Limited	$96 per tonne (USD)

Source: NSW Department of Planning and Infrastructure, Major Project Assessments website

World Bank

In January 2013, the World Bank (authoritative source on commodity prices) forecast that the price of Australian thermal coal would fall to around US$90 per mt in 2015 and then continue to fall (in real dollars) to around $80 per mt by 2025[42], see Figure 11.

Figure 11: World Bank price projection



Source: World Bank 2013, Marsden Jacob analysis

[42] http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1304428586133/Price_Forecast.pdf

Bureau of Energy and Resource Economics

In March 2013, the Bureau of Energy and Resource Economics identified that thermal coal supply has grown strongly over the past decade, but its growth may begin to slow by the end of the outlook period as a result of fuel switching and increased electricity generation from renewables. In 2018, the bureau forecasts a coal price of US$ 90 per mt. *"In the medium term, thermal coal prices … are projected to increase slightly in the short term, before decreasing later in the outlook period when large additions to supply are projected to come online. Consumption demand in key markets is projected to grow substantially over the next five years, but strong competition among coal producers is expected to moderate any price growth."*[43]

Reserve Bank

In February 2013, the Reserve Bank of Australia identified that the downward shift in coal prices reflected a shift in international market conditions:

> *"A key driver of the fall in thermal coal prices over 2011 and 2012 was an increase in the volume of exports from the Americas. Exports from the United States rose by over 50 per cent in the first half of 2012, after almost doubling over the previous two years from low levels (Graph A2). US coal exports increased as domestic energy demand shifted to gas. This followed a decline in US natural gas prices over 2011 and into 2012 as production of unconventional gas from shale rock increased. While some US coal producers responded by reducing production, others took advantage of low global freight rates to increase their exports of coal to Asia and Europe. The reduction in demand for coal in the United States also meant that US imports of coal declined. In response, countries that exported to the United States, such as Colombia (which had supplied around 80 per cent of US thermal coal imports in 2011), have increased their exports to other countries."*[44]

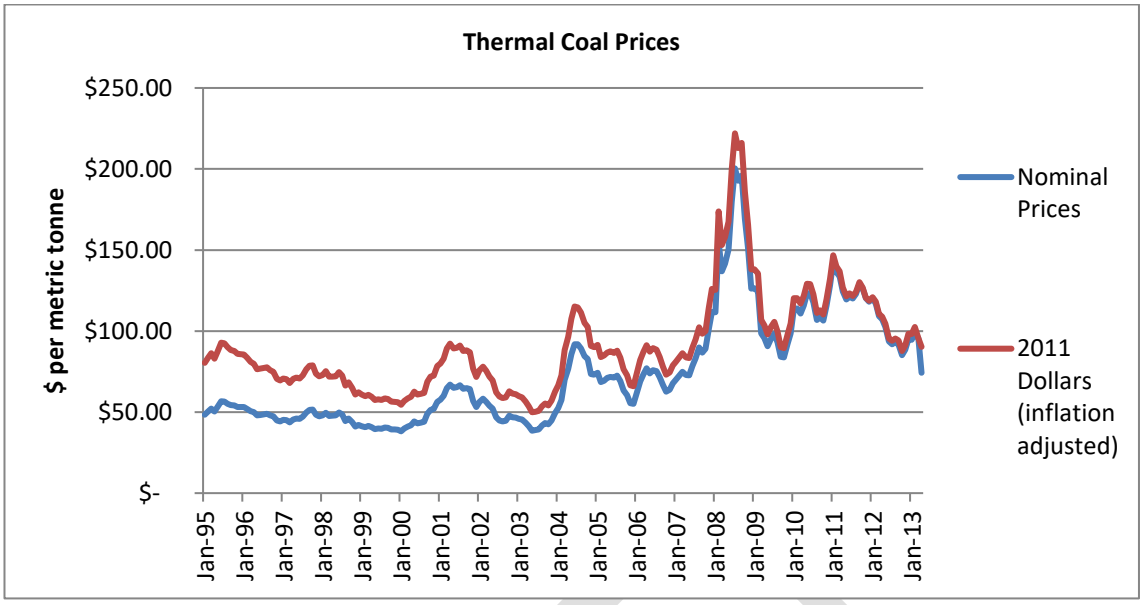
Indexmundi

Marsden Jacob analysis (based on Indexmundi monthly prices) identifies that the average price of thermal coal was AUS$90 per mt (real, 2011 dollars), over the period January 1995 to March 2013. Furthermore, if you remove the effect of the price spike in 2008-09 the price drops to approximately AUS$85 per mt (real 2011 dollars), see Figure 12.

[43] www.bree.gov.au/documents/publications/req/REQ_MAR2013.pdf

[44] www.rba.gov.au/publications/smp/2013/feb/html/box-a.html

Figure 12: Indexmundi Prices



Source: Indexmundi, Description: Coal, Australian thermal coal, 12000- btu/pound, less than 1% sulfur, 14% ash, FOB Newcastle/Port Kembla, Australian Dollar per Metric Ton

Production Costs and Benefits: Neighbouring Thoroughbred Operations

Coolmore Australia and Darley Australia have advised that if the Drayton South coal mine is developed they anticipate material business impacts which could drive them to move their business operations either inter-state or overseas.

This analysis includes production costs and benefits for the neighbouring thoroughbred operations, associated with both of these scenarios.

In the base analysis, all of the production benefits from the thoroughbred industry accrue to NSW. Darley Australia and Coolmore Australia are both foreign owned, however, based on Darley's publically available financial accounts the international arm of the business injects over $12 million per annum in capital into the Australian operation. However, to ensure our results are conservative we have modelled a sensitivity scenario that sees 10% of net production benefit exported.

Size of the Thoroughbred Operations

The highest quality thoroughbred breeding land will be adversely affected by the development of the Drayton South mine. Coolmore Australia's property near Jerrys Plains is 3,400 hectares (ha). Darley Australia has two properties in the Hunter Valley, Woodland and Kelvinside. Woodlands is located near Jerrys Plains and Kelvinside is located near Aberdeen. Woodlands is 2,428 ha and Kelvinside is 809 ha.

Table 22: Size of Coolmore Australia and Darley Australia's Farms

	TOTAL (ha)	Total (acres)
Coolmore Australia (Jerrys Plains)	3,400	8,402
Darley Australia (Woodlands)	2,428	6,000
Darley Australia (Kelvinside)	809	1,999
TOTAL	**6,637**	**16,400**

Sources: Coolmore Australia and Darley Australia

For the purpose of this analysis it assumed that 70% of this land is used as a stallion farm. This is a conservative assumption that serves to ensure that the results of the analysis are robust to changes in industry economic cycles. Darley Australia's Woodlands and Kelvinside have been included in the analysis as they are integrated operations and both would be impacted should this mine development proceed.

Opportunity cost of land

The opportunity cost of land is calculated as the difference in gross margin return between thoroughbred stud operations and the next best alternative use (see Table 23).

Table 23: Opportunity cost of land

	Gross Margin ($/ha)
Thoroughbred Breeding industry (stallion farms)	$4,627
Premium Cattle Grazing	$229

Sources: Ernst and Young (2010) and NSW Department of Primary Industries gross margin budgets (from December 2012)

The gross margin estimate for the thoroughbred breeding industry is based on data from a recent study by Ernst and Young, Hunter Valley Thoroughbred Breeding Industry - Size and Scope Study (2010). As part of the study, Ernst and Young surveyed both stallion and broodmare farms. Based on data from the survey, the average gross margin[45] for thoroughbred stud (stallion) farms in the Hunter Valley is estimated to be $4,627 per hectare.

For all scenarios we have assumed that the next best alternative use of the land is premium cattle production. Based on NSW Department of Primary Industries gross margin budgets (from December 2012) we have identified the highest returns come from "growing out steers 240-460kg in 12 months", with a gross margin of $229 per ha.[46]

Based on our experience, and the analysis in Section 2, the gross margin returns from Coolmore Australia and Darley Australia operations could justifiably be considerably higher than the

[45] A 'gross margin' is the gross income from an enterprise less the variable costs incurred in achieving it. It does not include fixed or overhead costs such as depreciation, interest payments, rates, or permanent labour. www.dpi.nsw.gov.au/agriculture/farm-business/budgets/about/intro, accessed 14 May 2013

[46] www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/175533/Summary.pdf, accessed 14 May 2013

Hunter Valley average as they are the highest value operations in the Hunter Valley.[47] However, the Hunter Valley average gross margin estimate has been used in this analysis to sure that our analysis is based on conservative assumptions. For the different scenarios the analysis assumes:

Base Case (No Mine): Under the base case the land currently owned and used by Coolmore Australia and Darley Australia is used in perpetuity for premium thoroughbred operations.

Scenario 1 (Relocate Overseas): If Darley Australia and Coolmore Australia relocate overseas, it is assumed that their market share will remain in NSW and other thoroughbred breeders (new and existing) will expand their operations. Consequently, there is an economic value transfer from Darley Australia and Coolmore Australia to the new (or expanded) operations. We have, however, assumed that market size will fall marginally as a result of the departure of Coolmore Australia and Darley Australia. Reflecting this change we assume that the area of land used for thoroughbred operations would be two thirds of the current area. The balance of the land would be shift from thoroughbred stud operations to premium cattle grazing.

Scenario 2 (Relocate to Victoria): If Darley Australia and Coolmore Australia relocate to Victoria they will take their market share with them. The analysis therefore assumes that Coolmore Australia's and Darley Australia's land in the Hunter Valley will shift from thoroughbred stud operations to premium cattle grazing.

Scenario 3 (Gillespie Economics Assumptions): Gillespie Economics assumed the Drayton South coal mine would not impact Coolmore Australia and Darley Australia's operations.

Exit Cost: Relocation and Re-establishment

Relocation and re-establishment costs vary by scenario. Relocation and re-establishment costs include property purchase, property upgrade and horse transport. Relocation and re-establishment benefits are revenue from the sale of the property, purchase cost for a new property, capital upgrades on the new property and horse transport costs.

Relocation and re-establishment costs and benefits occur in 2015. The construction phase for the Drayton South coal mine is scheduled to commence in 2014, so including these costs and benefits in 2015 is a conservative assumption. Property purchase cost estimates have been developed based on discussions with Inglis Property, Coolmore Australia, Darley Australia and a desktop scan of recent market prices.

For the different scenarios ,the analysis assumes the following exit costs:

Base Case (No Mine): In the base case, the three properties are assumed to have a combined value of $140 million. This is a conservative asset valuation, given Darley Australia purchased the Woodlands property (which neighbours the mine site) in 2008 for nearly $500 million. This purchase price included all assets (land, properties and bloodstock), nonetheless the land value was estimated to be $50 million in 2008 dollars[48].

Scenario 1 (Relocate Overseas): In this scenario it is assumed that relocation and re-establishment costs and benefits, include change in economic value of the land, property purchase and upgrade, and animal transport.

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[47] 8 of the top 10 stallions (by fees and earnings) in the Hunter Valley stand on Coolmore Australia and Darley Australia.

[48] Pers comms, Darley Australia

Economic value of the land is $100 million (down from $140 million), reflecting reduced area of thoroughbred breeding. In reality the Woodlands (Darley Australia) and Coolmore Australia land assets would suffer a considerably larger reduction in asset value. However, the analysis recognises that the majority of this loss in asset value would transfer across to other business in the Hunter Valley that pick up Coolmore Australia and Darley Australia's market share.

Transport of stallions and mares is $3 million. This assumes that 200 horses are retained and they each cost $15,000 to transport to the northern hemisphere. The majority of the bloodstock assets (stallions, mares, yearlings, etc) are sold and only the most valuable assets are retained.

Scenario 2 (Relocate to Victoria): In this scenario it is assumed that relocation costs and benefits, include change in economic value of the land, property purchase and upgrade, and animal transport.

Revenue from the sale of the three properties (Kelvinside, Woodland and Coolmore) is assumed to be $70 million (a loss of $70 million from the base case). The revenue from the sale is only 50% of the base case value of the land, because the land is no longer used for premium thoroughbred breeding (as this industry is incompatible with coal mining) and the Coolmore Australia and Darley Australia market transfers from NSW to Victoria.

Property purchase and upgrade is assumed to total $100 million, comprising:

- Coolmore Australia: Coolmore Australia does not own any thoroughbred studs properties elsewhere in Australia. It is assumed that Coolmore will need to spend $50 million to acquire a property of equivalent size and amenity in Victoria. A further $10 million will need to be spent on capital upgrades to the property. It is assumed that Coolmore may be able to purchase a pre-existing high quality thoroughbred stud along with neighbouring farm land. Capital upgrades are for neighbouring farm land that will be used for agistment and broodmare operations.
- Darley Australia already owns a property in Victoria, however, the infrastructure at the property would need to be enlarged so that more stallions can stand at the property. Darley Australia will need to acquire additional land to accommodate expanded breeding and racing operations, this is assumed to cost $20 million. The capital upgrades on the new and existing properties are assumed to cost $20 million.

Transport of stallions and mares is $4 million. This assumes that 800 horses are transported to Victoria at a cost of $1,500 per horse.

Scenario 3 (Gillespie Economics Assumptions): Gillespie Economics assumed the Drayton South coal mine would not impact Coolmore Australia and Darley Australia's operations.

Other Environmental, Social and Cultural Impacts

In this analysis we have focused on the coal prices and impacts on the thoroughbred sectors. The proposed coal mine will result in a number of other environmental, social and cultural impacts. Some of these impacts are valued at market rates but, for many of them, market and non-market values do not exist so they are under-estimated in the analysis, as discussed below:

- Greenhouse Gases: Shadow price of AUD $23/tonne of CO_2-e, reflecting the current shadow price for carbon.
- Operational noise: Noise mitigation costs are included in the capital costs of the project. Operational noise costs are under-estimated in the analysis, a fact that is recognised in the

Gillespie Economics (2012) analysis which notes that any residual noise related costs are *"understated"* (p14).

- Blasting overpressure and vibration: An allowance has been included in the capital costs to acquire Arrowfield, as this property is predicted to experience exceedence. Operational noise costs are thus under-estimated in the analysis.
- Air quality: the cost of acquiring properties that are predicted to experience exceedences is included in the analysis. Air quality impacts are therefore under-estimated in the analysis as the mine will reduce the air quality on neighbouring properties (that are not in the acquisition zone).
- Surface and groundwater: the project costs include the acquisition of general security licences and reduced runoff into the Hunter River (or associated catchments). The impacts are likely to be underestimated as the precise relationship between surface water and groundwater systems is unknown, so the project could impact on these systems and thereby affect water quality for other water users (consumptive and environmental).
- Road transport: the capital costs associated with the realignment of Edderton Road are included in the analysis. Any transport impacts, such as increased travel time (due to the realignment or increased congestion) and accidents have not been factored into the analysis.
- Aboriginal Heritage: a $45m impact, based on benefit transfer estimates, is included in the analysis and incorporated as a separate cost, as per Gillespie Economics.

A number of environmental, social and cultural impacts have not been quantitatively included in the Marsden Jacob analysis:

- Social infrastructure: Muswellbrook Shire Council submission[49] identifies that the development of the Drayton South coal mine could bring forward a planned upgrade to the water treatment plant to 2016-18. The water treatment plant is scheduled to be upgraded in 2022-24 at a cost of $35 million. The present value impact of this change is nearly $9 million, but given uncertainty around whether this will change be driven by the increase in mine employment we have excluded it from the analysis.
- Road transport: the Muswellbrook Shire Council submission identifies that there may be incremental road transport impacts from the project, including increased wear and tear, congestion, travel time and accidents. Because of a lack of information on road transport costs, they have not been included in the analysis.
- Visual: Visual impacts have not been included in the analysis. The Gillespie Economics analysis under-estimates the visual impact as it assumes such impacts will be mitigated by the development to a bund and other planting and landscaping works.

  Visitors to the neighbouring thoroughbred studs access the property by using the on-farm airstrip, helicopter landing pad or Golden Highway. Customers routinely visit the studs to see their horses involved in the property's breeding programs, view the properties, and the operation of the facility.
- A non-market value of employment has not been included in the analysis because the mine will use labour that would be other employed elsewhere. The main reason for this is that unemployment in the region is very low: Singleton is 1.1%, Upper Hunter is 1.2% and

[49] https://majorprojects.affinitylive.com/public/b41cc68334eb99d69faf06ce1d813d32/Drayton%20South%20-%20Muswellbrook%20Shire%20Council%20Submission.pdf, accessed 20 July 2013

Muswellbrook is 2.2%. This approach is supported by experts, such as Professor Jeff Bennett of the Australian National University.

A recent review of Gillespie Economics modelling of the Maules Creek project by Professor Jeff Bennett found that it is debateable whether people outside of the mine workforce benefit from people having jobs and that this argument should not necessarily have been included by Gillespie Economics. *"The argument advanced is that people outside of the mine workforce enjoy benefits associated with people having jobs in the mine… A number of points argue against this approach. First, there is a conceptual issue. In a fully employed economy, it is doubtful that people employed in the new mine would be drawn from the ranks of the unemployed. So people outside the mine are unlikely to hold any existence benefits for the jobs provided by the mine in that case"* (p3).[50]

[50] www.ecolarge.com/wp-content/uploads/2013/01/Bennett-2011-Review-of-economic-assessment.pdf

Attachment D: Economic Impact Analysis

Economic impact analysis is focused on the effect of an economic shock on an economy in terms of a number of specific indicators of economic activity, such as gross regional product, value added and employment.

NIEIR has undertaken the economic impacts analysis for this project.

Input-output Analysis

A range of methods can be used to examine the economic impacts of an activity on an economy, including econometric model, general equilibrium models and mathematically programming. To facilitate comparison with the previous modelling undertaken by Gillespie Economics, NIEIR's 2012 Regional IMP (RIMP) model (input-output model) was used to assess the regional impacts from Coolmore and Darley shifting their operations to Victoria.

Data sets

The following base datasets are used in the model:

- Population Census data (working population)
- ABS National Accounts (income, expenditure and product)
- ABS State Accounts
- ABS Labour Force Survey regional employment and hours estimates
- ATO Income tax estimates by postcode
- Centrelink payments by postcode
- Real Estate Institute (state) housing price and rent estimates
- ABS Household Expenditure Survey

Definitions

The indicators in this analysis are defined as follows:

Local Gross Regional Product (GRP) shows the value of the economy, generated by the workers within the area regardless of where they live, after taxes and dividends leave the area.

Local GRP gives the value of economic activity which accrues to the local area after taxes and dividends are paid outside the area. It is normally lower than Headline GRP as it does not reflect those elements of economic productivity which accrue to public company shareholders and the federal government outside the area.

Residents GRP is the economic value-added generated by the residents of the area, regardless of where they work. Residents GRP is best thought of as the income received by people in the LGA. Areas with a high Residents GRP and low Local GRP probably export most of their residents to jobs elsewhere, while areas with a high Local GRP and low Residents GRP mainly import their workers.

Employment is the number of people employed (full-time and part-time) with the unit being full-time equivalent (FTE). The employment effects are estimated using data estimates based on NIEIR modelling from a number of sources. They are not Census figures, and so should be a more accurate and up-to-date estimate of employment in the LGA than the Census figures, and give a clear idea of the employment breakdown by industry. However, it is not possible to derive the range of worker characteristics from them that are available in Census data, so both versions are presented.

Value-added is the difference between gross regional product and the costs of the inputs of raw material, components and services bought in to produce the GRP.

Assumptions

The input-output analysis was used to test the impact of an activity within the regional economy. In this assessment the modelling considered the regional economic impact of Coolmore Australia and Darley Australia moving their Hunter Valley operations to Victoria.

Several key assumptions underpin the modelling:

- The regional economy is defined as including Upper Hunter SLA, Muswellbrook SLA and Singleton SLA.
- Average annual production by Coolmore Australia and Darley Australia is $123.8 million. This is a conservative estimate based on the recent annual revenue from stallion service fees and yearling sales. The total production could potentially be 20-30% higher as recent returns are considerably below medium term averages.
- Coolmore Australia and Darley Australia employ 229 FTE staff across the three properties (Darley Australia: Kelvinside and Woodlands; and Coolmore Australia: Jerrys Plains). The analysis assumes that these jobs move to Victoria, as Coolmore Australia and Darley Australia will take their market with them to Victoria.
- Coolmore Australia and Darley Australia are net importers of income.

The following table presents the summary transaction table for the regional economy.

Table 24: Summary Transactions: Regional Economy 2012-13 ($'000)

	Agriculture	Mining	Manufacturing	Utilities	Construction	Services	Household consumption	Other Demand	Exports
Agriculture	50.3	0.3	96.1	0.0	0.8	12.2	14.7	11.4	401.1
Mining	0.2	407.1	6.0	52.2	0.9	7.1	2.0	23.1	8159.3
Manufacturing	21.1	87.1	67.6	5.9	82.3	55.9	60.4	20.6	499.9
Utilities	4.9	81.2	9.9	75.0	7.2	29.6	69.7	14.2	320.8
Construction	5.3	131.1	3.7	32.0	539.7	44.5	1.9	1223.1	0.0
Services	36.7	358.2	91.1	25.5	161.4	299.1	636.3	391.0	673.6
Value added	**453.0**	**5384.3**	**289.4**	**255.1**	**477.1**	**1308.4**	**0.0**	**0.0**	**0.0**
Gross output	**786.9**	**8658.0**	**900.8**	**612.6**	**1981.5**	**2630.0**	**0.0**	**0.0**	**0.0**
Imports	**215.3**	**2208.6**	**337.0**	**166.8**	**712.0**	**873.2**	**820.0**	**432.7**	**0.0**
Hours of work	**7038.6**	**22674.9**	**5107.7**	**1624.4**	**5460.6**	**27184.4**			
Employment - FTE	**3665.9**	**11809.8**	**2660.3**	**846.1**	**2844.1**	**14158.5**			

Regional Economic Contribution of Darley Australia and Coolmore Australia

The economic modelling estimates the regional economic contribution of Darley Australia and Coolmore Australia. The regional economic contribution is measured in terms of the gross regional production (industry and residents) and employment, both direct and indirect (multipliers).

For the analysis of the contribution of Darley Australia and Coolmore Australia, a shock was introduced into the model which reduced the amount of production and employment from the equine industry, a sub-sector within the Agriculture, Fisheries and Forestry sector.

Results

Coolmore Australia and Darley Australia are estimated to make the following total annual contribution to the regional economy every year:

- Gross Regional Product: $122 million
- Employment: 643 FTEs with 591 FTEs being local residents.

Consequently, if Coolmore Australia and Darley Australia were to relocate to Victoria, over 640 jobs could be put at risk in the regional economy.

The total and disaggregated annual impacts of the Project on the regional economy (in 2011 dollars) are shown in the following tables.

Table 25: Regional Economic Contribution of Coolmore and Darley ($'000)

	Direct effect	Direct effect	Production induced	Consumption induced	Total
	Gross output	Value added	Value added	Value added	Value added
Agriculture	136	78.9	7.0	1.0	86.9
Mining			0.1	0.3	0.4
Manufacturing			1.9	1.0	2.9
Utilities			0.7	1.3	2.1
Construction			0.5	0.2	0.7
Wholesale			2.3	3.2	5.5
Accommodation/ restaurants			0.2	1.4	1.7
Transport services			4.5	0.5	5.1
Other services			3.5	13.2	16.7
Total		**78.9**	**20.8**	**22.1**	**121.8**

Table 26: Regional Employment Contribution (resident) of Coolmore and Darley (FTEs)

	Direct effect	Production induced	Consumption induced	Total
Agriculture	280	25	4	309
Mining		0	0	1
Manufacturing		12	7	19
Utilities		2	3	5
Construction		2	1	3
Wholesale		23	32	55
Accommodation/ restaurants		2	17	19
Transport services		49	6	55
Other services		27	99	125
Total	280	143	168	591

Main Sectors that benefit

Coolmore Australia and Darley Australia are supporting a number of sectors in the regional economy. The sectors that benefits the most from their production and employment are agriculture (broodmare farms), other services (veterinary services), transport (equine transport), wholesale (feed, timber supplies) and manufacturing.

Attachment E: Discount Rates

The issues to be addressed

This CBA is dealing with two very different types of industry: minerals with a finite life (27 years) versus equine and other industries that are sustainable over an infinite time horizon.

The choice of discount rate is an important issue as it can have a significant impact on the ranking of options and their choice. Higher discount rates favour projects that have front loaded net benefits, because the higher the discount rate the more net benefits in the future are downgraded in present value terms relative to net benefits closer to hand.

Mining projects are more capital and revenue intensive than agri-industry activities. Mining activities have significant up-front net-benefits, capital and operating outlays and revenues. Agri-industry net benefits are lower and are spread further into the future.

Given the different net benefit streams and time horizons of (finite horizon) mining and (potentially infinite horizon) agri-industry, the CBA raises three questions:

- Can a case be made for a lower discount rate to be used if not for the whole analysis then for the equine industry impacts?
- What is the implication of using lower discount rates? Can lower discount rates have perverse outcomes?
- Should we apply a blanket discount rate or different rates?

We answer these questions by first looking to NSW Government guidelines on discount rates, and then looking at discount rates used in other Australian and international CBA guidelines.

NSW Government Guidelines

NSW Government Guidelines for Economic Appraisal (Section 10, p55) provide clear guidance on the use of discount rates in BCA. The guidelines state:

- the discount rate for economic appraisal should be set at 7 percent as the central discount rate;
- sensitivity analysis is required at 4-10 percent to test if the appraisal results are sensitive to the discount rate used in the analysis;
- that if the appraisal outcome is shown to be sensitive to variations in the discount rate, the critical 'breakeven' rate should be made clear to decision makers.

Productivity Commission

Based on Productivity Commission's (2010) *Valuing the Future: the social discount rate in CBA* the key observations are (based on reading of Chapter 2 and Annex I):

1. **When there is uncertainty and long benefit streams, hyperbolic discounting could be used**

When there is uncertainty about what discount rate to use, there is an argument that the appropriate discount rate to calculate present value is lower the further in the future that the payments are received.

When the discount rate declines the further into the future a payment is received, it is called hyperbolic discounting.

Hyperbolic discounting is extremely favourable for projects, like global warming abatement, with immediate costs but benefits that are received in the distant future. The immediate costs would be discounted at a high discount rate. The future benefits are discounted at a low rate, raising the net present value of the project compared with a constant rate.

2. International practice favours lower discount rates in industrialised countries than in are used in Australia, and for longer run environmental projects

International practice is summarised in Table 27.

Table 27: Current Real Discount Rates in Practice

	Discount Rate (%)
Philippines	15
India	12
New Zealand	8 (1982-2008 was 10)
Canada	8 (1976-2007 was 10)
South Africa	8 (and test 3 and 12)
United States	8 (and test 3), (10 until 1992)
European Union	5 (2001-06 was 6)
Italy	5
The Netherlands	4 (risk free rate)
France	4 (1985-2005 was 8)
United Kingdom	3.1 (declining to 1% for costs and benefits received more than 300 years in the future), (1969-78 was 10)
Norway	3.5 (1978-98 was 7)
Germany	3 (1999-04 was 4)
United States (Environment Protection Authority	2-3 (and test 7)

Source: Productivity Commission (2010)

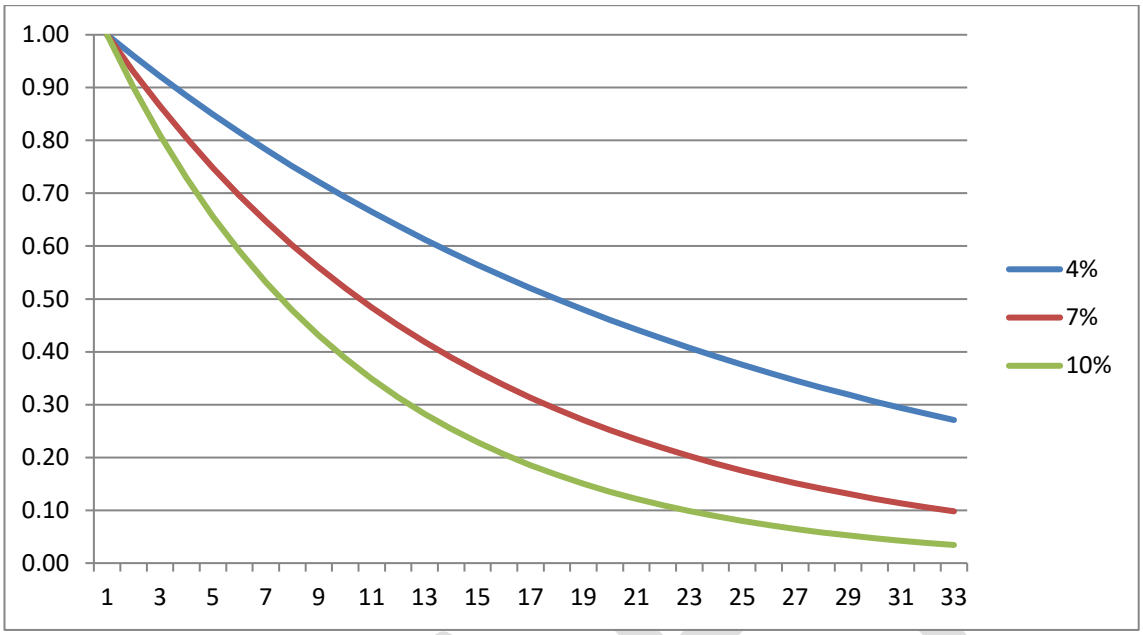
Recommended rates vary from 1 to 15 per cent. The table shows that the highest rates are used in developing countries. Low discount rates are often used in environmental applications, especially when benefits accrue in the distant future.

The key points from this analysis are:

- if we can show that the discount rate (7%, 4-10%) has a material impact on outcomes (especially the ranking and present value net benefits of the options) then we have a case to identify the threshold discount rate. This was not hard to do given we are comparing infinite versus finite horizon projects. At a 7% discount rate after 27 years the PV of $1 is $0.15 (see figure below).
- we can support the claim that the threshold discount rate that makes us indifferent between the mining project versus agri-industry is 'reasonable' by looking at

international and Australian literature on discount rates applied to inform Government CBAs.

Figure 13: Discount Rate impacts



Source: Marsden Jacob

Marsden Jacob analysis

Our analysis demonstrates that:

- the results are sensitive to different discount rates, which means we have a cause to identify the threshold discount rate.
- there is a clear international trend towards using lower discount rates in industrialised countries.
- many agencies have reduced the discount rate they use. This raises the argument that the Commonwealth or NSW Government may also do so in the future. If this happens, then infinite horizon projects will be more favoured.

Attachment F: CBA illustrative tables

The following tables illustrate the impact of the coal price, under Scenario 2.

Table 28: CBA Results, Coolmore and Darley move to Victoria (NPV, 50 years, 7% discount rate, $118 per mt coal price)

Costs		Benefits	
Description	Value ($ m)	Description	Value ($ m)
Mine: Capital Expenditure	419	Revenue (coal production)	4,047
Mine: Operating Expenditure	2,745		
MINE: NET PRODUCTION BENEFIT (Global)			883
MINE: NET PRODUCTION BENEFIT (NSW)			488
Non-market impacts	47		
Thoroughbred Land: Opportunity Cost	203		
Net Relocation Cost	26		
TOTAL NET BENEFIT TO NSW	**212**		

Source: Marsden Jacob analysis

Table 29: CBA Results, Coolmore and Darley move to Victoria (NPV, 50 years, 7% discount rate, $90 per mt coal price)

Costs		Benefits	
Description	Value ($ m)	Description	Value ($ m)
Mine: Capital Expenditure	419	Revenue (coal production)	3,087
Mine: Operating Expenditure	2,745		
MINE: NET PRODUCTION BENEFIT (Global)			-77
MINE: NET PRODUCTION BENEFIT (NSW)			-43
Non-market impacts	47		
Thoroughbred Land: Opportunity Cost	203		
Net Relocation Cost	26		
TOTAL NET BENEFIT TO NSW	**-318**		

Source: Marsden Jacob analysis

Table 30: CBA Results, Coolmore and Darley move to Victoria (NPV, 50 years, 7% discount rate, US$ coal price)

Costs		Benefits	
Description	**Value**	**Description**	**Value**
Mine: Capital Expenditure	419	Revenue (coal production)	3,361
Mine: Operating Expenditure	2,745		
MINE: NET PRODUCTION BENEFIT (Global)			883
MINE: NET PRODUCTION BENEFIT (NSW)			488
Non-market impacts	47		
Thoroughbred Land: Opportunity Cost	203		
Net Relocation Cost	26		
TOTAL NET BENEFIT TO NSW	**-167**		

Source: Marsden Jacob analysis