

# Economic impact of the proposed Drayton South Open-cut Coal Mine

## Independent Review by Marsden Jacob Associates (November 2016)

Anglo American is seeking development approval for the Drayton South coal mine ahead of selling the site. The Drayton South coal mine involves the development of mining operations for a period of 15 years.

The project is directly across the road from, and within 1km of, Australia's largest thoroughbred stud operations, owned and operated by Coolmore Australia and Darley Australia.

Marsden Jacob Associates (Marsden Jacob) has been commissioned by Coolmore Australia and Darley Australia to undertake an independent review of the economic aspects of the:

- Anglo American Response to Planning Assessment Commission Review Report – Drayton South Coal Project (May 2016)
- Expert report of Greg Houston - A report for Clayton Utz on behalf of Anglo American Metallurgical Coal Pty Ltd (March 2016)
- Professor Bennett, Review of the Supplementary Submissions by Hunter Thoroughbred Breeders Association, Coolmore Australia and Darley Australia on the Drayton South Coal Project (August 2016)
- Professor Bennett, Peer review of the Expert Review of Greg Houston (June 2016)
- Department of Planning and Environment – Drayton South Coal Project (SSD 6875) Final Assessment Report (September 2016)

In preparing this review Marsden Jacob has undertaken research into the broodmare market, interviewed broodmare owners and broodmare farms, and drawn upon previous submissions and reports.

### 1. Summary findings from our independent review

Marsden Jacob's independent review has identified a number of critical, persistent issues with the cost-benefit analysis that has been undertaken in support of the Drayton South open-cut coal mine. These issues point to systemic optimism bias, such that when the overall economic analysis is recalculated the Drayton South coal mine results in a net social loss.

Where the market impact analysis is concerned, in Marsden Jacob's professional opinion if the Drayton South mine is developed and Coolmore Australia and Darley Australia were forced to relocate to Victoria this will:

- fragment the Hunter Valley equine critical industry cluster;
- financially penalise service providers to broodmare owners (such as broodmare farms, vets, farriers, feed suppliers, to name a few) who will relocate their broodmares so as to remain close to the Coolmore Australia and Darley Australia stallions; and

- result in the epicentre of the thoroughbred breeding market shifting to Victoria.

Previous analysis by Marsden Jacob (2013) of the economic impacts on NSW and Hunter Valley region if Coolmore Australia and Darley Australia were to relocate found that:

- Coolmore Australia and Darley Australia directly employ up to 300 people during the breeding season in their Hunter Valley operations;
- if Coolmore Australia and Darley Australia were to relocate this would very conservatively put 640 jobs at risk in the Hunter Valley across broodmare farms, veterinary hospitals, transport, farriers, saddlers, capital equipment, hospitality, construction that are not supplying the mines;
- the direct economic loss to the NSW economy that results if Coolmore Australia and Darley Australia were to relocate to Victoria would be between \$229m (base case) and \$368m (sensitivity test), in present value terms; and
- if Coolmore Australia and Darley Australia were to relocate this would strip over \$120 million per annum in gross regional production from the local economy.

These changes will reduce the economic diversification in the Hunter Valley and without economic diversification regional economies are highly vulnerable to shocks that are outside their control, such as climatic events and commodity price changes.

## 2. Background

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 an important:

- source of employment and economic diversity: stallion farms, broodmare farms and a 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;
- economic contributor to a national racing and breeding industry that has 231,700 employees and participants, 381 clubs which conduct 19,168 races each year and produces \$5 billion in gross domestic product per annum; and
- source of export income: the Hunter Valley is the largest exporter of premium thoroughbreds and the market is forecast to expand into the Asia-Pacific market.

The Review PAC recommended that the Drayton South Coal Mine proposal from Anglo American should not proceed and that exclusion zones should be applied

In November 2015, the PAC “recommended that the Drayton South Coal Mine proposal from Anglo American should not proceed” (PAC 2015, Recommendation 1). In making this recommendation the PAC stated that:

- *“The Commission has balanced the economic, social and environmental factors in its review of the proposal and, in doing so, identified a real risk to another significant industry and to diversity within the regional economy.”* (PAC 2015 Fact Sheet)
- *“The mining and thoroughbred land uses are vastly different and are not compatible in close proximity.”* (PAC 2015 Fact Sheet)

- *“the studs are the cornerstone of the Hunter Equine Critical Industry Cluster, which represents the top of the pyramid of the industry in NSW and Australia, their future must also be secured. Whilst balancing the evidence and merits of the proposal before it, the Commission has been unable to find any additional practical mitigation options or management measures that would satisfy it that the longer term future of the studs could be assured if mining progressed.” (PAC 2015 Fact Sheet)*
- *“The Commission considers that the scenario of the studs leaving the Hunter is the critical issue for the decision maker to weigh up in considering whether to approve the project... **The risk of putting an industry of considerable international standing, which has a sustainable long term future, into decline and value reduction needs to be weighed against a project with potentially immediate and tangible employment and community benefits, but arguable over-all economic public benefit and a relatively short 15 year lifespan.**” (PAC 2015 page iii)*
- *“The Commission considers that, as has already been provided for coal seam gas and drafted for wind farms, clear buffers or **exclusion zones need to be established** to protect sensitive industries from the significant impacts of open cut mining.” (PAC 2015 Fact Sheet)*

The PAC also recommended that *“The importance of the Equine Critical Industry Cluster, its sensitivities to intensive development and the landscape character of its central operators, including the Coolmore and Woodlands studs, needs to be acknowledged with the development and enforcement of appropriate buffers, exclusionary zones or preservation measures to safeguard this important industry” (PAC 2015, Recommendation 5).*

The Review PAC found that the net economic benefits of the project were optimistic and likely to have been overstated.

Where the economic (cost-benefit) analysis is concerned, the PAC found:

- *“in the case of the Drayton South project for instance, **assumptions are favourable to the Applicant’s case**, and the BCA has excluded some potential costs such as impacts on the horse industry, impacts on the environment (including cumulative human health), Aboriginal cultural heritage, and landscape/tourism impacts.”*
- *“there are some **uncertainties** associated with the quantum of **benefits** that would be generated from the project and that there are a **number of externalities, or costs, that have not been included in the cost benefit analysis** undertaken.”*
- *“The Commission concludes there are a range of uncertainties in relation to the project benefits, that the risks to the Equine Critical Industry Cluster are real and that the risks are likely to outweigh the relatively short term benefits of the mine.”*
- *“The Commission considers that the **net economic benefits of the project are optimistic and are likely to have been overstated.**” (PAC 2015 page 25).*

### 3. Conclusions of this independent review

The following conclusions have emerged from Marsden Jacob’s review of the 2016 Supplementary Assessment reports by Anglo American and Houston Kemp, the Department of Planning and Environment – Drayton South Coal Project (SSD 6875) Final Assessment Report and review reports by Professor Bennett.

The Department’s conclusions draw extensively on the analysis by Houston Kemp and its reviewer Professor Jeff Bennett, despite empirical evidence that contradicts critical assumptions that underpin their conclusions

The Department concludes that even if Coolmore Australia and Darley Australia were to relocate the impacts on the Upper Hunter equine critical industry cluster would be limited. In reaching these conclusions the Department has drawn extensively on the reviews and analysis by Professor Bennett and Houston Kemp.

Unfortunately, the Department has not realised that a number of the assumptions that underpin Professor Bennett and/or Houston Kemp’s conclusions do not reflect the market realities of the Upper Hunter thoroughbred breeding industry, for instance:

1. Broodmare farms only own a very small proportion of broodmares (5-10%), whereas Professor Bennett incorrectly states that they are the “buyers” and thus the source of the agglomeration.
2. Not all stallions are capable of covering at a 90% level and broodmare owners select stallions with particular attributes to match their breeding intentions.
3. There is no market where “proven” premium stallions can be readily bought and sold, and buyers of Coolmore and Darley stallion services are predominantly looking for proven stallions “78% of our stock go to proven stallions” (O’Brien 2016 Segenhoe, PAC presentation).
4. Shuttle stallions have been a market reality for many years, but according to broodmare farms that they are not ready substitutes and the market is contracting and Coolmore Australia and Darley Australia are the market leaders in shuttle stallions.<sup>1</sup>

These points are discussed in more detail following and in previous review reports by Marsden Jacob that are referenced below.

Houston Kemp’s findings are based on assumptions that do not reflect the fundamentals of the industry

Houston Kemp argues that if Coolmore and Darley were to leave the Upper Hunter the equine critical industry cluster (CIC) would not be under threat because:

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<sup>1</sup> See also Stowe (2016) Peer Review of “Expert report of Greg Houston” and Dr. Jeff Bennett’s “Peer review of expert report of Greg Houston”: “Shuttle stallions cannot fill the void for those having left the region. Bennett suggests that shuttle stallions could serve as substitutes for those that have left the region. I would argue that the pool of stallions that can shuttle is small. First, the highest quality stallions are typically not shuttled, so those flagship stallions that left could not be replaced. Second, for a stallion to be a viable candidate for shuttling, it must have the appropriate pedigree for the intended market, which differs across countries. A popular stallion in the U.S. may receive little interest in Australia because the two industries produce different types of racehorses. Finally, there are significant costs associated with shuttling a stallion, including transportation, insurance, and risks to the horse’s health” (page 6).

- new stud farms would enter the CIC and existing stud farms would expand their services; and
- the CIC would still be the largest thoroughbred breeding region in Australia.

These conclusions are based on a series of flawed assumptions that result from an ill-informed analysis of data from the Australian Stud Book (ASB). For instance, the analysis:

- incorrectly assumes that stallion and mare fertility is homogenous and is overly optimistically assumes that all stallions can cover at their equivalent 90% level while maintaining fertility;
- incorrectly assumes that stallion libido (sex drive/sexual appetite) is homogeneous;
- falsely assumes that Darley Australia and Coolmore Australia could simply relocate from Jerrys Plains and stay in the Hunter region;
- misunderstands the breeding market. Mares follow stallions, so if Coolmore Australia and Darley Australia were forced to relocate to Victoria they would take their market with them;
- ignores the known fact that a significantly number of premium stallions cannot simply be purchased from a thoroughbred sale because the market is constrained; and
- fails to acknowledge that if Coolmore and Darley were to relocate to Victoria the Victorian thoroughbred stud market would become larger than NSW.

The evidence underpinning these findings is detailed in Marsden Jacob's previous review report (Drayton South Coal Mine: Supplementary Assessment, Independent review of Anglo American response, July 2016).

Further to the analysis in our earlier review report, Marsden Jacob has interviewed a number of broodmare farm operators and broodmare owners in the Upper Hunter in the preparation of this review. These interviewees confirmed that:

- stallions and mares are not homogeneous. On the contrary, they commented that to specifically match mares with stallions was desirable because they are looking for certain attributes, such as fertility, temperament and credentials. These attributes cannot be 'simply' substituted<sup>2</sup>;
- it takes several years for a stallion to be "proven" and only around one in eight unproven stallions become proven stallions. Given that an unproven stallion can cost tens of millions of dollars (see Guihot 2016<sup>3</sup>) they commented that there are material barriers to entry in the premium stallion market that would mean that if Coolmore and Darley were to relocate the broodmares would also relocate;
- broodmare farms typically only own a small proportion (around 5-10%) of the broodmares. The remainder are owned independently from the broodmare farm and they engage the services of the broodmare farm operator. The independent broodmare owners reside all around Australia and even overseas, however, a number of interviewees commented that a significant proportion of the broodmares are owned by Victoria-based investors. This confirms they have no particular ties to the Hunter Valley and are mobile in their decision-making;
- broodmares would follow the stallions if Coolmore Australia and Darley Australia were to relocate, because:

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<sup>2</sup> See also Stowe J (2016) Peer Review of "Expert report of Greg Houston" and Dr. Jeff Bennett's "Peer review of expert report of Greg Houston"

<sup>3</sup> Guihot D (2016) Submission to the NSW Department of Planning and Environment in respect of the possible approval for development of the Drayton South Coal Mine

- broodmare owners have no particular loyalty to broodmare farms in the Upper Hunter, and they were confident that they could identify comparable services in Victoria,
  - it is advantageous for the broodmares to be located near the stallions so that the timing of covering can be optimised and most broodmare owners do not like transporting pregnant broodmares or young foals long distances because of the risks this presents to the broodmare and foal; and
- they would not anticipate a rapid increase in the shuttle stallion market, because the racing results from this market have not always been as strong so they have a preference for local stallions.

Additionally, at the PAC meeting on 16 November 2016 Mr Houston stated *“It is much more difficult to relocate 150 broodmare farms than it is to relocate a small number of studs. It doesn’t really make sense (that Coolmore Australia and Darley Australia would relocate).”* Mr Houston’s statement is contradictory and continues to misunderstand the nature and operation of the thoroughbred industry. The market reality is that if Coolmore Australia and Darley Australia were to relocate interstate, the broodmare farm operators in the Hunter Valley commented that they would take a very significant financial hit that would result in the closure of many broodmare operations.

#### Professor Bennett’s wrongly assumes that broodmare farms own the broodmares on their properties

Marsden Jacob agrees with Professor Bennett’s observation that central place theory and the advantages to business of locational ‘agglomeration’ are widely understood. However, we disagree with Professor Bennett’s assumption that *“The extent of the market that is the source of the agglomeration advantage is the broodmare farms of the ECIC. The broodmare farms are essentially the ‘buyers’ in the market”* (page 4).

This is the critical assumption that underpins Professor Bennett’s conclusions, but it does not reflect the fundamentals of the industry, as confirmed in our research into broodmare stud farms and of broodmare owners.

Broodmare owners are the buyers in the market not broodmare farms. Broodmare farms are a service provider in the market because most broodmares are independently owned and their owners are mobile in their decision making. This has been confirmed through direct consultation with broodmare owners, broodmare studs and in numerous submissions to the PAC.

For instance, Guihot (2016) states that:

- *“There are no material barriers to relocation of the stallions or mares”* (page 6)
- *“the departure of a significant pool of broodmares (3,000) will follow (Coolmore and Darley) with 100% predictability”* (page 7)
- *“competitor studs (to Coolmore and Darley) are currently unable to source as many as three viable new stallions each year between them on average, so sourcing their present average and somehow finding another six would represent a more than 300% lift on current activity. This could only be done by sourcing stallions of such reduced quality that broodmare owners would have no interest”.* (page 10)

Marsden Jacob’s interviews with broodmare farms and broodmare owners finds that:

- there are only 2 boutique broodmare farms (out of 150 broodmare farms in the Hunter Valley) that own all of the broodmares on the farm;
- the consensus from our research into broodmare farms and broodmare owners is that around 90-95% of high-quality broodmares are independently owned;

- broodmare farms are not the source of the agglomeration. They are service providers to broodmare owners. Peter O'Brien of Segenhoe stated to the PAC on 16 November 2016: *"To say that the broodmare farms are the customers is just plainly not true"*; and
- broodmare farm operators have commented that with *"100% predictability"* (Guihot 2016) the owners of broodmares will move them so that they remain close to the premium stallions that are stood by Coolmore Australia and Darley Australia that they want to service their broodmares.

It should also be noted that the only empirical example provided by Professor Bennet is Edinglassie: *"the case of Edinglassie is used to demonstrate that another stud farm is able to continue to operate successfully in the near presence of an active coal mine (Bengalla)"* (page 6). However, this case study bears no comparison to Coolmore Australia and Darley Australia because Edinglassie is not a stud farm it is a broodmare farm, the business model for which is not comparable to a stud farm: *"Edinglassie Stud does not undertake covering on site, nor does it receive visiting mares on the property for covering."* (Review PAC 2015, page 41) *"Edinglassie stud is owned by BHP"* (Review PAC 2015, page 48).

### Professor Bennett's claim that premium stallions are readily substitutable does not reflect the fundamentals of the industry

Professor Bennett finds that substitution would emerge and mean that the Hunter Valley ECIC would not be affected and states that a short-term shock may occur if Coolmore Australia and Darley Australia relocated but then states that in the medium to long term substitution will emerge. Professor Bennett argues that *"stallion services, even of a very high breeding quality, are readily substitutable, mobile and can be established in a location at relatively low cost"* (page 5).

This conclusion directly contracts independent industry experts who attest that establishing stallion services of a very high breeding quality is very difficult. For instance, Guihot (2016) argues that key barriers include:

- it takes around 5 years to prove a stallion, because it takes this long for its progeny to reach racing age; and
- acquiring new premium stallions cost tens of millions of dollars. Guihot identifies that *So You Think* and *Vancouver* are understood to have sold for \$60m and \$40m, respectively and these are the 9<sup>th</sup> and 16<sup>th</sup> most expensive stallions in Australia.

Based on Marsden Jacob's research we conclude that proven premium stallions are not readily substitutable because they take several years to prove, there are very few available and there is no active market where they can be purchased.

### The Department misinterprets and misreports its own expert – assumed coal price, non-market employment benefits and financial viability comments

The Department's Final Assessment Report contains a number of factual errors that Marsden Jacob would like to raise to the attention of the PAC.

#### Coal prices

The Department's Report (2016) claims that Marsden Jacob's previous reviews are based on short-term spot prices, attributing this to Professor Bennett: *"Professor Bennett states that the recent recovery of coal prices demonstrates why MJA's assessment of the short term spot-price is not appropriate for calculating the project BCA"* (page 17).

This is not correct. Marsden Jacob agrees with Professor Bennett that long run coal prices should be used and that it is impossible to predict with certainty the future value of product coal from the mine. Furthermore, Marsden Jacob has reviewed the report by Professor Bennett and can find no reference to spot prices nor comments that Marsden Jacob has used spot prices in our analysis.

Marsden Jacob draws the following to the attention of the PAC:

1. Marsden Jacob was the only peer reviewer (in 2015) to identify that the Gillespie Economics modelling actually assumed a coal price of over AUD\$102 per tonne whereas the report stated at several points that the assumed coal price was AUD\$87 per tonne. Neither BDA nor Deloitte Access Economics identified this error.
2. Marsden Jacob does not use spot prices as this would be entirely inappropriate for the economic analysis of a project over nearly two decades. Instead the analysis in our review is based on transparently reported long-run coal prices based on a number of public sources.
3. Marsden Jacob has recalculated the value of coal using a long run value of AUD \$87 per tonne (which was the value that Gillespie Economics stated was used in its analysis) and found that the value of coal falls by over \$413 million (present value), significantly eroding the vast majority of the claimed net social benefit (\$485 million).

For further information please refer to Marsden Jacob's previous review reports:

- Marsden Jacob (July 2016) Drayton South Coal Mine: Supplementary Assessment, Independent review of Anglo American response
- Marsden Jacob (October 2015) Drayton South Coal Mine: Review PAC, Independent review of the Economic Assessment

### **Non-market employment benefits**

The Department's Report (2016) claims that Marsden Jacob has included non-market employment benefits in our economic analysis of the impacts that would emerge if Coolmore and Darley were to relocate: *"In essence, Prof Bennett recommends that the non-market benefits of employment be treated equally in economic assessment of both industries. This means that if the mining industry cannot count the indirect value created by the employment benefits of the project, then neither should the studs promote the social benefits created by the thoroughbred industry's contribution to employment in the Valley"* (page 18).

Marsden Jacob confirms that we have not included non-market employment benefits in our economic analysis a fact that was confirmed by Professor Bennett: *"The MJA report **does not** however **include any costs** relating to their predictions **of lost employment** in the thoroughbred industry that would be caused by the Project **in their BCA calculus**"* (page 6).

### **Financial viability**

The Department's Report (2016) claims that Marsden Jacob has commented on the financial viability of the mine, attributing this to Professor Bennett: *"Prof Bennett concludes that MJA's suggestion that the application of the current spot price for coal demonstrates that the project would not earn a profit (as distinct from providing a net social benefit) is poorly founded and notes the studs' assertions that Anglo would attempt to inflate the project valuation in order to sell the mine are ungrounded, especially given the fact that any prospective buyer would have a financial incentive to ensure the asset is appropriately valued."*

In our review reports we have made it clear that we have not assessed the financial viability of the profitability of the proposed mine: *"Marsden Jacob has not assessed the financial viability of the*

*proposed Drayton South open-cut coal mine.*” (Marsden Jacob 2015 page 1). We were not engaged to assess the financial viability of the mine and to do so would have required the development of a completely different and separate model that assessed the financial merit of the project.

Equally it should be noted that while Professor Bennett states “*external studies that suggest the Project will not earn a profit (as distinct from generate a net social benefit) are poorly founded*” (page 6), this statement makes no reference to Marsden Jacob, so we cannot understand why this criticism is being directed at us. It is fact that a number of submission that have been made on the proposed mine make comment on the financial viability of the proposed mine, but Marsden Jacob has never commented on this issue and would not do so because it bears no relevance to decision-making by the PAC.

## 4. Conclusions from previous reviews remain valid

The recent submissions by Mr Houston and Professor Bennett do not resolve many of the issues that have been identified with the economic analysis of the Drayton South open-cut coal mine. Marsden Jacob’s conclusions point to systemic optimism bias in the economic analysis that necessitates careful consideration, and robust review and sensitivity testing, by the PAC.

In addition to our review comments that follow, Marsden Jacob refers the PAC to the following previous reviews:

- Marsden Jacob (July 2016) Drayton South Coal Mine: Supplementary Assessment, Independent review of Anglo American response;
- Marsden Jacob (October 2015) Drayton South Coal Mine: Review PAC, Independent review of the Economic Assessment; and
- Marsden Jacob (2013) Economic impact of the proposed Drayton South Open-cut Coal Mine development on the Hunter Valley Thoroughbred Industry.

Copies of these reports are attached.

[The economic analysis over-estimates the net social benefit of the proposed mine by at least \\$533 million, even before other costs such as capital, production tonnages and impacts on the neighbouring studs are factored into the analysis.](#)

Marsden Jacob’s review of the Drayton South open-cut coal mine economic analysis has identified that the net social benefit of the proposed mine is over-estimated by at least \$533 million (present value). Furthermore, this reduction in the net social benefit is conservative because it only factors in changes to the value of coal, sustaining capital, aboriginal heritage and travel time impacts.

The reduction in the net social benefit could be significantly higher if other costs were included, such as if: product coal tonnes are over-estimated (over \$0.5 billion PV<sup>4</sup>), greenhouse gas emission costs are underestimated (up to \$75 million), rehabilitation costs are under-estimated (\$18-28 million PV) and state impacts emerge because Coolmore Australia and Darley Australia are forced to relocate

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<sup>4</sup> Note this estimate assumes that while revenue falls the operating costs for the mine would also fall because a proportion of these are variable.

interstate (up to \$368 million PV<sup>5</sup>). In summary, Marsden Jacob’s review identifies that benefits and costs have potentially been miscalculated by over \$1 billion (PV).

The problems with the economic analysis of the Drayton South open-cut coal mine are discussed briefly in Table 1 and discussed in more detail in the previous review reports by Marsden Jacob (cited above).

**Table 1: Under-estimated costs and over-estimated benefits**

	Under-estimated costs	Over-estimated benefits	Comments
<b>Value of Coal</b>		~\$413 million (PV)	Value of coal falls when a long run value of coal is assumed (AUD\$87 per tonne), instead of over \$102 per tonne.
<b>Sustaining capital cost</b>	~\$70 million (PV)		Recent announcements and independent reviews have raised concerns around the project sustaining capital costs having been under-estimated (see PAC submission by White 2016).
<b>Aboriginal Heritage Impacts</b>	~\$45 million (PV)		Aboriginal heritage impacts were included in the 2012 analysis, but excluded in the 2015 analysis. This change, between 2012 and 2015, materially biases the economic analysis in favour of the proposed Drayton South open-cut coal mine.
<b>Travel time costs</b>	~\$5 million (PV)		Travel time cost are readily quantified but have been excluded from the analysis.
<b>Value of Greenhouse Gas Emissions</b>	~\$75 million (PV)		Value of greenhouse gas emission impacts increases from \$6 million to \$81 million (PV), a discrepancy of \$75 million. This calculation is based on the greenhouse gas emissions as stated in Gillespie Economics (E-11). Marsden Jacob has not included Scope 3 emissions from the burning of coal. Marsden Jacob notes that there is some conjecture around the valuation of the greenhouse gas emissions, with independent experts having differing opinions on the assumed population with standing.
<b>Non-market employment</b>		\$146 million (PV)	Exclusion of non-market employment benefits.

<sup>5</sup> Refer Marsden Jacob (2013) Economic impact of the proposed Drayton South Open-cut Coal Mine development on the Hunter Valley Thoroughbred Industry

	Under-estimated costs	Over-estimated benefits	Comments
<b>Product tonnes</b>		>\$500 million (PV)	Anglo American over-estimated the size of the economic coal resource at the existing Drayton (North) mine by 15.8 million tonnes or nearly 35% (see White 2016). It is therefore possible that the size of the coal resource at Drayton South has also been materially over-estimated. This, in turn, would mean that the value of coal and royalty returns are over-estimated, so a 35% reduction in product tonnage sensitivity analysis should be undertaken. If the coal resource is smaller it is anticipated that the variable components of the operating costs would fall and partially offset the change, this change is factored into this estimate.
<b>Rehabilitation and decommissioning</b>	\$18-38 million (PV)		Reviews of the rehabilitation and decommissioning costs have identified that costs may have been underestimated by between \$60 and \$120 million (see PAC submission by Scott 2016).
<b>Other externalities</b>	\$unknown		Independent reviews of the project have identified a number externality impacts that are not quantified in the current economic analysis, including legacy surface water and groundwater, noise, air, animal health, animal behaviour, marketing, heritage and visual impacts. The omission of these impacts in the analysis means the economic costs have been underestimated.

It should be noted that Marsden Jacob was unable to check several cost and benefit items because they are only reported at an aggregate level, such as opportunity cost of land, operating cost and avoided decommissioning and rehabilitation costs.

The stated coal price has increased from AUD\$87 per tonne to USD\$102 per tonne. This outlook is far higher than recent price outlooks from UBS – the same source cited in the Gillespie Economics analysis.

Marsden Jacob agrees with the Review PAC statement that “it is evident from a review of a number of credible forecasts of coal prices that the Applicant’s assumptions are at the upper end of the spectrum” (PAC 2015 page 24).

The Anglo American Response to PAC Report has confirmed that the assumed coal price is actually AUD\$102 per tonne, not AUD\$87 per tonne. Gillespie Economics previously stated that the: “Projected prices for the Project product thermal coal were provided by Anglo American and are based on the average of the December 2014 Consensus Pricing from 21 financial institutions (UBS, 2014). The assumed price is USD\$72/t in 2016, USD\$82/t in 2017 and AUD\$87/t thereafter”. (2015 page E-25)

In November 2015 UBS (the source of the consensus pricing for coal in Gillespie Economics) released a report titled *North American Coal Industry – 2016 outlook: black as coal*. In this report UBS cuts its long-term (2020) seaborne thermal coal real-price forecasts to USD\$55/mt (see Table 2). USD\$55 per tonne equates to between AUD\$65 and AUD\$73 per tonne (0.85-0.75 exchange rate).

UBS commented that the “price cuts are driven by: an absence of demand growth from seaborne markets, ample brownfield expansion potential to replace depletion, and deflated capex and opex assumptions in our coal price model” (page 1).

**Table 2: UBS thermal coal outlook (USD\$)**

		2015E	2016E	2017E	2018E	2019E	LT
<b>Thermal coal – contract (\$/mt)</b>	New	\$71	\$63	\$60	\$61	\$62	\$55
	Old	\$71	\$64	\$65	\$70	\$82	\$82
<b>Thermal coal – spot (\$/mt)</b>	New	\$59	\$55	\$56	\$57	\$58	\$55
	Old	\$59	\$56	\$61	\$71	\$84	\$82

Source: North American Coal Industry – 2016 outlook: black as coal

Given UBS has materially reduced the coal price outlook, Marsden Jacob has analysed the impact if the assumed long run coal value is AUD\$87 per tonne (which is well above the UBS outlook price). At this ‘illustrative’ coal price the value of coal production falls by over \$400 million in present value terms. For instance, the World Bank has forecasts prices of around USD\$50 to USD\$60 per tonne (see Table 3) and the [International Energy Agency](#) has recently forecast that coal production will fall “coal use falls back to levels last seen in the mid-1980s, at under 3 000 million tonnes of coal equivalent per year (by 2040)” (page 5), which is anticipated to put downward pressure on prices. It also equates to the 20-year average (real) benchmark thermal coal prices as reported by [Indexmundi](#).

**Table 3: World Bank Thermal Coal forecast, April 2016**

	2015	2016	2017	2018	2019	2020	2025
<b>Australian Coal (USD \$/mt)</b>	\$57.5	\$50.0	\$51.0	\$52.1	\$53.1	\$54.2	\$60.0

Note: Coal (Australia). Thermal, f.o.b. piers, Newcastle/Port Kembla, 6,700 kcal/kg, 90 days forward delivery

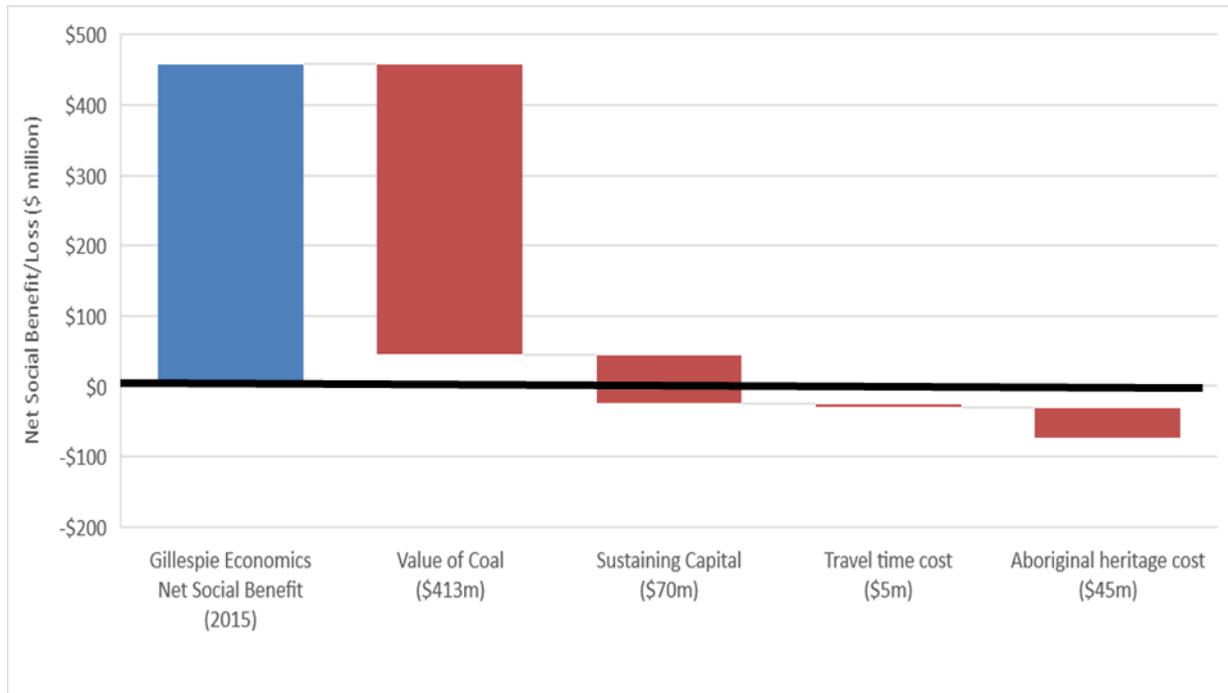
When the economic analysis is recalculated the Drayton South coal mine results in a net social loss of around \$75 million.

The proposed Drayton South open-cut coal mine is not economically beneficial, even before impacts on the studs are factored into the analysis. Figure 1 illustrates that the claimed net social benefit of \$458 million (net present value) should conservatively be a net social loss of around \$75 million (net present value). The net social loss results from:

- revised value of coal – subtract \$413 million (present value);
- revised sustaining capital – subtract \$70 million (present value);
- travel time costs – subtract \$5 million (present value); and
- aboriginal heritage impacts based on Gillespie Economics’ (2012) – subtract \$45 million (present value).

If other production, externality and capital costs were also factored into the current economic analysis this will further increase the net social loss that would result if the mine is developed.

Figure 1: Net Social Benefit/Loss



The analysis does not comply with government requirements

Marsden Jacob does not believe the economic analysis complies with the NSW government’s requirements, because:

- all assumptions and estimates have not been made explicit, such as capital costs, operating costs and externality impacts. NSW Treasury guidelines stipulate “Assumptions underlying all estimates should be made explicit in the evaluation” (TPP07-5, page 17);
- there are issues with the calculations. NSW Treasury guidelines state: “The key to the analysis is a complete and accurate enumeration of all the costs and benefits associated with a project” (TPP07-5, page 50). The Secretary’s Environmental Assessment Requirements (SEARs) state: “projected economic costs and benefits of the project, including the basis for their estimation”;
- all of the negative impacts have not been included in the analysis. The supplement to the SEARs state: “The economic and social impacts of the action, both positive and negative, must be analysed”;
- the analysis of the costs and benefits to NSW is focused on royalties, taxes and contributions. The SEARs require a detailed assessment of: “the costs and benefits of the project, identifying whether the development as a whole would result in a net benefit to NSW”; and
- the analysis does not pay “particular attention to impacts on the operation and reputation of the Upper Hunter Equine and Viticulture Critical Industry Clusters and the associated tourism industry” (SEARs). The analysis simply asserts that the Drayton South open-cut coal mine will have no impact on the viability of the neighbouring studs.

For further information refer to Marsden Jacob (October 2015) Drayton South Coal Mine: Review PAC, Independent review of the Economic Assessment.

## 5. Glossary

Broodmare	A female horse used to produce foals. <i>Source: Rules of the Australian Stud Book</i>
Broodmare farm	A service provider to broodmare owners.
Broodmare owners	Owners of broodmares.
Cover	(The service) the natural act of a stallion mating with a mare. <i>Source: Rules of the Australian Stud Book</i>
Stallion	A male horse used to produce foals. <i>Source: Rules of the Australian Stud Book</i>
Thoroughbred stud	A property where thoroughbreds are bred. <i>Source: Rules of the Australian Stud Book</i>
Proven stallion	A stallion whose offspring have been ‘proven’ on the race track.
Unproven stallion	A stallion whose offspring have not been proven on the race track.
Shuttle stallion	Any stallion that commutes between hemispheres to cover mares, but may not cover mares in both hemispheres every calendar year. <i>Source: Rules of the Australian Stud Book</i>
Equine Critical Industry Cluster	Critical industry clusters are concentrations of highly productive industries within a region that are related to each other, contribute to the identity of that region and provide significant employment opportunities. The Department of Planning and Environment has identified a concentration of equine (horse) and viticulture (wine) industries in the Upper Hunter and mapped these locations as ‘Critical Industry Clusters’ (CICs). <i>Source: Department of Planning and Environment</i>