

## **APPENDIX C: INDEPENDENT REVIEWS BY PROF JEFF BENNETT OF THE HOUSTON REPORT AND THOROUGHbred INDUSTRY SUBMISSIONS**

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# Peer review of the Expert Report of Greg Houston

*Prepared by*

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## 1. Objectives and approach

The objectives of this peer review is to consider the Expert Report of Greg Houston (hereafter “The Report”) as to its findings regarding:

- The impacts of the proposed Drayton South Coal Project (hereafter “The Project”) on the operations, branding and reputations of Coolmore and Darley Studs (hereafter “The Studs”) and the Upper Hunter Equine Critical Industry Cluster (ECIC);
- The economic barriers and/or benefits of the Studs relocating; and.
- The likely impact on the ECIC of one or both Studs leaving the Upper Hunter.

In addressing these objectives, this review will also point out any analytical deficiencies and provide advice on the overall merit of the Report as an element in deciding the future of the Project.

The approach taken in this review is to first make clear any assumptions (both explicit and implicit) made in the Report that are likely to be critical to its findings and to assess the validity and significance of those assumptions. Second, some key economic concepts that relate to the issue of business location are introduced. Their relevance to the Upper Hunter context is considered and the way in which the Report has used them (or not) assessed. This conceptual analysis is important because the objectives of this review, and of the Report, involve predicting the impact of an event that has no precedent – the Drayton South mine. That means strong, direct empirical evidence is not available. Without such evidence, theory can be used as the basis of prediction. However, where empirical evidence has been presented by the Report, that is reviewed in the fourth section of this review. Conclusions and recommendations relating to further analysis are presented in the final section.

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## 2. Assumptions

The analysis presented in the Report is necessarily based on a series of assumptions, two of which deserve consideration here. Any analysis involving an attempt to predict the future must be grounded in some assumptions. Perfect information regarding the future is not available and so some parameters must be defined around the decisions that are being predicted. The two assumptions in question involve the motivations of decision makers and the context of their choices. These are now addressed.

### 2.1 Motivation

The Report attempts to forecast the impacts of the Project on the future decisions made by the owners of the Studs and other business operators in the ECIC. The Report does so under the assumption that the prime motivation of action is profit: that is, entities are 'rational economic decision maker(s)' (p.17). Many economic models take this approach and their predicative capacity across large numbers of individuals and contexts has generally proven reliable. However, where the context involves small numbers of individual decision makers, the profit maximisation assumption is potentially not as useful.

For instance, some individuals may engage in profit 'satisficing' and pursue additional non-profit goals. This means that an individual may seek a level of profit from their efforts that satisfies their requirements for financial return without maximising it, and then look to achieve other non-profit goals. These may include charitable actions or the pursuit of 'lifestyle' goals. The latter is exemplified by people taking on agricultural enterprises but doing so for the peace and quiet or the scenic views even at the expense of a financial loss. Such motivation may be termed 'utility maximisation'.

Predicting peoples' behaviour under that alternative motivation is inevitably more complex because it is impossible to know exactly what factors provide or detract from an individual's happiness. This is one element of 'behavioural economics', a branch of the discipline that is yet to provide much by way of concrete predictive capacity. However, given that the ownership of the Studs is in the hands of high wealth individuals, it could be expected that profit may not be the only or even the primary driver of decisions. The marginal utility of money (profit) to high wealth individuals can be diminished to the point where other factors become more prominent in their overall well-being (or utility).

So while statements made in the Report to the effect that breeding and racing ability is not affected by the scenery enjoyed by the stallions and brood mares, it may affect the well-being of the owners of those animals. Changes to said scenery may therefore affect decisions made by the owners. Indeed, even if the scenery doesn't objectively change but the decision makers' perception is that the scenery has changed then choices may be revised.

However, acknowledging the potential for motives other than profit to drive decision making, doesn't mean that predicting behaviour on any other grounds is likely to be superior. Furthermore, the profit maximising incentive is likely to hold considerable sway for many decision makers and so acts as a highly useful guide in the prediction process. Indeed, the pursuit of non-profit objectives mostly comes at a cost to profit and that foregone profit can be a significant moderator of actions taken.

In the absence of any better understanding of motives, and behavioural economics has to date failed to provide that, assuming that people act in their self-interest to ensure the best profitability they

can achieve – that is they are rational economic decision makers - is the most useful way forward. The alternative is conjecture regarding motivation and that would inject inappropriate subjectivity into the analysis.

## 2.2 The choice context

The Report focuses on the impact of the Drayton South mine (the Project) on the Studs and the ECIC. The inherent assumption made in the Report is that decision making by the Studs and other equine businesses will be driven by the development and operation of that single mine. Yet as is well understood, the Hunter region is a centre of coal mining in NSW and the Drayton South mine is the next in a continuum of mines that create a cumulative effect. Decisions are made regarding responses to the Project in the context of the accumulation of mines and the expectations (perceptions) of future prospects for further mine development. Furthermore, the report makes its predictions on the basis of the Drayton South mine being the only factor of change having an impact on Stud and ECIC decision making. In other words, the margin is defined only in terms of the Drayton South mine.

Given that the requirements made of the Report were to assess the impacts of the Drayton South mine, it is reasonable that the margin is defined by the single mine. However, it is important in considering the impacts of the mine to ensure that the analysis recognises that choices made by the Studs' owners and components of the ECIC will be based on the accumulation of mine impacts and the expectations of future mining expansions. This is not made explicit in the Report although recognition is given to the significance of other mines in the region and their impacts on the existing equine operations. Prospects for future expansions of mining in the Upper Hunter are not mentioned.

## 3. Conceptual analysis

In predicting future locational choice outcomes that do not have precedent, the use of theoretical concepts is important. These concepts are based on evidence established in a range of different contexts and have been demonstrated to be useful in making predictions. A number of these concepts are outlined here and their relevance to the Report's analysis is established.

### 3.1 Central place theory

The advantages to business of locational 'agglomeration' have been widely understood for centuries. Early economic geographers such as von Thunen and Christaller posited 'central place theory' to explain how cost savings to both buyers and sellers generate significant incentives for businesses to agglomerate in a location that is central to the market. Cost savings to buyers are in terms of their transportation costs to the location of the seller/s. Sellers' cost savings are enjoyed through the economies of scale enjoyed by providers of services to the sellers. Later, economist Harold Hotelling demonstrated the competitive pressures faced by (relatively immobile) businesses that push them toward locating adjacent to each other in the middle of the established (relatively mobile) consumer demand. Sellers can gain a competitive advantage by locating in a position that is closer to more buyers because they can access a greater segment of the demand. Competitive relocations through time will ensure all suppliers locate centrally. Moving away from the centre will reduce market share and so there is a locational equilibrium established.

### 3.2 Competition and market structure

Predictions about firms' decisions, including those relating to location, involve the structure of the market in which they operate. A key element that defines market structure is the level of competition faced by incumbents. Early economic theories placed emphasis on the numbers of firms that constitute the industry, with the understanding that the greater the number of firms, the more competition there would be. More recent thinking, such as that of Michael Porter in his theory of competitive advantage, focuses on the extent of barriers to entry and exit. Such barriers may include government regulations but also financial factors such as the extent of fixed costs associated with establishing a new operator, relocating an enterprise or exiting altogether to reinvest in another industry. With low entry barriers even a single firm faces competitive pressure because any profit advantage they achieve will be seen as an opportunity for new firms to enter the industry. Low exit barriers will create less inertia in any industry.

### 3.3 Substitution

A basic tenant of economic theory is the principle of substitution. If a buyer finds the costs of purchasing a product (including the purchase price and the transaction costs of making the purchase) to be rising, they will search for alternative suppliers or alternative products that will satisfy their requirements. Similarly, sellers search for the lowest costs of inputs. In both cases, the possibilities for substitution are investigated. It is exceptionally rare that substitutes for final products and production inputs are not available. Where substitution possibilities are limited, the prospect of profit from the development of new substitutes creates a powerful force to innovate that works to remedy the limitation.

### 3.4 The Report's application of economic concepts

All of the key concepts outlined have been used either directly or indirectly in the Report however it is useful to reconsider the analysis conducted in the Report, making clear and checking the appropriate application of these principles.

The first point to recognise is that the existing cluster of studs and brood mare farms demonstrates the strength of the benefits associated with locational agglomeration. The existing locational attributes that give the Upper Hunter region a comparative advantage (soils, pastures, water, topography, proximity to transportation, proximity to major urban centres, etc<sup>2</sup>) have been supplemented by the agglomeration of like businesses and service providers. Previous locational decisions support the contention that the Upper Hunter has been the best location for the businesses operating there. If it wasn't they would have moved elsewhere over time.

The question is whether or not these established benefits of agglomeration will be impacted by the proposed mine. 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. The 8286 broodmares in the ECIC are geographically scattered across the area. Given the requirement for mares to be 'covered' by stallions, then it is the transportation costs of mares to stallions and vice versa that is a key component of the locational decision.

Proximity to the proposed mine is not an issue for the majority of broodmare farms as they are predominantly located away from the proposed mine site. It would therefore appear to be the case that the establishment of the mine would not impact on the location of the broodmare farms. In

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<sup>2</sup> The Report indicates that the gross margins in the industry are twenty times greater than what could be earned in the next best pastoral use of the land: beef cattle. This gives an indication of the extent to which the ECIC firms have a comparative advantage.

turn this suggests that the mine would not reduce the benefits of agglomeration<sup>3</sup>. Even with the mine in operation, there would be benefits to be enjoyed by a firm offering the services of stallions (the sellers) in a location central to the ECIC.

If the benefits of agglomeration are likely to remain with the mine operating, the next question is which firm will be in the best position to take advantage of them. This is a matter of industry structure and substitution.

Barriers to entry to the provision of stallion services are relatively low (confirmed by the ACCC). This is particularly exemplified by the growth in use of 'shuttle stallions' that are brought from overseas to the Upper Hunter each year: shuttle stallions account for 23% of mares covered. Furthermore, there is competition between local stallion suppliers across the ECIC. In other words, stallion services, even of very high breeding quality, are readily substitutable, mobile and can be established in a location at relatively low cost.

The conclusion to be drawn is that the existing ECIC agglomeration of broodmare farms will continue to be an attractive source of business for stallion suppliers even with the proposed mine in operation.

The next step in the logic is to consider the role of the Stud's in the provision of these stallion services. With the benefits of agglomeration still available, the Stud's' business model would not change materially with the operation of the mine. Given that:

1. the choices made to establish in their current locations indicates the superiority of those sites relative to alternatives (say in Victoria or NZ);
2. the advent of the mine will not impact on their basic business model<sup>4</sup>; and,
3. there would be re-establishment costs associated with moving location,

it would appear that a profit motivated operator would choose not to move location in the event of the Project proceeding. This conclusion is in line with that of the Report.

Should the Stud's choose to move away from their current locations for non-profit related but utility maximising motives such as lifestyle impacts, then the next question involves their choice of alternative locations. At least two alternatives are possible: Within the ECIC or an interstate or overseas location.

Making a judgement on the relative attractiveness of these two alternatives is very difficult without evidence of the relativities of the re-establishment costs and the inherent comparative advantages of alternative locations (in factors such as soils, topography, water etc). However, the lower re-establishment costs associated with a move to an alternative local position within the ECIC would be a strong driver of that choice.

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<sup>3</sup> Note that the broodmares held by the Stud's constitute a relatively small proportion of the total broodmares in the ECIC: For example, Darley holds 250 of the 8286 total in the ECIC. Also, the concentration of firms in the broodmare sector of the industry is relatively low with 80 per cent of breeders in the ECIC having fewer than three mares.

<sup>4</sup> The Stud's are not 'location leaders' in the market even though they supply 36 per cent of covers in the ECIC. That is, the broodmare farms did not locate in the ECIC area because of the presence of the Stud's. The ECIC arose because of the attraction of the region to the broodmare industry. Competition between stallion suppliers means that the relocation of the Stud's would be unlikely to draw broodmare farms away from the ECIC.

In many ways however, that choice of alternative locations is of little consequence to the future of the ECIC. That is because if the Studts did choose to relocate away from the ECIC, the ease of entry into the industry and the benefits of agglomeration would mean that substitute suppliers of stallion services (competitors) would quickly emerge. The loss of the Studts' broodmares would reduce the size of the industry in the ECIC, at least in the short term. However this reduction could be swiftly reversed with favourable economic conditions driving growth in the racing industry which is the source of the derived demand for foals.

These conclusions are consistent with those drawn by the Report but the Report does not go far enough in recognising the competitive potential in the stallion services supply and the prospect for substitution of the segment of the market currently occupied by the Studts. While the Studts currently occupy what appears to be a prominent position with the ECIC, their leaving the region would be unlikely to trigger an exodus of broodmare farms from the ECIC. To the contrary, the Studts' exit would open the market to the entry of substitutes that would in a relatively short period of time, fill the vacated market niche. While the Report's appendix looks at the capacity of existing studs to fill this niche, it does not consider the potential for growth in the supply of shuttle stallions. With the regulations relating to the age of race horses creating definite seasons in the northern and southern hemispheres, there is a clear competitive advantage to stallion owners to increase the rates of return by increasing the capacity utilisation of their stallions. At low marginal costs (associated with transportation) revenue can be significantly increased by supplying services in both hemispheres.

This conclusion is important given the possibility that profit maximisation is not the main motivation of the Studts' owners (and hence a breach of that key assumption). Relocation of the Studts may occur because of the owners' displeasure (for whatever reason) at having their properties located adjacent to an operating mine. However, in terms of the ECIC's continued existence, such a non-profit motivated choice is likely to have little long term influence on the industry in the region given that the majority of broodmare farm owners are profit motivated and not subject to utility impacts associated with the location of the mine.

#### 4. Empirical Evidence

The Report takes advantage of some empirical evidence relating to the effects of coal mine location on other stud farms. In particular, 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). The Edinglassie case does not provide a contextual parallel to the context of the Studts. There are significant differences in ownership and in the nature of the operation conducted. However, in the absence of any closer contexts for comparison, there are important conclusions to be drawn from the Edinglassie case.

First, it demonstrates the strength of the agglomeration benefits available from the ECIC. Second, it shows that the physical operations of a stud farm are not compromised by the proximity of coal mining operations. Hence, from a purely production and profitability angle, Edinglassie is proof that the Studts' operational potential will not be compromised by the Drayton South operation. It seems clear that stallions' capacity to cover is not impacted by adjacent mining operations. This conclusion is substantiated by the PAC in its acknowledgement that the Project will not cause offsite impacts that are any worse than those of mines elsewhere in the Hunter that have received approval.

The Edinglassie case does not, however, give any evidence regarding the prospects of the Studts' future location decisions. The ownership characteristics (between BHP as the land - but not the business - owner for Edinglassie, and the Sheik for Darley) are too different to achieve that. What



the example does is to show that in the event of the Studs deciding to leave the ECIC, it is highly likely that alternative stallion suppliers (either new entrants or expanded existing operators) will set up/expand to fill the vacated market niche given the profit incentive to do so.

Other cases of equine operations being located adjacent to mines are also provided in the Report. For example, Woodlands is located five kilometres from the Mt Arthur mine. The Report also points out that Darley Kelvinside was located adjacent to a tannery which produced off-site effects that did not impact its operations.

Empirical evidence regarding the mobility of stallion service providers that supports that conclusion is also provided by the Report. That evidence is in the form of data relating to entry and exit of firms into and out of the ECIC. The cases of Newgate and Patinack in particular demonstrate the flexibility existing in the industry.

## 5. Conclusions

I am in agreement with the major conclusions drawn by the Report. My approach to considering the questions addressed in the Report is somewhat different but the end point is fundamentally the same.

The Report employs sound economic analysis that is reinforced by the formal presentation of the conceptual principles that are set out in this review.

In short, the benefits of agglomeration and the forces of competition are too strong to see the ECIC disbanded, with or without the continued presence of the Studs.

The decisions regarding location to be taken by the Studs cannot be readily predicted given the prospects of non-profit incentives driving owners' choices. There is certainly good profit based reasons for the Studs to stay in their current locations. And it would appear that a second-best outcome in terms of profitability would be for them to relocate to an alternative site within the ECIC. However, there remains the prospect that both Darley and Coolmore will move away. This however should not be seen as the end of the ECIC. Rather, it is likely that alternative suppliers will take up the market niche vacated by the Studs and the ECIC will, over a relatively short period of time, return to its current size and standing.

Given that the physical off-site effects of the Project (eg. Dust and noise) have been acknowledged as within accepted guidelines, there is nothing to suggest that the capacity of the Studs to carry on with their existing operations would be impeded by the mine. The immediate visual impacts of the mine from the Studs are also negligible. Once on site, clients of the Studs would not be aware of the adjacent mining activities. They would of course be aware of the mine and the numerous other mines in the region in travelling to and from the Studs. This may impact on clients' perceptions of the Studs but it is dubious to conclude that business would be lost by the Studs as a result. There is little doubt that the overriding factors in clients' (broodmare owners) decision making regarding the use of a stallion are the bloodline of the animal and the cost of covering. These factors are not influenced by the Project<sup>5</sup>.

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<sup>5</sup> The debate highlighted in the Report regarding the importance of gardening costs at the Studs is inconsequential in light of this conclusion. The attractiveness or otherwise of the Studs' gardens is not likely to be a key driver of clients' purchases of stallion services in comparison to the bloodline of the available stallions and their costs.

The analysis conducted in this review and that of the Report do not take into account the prospect of further mining developments being located within the ECIC. The cumulative impact of such expansion may give rise to different conclusions, especially if mining expansion was to reduce significantly the number of broodmares in the ECIC. Such reductions could jeopardize the existence of the agglomeration benefits currently enjoyed. Even if equine industry expectations were that mining expansion will continue into the ECIC, then current locational decisions may be affected.

The future locational decisions of broodmare farm owners are thus very important to the continued viability of the ECIC. A study to investigate the factors that drive those decisions would provide information useful to the planning of the region. Such a study could involve an 'ex post' analysis of what factors were important in past decisions or an 'ex ante' analysis of likely impacts of future changes in location choice drivers. Both types of studies involve complexities associated with collecting reliable data from broodmare farm owners given incentives to answer questions 'strategically' in an attempt to secure favourable planning outcomes. One option is to conduct a 'choice experiment' in which current broodmare farm owners are asked how they would react to a sequence of different contexts, where the contexts are described in terms of variations in key locational drivers including costs of relocation, differential profitability and proximity to coal mining activities. The analysis of choices made in the alternative contexts would allow a better understanding of the impact of mining relative to other factors.

# Review of the Supplementary Submissions by Hunter Thoroughbred Breeders Association, Coolmore Australia and Darley Australia on the Drayton South Coal Project

*Prepared by*

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*21 August 2016*

## 1. Objectives, background and approach

The objective of this review is to consider the supplementary submissions by Hunter Thoroughbred Breeders Association (HTBA), Coolmore Australia and Darley Australia on the Drayton South Coal Project (hereafter “the Submissions”) as to their findings regarding:

- The prospects for a thoroughbred horse breeding industry in the Upper Hunter region should the Drayton South Coal Project (Hereafter “the Project”) go ahead; and,
- The benefit-cost analysis (BCA) of The Project.

These two issues are at the core of the objections to the Project put by the Submissions. Fundamentally, the Submissions claim that should the Project proceed, both the Coolmore and Darley studs would relocate their operations to Victoria and this would then cause the relocation of most of the brood mare farms in the Upper Hunter as well as the ancillary support service businesses. The argument advanced by the Submissions is that such a broad scale withdrawal of the industry cluster would be detrimental to the region and the State, given the loss of jobs, income and the move from a sustainable agricultural industry to an extractive industry which has a comparatively short life expectancy. The Submissions reject the logic advanced by the Expert Report of Greg Houston. Houston argued that the likelihood of the studs leaving the Upper Hunter was low.

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This disagreement between the Submissions and the Houston report is closely linked to the second focus of this review: the BCA of the Project. The economic technique used to assess whether or not a change in resource use, such as the one proposed under the Project, is beneficial to the community or not is BCA. A BCA of the Project, conducted by Gillespie Economics (GE), was included in the Environmental Impact Statement of the Project. It was subsequently peer reviewed by BDA Group and Deloitte Access Economics (DAE). Even though the peer reviewers pointed out some inadequacies in the GE study, they both agreed with the fundamental conclusion reached by GE that the Project would generate a net social benefit to the community and should be approved.

The Submissions claim that there were numerous faults in the Gillespie Economics BCA and support their argument with an economic assessment conducted by Marsden Jacob and Associates (MJA) that was commissioned by Coolmore and Darley. The MJA report claimed that the GE BCA significantly overstated the net benefit of the Project, particularly through the use of an inflated price of coal through the life-time of the Project and the failure to include the costs associated with the loss of the thoroughbred industry in the Upper Hunter. With regard to the latter claim, the GE BCA argues that there will be no impact of the Project on the thoroughbred industry (a position that is somewhat supported by the Houston report) whilst MJA argued that Coolmore and Darley would relocate and that as a result costs would be incurred. The MJA report concludes that the Project would result in a net social loss and so should not proceed.

These two issues – the future of the thoroughbred industry and the Project BCA - would appear to constitute the significant substance of the Submissions. Hence, the approach taken in this review is to consider the weight of evidence presented by the Submissions in light of the arguments put by Houston with regard to the first issue and Gillespie Economics in regard to the BCA debate. Given that this reviewer's expertise lies in the field of economics, emphasis will be given to the MJA report included as appendices to the Submissions.

## 2. Prospects for the thoroughbred industry in the Upper Hunter

At the core of the Submissions' logic regarding the future of the thoroughbred industry in the Upper Hunter are two assertions:

- That approval of the Drayton South Mine would cause both Coolmore and Darley to leave the Upper Hunter; and,
- That Coolmore and Darley are the 'core' of the industry cluster, to the extent that their position in that role is non-substitutable.

The end point of the logic is that the result of the Project's approval would be that the industry 'core' would be removed and the Upper Hunter Equine Critical Industry Cluster (ECIC) would 'follow the core' to wherever it chose to relocate outside the Upper Hunter.

Houston disputes both elements of that logic. His counter claims are that such is the comparative advantage offered by the Upper Hunter that neither Coolmore nor Darley would leave the region and that, in the unlikely event of them both leaving, their role as the core of the industry cluster would readily be substituted by other operators. He concludes that the mine's operation would have little impact on the thoroughbred industry in the region.

The veracity of these opposing positions rests on a number of key factors. The first relates to the question of whether 'mares follow stallions' or 'stallions follow mares'. The second involves the substitutability of Coolmore and Darleys' operations

The Submissions are clear in stating that the stallions are, locationally, the central points of the thoroughbred industry. An industry cluster is therefore argued to locate around the place where stallions are standing. Mares are transported for joining to the stallions.

This business model is similar to any retail operation where customers travel to a point of sale to buy a product. The question for suppliers is where to locate. The answer is where they can achieve the greatest segment of the demand and that, generally, is in a central place relative to their customers' locations. Points of sale will locate where convenient for buyers. For the provision of stallion services, studs will tend to locate where there is a concentration of broodmares in order to maximise their opportunities to make a sale. With that conclusion, the question is where brood mares will locate. The Upper Hunter has demonstrated its comparative advantage as a location for keeping broodmares and raising their foals. It can therefore be expected that broodmares and foals will continue to be the focus of agricultural operations in the Upper Hunter<sup>2</sup>. This conclusion is supported by the Coolmore submission in that it acknowledges the continued presence of broodmare farms in the region even in the event of the relocation of Coolmore and Darley.

With broodmares being retained in the Upper Hunter it is likely that stallions will locate there. As the HTBA submission recognises, premier stallions are highly mobile. This is further indicated by the strength of the 'shuttle stallion' segment of the supply: Stallions are regularly moved not just within Australia but also between the northern hemisphere nodes in the UK and USA and Australia.

So while it is not disputed that mares, in the short run, are brought to stallions for servicing, the location of the stallions is flexible. Hence, in the longer run, stallions have the locational flexibility to move to areas where the broodmares are concentrated. The current concentration of broodmares in the Upper Hunter therefore acts as a significant attractant to stallion suppliers.

This logic supports the Houston argument that there are significant advantages to Coolmore and Darley to continue their presence in the Upper Hunter. This includes the options of maintaining their current locations and relocating to other locations in the Upper Hunter. The latter option does however impose costs on the businesses given the need to relocate elements of capital invested at the existing locations or to engage in replacement investments at the new sites<sup>3</sup>. With these additional costs in mind, the current locations have further advantages<sup>4</sup>.

This is not to suggest, however, that should the Project proceed, there would be no change to the structure and composition of the thoroughbred industry in the Upper Hunter. Indeed some changes are likely. One or both of Coolmore and Darley may decide to relocate independent of the economic rationale presented by Houston. Financial performance may not be the sole driver of decisions made by the two studs. However, the above logic would suggest that the market supply gap caused by their exit from the region would be filled. The Submissions attest that the thoroughbred industry is

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<sup>2</sup> It is noted that the only real 'immobility' of horses occurs during late pregnancy for the mares and during the first months of a foal's life.

<sup>3</sup> Such costs are likely to be higher for relocations further from the current properties.

<sup>4</sup> It is noted that Darley's stud operations are already located at its Kelvinside property, at some distance from the Project.

highly competitive. That implies the existence of ample substitutes for the services they supply. Yet the Submissions also argue that stallion substitution is impossible. Both cannot be the case.

Much of the discussion regarding stallion substitution in the Submissions revolves around the Houston calculations of the additional covers that could be achieved by stallions currently standing in the Upper Hunter. This is misplaced given the attested mobility of stallions. In particular, the rise in prominence of shuttle stallions is moot. There may be some short run shortage of stallions given that the assumptions regarding covers made for the Houston calculations are overly optimistic. However, in the medium to longer term, no such shortage is likely to prevail. The Coolmore and Darley operations do not constitute a monopoly supplier, particularly on the increasingly relevant international market. Certainly, their ownership of specific, highly sought after stallions provides them with some immediate market power, but internationally there are substitutes even for the most prized stallion, shuttle or otherwise, at the right price.

The rise of shuttle stallions in a sense represents a 'disruptive technology' for the thoroughbred industry. Decreasing costs of international air transportation, and increasing degrees of transport comfort being afforded stallions (to reduce 'recovery times' following transportation and hence increasing the potential covers a stallion would be able to achieve) are acting to increase the substitutability of stallion services. The *status quo* operational model of the industry is increasingly under threat with or without the Project as industry 'barriers to entry' are diminished<sup>5</sup>.

There is also locational substitutability in the thoroughbred industry. It is the case that the Upper Hunter faces competition from other locations both in the southern and northern hemisphere. There is however some degree of short term and even long term locational inertia in the industry because of the costs of moving. The Submissions make it clear that to establish 'green-field' sites would take not only a significant investment in infrastructure but also a long term programme of soil and pasture improvement.

The conclusion to be drawn then is that changes to the thoroughbred industry are likely to occur should the Project proceed. The changes to be expected are however, unlikely to be as dramatic as anticipated in the Submissions and in the MJA report. In the short run, adjustment costs are probable. These will include costs associated with operational relocations and measures taken to overcome the immediate shortage of stallions available for covers<sup>6</sup>. In the longer term, there may also be some adjustments in property values reflecting the impacts of the Project on the profitability (over time) of businesses. For instance, if Coolmore and/or Darley chose to sell their properties adjacent to the Project site, reductions in the sale price of the land would be an indicator of changed levels of expected profitability<sup>7</sup> available from the property.

However, the principles of substitution in supply hold. Given the extent to which the Submissions suggest their industry is competitive, the prospects of substitution of stallion services either on-location in the Upper Hunter, imported in the form of shuttle stallions or supplied elsewhere in

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<sup>5</sup> It is noted that the requirement for natural covers in the thoroughbred industry remains a crucial barrier to entry as it effectively increases the cost of foal production through limiting the supply of stallion services. Should that barrier be removed, there would be a radical transformation of the thoroughbred industry just as technologies such as artificial insemination and embryo transplants have transformed other livestock industries such as beef and sheep production, particularly at the stud level.

<sup>6</sup> Including the potential transportation of broodmares from the Upper Hunter to the new locations of Coolmore and Darley.

<sup>7</sup> Note however, that purchases to replace their existing properties could be bid to higher prices because of the greater profitability expected from the newly acquired land. This would indicate a transfer of value rather than a loss.

south eastern Australia (with mares being transported to stallions) are strong. The implication is that the extent of the costs arising from the industry changes brought about by the Project will not be as large as forecast by MJA and will trend downwards with the passage of time. However, nor is it likely that they will be zero as implied by GE through the complete omission of any costs associated with changes in the thoroughbred industry from the BCA.

It is beyond the scope of this review to make numerical predictions as to the present value of these costs.

### 3. Benefit Cost Analysis

The Submissions are critical of the BCA conducted by GE for inclusion in the Project EIS. The GE BCA concludes that the Project will yield a significant net social benefit and so should be approved. The MJA critique of the GE BCA, as reported in the Submissions, argues to the contrary that the Project will overall cause net harm to the people of NSW. Five specific points of criticism made by MJA are considered in this review:

1. The price of coal;
2. Benefits of employment;
3. Greenhouse gas emission costs;
4. The jurisdictional limits of the BCA; and,
5. The costs of thoroughbred industry adjustment.

#### *3.1 The price of coal (and stallions)*

Principal amongst the factors that lead MJA to their conclusion that the Project will result in a net social loss is the price of coal produced by the Drayton South mine assumed under the GE BCA. The coal price MJA used in their calculations is significantly lower than that used by GE. Which is right? The answer is almost inevitably, neither. Coal prices have been and will continue to be volatile. Over the time period between when the GE BCA was conducted and when the Submissions were prepared, the price of thermal coal declined significantly as the global demand for coal fell, most notably with the slowdown of Chinese economic growth and the increase in world supply that had been stimulated by the high prices of the previous decade. However, in the period between June and August 2016, the price of Newcastle delivered thermal coal increased from USD52 to USD68 /mT. This takes the AUD price to over \$90 /mT and represents a 30%+ increase in two months.

Chinese production, Indian demand, the exchange rate, international climate change policies are just a few of the factors that will undoubtedly cause prices to fluctuate into the future. The point to recognise is that any projection of price will be subject to risk and uncertainty. That gives reason to carry out sensitivity analyses of alternative price projections within any BCA of mining proposals.

It should also be made clear that the prices received for stallion services are also subject to risk. For instance, the increase in substitution possibilities could cause stallion service fees to fall over time. Changes in the regulatory environment could similarly impact on stallion fees. For instance, new regulations relating to the safety of horses engaged in racing may prove costly to the racing industry and so reduce the derived demand for stallion services. Industry self-regulation could also have an impact. As an example, consider the impact of relaxing the stud book rules to allow for artificial insemination. All of these are factors that cannot be ignored in forecasting the profits of the

thoroughbred industry and again should be the subject of sensitivity analysis in the calculation of losses associated with the Project.

It is important to note that the expected price of coal is a key factor in driving the corporate decision making process of whether or not to proceed with the Project. The action of investing in an application to proceed at the very least indicates that the Project proponent has confidence in the viability of the Project and hence the long run price of coal. External studies that suggest the Project will not earn a profit (as distinct from generate a net social benefit) are poorly founded. The proponent, with a considerable amount of their shareholders' funds on the line, are better placed to forecast coal prices than those who have no 'skin in the game'. The extent to which MJA revise downwards the estimates of firm profitability resulting from the Project (and included in the BCA) is such that the financial viability of the mine would be in question. This begs the question of why would the proponent continue to seek approval for the Project if expectations of coal prices were as predicted by MJA. The Submissions suggest it is doing so merely to improve the prospects of being able to sell the asset, given that Anglo-American has flagged the sale of its Hunter Valley coal mine portfolio as 'non-core assets'. In this regard, ownership of the asset is irrelevant. Both the seller and any intending buyer has a strong profit-driven incentive to conduct 'due diligence' on the value of the asset. Inflating the expected prices to have the mine approved would not give the current owner any advantage as prospective buyers have every incentive to be very well informed regarding the mine's true prospects.

### *3.2 Employment benefits*

The next element of the GE BCA that is questioned by the Submissions is the inclusion of the benefits of the employment opportunities generated by the Project that are enjoyed by the broader community. These are 'non-market' values and the debate relating to the inclusion of this BCA element has been on-going for some time. Its inclusion is justified by the argument that community surveys regarding coal mine approval policy in NSW have demonstrated that the employment impacts of a mine are important to members of the NSW citizenry. That is, members of the community who have no financial connection to the mine experience a benefit from the knowledge that the mine creates employment opportunities for others. Those who argue against the inclusion of the non-market benefits of employment contend that in an otherwise fully employed labour market, the jobs created by a new mine do not reduce the numbers of people who are unemployed. Hence the concerns of the general public for the well-being of people through a lack of employment prospects are ill founded.

The inclusion of the non-market benefits of employment by GE in its BCA of the project is, however, based on the same premise that causes the MJA report and the Submissions to stress the contribution of the thoroughbred industry to employment in the region. To the extent that the non-market value of employment in the Project should be excluded from any BCA of the Project, so too should consideration of the employment impacts of the thoroughbred industry be taken out of the arguments put by the Submissions.

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. It is therefore appropriate that the results presented in the GE BCA sensitivity testing in which non-market benefits of mine employment are not included be used as the most appropriate for decision making. This is consistent with the BDA Group and DAE peer review advice.



### 3.3 Greenhouse gas emission costs

The MJA approach to the inclusion of greenhouse gas emissions as a cost to the Project is to include the amount of the Gillard Government's \$23 tax per tonne of carbon emitted, is not recommended. While the \$23 amount was the financial cost (tax) of carbon emissions imposed under the Gillard Federal Government, it was not and is still not the resource cost of the emissions to the people of NSW. It is the resource cost and not the financial cost that is relevant to a BCA. An estimate of the true resource marginal social costs of a tonne of carbon emissions is difficult to establish, and analysts have frequently reverted to the tax rate as a surrogate measure. That approach is based on the assumption that the Federal Government made an accurate assessment of the social cost of emissions when setting the tax rate. That, at best, is dubious particularly given that the carbon tax rates set in different jurisdictions around the world vary dramatically. Furthermore, the tax rate, at least in principle, is set to be a reflection of the marginal social cost of emissions to the world's population. If the BCA conducted for the Project is based on the consequences for the citizenry of NSW, that is, the people of NSW are the only ones who have 'standing' in the BCA, then the GE approach of apportioning the \$23 per tonne rate to the fraction of the world's population that is constituted by the people of NSW is appropriate.

Given the dubious nature of the process used to estimate the marginal social cost of greenhouse gas emissions and the diluting impact of apportioning that cost so that it is relevant to the NSW jurisdiction, the most appropriate treatment of the costs of emissions is to consider them to be inconsequential<sup>8</sup>.

### 3.4 Jurisdictional limits in the BCA

The MJA report criticizes the GE approach for not meeting NSW Government guidelines that require a NSW state-based approach. The GE analysis is based at a national level, whereby the people of Australia have 'standing' in the BCA. That approach is taken because of the undoubted complexities of distinguishing between benefits and costs enjoyed and borne in NSW and those experienced by people resident in other states. However, the GE analysis does attempt a breakdown of national benefits and costs to develop a state-based and a region-based analysis of benefits and costs.

A further element of the Project BCA that has not been considered by the Submissions or by the GE analysis is the issue of foreign ownership. Given that Anglo American, the current owner of the Drayton South coal lease, is a foreign owned corporation, profits from the Project distributed to shareholders who are not resident in Australia should not be included in the BCA of the Project. It is also the case that payments of income tax that are distributed as Federal Government expenditure to people other than those resident in NSW should also be excluded as benefits of the Project if a strictly state-based approach is to be taken. That leaves payments of royalties to the NSW state Government as the primary element of benefits to be included in the Project BCA. The GE analysis has not made that point explicitly and it is material to the estimation of the Projects' net social benefit.

However, this approach needs also to be applied to any costs imposed by the Project on the thoroughbred industry. For instance, given that Darley is owned by a foreign entity, Sheik

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<sup>8</sup> Omitting the costs of greenhouse gas emissions of mining is methodologically consistent with MJA's omission of the costs associated with any greenhouse gas emissions arising from the grazing of horses, growing and cutting of hay etc in their estimation of the social net benefit of the thoroughbred operations.

Mohammed, any losses incurred by Darley given the Project's approval should not be included in the BCA of the Project.

### *3.5 Thoroughbred industry adjustment costs*

Section 2 of this review set out the core arguments regarding the likelihood and costs of Coolmore and Darley leaving the Upper Hunter. It was concluded that while some costs could be expected, their magnitude is likely to be moderated by the substitution of alternative resources. The matter of foreign ownership detailed in the previous sub-section implies that further moderation of the expected costs is required before inclusion in a BCA of the Project. No such costs were included in the GE BCA and as such, the results of that study are likely to exaggerate the net social benefits of the Project. However, the approach used by MJA to estimate the extent of the costs (calculating the differences in gross margins between the alternative land use types) does not take into account the likely process of industry adjustment and so represents an over-estimate of expected costs.

### *3.6 In summary*

In essence, the results of the BCA conducted by GE should be regarded as a relatively optimistic view of the net social benefits to be achieved by the people of NSW from the Project. However, the adjustments to the BCA advocated by the Submissions and estimated by MJA are excessive. In particular:

- the price time series used by MJA reflects the situation as it has been at the bottom of the resource cycle and is thus relatively pessimistic and does not accord with industry expectations;
- the method used to account for the social cost of greenhouse gas emissions is unreliable and the true estimate of the social costs of emissions is likely to be inconsequential; and,
- the costs to the thoroughbred industry resulting from the Project are exaggerated because of the failure to allow for the prospects afforded by resource substitution.

Issues raised by the Submissions such as the costs associated with heritage, noise and dust impacts of the Project have not been assessed in this review. The approach taken by GE to these matters is accepted: that is, the Project proponent is forced by government regulations relating to these issues to internalise the costs through protection and suppression actions. The exception to this relates to any costs born because of the relocation of Coolmore and Darley. These are specifically noted above as being moderated by the process of resource substitution. Finally, the travel cost impacts of the Project are noted to be largely self-cancelling and hence immaterial to the overall BCA result.

An empirical revision of the BCA for the Project is, however, beyond the scope of this review.

## 4. Conclusions

The likely consequences of the Project and their inclusion into the decision making framework afforded by BCA have been the subject of extensive conjecture and debate. The decision making process, as a consequence, has been complex and extended. The aim of this review has been to provide an external perspective of the key matters of contention: the future of the Coolmore and Darley studs, along with the Upper Hunter ECIC in the face of the Project going ahead and the merits of the BCA conducted for the Project.

There is little doubt that the Submissions exaggerate the likely impacts of the Project on the thoroughbred industry in the Upper Hunter. However, it is also the case that the assessment of the Project by the proponent, as presented through the GE BCA, is overly optimistic in its support.

The conclusion drawn here is that the Project will deliver a net benefit to the people of NSW. This is consistent with the conclusions of the peer reviewers of the GE BCA and supports the approval of the Project. The arguments presented in this review are sufficiently strong to downplay the concerns raised by the MJA report to the point where they would not have a material effect on this overall conclusion.

That said, this review has not been intended to revise the empirics of the original BCA. Such a revision may be advisable in order to consolidate the conclusion drawn here. There is sufficient information now available, given the extent of the effort already made to establish the Project's benefits and costs, to allow a low-additional-cost revision of the BCA to be produced. Of course there can never be complete information regarding the future so even the revised BCA would be imperfect. While imperfect knowledge is unavoidable, policy decisions must still be made.

A number of other matters are worthy of note in concluding this review. They largely reflect on some of the inappropriate arguments that have been raised in the debate.

First it is important for decision makers to reflect on the nature of the choice being made. It is a choice involving a single mine and its consequences for the upper hunter thoroughbred industry. Hence it is the benefits and costs arising from the changes caused by the implementation of the Project that are of relevance to the decision. It is unhelpful of the Submissions to make mention of the overall size of the Australian horse racing industry (with a contribution to GDP of over \$5b) in support of their case. The principles of resource substitution outlined in this review apply to an even greater extent when considered at the national scale. The Project in no way poses a threat to the national horse breeding/racing industry.

Should the proponent of the Project choose to follow the same pattern of argument, they could equally invoke the value of the industries that use the electricity generated from the coal that would be mined as supporting evidence. This is not a useful piece of information.

Second, the contention put by the Submissions that a decision to approve the Project would effectively signal that NSW is not open to agricultural business is unsubstantiated. Furthermore, such contentions could readily be matched by the Project proponent if they chose to state that a refusal to approve the project would be a signal that NSW is closed to mineral development. Neither contention is useful to the decision making process.

It is worth noting that the Submissions make recourse to the term 'sustainability' to support the thoroughbred industry as opposed to mineral development. Sustainability is a very nebulous term and one that can be used in many and sometimes misleading ways. Without labouring the point, the broadest definition of sustainability is that resources are used to ensure that over time, people are made better off. The use of non-renewable resources such as coal can, under that definition, be regarded as sustainable. To achieve sustainability where non-renewable resources are involved requires the conversion of the value enjoyed from those resources into other forms of capital that can provide for improvements in the well-being of the people of NSW. For instance, if the royalty payments made to the government are used to pay for health and educational facilities, 'human capital' is created. Similarly, investments in infrastructure ('built capital') can secure long term improvements in wellbeing. Recourse by the Submissions to a justification of their case on the basis of 'sustainability' is therefore ill founded.

The same logic applies to the use of the 'precautionary principle' by the Submissions to support their case against the Project. It is the convention to use the precautionary principle to foil applications for development. The principle, in its strongest form, effectively reverses the burden of proof so that a proponent of development must show that the action they propose will not have any adverse impact on the environment. This of course is an impossibility. It is also undesirable as it is highly unlikely that any development no matter how socially desirable will not cause some environmental costs. For instance, the invention of the motor vehicle has come with environmental damage yet we are all advantaged by its development. The real question is whether or not the environmental damage caused by a development, along with all of its other costs, are worth the benefits of the development. This in essence is the question addressed by BCA. All future options for resource use, be they development or maintaining the status quo come with associated risks and uncertainties. The notion of the precautionary principle should therefore be to 'look before you leap' and ensure that a BCA of any change recognises and incorporates the presence of risk and uncertainty. At the very least, this should entail careful use of scenario sensitivity testing.

In the case of the Project, it is clear that the process of development application has involved an extraordinary amount of analysis and consideration, including that resulting from challenges made by its opponents. There is clear evidence arising from that process that the Project will generate significant net social benefits to the people of NSW under a wide range of scenarios. However, it is acknowledged that the original BCA conducted by GE erred by not including any costs to the thoroughbred industry in the region that would arise because of the Project. As such, the extent of the Project's net social benefits is over-stated by the GE analysis. The Submissions argue that these omitted costs reverse the GE conclusion regarding the social viability of the Project. However, it has been argued in this review that the extent of the adjustment costs has similarly been overstated in the Submissions and the MJA report on which they are based. This is primarily because of MJA's failures to take into full account the consequences of stallion substitution in what is a highly competitive market. The Houston analysis makes that point clearly. Hence, even after taking into account the adjustment costs that will be borne by the thoroughbred industry in the region, it is concluded that the recommendation made by GE, and supported by the peer reviews of both BDA and DAE, remains appropriate: the benefits of the Project will exceed its costs.