Economic Environment for the proposed Ellensfield Coal Mine Development

Prime Research

A report prepared for
URS Australia Pty Ltd

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1 Introduction

Vale Pty Ltd proposes to develop an underground coal mine in the Isaac Region[1], within the northern region of the Bowen Basin, approximately 175km west of the regional coastal city of Mackay. The Ellensfield Coal Mine Project (the project) will be located approximately midway between the towns of Coppabella and Moranbah.

The project will occur over a longwall area of 1,793 ha and an infrastructure area of 318 ha. The longwall area is underground; however, the surface area above it may be subject to subsidence.

The project will have an impact on the Queensland economy as well as on the local economy of the Isaac Region and on the regional economy of the Mackay Statistical Division (SD). This report describes the nature of these economic impacts and quantifies these impacts where appropriate and practical.

[1] The Isaac Region refers to the area covered by the Isaac Regional Council. The Isaac Regional Council was formed through the amalgamation of the three shires of Belyando, Broadsound and Nebo. The Isaac Regional Council commenced operations on the 15th of March 2008 (Isaac Regional Council, 2008).

2 Descriptions of Environmental Values

2.1 Economic composition

In order to understand the economic composition of the Mackay SD and of the Isaac Region, an input-output table for each region has been generated (for a description of input-output tables see Section 3.1.1). From these input-output tables it is possible to derive an estimate of the industry contributions to value added (at factor cost) in each region, and to compare these with Queensland as a whole.[2]

Table 1 shows that the Mackay SD is considerably more specialised in primary production than is Queensland as a whole. Across Queensland, *agriculture, forestry and fishing* account for 4.3 percent of the State's economy. In Mackay, the industry's share of the economy is slightly higher at 5.2 percent. However, it is in *mining* that the differences are truly significant. Queensland's *mining* industry accounts for nearly 9 percent of the State's economy. *Mining's* share is a much more significant 55 percent in Mackay. While *mining* in Queensland includes a variety of minerals, *mining* in Mackay is over 95 percent Coal mining.

With primary industries representing a large share of Mackay SD's economy, most other sectors will naturally be relatively under represented. The Mackay SD is particularly under represented in *communication services*, *government administration and defence*, *cultural and recreational services* and *personal and other services*.[3] *Transport and storage* is also under represented in the Mackay SD, with 3.2 percent of the Mackay SD economy compared with 5.2 percent of the Queensland economy; however, it is an important service provider to the region's coal industry. *Transport and storage* includes the road and rail transport used to move the coal to the ports, and the ports themselves, which are located at Abbot Point, Dalrymple Bay and Hay Point.

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[2] Value added at factor cost consists of *wages and salaries* plus *gross operating surplus*.

[3] *Personal and other services* includes the hiring of personal and household goods, religious organisations, interest groups and public order and safety.

Table 1 Value added shares for Queensland, Mackay SD and Isaac Region in 2005-06

	Queensland	Mackay	Isaac
	(percent)	(percent)	(percent)
Agriculture, forestry and fishing	4.26	5.19	2.99
Mining	8.94	55.12	89.64
Manufacturing	9.97	4.45	0.17
Electricity, gas and water supply	2.08	0.86	0.07
Construction	8.19	4.77	1.66
Wholesale trade	4.80	2.96	0.36
Retail trade	7.42	2.74	0.49
Accommodation, cafes and restaurants	2.97	2.19	0.54
Transport and storage	5.25	3.18	0.52
Communication services	2.31	0.71	0.13
Finance and insurance	5.27	1.87	0.19
Property and business services	10.22	4.60	0.69
Government administration and defence	4.80	1.55	0.36
Education	5.17	1.93	0.49
Health and community services	6.69	2.46	0.36
Cultural and recreational services	1.22	0.31	0.02
Personal and other services	2.35	0.76	0.13
Ownership of dwellings	8.11	4.33	1.20
TOTAL	100.00	100.00	100.00
Value added at factor cost ($m)	159,154	11,122	5,347

Source: Queensland value added and value added shares are calculated from ABS (2007). Isaac Region and Mackay SD value added and value added shares are calculated from input-output tables derived for this report.

In the Isaac Region, *agriculture, forestry and fishing* (three percent) is a smaller share of the economy than in Queensland or Mackay SD; however, as it has the second largest share in the local economy it must still be considered a significant industry. *Mining* (effectively Coal mining), with a 90 percent share of the Isaac economy, clearly dominates. The remaining industries located within Isaac account for around seven percent of the economy; of these *construction*, at 1.7 percent, is the largest. It would be expected that much of the *construction* sector would be associated with activity in the mining industry.

2.2 Business composition of Mackay and Isaac

To further understand the types of businesses in the Mackay SD and Isaac Region, Australian Bureau of Statistics (ABS) data on business counts for 15 industry types were obtained and are presented in

Table 2Table 2 and Table 3 respectively. (Seventeen industry types are presented in Table 2 and Table 3 to give complete coverage of each economy. Business count data is not available for *electricity, gas and water supply* and for *government administration and defence*.) In viewing these tables it must be remembered that this ABS data, particularly at a small regional level, will be affected due to a "confidentiality process" that ensures no individual business can be identified. The confidentiality process involves the random rounding of data to a higher or lower multiple of three. (Therefore, a seven can become a six or a nine, and a 25 can become a 24 or a 27). To provide a secondary source of information for comparison purposes, census data for 2006 is added to the final columns of Table 2 and Table 3. While the census data is also subject to a confidentiality process, experience suggests that it does paint a reasonable picture of regional economic activity. It should also be noted that businesses are counted in the location at which they register for an Australian Business Number (ABN); therefore, some businesses in a region will not appear in a count because they are registered elsewhere.

Despite mining's major share of the Mackay SD's economy, Table 2 suggests that the industry has fewer members in the region than most of the other industry types. This is not surprising given the inherently large scale operations associated with most mining enterprises. In fact, it is likely that many of the 231 businesses

counted in Mackay SD in 2007 were actually providing services to the mining industry rather than carrying out extractive operations - particularly those business employing four people or less (201 of the 231 *mining* businesses). It is also likely that many of the larger mining operations in the Mackay SD registered for an ABN in a capital city location and therefore do not appear in the Mackay SD business counts.

Table 2 Business counts in the Mackay SD (2007) and employment (2006)

	Employment size range[1]					Total count[1]	Jobs[2]
Industry	**Non Employing[3]**	**1 - 4**	**5 - 19**	**20 - 199**	**200+**		
Agriculture, Forestry and Fishing	2,439	723	180	84	21	3,447	4,662
Mining	78	123	12	15	3	231	8,052
Manufacturing	297	213	111	30	9	660	5,176
Electricity, gas and water supply							454
Construction	1,338	753	300	96	0	2,487	5,554
Wholesale Trade	159	108	42	66	0	375	3,368
Retail Trade	489	507	393	147	6	1,542	9,768
Accommodation, Cafes and Restaurants	165	111	141	111	6	534	5,123
Transport and Storage	501	258	129	57	0	945	3,905
Communication Services	30	57	21	6	0	114	485
Finance and Insurance	474	135	39	3	0	651	777
Property and Business services	1,734	576	267	81	3	2,661	5,402
Government administration and defense							2,181
Education	69	36	15	9	0	129	4,249
Health and Community Services	192	132	69	21	3	417	5,123
Cultural and recreational Services	108	60	18	12	0	198	737
Personal and Other Services	183	132	63	6	0	384	1,794
Total	**8,256**	**3,924**	**1,800**	**744**	**51**	**14,775**	**66,812**

Notes: 1. Business count data provided by the Australian Bureau of Statistics (ABS) from Australian Bureau of Statistics (2007).
2. Jobs data provided by the Australian Bureau of Statistics from the 2006 census.
3. Non employing businesses are businesses that operate without staff other than the business owners.

The largest number of businesses registered for an ABN in the Mackay SD are involved in *agriculture, forestry and fishing* - while the census data suggests the business counts may be an overestimate, it is likely that a significant number of agriculturally based businesses exist in the region. *Property and business services*, *construction* and *retail trade* also contain a significant number of enterprises in the Mackay SD.

Table 3 shows that the *mining* sector in Isaac, with over 6,000 workers, is the largest employer in the Region. However, *mining* does not have a significant number of registered businesses in Region. The major mining operations located in Isaac are most likely registered for an ABN at another, probably capital city, location.

Table 3 Business counts in the Isaac Region (2007)

	Employment size range[1]					Total count[1]	Jobs[2]
Industry	**Non Employing[3]**	**1 - 4**	**5 - 19**	**20 - 199**	**200+**		
Agriculture, Forestry and Fishing	504	165	48	6	6	**729**	**1,037**
Mining	12	18	0	3	0	**33**	**6,153**
Manufacturing	39	33	6	0	0	**78**	**82**
Electricity, gas and water supply							**17**
Construction	87	54	21	12	0	**174**	**815**
Wholesale Trade	21	9	0	9	0	**39**	**195**
Retail Trade	48	30	36	12	0	**126**	**837**
Accommodation, Cafes and Restaurants	19	9	9	3	0	**39**	**613**
Transport and Storage	42	36	15	3	0	**96**	**317**
Communication Services	0	15	3	3	0	**21**	**44**
Finance and Insurance	39	6	0	0	0	**45**	**44**
Property and Business services	129	33	18	3	0	**183**	**394**
Government administration and defense							**240**
Education	6	0	3	0	0	**9**	**516**
Health and Community Services	9	6	6	0	0	**21**	**330**
Cultural and recreational Services	9	6	3	3	0	**21**	**16**
Personal and Other Services	6	6	12	0	0	**24**	**156**
Total	**969**	**426**	**180**	**57**	**6**	**1,638**	**11,806**

Notes: 1. Business count data provided by the Australian Bureau of Statistics (ABS) from Australian Bureau of Statistics (2007).
2. Jobs data provided by the Australian Bureau of Statistics from the 2006 census.
3. Non employing businesses are businesses that operate without staff other than the business owners.

The Isaac Region clearly does contain a large number of Agricultural businesses, as well as many *construction*, *retail trade* and *property and business services* businesses. The *construction* businesses, and their more than 800 employees, likely depend for much of their work on the *mining* industry in the Region.

2.3 Regional agriculture

The major agricultural activities in the Mackay SD and the Isaac Region revolve around raising cattle for human consumption, and the growth of cereal crops and sugar cane. These account for over 90 percent of the agricultural industry in these regions, as Table 4 shows. By comparison, for Queensland these account for 50 percent of the State's activities.

The Isaac Region itself, produces approximately 60 percent of the Mackay SD's agricultural products.

In the period from 2000-01 to 2006-07, there has been a considerable drop in the generation of cereal crops in both the Isaac Region and Mackay SD - amounting to an 80 percent loss in the value of production (calculated from Table 4). Cereal crop production in Queensland also fell over this period, but by only 20 percent. The fall in the value of cereal crops in the regions has been partially offset by an increase in the value of cattle slaughterings over the same period, while sugar cane production changed by a relatively small amount.

Overall the period from 2000-01 to 2006-07 has seen a 5 percent drop in the value of agricultural products in the Isaac region. Over the same period the Mackay SD experienced a similar fall in the value of production. These regional trends are different to the trend seen for the State, which showed an almost 50 percent increase in value over the same period.

Table 4 Value of agricultural production in Queensland, Mackay SD and Isaac Region

	Value of production ($m)	
	2000-01	2006-07
Queensland		

Cereal crops	535.8	429.1
Cattle and calves slaughterings	2,872.7	3,815.9
Sugar cane	640.5	1,121.5
TOTAL	**8,041.8**	**11,970.2**
Mackay		
Cereal crops	81.0	19.2
Cattle and calves slaughterings	388.6	427.5
Sugar cane	21.1	26.2
TOTAL	**514.7**	**484.9**
Isaac		
Cereal crops	65.5	13.8
Cattle and calves slaughterings	249.4	289.4
Sugar cane	10.6	10.6
TOTAL	**343.3**	**324.1**

Source: Regional estimates based on production shares and value of Queensland sales from ABS (2008a).

Drought has had a negative impact on farming in the Isaac Region. However, good summer rainfalls led the Queensland Government to revoke the region's drought status in July this year (ABC News, 2008). Further positive news for agriculture, in Mackay SD as well as Isaac, is the recent high prices being paid for beef cattle in Queensland due to the fall in the Australian dollar and a shortage of cattle (Meat and Livestock Australia, 2008).

2.4 Mining in the Bowen Basin

The coal deposits associated with the project are part of the Bowen Basin coal deposits that currently supports 34 coal mines in Queensland (Mining Australia, 2008).

Recent projects that have commenced in the Isaac Region include:

- Carborough Downs Mine Expansion. Located 15km east of Moranbah this mine expansion is increasing mining output from 1.9 Mtpa to around 5 Mtpa of Run of Mine (ROM) coal and increasing the mine's workforce by 76 full time equivalent employees (Queensland Government Environmental Protection Agency, 2007).

- Lake Lindsay Project. Located in the Isaac Region (formerly the Broadsound Shire) this new mine development is expected to reach full production of 4 Mtpa of saleable coal in 2009 (Anglo Coal, 2008) and

employ up to 150 people (Queensland Government Environmental Protection Agency, 2005).

- Newlands Coal Project. Located 129km west if Mackay in the Isaac Region (formerly the Nebo Shire) and will expand the mine's output by up to 2.5 Mtpa of ROM coal. No new staff will be required to meet this expanded output (Queensland Government Environmental Protection Agency, 2006a).

- Norwich Park East Pit Coal Mine. This mine expansion in the Isaac Region (formerly the Broadsound Shire) requires no addition labour as staff shall be redistributed from the existing Norwich Park workforce (Queensland Government Environmental Protection Agency, 2008).

- Sonoma Coal Project. Located in the Bowen Shire (part of the Mackay SD) this project will extract approximately 3 Mtpa of coal for local processing. Mining and processing of coal will require approximately 110 personnel (Queensland Government Environmental Protection Agency, 2006b).

In addition, there are eight expansion projects committed or under consideration as well as 22 new mines under consideration, including Ellensfield (Bowen Basin, Mining Communities Research Exchange, 2008). With such strong levels of activity in the Bowen Basin region it is expected that the Isaac Region and the Mackay SD will continue to be influenced by the construction and operation phases of new and existing mines in the short and medium term. Long term, new developments will be influenced by world - particularly Chinese and Indian - growth rates and by increasing Coal mining capacity in other parts of Australian and the rest of the world. There is an expectation that by 2010 prices for hard coking coals will fall from the very high levels of 2008 to the still strong price levels experienced in 2006 (for example from US$289/t FOB to around US$110/t FOB for Standard Hard Coking Coal) (MineCraft Consulting, 2008). Prices for thermal coal are expected to stay higher than 2006 (around US$50/t FOB) into the foreseeable future (MineCraft Consulting, 2008).

2.5 Housing

Contractors working on the construction of the project will be housed at the Coppabella Camp, although there may be a need to house up to 20 percent of the workers at the Nebo camp. Construction is anticipated to last for 28 months. While attempts will be made to source construction workers locally, it is likely that most will be from Mackay or Brisbane. The Isaac region, with an unemployment rate of around 1.0 percent in June 2008, is unlikely to contain sufficient available skilled labour (calculated from Department of Education, Employment and Workplace Relations, 2008).

Full operations at the project are projected to begin in 2012 and last 18 years. The Isaac Regional Council is proposing to develop a number of 100 ha blocks over the next few years to provide accommodation for the developments occurring in the region. The project is expected to receive an allocation of 130 lots to house approximately 130 workers and their families.

Mackay is a large regional city located 975km north of Brisbane in the Mackay SD. At the 2006 census the population of the city of Mackay was approximately 85,000; the population of the Mackay SD was just over 150,000 at the census. Moranbah, by comparison is a small regional town located approximately 200km south-west of Mackay. At the 2006 census the population of Moranbah was approximately 7,400.

The boom in coal mine construction and production throughout the Bowen Basin has put enormous pressure on the region. Moranbah, which is in the Isaac Region, is a rapidly growing town where housing prices have risen rapidly. The median house price in the town has risen from $75,000 in 2003 to $346,875 in March 2008, an annual growth rate of 36 percent (Ludlow, 2008). Inquires to a Moranbah based real estate agency revealed that there are currently no rental vacancies in Moranbah and there exists a waiting list of at least 120 for rental accommodation in the town. Weekly rent for an average three bedroom house in the town is currently around $750 per week (McArtney, 2008).

The proposed developments in Moranbah will to an extent ease the current housing pressures, but with the population of the town likely to continue to rise

while well paid work in the area remains plentiful, a fall in residential pricing is unlikely and the rental market would be expected to remain tight.

House prices in the regional city of Mackay have shown some remarkable fluctuations, peaking in 2002 and 2006 with rises of 177 percent, before stabilising in the last two years. The average price for a house in Mackay in the September quarter 2007 was $385,000 and rents are high with a two bedroom unit on the market for $750 per week (Ludlow, 2008).

2.6 Availability of goods and services and relative prices

The city of Mackay boasts a large range of goods and services, similar in scope to the availability in the Queensland capital nearly 1,000 km to the south. Moranbah, as befits its size, has a much more restricted range of goods and services, although the town does boast a well stocked supermarket and it is assumed that the new residential development will incorporate additional retail outlets.

In order to estimate an indicative index of relative prices for consumer goods in Moranbah and Mackay, a survey of supermarket prices for 18 goods was undertaken. Only one supermarket in Moranbah, Mackay and Brisbane was surveyed and this, coupled with the small range of goods sampled, limits the accuracy of the results. Nonetheless, some interesting comparisons can be made.

Twelve of the goods surveyed were the same price in Mackay as in Brisbane; three goods had a lower price in Mackay while three had a higher price in Mackay than in Brisbane. Overall the average price was 2.4 percent higher in Mackay than Brisbane due mainly to much higher prices for potatoes and lettuce.

Prices for Moranbah were only the same as the prices in Brisbane for two of the 18 goods sampled. Prices were lower in Moranbah only for bananas. Overall the average price in Moranbah was 5.3 percent higher than in Brisbane and 2.9 percent higher than in Mackay.

3 Potential Impacts and Mitigation Measures

The Ellensfield Coal Mine Project is projected to involve capital expenditure of $640 million over a 28 month period and an annual operating budget (once full production is achieved) of around $250 million. Input-output analysis was used in order to estimate the impact of these expenditures on the economies of Isaac, the Mackay SD and on Queensland.

3.1 Input-output analysis

3.1.1 Input-output tables

An input-output table provides a summary, or a "snapshot", of the transactions occurring within an economy over a selected period. The Australian Bureau of Statistics (ABS) produces input-output tables at the national level. These tables show the consumption and sales patterns of over 100 industries. In simple terms they show, for a given industry, which other industries it purchases from and to which other industries it sells. The national (Australian) input-output tables also show the use of industry production in private and government consumption, the use in public and private investment and sales to foreigners (exports).

While the ABS produces national input-output tables, they do not produce state or regional tables. Input-output tables and multipliers for the Isaac Region, the Mackay SD and State of Queensland were produced for the purpose of this report.

3.1.2 Input-output multipliers

Input-output tables provide a snapshot of the economy of a given region. They are therefore very useful in a descriptive sense, and they allow for a detailed analysis of a regional economy to be performed. However, input-output tables are most frequently used to generate input-output multipliers, which are used to conduct economic impact analysis.

Input-output multipliers capture the direct and indirect effects of an economic stimulus on a region. For example, if demand for transport services from Queensland were to increase, input-output multipliers can be used to estimate the total impact of this increased demand on income, value-added and employment in Queensland.

Value-added (at market prices), it should be noted, represents the sum of wages, profits and indirect taxes, and is the standard measure used in Australia to represent the size of an economy. At the regional level, the increase in value-added represents the increase in Gross Regional Product (GRP); at the state level, the increase in Gross State Product (GSP); while at the national level it represents the increase in Gross Domestic Product (GDP).

The total economic impact identified by use of input-output multipliers includes the direct effect of the initial increase in demand and the indirect (or "flow-on") effects. The flow-on effects result from the linkages between industries in the economy. For example, transport service providers in Queensland purchase inputs from other local industries. When demand for their output increases, the transport companies will increase their purchases from other local businesses, who themselves must increase their consumption, some of which will be from other local firms, and so on.

Input-output multipliers that capture the flow-on effects of inter-industry interactions are said to be of Type 1. Where the multipliers also capture the impacts of increased employment and a subsequent increase in private consumption, then the multipliers are said to be of Type 2. Because "consumption induced" effects are included in Type 2 multipliers, they are larger than the corresponding Type 1 multipliers.

3.1.3 Limitations of input-output analysis

The input-output analysis technique is based on certain restrictive assumptions, including:

- constant prices
- fixed technology
- fixed import shares
- unlimited supplies of all resources, including labour and capital
- a fixed relationship between income and private consumption.

As a result of these assumptions, there is no substitution between goods and services or between capital and labour in the production process and no substitution between goods and services in consumption. Also, there are no limitations on the supply of labour or capital to industry, and so no supply-side limits on growth.

Type 2 multipliers, as described above, include consumption induced effects. These consumption induced effects assume that all of the labour used in the project and all of the labour employed as a result of the flow-on effects was previously unemployed and with zero expenditure. Furthermore, it is assumed that this newly employed labour spends all of its income. As a result, Type 2 multipliers are generally considered to overestimate economic impacts.

In this report both Type 1 and Type 2 multipliers are used so as to provide a plausible range of economic impacts.

3.2 Data and assumptions used in the analysis

A detailed cost breakdown for construction (about 50 cost items provided, see Appendix A) and operations (around 80 cost items, see Appendix A) was obtained from MineCraft Consulting (2008) and were used in the input-output analysis. In addition to the cost breakdown, employment data for both construction (URS, 2008) and operation (MineCraft Consulting, 2008) were also available. The construction workforce is projected to average 500 workers over the 28 months of production, while in operation the projected workforce is as shown in Table 5.

Table 5 Operations workforce

	Jobs
Employees	257
Contractors	64
Contract absentee coverage	35
TOTAL	**356**
Contract long wall move (part time)	30

Source: MincCraft (2008)

The individual cost items provided gave a detailed indication of the types of purchased goods and services required for construction and operation; however, the breakdown did not indicate the source of supply of the purchased items and so estimates were made based on experience. These estimates of source of supply

were made on an item-by-item basis and do not include the estimated spending on wages and salaries in either the construction or operations phases. Table 6 shows the estimated source of supply over all purchases associated with construction and operation. For the construction phase, Table 6 shows that 25 percent of construction expenditure is estimated to be on goods and services produced within Queensland; seven percent is estimated to be from within the Mackay SD, while 1.6 percent is estimated to be from the Isaac Region. Seventy five percent of construction spend on goods and services therefore is assumed to come from outside of Queensland.

Table 6 Estimated local shares in construction and production

	Queensland	Mackay	Isaac
	(percent)	(percent)	(percent)
Construction[1]	25.0	7.0	1.6
Operation[1]	91.9	50.6	6.2

Note: 1. Cost shares do not include labour costs or profits

In the operations phase, it is estimated that 92 percent of purchased goods and services are supplied from within Queensland, 51 percent from within Mackay SD and 6.2 percent from within the Isaac Region.

3.3 Economic impact

Using the input-output multipliers derived for Queensland, Mackay SD and the Isaac Region, the economic impact of the construction and operation of the project were estimated. The scale of the project, while significant at a local, regional and state level, is not considered to of sufficient magnitude to warrant national level analysis to be conducted (the total value of production is anticipated to represent only 0.05 percent of GDP). Economic impacts have therefore been determined only for Queensland and its regions.

3.3.1 Construction phase impacts

The economic impacts associated with a typical year of the construction phase are shown in Table 7. Income - wages and salaries - is estimated to increase between $104 and $135 million, in a typical year, while value added is estimated to increase between $120 and $188 million. Employment in Queensland is

estimated to increase between 884 and 1,448 jobs. These job figures include the 500 jobs created directly by the construction phase of the project.

Table 7 Annual average economic impacts from construction

	Queensland		Mackay		Isaac	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
Income ($m)	104	135	79	92	75	76
Value added ($m)	120	188	82	114	75	78
Employment (jobs)	884	1,448	555	825	502	523

In the Mackay SD and the Isaac Region the impacts are smaller, as would be expected. In Mackay SD, income is estimated to increase between $79 and $92 million in a typical year of construction, while value added rises by between $82 and $114 million. Employment in Mackay SD is estimated to increase between 555 and 825 - which includes the 500 direct jobs in mine construction.

The Isaac Region is estimated to see incomes increase between $75 and $76 million, value added increase between $75 and $78 million and employment increase between 502 and 523 jobs. Clearly, with 500 of these jobs directly created by the mine's construction there is little in the way of flow-on employment; however, the 500 direct jobs clearly provide local opportunities. Given that total employment in the Isaac Region (from the 2006 census, see Table 3) is 11,800, an additional 500 jobs in the region represents a four percent increase in employment.

3.3.2 Operations phase impacts

The economic impacts associated with a full year of the operations phase are shown in Table 8. Full production is anticipated to commence in 2012 and last to 2030 providing medium to long term effects on the State, regional and local economies. In Queensland, income is estimated to increase between $123 and $162 million, at full production, while value added is estimated to increase between $522 and $610 million. Employment in Queensland is estimated to increase between 1,313 and 2,041 jobs. These job figures include the 356 jobs created directly by the operation of the mine.

Table 8 Annual average economic impacts from operation

	Queensland		Mackay		Isaac	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
Income ($m)	123	162	86	101	59	61
Value added ($m)	522	610	451	490	395	401
Employment (jobs)	1,313	2,041	820	1,146	412	458

In Mackay SD, income is estimated to increase between $86 and $101 million in a typical year of operation, while value added rises by between $451 and $490 million. Employment in Mackay SD is estimated to increase between 820 and 1,146 - which includes the 356 direct jobs in operation.

The Isaac Region is estimated to see incomes increase between $59 and $61 million, value added increase between $395 and $401 million and employment increase between 412 and 458 jobs. Given that total employment in the Isaac Region is 11,800, an additional 450 jobs in the region represents a four percent increase in employment.

3.4 Opportunity cost of land use

The area of surface disturbance associated with the project's infrastructure will be 318 ha. Currently this is grazing land for beef cattle.

The underground longwall area (1,793 ha) may be impacted by subsidence at the surface; however, for this analysis any subsidence is assumed to not have a significant impact on the productivity of the grazing land and so has been excluded.

In 2005-06, 5.18 mha of land in Isaac was used for grazing purposes (ABS, 2008c), grazing 861,000 cattle (ABS, 2008d), giving 0.17 cattle/ha. A loss of 318 ha of grazing land translates to an approximate loss of 54 cattle. Assuming a relatively high turnoff rate (for export or processing) of 40 percent, there would be a loss of sales of 22 cattle per annum as a result of forgoing 318 ha of grazing land.

At an assumed price of $1,000 per head the loss of sales of 22 cattle per annum translates to a loss of regional production of $22,000 per annum. Applying input-output multipliers to this forgone production enables an estimate of the total

economic impact to be calculated. Table 9 shows the total impact arising from the loss of $22,000 per annum of beef cattle sales.

Table 9 Annual average opportunity cost from loss of grazing land

	Queensland		Mackay		Isaac	
	Type 1	Type 2	Type 1	Type 2	Type 1	Type 2
Income ($)	2,944	4,034	2,534	3,119	1,801	2,007
Value added ($)	18,421	20,860	17,651	19,081	15,759	16,375
Employment (jobs)	0.1	0.1	0.1	0.1	0.1	0.1

Comparing the opportunity cost of using the 318 ha of grazing land for the ECMP with the positive impacts arising from the operation of the mine (see Table 8) it is clear that the impact of the loss of grazing land is relatively small. For example, the loss of income in Isaac is around $2,000 from the loss of grazing land compared with a gain of $60 million from the operation of the ECMP.

3.5 Value of ecosystem services

As stated above, the area of surface disturbance associated with the project will be approximately 318 ha of grazing land. This land surface includes no unique environmental features and its disturbance will not lessen the ability of the environment - at a local, regional or state level - to provide ecosystem services such as waste disposal and assimilation, flood mitigation, water catchment or pollination of crops. Therefore, no value has been assigned for the loss of ecosystem services as a result of the project.

3.6 Other economic impacts

Projects of this scale - construction spending of around $640 million and an annual operations budget of around $250 million - have significant impacts, as Table 7 and Table 8 demonstrate. However, the input-output analysis conducted for this report does not capture all of the potential economic effects, the most important of which will be discussed in this section.

3.6.1 Housing

The extensive development of the Bowen Basin coal deposits has resulted in strong demand for housing within the Mackay SD, including in the City of

Mackay and the town of Moranbah. The project can only increase housing demand locally and throughout the region. The potential development of new lots within Moranbah will alleviate the situation to a new extent; however, it is likely that these lots will not substantially reduce the backlog of demand for rental accommodation, especially in the short term.

3.6.2 Local business

Australia's mining boom towns share in common labour supply issues. High demand for labour - skilled, semi-skilled and unskilled - has driven labour costs up for all businesses within the boom towns and beyond to surrounding areas. Labour availability is also compromised for local small and medium enterprises. Construction and operations workforces associated with the project will increase pressures in an already tight labour market throughout the Mackay SD (unemployment rate in June 2008 of 3.2 percent - calculated from Department of Education, Employment and Workplace Relations, 2008). with some of these pressures transferred to Brisbane and beyond.

3.6.3 Potential for investment in the project

Locally owned businesses and local residents in the Isaac region lack the capacity to investment in a project of this size. Therefore, no local investment in the project is anticipated.

3.6.4 Infrastructure needs

Any infrastructure requirements for the project will be handled by direct negotiation between Vale Pty Ltd and the Queensland Government and relevant local government authorities.

Access to coal export terminals will be facilitated by the north missing link rail project. As with other infrastructure needs of the project, direct negotiations will be employed to seek appropriate outcomes for all parties.

3.6.5 Potential impacts of major hazards

Flooding is a known threat to the continuity of mining operations. Instances of major local flooding could result in losses in production from the project.

Table 8 shows the estimated annual economic impact from operation of the project. If it is assumed that severe local flooding resulted in the closure of the project's operations for one week, the economic impacts from that closure could be estimated at around one fiftieth (or two percent) of the impacts shown in Table 8. However, in practice it is unlikely that the impacts would be this high, as mineworkers would not all be stood down for the week affected by the flooding. In fact, it is possible that additional workers and additional goods and services would be required at the mine to undertake remedial work to overcome the impacts of the flooding creating flow-on economic benefits to local workers and businesses.

3.6.6 Distributional effects

The town of Moranbah will be the most affected by the project's development and operation. The inflated housing market in Moranbah is already forcing lower income earners out of the market and creating a severe accommodation shortage (Queensland Department of Housing, 2007). The ECMP will add to these housing pressures.

Higher accommodation and labour costs also add to pressures on local small to medium businesses that are unable to capture the positive income effects of the current mining boom. The ECMP will add to these pressures in Moranbah and in the Mackay SD.

3.6.7 Balance of trade

Production from the ECMP will be valued at just under $600 million per annum, all of which is assumed to be exported. Assuming only a small share of the annual $250 million operating costs are met through imported goods and services (say 10 percent), then in operations an improvement in Australia's balance of trade of over $550 million is to be expected (this does not take into account any potential exchange rate impacts).

The positive balance of trade position in operations is balanced to some extent by a negative trade balance associated with the construction phase, as imports of mining equipment will be required. Construction phase imports of up to $300

million may be possible, which is still less than one year's exports during operations.

3.7 Potential mitigation strategies

Accommodation costs are a key variable determining how the benefits of major projects flow through to local and regional communities. Local benefits are maximised by employment flowing to local areas; however, in times of escalating accommodation costs, employees and businesses not linked to the boom can find they miss out on many of the benefits.

A healthy mixed economy is able to utilise workers of a variety of occupations and skill levels. Not all of these workers are able to command the level of income needed to meet housing and living costs in the so-called booming mining towns.

Rising accommodation costs are brought about by increases in demand outstripping increases in supply. Lags in the approvals processes for land releases and for accommodation construction can lead to excessive delays (relative to market demand) in the new accommodation developments. Housing construction can also be restricted due to lack of appropriate trades - many of whom may have found work in the mines.

The local government authorities responsible for Moranbah have favoured developments that foster "permanent" housing (housing for potential long term residents and their families) and have rejected single person accommodation options (rejecting a planned 2000 person development outside of Moranbah in 2006). This policy, while fostering local community development, does increase housing demand in the town.

Local government has also favoured traditional residential lot sizes, as opposed to higher density housing, thus requiring larger areas of land to be developed to accommodate the same number of people.

A revision to local government policies could produce accommodation developments that would reduce housing pressures; however, such a policy shift may compromise aspirations for a long-term stable community in Moranbah.

Regional infrastructure - for example water supply in Moranbah (McMahon, 2006) - can frequently be subject to capacity constraints making it difficult to develop and release land for housing.

The owners of the ECMP cannot be expected to take responsibility for major town infrastructure or for land release. These issues are not exclusively related to the ECMP or to any individual project. Government, State and local, have an opportunity to foster local and regional development by accelerating accommodation developments. In the absence of such developments, Vale Pty Ltd may be able to reduce housing pressures in local areas through a combination of fly-in fly-out and drive-in drive-out practices which would mitigate against further increases to accommodation costs.

Vale Pty Ltd may be in a position to assist the local and state government authorities in other ways, such as through support for some community infrastructure. Any such arrangements will need to be the result of direct negotiation between the relevant parties.

3.8 Consideration of Central Queensland Strategy for Sustainability

The Central Queensland Strategy for Sustainability (Fitzroy Basin, 2005) considers viable industries as the basis for healthy regions. The project, with a mine life out to 2030 promotes the long-term economic viability of the Isaac Region, Mackay SD and Queensland.

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Appendix A

(1) Cost items for construction:

Project feasibility studies and approvals
2007 administration
2007 exploration
2007 mining lease application
2007 feasibility studies
2008 administration
2008 exploration
2008 mining lease application
2008 feasibility studies
Project management
Four project engineering positions for 24-30 months
Detailed underground engineering studies
Detailed surface and regional infrastructure studies
Geotechnical engineering studies
Assistance to project management team to prepare equipment specs
Project risk assessments and safety consultants
Owners costs and overheads
Exploration, extraction and sampling of a bulk sample of coal from a shallow open cut
Engineering management and reviews
Project construction
Excavating the mine entry cut box
Installing the three mine portals
Ancillary works around mine entry including concrete floors, shotcrete walls and dewatering sumps
Construction of ventilation shaft
Development equipment
Development equipment
Associated development electrical equipment
Supporting panel equipment
Longwall equipment
Roof supports, shearers, chain coal clearance systems AFC, BSL, crusher and boot end
Conveyors
Conveyors
Underground vehicles
LHDs and personnel transport vehicles
Underground services
Victaulic piping
Computer based equipment and environmental monitoring

Ventilation and gas drainage
Main ventilation fan system
Temporary portable fan
Goaf drainage pumps
Ventilation control devices
Underground infrastructure
Boreholes for infrastructure reticulation
Area lighting and concrete pads
Coal handling and preparation plant
Coal handling and washing
Surface facilities
Diesel storage and dispensing station
Emulsion farm
Compressor station
Dirty water collection system
Surface vehicles
Forklifts
Power supply
Temporary switch power infrastructure
Permanent power supply infrastructure
Power supply distribution
Power supply isolation
Onsite infrastructure
Administration building, office buildings and bathhouse
Workshop and warehousing facility
Raw water tanks and piping and potable water plant and piping
Sewage treatment plant
Preparatory construction work, roads etc
Offsite infrastructure
Rail loop
Haul road
Remote offices
Electrical, data and lighting
Materials handling
Incoming raw water pipeline
Local council applications and contributions
Safety equipment
Self rescue devices, personal safety equipment, surface fire station, underground fire depots, etc
Owners costs and indirect costs
Land owner compensation

(2) Cost items for operation

MINING COSTS - DEVELOPMENT

Development materials

Roof bolts, chemical anchors and mesh

Miscellaneous timber, stonedust, road ballest and concrete

Development maintenance

Cable repairs ($6/m)

Electrical parts ($18/m)

External repairs ($100/m)

Fuel and lubricants ($25/m)

Hydraulic materials ($6/m)

Mechanical spares ($70/m)

Water and air related components ($6.50/m)

Development panel advance

Conveyor components

Piped services

Cables

Gas monitoring

Roadworks

Stoppings

Fire depots

Stone dust barriers

Equipment overhauls

Development contract services

Mining services

Development contract labour

MINING COSTS - LONGWALL

Longwall materials

Cutter picks

Sprays

Stone dust barriers

Chains

Safety equipment

String lines

Measuring tapes

Minor tools

Miscellaneous timber

Longwall secondary support

Flexibolts

Standing supports

Rib bolts

Seals

Longwall maintenance
Cable repairs
Electrical parts
External repairs
Fuel and lubricants
Hydraulic materials
Mechanical spares
Water and air related components
Longwall contract services
Mining services
Longwall contract labour

LONGWALL MOVES
Longwall move materials
Ground support
Roof mesh
Roof bolts
Rib bolts
Longwall move equipment
Equipment hire
Longwall move overhauls
Equipment overhaul
Longwall move contract labour
MINING GENERAL
Outbye materials
Stone dusting
Remedial roof and rib support
Roadworks
Pumping supplies
Maintenance of outbye electrical equipment
Maintenance of pumps
Hire and maintenance of refrigeration equipment
Coal clearance (conveyor) maintenance
Drivehead maintenance
Look take up maintenance
Pulleys maintenance
Idler replacements
Belt clips and materials
Belt refurbishments
Structure refurbishment
Surge bin and sizer maintenance
Transfer points
Belt vulcanisation
Miscellaneous works
Conveyor installations
Installation of three gateroad conveyors per annum

Outbye contractors
Nine men for 40hrs/wk for 50wks pa

GAS MANAGEMENT
Inseam gas drilling
Mining services
Goaf drainage
Goaf wells
STIS drilling
Drilling
Gas management
Consultancy fees
Gas sample analysis
Contract labour

BUSINESS SUPPORT OVERHEADS
General management
Travel
Consulting
Contractor support
Engineering and maintenance
Short term hire of mining equipment
Consulting
Tool allowance
Fuels and lubricants
Technical services
Contract technical assistant
Technical related consulting services
Exploration
Health, safety and environment
HSEC consulting services
Licenses
Permits
Employee relations
Recruitment expenses
Medical exams
Advertising
Contract support resource
Consulting advice
Two vehicles for senior management packages
FBT
Training
Training course fees
Venue hire
Consultants and contract support team
Administration

Insurance premiums
Employee housing (including meals)
Computer system and contractor support
Stationary, legal expenses, bank charges, freight costs, security, telephone, water, rates, warehousing and miscellaneous levies

ACARP levy
Australian Coal Association Research Program
Electricity

LABOUR COST
Labour

SURFACE AND OFFSITE COSTS
CHPP processing
Truck and loader fleet hire
Truck fuel
Loader fuel
Haul road maintenance
Dozer hire
Dozer maintenance
Other costs
Transport to rail
Rail freight
Port charges
Duty and excise
Marketing
Royalty