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# Economic Impact of Sealing the Menindee-Pooncarie Road

Prepared for the Central Darling Shire Council by the Western Research Institute

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## ABSTRACT

The Menindee-Pooncarie Road is a 123km stretch of dirt road between the townships of Menindee and Pooncarie. The Central Darling Council estimated in 2000 that approximately 50 vehicles travel along the road each day<sup>1</sup>. Council is in favour of the upgrade of the unsealed section of road, which has been estimated to cost around \$24 million<sup>2</sup>.

The economic impact was calculated using an input-output table constructed for the Far West region of NSW. This table was then used to estimate the economic impact of sealing the road by examining how the Far West economy, and in particular cotton, horticulture and tourism operations, would be expected to change. The economic impact was estimated using the marginal coefficients model, which addresses the overestimation problems associated with traditional economic impact analysis.

Sealing the Menindee-Pooncarie road would have two main impacts: 1) increased tourism to the region; and 2) expansion of the agriculture industry. The development of a tourist loop from Wentworth through Broken Hill, Menindee and Pooncarie could boost the tourism sector by up to \$6.5 million, with a total impact of up to:

- \$5.5 million GRP;
- \$2.3 million household income; and
- 82 full-time equivalent jobs.

Improved access to the labour market and reduced transport costs could lead to expansion in the cotton and horticulture industries of around \$8.5 million, leading to a total increase of:

- \$7.3 million GRP;
- \$2.7 million household income; and
- 52 full-time equivalent jobs.

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<sup>1</sup> Western Research Institute (2000). *Economic Impact Assessment of sealing the Menindee-Pooncarie Road*.

<sup>2</sup> Central Darling Council (2006). Personal Communication: Director of Engineering Services, Russell Bow.

Central Darling Shire Council has estimated the cost of sealing the Menindee-Pooncarie road to be around \$24 million, with an average increase of only \$500 in annual maintenance costs anticipated. If tourism and expansion estimates are realised, between 70% and 93% of the cost of the road could be offset by increased output in the Far West. An additional one-off impact due to the construction of the road (including increased output, jobs, income and expenditure in the region) could also be expected to benefit the Far West as a result of sealing the road.

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## 1 INTRODUCTION

The Menindee-Pooncarie Road is a 123km stretch of dirt road between the townships of Menindee and Pooncarie. The Central Darling Council estimated in 2000 that approximately 50 vehicles travel along the road each day<sup>3</sup>. Council is in favour of the upgrade of the unsealed section of road, which has been estimated to cost around \$24 million<sup>4</sup>.

The Western Research Institute has been commissioned by the Central Darling Shire Council to estimate the economic impact of sealing the Menindee-Pooncarie Road, with particular reference to the cotton, horticulture and tourism industries. Council believes that in sealing the road a range of benefits will be realised in the Far West, including decreased freight costs and increased tourism.

## 2 ANTICIPATED IMPACTS OF SEALING THE MENINDEE-POONCARIE ROAD

Input-output tables are frequently used to provide estimates of the impact of a particular change in structure, expenditure or income of an industry in terms of the effect on the local economy. The first step in this process is to estimate the size of the Far West economy and the structure of the industries being impacted (cotton, horticulture and tourism). The basic structure of the economy was derived from ABS Census (2001) employment, ABS State Accounts (2005) estimates of gross regional product and ATO (2003) records of income. All indicators (except employment and income<sup>5</sup>) were inflated to the 2004-05 financial year using NSW averages. The structures of the cotton, horticulture and tourism sectors were determined from information provided by industry representatives in the region.

### 2.1 Tourism Impacts

Industry participants in Broken Hill believe that the sealing of the Menindee-Pooncarie Road could increase tourism to the region from North West Victoria through the development of a tourist drive loop. The proposed loop would extend up the Silver City Highway from Wentworth to Broken Hill and then back again through Menindee and Pooncarie as shown in Figure 1. The development of the loop could increase tourism in the Far West through two effects: 1) sealing of the road would open up the road for use by tourists that avoid driving on dirt roads, particularly self-drive retirees; and 2) travelling along a loop route is more appealing to a range

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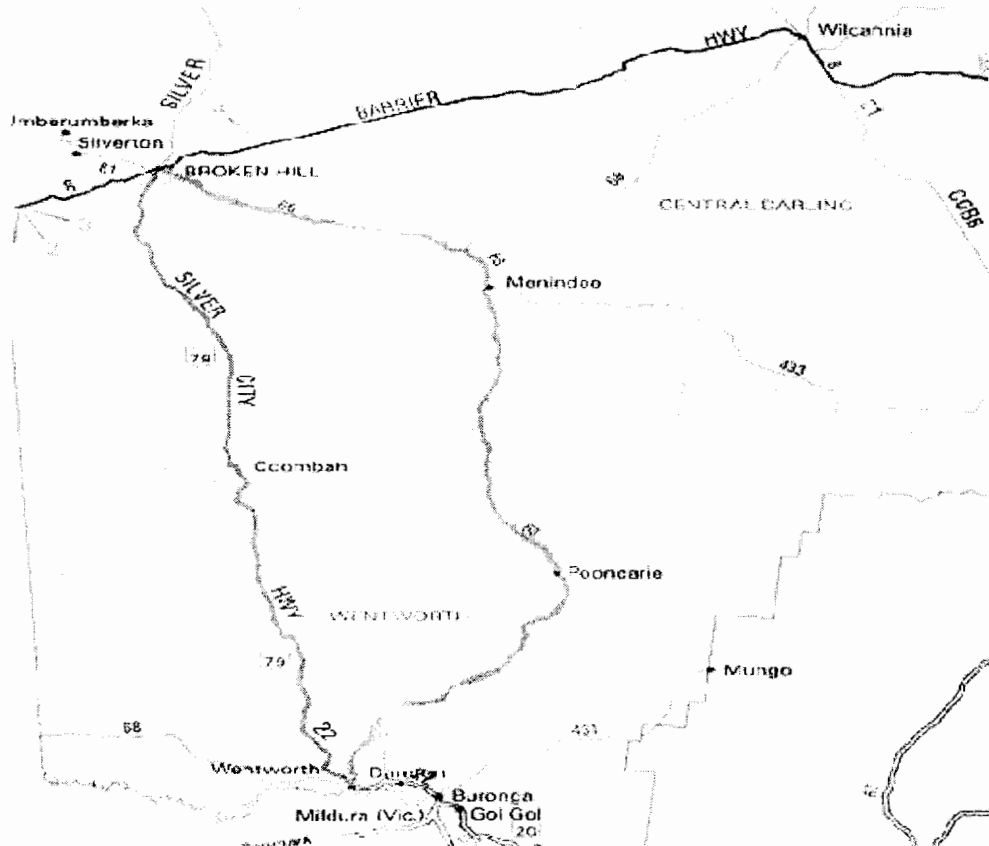
<sup>3</sup> Western Research Institute (2000). *Economic Impact Assessment of sealing the Menindee-Pooncarie Road*.

<sup>4</sup> Central Darling Council (2006). Personal Communication: Director of Engineering Services, Russell Bow.

<sup>5</sup> The Far West cannot be assumed to have growth in employment and income equivalent to that of NSW given population decline in the region since 2001. Therefore, these indicators were inflated by the state average and then deflated by the relevant percentage decline in population over the period 2001 – 2005.

of tourists as they will no longer have to retrace their journey along the Silver City Highway when visiting Broken Hill from Wentworth.

Figure 1: Proposed Tourist Loop



The impact on the tourism industry of sealing roads, particularly in regional areas, has been documented in a range of studies. The Western Australian tourism development plan indicated that most people with two-wheel drive cars will not drive on unsealed roads and hire car companies do not generally provide insurance for vehicles driven on gravel roads<sup>6</sup>. Hence, sealing roads can significantly increase the number of visitors to a region and allow regions to realise their tourism potential<sup>6</sup>. A case study of the Carpentaria Shire in North Western Queensland showed that tourism had become a major industry since sealing roads in the Shire improved access for tourists, having an especially profound impact in smaller communities<sup>7</sup>.

<sup>6</sup> Western Australian Tourism Commission (2004). *Western Australian Tourism Product and Infrastructure Development Plan 2004-2013*. Accessed online at <http://www.westernaustralia.com/NR/rdonlyres/7FA98D09-8CC1-4480-96E1-9589806A6E6D/0/StateTourismDevelopmentPlanFinalv2.pdf>.

<sup>7</sup> *Benefits and Costs of Tourism for Remote Communities: Case study for the Carpentaria Shire North West Queensland*. Accessed online at <http://savanna.ntu.edu.au/downloads/Chapter%201.pdf>.

Transport infrastructure is one of the most significant influences on the development of tourism in a region<sup>8</sup>. In particular, tourism in regional areas is heavily tied to road transport infrastructure<sup>9</sup>. In Australia, 70% of all trips are taken by car with 86% of domestic tourism to regional areas being self-drive<sup>10</sup>. In Outback NSW around 87% of visitors travel to and around the region by car or caravan<sup>11</sup>, around 16% of which are from Victoria<sup>12</sup>.

Given the worldwide growth in demand for rural tourism and the expectation that this growth will continue for some time<sup>9</sup>, the potential for tourism development in the Outback NSW region is significant. Regional tourism is expected to continue to grow due to:

- growing interest in heritage, tradition, authenticity and rurality;
- desire for short break holidays;
- positive appeal of fresh air, activity opportunities and a stress free environment;
- interest in outdoor recreation;
- solitude and relaxation in a natural place; and
- an ageing but active population<sup>9</sup>.

It is anticipated that sealing the Menindee-Pooncarie Road will help the region to develop to its potential. This could lead to economic growth driven by visitor expenditure in the hospitality, retail and transport sectors.

In a similar study conducted on Kangaroo Island in South Australia, an increase in visitation of 4.4% over a period of 15 years was estimated to result from sealing a tourist road<sup>13</sup>. This study modelled future growth using regression analysis and estimated repeat visits as a result of improved road access. Similar modelling was also undertaken regarding improved access across the Blue Mountains of New South Wales, which estimated an increase of between 8% and 20% depending on the level of promotion undertaken to promote the region<sup>14</sup>.

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<sup>8</sup> Palhares, G.L. (2003). *The Role of Transport in Tourism Development: Nodal Functions and Management Practices*. The International Journal of Tourism Research, Vol 5 (5) pp. 403-407.

<sup>9</sup> Gartner, W.C. (2004). *Rural Tourism Development in the USA*. The International Journal of Tourism Research, Vol. 6 (3) pp. 151-164.

<sup>10</sup> Prideaux, B. and Carson, D. (2003). *A Framework for increasing understanding of self-drive tourism markets*. Journal of Vacation Marketing, Vol 9 (4) pp. 307-313.

<sup>11</sup> Tourism New South Wales (2002). *Outback NSW Visitor Profile: Who are our holiday visitors?* Accessed online at <http://corporate.tourism.nsw.gov.au/corporatelive/downloads/industry/otoutbackprofile.pdf> .

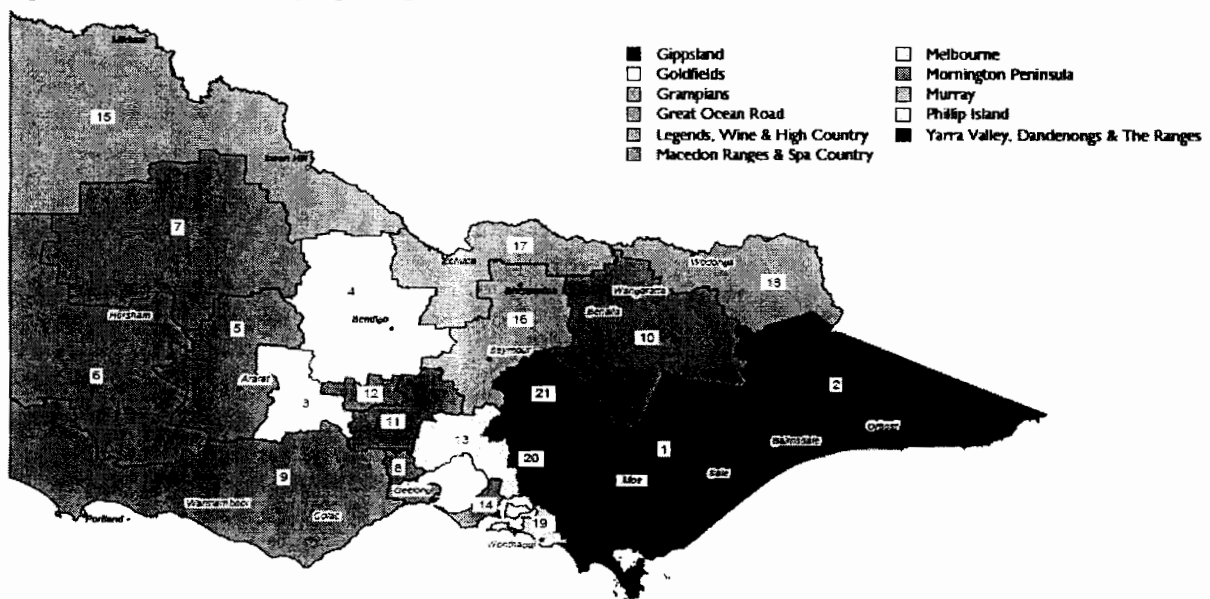
<sup>12</sup> Tourism New South Wales (2004). *Outback New South Wales: Draft Tourism Development Plan 2004-2008*. Accessed online at [http://corporate.tourism.nsw.gov.au/corporatelive/downloads/industry/outback\\_final\\_draft.pdf](http://corporate.tourism.nsw.gov.au/corporatelive/downloads/industry/outback_final_draft.pdf) .

<sup>13</sup> PPK Consultants Pty Ltd & KPMG Peat Marwick (1991). *Kangaroo Island Tourism Road Evaluation – Final Report*. Prepared for Tourism South Australia.

<sup>14</sup> Environmetrics (2005). *Bells Line Of Road development: Estimate of increased tourism flow to Centroc Region*. Prepared for the Western Research Institute.

In relation to western NSW Tourism NSW research indicated that “approximately three months after receiving the Darling River Run information pack 14% reported taking a holiday stopping over night along the Darling River Run”<sup>15</sup>. This evidence suggests that promotion of a themed or geographically based holiday through the region (including Broken Hill, Menindee, Pooncarie and Lake Mungo) could significantly boost tourism numbers. Based on these studies and expert opinion in the Far West Region, the WRI has developed two cases, a likely 4% capture of north-west Victorian tourism when there is no significant associated promotion and an optimistic 9% capture when there is significant themed or geographically based promotion. Figure 2 shows Victoria’s tourism regions, the region of interest in this report (as defined in the 2000 impact study) includes the Western Grampians, Wimmera and Mallee subregions (6, 7 and 15 respectively). Table 2 shows the expected increase in visitor nights under each scenario.

Figure 2: Victoria’s Campaign Regions



Source: Tourism Victoria, 2004

Table 2: Growth in Tourism Expenditure

	Domestic		International
	Western Grampians and Wimmera	Mallee	North-west Victoria
Visitors (2005)	382,000	675,000	33,010
4% Capture	15,280	27,000	1,320
9% Capture	34,380	60,750	2,970
Average expenditure per night	\$66	\$98	\$67

Source: Tourism Victoria, 2005

<sup>15</sup> AMR Interactive (2002). *The Darling River Run Conversion Study Report*. Prepared for Tourism NSW. p.3.

Based on average expenditure per night by each type of tourist<sup>16</sup> and the average distribution of tourism expenditure<sup>17</sup>, the impact to the Far West as a result of increased tourism can be calculated. The total increase in expenditure as a result of capturing 4% and 9% of overnight visitor tourism to north-west Victoria is provided in Table 3.

**Table 3: Growth in Tourism Expenditure**

Industry Sector	Increase in Revenue (\$)	
	4% Capture	9% Capture
Retail	1,278,720	2,877,120
Hospitality	1,267,525	2,851,933
Transport	243,494	547,861
Recreation	114,329	257,241
Communications	1,657	3,728
<b>Total</b>	<b>2,905,725</b>	<b>6,537,884</b>

Table 4 outlines the economic impact to the Far West as a result of a 4% of north-west Victorian overnight tourism. In this scenario, tourism expenditure is expected to increase by around \$2.9 million, resulting in a total increase of \$2.5 million in GRP, over \$1 million in household income and 36 full-time equivalent jobs.

**Table 4: Economic Impact of Attracting 4% of North-Western Victoria's Overnight Tourism**

	Initial	Flow-on	Total	Multiplier
Output (\$'000)	2,906	1,526	4,432	1.53
Value Added (\$'000)	1,643	816	2,459	1.50
Income (\$'000)	640	380	1,020	1.59
Employment (FTE)	26	11	36	1.43

<sup>16</sup> Tourism Victoria (2004). *Domestic Tourism Expenditure in Victoria*. Accessed online at [http://www.tourismvictoria.com.au/images/assets/All\\_PDFs/research/Domestic Tourism Expenditure in Regions of Victoria\\_year\\_ending\\_Dec\\_2001-2004.pdf](http://www.tourismvictoria.com.au/images/assets/All_PDFs/research/Domestic_Tourism_Expenditure_in_Regions_of_Victoria_year_ending_Dec_2001-2004.pdf) on the 10th April 2006 and Tourism Victoria (2004). *International Expenditure in Regional Victoria*. Accessed online at [http://www.tourismvictoria.com.au/images/assets/All\\_PDFs/research/International Tourism Expenditure in Victoria\\_Dec\\_1999-2004.pdf](http://www.tourismvictoria.com.au/images/assets/All_PDFs/research/International_Tourism_Expenditure_in_Victoria_Dec_1999-2004.pdf) on the 10th April 2006.

<sup>17</sup> Bureau of Tourism Research (2002). *Tourism Snapshot – Domestic*. Accessed online at <http://www.tra.australia.com/> on 10<sup>th</sup> April 2006 and Bureau of Tourism Research (2002). *Tourism Snapshot – Domestic*. Accessed online at <http://210.193.176.101/service/datacard/international.pdf> on 10th April 2006.

Table 5 outlines the economic impact to the Far West as a result of a 9% of north-west Victorian overnight tourism. In this scenario, tourism expenditure is expected to increase by around \$6.5 million, resulting in a total increase of \$5.5 million in GRP, over \$2.2 million in household income and around 82 full-time equivalent jobs.

**Table 5: Economic Impact of Attracting 9% of North-Western Victoria's Overnight Tourism**

	Initial	Flow-on	Total	Multiplier
Output (\$'000)	6,538	3,434	9,972	1.53
Value Added (\$'000)	3,698	1,835	5,533	1.50
Income (\$'000)	1,440	854	2,294	1.59
Employment (FTE)	57	24	82	1.43

## 2.2 Agricultural Impacts

Sealing the Menindee-Pooncarie road is also expected to affect the cotton and horticulture industries in the local area. Industry surveys have indicated that there are two changes that result from sealing the road: 1) a reduction in fruit transport costs as fruit growers in Menindee become able to utilise the road south rather than having to travel a loop through Broken Hill; and 2) an expansion of the cotton and horticulture industry sectors due to improved access to the Victorian labour market.

The cotton and horticulture industries around Broken Hill provide a significant contribution to the Far West economy. Table 6 shows the estimated value of these sectors in 2004/05. Together, cotton and horticulture produce almost \$50 million each year and directly and indirectly contribute around \$43 million to GRP, \$16 million to household income and almost 300 full-time equivalent jobs in the Far West economy. This represents around 7% of the entire Far West Economy.

**Table 6: Contribution of the Cotton and Horticulture Sectors in the Far West**

	Initial	Flow-on	Total	Multiplier
Output (\$'000)	49,871	21,585	71,456	1.43
Value Added (\$'000)	31,170	11,358	42,529	1.36
Income (\$'000)	11,150	4,556	15,707	1.41
Employment (FTE)	127	172	299	2.36

The only direct impact of sealing the road identified by industry participants was a reduction in the cost of fruit transport. At present, fruit grown at Menindee must travel to along the sealed road to Broken Hill before being transported to Wentworth to avoid bruising. Sealing the Menindee-Pooncarie road would allow fruit to be transported directly to Wentworth via Pooncarie and could reduce industry transport costs by up to \$175,000 annually. An earlier

report into the impact of sealing the road estimated that transport cost savings could reach \$1 million<sup>18</sup>. Given the relative size of the Far West economy, these changes would have little impact on the region.

One industry participant has also indicated that improved access to Victoria from Menindee would allow a considerable expansion as a result of better access to the Wentworth labour market. An estimated expansion of around \$8.5 million has been nominated, the impact of which is provided in Table 7 below. Note that the impact does not include investment or construction costs, only the ongoing increase in output.

An industry expansion of \$8.5 million would result in considerable benefits to the Far West economy. A total increase of \$7.3 million GRP, \$2.7 million household income and 52 full-time equivalent jobs could be expected as a result.

**Table 7: Economic Impact of an \$8.5 million Expansion**

	Initial	Flow-on	Total	Multiplier
Output (\$'000)	8,500	3,815	12,315	1.45
Value Added (\$'000)	5,313	2,017	7,330	1.38
Income (\$'000)	1,900	807	2,707	1.42
Employment (FTE)	22	30	52	2.38

<sup>18</sup> Western Research Institute (2000). *Economic Impact Assessment of Sealing the Menindee Pooncarie Road*.

### 3 CONCLUSION

Sealing the Menindee-Pooncarie road would mainly impact two industries in the Far West, the agriculture and tourism sectors. The development of a tourist loop from Wentworth through Broken Hill, Menindee and Pooncarie could boost the tourism sector by up to \$6.5 million, to a total increase in GRP of \$5.5 million. Improved access to the labour market and reduced transport costs could lead to expansion in the cotton and horticulture industries of around \$8.5 million, leading to a total increase in GRP of \$7.3 million. Table 8 shows the total economic impact of sealing the road on the tourism (4% and 9% scenarios) and agriculture industries.

**Table 8: Summary Economic Impact of Sealing the Menindee-Pooncarie Road**

	Initial		Flow-on		Total	
	4% tourism	9% tourism	4% tourism	9% tourism	4% tourism	9% tourism
Output (\$'000)	11,406	15,038	5,342	7,249	16,747	22,287
Value Added (\$'000)	6,956	9,010	2,833	3,852	9,789	12,862
Income (\$'000)	2,540	3,340	1,186	1,661	3,727	5,001
Employment (FTE)	47	79	41	54	88	133

Note: Definitions of key terms are shown in the glossary at the end of this report.

Central Darling Shire Council has estimated the cost of sealing the Menindee-Pooncarie road to be around \$24 million, at an average annual maintenance cost of around \$2,700 (compared with \$2,200 unsealed)<sup>19</sup>. In addition to the ongoing benefits to tourism and agriculture, a one-off impact due to the construction of the road (including increased output, jobs, income and expenditure in the region) could also be expected to benefit the Far West as a result of sealing the road.

<sup>19</sup> Central Darling Council (2006). Personal Communication: Director of Engineering Services, Russell Bow.

## 4 TECHNICAL APPENDIX

This appendix discusses the basics of input-output methodology, including how the Far West table was constructed and the assumptions of the model. A glossary is shown at the end of this report to help you understand the definitions of key input-output terms.

### 4.1 Input-Output Tables

Input-output tables are part of the Australian national accounts. An input-output model provides a detailed picture of the structure of an economy at a particular point in time. It includes all the transactions that occur during a specific period, usually one year.

- The rows of an input-output table show the disposal of the output of an industry to itself and to other industries as well as final demand categories (i.e. exports and household consumption); and
- The columns show the origin of inputs into production, whether they are intermediate inputs (i.e. intra/inter industry purchases) or primary inputs (i.e. labour and capital).

One of the main attractions of input-output models is their relative ease of use and the level of detail obtained concerning the structure of the economy. Indeed, the Australian Bureau of Statistics (ABS) notes the usefulness of input-output tables,

*"Input-output tables provide detailed information about the supply and disposition of commodities in the Australian economy and about the structure of, and inter-relationships between, Australian industries. Detailed data on supply and use of commodities, inter-industry flows and a range of derived data, such as input-output multipliers, are provided for economic planning and analysis, and construction of models for forecasting purposes."* (ABS *Introduction to Input-Output Multipliers*, Cat. 5246.0)

The main use of input-output tables is economic impact analysis, where the tables are used to estimate the benefits generated by new initiatives on each and every sector of an economy. For example, if there is a change in the purchasing or sales pattern of any industry, the flow-on, or multiplier, effects on upstream industries can be calculated. An input-output table is also very useful for estimating the economic significance of an industry or firm to a region.

### 4.2 Methodology of Table Construction

The Far West input-output table was extracted from the Australian Bureau of Statistics (ABS) 1996-97 national input-output table using the Generation of Regional Input-Output Tables

(GRIT) technique.<sup>20</sup> The GRIT technique is basically a hybrid method of deriving regional input-output tables from the National input-output table while at the same time allowing for the insertion of superior data at various stages in the construction process.

The GRIT technique was developed by Associate Professor Guy West and Professor Rod Jensen of the University of Queensland and is the most widely used method of constructing input-output tables in Australia. The GRIT method is also widely used in America and Europe. The system is "variable interference" in that the analyst is able to determine the extent to which they interfere with the mechanical processes by introducing primary or other superior data. The GRIT system is designed to produce regional tables that are: consistent in accounting terms with each other and with the national table; capable of calculations to a reasonable degree of holistic accuracy; and capable of being updated with a minimum of effort as new data becomes available.

The Far West input-output table was balanced using a bi-proportional iterative adjustment method that modifies the base input-output matrix to fit estimated output levels. The rows and columns of each sector are simply adjusted proportionally to the new row (i.e. input) and column (i.e. output) totals in turn, and the cycle repeated until the actual row and column totals converge to the specified values. The basic aim of this method is to achieve a balanced table with minimal error in each cell. After the table was balanced its consistency was checked to identify any large discrepancies or obvious anomalies.

### **4.3 Assumptions of the Input-Output Model**

The use of an input-output table in economic impact analysis requires a number of explicit assumptions. The specific assumptions are as follows:

- The inputs purchased by each sector are a function of the output of that sector. The input function is generally assumed linear and homogeneous of degree one, which implies constant returns to scale and no substitution between inputs. The technology is also assumed constant.
- Each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies that there is only one method used to produce each commodity and that each sector has only a single primary output. In other words, there are no joint products.

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<sup>20</sup> The Illawarra regional input-output table was constructed for the Illawarra Statistical District.

- The total effect of several types of production is the sum of the separate effects. This rules out external economies and diseconomies and is known simply as the additivity assumption.
- The system is in equilibrium at given prices.
- In the static input-output model, there are no capacity constraints so that the supply of each good is perfectly elastic. Each industry can supply whatever quantity is demanded of it and there are no capital restrictions.

In terms of applied input-output analysis, the focus of these assumptions comes down primarily to the linearity property. The assumption of a linear relationship between the input coefficients and output unrealistically implies that supply is infinitely elastic. This limitation generally leads to an overestimation of the multiplier effects generated by any initial change in expenditure. The overestimation of impacts can occur in the short run, when a firm has excess capacity and in the long run if a firm is experiencing increasing returns to scale. In both cases an increase in output can occur that is less than proportional to the necessary increase in inputs, and the linear coefficients assumption is violated.

Transfer and expenditure switching is the second major problem that arises when using input-output tables, as economic impacts tend to be overstated. The Bureau of Industry Economics (1984: page 3) argues that expenditure transfers occur when expenditure on a particular good or service is transferred from one location to another.<sup>21</sup> Expenditure switching, on the other hand, is when expenditure is switched from one good or service to another. When such transfers of expenditure occur within the region under investigation then the economic impact can be overstated to the extent of that transfer.

#### **4.4 The Marginal Coefficients Model**

As discussed above one of the main limitations of input-output tables is the assumption of linear coefficients. To address this problem this study uses the marginal coefficients model. The marginal income coefficients model attempts to overcome the limitations of traditional input-output analysis by removing the assumption of linear coefficients for the household sector. As is well documented in the literature, the household sector is the dominant component of multiplier effects in an input-output table, so using marginal income coefficients for the household sector only provides a more accurate estimate of the multiplier effects and provides results closer to those of a computable general equilibrium (CGE) model.

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<sup>21</sup> Bureau of Industry Economics (1984). *Tourist Expenditure in Australia*. Research Report 16, AGPS.

Following West and Gamage (1997) the linear coefficients assumption between other intermediate sectors of the input-output table has been maintained, but the relationships between the primary factors are non-linear. The one exception is the pig processing sector where it has been assumed that there is a more or less linear relationship between output and the household sector. The main reason for this difference is that the sector has significant excess capacity and thus output declines would be expected to result in employment reductions that are more or less proportional.

The marginal coefficients model therefore provides a non-linear relationship between household income and household consumption. This is done by using a generalised least squares regression to estimate a logarithmic equation for household income elasticities. This marginal coefficients model then replaces the average income coefficients of households with marginal coefficients estimated from time series data at the sectoral level.

Information for the state of Queensland was used for estimating the marginal coefficients used in this study, as these are the only marginal coefficients available for Australia. Given that it is a general principle of economic behaviour that income rises cause changes in the distribution of expenditure it would be expected that the marginal coefficients would be similar Australia wide. There may be very small changes in the coefficients from region to region, but the relativities between these elasticities would remain basically unchanged. In addition, given the broad similarity between the economic structure of Queensland and the Far West region it is likely that the marginal coefficients would be practically the same in both tables. Thus, the Queensland estimates were used as a proxy for the table used in this study. This should still result in a more accurate estimate of the economic impact of sealing the Menindee-Pooncarie road than would be possible with traditional input-output analysis.

#### 4.5 The Far West Input-Output Table

The input-output table used in this report is for the Far West Statistical Division. The table contains 18 sectors, primarily based on the Australian and New Zealand Standard Industry Classification (ANZSIC 1993 Edition), as shown in Table TA1.

<i>Table TA1</i>	<i>Sector classification</i>	
<b>Sector Name</b>	<b>Full Industry Title</b>	<b>ANZSIC Classification</b>
Agriculture	Agriculture, Forestry and Fishing	Division A (ex. groups 011 and 016 )
Other Agriculture	Horticulture, fruit and other crop growing	Groups 011 and 016
Mining	Coal & Oil Mining	Division B
Manufacturing	Manufacturing	Division C
Utilities	Electricity, Gas and Water Supply	Division D
Construction	Construction	Division E
Wholesale	Wholesale Trade	Division F
Retail	Retail Trade (inc. Repairs and Maintenance)	Division G
Hospitality	Accommodation, Cafes and Restaurants	Division H
Transport	Transport and Storage	Division I
Communications	Communication Services	Division J
Finance	Finance and Insurance	Division K
Dwellings	Ownership of Dwellings	Based on national input-output table
Business	Property and Business Services	Division L
Gov. Admin	Government Administration and Defence	Division M
Education	Education Services	Division N
Health	Health and Community Services	Division O
Recreation	Recreational and Cultural Services	Division P
Personal	Personal and Other Services	Division Q

Note: The sector names are listed as they appear in the Far West input-output table.

## GLOSSARY OF KEY TERMS

<i>Capital Expenditure</i>	Gross fixed capital expenditure is the purchase of durable investment goods such as dwellings, plant and equipment.
<i>COE</i>	Compensation of employees is equal to the wages and salaries of employees plus on-costs (e.g. superannuation and payroll tax). Compensation of employees is the basis of the <i>household income</i> multiplier.
<i>Employment</i>	Employment is measured as full-time equivalent jobs.
<i>Exports</i>	Exports are goods and services sold to non-residents, which are defined as consumers, firms and governments from outside the Illawarra/Wollondilly region.
<i>Final Consumption</i>	Final consumption expenditure is the current expenditure of households, industry and government. It includes purchases of durable and non-durable commodities, except the purchase of dwellings and equipment that are capital in nature. There are two types of final consumption: private final consumption expenditure (PFCE) and government final consumption expenditure (GFCE).
<i>Final Demand</i>	Final demand is the demand for goods and services not used up during the production process. Final demand is the sum of household and government consumption expenditure, capital investment, exports and increases in inventories.
<i>Intermediate Inputs</i>	An intermediate input is a good or service that is used in the production process.
<i>Imports</i>	Imports are goods and services purchased from non-residents and may include: competing imports, where there is a locally produced substitute; and complementary imports, where there is no locally produced substitute. Note that non-residents are defined as consumers, firms and governments from outside the Illawarra/Wollondilly region.

<i>GOS</i>	Gross operating surplus is the excess of gross output over the costs of production, before deducting depreciation, interest and company taxes.
<i>Multiplier</i>	<p>A multiplier is a summary measure used for estimating the economic impact on an economy caused by a change in the demand for the output of a particular industry or group of industries. A multiplier indicates the relative magnitude of the flow-on effects compared to the direct effect of the company.</p> <p>The multipliers in this report are <i>type IIA</i> multipliers, which are calculated as the ratio of the total economic impact (i.e. direct plus indirect effects) divided by the direct effects. The multipliers used in this report are for <i>output</i>, <i>value added</i>, household income (i.e. <i>compensation of employees</i>) and <i>employment</i>.</p>
<i>Output</i>	Output is equal to total sales (i.e. quantity sold multiplied by price per unit).
<i>Primary Inputs</i>	A primary input is an input into the production process that is not a good or service. Primary inputs therefore include compensation of employees, gross operating surplus, imports and indirect taxes on products and production.
<i>Value Added</i>	Value added is equal to the value of output minus the value of intermediate inputs. That is value added is the difference between the costs of production (excluding the compensation of employees, gross operating surplus, taxes and imports) and the value of sales turnover. In a national accounts context, GDP consists of the sum of value added by all industries. Value added also pertains to differences between the value of production at various stages of the supply chain (e.g. mining, iron and steel manufacturing, construction, etc).

## **RESEARCH TEAM**

### **Tom Murphy – Chief Executive Officer** *B.Ec. (Hons I) MSc. (Econ) Lancaster*

Tom has been the CEO of WRI since its inception and brought with him a strong reputation built on private and public sector experience. Previously Tom held senior academic positions in the Faculty of Commerce, Charles Sturt University, as a senior lecturer and as Director of the Regional Economics Research Unit. He was an Economic Analyst with the Office of National Assessments in Canberra, with responsibility for the ASEAN economies and Senior Consultant with KPMG Peat Marwick Management Consultants. Tom has frequently been invited to participate in National and State regional economic development conferences and provide input to government policy. Tom was pivotal in establishing the WRI and his vast experience provides strong leadership to the WRI team.

### **Luciana Mazzotti – Senior Research Officer** *BBus (Hons 1) BBus (MKT) CSU*

Luciana has strong analytical capabilities and economic modelling skills and manages a range of WRI projects. Her excellent written communication skills are demonstrated by the clear and simple language that characterises WRI research reports. Luciana has experience in the retail, hospitality and advertising industries and brings a diverse range of skills to the WRI.