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# CONSTELLATION PROJECT ECONOMIC IMPACT ASSESSMENT

MAY 2024

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# EXECUTIVE SUMMARY

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## BACKGROUND

Aeris Resources Ltd (Aeris) is the owner and operator of Tritton Copper Operations, an existing hub and spoke copper mining operation located approximately 45 km north-west of Nyngan, in the central west region of New South Wales (NSW). Aeris is seeking approval for further open pit and underground mining operations as part of Tritton Copper Operations through the Constellation Project (the Project). The Project primarily seeks to continue supplying ore to the Tritton processing plant, with an anticipated mine life of approximately 16 years inclusive of the Project construction period and rehabilitation/ closure period.

An Environmental Impact Statement (EIS) is required for the proposed development to comply with the requirements of the *Environmental Planning and Assessment Regulation 2000*. This Economic Impact Assessment has been developed as a technical document for use in preparing the EIS. The report quantifies the expected beneficial and adverse economic impacts of the Project on the regional and state economies. The report also recommends mitigation strategies to ensure regional economic values are enhanced or, as a minimum, maintained if the Project proceeds. This assessment has been prepared in accordance with requirements set out in the Secretary's Environmental Assessment Requirements (SEARs) for the Project.

The most relevant economies against which to examine the regional impacts associated with the Project is the local economy of Bogan Local Government Area (LGA) where the Constellation Mine is located (referred to as the Local Catchment), as well as the regional economy comprised of Bogan, Cabonne, Dubbo, Gilgandra, Lachlan, Narromine, Orange, Parkes, and Warren LGAs (referred to as the Regional Catchment).

## EXISTING ECONOMIC ENVIRONMENT

The Local Catchment's population decreased from 2,980 to 2,460 residents from 2012 to 2022, representing a decline at an average annual rate of 1.9% over this period. This trend was especially pronounced in 2020 (the height of the COVID-19 pandemic) and in contrast to trends seen across regional Australia, with many regional areas experiencing population increases during the pandemic. The Regional Catchment's population increased from 141,400 to 149,800 residents from 2012 to 2022, representing growth at an average annual rate of 0.6% over this period. The population of the Regional Catchment is concentrated in the LGAs of Dubbo and Orange, comprising two-thirds of the Regional Catchment in 2022 and largely driving population growth in the Regional Catchment over the last decade.

The Local Catchment recorded Gross Regional Product (GRP) of approximately \$563.8 million in 2021/22. The economy is heavily influenced by fluctuations in agricultural and mining activity, which have contributed to the Local Catchment's GRP being relatively volatile year to year over the past decade. These industries contributed a combined 73.2% of total Gross Value Add (GVA)<sup>1</sup> in 2021/22. Mining was also the largest employing industry in the Local Catchment in 2021/22, employing 20.5% of the Local Catchment's total workforce, while agriculture comprised 19.2% of the total workforce.

The unemployment rate in both the Local Catchment and Regional Catchment has predominantly been lower than in New South Wales over the last decade. A decade-low unemployment rate of 1.6% in September 2020 was recorded in the Local Catchment despite a reduction in the labour force in the 12 months prior to the onset of the COVID-19 pandemic, compared to an unemployment peak of 6.8% in New South Wales. The labour market has since supported a recovery in the Local Catchment labour force but also a rise in unemployment, registering an unemployment rate of 5.0% as of December 2022 compared to 3.0% in the State.

The Local Catchment has observed a low level of property market development activity over the last decade as a result of sustained population decline. While subdued growth in property prices and rental costs have been

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<sup>1</sup> Sector GVA represents the contribution of all industries as well as the sector of ownership of dwellings to GRP, excluding taxes less subsidies on products.

observed, the relative gap in prices over the last decade with the Regional Catchment and State has widened considerably. Local Catchment vacancy rates have subsequently experienced minimal volatility over this period.

## LOCAL EFFECTS ANALYSIS

### Potential Beneficial Impacts

Key beneficial impacts arising from the Project are outlined in the table below. Impacts are examined in consideration of what would otherwise occur if the Project does not proceed.

**Table ES.1. Assessment of Beneficial Impacts of the Project**

Impact	Description
<b>Economic Output</b>	<p>The Project will contribute to increased levels of industry output and Gross Regional/State Product (GRP/GSP) in the Regional Catchment and NSW economies during construction and operations, flowing from both direct and flow on impacts:</p> <ul style="list-style-type: none"> <li>• Construction activity is expected to generate a total of \$144.7 million in output for businesses in the Regional Catchment and an additional \$136.6 million in direct and flow-on output for businesses in NSW outside of the Regional Catchment.</li> <li>• Business activity attributable to construction is estimated to support \$62.4 million in GRP for the Regional Catchment and an additional \$69.8 million in GRP for the rest of NSW, for a total of \$132.1 million in GSP in NSW.</li> <li>• Operational activity is expected to generate an average output of \$179.5 million per annum in the Regional Catchment and an additional average output of \$122.1 million per annum in direct and flow-on impacts for businesses in NSW outside of the Regional Catchment.</li> <li>• Business activity attributable to operations is estimated to generate an annual average of \$111.4 million in GRP in the Regional Catchment and an additional \$60.0 million in average annual GRP for the rest of NSW, for a total of \$171.4 million in GSP per annum in NSW.</li> </ul>
<b>Employment</b>	<p>The Project will support jobs in the Regional Catchment and NSW economies during construction and operations, flowing from both direct and flow-on impacts:</p> <ul style="list-style-type: none"> <li>• Construction activity is expected to support 315 FTE job years in the Regional Catchment and an additional 429 FTE job years in NSW outside of the Regional Catchment, for a total of 744 FTE job years in NSW.</li> <li>• Operations activity is expected to support 256 FTE jobs in the Regional Catchment and an additional 362 FTE jobs for the rest of NSW, for a total of 618 FTE jobs in NSW.</li> </ul>
<b>Household Incomes</b>	<p>The increase in employment will also support increased incomes in the Regional Catchment and NSW, flowing from both direct and flow-on impacts:</p> <ul style="list-style-type: none"> <li>• Construction activity is expected to support \$40.4 million in wages and salaries in the Regional Catchment and an additional \$40.5 million in wages and salaries in NSW outside of the Regional Catchment, for a total of \$80.9 million in wages and salaries in NSW.</li> <li>• Operations activity is expected to support \$28.9 million in wages and salaries in the Regional Catchment and an additional \$35.2 million in wages and salaries for the rest of NSW, for a total of \$64.1 million in wages and salaries in NSW.</li> </ul>
<b>Support for Local Businesses</b>	<p>The proponent has in place existing supply contracts and supply chains for Tritton Copper Operations, supporting local and NSW businesses. The Project will extend the mining and processing activities of the operation, thereby enabling continued support and opportunities for suppliers in the Regional Catchment and NSW that otherwise would be lost, providing additional security and longevity of business incomes (and employment). The Project will also present opportunities to secure new contracts to supply and service the needs of the Project during all phases of the Project. These supply contracts would not be able to be supported without the Project.</p>
<b>Government Revenue</b>	<p>The Project will provide a lift in State and Australian government taxation revenues through a variety of taxes and duties. The NSW Government is expected to receive approximately \$1.3 million in net additional revenue during construction through payroll tax, as well as \$6.3 million on average per annum during peak operations primarily through royalty payments. The Australian Government is estimated to receive approximately \$28.5 million in total during construction and \$32.8 million on average per annum during peak operations in various taxes. These additional revenues can be used by government to provide additional infrastructure and services to support business and households throughout Australia and NSW.</p>

Source: AEC

### Potential Adverse Impacts

Key adverse impacts arising from the Project are outlined in the table below. Impacts are examined in consideration of what would otherwise occur if the Project does not proceed.

**Table ES.2. Assessment of Adverse Impacts of the Project**

Impact	Description
<b>Impacts on Local Businesses from Competition for Resources</b>	There will be increased competition for labour and resources, leading to inflationary pressure and increased costs to businesses as well as potential difficulties for local businesses attracting and retaining staff. As a result, some industries (e.g. manufacturing) may observe a small decline in activity and employment relative to what would otherwise be expected to occur without the Project. Despite this, the impacts of the Project on industry output are estimated to be relatively small, and the Project’s impacts primarily reflect the retention and ongoing support of economic activity already delivered by existing Tritton Copper Operations activity into the longer term.
<b>Impacts on Agricultural Productivity</b>	The Project is expected to result in the disturbance of 182.8 ha of land currently used for agricultural activities, with this area temporarily removed from production during the life of the Project but returned to agricultural use following Project completion and site rehabilitation. This is estimated to temporarily result in a potential value loss of approximately \$11,100 per annum in grazing activity and approximately \$22,000 per annum in cropping activity over the life of the Project.
<b>Impacts on Local Property Market</b>	As the Project workforce will largely comprise existing Aeris personnel and primarily reflect a maintenance of existing workforce levels, the local workforce is not anticipated to place any additional demand on the local property market beyond these existing levels. While it is acknowledged that some additional workers (beyond existing Aeris personnel) may be required during construction, the number of additional workers is expected to be small. The impact of the Project on the local property market will thereby likely be more positive in nature, supporting retention of the local population against a backdrop of rural decline. Without the Project, it is likely many workers living locally could leave to seek employment elsewhere. This could lead to high levels of vacancy rates and potential declines in local property values, adversely impacting property owners.
<b>Impacts on Local Infrastructure and Service Provision</b>	As the Project will reflect an extension of existing mining activities in the local area, and thereby a retention of the existing workforce and levels of activity, the Project is not expected to result in any tangible changes in demand and requirements for local infrastructure and service provision beyond what is currently available. It is anticipated that any Voluntary Planning Agreement would be based around the proposed infrastructure to be developed during construction and continuing any existing levels of contributions and community support by Aeris over the life of the Project.
<b>Greenhouse Gas Emissions</b>	The Project is estimated to produce approximately 253,300 tonnes of Scope 1 and 2 CO <sub>2</sub> -e emissions over the life of the Project. Applying the spot price for Australian Carbon Credit Units (ACCUs), the total cost of these additional greenhouse gas emissions generated by the Project was estimated at a value of approximately \$7.9 million over the life of the Project.
<b>Traffic Generation</b>	The Project will generate additional transport movements than would otherwise occur without the Project for the movement of labour to the mine site, as well as transport associated with general freight, movement of fuel and supplies. This will result in increased vehicle fuel and maintenance costs, road damage costs as well as increase the risk of accidents due to increased travel. The total cost of additional traffic generation due to the Project was estimated at approximately \$3.1 million during construction and \$2.1 million per annum during peak operations.
<b>Ecosystem Service Impacts</b>	The Project is expected to result in the removal of approximately 97.2 ha of native vegetation from the subject land on which Project construction and operations will occur. This will result in direct impacts to a number of plant community types that will require environmental offsets. A total of 259 ecosystem credits are estimated to be required to offset Project development activity, with the total cost of these credits estimated at a value of approximately \$851,500 (including oncosts).

Source: AEC

## MITIGATION STRATEGIES

Economic impacts of the Project are anticipated to be overwhelmingly positive, with minimal adverse economic impacts. While the potential adverse economic impacts from the Project are assessed to be low, there are some potential areas that should be monitored, and strategies employed to ensure benefits of the Project to the Local Catchment, Regional Catchment and NSW are maximised and any potential adverse impacts minimised:

- To maximise local benefits derived from the Project, and consistent with existing policies implemented in relation to Tritton Copper Operations, the proponent and contractors engaged by the proponent will be encouraged to source labour locally where possible and practical and provide training opportunities where practical.
- The proponent has longstanding relationships with local business and an established supply chain for its existing activities in the Local Catchment, Regional Catchment and NSW. To maximise local benefits derived from the Project, the proponent will continue to support local business by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.

The above measures/ strategies are consistent with industry best practice and considered sufficient to address the adverse economic impacts identified in consideration of the relatively low level of magnitude of these impacts. It is not anticipated that any contingency plans will be necessary to manage residual risks. It should be recognised that these strategies form part of the proponent's Project planning, and as such, modelling and analysis of impacts in this report has been based on these strategies being implemented.

In addition to the above:

- The Project may result in some impacts in terms of additional demand for accommodation/ housing in the Local Catchment, which could impact on accommodation/ housing availability and affordability. The proponent will seek to mitigate these adverse impacts by monitoring the accommodation/ housing market within the Local and Regional Catchment, and the resulting demand placed on it by the Project workforce during both construction and operations.
- The proponent will continue to employ existing mitigation measures and strategies for Tritton Copper Operations, as well as progressive rehabilitation of the site, to ensure the long-term impacts of the Project on agriculture are minimised.

## ABBREVIATIONS, ACRONYMS AND UNITS

Abbreviation/ Acronym/ Unit	Term
<b>Abbreviations/ Acronyms</b>	
ACCU	Australian carbon credit unit
AEC	AEC Group Pty Ltd
Aeris	Aeris Resources Ltd
DIDO	Drive in drive out
EIS	Environmental impact statement
FIFO	Fly in fly out
FTE	Full time equivalent
GFC	Global financial crisis
GDP	Gross domestic product
GHG	Greenhouse gas
GRP	Gross regional product
GSP	Gross state product
GST	Goods and services tax
GVA	Gross value add
IO	Input-Output
LEA	Local effects analysis
LGA	Local government area
NSW	New South Wales
PCT	Plant community type
SEARs	Secretary's Environmental Assessment Requirements
<b>Units</b>	
\$/ha	Dollars per hectare
\$/kg	Dollars per kilogram
\$/t	Dollars per tonne
\$M	Million dollars
c/km	Cents per kilometre
c/L	Cents per litre
CO <sub>2</sub> -e	Carbon dioxide equivalent
ha	Hectares
km	Kilometres
p.a.	Per annum
t	Tonnes

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# 1. INTRODUCTION

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## 1.1 BACKGROUND

Aeris Resources Ltd (Aeris) is the owner and operator of Tritton Copper Operations, an existing hub and spoke copper mining operation located approximately 45 km north-west of Nyngan, in the central west region of New South Wales (NSW). Tritton Copper Mine serves as the hub of the operation along with other surrounding deposits all supplying ore for processing at the Tritton processing plant. Open pit mining operations commenced in 1992, before underground mining activities commenced at Tritton Copper Mine in 2005, and then at Murrawombie Copper Mine in 2018.

The Life of Mine planning for Tritton Copper Operations has identified that additional resource input is required to supplement and replace production for the Tritton and Murrawombie deposits, with current ore reserves of the Tritton and Murrawombie mines forecast to be exhausted by the end of 2024. An ongoing regional exploration program has identified several deposits, including the Constellation deposit, which could be incorporated into the hub and spoke operational model and meet these demand requirements.

Aeris is seeking approval for further open pit and underground mining operations as part of Tritton Copper Operations through the Constellation Project (the Project). The Project primarily seeks to continue supplying ore to the Tritton processing plant, with an anticipated mine life of approximately 16 years, inclusive of the Project construction period and rehabilitation/ closure period. There is potential for mine life extensions as the deposit is developed down plunge (to depth).

## 1.2 PURPOSE OF THIS REPORT

An Environmental Impact Statement (EIS) is required for the proposed development to comply with the requirements of the *Environmental Planning and Assessment Regulation 2000*. As part of the EIS, analysis of the anticipated economic impacts of the Project is required.

This report has been developed as a technical document for use in preparing the EIS. The report quantifies the expected beneficial and adverse economic impacts of the Project on the regional and state economies. The report also recommends mitigation strategies to ensure regional economic values are enhanced or, as a minimum, maintained if the Project proceeds.

## 2. ASSESSMENT APPROACH

### 2.1 ASSESSMENT REQUIREMENTS

This assessment has been prepared in accordance with requirements set out in the Secretary’s Environmental Assessment Requirements (SEARs) for the Project. The SEARs identify matters which must be addressed in the EIS and essentially form its terms of reference. The table below lists individual requirements in the SEARs relevant to this economic assessment and the section in this report where the requirements are addressed.

**Table 2.1. SEARs Requirements**

Requirement	Section(s) Addressed
<b>General Requirements</b>	
An assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including: <ul style="list-style-type: none"> <li>• A description of the existing environment likely to be affected by the development, using sufficient baseline data.</li> <li>• An assessment of the likely impacts of all stages of the development, including likely interactions between the development and any other existing, approved or proposed developments in the vicinity, including any cumulative impacts, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice.</li> <li>• A description of the measures that would be implemented to avoid, mitigate and/or offset residual impacts of the development, including incident management procedures, and the likely effectiveness of these measures, and an assessment of:                             <ul style="list-style-type: none"> <li>○ Whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented.</li> <li>○ The likely effectiveness of these measures, including performance measures where relevant.</li> <li>○ Whether contingency plans would be necessary to manage any residual risks.</li> </ul> </li> </ul>	4  5  6
An evaluation of the development as a whole, having regard to the [...] economic [...] costs and benefits of the development.	5
An estimate of jobs that will be created during the construction and operational phases of the proposed infrastructure.	3.2.1.2, 3.2.2.4 and 5.1
<b>Key Issues</b>	
Economic – including an assessment of the likely economic impacts of the development, paying particular attention to the: <ul style="list-style-type: none"> <li>• Significance of the resource.</li> <li>• Costs and benefits of the development for the State and region.</li> <li>• The demand for the provision of local infrastructure and services.</li> <li>• Consideration of the need for a Voluntary Planning Agreement in relation to the demand for the provision of local infrastructure and services.</li> </ul>	5.1 5 5.3.2 5.3.2

Source: NSW Government (2023 a)

### 2.2 METHOD OF ASSESSMENT

#### 2.2.1 Existing Economic Environment

The existing economic environment section provides an overview of the existing economic profile of the Project study area (see section 2.3 for a definition of the Catchment used for the Project study area) based on data available as of June 2023 and provides a current baseline for assessment of the significance of potential impacts of the proposed development. Regional economic data collected during this stage is used to develop economic models and informs the ‘base case’ (or baseline scenario) against which the Project’s impacts are assessed.

A summary of the existing economic environment is presented in section 4, with supporting data in Appendix A.

### 2.2.2 Local Effects Analysis (LEA)

The LEA section uses economic impact modelling results as well as information from the existing environment and desktop research to analyse, assess and discuss the economic impacts of the Project.

The LEA includes input and information from:

- Economic modelling using Input-Output (IO) modelling techniques. A description of the IO methodology implemented is provided in Appendix B.
- Interpretation of modelling output in the context of the regional and state economies, and analysis of other non-quantified changes to the economic environment.
- Evaluation of the significance of impacts in relation to economic resources.

The assessment identifies the economic impacts specific to the Project compared to what would be anticipated if the Project does not proceed. The LEA is presented in section 5.

### 2.2.3 Mitigation and Enhancement Strategies

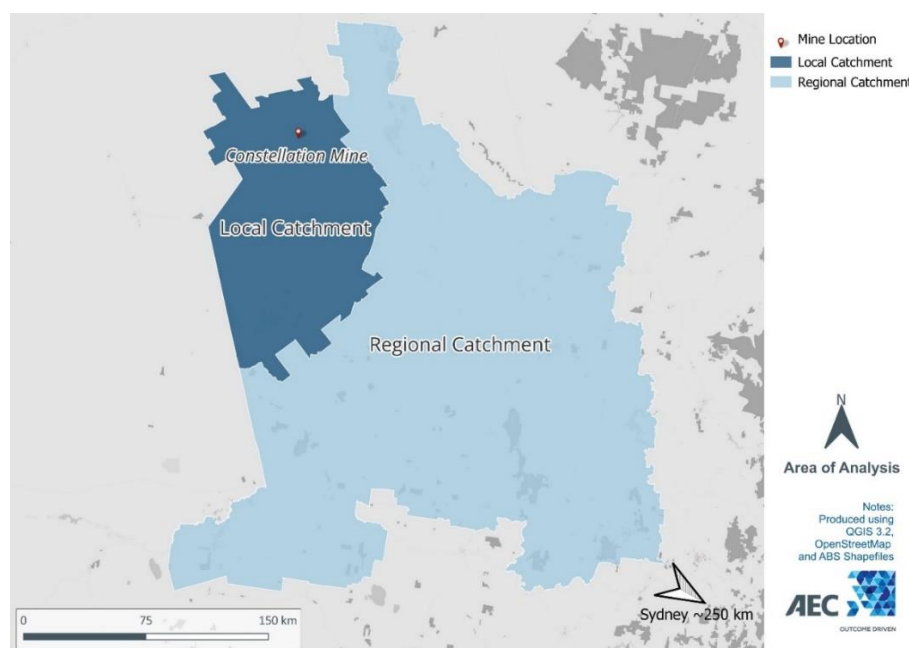
The mitigation strategies section identifies strategies to avoid, reduce or mitigate the negative economic impacts and enhance and facilitate the capture of the positive impacts identified in the economic impact assessment. Mitigation and enhancement strategies are presented in section 6.

## 2.3 STUDY AREA

Definition of the study area for examining the economic impacts of the Project has been based on the location of the Constellation Project. The Local Catchment is Bogan LGA, the local government area in which the Constellation Mine is located.

The nature of mining operations also affects neighbouring regions, with the Regional Catchment defined as the LGAs of Bogan, Cabonne, Dubbo, Gilgandra, Lachlan, Narromine, Orange, Parkes, and Warren. The Regional Catchment has been defined based on an expectation of where the majority of locally sourced workers, goods and services would be sourced from, covering key nearby mining service centres located within a two to three hour drive of the Project site. The State of New South Wales has also been included to understand the existing economic environment of the Local and Regional Catchments relative to the broader State.

**Figure 2.1. Study Catchments**



Source: AEC.

## 3. PROJECT SCENARIO AND ASSUMPTIONS

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### 3.1 PROJECT DESCRIPTION

The Constellation Project is located in Bogan LGA, of central-western New South Wales. The Project site is located approximately 20 km north-east of the township of Girilambone and approximately 45 km north-west of Nyngan.

The Project is proposed as a satellite site of Tritton Copper Operations (owned and operated by AERIS). Tritton Copper Operations operates as a hub and spoke model, with Tritton Copper Mine serving as the hub (where the processing facility is located) and other surrounding deposits supplying ore for processing. The Project is located approximately 45 km north-east of the Tritton processing plant.

The Project proposes to mine copper ore by developing an open cut pit and underground mine. Mined ore will be transported via road to the Tritton processing plant for processing, utilising existing road networks as far as practicable. Lower grade oxide ore will be processed by heap leaching at the Project site. Transport of dewatered tailings material from Tritton Copper Mine (back to the Project site for use in cemented paste fill) will support the underground mining activities at the Project.

The Project proposes to mine an average of 500,000 tonnes of copper ore per annum to replace depleting production from AERIS' existing Tritton Copper Mine and Murrawombie Copper Mine and maintain feed to the Tritton processing plant. However, peak volumes of ore transported to Tritton Copper Mine in any given period may be up to 1 million tonnes per annum. Ore produced during operations will vary as open cut mining is completed and underground operations ramp up. The anticipated mine life is approximately 16 years, inclusive of the initial Project construction period and rehabilitation/ closure period. There is potential for future mine life extensions as the deposit is developed down plunge (to depth).

Rehabilitation will occur progressively where possible, noting that disturbance associated with the Project site will be of a very small scale.

Supporting infrastructure for the proposed Project will include developing:

- A road upgrade between the Project site and the Mitchell Highway (to support haulage activity).
- A new T intersection to link the proposed haul road with the eastern side of the Mitchell Highway (north of Girilambone).
- An upgrade to the intersection of the Mitchell Highway with Railway Road (west of Girilambone).
- A waste rock emplacement at the Project site.
- A run of mine stockpile to support the handling of mined ore.
- A mine laydown area and workshop.
- A heap leach pad and associated processing facility.
- A paste plant, emulsion storage and shotcrete batch plant.
- Topsoil stockpiles.
- A solar farm and on-site power station.
- Water management and storage infrastructure, including a bi-directional water pipeline between the Project site and Murrawombie Copper Mine.
- Administrative facilities including offices, amenities, and carpark.

## 3.2 PROJECT SCENARIO

An overview of Project assumptions and parameters used in undertaking economic modelling and analysis are provided in the following sections.

### 3.2.1 Construction

#### 3.2.1.1 Construction Costs and Timing

Initial construction costs for the Project are expected to be in the order of approximately \$120 million (Aeris Resources, unpublished). Construction will largely occur over a 12-month period, with some ancillary construction activity also occurring outside this initial 12-month period (e.g. the underground mine development will extend beyond the initial 12-month period).

An indicative breakdown of the approximate \$120 million in construction costs across relevant industries used in economic modelling is provided below. In addition to the construction costs, the Project will also require environmental offset costs which are yet to be determined.

**Table 3.1. Construction Costs by Industry (\$M)**

Industry	Cost (\$M)
Heavy and Civil Engineering Construction	\$69.1
Construction Services	\$6.0
Non-Residential Building Construction	\$1.7
Residential Building Construction	\$1.7
Specialised and Other Machinery and Equipment Manufacturing	\$16.5
Motor Vehicles and Parts; Other Transport Equipment Manufacturing	\$0.2
Electrical Equipment Manufacturing	\$11.5
Professional, Scientific, Computer and Electronic Equipment Manufacturing	\$3.1
Polymer Product Manufacturing	\$7.2
Metal Containers and Other Sheet Metal Product Manufacturing	\$0.5
Road Transport	\$1.1
Insurance and Superannuation Funds	\$1.4
<b>Total</b>	<b>\$120.0</b>

Source: Aeris Resources (unpublished)

#### 3.2.1.2 Construction Labour

A total of 95 full-time equivalent job years (FTE job years)<sup>2</sup> are estimated to be required during the overall construction period, including 90 FTE job years for direct on-site construction works and 5 FTE job years for indirect client/ project management works (Aeris Resources, unpublished). Construction activity is expected to be undertaken (to the extent possible) by existing Aeris personnel in the region.

**Table 3.2. Construction Labour (FTE)**

Labour	Total (FTE)
Direct (on-site construction workforce)	90
Indirect (client/project management)	5
<b>Total</b>	<b>95</b>

Source: Aeris Resources (unpublished)

<sup>2</sup> Where one FTE job year is equivalent to one person working full time for a period of one year.

### 3.2.1.3 Source of Labour, Goods and Services

For the purposes of the economic impact assessment, assumptions regarding where goods and services for construction will be sourced from were developed in consideration of the types of goods and services required and capacity within the local and regional economy.

Construction will use labour from the Local and Regional Catchments where feasible, with the rest of the construction workforce supplemented by workers outside the Regional Catchment.

**Table 3.3. Assumed Construction Source of Goods, Services and Labour (%)**

Industry	Regional Catchment	Rest of NSW	Rest of Australia and Overseas
Construction	75%	25%	0%
Manufacturing	25%	25%	50%
Road Transport	50%	50%	0%
Insurance and Superannuation Funds	10%	90%	0%

Source: Aeris Resources (unpublished), AEC.

## 3.2.2 Operations

### 3.2.2.1 Production and Timing

The ore to be mined at the Constellation Mine primarily contains copper, as well as a small quantity of gold. Initially (during the first two to three years of operations), the Project will involve open cut mining operations. Underground mining will commence from around the second year of operations, with the Project fully transitioning to underground mining around the third year of operation.

Indicative estimates of the average annual production at peak production levels of the Project (which will occur during underground operations) are presented below (Aeris Resources, unpublished). Economic analysis of operations has been based on this level of production and thereby reflects activity during underground mining operations.

**Table 3.4. Average Annual Production at Peak**

Production	Annual Average at Peak
<b>Mining</b>	
Target Annual Mined Production (tonnes p.a.)	500,000
<b>Processing (on-site)</b>	
Target Annual Processed Material (tonnes p.a.)	500,000
Average Annual Concentrate Produced (dry tonnes p.a.)	42,000
Average Copper Produced Annually (tonnes p.a.)	9,900
Average Gold Produced Annually (kilograms p.a.)	270

Source: Aeris Resources (unpublished)

In addition to the above, a total of 33,000 tonnes of copper sulphate (as pentahydrate) will also be produced through heap leach processing over the first two to three years of operations.

### 3.2.2.2 Commodity Prices

Economic modelling has been undertaken assuming the commodity prices outlined below, based on a review of historic and projected prices for commodities (Aeris Resources, unpublished). Prices are presented in Australian dollars and assumed to remain constant for the duration of the Project. Sensitivity of economic modelling results (presented in section 5.1) to these prices has also been undertaken at the ranges outlined below.

- **Copper:** A copper price of \$13,000 per tonne. *Sensitivity Range: \$12,000 to \$14,000.*
- **Gold:** A gold price of \$85,000 per kilogram. *Sensitivity Range: \$70,000 to \$100,000.*

### 3.2.2.3 Operating Expenditure

Estimates of operating expenditure were provided by Aeris Resources and are commercial in confidence, and thereby have not been reported in this document. Estimates of operating expenditure provided by Aeris Resources were used in assessing the direct and flow-on economic activity anticipated to be supported by the Project in economic modelling.

### 3.2.2.4 Operations Labour

A total of 178 FTE jobs are estimated to be required annually on average at peak operational levels (Aeris Resources, unpublished), noting these reflect peak employment levels during underground mining. An open cut mining contractor will be engaged in the first two to three years to undertake the open cut mining activities. A breakdown of operational labour across Project activities is presented below. As operations will largely reflect a continuation of mining activity in the region by Aeris, to replace depleting production from Aeris’ existing Tritton Copper Mine and Murrawombie Copper Mine, it is anticipated this workforce will largely be comprised of existing Aeris personnel transitioning from existing mining operations to the Project.

**Table 3.5. Average Annual Operations Labour at Peak (FTE)**

Labour	Annual Average at Peak (FTE)
Mining	117
Transport	23
Processing	38
<b>Total</b>	<b>178</b>

Source: Aeris Resources (unpublished)

### 3.2.2.5 Source of Labour, Goods and Services

For the purposes of the economic impact assessment, estimates of where goods and services for operations will be sourced from were based on standard industry benchmarks for the non-ferrous metal ore mining industry, as per national IO transaction tables (ABS, 2021 a).

Operations will use labour from the Local and Regional Catchments where feasible, with the rest of the operations workforce supplemented by workers outside the Regional Catchment.

## 3.3 WORKFORCE ACCOMMODATION

As per existing accommodation arrangements provided by Aeris for their Tritton Copper Operations, the Project is anticipated to provide workforce accommodation at the Tritton Resources Camp and Outback Motor Inn at Nyngan. The accommodation village at the Tritton Resources Camp currently has 30 single accommodation units and recreation dining facilities on site, while the Outback Motor Inn in Nyngan has a further 49 rooms, all of single occupancy, for a total of 79 rooms available (Aeris Resources, unpublished).

As outlined in sections 3.2.1.2 and 3.2.2.4 above, it is anticipated the Project workforce (both construction and operations) will largely comprise existing Aeris personnel, and thereby reflect a maintenance of existing workforce levels. In line with existing personnel, it is anticipated approximately 49% of the total Project workforce, including construction and operations, will be FIFO and DIDO workers primarily from the NSW Central Coast regions. These workers will stay at the Tritton Resources Camp or Outback Motor Inn during their rostered on period, returning to their place of usual residence outside of their rostered period. The remaining 51% of the total Project workforce are expected to reside in surrounding local communities, including Nyngan, Cobar, Hermidale and Girilambone (Aeris Resources, unpublished). As these largely represent existing workers (with an existing residence in the local community), the local workforce is not anticipated to place any additional demand on the local property market.

### 3.4 CONSEQUENCES OF NOT PROCEEDING WITH PROJECT

Where the Project does not proceed, the economic contribution to be delivered by the Project would not be realised. The Project will enable the continuation of mining activity in the region. Where the Project proceeds, mining activity and supply contracts will be delivered in the region, with a retention of activity in the region and NSW as production supplied to the Tritton processing plant depletes over the next decade.

## 4. EXISTING ECONOMIC ENVIRONMENT

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This section provides a summary of the existing economic environment of the Local Catchment and Regional Catchment. Comparisons to New South Wales are also provided where relevant. Monetary values are presented in 2023 Australian dollar values unless otherwise specified. Supporting figures and tables that relate to this analysis are provided in Appendix A.

The following are key attributes of the local and regional economy:

- **Declining local population in the decade to 2022:** The Local Catchment's population decreased from 2,980 to 2,460 residents from 2012 to 2022, representing a decline of approximately 520 residents at an average annual rate of 1.9% (ABS, 2023 a). This trend was especially pronounced in 2020 (the height of the COVID-19 pandemic) and in contrast to trends seen across regional Australia, with many regional areas experiencing population increases during the pandemic (ABS, 2022 c). Factors that have impacted the population decrease in the Local Catchment include:
  - Volatile agricultural production seasons impacting agricultural work, with rainfall deficiencies and several periods of severe drought (Doyle, 2019).
  - Consolidation across rural industries, with larger commercial operations typically using less labour than traditional small family farms.
  - Youth moving away to metropolitan areas, with most staying and not returning (Judd, 2022).
  - An ageing population.
- **Moderate regional population growth in the decade to 2022:** The Regional Catchment's population increased from 141,400 to 149,800 residents from 2012 to 2022, representing a growth of approximately 8,400 residents at an average annual rate of 0.6% (ABS, 2023 a). The population of the Regional Catchment is concentrated in the LGAs of Dubbo and Orange, comprising two-thirds of the Regional Catchment in 2022, while the Local Catchment comprises only 1.6%. Population growth in New South Wales outpaced the Regional Catchment over the decade, rising at a rate of 1.1% per annum on average.
- **Historical population trends anticipated to continue:** The population of the Local Catchment is projected to decrease by approximately 900 over the next 20 years to around 1,600 residents by 2041, at an average annual rate of 2.4%. This reflects an average rate of decline greater than that experienced in the previous decade between 2012 and 2022 of 1.9% (NSW Government, 2022). The Regional Catchment and New South Wales are both projected to experience population growth over the next 20 years to 2041, although at slightly slower rates than was experienced over the decade to 2022. Population in the Regional Catchment is projected to grow at an average annual rate of 0.4%, while in New South Wales, an average annual growth rate of 1.0% is projected.
- **Significant fluctuations in mining output within the Local Catchment over the past 15 years:** Gross Regional Product (GRP), as measured in chain-volume prices, has fluctuated significantly in the Local Catchment over the last 15 years to 2021/22, driven largely by the mining sector (AEC, unpublished a). The Local Catchment experienced a significant economic contraction during 2007/08 and 2008/09, caused by the convergence of the end of the mining boom and the Global Financial Crisis (GFC) (Tulip, 2014; Woods, 2012) and resulted in consecutive years of GRP contractions greater than 20%. After the GFC, a recovery was driven by strong Chinese demand for Australian minerals, including copper, aiding economic stability in the Local Catchment between 2010/11 and 2014/15. This was followed by a slowdown between 2015/16 and 2018/19 caused by decreased Chinese demand for mining outputs and a substantial fall in commodity prices (PwC, 2016). Following this, mining outputs and the broader Local Catchment economy expanded due to increased commodity prices (IndexMundi, 2023), particularly during the COVID-19 pandemic. This growth occurred despite sanctions imposed by China on Australian exports (including copper) (Fillingham, 2023), and saw the Local Catchment record an average annual growth rate in GRP of 15.0% from 2019/20 through to 2021/22. This rate of growth was larger than GRP growth observed in both the Regional Catchment (9.4%) and New South Wales (5.7%) over this period.

- **Mining and agriculture dominate the Local Catchment economy:** The mining sector has been the largest within the Local Catchment for the last 15 years, comprising 54.2% of Gross Value Add (GVA)<sup>3</sup> and 20.5% of total employment in 2021/22 (AEC, unpublished a, b). Agriculture comprised a further 19.0% of GVA and 19.2% of jobs in 2021/22. The Local Catchment is highly reliant on these two sectors, with all other industries accounting for the remaining 26.8% of GVA in 2021/22, each comprising a share of total GVA below 3.0%. While mining and agriculture also dominate the Regional Catchment's economy, the Regional Catchment is more diversified than the Local Catchment, with service-related sectors accounting for relatively larger shares of GVA and employment. This was observed in 2021/22, with more significant contributions from health care and social assistance (9.4% of GVA and 19.4% of employment), education and training (5.0% of GVA and 9.5% of employment), and retail trade (4.1% of GVA and 9.4% of employment).
- **Increased copper prices in recent years:** The primary mining output of the Local Catchment is copper, which experienced a significant increase in price during the COVID-19 pandemic. This was largely attributable to an increased demand for renewable energy, which often requires copper during manufacturing (Carrington, 2020; IEA, 2021). Over the two years to May 2022, the price of copper increased 65.3% from \$8,052/t in May 2020 to \$13,311/t in May 2022 (IndexMundi, 2023). With China accounting for 40% of global copper demand (PwC, 2016), this was followed by a slight price drop to \$10,996/t in July 2022 due to the continuation of Chinese COVID-19 policies (mining.com, 2022), before a further price rise to \$13,159/t in April 2023 (IndexMundi, 2023). The price for copper is anticipated to continue to be high to 2030, with market shortages resulting from a global transition to renewable energy sources (Shan, 2023).
- **Agricultural production value in the Local Catchment dominated by wheat and cotton:** The total value of agricultural production in the Local Catchment rose from \$138.6 million in 2016 to \$232.7 million in 2021 at an average annual rate of 10.9% (ABS, 2022 a). Agricultural production value in the Regional Catchment also rose over this period, from \$1.2 billion in 2016 to \$2.1 billion in 2021 at an average annual rate of 12.5%. The rise in values for both the Local and Regional Catchments outpaced growth observed in New South Wales over this period, at 6.6% per annum on average. The largest value agricultural outputs in the Local Catchment were wheat and cotton, which comprised 61.5% of total value in the Local Catchment in 2021. A sizeable livestock industry also supports agricultural activity in the Local Catchment, accounting for 22.7% of total value in 2021 through cattle and calves, as well as sheep and lambs and their associated wool outputs.
- **Increased prices of key agricultural outputs in recent years:** Wheat prices have increased substantially since early 2021, from \$365/t in April 2021 to a peak of \$741/t in May 2022 (IndexMundi, 2023). This has been in part due to the Russia-Ukraine war, which has disrupted nearly one-third of global wheat supply (Aizeman, 2023). Market uncertainty has shifted consumer preferences for wheat suppliers towards Australia (S&P Global, 2022), with the value of Australian wheat production estimated to have reached a record high in 2022/23 of \$15.9 billion (Australian Government, 2023 a). The price of cotton has remained stable over the last decade before a price spike between May 2020 and May 2022, from \$2.23/kg to \$5.12/kg (IndexMundi, 2023). This increase was largely attributable to increased demand from China and floods in Pakistan (Thomas, 2021), as well as various adverse environmental events across American production areas (Perez, 2022).
- **Increased prices of key livestock related outputs in recent years:** Wool prices increased considerably between March 2016 and September 2018. The price of fine wool rose from \$13.86/kg to \$24.26/kg over this period, due to both high demand from China and inelastic domestic supply (Letts, 2018). Since then, however, prices dropped significantly to \$10.04/kg, as a result of decreased demand from China and changing consumer preferences (away from wool) during a high inflationary period (Field, 2022). Wool prices have remained stable post-pandemic, recorded at \$16.23/kg in April 2023. The price of lamb and beef has generally increased since December 2012, with prices rising strongest from September 2019 to December 2021 (IndexMundi, 2023; Radford, 2021). The COVID-19 pandemic significantly disrupted supply chains which impacted the cost of meat over this period (NSA, 2022), compounded by the lasting effects of panic buying (Chapman, 2021) and labour disruptions to meat processing facilities (Whitehead, 2022).

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<sup>3</sup> Sector GVA represents the contribution of all industries as well as the sector of ownership of dwellings to GRP, excluding taxes less subsidies on products.

- **Relative stability in the local and regional labour market:** The unemployment rate in both the Local Catchment and Regional Catchment has predominantly been lower than in New South Wales over the last decade to December 2022 (ABS, 2023 b; Australian Government, 2023 c). A pronounced labour force contraction occurred from June 2013 to June 2014, decreasing by approximately 230 persons (14.9%). The labour force recovered following this, with peaks in the subsequent three years around March and June of each year coinciding with the cotton picking season. The Local Catchment experienced another significant reduction in the labour force from June 2019 to June 2020 of approximately 15.9%, largely as a result of COVID-19 disruptions before the easing of restrictions supported a recovery.
- **Marginally lower incomes locally and regionally than New South Wales:** In 2021, the Local Catchment recorded an average weekly income of \$1,386 per week compared to \$1,301 per week for the Regional Catchment, both lower than the New South Wales average of \$1,472 per week. (ABS, 2022 b). Since 2011, average weekly incomes in the Local Catchment rose on average by 4.5% per annum, compared to 3.9% in the Regional Catchment and 4.0% in New South Wales. Mining incomes are significantly greater than all other sectors of the economy on average, with workers in retail trade, accommodation and food services and administration and support services recording the lowest average weekly incomes in the Local Catchment in 2021.
- **Local average rent prices have increased, but at a slower rate:** Average rent prices in the Local Catchment have increased from \$141 per week in 2011 to \$208 per week in 2021 (ABS 2012; 2022 b). Average rent prices in 2021 are greater in both the Regional Catchment (\$304 per week in 2021) and New South Wales (\$482 per week in 2021) compared to the Local Catchment. From 2011 to 2021, average weekly rent prices rose \$115 in the Regional Catchment and \$168 in New South Wales, surpassing the increase observed in the Local Catchment over this period of \$67.
- **Low median house prices in the Local Catchment:** Median property prices in the Local Catchment are significantly lower than both the Regional Catchment and the State (NSW Government, 2023 c). The latest recorded<sup>4</sup> median property price for the Local Catchment was \$175,000 in December 2021. In comparison, median property prices in the Regional Catchment were recorded at \$510,000 and \$1.16 million in New South Wales over the same period. The gap in median property prices between the Local Catchment and Regional Catchment has widened in the last five years, increasing from a gap of \$189,000 in December 2017 to a gap of \$334,000 in December 2021. This is likely attributable to significant population decline in the Local Catchment over the last decade, with population declines generally having a larger impact on property prices than population increases (Hashimoto, 2020).
- **Limited residential development in the Local Catchment:** A total of 45 residential buildings have been approved in the last six years to March 2023 in the Local Catchment (ABS, 2023 c). This low level of development approvals and activity can be attributed to a sustained population decline in the Local Catchment over the last decade (ABS, 2023 a). Despite this, two-thirds (30) of these approvals have occurred over the last two years since March 2021, likely due to government policies such as the *HomeBuilder* grant incentivising residential development (NSW Government, 2023 b). Residential building approvals in the Regional Catchment were strong in the three years prior to COVID-19, with the region recording almost 9,000 residential building approvals from July 2016 to June 2019. This was driven by Dubbo and Orange LGAs, which comprised 96.7% of these approvals over this period. Building approvals in the Regional Catchment over this period were highly concentrated in Dubbo and Orange due to strong population growth, largely from a strong industrial base attracting new residents to these regions (Beer, 2020). The impact of COVID-19 was felt strongly across the Regional Catchment, with less than 2,200 residential building approvals over the next three years from July 2019 to June 2022. New South Wales experienced robust average annual growth in the volume and value of building approvals over the last six years.

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<sup>4</sup> Due to the data privacy policy enacted by the Department of Communities and Justice to not report property price data for geographies with fewer than 10 sales in the quarter, gaps exist in property price data for the Local Catchment.

## 5. LOCAL EFFECTS ANALYSIS

The following section examines the economic impacts of the Project within the Regional Catchment (local effects analysis), as well as impacts to the State of NSW for context. Impacts within the Local Catchment and Australia are also examined where relevant and appropriate. This analysis uses economic modelling as well as findings from the literature review and existing environment to inform the assessment of economic impacts as appropriate.

**Note:** All modelling outcomes are presented in 2023 Australian dollar values unless otherwise specified.

### 5.1 CONTRIBUTION TO THE ECONOMY

The Project will contribute to the Regional Catchment and NSW economies by supporting business/ industry output, gross product, jobs and employee incomes, both:

- Directly, through construction of the mine and the extraction, processing and export of copper and gold during operations.
- Indirectly, through flow-on impacts from additional demand for goods and services to support the Project across the construction and operations phases, as well as household consumption effects as a result of additional wages and salaries paid.

A detailed description of the Input-Output modelling approach used is provided in Appendix B.

#### 5.1.1 Construction

Construction activity associated with the approximately \$120 million investment to develop the Project is expected to generate a total of \$144.7 million in output for businesses in the Regional Catchment, of which \$88.9 million will be supported directly through construction activity and \$55.7 million through flow-on activity. This level of business activity is estimated to support, including direct and flow-on impacts, \$62.4 million in GRP for the Regional Catchment, and a total of 315 FTE job years paying an estimated \$40.4 million in wages and salaries.

Construction of the Project will also provide economic benefits elsewhere in NSW, both directly through sourcing construction and professional services outside the Regional Catchment as well as through flow-on activity. An additional \$136.6 million in direct and flow-on output for businesses in NSW outside of the Regional Catchment is expected to be generated as a result of construction activity associated with the Project, for a total of \$281.2 million in output in NSW. This is expected to generate an additional \$69.8 million in GRP for the rest of NSW, for a total of \$132.1 million in Gross State Product (GSP) in NSW.

**Table 5.1. Economic Contribution of Construction Activity**

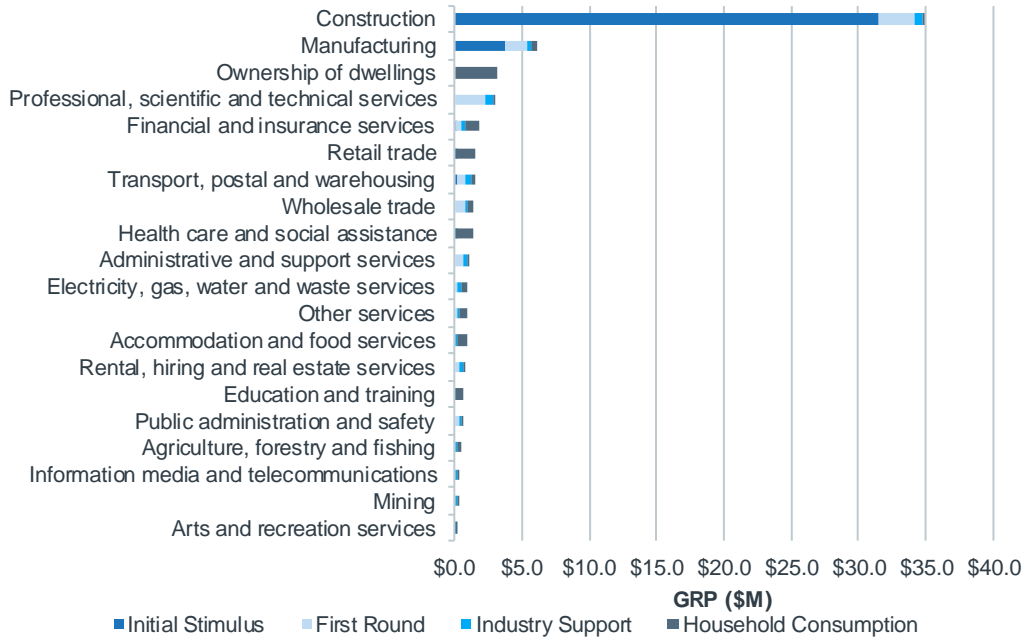
Impact	Output (\$M)	GRP/ GSP (\$M)	Income (\$M)	Employment (FTE)
<b>Regional Catchment</b>				
Initial Stimulus in Local Economy	\$88.9	\$35.6	\$23.2	125
Direct Requirements (First Round Type I) Impacts	\$26.1	\$10.9	\$8.1	83
Industry Support (Subsequent Round Type I) Impacts	\$8.7	\$3.8	\$2.7	27
Household Consumption (Type II) Impacts	\$20.9	\$12.0	\$6.3	80
<b>Total Impacts in Local Economy</b>	<b>\$144.7</b>	<b>\$62.4</b>	<b>\$40.4</b>	<b>315</b>
<b>New South Wales</b>				
Initial Stimulus in Local Economy	\$100.5	\$39.9	\$26.3	157
Direct Requirements (First Round Type I) Impacts	\$50.0	\$21.5	\$16.0	160
Industry Support (Subsequent Round Type I) Impacts	\$32.3	\$15.3	\$10.5	102
Household Consumption (Type II) Impacts	\$98.4	\$55.4	\$28.1	325
<b>Total Impacts in Local Economy</b>	<b>\$281.2</b>	<b>\$132.1</b>	<b>\$80.9</b>	<b>744</b>

Note: Totals may not sum due to rounding.

Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), Australian Government (2021), AEC.

A breakdown of GRP supported by industry in the Regional Catchment from construction activity associated with the Project is provided in the figure below. The construction industry is estimated to receive the largest share of GRP impacts, at \$34.8 million.

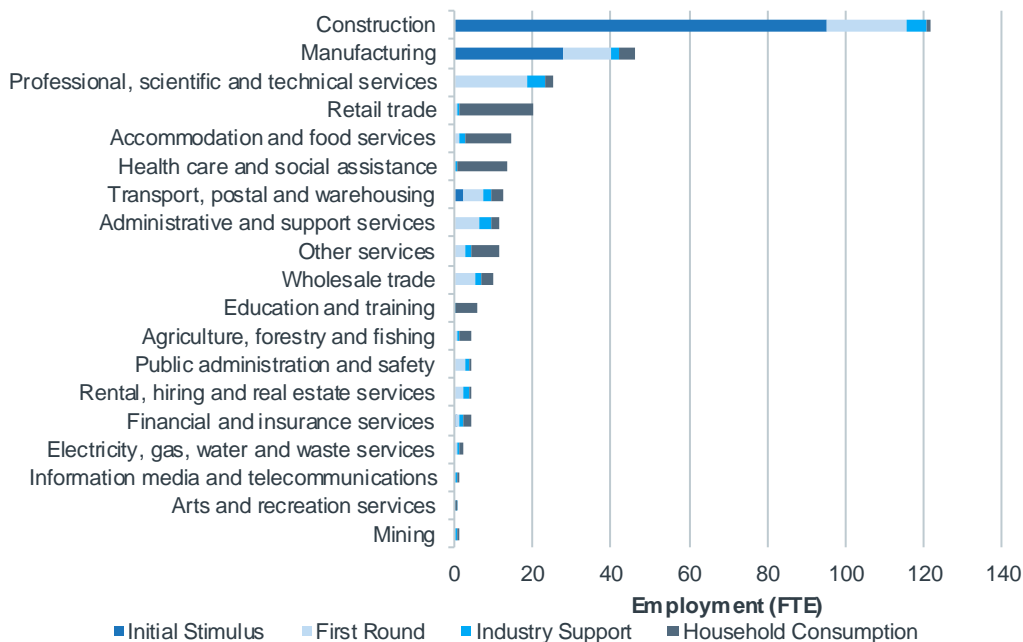
**Figure 5.1. GRP Supported Through Construction Activity (\$M), Regional Catchment**



Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), AEC.

A breakdown of employment supported by industry in the Regional Catchment from construction activity associated with the Project is provided in the figure below. The construction industry is estimated to receive the largest share of employment, at 122 FTE job years.

**Figure 5.2. Employment Supported Through Construction Activity (FTE Job Years), Regional Catchment**



Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), AEC.

### 5.1.2 Operations

During peak operations, the Project is estimated to directly generate an average output of \$151.7 million per annum in the Regional Catchment, supporting an additional \$27.8 million in industry output through flow-on activity. This level of output is estimated to generate an annual average of \$111.4 million in GRP in the Regional Catchment, supporting 256 FTE jobs paying \$28.9 million per annum in wages and salaries (including direct and flow-on activity).

Operational activity associated with the Project will also support businesses, jobs and economic activity elsewhere in NSW through flow-on impacts. Project operations are estimated to generate an additional average output of \$122.1 million per annum in flow-on impacts for businesses in NSW outside of the Regional Catchment, for a total of \$301.6 million in output per annum in NSW. This is expected to generate an additional \$60.0 million in average annual GRP for the rest of NSW, for a total of \$171.4 million in GSP per annum in NSW.

**Table 5.2. Economic Contribution of Operations Activity**

Impact	Output (\$M)	GRP/ GSP (\$M)	Income (\$M)	Employment (FTE)
<b>Regional Catchment</b>				
Initial Stimulus in Local Economy	\$151.7	\$98.0	\$21.7	178
Direct Requirements (First Round Type I) Impacts	\$13.0	\$5.5	\$2.8	27
Industry Support (Subsequent Round Type I) Impacts	\$4.3	\$1.9	\$1.1	11
Household Consumption (Type II) Impacts	\$10.6	\$6.1	\$3.2	40
<b>Total Impacts in Local Economy</b>	<b>\$179.5</b>	<b>\$111.4</b>	<b>\$28.9</b>	<b>256</b>
<b>New South Wales</b>				
Initial Stimulus in Local Economy	\$151.7	\$98.0	\$21.7	178
Direct Requirements (First Round Type I) Impacts	\$48.1	\$19.7	\$12.2	115
Industry Support (Subsequent Round Type I) Impacts	\$40.2	\$19.1	\$12.7	122
Household Consumption (Type II) Impacts	\$61.5	\$34.6	\$17.6	203
<b>Total Impacts in Local Economy</b>	<b>\$301.6</b>	<b>\$171.4</b>	<b>\$64.1</b>	<b>618</b>

Note: Totals may not sum due to rounding.

Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), Australian Government (2021), AEC.

Economic modelling of operations activity was also examined under different price assumptions for copper and gold to test the impact on economic modelling results at lower and higher prices, as follows (and outlined in section 3.2.2.2):

- Low price range: Copper price of \$12,000 per tonne, gold price of \$70,000 per kilogram.
- High price range: Copper price of \$14,000 per tonne, gold price of \$100,000 per kilogram.

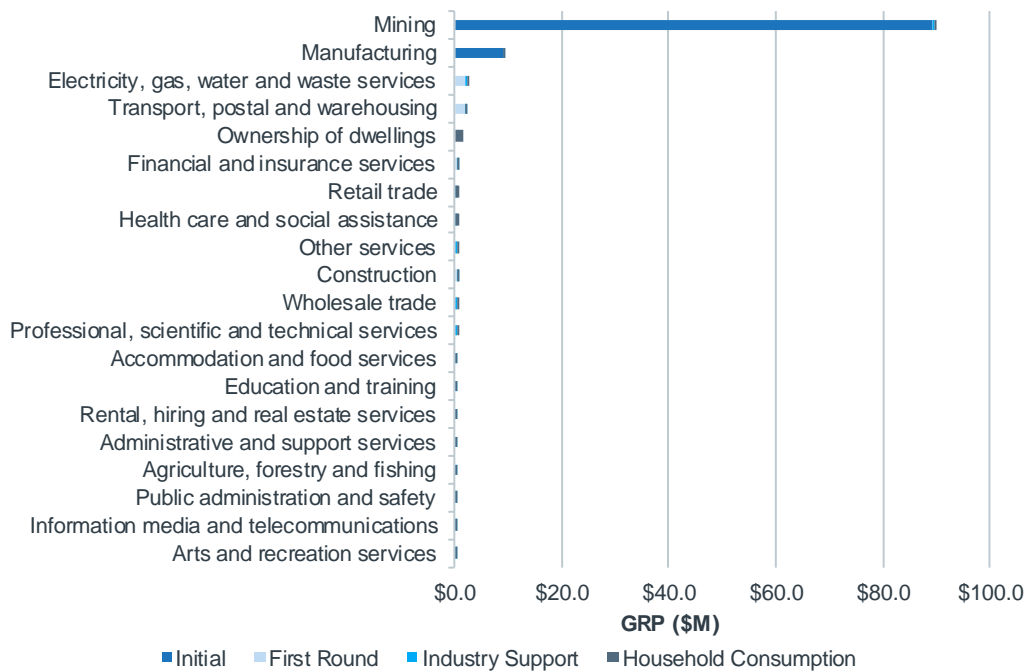
Note that in undertaking modelling of the low and high scenarios, the same level of peak production, operating expenditure and employment as outlined in section 3.2.2 was assumed, with only the price received assumed to change. As a result, the only difference in modelling results is realised in the initial (direct) output and GRP/ GSP estimates, as follows:

- Under the low price scenario, the Project is estimated to directly generate an average annual output of \$137.7 million at peak operations, with a direct contribution to GRP/ GSP of \$84.0 million. This equates to a decrease of approximately \$14.0 million in output and contribution to GRP/ GSP in comparison to the base scenario.
- Under the high price scenario, the Project is estimated to directly generate an average annual output of \$165.6 million at peak operations, with a direct contribution to GRP/ GSP of \$112.0 million. This equates to an increase of approximately \$14.0 million in output and contribution to GRP/ GSP in comparison to the base scenario.

While the price of copper can be expected to continue to fluctuate into the future, it can reasonably be expected to remain high relative to historic prices over the next few years due to the high demand for copper to support the transition to renewable technologies.

A breakdown of GRP supported by industry in the Regional Catchment from operations activity associated with the Project is provided in the figure below (at a copper price of \$13,000 per tonne and gold price of \$85,000 per kilogram). The mining industry is estimated to receive the largest share of GRP impacts, at \$89.5 million.

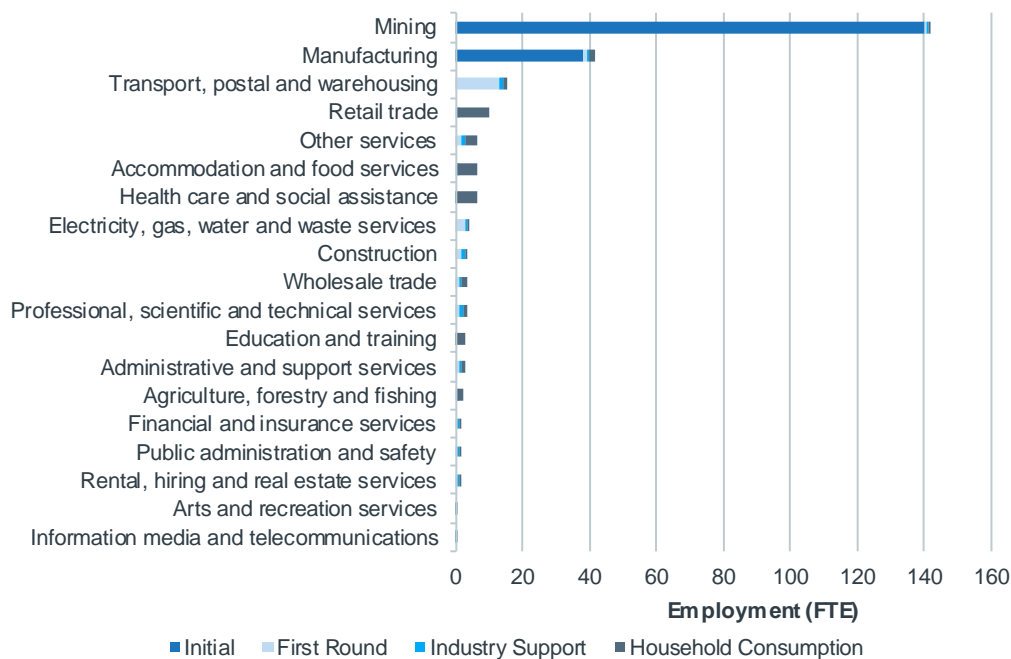
**Figure 5.3. GRP Supported Through Operations Activity (\$M), Regional Catchment**



Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), AEC.

A breakdown of employment supported by industry in the Regional Catchment from operations activity associated with the Project is provided in the figure below. The mining industry is estimated to receive the largest share of employment impacts, at 141 FTE jobs.

**Figure 5.4. Employment Supported Through Operations Activity (FTE), Regional Catchment**



Source: ABS (2012, 2017, 2021 a, 2021 b, 2022 d), Aeris Resources (unpublished), AEC.

## 5.2 IMPACTS TO BUSINESS

### 5.2.1 Beneficial Impacts

#### 5.2.1.1 Benefits to Business Upstream in the Supply Chain

The proponent has in place existing supply contracts and supply chains for Tritton Copper Operations, supporting local and NSW businesses. The Project will extend the mining and processing activities of the operation, thereby enabling continued support and opportunities for suppliers in the Regional Catchment and NSW that otherwise would be lost, providing additional security and longevity of business incomes (and employment). The Project will also present opportunities to secure new contracts to supply and service the needs of the Project during all phases of the Project. These supply contracts would not be able to be supported without the Project.

### 5.2.2 Adverse Impacts

#### 5.2.2.1 Impacts on Business from Competition for Resources

While the Project will provide opportunities for businesses within the mining supply and value chain, some businesses and industries may be adversely impacted by the Project. Mining projects typically compete with industries such as manufacturing for labour as these industries have similar skill sets, which can drive up costs for labour in these industries. The Project may also lead to increases in other costs of business as competition for goods and services drives input prices up.

While some sectors may experience lower levels of activity relative to what would otherwise be expected to occur without the Project, these contractions are likely to be small relative to overall industry size and therefore unlikely to be noticeable in the context of existing market conditions. It should also be understood that:

- The Project can be expected to deliver an increase in industry output and employment in aggregate, relative to what would otherwise occur without the Project.
- The Project's estimated impacts primarily reflect the ongoing support of economic activity already delivered by existing Tritton Copper Operations, and the operations activity supported by the Project presented in modelling is an estimate of what could be lost without the Project.

#### 5.2.2.2 Impacts on Agricultural Productivity

The Project is expected to result in the disturbance of 182.8 ha of land, including 156.9 ha currently used for grazing purposes, 25.6 ha used for cropping and 0.3 ha for other uses (Ecoplanning, 2024). This area will be temporarily removed from production during the life of the Project, but will be returned to agricultural use following Project completion and site rehabilitation.

In 2020-21, the Local Catchment recorded a total production value for cattle and sheep livestock (including wool) of \$52.7 million across approximately 747,000 hectares of land used primarily for grazing purposes, equating to an average value of \$70.61/ha for land primarily used for grazing (ABS, 2022 f, g). Based on a total disturbance area of 156.9 ha of grazing land, this equates to approximately \$11,100 per annum in potential value lost in grazing over the life of the Project. Likewise, an average value of \$859.13/ha for cropping production in the Local Catchment in 2020-21 (ABS, 2022 f, g) equates to approximately \$22,000 per annum in potential value lost in cropping over the life of the Project.

The reduction in agricultural activity over the life of the Project is not a measure of the potential value per hectare that can be achieved under intensive practices, but rather, an average value across all land that is primarily used for agricultural activities undertaken within the Local Catchment. There is also potential for significant fluctuations in agricultural productivity associated with climatic conditions and market activities.

**Table 5.3. Agricultural Productivity Impacts**

Activity	Average Production Value (\$/ha)	Land Disturbance (ha)	Reduction in Agricultural Activity (\$)
Grazing	\$70.61	156.9	\$11,078
Cropping	\$859.13	25.6	\$22,028

Source: ABS (2022 f, g), Ecoplanning (2024), AEC.

The total disturbance area for cropping and grazing activity accounts for approximately 0.02% of the total grazing and cropping area in the Local Catchment. The total lost activity per annum at peak disturbance generated by the Project may overestimate the potential value of agricultural activity lost, as activities currently undertaken in the disturbance area could potentially be located elsewhere.

## 5.3 IMPACTS TO GOVERNMENT

### 5.3.1 Contribution to Government Revenues

#### 5.3.1.1 Approach

Estimates of taxation revenue to the NSW and Australian Government have been developed based on benchmarks of taxation revenue received compared to relevant NSW and Australian measures and applied to results from IO modelling for NSW. Modelling results for NSW were used as a proxy for Australian Government taxes, as this is where the majority of national activity for the Project will occur (i.e., while the majority of taxes paid are to the Australian Government, the vast majority of this will be paid by NSW stakeholders). As such, the NSW modelling results can be considered to be a reasonable estimation of total Australian Government revenues to be received.

The following benchmarks were applied by taxation item:

- **Personal income tax (Australian Government):** Total income tax received (ABS, 2023 d) compared to total wages and salaries paid to Australian employees (ABS, 2023 e; ABS, 2023 f) between the financial years of 2012/13 and 2021/22. This was applied to estimates of incomes paid in NSW from the modelling.
- **Fringe benefits tax (Australian Government):** Total fringe benefits tax received (ABS, 2023 d) compared to total wages and salaries paid to Australian employees (ABS, 2023 e; ABS, 2023 f) between the financial years of 2012/13 and 2021/22. This was applied to estimates of incomes paid in NSW from the modelling.
- **Company income tax (Australian Government):** Total company tax received (ABS, 2023 d) compared to total gross profit of businesses in Australia (i.e. total GDP, less total wages and salaries paid to employees) (ABS, 2022 e; ABS, 2023 e; ABS, 2023 f) between the financial years of 2012/13 and 2021/22. This was applied to estimates of GSP less incomes paid in NSW from the modelling.
- **Goods and services tax (GST) (Australian Government):** Total GST received (ABS, 2023 d) compared to total Australian GDP (ABS, 2022 e) between the financial years of 2012/13 and 2021/22. This was applied to estimates of GSP for NSW from the modelling.
- **Payroll tax (NSW Government):** Total payroll tax received (ABS, 2023 d) compared to total wages and salaries paid to NSW employees (ABS, 2023 e; ABS, 2023 f) between the financial years of 2012/13 and 2021/22. This was applied to estimates of incomes paid in NSW from the modelling.

Both direct and flow-on impacts are included in the estimation of the above taxation revenues.

In addition to the above, the proponent will also pay the NSW Government royalties for the extraction of copper and gold. Royalty payments were estimated using royalty rates outlined by the NSW Government (NSW Government, 2023 d). The royalty rate for copper and gold is an ad valorem royalty with a base rate of 4% of 'ex-mine' value<sup>5</sup>.

<sup>5</sup> The ex-mine value refers to the value of the mineral once it is mined and brought to the surface. In some cases, the costs associated with the processing or treatment may be allowable deductions. However, the costs associated with exploration, development and mining of the ore body and the rehabilitation of the site are not allowable deductions (NSW Government, 2023 d).

### 5.3.1.2 Tax Revenues

Estimates of the value of anticipated taxation revenue from both direct and flow-on activity associated with the Project are summarised in the table below.

The NSW Government is expected to receive net additional revenue of approximately \$1.3 million during construction and approximately \$6.3 million on average annually during peak operations, through royalty payments and payroll tax. The Australian Government is estimated to receive net additional revenue of approximately \$28.5 million during construction and approximately \$32.8 million on average annually during peak operations, through various taxes.

It should be noted a portion of Australian Government revenues are likely to provide benefits to NSW, with the NSW Government allocated a portion of GST revenue as well as through the subsequent expenditure and redistribution of Australian Government revenues to provide services and infrastructure throughout Australia (including in NSW).

**Table 5.4. Aggregate Government Revenues Supported by the Project (\$M)**

Tax	Construction – Total Value (\$M)	Operations – Average Annual Value (\$M)
<b>NSW Government</b>		
Payroll Tax	\$1.3	\$1.0
Royalties	\$0.0	\$5.3
<b>Total</b>	<b>\$1.3</b>	<b>\$6.3</b>
<b>Australian Government</b>		
Personal Income Tax	\$19.5	\$15.5
Fringe Benefits Tax	\$0.4	\$0.4
Company Income Tax	\$4.1	\$10.4
GST	\$4.5	\$6.6
<b>Total</b>	<b>\$28.5</b>	<b>\$32.8</b>

Note: Totals may not sum due to rounding.

Source: ABS (2022 e, 2023 d, 2023 e, 2023 f), Aeris Resources (unpublished), NSW Government (2023 d), AEC.

### 5.3.2 Impact on Local Infrastructure and Service Provision

As part of construction activities, the proponent will install electricity supply, water supply and communication facilities to the site, as well as road upgrades (as outlined in section 3.1). As the Project will reflect an extension of existing mining activities in the local area, and thereby a retention of the existing workforce and levels of activity, the Project is not expected to result in any tangible changes in demand and requirements for local infrastructure and service provision beyond what is currently available.

In consideration of the above, it is anticipated that any Voluntary Planning Agreement would be based around the proposed infrastructure to be developed during construction and continuing any existing levels of contributions and community support by Aeris over the life of the Project.

## 5.4 IMPACTS ON THE LOCAL PROPERTY MARKET

As outlined in sections 3.2.1.2 and 3.2.2.4, it is anticipated the Project workforce (both construction and operations) will largely comprise existing Aeris personnel, and thereby primarily reflect a maintenance of existing workforce levels rather than a lift in the local workforce. The FIFO/ DIDO workforce (anticipated to reflect approximately 49% of workers) will be accommodated in the Tritton Resources Camp and Outback Motor Inn, which provides for a total of 79 rooms and will be sufficient to meet the accommodation needs of the Project’s FIFO/ DIDO workforce.

Approximately 51% of the Project’s workforce is expected to reside in surrounding local communities, including Nyngan, Cobar, Hermidale and Girilambone. As these largely represent existing workers (with an existing residence in the local community), the local workforce is not anticipated to place any additional demand on the local property market beyond existing levels.

While it is acknowledged that some additional workers (beyond existing Aeris personnel) may be required during construction, the number of additional workers is expected to be small. Due to the relatively short-term construction timeframe of the Project, any non-local members of the construction workforce requiring accommodation would predominantly seek short-term accommodation rather than rental accommodation. However, demand on short-stay accommodation from the construction workforce is anticipated to be very small.

Property and rental markets in the Local Catchment have plateaued between 2018 and 2023, with prices remaining reasonably flat (NSW Government, 2023 c). A lack of growth in the property market in the Local Catchment can be largely attributed to limited levels of residential development, stemming from a sustained decline in population over the last decade. Rent and property prices in the Local Catchment remain well below the NSW average.

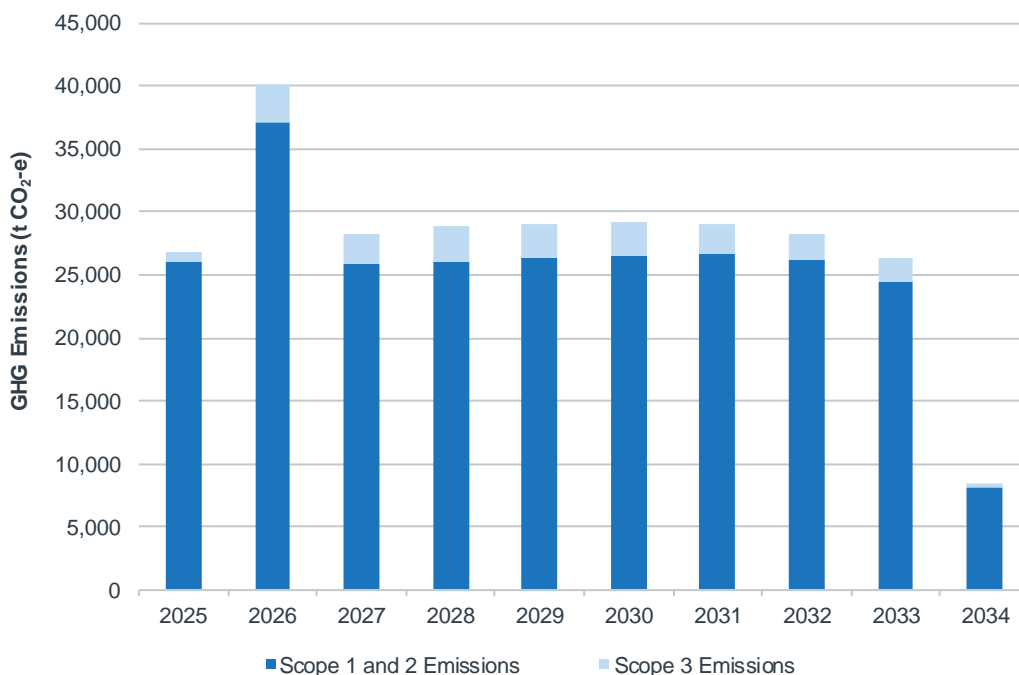
The impact of the Project on the local property market will thereby likely be more positive in nature, with a key outcome of the Project being the longer-term retention of the existing Tritton Copper Operations workforce in the local community and thereby supporting retention of the local population against a backdrop of rural decline. Without the Project, it is likely many workers living locally could leave to seek employment elsewhere. This could lead to high levels of vacancy rates and potential declines in local property values, adversely impacting property owners.

## 5.5 OTHER IMPACTS

### 5.5.1 Cost of Greenhouse Gas Emissions

Estimates of total greenhouse gas (GHG) emissions generated by the Project are outlined in the *Greenhouse Gas Assessment* (AARC, 2023). The Project is estimated to produce approximately 253,300 tonnes of Scope 1 and Scope 2 CO<sub>2</sub>-e emissions over the life of the Project, as well as approximately 21,200 tonnes of Scope 3 CO<sub>2</sub>-e emissions. The timing of GHG emissions is as per the timing outlined below.

**Figure 5.5. Project Annual GHG Emissions (t CO<sub>2</sub>-e)**



Source: AARC (2023).

In valuing the cost of emissions, the spot price for Australian Carbon Credit Units (ACCUs) was applied. The spot price of ACCUs was found to be approximately \$31 per tonne of CO<sub>2</sub>-e emissions as of 3 November 2023 (Jarden, 2023). This price was applied to the Scope 1 and Scope 2 tonnes of CO<sub>2</sub>-e emissions produced by the Project. The cost of additional Scope 1 and Scope 2 GHG emissions generated by the Project was estimated at a value of approximately \$7.9 million over the life of the Project.

### 5.5.2 Cost of Traffic Generation

The Project will generate additional transport movements than would otherwise occur without the Project for the movement of labour to the mine site, as well as transport associated with general freight, movement of fuel and supplies. This will result in increased vehicle fuel and maintenance costs, road damage costs as well as increase the risk of accidents due to increased travel.

Estimates of vehicle movements generated by the Project during peak construction and operations were developed by Stantec (2023) and are summarised in the table below. Assumptions used in developing these traffic estimates are presented in the *Transport Impact Assessment* (Stantec, 2023).

**Table 5.5. Peak Vehicle Movements to/ from Site (No.)**

Vehicle	Construction	Operations
<b>Staff Movements</b>		
Light Vehicle (daily)	23	72
Shuttle Bus (daily)	2	4
<b>Freight Movements</b>		
Light Vehicle (daily)	35	0
Semi-Trailer Truck (weekly)	7	4
Oversize Vehicle (weekly)	1	0
Rigid Truck (weekly)	0	3

Note: Round trip vehicle movements (i.e. journeys to and from the site are counted as one vehicle movement).  
Source: Stantec (2023)

Annualised estimates of vehicle movements during peak construction and operations are presented below. These estimates were based on the peak vehicle movements outlined above. Daily vehicle movements were converted to annual estimates assuming the site operates for 365 days a year, while weekly vehicle movements were converted to annual estimates assuming the site operates for 52 weeks a year.

**Table 5.6. Annual Peak Vehicle Movements to/ from Site (No.)**

Vehicle	Construction	Operations
Light Vehicle	21,170	26,280
Shuttle Bus	730	1,460
Semi-Trailer Truck	364	208
Oversize Vehicle	52	0
Rigid Truck	0	156
<b>Total</b>	<b>22,316</b>	<b>28,104</b>

Note: Round trip vehicle movements (i.e. journeys to and from the site are counted as one vehicle movement).  
Source: AEC

For the purposes of estimating travel distance of vehicles the following was assumed:

- An average distance of approximately 70 km each way for travel between the Tritton Resources Camp and the site for all staff-related vehicle movements.
- An average distance of approximately 550 km each way for all freight-related heavy vehicle movements (approximately equivalent to the distance to the Port of Newcastle).
- An average distance of approximately 200 km each way for all freight-related light vehicle movements.

The cost of additional traffic generation due to the Project has been measured through additional:

- Vehicle operating costs (associated with fuel and vehicle maintenance).
- Road damage costs (associated with increased vehicle movements on roads).
- Road safety costs (associated with the increased risk of accidents due to increased travel).

These costs are examined below.

### 5.5.2.1 Vehicle Operating Costs

Estimated fuel costs were based on an average price in Nyngan for diesel (on the basis the vast majority of vehicles are expected to use diesel) of approximately 217.7 c/L (PetrolSpy, 2023), reflecting the average cost for fuel in Nyngan as of 6 November 2023. GST of 10% and a fuel excise rate of 48.8 c/L (ATO, 2023) were subtracted from this price to provide the resource cost for diesel. Average kilometres travelled per litre of fuel was estimated at 0.12 for passenger vehicles, 0.32 for buses, 0.60 for articulated trucks and 0.29 for rigid trucks (ABS, 2020).

Estimates of vehicle repair and maintenance costs are presented in the table below (ATAP, 2016), accounting for inflation between 2013 and 2023 (ABS, 2023 g).

**Table 5.7. Vehicle Repair and Maintenance Costs (c/km)**

Vehicle	Cost (c/km)
Utility Vehicle – 4WD Mid-Size Petrol	10.6
Bus – Heavy Bus	17.0
Articulated Truck – 5 axle	28.8
Combination Vehicle – B-Double	34.4
Rigid Truck – Heavy (3 axle)	18.2

Source: ATAP (2016)

These fuel consumption rates and vehicle repair/ maintenance cost values were applied to the travel distances as estimated above. Vehicle operating costs generated by the Project were estimated at approximately \$2.4 million during construction and \$1.6 million per annum during peak operations.

### 5.5.2.2 Road Damage Costs

Estimates of road damage costs for various vehicles are presented in the table below (NSW Government, 2020), accounting for inflation between 2019 and 2023 (ABS, 2023 g).

**Table 5.8. Road Damage Costs (c/km)**

Vehicle	Cost (c/km)
Cars and Motorcycles	5.3
Bus – Light bus 2 axle	5.3
Articulated Truck – 5 axle	20.2
Combination Vehicle – B-Double	30.7
Rigid Truck – Heavy	18.4

Source: NSW Government (2020)

These cost values were applied to the travel distances as estimated above. Road damage costs generated by the Project were estimated at approximately \$440,000 during construction and \$285,500 per annum during peak operations.

### 5.5.2.3 Road Safety Costs

The *Transport Impact Assessment* (Stantec, 2023) outlines the routes anticipated to be used during the Project. Data from Austroads (2012) provides crash rates on non-urban roads for a range of road types and widths. Based on the preferred routes, the following estimated average crash rates per 100 million vehicle kilometres travelled were used:

- 1.08 crashes resulting in a fatality.
- 21.29 crashes resulting in a serious injury.
- 38.79 crashes resulting in minor injuries/ property damage.

The following estimated casualty costs were used, based on value estimates from ATAP (2016) and accounting for inflation between 2013 and 2023 (ABS, 2023 g). Values are inclusive of medical costs, insurance, workplace production losses, legal costs, vehicle and property repair costs, as well as other costs such as travel delays and emergency service provision.

- \$2.9 million for crashes resulting in a fatality.
- \$648,300 for crashes resulting in a serious injury.
- \$25,400 for crashes resulting in minor injuries/ property damage.

These crash rates and cost values were applied to the travel distances as estimated above. Road safety costs generated by the Project were estimated at approximately \$293,400 during construction and \$219,800 per annum during peak operations.

#### 5.5.2.4 Total Cost of Traffic Generation

The total cost of additional traffic generation due to the Project, as measured through additional vehicle operating costs, road damage costs and road safety costs, has been estimated at approximately \$3.1 million during construction and \$2.1 million per annum during peak operations.

**Table 5.9. Traffic Generation Costs (\$)**

Cost	Construction	Operations (p.a.)
Vehicle Operating Costs	\$2,394,158	\$1,551,061
Road Damage Costs	\$439,957	\$285,497
Road Safety Costs	\$293,359	\$219,842
<b>Total</b>	<b>\$3,127,475</b>	<b>\$2,056,400</b>

Source: AEC

#### 5.5.3 Ecosystem Service Impacts

Estimates of ecosystem service impacts generated by the Project are outlined in the *Biodiversity Development Assessment Report* (Ecoplanning, 2024). The Project is expected to completely remove approximately 97.2 ha of native vegetation from the subject land on which Project construction and operations will occur. This will result in direct impacts to a number of plant community types (PCTs) that will require environmental offsets.

A total of 259 ecosystem credits are estimated to be required to offset Project development activity (Ecoplanning, 2024). A breakdown of these credits is provided below.

**Table 5.10. Environmental Offset Requirements**

Vegetation Impacted	Condition Class	Credits Required
<b>PCT 103:</b> Poplar Box – Gum Coolabah – White Cypress Pine shrubby woodland mainly in the Cobar Penneplain Bioregion	Woodland	232
	Open woodland	25
<b>PCT 105:</b> Poplar Box grassy woodland on flats mainly in the Cobar Penneplain Bioregion and Murray Darling Depression Bioregion	Intact	2
<b>Total Credits Required</b>	-	<b>259</b>

Source: Ecoplanning (2024)

The total cost of credits required to offset Project development activity (including oncosts) was estimated at a value of approximately \$851,500 (Ecoplanning, 2024). A breakdown of this estimated cost is provided below.

**Table 5.11. Environmental Offset Cost Estimate**

Item	Cost (\$)
PCT 103 Ecosystem Credits	\$693,900
PCT 105 Ecosystem Credits	\$5,200
Delivery Fee	\$34,955
Risk Premium	\$117,449
<b>Total Cost</b>	<b>\$851,504</b>

Source: Ecoplanning (2024)

## 5.6 CUMULATIVE ECONOMIC IMPACTS

An assessment of the Project's potential to generate cumulative impacts included consideration of the following major projects:

- Nyngan to Cobar Pipeline.
- Nyngan Scandium Mine.
- Nyngan Solar Farm.
- Bogan River Solar Farm.
- Yarren Hut Solar Farm.

### **Impacts on the Labour Market**

Cumulative labour demand and increased competition for labour resources has the potential to reduce the availability of labour for local businesses, drive-up labour costs for businesses, increase reliance on non-local labour forces to support delivery of projects, and potentially delay projects. The construction industry nationally and in NSW is currently experiencing severe labour and skills shortages (Australian Government, 2023 b), in part due to ongoing difficulties in accessing skilled migrant labour. The cumulative impacts of the Project in conjunction with other planned projects has the potential to exacerbate the impacts on the real wage rate and increase the level of drawdown on other businesses.

Given the Project largely reflects an extension of mining activities to supplement and replace production of other mines reaching their end of life, cumulative labour demand impacts can be expected to be limited to construction activity, with minimal impact during operations.

### **Impacts on Housing Affordability**

Non-local workforces across multiple projects being developed concurrently can lead to increased demand for both short-term accommodation and housing within the local rental/ property market and thereby lead to market tightness and increased prices for accommodation and housing. This has the potential to exacerbate impacts on short-term accommodation availability, as well as the availability of rental properties.

Despite multiple solar farm projects awaiting commencement, given the Project reflects an extension of mining activities and transition of workforce, the Project's contribution to short-term accommodation and rental property demand is expected to be relatively small (compared to existing demands placed on these markets by Tritton Copper Operations) and limited to peak construction periods (with construction activity expected to primarily be undertaken over a 12-month period).

### **Impacts on Infrastructure and Service Provision**

An influx of workers and population can increase pressures on a range of services and infrastructure and thereby require additional investment and funding. The cumulative impacts of multiple projects being developed concurrently with the Project has the potential to exacerbate accessibility of services and infrastructure in the Local Catchment. In particular, service provision in the township of Nyngan may come under increased strain as the closest township to the Project and a key service hub for the various major projects in the Local Catchment.

Given the Project's construction workforce is relatively small and the Project's ongoing impacts once operational will place minimal additional demand on local services than already occurs from existing activities of Tritton Copper Operations, cumulative impacts are not expected to result in significant changes in demand and requirements for local infrastructure and service provision beyond what is currently available.

## 6. MITIGATION AND ENHANCEMENT STRATEGIES

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Assessment of the economic impacts of the Project identified the Project will extend mining activities associated with Tritton Copper Operations. This will provide an important retention of economic activity and employment within the Local Catchment, Regional Catchment and NSW economies that would otherwise be lost without the Project. Economic impacts of the Project are anticipated to be overwhelmingly positive, with minimal adverse economic impacts.

While the potential adverse economic impacts from the Project are assessed to be low, there are some potential areas that should be monitored, and strategies employed to ensure benefits of the Project to the Local Catchment, Regional Catchment and NSW are maximised and any potential adverse impacts minimised:

- To maximise local benefits derived from the Project, and consistent with existing policies implemented in relation to Tritton Copper Operations, the proponent and contractors engaged by the proponent will be encouraged to source labour locally where possible and practical and provide training opportunities where practical.
- The proponent has longstanding relationships with local business and an established supply chain for its existing activities in the Local Catchment, Regional Catchment and NSW. To maximise local benefits derived from the Project, the proponent will continue to support local business by utilising these established supply networks and providing sufficient opportunities and information for local business to secure new supply contracts.

The above measures/ strategies are consistent with industry best practice and considered sufficient to address the adverse economic impacts identified in consideration of the relatively low level of magnitude of these impacts. It is not anticipated that any contingency plans will be necessary to manage residual risks. It should be recognised that these strategies form part of the proponent's Project planning, and as such, modelling and analysis of impacts in this report has been based on these strategies being implemented.

In addition to the above:

- The Project may result in some impacts in terms of additional demand for accommodation/ housing in the Local Catchment, which could impact on accommodation/ housing availability and affordability. The proponent will seek to mitigate these adverse impacts by monitoring the accommodation/ housing market within the Local and Regional Catchment, and the resulting demand placed on it by the Project workforce during both construction and operations.
- The proponent will continue to employ existing mitigation measures and strategies for Tritton Copper Operations, as well as progressive rehabilitation of the site, to ensure the long-term impacts of the Project on agriculture are minimised.

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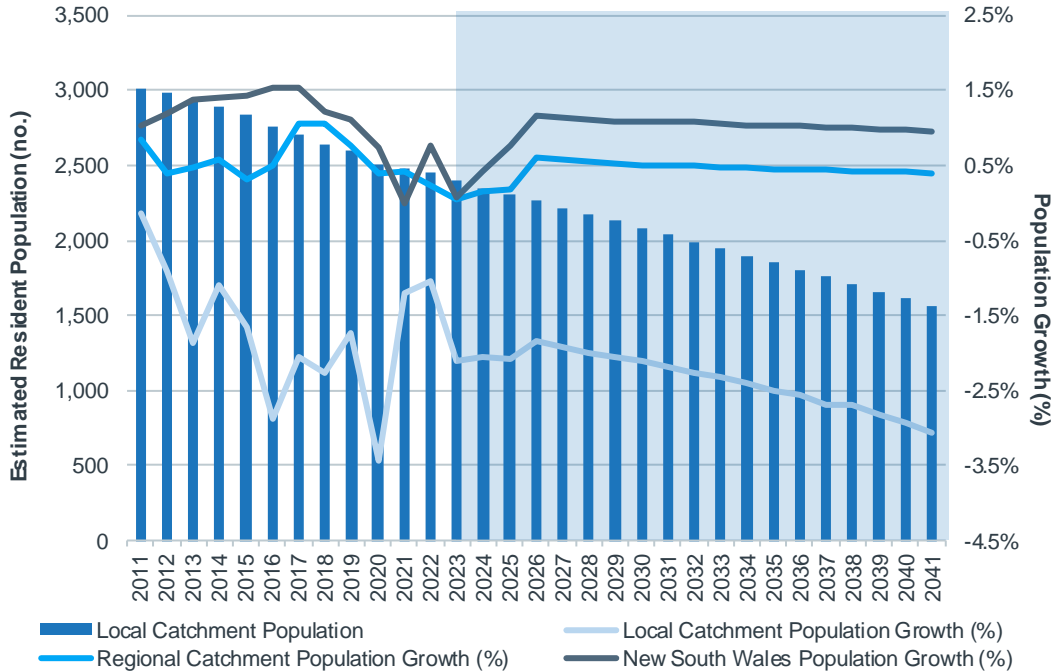
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# APPENDIX A: SOCIO-ECONOMIC DATA

Supporting figures and tables relating to analysis of the existing economic environment provided in section 4 are presented below.

## POPULATION

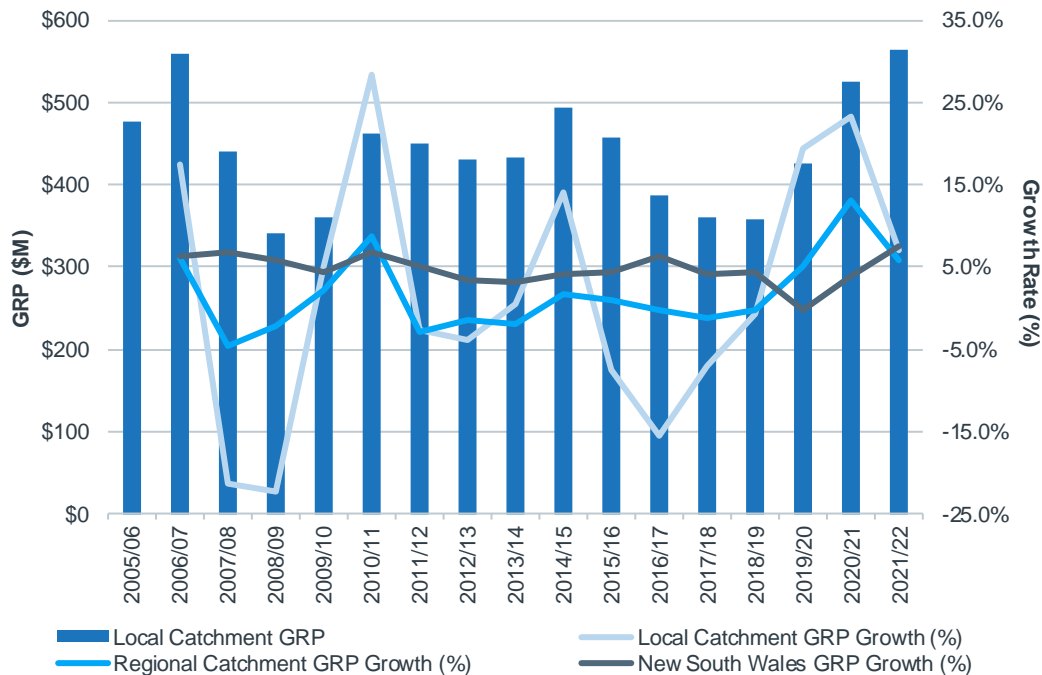
Figure A.1. Population, 2011 to 2041



Source: ABS (2023 a), NSW Government (2022).

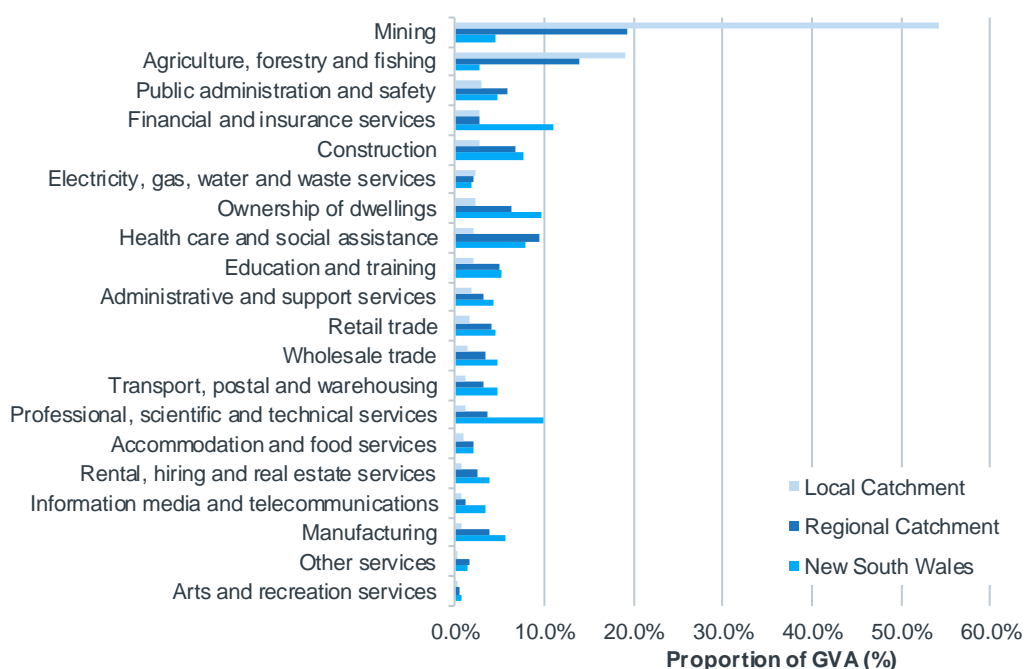
## ECONOMY

Figure A.2. Gross Regional Product, 2005/06 to 2021/22



Source: AEC (unpublished a).

Figure A.3. Gross Value Add by Industry, 2021/22



Source: AEC (unpublished a).

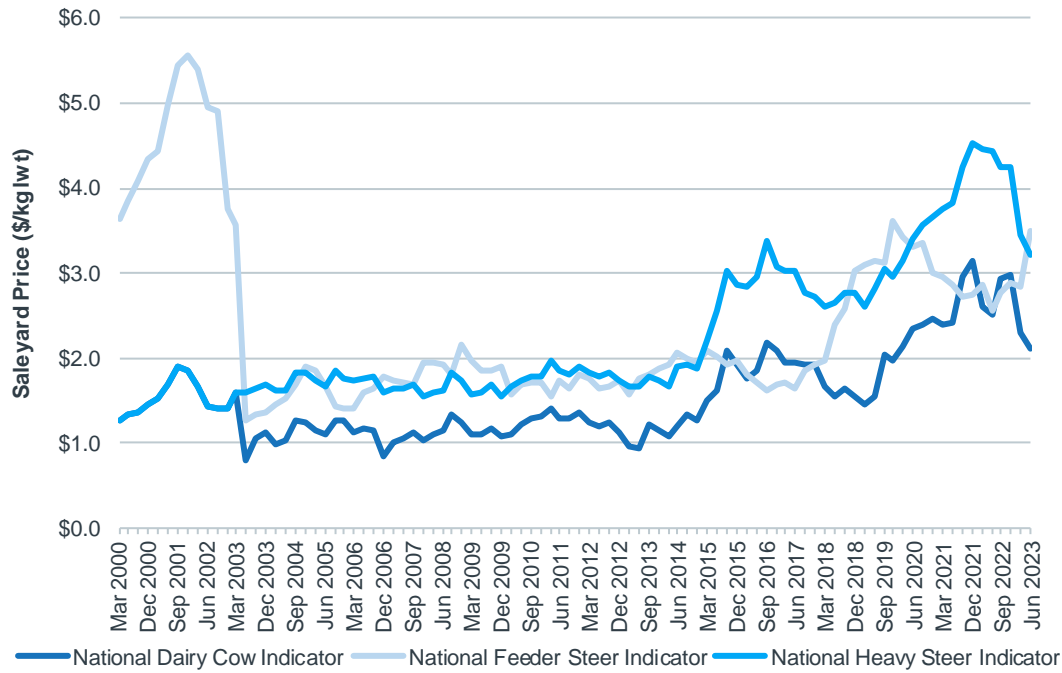
## AGRICULTURE

Table A.1. Value of Agricultural Production (\$M), 2021

Product	Local Catchment	Regional Catchment	New South Wales
<b>Crops</b>			
Wheat (Grain)	\$88.4	\$783.1	\$3,815.9
Oats (Grain)	\$3.8	\$48.3	\$160.5
Barley (Grain)	\$11.3	\$135.7	\$938.3
Lupins	\$0.6	\$14.3	\$64.3
Cotton Lint	\$54.6	\$175.6	\$915.9
Chickpeas	\$8.7	\$39.7	\$333.0
Canola	\$7.6	\$118.4	\$887.9
Cereal (hay)	\$3.8	\$81.8	\$508.7
Cherries	-	\$10.6	\$33.0
Apples	-	\$33.9	\$90.4
<b>Total</b>	<b>\$178.8</b>	<b>\$1,441.3</b>	<b>\$7,748.0</b>
<b>Livestock</b>			
Wool	\$12.5	\$132.0	\$841.8
Sheep and Lambs	\$19.8	\$195.2	\$1,262.5
Cattle and Calves	\$20.4	\$206.7	\$2,751.8
Dairy Cattle	-	\$20.9	\$670.3
<b>Total</b>	<b>\$52.7</b>	<b>\$554.7</b>	<b>\$5,526.4</b>
<b>Other</b>			
All Other Products	\$1.1	\$112.1	\$4,735.2
<b>Total</b>	<b>\$232.7</b>	<b>\$2,108.1</b>	<b>\$18,009.5</b>

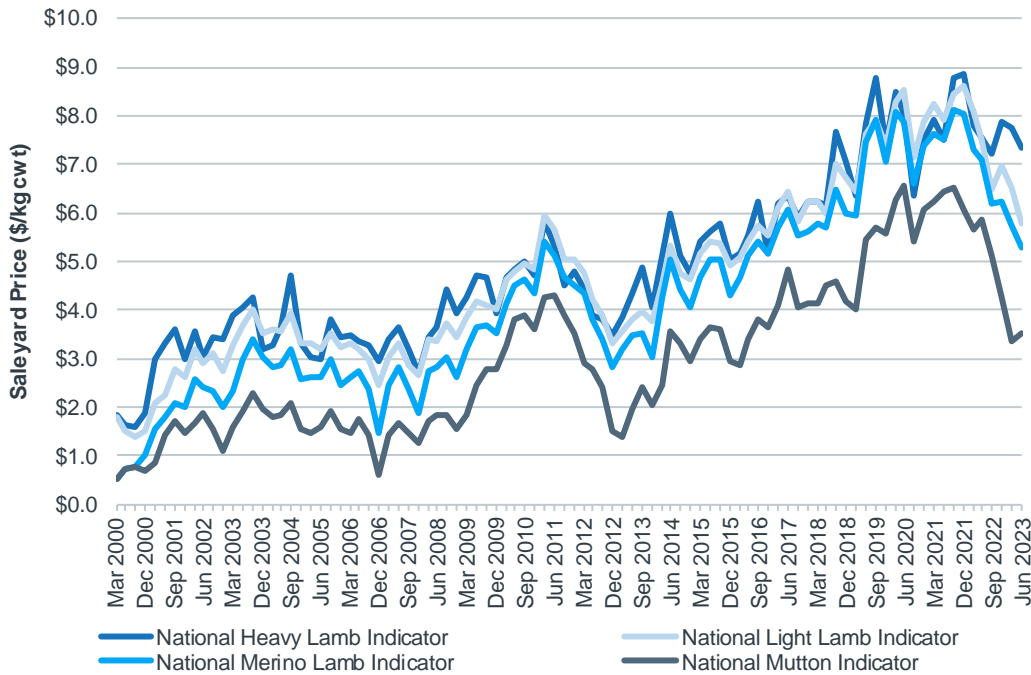
Source: ABS (2022 a).

Figure A.4. National Beef and Dairy Cattle Prices, March 2000 to June 2023



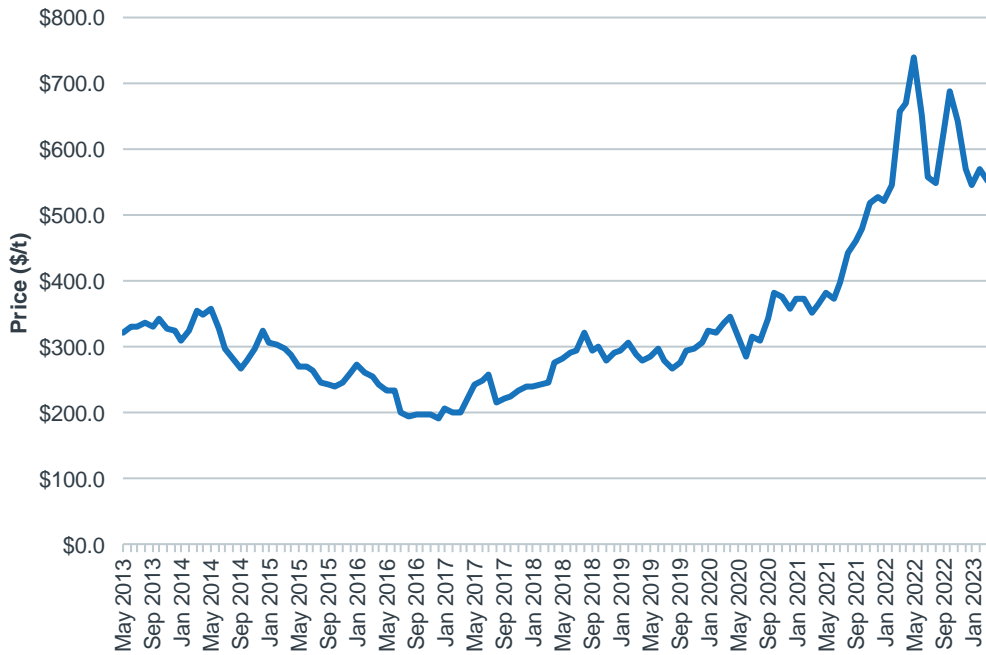
Note: \$/kg lwt represents the price per kilogram of live weight.  
 Source: MLA (2023).

Figure A.5. Sheep and Lamb Prices, March 2000 to June 2023



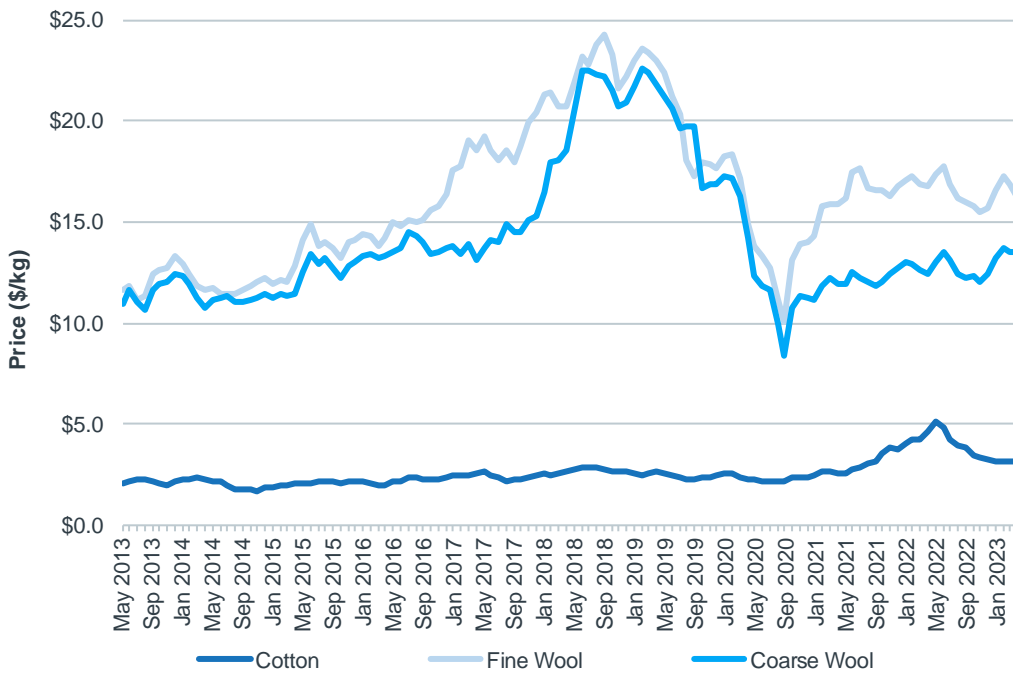
Note: \$/kg cwt represents the price per kilogram of carcass weight.  
 Source: MLA (2023).

**Figure A.6. Wheat Price, May 2013 to April 2023**



Source: IndexMundi (2023).

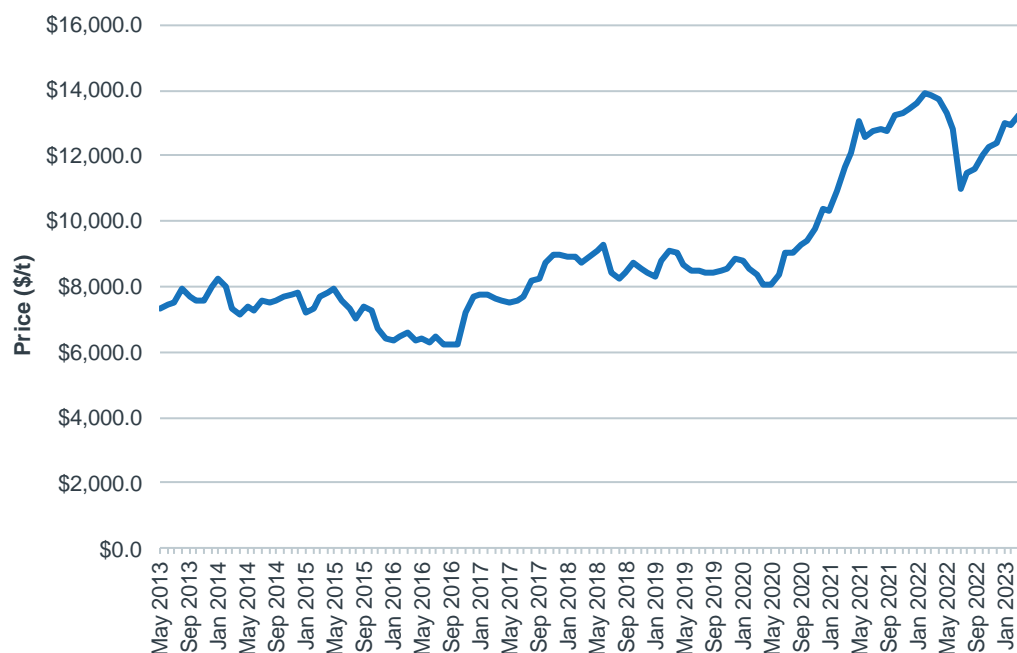
**Figure A.7. Cotton and Wool Prices, May 2013 to April 2023**



Source: IndexMundi (2023).

## MINING

Figure A.8. Copper Prices, May 2013 to April 2023



Source: IndexMundi (2023).

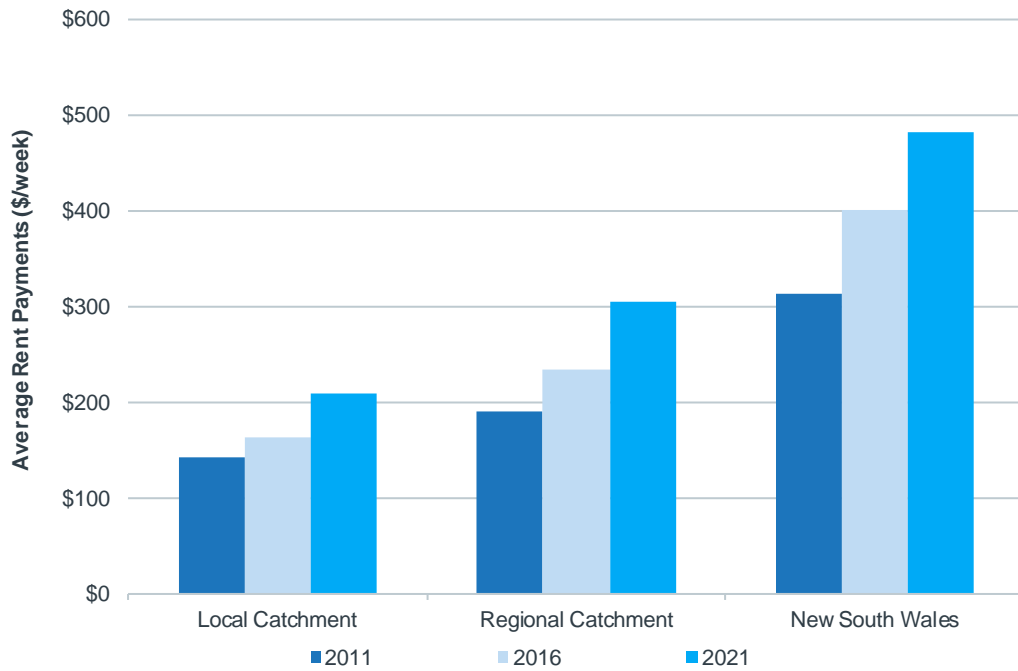
## PROPERTY MARKET

Table A.2. Residential Building Approvals, 2016-17 to 2022-23<sup>(a)</sup>

Financial Year	Local Catchment	Regional Catchment	New South Wales
<b>Value (\$M)</b>			
2016-17	\$2.5	\$749.0	\$13,316.3
2017-18	\$0.7	\$995.4	\$16,543.4
2018-19	\$3.2	\$687.4	\$19,737.9
2019-20	\$1.1	\$210.1	\$24,561.3
2020-21	\$3.6	\$323.3	\$25,433.8
2021-22	\$6.1	\$332.4	\$26,688.3
2022-23 <sup>(a)</sup>	\$4.5	\$317.1	\$16,783.1
<b>Volume (no.)</b>			
2016-17	9	2,943	42,789
2017-18	2	3,609	54,067
2018-19	5	2,400	63,344
2019-20	4	575	73,314
2020-21	11	863	73,045
2021-22	12	750	72,630
2022-23 <sup>(a)</sup>	8	653	44,085

Note: (a) Includes building approvals up to and including March 2023.  
Source: ABS (2023 a).

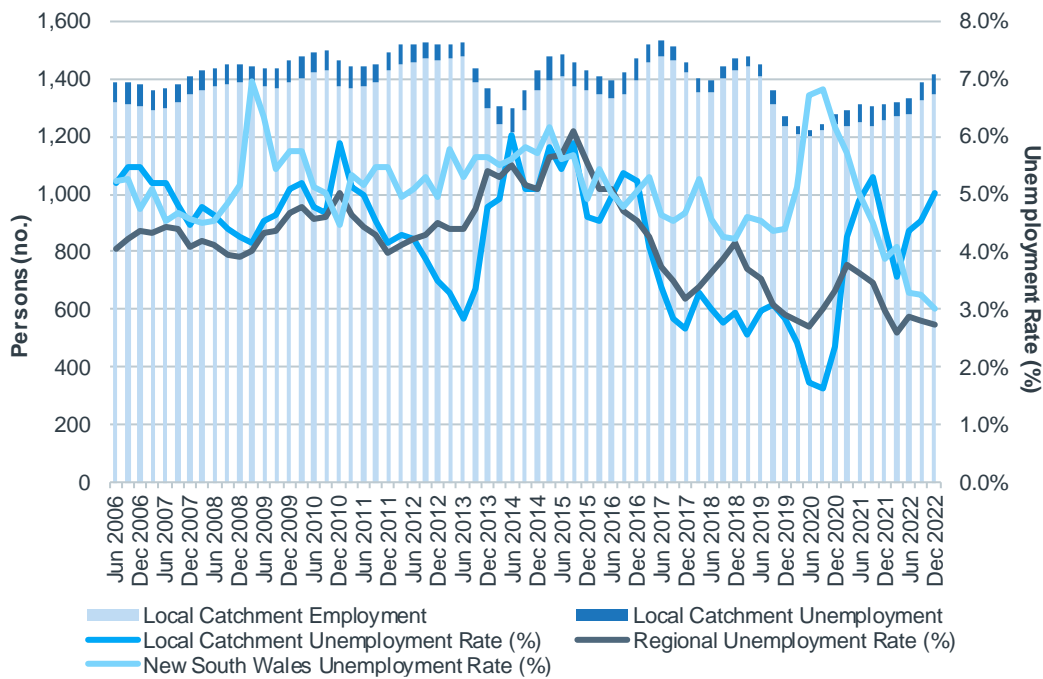
Figure A.9. Average Rent Payments, 2011, 2016 and 2021



Source: ABS (2012, 2017, 2022 b).

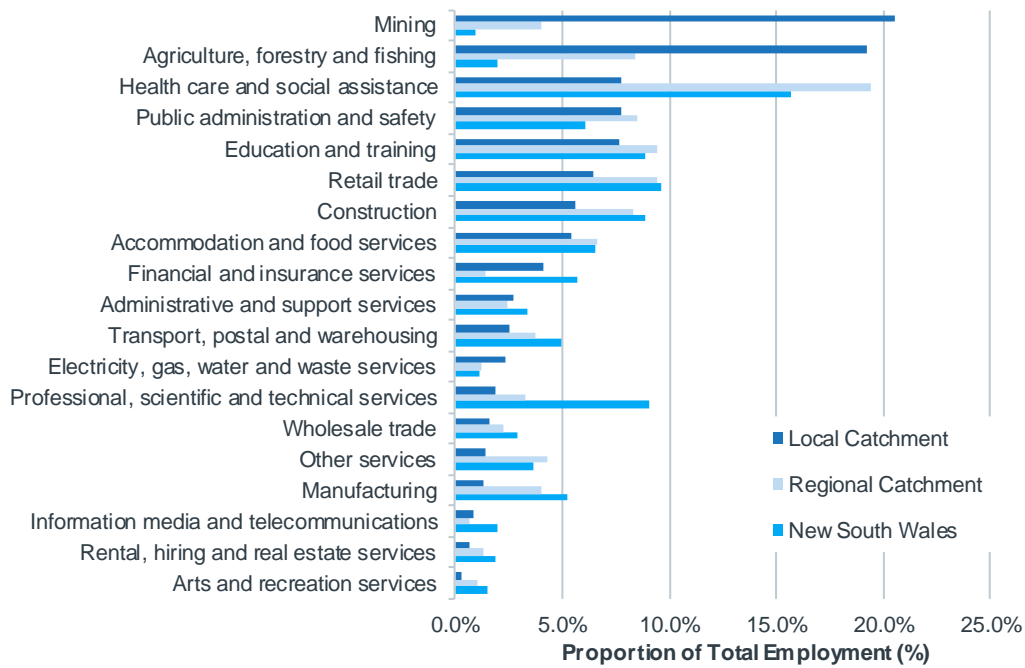
## LABOUR MARKET

Figure A.10. Local Catchment Labour Market, June 2006 to December 2022



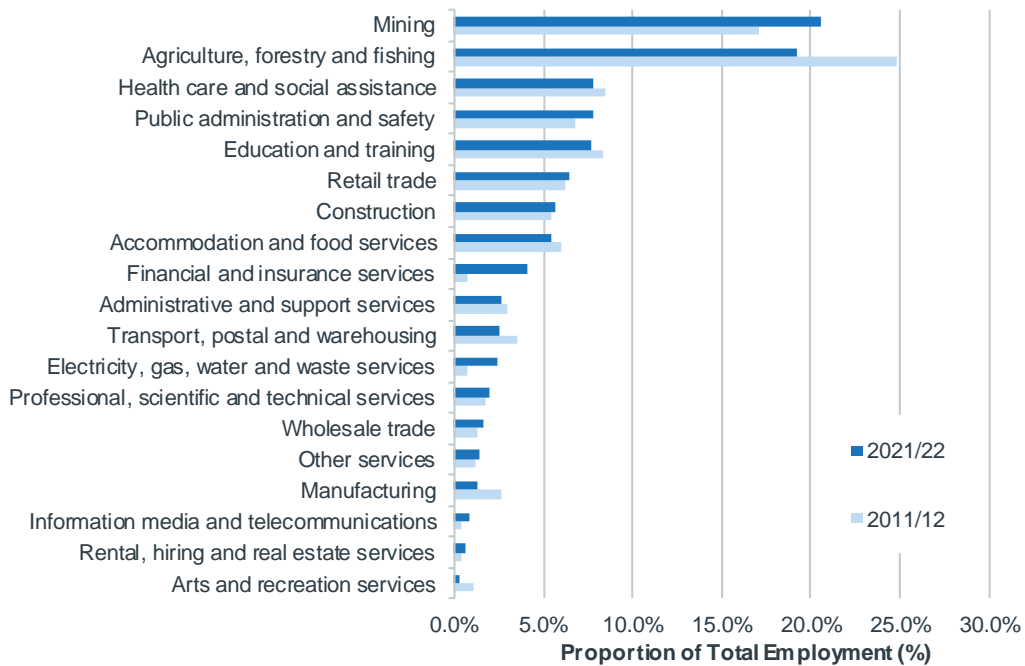
Source: ABS (2023 a), Australian Government (2023 c).

**Figure A.11. Employment by Industry, 2021/22**



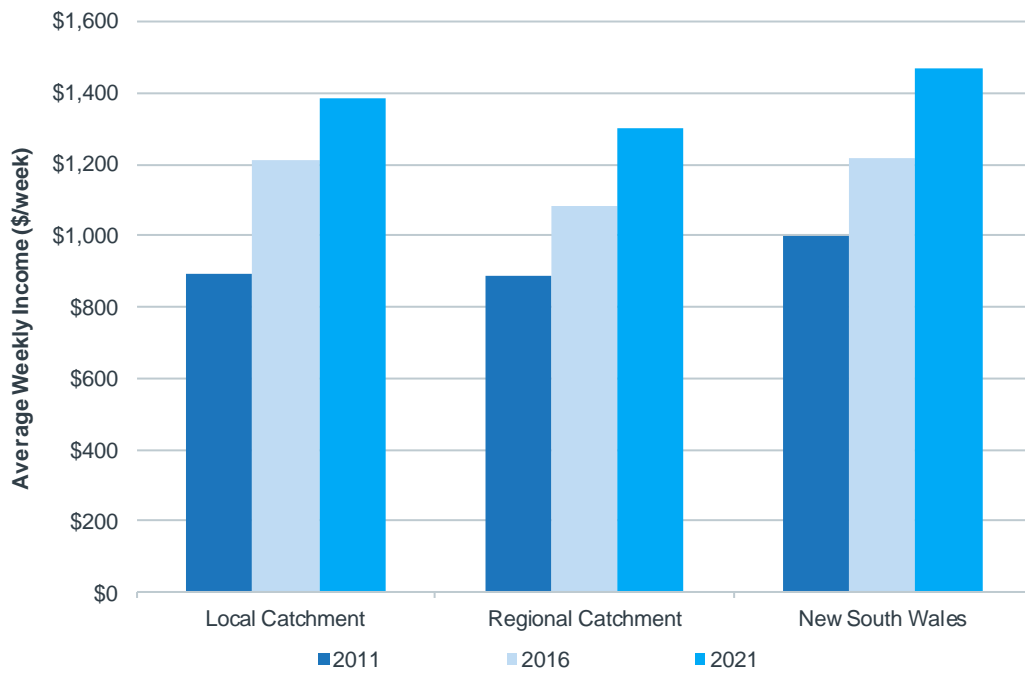
Source: AEC (unpublished b).

**Figure A.12. Employment by Industry, Local Catchment**



Source: AEC (unpublished b).

**Figure A.13. Average Weekly Income (Place of Work), 2011, 2016 and 2021**



Source: ABS (2012, 2017, 2022 b).

## APPENDIX B: INPUT-OUTPUT METHODOLOGY

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### INPUT-OUTPUT MODEL OVERVIEW

Input-Output analysis demonstrates inter-industry relationships in an economy, depicting how the output of one industry is purchased by other industries, households, the government and external parties (i.e. exports), as well as expenditure on other factors of production such as labour, capital and imports. Input-Output analysis shows the direct and indirect (flow-on) effects of one sector on other sectors and the general economy. As such, Input-Output modelling can be used to demonstrate the economic contribution of a sector on the overall economy and how much the economy relies on this sector or to examine a change in final demand of any one sector and the resultant change in activity of its supporting sectors.

The economic contribution can be traced through the economic system via:

- **Initial stimulus (direct) impacts**, which represent the economic activity of the industry directly experiencing the stimulus.
- **Flow-on impacts**, which are disaggregated to:
  - **Production induced effects (type I flow-on)**, which comprise the effects from:
    - Direct expenditure on goods and services by the industry experiencing the stimulus (direct suppliers to the industry), known as the first round or direct requirements effects.
    - The second and subsequent round effects of increased purchases by suppliers in response to increased sales, known as the industry support effects.
  - **Household consumption effects (type II flow-on)**, which represent the consumption induced activity from additional household expenditure on goods and services resulting from additional wages and salaries being paid within the economic system.

These effects can be identified through the examination of four types of impacts:

- **Output:** Refers to the gross value of goods and services transacted, including the costs of goods and services used in the development and provision of the final product. Output typically overstates the economic impacts as it counts all goods and services used in one stage of production as an input to later stages of production, hence counting their contribution more than once.
- **Gross product:** Refers to the value of output after deducting the cost of goods and services inputs in the production process. Gross product (e.g., Gross Regional Product) defines a true net economic contribution and is subsequently the preferred measure for assessing economic impacts.
- **Income:** Measures the level of wages and salaries paid to employees of the industry under consideration and to other industries benefiting from the project.
- **Employment:** Refers to the part-time and full-time employment positions generated by the economic shock, both directly and indirectly through flow-on activity, and is expressed in terms of full time equivalent (FTE) positions.

Input-Output multipliers can be derived from open (Type I) Input-Output models or closed (Type II) models. Open models show the direct effects of spending in a particular industry as well as the indirect or flow-on (industrial support) effects of additional activities undertaken by industries increasing their activity in response to the direct spending.

Closed models re-circulate the labour income earned as a result of the initial spending through other industry and commodity groups to estimate consumption induced effects (or impacts from increased household consumption).

## MODEL DEVELOPMENT

Multipliers used in this assessment are derived from sub-regional transaction tables developed specifically for this project. The process of developing a sub-regional transaction table involves developing regional estimates of gross production and purchasing patterns based on a parent table, in this case, the 2018-19 Australian transaction table (ABS, 2021 a).

Estimates of gross production (by industry) in the study areas were developed based on the percent contribution to employment (by place of work) of the study areas to the Australian economy (ABS, 2012; ABS, 2017; ABS, 2021 b; Australian Government, 2021), and applied to Australian gross output identified in the 2018-19 Australian table.

Industry purchasing patterns within the study area were estimated using a Flegg Location Quotient approach, as described in Flegg *et al.* (2021), with a fixed degree of convexity applied to the regional size scalar. Regional final demand estimates (except exports) developed based on the regional inter-industry sales estimated using the Flegg Location Quotient relative to national inter-industry sales and final demand estimates for each industry (noting regional exports are assumed to reflect the remainder of total uses).

Employment estimates were rebased from 2018-19 (as used in the Australian national Input-Output transaction tables) to current year values using the Wage Price Index (ABS, 2022 d).

## MODELLING ASSUMPTIONS

The key assumptions and limitations of Input-Output analysis include:

- **Lack of supply-side constraints:** The most significant limitation of economic impact analysis using Input-Output multipliers is the implicit assumption that the economy has no supply-side constraints so the supply of each good is perfectly elastic. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.
- **Fixed prices:** Constraints on the availability of inputs, such as skilled labour, require prices to act as a rationing device. In assessments using Input-Output multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. The system is in equilibrium at given prices, and prices are assumed to be unaffected by policy and any crowding out effects are not captured. This is not the case in an economic system subject to external influences.
- **Fixed ratios for intermediate inputs and production (linear production function):** Economic impact analysis using Input-Output multipliers implicitly assumes that there is a fixed input structure in each industry and fixed ratios for production. That is, the input function is generally assumed linear and homogenous of degree one (which implies constant returns to scale and no substitution between inputs). As such, impact analysis using Input-Output multipliers can be seen to describe average effects, not marginal effects. For example, increased demand for a product is assumed to imply an equal increase in production for that product. In reality, however, it may be more efficient to increase imports or divert some exports to local consumption rather than increasing local production by the full amount. Further, it is assumed each commodity (or group of commodities) is supplied by a single industry or sector of production. This implies there is only one method used to produce each commodity and that each sector has only one primary output.
- **No allowance for economies of scope:** The total effect of carrying on 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”. This generally does not reflect real world operations.
- **No allowance for purchasers’ marginal responses to change:** Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. For example, the household budget share of some goods might increase as household income increases. This equally applies to industrial consumption of intermediate inputs and factors of production.
- **Absence of budget constraints:** Assessments of economic impacts using multipliers that consider consumption induced effects (type two multipliers) implicitly assume that household and government consumption is not subject to budget constraints.

Despite these limitations, Input-Output techniques provide a solid approach for taking account of the inter-relationships between the various sectors of the economy in the short-term and provide useful insight into the quantum of final demand for goods and services, both directly and indirectly, likely to be generated by a project.

In addition to the general limitations of Input-Output analysis, there are three other factors that need to be considered when assessing the outputs of sub-regional transaction table developed using the above approach, namely:

- It is assumed the sub-region has similar technology and demand/ consumption patterns as the parent (Australia) table (e.g. the ratio of employee compensation to employees for each industry is held constant).
- Intra-regional cross-industry purchasing patterns for a given sector vary from the national tables depending on the prominence of the sector in the regional economy compared to its input sectors. Typically, sectors that are more prominent in the region (compared to the national economy) will be assessed as purchasing a higher proportion of imports from input sectors than at the national level, and vice versa.

The size of the regional economy is assumed to have an inverse relationship with the requirement to import goods/ services to meet its needs (i.e. the smaller the economy, in general the greater the reliance on imports).

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