
Technical report 19

Economic impact assessment



Hunter Transmission Project Economic Impact Assessment

Prepared for
Energy Corporation of NSW
by



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Disclaimer

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Glossary

Term	Definition
Access tracks	Temporary and permanent tracks used to access the project. Refer to <i>Chapter 4 – Project description</i> of the EIS for further details.
Bayswater Power Station	Existing power station at Bayswater owned by AGL.
Bayswater South switching station	The new switching station that would be constructed south of Bayswater Power Station.
Construction impact area	The area that would be directly impacted by the construction of the project, including (but not limited to) transmission towers and lines, stringing sites, access roads, access tracks, substations, switching stations, adjustments and upgrades to existing lines, communications infrastructure, temporary worker accommodation, construction support sites, laydown areas and utility adjustments.
Construction support site	An area used as the base for construction activities, usually for the storage of plant/equipment and materials, processing facilities (concrete batching, aggregate crushing, grinding and screening), maintenance facilities/workshops, staff facilities, firefighting equipment, helicopter landing pad and support facilities, access and parking and wastewater treatment. Some construction support sites would also include temporary workers accommodation. Construction support sites are discussed in <i>section 4.3.5</i> of the EIS.
Consumption-induced flow-on	the economic effects that occur from the spending by households of the income they derive from a project. This spending ripples through various sectors of the economy, leading to increased output, employment, value added and income in related industries.
Critical State significant infrastructure (CSSI) application area	The critical State significant infrastructure (CSSI) application for the HTP covers 5 local government areas (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie).
Cumulative impact	The combined impacts of the project on a matter with other relevant future projects.
Disturbance area	This and is used primarily to assess potential impacts on biodiversity values in <i>Technical Report 1 – Biodiversity development assessment report</i> . Includes the following categories: • Disturbance area A • Disturbance area A (centreline) • Disturbance area B • Disturbance area HZ.
Disturbance area A	The area where vegetation would be completely removed. It includes areas at and around transmission towers (including tower pads and batters), stringing sites, laydown areas, switching stations, substation upgrades, construction support sites, new and upgraded access tracks and road upgrades. Impacts within this area would include sub-surface disturbance from construction activities such as grading, excavation, and full tree removal. With the exception of areas that only require temporary disturbance (i.e. temporary access tracks and stringing sites), this area would also be subject to ongoing maintenance during operation (including vegetation removal to ground level) for operational and safety requirements (including bushfire).

Term	Definition
Disturbance area A (centreline)	A 20 m wide centreline area between transmission towers where all vegetation would be removed to ground level during construction. This area would also be subject to ongoing maintenance during operation (i.e. removal to maintain vegetation clearance requirements) for operational and safety requirements (including bushfire).
Disturbance area B	The area within the transmission line easement, excluding disturbance area A and disturbance area A (centreline), where partial clearing would be undertaken. Removal of vegetation (including trees) would be required if there is a risk of vegetation exceeding the designated clearance heights. These heights are set for operational and safety requirements, including bushfire risk management (indicatively 13.5m below the conductors at maximum operating temperature). Vegetation with mature growth heights up to 2 m can remain, while vegetation exceeding 2 m will be managed to maintain these clearance heights. This area would be subject to ongoing maintenance during operation.
Disturbance area hazard tree zone (HZ)	Hazard trees are those that have the potential to pose a risk to safe operation of the transmission line by falling onto the transmission towers, conductors and associated infrastructure within the easement. A hazard tree zone has been identified in limited areas on either side of the transmission line easement through LiDAR analysis of tree heights and topography. Hazard tree management would occur during operation to maintain safe operating clearances for the conductors and tower structures. The hazard tree zone will be inspected for trees in the height range of 20 m or more, which is typically in the high-risk category. High-risk category trees will be assessed for structural instability and managed according to the risk present, including tree removal if required.
Economic activity	Measures of economic activity include output, value-added, income and employment.
Economic impact	Refers to the effect of a project on economic activity within a local area or region.
Employment	The number of people employed (including full-time and part-time).
EnergyCo	The Energy Corporation of New South Wales constituted by section 7 of the NSW <i>Energy and Utilities Administration Act 1987</i> as the NSW Government-controlled statutory authority appointed as the infrastructure planner under the NSW <i>Electricity Investment Act 2020</i> responsible for the delivery of NSW's REZs. The proponent for the HTP.
Gross regional product	One of several measures of the size of a regional economy. It is the market value of all final goods and services produced by all firms in a regional economy.
Household income	The wages paid to employees including imputed wages for self-employed and business owners.
Hunter Transmission Project (HTP) or project	The HTP as described in <i>Chapter 4 (Project Description)</i> of the EIS and identified in the overview figures of the EIS.
HTP corridor	Comprises: - the transmission line corridor connecting Bayswater South switching station to Olney switching station - the transmission line corridor connecting the Bayswater South switching station to the existing 500 kV transmission line near Bayswater Power Station - the transmission line corridor connecting the Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek The HTP corridor is around 140 metres wide.
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.

Term	Definition
Input-output analysis	A method to assess the direct and indirect economic activity generated by a project through spending.
Intermediate good	A good that is used as an input into the production of other goods and services
Laydown areas	Established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites. These would act as temporary staging, storage, and complex plant/equipment setup areas. They would also act as traffic control nodes during construction of the HTP.
Multiplier	A summary measure used for predicting the total impact on all industries in an economy from changes in the demand for the output of any one industry. There are many types of multipliers.
Output	Total revenue or businesses turnover.
Operation impact area	The area that would be occupied by permanent components of the project and/or maintained, including transmission line easements, transmission lines and towers, substations, switching stations, communications infrastructure, maintenance facilities, permanent access roads to substations and switching stations and access tracks to the transmission line easement.
Production-induced flow-on	The sum of the first round effects and industrial support effects (i.e. the total amount of output from all industries in the economy required to produce the initial change in output).
(the) proponent	The Energy Corporation of NSW (EnergyCo).
Project impact area	The area that has been assumed for the purpose of the EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Renewable Energy Zone (REZ)	A geographic area identified and declared by the NSW Government as a Renewable Energy Zone.
Stringing site	Used for the preparation, assembly and operation of stringing equipment to connect the transmission line to the towers. Stringing sites would be positioned along the HTP corridor. On other transmission projects, they may be referred to as 'brake and winch' sites.
Substation	A facility used to increase or decrease voltages between incoming and outgoing lines (e.g. 330 kV to 500 kV).
Switching station	A facility used to connect 2 or more distinct transmission lines of the same designated voltage.
Temporary worker accommodation	Temporary accommodation that would be erected and used during construction to house the construction workforce. Worker accommodation would be located at some construction support sites.
Transmission line easement	An area surrounding and including the transmission lines which is a legal proprietary right and allows for ongoing access and maintenance of the transmission lines. Landowners can typically continue to use most of the land within transmission line easements, subject to some restrictions for safety and operational reasons.
Transmission tower	For 500kV transmission lines, this is typically a free-standing steel lattice structure (suspension or tension tower). Transmission towers for the HTP would generally be up to 85 m high.
Type 11a ratio multiplier	Summarise the total impact on all industries in an economy in relation to the initial own sector effect e.g. total income effect from an initial income effect and total employment effect from an initial employment effect, etc.
Value-added	The difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output.

Abbreviations

ABS	Australian Bureau of Statistics
ANZSIC	Australian and New Zealand Standard Industry Classification
CSSI	Critical state significant infrastructure
DIDO	Drive-in drive-out
DPHI	Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
EnergyCo	The Energy Corporation of NSW
EP&A Act	<i>(NSW) Environmental Planning and Assessment Act 1979</i>
FIFO	Fly-in fly-out
GRIT	Generation of Input-Output Tables
HTP	Hunter Transmission Project
IO	Input-Output (Analysis)
km	Kilometres
kV	kilovolt
LGA	Local Government Area
NEM	National Energy Market
NSW	New South Wales
REZ	Renewable energy zone
SEARs	Secretary's environmental assessment requirements

Executive summary

This economic impact assessment details the potential impacts to the regional and New South Wales (NSW) economy from the construction and operation of the Hunter Transmission Project (HTP, the project) and has been prepared to support and inform the environmental impact statement (EIS) for the project.

The impacts have been assessed in accordance with the Secretary's environmental assessment requirements (SEARs) issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) and against the relevant legislation and guidelines as they apply to economic matters.

Project overview

The NSW Government is leading the development of renewable energy zones (REZs) across NSW to deliver renewable energy generation and storage, supported by high voltage transmission infrastructure. The Energy Corporation of NSW (EnergyCo) is proposing the construction and operation of:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 110 kilometres (the HTP corridor)
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments to existing transmission lines
- property adjustment works to facilitate access to the transmission lines and switching stations
- utility adjustments required for the construction of the transmission network infrastructure
- ancillary works to support construction including road upgrades, establishment of new access tracks and upgrades to existing access tracks, construction support sites (some with temporary worker accommodation), and other construction facilities such as laydown areas.

The new transmission line would transport electricity generated in the Central-West Orana and New England REZs. It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This would strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The HTP involves development across 5 local government areas (LGAs) (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). Most of this development will be concentrated in and around the HTP corridor.

Methodology

The benefit of the Project as an integral component of the NSW Electricity Strategy which aims to deliver reliable, affordable and sustainable electricity systems for NSW is assessed qualitatively.

The project would provide economic activity to the regional and NSW economy during both the construction and operation phase. It would also result in some reduction in economic activity from foregone potential agricultural and forestry activity within the project impact area.

The project's potential impacts on the regional and NSW economies as a result of changes in economic activity were assessed using input-output (IO) analysis. IO analysis involves:

- the development of an IO table of the regional and NSW economies that can be used to identify the economic structure and linkages between existing sectors of the economies. IO tables for the regional and NSW economies were developed using the Generation of Regional Input Output Tables (GRIT) procedure developed by the University of Queensland and recognised internationally

- identification of the direct economic activity impacts of the project (during construction and operation) in a form compatible with the IO equations, so that the IO multipliers and flow-on effects for the economic activity of the impacts of the project can then be estimated (West 1993). The direct economic activity impacts of the project were estimated from data provided by EnergyCo and production ratios in the IO tables. Indirect effects were estimated using the *EconImp* program.¹

Qualitative consideration based on economic principles of demand and supply has also been given to potential cumulative impacts of the project, and other relevant projects, on demand for regional and NSW labour resources and other inputs to production.

The economic impact assessment predates the engagement of the future network operator for the project and so is based on a number of assumptions which would be confirmed during detailed design of the project.

Existing environment

The regional economy is defined as the combined LGAs of Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie. In 2021, it had a population of 665,007 and labour force of 309,405 (ABS 2021a,b). The population of the region has been growing at an average annual rate of 1.0 per cent since 2006 (compared to 1.3 per cent for NSW), with the highest growth rate being in Cessnock LGA followed by Central Coast and Lake Macquarie LGAs. Australian Bureau of Statistics (ABS) Census place of work data indicates the significance of the health care and social assistance, retail trade, construction, accommodation and food services, and education and training sectors within the relevant LGAs. However, the main employment in the region varies across LGAs. The main employment sector in the Central Coast and Lake Macquarie LGAs is health care and social assistance. The main employment sector in the Muswellbrook and Singleton LGAs is mining and the main employment sector in the Cessnock LGA is accommodation and food services.

Exporting sectors are key drivers of regional economies and reflect a region's endowments and competitive advantages. Using the IO industry sector classifications, the largest exporting industries by value are coal mining, basic non-ferrous metal manufacturing, electricity generation, residential care and social assistance, and insurance and superannuation funds.

Potential construction impacts

Construction impacts would occur over a 2.5-year period. The average annual construction workforce over the 2 years of peak construction is estimated at 486 workers, with average quarterly construction employment peaking at 830 workers.

The average annual construction impacts of the project on the regional economy for the 2 peak years of construction are estimated at up to:

- \$325M in annual direct and indirect output
- \$113M in annual direct and indirect value-added
- \$72M in annual direct and indirect household income (\$33M accruing to the region)
- 789 direct and indirect jobs (381 accruing to regional labour).

The average annual construction impacts of the project on the NSW economy for the 2 peak years of construction are estimated at up to:

- \$551M in annual direct and indirect output
- \$232M in annual direct and indirect value added
- \$150M in annual direct and indirect household income
- 1524 direct and indirect jobs.

¹ The EconImp program uses the Leontif Inverse Matrix to estimate indirect effects.

Construction of the workforce accommodation camps are a minor subcomponent of the above impacts. Due to likely centralised purchasing activities for the workforce accommodation camps, they are likely to provide only modest impacts to the regional economy during the construction phase.

The construction of the project would result in a temporary (2.5 year) reduction in the area available for agricultural activity – 57 hectares for dairy cattle and 817 hectares for meat cattle/sheep. This is considered conservative as disturbance is not anticipated to occur across the entire HTP corridor at any one time. The direct impact of construction on gross agricultural value of production is estimated to be \$404,738 per year. The direct and indirect regional economic impacts of this temporary reduction in agriculture are estimated at less than 0.1% of agricultural activity in the region and a fraction of the economic activity gains from the project. The project construction would also result in a minor reduction in forestry activity valued at in the order of \$36,000 per year. The regional impacts associated with this level of reduced economic activity are immaterial.

The construction of the project would create demand for regional labour resources and regional inputs to production. This has the potential in the short term to lead to increased construction wages, attraction of workers from other relevant sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), and rising costs as firms pass wage costs onto consumers. In addition, in the short term, excess demand for inputs to construction of an individual project such as quarry materials and concrete can result in rising costs and potentially shortages for other uses.

Potential operational impacts

The Australian and State Governments are transitioning the National Electricity Market (NEM) towards renewable energy to achieve net zero emissions. This involves replacing fossil fuel-based generation with renewable sources and energy storage. Renewable Energy Zones (REZs) in Eastern Australia, including 5 in NSW, require new transmission infrastructure to connect to the load centres. The HTP project will provide up to 5 GW of transfer capacity to connect renewable energy projects in the Central West-Orana and New England REZs to the NEM, supporting the NSW Electricity Strategy's goals of reliable, affordable, and sustainable electricity.

The project operation will also provide economic activity to the regional and NSW economies. The project is estimated to make up to the following total annual contribution to the regional economy during operation:

- \$27M in annual direct and indirect output
- \$10M in annual direct and indirect value-added
- \$4M in annual direct and indirect household income
- 40 direct and indirect jobs.

The project is estimated to make up to the following total annual contribution to the NSW economy during operation:

- \$37M in annual direct and indirect output
- \$15M in annual direct and indirect value-added
- \$7M in annual direct and indirect household income
- 67 direct and indirect jobs.

The construction and operation impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy (i.e. the NSW economy because of its size and diversity is better placed to provide more of the inputs to production than the regional economy).

Businesses that can provide the inputs to project operation and/or the products and services required by the workforce would directly benefit from the project by way of increased economic activity. However, because of the inter-linkages between sectors, many indirect businesses also benefit.

The workforce accommodation camps would not operate during the operation phase of the project and hence no regional or NSW economic impacts would occur.

The operation of the project would result in a reduction in the area available for agricultural activity – 13 hectares for dairy cattle and 176 hectares for meat cattle/sheep. The direct impact of operation on gross agricultural value of production is estimated to be \$88,937 per year. The direct and indirect regional economic impacts of this temporary reduction in agriculture are estimated at less than 0.03% of agricultural activity in the region and a fraction of the economic activity gains from the project. The project operation would also result in a minor reduction in forestry activity valued at in the order of \$23,000 per year. The regional impacts associated with this level of reduced economic activity are immaterial.

The operation of the project would only create a small demand for regional labour resources and regional inputs to production compared to the construction phase. Consequently, no potential wage or price increases or production shortages are anticipated.

Management measures

The inclusion of temporary worker accommodation has been proposed to ensure that the project does not significantly increase competition for labour and housing in the region. Notwithstanding, it is the intention of the project to provide positive local employment and business opportunities for the region.

These benefits can be maximised via the promotion of local workforce participation via the preparation and implementation of a Local Industry Participation Plan and Australian Industry Participation Plan.

1 Introduction

The Hunter Transmission Project (HTP, the project) involves the construction of a new overhead 500 kilovolt (kV) transmission line of around 110 kilometres connecting the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring in the Hunter region of New South Wales (NSW).

Due to its strategic importance, the NSW Minister for Planning and Public Spaces has declared the HTP to be critical State significant infrastructure (CSSI) under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act).

Under this process, the Energy Corporation of NSW (EnergyCo, the proponent) is required to prepare an environmental impact statement (EIS) in accordance with the NSW Environmental Planning and Assessment Regulation 2021.

This economic impact assessment accompanies the EIS for the HTP and addresses the Secretary's environmental assessment requirements (SEARs) issued on 13 August 2024 (see Table 1-1).

In addition to the SEARs, advice from several government agencies was received on the HTP. Agency advice relevant to and considered in this economic impact assessment is provided on the Major Projects website maintained by the NSW Department of Planning, Housing and Infrastructure (DPHI). No specific considerations for assessment of economic impacts are contained within the agency advice.

Table 1-1 HTP SEARs – economic impact assessment

HTP SEARs:

- an assessment of the economic benefits of the project for the region and the State as a whole, including:
 - consideration of any increase in demand for community infrastructure and services, and details of how the construction workforce will be managed to minimise local impacts, including consideration of construction workforce accommodation
 - an assessment of the impacts to State Forests; and
 - details of any proposed benefit sharing arrangements.

This economic impact assessment focuses on the economic benefits for the region and State as a whole. This includes assessment of the impacts to State forests.

Consideration of demand for community infrastructure, the construction workforce accommodation and benefit sharing are addressed in the Social Impact Assessment (refer to *Technical Report 7 – Social Impact Assessment* of the EIS).

2 The Hunter Transmission Project

The Hunter Transmission Project (HTP, the project) is critical State significant infrastructure (CSSI). It must be built by the end of 2029 to protect energy security in New South Wales (NSW) as the remaining coal-fired power stations close.

The HTP includes:

- a new overhead 500 kilovolt (kV) double circuit transmission line of around 110 kilometres
- 2 new switching stations (Bayswater South and Olney)
- upgrades to the existing Bayswater and Eraring substations
- adjustments and upgrades to existing transmission lines
- property adjustment works to facilitate access to the transmission lines and switching stations
- utility adjustments required for the construction of the transmission network infrastructure
- ancillary works to support construction including road upgrades, establishment of new access tracks and upgrades to existing access tracks, construction support sites (some with temporary worker accommodation), and other construction facilities such as laydown areas.

The new transmission line would transport electricity generated in the Central-West Orana and New England Renewable Energy Zones (REZs). It would connect the existing 500 kV transmission line at Bayswater to the existing 500 kV transmission line in the Olney State Forest near Eraring. This would strengthen the State's core electricity grid and supply clean and reliable energy to NSW consumers for generations to come.

The HTP involves development across 5 local government areas (LGAs) (Muswellbrook, Singleton, Cessnock, Central Coast and Lake Macquarie). Most of this development would be concentrated in and around the HTP corridor.

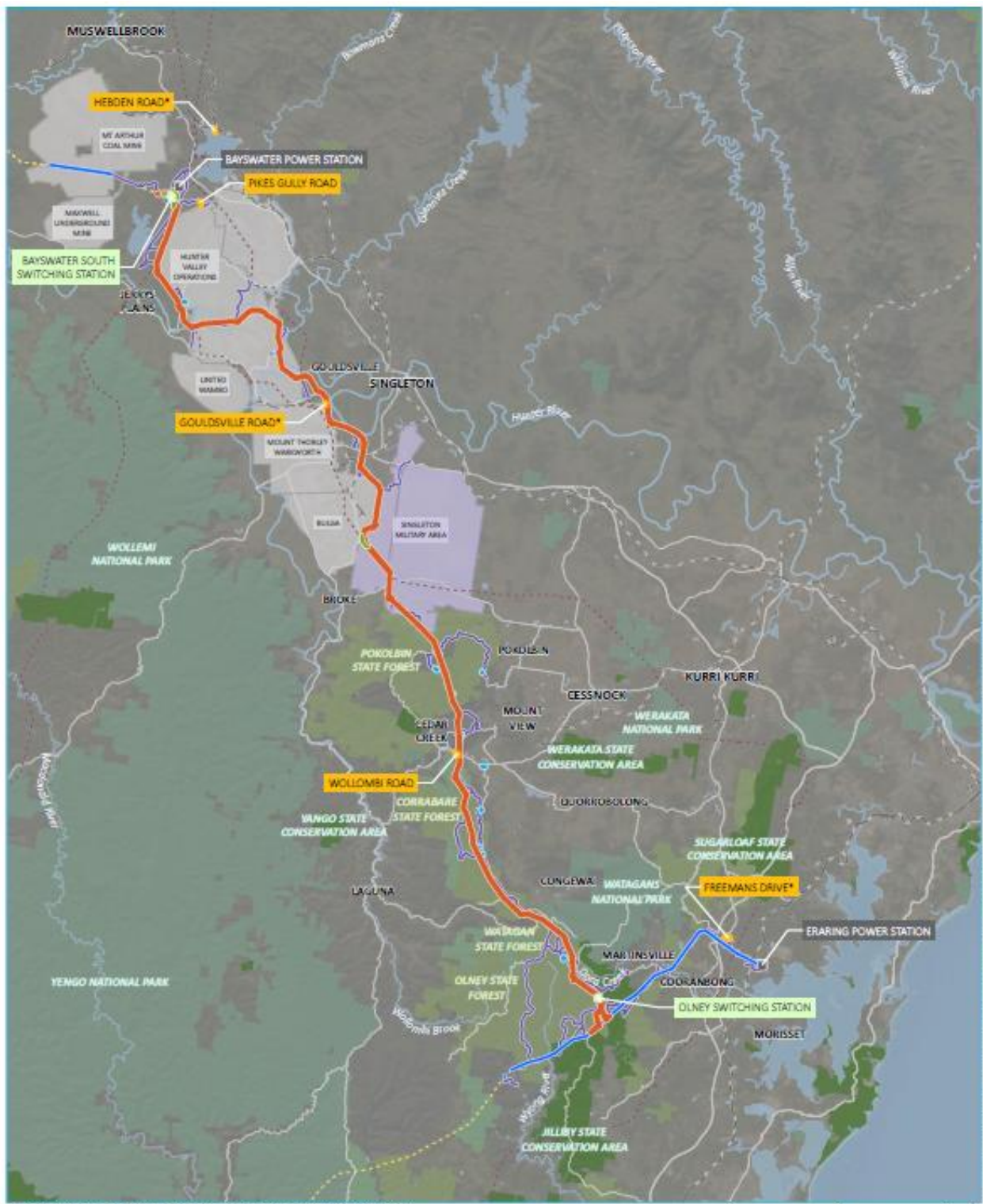
An overview of the HTP is provided in Table 2-1 and shown in Figure 2-1. The key project elements are shown in Figure 2-2. Further details are provided in *Chapter 4 (Project description)* of the environmental impact statement (EIS).

Table 2-1 Project overview

The project	• The critical State significant infrastructure application for the HTP covers 5 local government areas • Most development would be concentrated in and around the HTP corridor. Some ancillary development such as construction support sites and temporary worker accommodation, road upgrades and laydown areas would be outside the HTP corridor
Project impact area	• The area that has been assumed for the purpose of this EIS to be directly affected by the construction and operation of the project. It includes the indicative location of project infrastructure, the area that would be directly disturbed during construction and any easement required during operation.
Construction and operation	• Construction impact area around 2351 ha • Operation impact area around 1261 ha
Disturbance area	• Disturbance area around 1266 ha • Disturbance area A around 683 ha • Disturbance area A (centreline) around 214 ha • Disturbance area B around 367 ha • Disturbance area HZ around 1.84 ha
New transmission line and transmission towers	• Overhead 500 kV double circuit transmission line of around 110 km between Bayswater South 500 kV switching station and Olney 500 kV switching station • Steel lattice towers generally up to 85 m high and that are spaced anywhere between 75 m to around 1.3 km apart (typically between 300 m and 600 m) • 500 kV transmission lines with a minimum ground clearance of 13.5 m • Ancillary infrastructure such as earth wire and communications systems • HTP corridor of around 140 m wide • Operational easement around 70 m wide
Switching stations/substation works	• New Bayswater South 500 kV switching station – construction impact area around 26.6 ha • Modifications at the existing Bayswater 500 kV/330 kV substation within the existing footprint • New Olney 500 kV switching station – construction impact area around 20 ha • Augmentation and modifications at the existing Eraring 500 kV/330 kV substation, including installation of 2 new transformers
Adjustments and crossings – existing transmission lines	• Adjustments to existing double circuit 500 kV transmission lines: — Line 5A1 and 5A2: Eraring – Kemps Creek 500 kV at Ravensdale to connect to the new Olney 500 kV switching station — Line 5A3: Bayswater – Mt Piper 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station — Line 5A4: Bayswater – Wollar 500 kV at Bayswater to connect to the new Bayswater South 500 kV switching station • Adjustments to existing double circuit 330 kV transmission lines: — Line 31: Bayswater – Regentville 330 kV — Line 32: Bayswater – Sydney West 330 kV — Line 81: Newcastle – Liddell 330 kV • Crossing of existing double circuit 330 kV transmission lines: — Line 31: Bayswater – Regentville 330 kV at Bayswater — Line 32: Bayswater – Sydney West 330 kV at Bayswater — Line 81: 330 kV: Newcastle – Liddell 330 kV at Lemington and again at the Singleton Military Area • Line 82: 330 kV: Tomago – Liddell 300 kV at Warkworth and again at the Singleton Military Area
Upgrades – existing transmission lines and towers	• Upgraded earth wire on Line 5A3 and Line 5A4 • Upgraded earth wire and communications systems on Line 5A1 and Line 5A2 • Tower strengthening on various existing towers on Line 5A1, Line 5A2, Line 5A3 and Line 5A4

Road works	• Modifications to the existing public road network • New and upgraded access tracks for construction and operation
Construction support sites	• Five construction support sites: Hebden Road, Pikes Gully Road, Gouldsville Road, Wollombi Road and Freemans Drive • Helicopter pads (helipads) indicatively at: Hebden Road, Pikes Gully Road, Gouldsville Road and Freemans Drive
Ancillary works	• Laydown areas, which would be established to allow for flexibility in construction and to minimise the need for vehicle movements to and from the construction support sites
Utility adjustments	• Third party utility works including gas, telecommunications, water, sewer and stormwater
Timing	• Construction to start in 2027 • Operation by end of 2029

Figure 2-1 Project overview



Source: EMM (2025); Beca (2025); ESN (2025); DCSSS (2024); FONSW (2022); DFSI (2017)

KEY

Project impact area

- HTP corridor
- Switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area
- Adjustment to existing transmission line
- Upgrades to existing transmission line
- Access track

Existing environment

- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway
- Major road
- Named watercourse

Named waterbody

- NPWS reserve
- State conservation area
- State forest
- Defence
- Mining

Figure 2-2 Key project elements (Map 1 of 4)

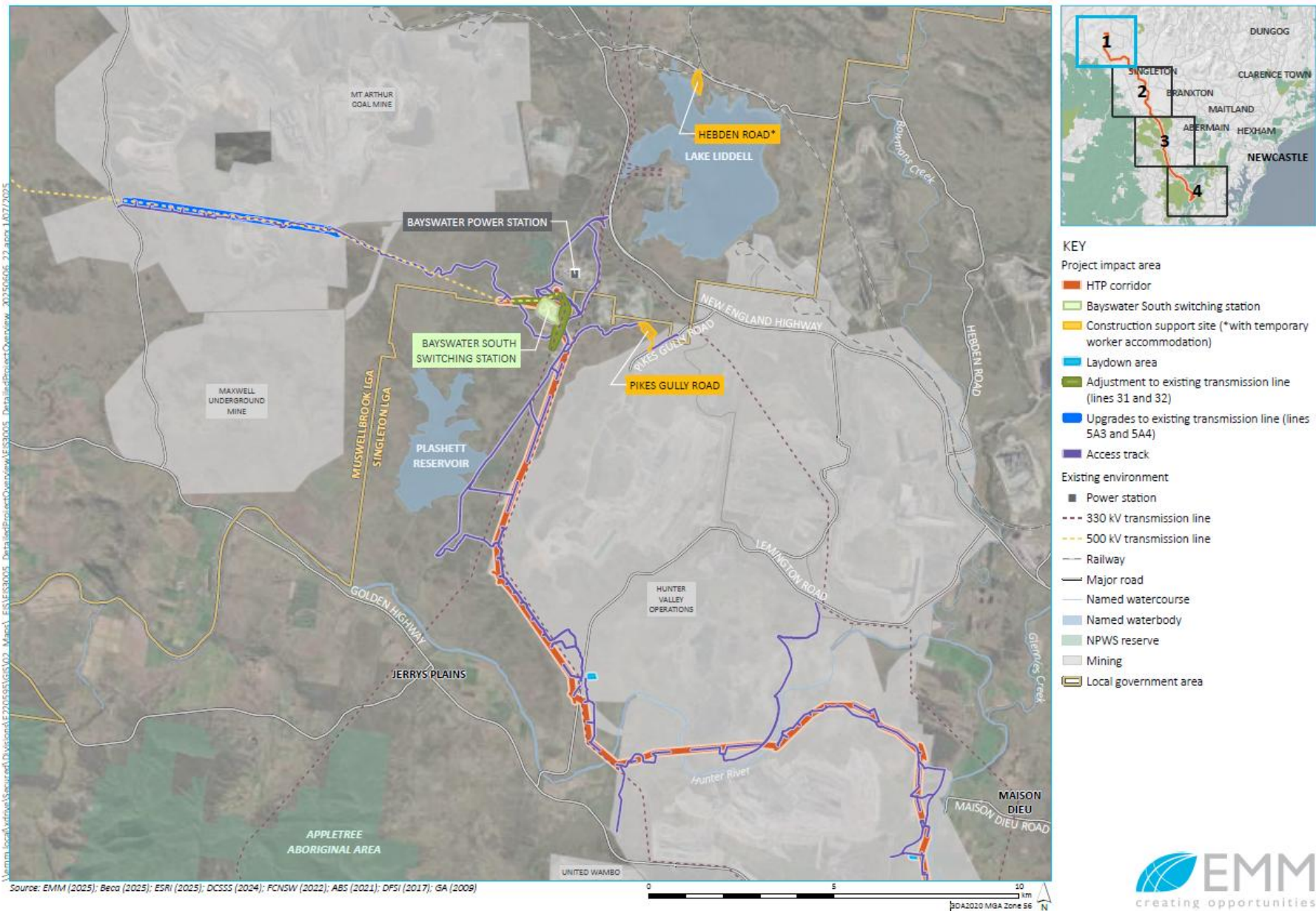


Figure 2-3 Key project elements (Map 2 of 4)

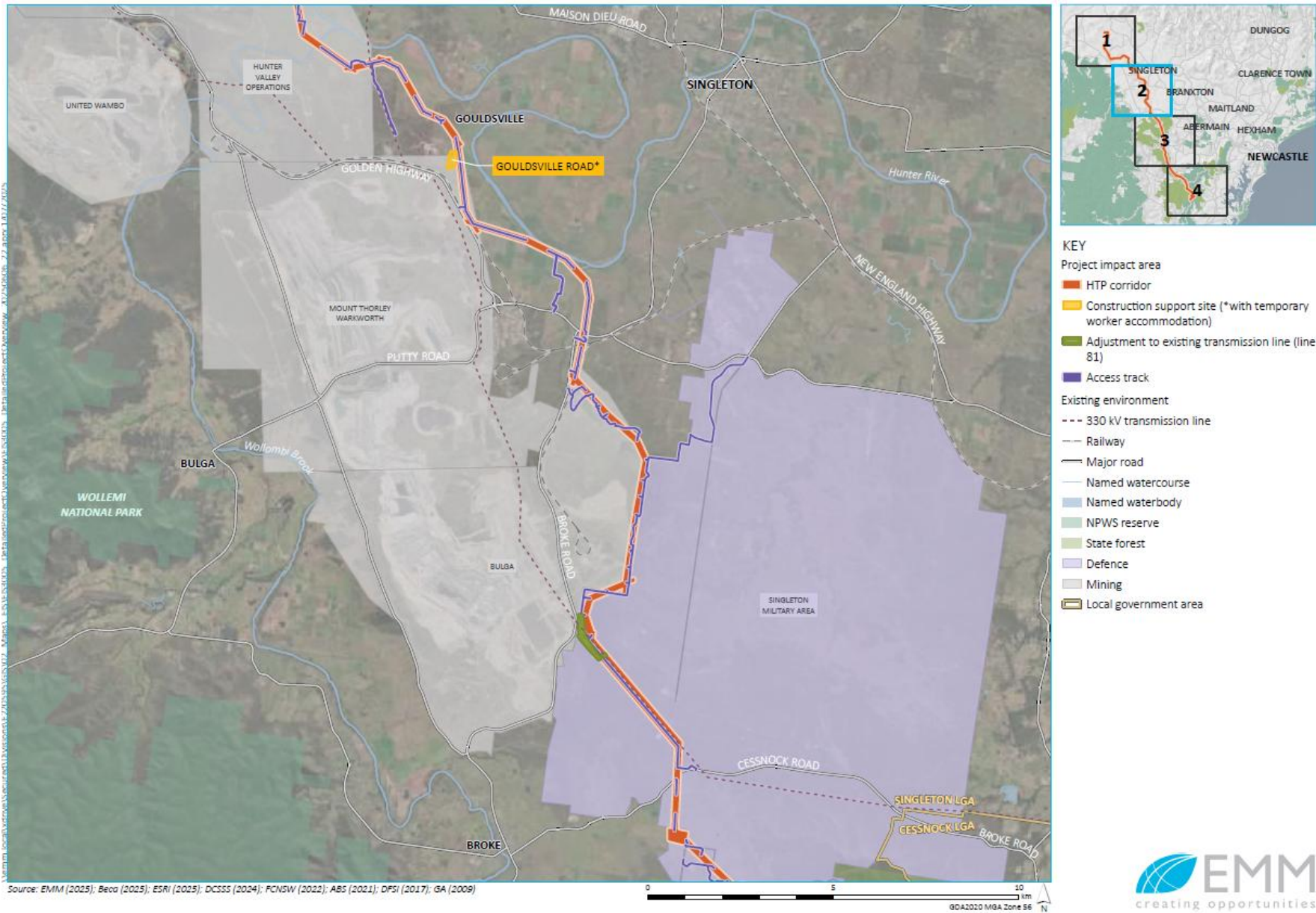


Figure 2-4 Key project elements (Map 3 of 4)

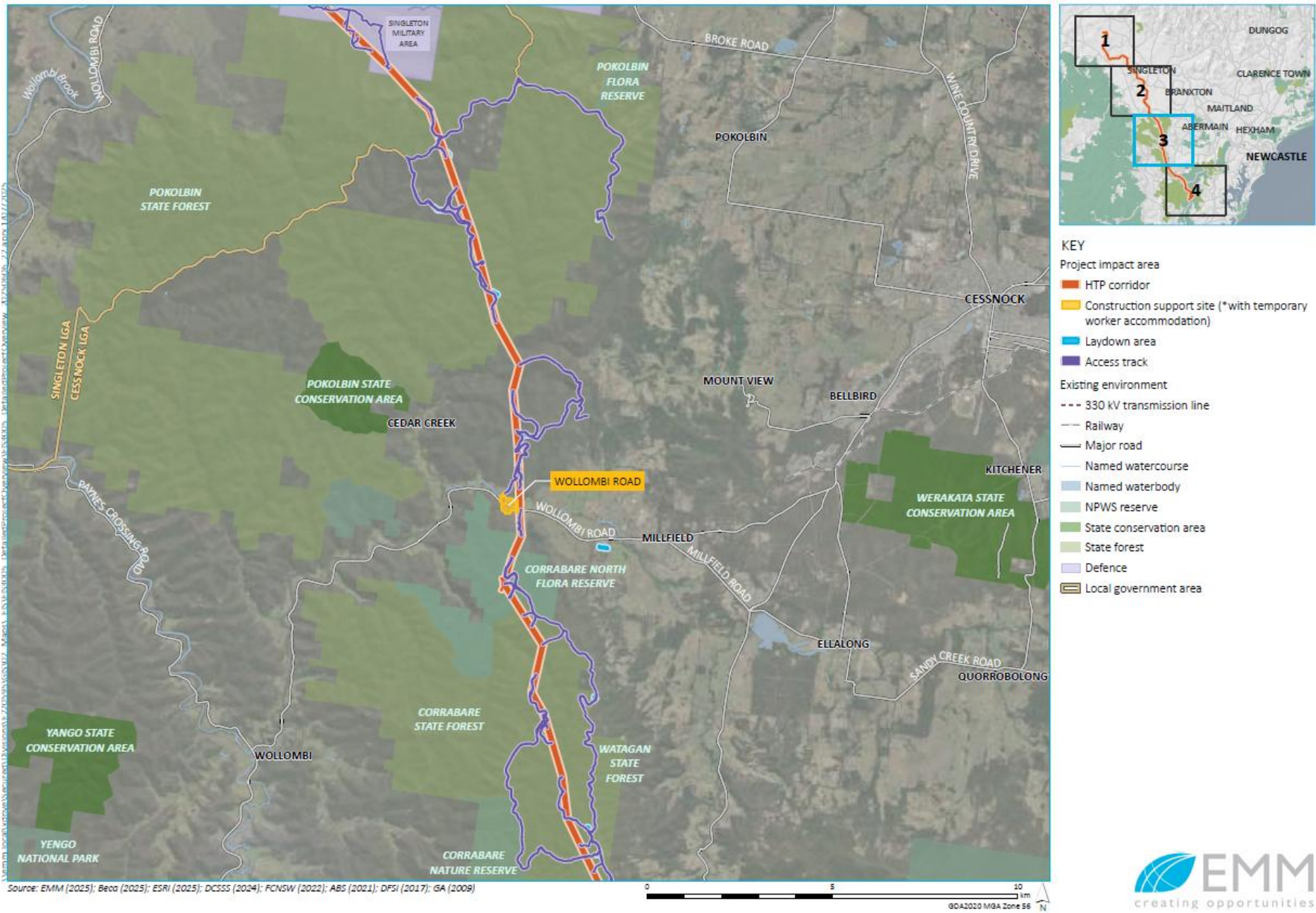
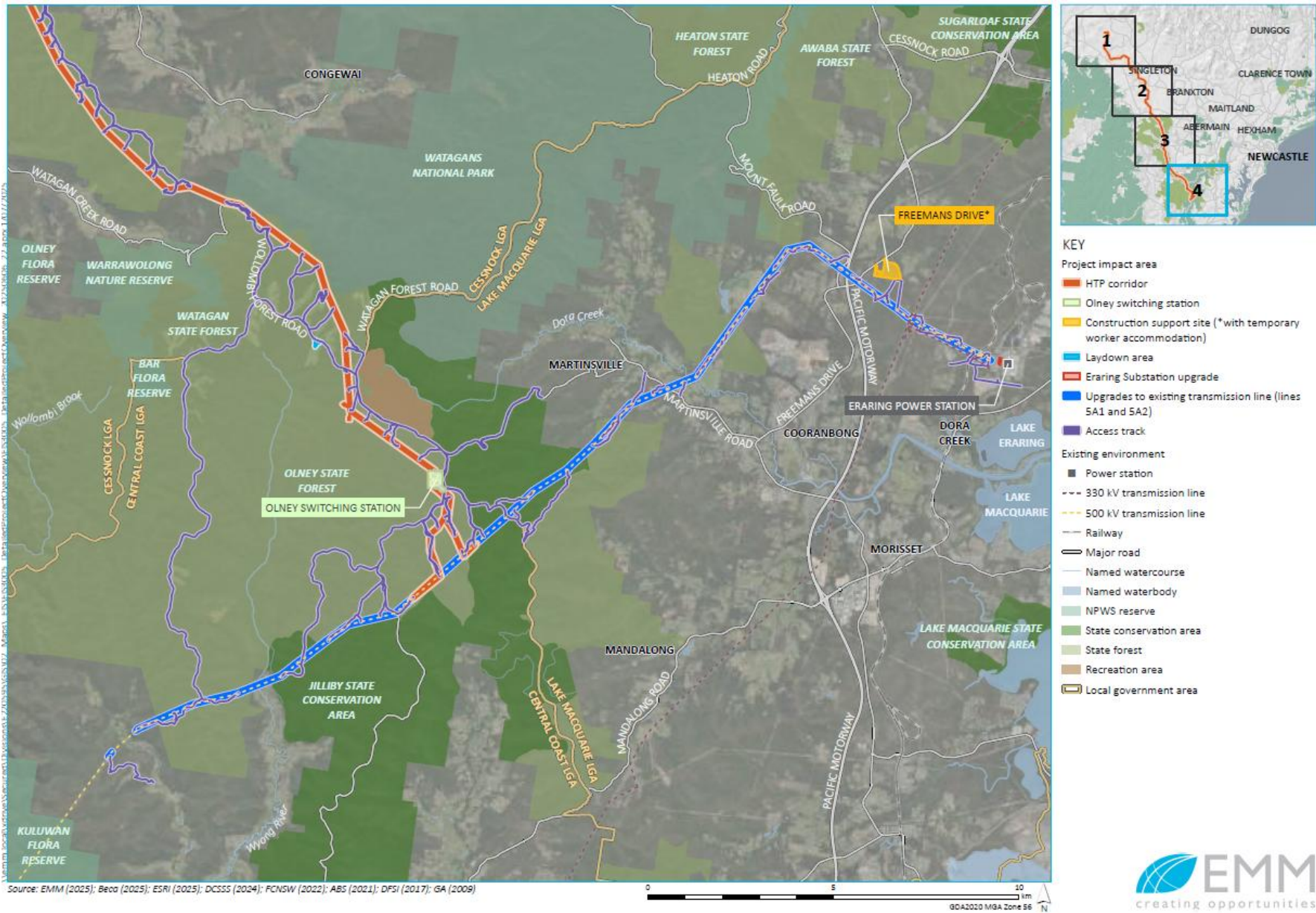


Figure 2-5 Key project elements (Map 4 of 4)



3 Assessment methodology

3.1 Overview

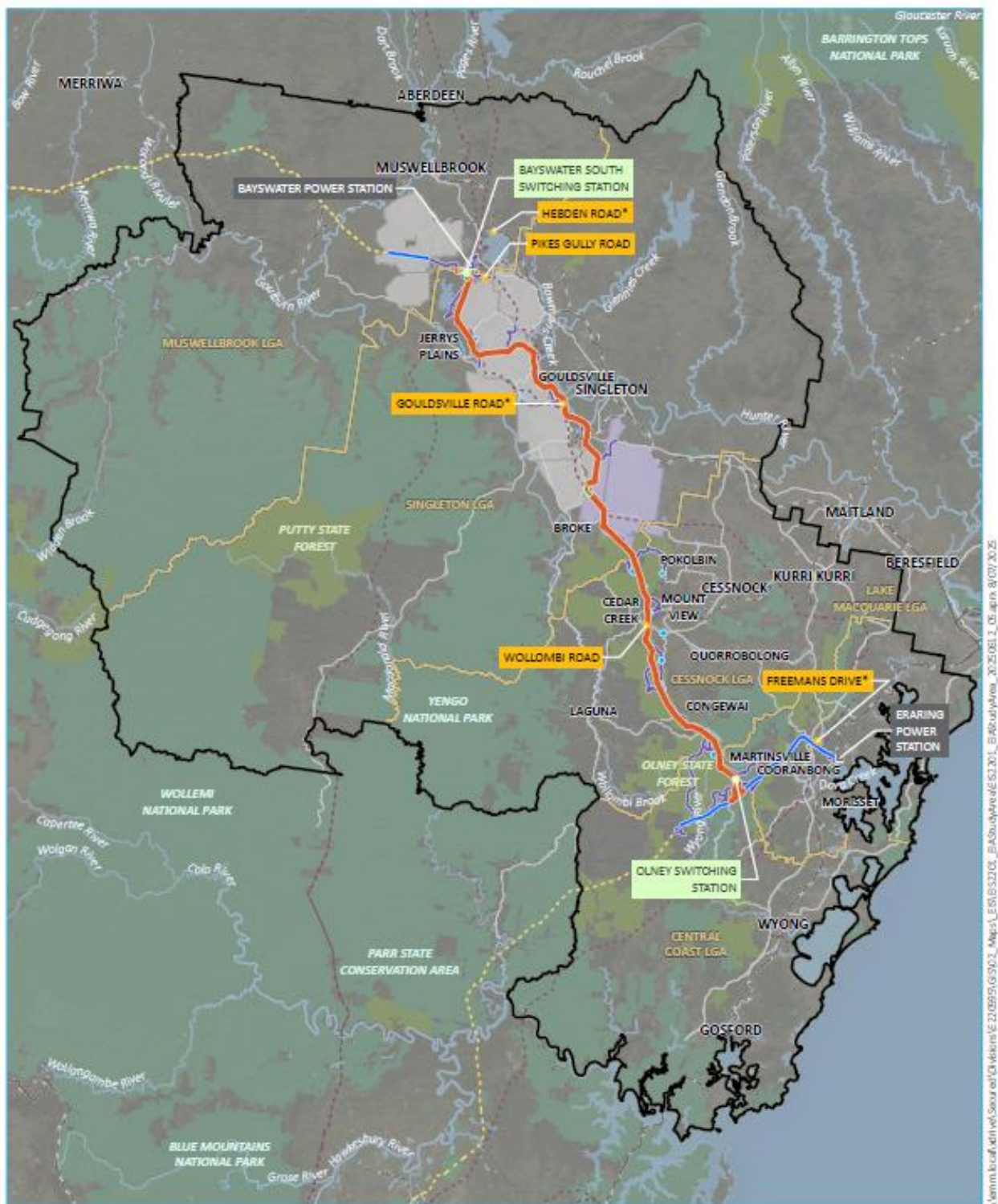
The Hunter Transmission Project (HTP, the project) would form an integral component of the New South Wales (NSW) Electricity Strategy which aims to deliver reliable, affordable and sustainable electricity systems for NSW. The benefits of the project to the NSW electricity system have been assessed qualitatively.

The project would also generate economic activity within the regional and NSW economies, during construction and operation. It would also result in some contraction in agricultural and forestry economic activity from the construction and operation footprint. The assessment of these potential economic impacts has been undertaken using input-output (IO) analysis. Other potential impacts are discussed qualitatively.

3.2 Study area

The study area for this economic impact assessment is defined as the combined Muswellbrook, Singleton, Cessnock, Lake Macquarie and Central Coast Local Government Areas (LGAs). Refer to Figure 3-1. This is the region in which the project is located and has the potential to provide inputs to the project and derive economic benefits from the construction and operation of the project. It is also the region that may experience impacts from reduction in agricultural activity and from increased demand for labour and other inputs to production. While the region is the focus of the analysis, impacts on the NSW economy are also assessed.

Figure 3-1 Economic impact assessment study area



Source: EMM (2025), Beica (2025), ESRI (2025), DCSS (2024), FCNSW (2022), DFS (2017)

KEY

- Economic impact assessment study area
- Local government area
- Project impact area
- HTP corridor
- Switching station
- Construction support site (*with temporary worker accommodation)
- Laydown area

- Adjustment to existing transmission line
- Upgrades to existing transmission line
- Access track
- Existing environment
- Power station
- 330 kV transmission line
- 500 kV transmission line
- Railway

- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest
- Defence
- Mining

Economic impact assessment study area

Hunter Transmission Project
Economic Impact Assessment
Figure 3.1



3.3 Data used to describe the regional economy

The description of the regional economy is based on Australian Bureau of Statistics (ABS) Census of Population and Housing data (2021a) and information from the model of the regional economy developed for the IO analysis. Data is provided at different levels of aggregation (i.e. one-digit and four-digit Australian and New Zealand Standard Industry Classification² (ANZSIC)) to provide a more complete picture of the regional economy. Some information is also provided in terms of IO sectors³ because IO analysis generates economic information on this basis that is not available from Census data.

3.4 Input-output analysis

IO analysis assesses the direct and indirect impacts (gross economic footprint) of the construction and operation of the project on the regional and NSW economy.

The IO analysis involves 2 key steps:

- Development of an appropriate IO table (regional transaction table) that can be used to identify the economic structure of the region and multipliers for each existing sector of the economy. IO tables for the regional and NSW economies were developed using the Generation of Regional Input Output Tables (GRIT) procedure developed by the University of Queensland and recognised internationally (Refer to Attachment 1)
- Identification of the direct impact of the project, in a form that is compatible with the IO equations, so that the IO multipliers and flow-on effects for the impacts of the project can then be estimated (West 1993). The direct impact of the project was estimated from data provided by the Energy Corporation of NSW (EnergyCo) and production ratios in the IO tables. Indirect effects were estimated using the *EconImp* program.⁴

IO analysis identifies the economic activity of a project on the economy in terms of 4 main indicators:

- gross regional output – the gross value of business turnover in a region
- value-added – the difference between the gross value of business turnover and the costs of the inputs of raw materials, components and services bought in to produce the gross regional output. These costs exclude wage costs
- income – the wages paid to employees including imputed wages for self-employed and business owners
- employment – the number of people employed (including self-employed, full-time, and part-time).

IO analysis is focused on economic activity that occurs in a region. Direct effects (e.g. output, value-added, income and employment) of construction of the project in the region are counted even if these effects do not accrue to existing regional businesses and residents. Production induced flow-on effects and consumption induced flow-on are estimates of flow-on effects to the region that arise from the direct expenditures that occur in the region.

The IO method is based on several assumptions that are outlined in Attachment 2. Most notably, IO analysis assumes that the regional economy has access to sufficient labour and capital resources (from both inside and outside the region) so that an individual project does not result in any regional price changes (e.g. wages in other industries or house rentals, which would lead to contractions ('crowding out') of economic activity in other sectors in the same region). Any 'crowding out' is assumed to occur outside the region where the project is concentrated and the regional impact analysis is focused.

The consequence of the assumptions of IO analysis is that IO modelling provides an estimate of the gross economic impact or footprint of the project which is an upper bound estimate of net economic activity impacts.

² This refers to different level of aggregation of industry sectors with one-digit being the most aggregated form (19 sectors) and four-digit being the most disaggregated (200 sectors).

³ IO sector classification is based on the primary production activities of businesses. There are 115 IO sectors. Refer to the ABS Australian National Account: Input-Output tables.

⁴ The EconImp program uses the Leontif Inverse Matrix to estimate indirect effects.

Qualitative consideration based on the principles of supply and demand is given to potential 'crowding out' impacts resulting from the project and other relevant projects (cumulative projects) on the regional and NSW economies.

4 Existing environment

The Hunter Transmission Project (HTP, the project) corridor runs mostly through power station, mining and government land between Bayswater and Broke in the upper Hunter region. It then traverses the Pokolbin, Corrabare, Watagan and Olney State forests in the lower Hunter region (see Figure 2-1).

The proposed new transmission line would connect the new the Bayswater South switching station to the existing 500 kV transmission line near the Baywater Power Station and the new Olney switching station to the existing 500 kV transmission line between Eraring and Kemps Creek.

This section characterises the regional economy (refer to Figure 3-1) from 2 perspectives: residents of the region, and workers in the region. Characterisation of the New South Wales (NSW) economy is provided where appropriate for comparison with the regional economy.

4.1 Residents of the region

Table 4.1 provides some characteristics of the usual residents of the 5 local government areas (LGAs) comprising the regional economy based on the Australian Bureau of Statistics (ABS) (2021a) Census of Population and Housing. In 2021, the region had a population of 665,007 and a labour force of 309,405, with the Central Coast LGA accounting for 52% of the total population. Together the Central Coast LGA and Lake Macquarie LGA account for 84% of the regional population and 84% of the regional labour force. In the 2021 Census, 14,584 people (about 4.7% of the total regional workforce) were unemployed, with the majority of these located in the Central Coast LGA and Lake Macquarie LGA.

The main occupations of usual residents were professionals (19.7%) followed by technicians and trades workers (15.9%) and community and personal service workers (13.3%) (ABS 2021b). The percentage of usual residents employed as professionals was greatest in the Central Coast and Lake Macquarie LGAs. The percentage of usual residents employed as technicians and trades workers was greatest in Muswellbrook, Singleton and Cessnock LGAs.

The main industry sectors in which usual residents were employed in 2021 is provided in Table 4.2. Hospitals (except psychiatric hospitals) was the most significant employment sector for residents of the region as well as for the Central Coast and Lake Macquarie LGAs. Coal mining is the most significant employment sector for residents of Muswellbrook, Singleton and Cessnock LGAs.

Table 4-1 Characteristics of usual residents

	Muswellbrook LGA		Singleton LGA		Cessnock LGA		Lake Macquarie LGA		Central Coast LGA		Total region		NSW	
Population	16,357		24,577		63,632		213,845		346,596		665,007		8,072,163	
% Aboriginal and/or Torres Strait Islanders	11.7		8.3		10.2		5.5		4.9		5.9		3.4	
Median Age	37		37		37		42		43		42		39	
% of population <15 years	21.1		20.7		20.1		18.1		18		18.4		18.2	
% of population 65+	15		14.4		16.9		22		22.2		21.2		17.7	
In labour force	7,751		12,574		28,714		102,070		158,296		309,405		3,874,012	
Unemployed%	5.1		3.7		5.6		4.6		4.7		4.7		4.9	
No.	397		467		1,595		4,662		7,463		14,584		189,852	
Labour force to population ratio	47.4		51.2		45.1		47.7		45.7		46.5		48.0	
Median household weekly income	\$1,628		\$2,016		\$1,493		\$1,623		\$1,507		\$1,564		\$1,829	
Unoccupied private dwellings%	11.8		8.7		8.5		6.3		9.9		8.7		9.4	
No.	805		808		2,108		5,384		14,532		23,637		299,524	
Median weekly rent	\$300		\$338		\$340		\$375		\$400		\$382		\$420	
Level of highest education attainment - 15+	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	%	No.
Year 9 or below	1,571	12.2	1,912	9.8	5,935	11.7	15,893	9.1	23,746	8.4	49,057	9.1	487,855	7.4
Year 10	2,310	17.9	3,179	16.3	8,834	17.4	25,763	14.7	41,159	14.5	81,245	15.0	698,390	10.6
Year 12	1,303	10.1	2,200	11.3	5,402	10.6	19,403	11.1	36,649	12.9	64,957	12.0	954,987	14.5
Bachelor's degree and above	1,122	8.7	2,277	11.7	4,876	9.6	33,332	19.0	50,747	17.9	92,354	17.0	1,838,502	27.8

	Muswellbrook LGA		Singleton LGA		Cessnock LGA		Lake Macquarie LGA		Central Coast LGA		Total region		NSW	
Occupations	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Technicians and Trades Workers	1,431	19.4	2,183	18.0	4,914	18.1	15,383	15.8	22,054	14.6	45,965	15.9	436,589	11.9
Machinery Operators and Drivers	1,324	18.0	1,936	16.0	3,388	12.5	6,267	6.4	9,014	6.0	21,929	7.6	222,186	6.0
Labourers	1,014	13.8	1,182	9.8	3,472	12.8	8,820	9.1	14,666	9.7	29,154	10.1	300,966	8.2
Community and Personal Service Workers	755	10.3	1,570	13.0	3,765	13.9	12,834	13.2	19,613	13.0	38,537	13.3	390,779	10.6
Professionals	745	10.1	1,464	12.1	3,204	11.8	20,897	21.5	30,741	20.4	57,051	19.7	952,131	25.8
Clerical and Administrative Workers	691	9.4	1,307	10.8	2,919	10.8	12,800	13.1	19,738	13.1	37,455	12.9	480,612	13.0
Managers	670	9.1	1,303	10.8	2,547	9.4	10,586	10.9	18,585	12.3	33,691	11.6	536,820	14.6
Sales Workers	572	7.8	942	7.8	2,411	8.9	8,383	8.6	13,860	9.2	26,168	9.0	294,889	8.0

Source: ABS 2021a

Table 4-2 Top 5 industry sectors of employment for usual residents (four-digit ANZSIC)

Muswellbrook	No.	%	Singleton	No.	%	Cessnock	No.	%	Lake Macquarie	No.	%	Central Coast	No.	%	Total region	No.	%
Coal Mining	1465	19.9	Coal Mining	2420	20.0	Coal Mining	2021	7.5	Hospitals (except Psychiatric Hospitals)	5127	5.3	Hospitals (except Psychiatric Hospitals)	7484	5	Hospitals (except Psychiatric Hospitals)	13,748	4.7
Horse Farming	250	3.4	Defence	502	4.1	Other Social Assistance Services	912	3.4	Other Social Assistance Services	3653	3.8	Other Social Assistance Services	5194	3.4	Other Social Assistance Services	10,104	3.4
Takeaway Food Services	201	2.7	Takeaway Food Services	308	2.5	Aged Care Residential Services	858	3.2	Aged Care Residential Services	2902	3.0	Aged Care Residential Services	4838	3.2	Aged Care Residential Services	8933	3.0
Supermarket and Grocery Stores	197	2.7	Supermarket and Grocery Stores	297	2.5	Hospitals (except Psychiatric Hospitals)	795	2.9	Supermarket and Grocery Stores	2765	2.8	Supermarket and Grocery Stores	4711	3.1	Supermarket and Grocery Stores	8705	3.0
Labour Supply Services	194	2.6	Labour Supply Services	224	1.9	Supermarket and Grocery Stores	741	2.7	Takeaway Food Services	2477	2.5	Takeaway Food Services	4225	2.8	Coal Mining	8200	2.8

Source: ABS 2021b

An indication of the health of an economy can be gained from population changes. This theory of regional economic growth suggests that places that can attract population immigration⁵, create increased demand for goods and services and thus more jobs. This growth leads to increasing local multiplier effects, scale economies and an increase in the rate of innovation and capital availability (Sorensen 1990). Conversely, population losses can contribute to a 'vicious cycle' of decline whereby reduced populations result in closure of services, which in turn makes it difficult to attract new populations (Sorensen 1990).

Trends in regional economies because of globalisation and associated structural adjustment include (Collits 2000):

- loss of significant industries such as abattoirs and timber mills from many rural areas
- increased mechanisation of agriculture and aggregation of properties, resulting in loss of employment opportunities in this industry
- growth of regional centres, at the expense of smaller towns
- preference of Australians for coastal living, particularly for retirement
- preference of many of today's fastest growing industries to locate in large cities.

The result is that there has been declining population or stagnating population in many rural LGAs that are in non-coastal areas. There has also been a decline or stagnation in the population of smaller towns even in regions where the population has been growing.

Against this backdrop, it is evident that the population of the project's regional economy has been growing at an average annual rate of 1.0% since 2006 (compared to 1.3% for NSW), with the highest growth rate being in Cessnock LGA, followed by Central Coast and Lake Macquarie LGAs. The lowest average annual population growth rate was in Muswellbrook LGA followed by Singleton LGA.

Table 4-3 Population growth

	Population				Average Annual Growth Rate			
	2006	2011	2016	2021	2006 - 2011	2011 - 2016	2016 - 2021	2006 - 2021
Muswellbrook	15,639	16,328	16,462	16,463	0.9%	0.2%	0.0%	0.4%
Singleton	22,535	23,523	23,576	24,719	0.9%	0.0%	1.0%	0.6%
Cessnock	47,426	52,485	56,720	64,082	2.1%	1.6%	2.6%	2.3%
Lake Macquarie	188,503	196,811	202,332	213,967	0.9%	0.6%	1.2%	0.9%
Central Coast	303,051	322,657	336,611	348,379	1.3%	0.9%	0.7%	1.0%
Total Region	577,154	611,804	635,701	667,610	1.2%	0.8%	1.0%	1.0%
NSW	6,742,690	7,218,529	7,732,858	8,093,815	1.4%	1.4%	0.9%	1.3%

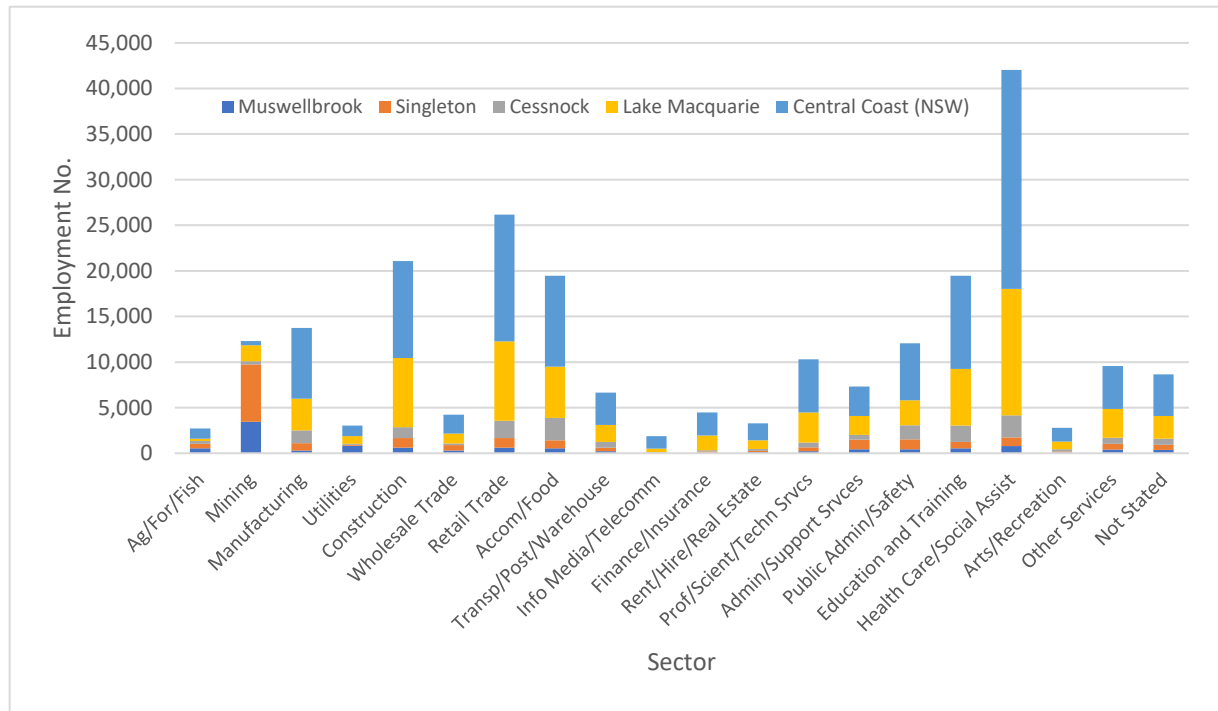
Source: ABS 2024

⁵ Mainly due to natural endowments and comparative advantage in certain industry sectors.

4.2 Economic activity in the region

An indication of the nature of the regional economy can be gained by examining place of work employment by industry data (one-digit ANZSIC), as shown in Figure 4.1. This indicates the significance of the health care and social assistance, retail trade, construction, accommodation and food services, and education and training sectors. However, the main employment in the region varies across LGAs. The main employment sector in the Central Coast and Lake Macquarie LGAs is health care and social assistance. The main employment sector in the Muswellbrook and Singleton LGAs is mining and the main employment sector in the Cessnock LGA is accommodation and food services.

Figure 4-1 Place of work employment by industry sectors (one-digit ANZSIC)



Source: ABS 2021b

At the more disaggregated level (place of work employment by 4-digit ANZSIC) the main industry sectors of employment in the region are coal mining, hospitals (except psychiatric hospitals), supermarket and grocery stores, age care residential services and takeaway food services (see Table 4-4). The main industry sector of employment for each LGA that makes up the region is as follows:

- Muswellbrook LGA – coal mining
- Singleton LGA – coal mining
- Cessnock LGA - accommodation
- Central Coast LGA - hospitals (except psychiatric hospitals)
- Lake Macquarie LGA - aged care residential services.

Table 4-4 Place of work top 5 industry sectors of employment (four-digit ANZSIC)

Muswellbrook	No.	%	Singleton	No.	%	Cessnock	No.	%	Lake Macquarie	No.	%	Central Coast	No.	%	Total Region	No.	%
Coal Mining	3263	30.2	Coal Mining	5872	33.5	Accommodation	741	4.3	Aged Care Residential Services	3096	4.5	Hospitals (except Psychiatric Hospitals)	7186	6.2	Coal Mining	10994	4.8
On Selling Electricity and Electricity Market Operation	500	4.6	Labour Supply Services	679	3.9	Correctional and Detention Services	724	4.2	Supermarket and Grocery Stores	2673	3.9	Supermarket and Grocery Stores	4467	3.8	Hospitals (except Psychiatric Hospitals)	10406	4.5
Labour Supply Services	277	2.6	Defence	668	3.8	Primary Education	637	3.7	Other Social Assistance Services	2567	3.7	Aged Care Residential Services	4268	3.7	Supermarket and Grocery Stores	8262	3.6
Horse Farming	263	2.4	Supermarket and Grocery Stores	339	1.9	Takeaway Food Services	628	3.6	Takeaway Food Services	2501	3.6	Other Social Assistance Services	4237	3.6	Aged Care Residential Services	8253	3.6
Takeaway Food Services	219	2.0	Takeaway Food Services	296	1.7	Wine and Other Alcoholic Beverage Manufacturing	601	3.5	Hospitals (except Psychiatric Hospitals)	2419	3.5	Takeaway Food Services	4014	3.4	Takeaway Food Services	7663	3.3

Source: ABS 2021b

An input/output (IO) table for the regional economy has been produced using the Generation of Input-Output Tables (GRIT) procedure (refer to Attachment 1). From this IO table, the value-added to the regional economy was estimated at \$62 billion for 2020.

The regional economy is a net exporter, with exports out of the region totalling about \$47 billion and imports into the region of \$28 billion. Using the IO industry classifications, the largest exporting industries by value from the regional economy are:

- coal mining (\$41 billion)
- basic non-ferrous metal manufacturing (\$1 billion)
- electricity generation (\$1 billion)
- residential care and social assistance (\$1 billion)
- insurance and superannuation funds (\$0.7 billion).

Exporting sectors are key drivers of regional economies and reflect a region's endowments and competitive advantages.

The following analysis uses the IO table data but reports the findings in terms of both the IO industry classifications (see Table 4-5) and the ANZSIC one-digit industry classification (see Table 4-6). See ABS (2022) for concordance of industries between these classifications.

Using the IO industry classification, in terms of value-added, it is estimated that coal mining; residential care and social assistance services; retail trade; health care services; and primary and secondary school education had the highest value-added, in total equalling approximately 62% of the regional economy value-added and 43% of regional employment (see Table 4.4).

Table 4-5 Gross value-added for the 5 largest industries in the regional economy (IO sectors)

Industry	Gross value added (\$b)	Proportion of regional value added (%)	Proportion of regional employment (%)
Coal mining	31.0	50%	5%
Residential Care and Social Assistance Services	2.4	4%	9%
Retail Trade	1.8	3%	12%
Health Care Services	1.8	3%	10%
Primary and secondary education services (including preschool and special schools)	1.5	2%	7%
Total	38.5	62%	43%

Source: Gillespie Economics Input-Output Table

Based on the ANZSIC One-digit industry classification, in terms of value-added, it is estimated that mining; rental, hiring and real estate services; health care and social assistance; construction; and manufacturing had the highest value added - in total, equal to approximately 73% of the regional economy value-added and 42% of regional employment (see Table 4-6).

Table 4-6 Gross value-added for the 5 largest industries in the regional economy (one-digit ANZSIC)

Industry	Gross value added (\$b)	Proportion of regional economy (%)	Proportion of regional employment (%)
Mining	31.4	50%	6%
Rental, Hiring and Real Estate Services	4.9	8%	1%
Health Care and Social Assistance	4.2	7%	19%
Construction	2.8	5%	9%
Manufacturing	1.9	3%	6%
Total	45.2	73%	42%

Source: Gillespie Economics Input-Output Table

5 Assessment of impacts

5.1 Assessment of potential construction impacts

5.1.1 Transmission and other infrastructure

5.1.1.1 Impacts

Construction expenditure is associated with manufacturing of equipment and expenditure across the following 3 construction sectors of the input/output (IO) industry classification (ABS 2022):

- the *Heavy and Civil Engineering Construction* sector, which includes businesses involved in engineering construction and project management services for a diverse range of activities including construction of electricity transmission towers or lines, road construction and tunnelling
- the *Construction Services* sector which includes businesses involved in earthmoving work such as levelling of construction sites, excavation of foundations, trench digging, concreting services, electrical services and hire of earthmoving plant with operator
- the *Non-Residential Building Construction* sector which includes businesses engaged in the construction of non-residential buildings.

Conservatively, all machinery manufacturing is assumed to occur outside the region/New South Wales (NSW).

Construction would occur over a 2.5-year period, with average quarterly construction employment peaking at 830 workers. Average annual construction workforce over the peak 2 years of construction is estimated at 486 workers, as shown in Table 5-1.⁶

Table 5-1 Average annual construction workforce for the 2 peak years of construction and expenditure in the 3 construction sectors

Construction year	Construction workforce (expected)	Annual expenditure (\$M)
Year 1	450	156
Year 2	523	181
Average	486	168

The direct and indirect regional economic impact of the average annual level of expenditure in the regional and NSW economy are reported in Tables 5.2 and 5.3. Further detail regarding the assumptions and interpretations used in the calculation of this data is provided in Attachment 2.

⁶ Construction workforce levels are minor in the third part year of construction.

Table 5-2 Average annual economic impacts of the construction workforce on the regional economy

	Direct	Production induced	Consumption induced	Total flow on	TOTAL EFFECT
OUTPUT (\$M)	168	143	15	157	325
<i>Type IIA Ratio</i>	1.00	0.85	0.09	0.93	1.93
VALUE ADDED (\$M)	70	36	8	44	113
<i>Type IIA Ratio</i>	1.00	0.51	0.12	0.63	1.63
INCOME (\$M)	47 (9)	21 (20)	4(3)	25 (23)	72 (33)
<i>Type IIA Ratio</i>	1.00	0.45	0.08	0.52	1.52
EMPLOYMENT (No.)	486 (97)	247 (230)	57 (54)	303 (283)	789 (381)
<i>Type IIA Ratio</i>	1.00	0.51	0.12	0.62	1.62

Note: Totals may have minor discrepancies due to rounding.

Table 5-3 Average annual economic impacts of the construction workforce on the NSW economy

	Direct	Production induced	Consumption induced	Total flow on	TOTAL EFFECT
OUTPUT (\$M)	168	192	190	382	551
<i>Type IIA Ratio</i>	1.00	1.14	1.13	2.27	3.27
VALUE ADDED (\$M)	70	59	103	163	232
<i>Type IIA Ratio</i>	1.00	0.85	1.48	2.34	3.34
INCOME (\$M)	47	48	55	103	150
<i>Type IIA Ratio</i>	1.00	1.02	1.18	2.20	3.20
EMPLOYMENT (No.)	486	378	660	1,038	1,524
<i>Type IIA Ratio</i>	1.00	0.78	1.36	2.14	3.14

Note: Totals may have minor discrepancies due to rounding.

In estimating the average annual regional economic impacts of the Hunter Transmission Project (HTP, the project), it is important to separate the flow-on effects that are associated with firms buying goods and services from each other (production-induced effects) and the flow-on effects that are associated with employing people who subsequently buy goods and services as households (consumption-induced effects). This is because these 2 effects operate in different ways and have different spatial impacts.

Direct effects refer to the metrics that summarise the direct impact (in this case the construction activity). While this direct output, value-added, income and employment occur in the region, it may not accrue to regionally based businesses or regionally based labour. In Table 5-1 the direct income and employment accruing to regionally based labour is provided in brackets. For NSW, all direct effects are assumed to accrue to the State. Flow-on effects occur to businesses in the region who employ labour from inside the region and outside the region. Flow-on income and employment that accrues to regionally based labour is provided in brackets. For NSW, all flow-on effects are assumed to accrue to the State.

Both production-induced effects and consumption-induced effects accrue to the region based on local purchases for production and wage spending. Production-induced effects occur in a near-proportional way within a region, whereas the consumption-induced flow-on effects only occur in a proportional way if workers and their families are in the region or migrate into the region. Where workers commute from outside the region, some of the consumption-induced flow-on effects leak from the region. It is estimated that approximately 20% of the construction workforce is expected to be from the region. Consequently, Table 5-2 has been adjusted to only include 20% of consumption-induced flow-ons. At the NSW level, all of the construction workforce is assumed to come from NSW and hence no adjustment to consumption-induced flow-ons is made.

The average annual construction impacts of the project on the regional economy for 2 peak years of construction are estimated at up to:

- \$325M in annual direct and indirect output
- \$113M in annual direct and indirect value-added
- \$72M in annual direct and indirect household income (\$33M accruing to the region)
- 789 direct and indirect jobs (381 accruing to regional labour).

The average annual construction impacts of the project on the NSW economy for the 2 peak years of construction are estimated at up to:

- \$551M in annual direct and indirect output
- \$232M in annual direct and indirect value added
- \$150M in annual direct and indirect household income
- 1,524 direct and indirect jobs.

The impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy and hence greater production induced and consumption induced flow-on effects.

Year by year impacts on the regional and NSW economies are shown in Figures 5.1 and 5.2, respectively.

Figure 5-1 Annual construction impacts on the regional economy

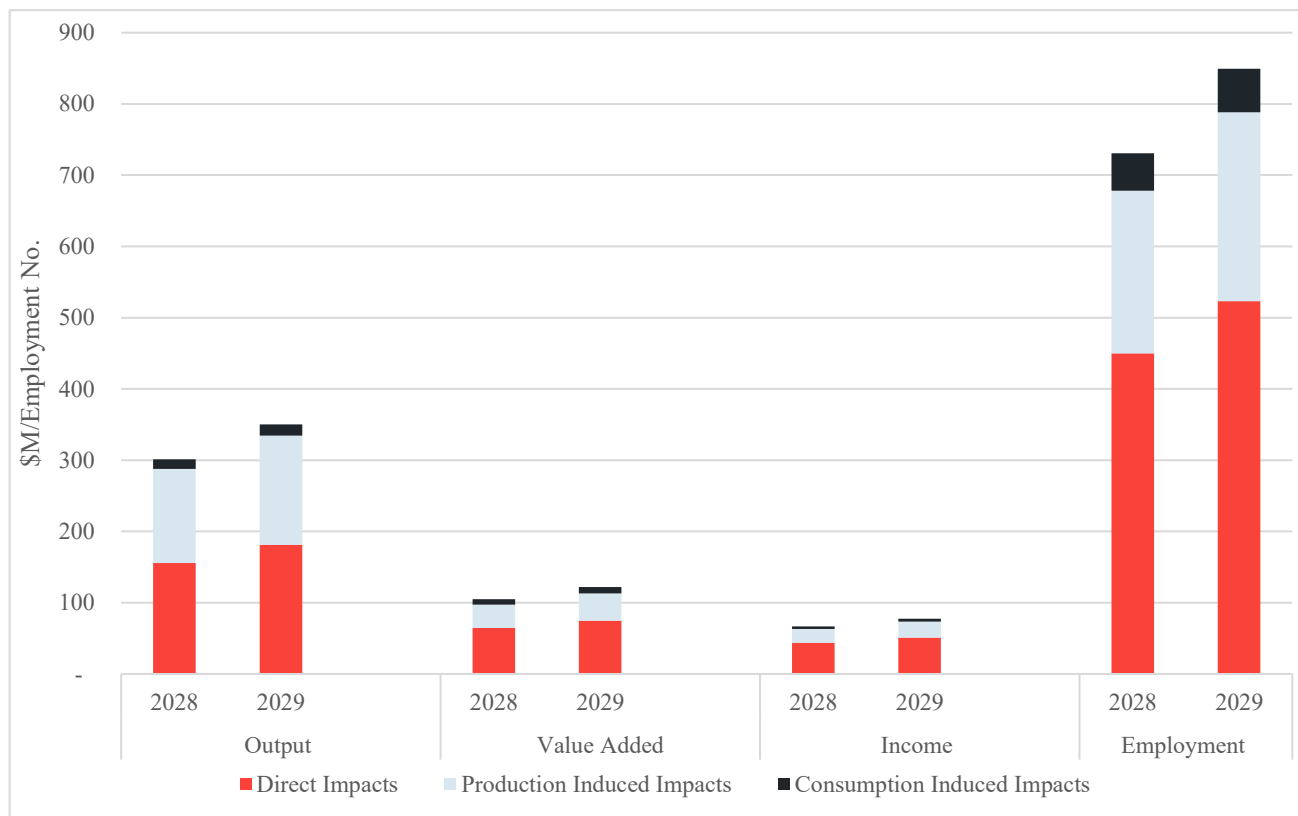
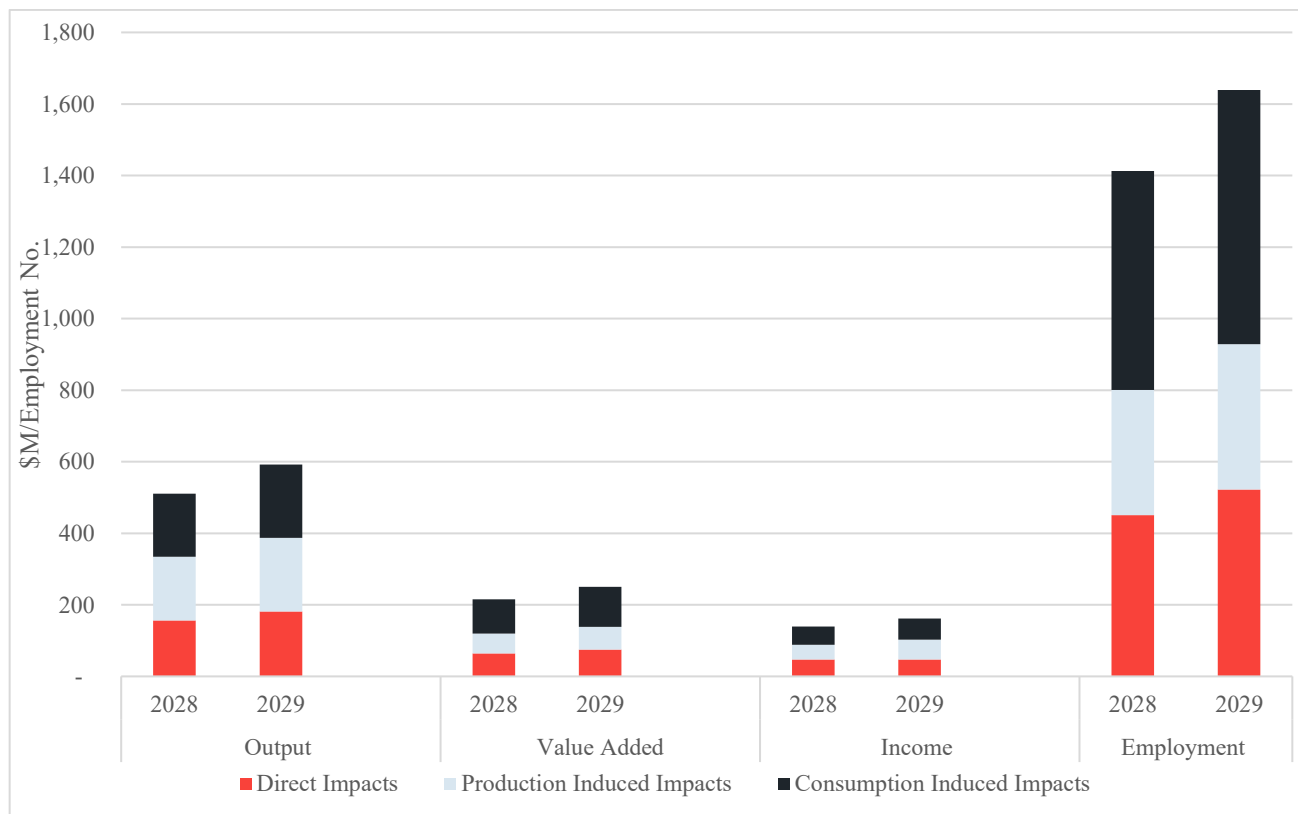


Figure 5-2 Annual construction impacts on the NSW economy



5.1.1.2 Multipliers

Multipliers are summary measures of the above impacts that identify total impact on all industries in an economy from changes in the demand for the output of any one industry (ABS 1995). There are many types of multipliers that can be generated from IO analysis (refer to Attachment 2). Type 11A ratio multipliers summarise the total impact on all industries in an economy in relation to the direct own sector effect (e.g. total income effect from a direct income effect and total employment effect from the direct employment effect).

At the regional level, the adjusted type 11A ratio multipliers for the construction workforce of the project range from 1.52 for income up to 1.93 for output. The multipliers are larger for the NSW economy because of the higher level of intersectoral linkages in the larger economy and hence larger level of flow-on impacts (i.e. less leakages compared to the regional economy).

5.1.1.3 Main sectors affected

Construction is most likely to directly impact the *Heavy and Civil Engineering Construction* sector, *Construction Services* sector and *Non-Residential Building Construction* sector. Flow-on impacts from the construction of the project are likely to affect several different sectors of the regional and NSW economies.

The sectors of the regional economy most impacted by output, value-added, income and employment production-induced flow-ons, associated with firms buying goods and services from each other are likely to be as follows:

- *Professional, Scientific and Technical Services*
- *Wholesale and Retail Trade*
- *Cement Lime and Ready-Mixed Concrete Manufacturing*
- *Structural Metal Product Manufacturing*
- *Employment, Travel Agency and Other Administrative Services*
- *Road Transport.*

For the NSW economy the *Residential Building Construction*, *Non-Residential Property Operators and Real Estate Services*, and *Auxiliary Finance and Insurance Services* sectors are also important production induced flow-on sectors.

Consumption-induced flow-on effects in the region, associated with employing people who subsequently buy goods and services as households would be mainly experienced in the following sectors:

- *Retail and Wholesale Trade*
- *Food and Beverage Services*
- *Health Care Services*
- *Primary and Secondary Education*
- *Residential Care and Social Assistance Services*
- *Employment, Travel Agency and Other Administrative Services.*

For the NSW economy the *Finance, Insurance and Superannuation*, and *Other Service* sectors are also important consumption induced flow-on sectors.

Businesses that can provide the inputs to the production process required by the construction contractor and/or the products and services required by the workforce would directly benefit from the project by way of an increased economic activity. However, because of the inter-linkages between sectors, many indirect businesses also benefit.

5.1.1.4 Benefit sharing

Positive outcomes for the regional economy and individual local government areas (LGAs) will be enhanced via the preparation and implementation of a benefits scheme and local workforce participation strategy.

Proposed benefit sharing includes:

- providing strategic benefit payments to private landowners hosting transmission infrastructure (\$200,000/kilometres of transmission infrastructure hosted to be paid in instalments over 20 years starting from the commencement of operations)
- increasing income and employment opportunities for local Aboriginal groups under the First Nations Guidelines to the value of at least 1.5 % of the contract value of the project
- maximising the employment of locals and the purchase of local goods and services
- \$50 million of funding, which will:
 - be provided to local Councils for strategic initiatives to provide direct benefits to the community affected by the project
 - be used to enhance the recreational facilities in the Pokolbin and Watagan State forests
 - support payments to private landowners that may be subject to significant visual impacts as a result of the project
 - support local education and training initiatives for the local community
 - be used to deliver other benefit-sharing initiatives for the local community.

5.1.2 *Temporary worker accommodation*

Construction of the temporary worker accommodation would result in spending in the *Non-Residential Building Construction* sector which includes construction of non-residential buildings such as hotels, motels, hospitals and industrial buildings. The impacts from construction of the temporary worker accommodation are a subcomponent of the impact of transmission and other infrastructure in Section 5.1.1. This assessment assumed that 80% of the required direct construction workforce for the project would reside in the temporary workforce accommodation and that none of the wages of these people would be spent in the regional economy. However, some portion of construction workforce wages may be spent in the regional economy. Overall, construction of the temporary worker accommodation would represent a minor component of overall construction impacts and has not been assessed separately.

The operation of the temporary worker accommodation during the construction phase may also potentially have some regional economic impacts from purchases of goods and services from the regional economy. In this respect, the worker accommodation operator would have certain targets in relation to procurement of local goods and services. However, there may be a limit to local procurement because of local unavailability of required inputs. Notwithstanding, some small regional businesses may be able to supply some of the non-labour inputs to production.

5.1.3 *Agriculture*

The construction of the project would result in a temporary reduction in the area available for agricultural activity – 57 hectares for dairy cattle and 817 hectares for meat cattle/sheep (Minesoils 2025). This is considered conservative as disturbance is not anticipated to occur across the entire Hunter Transmission Project (HTP, the project) corridor at any one time (Minesoils 2025).

The Agriculture impact assessment (Minesoils 2025) provides an assessment of the impacts on agriculture from the project. The direct impact of construction on gross agricultural value of production is estimated to be \$404,738 per year for 3 years of construction.. Using revenue, expenditure and employment ratios in the *sheep, grain, beef and dairy cattle* sector of the regional and NSW IO tables, the direct and indirect impact of this level of gross regional production is summarised in Table 5-4 and Table 5-5.

Table 5-4 Annual regional economic impacts of foregone agriculture during project construction

	Direct	Production induced	Consumption induced	Total flow on	TOTAL EFFECT
OUTPUT (\$M)	0.40	0.15	0.09	0.25	0.65
<i>Type IIA Ratio</i>	1.00	0.38	0.23	0.61	1.61
VALUE ADDED (\$M)	0.19	0.07	0.05	0.12	0.31
<i>Type IIA Ratio</i>	1.00	0.36	0.28	0.65	1.65
INCOME (\$M)	0.05	0.04	0.02	0.06	0.11
<i>Type IIA Ratio</i>	1.00	0.71	0.46	1.17	2.17
EMPL. (No.)	0.84	0.48	0.37	0.85	1.69
<i>Type IIA Ratio</i>	1.00	0.57	0.43	1.01	2.01

Note: Totals may have minor discrepancies due to rounding.

Table 5-5 Annual NSW economic impacts of foregone agriculture during project construction

	Direct	Production induced	Consumption induced	Total flow on	TOTAL EFFECT
OUTPUT (\$M)	0.40	0.30	0.28	0.58	0.99
<i>Type IIA Ratio</i>	1.00	0.75	0.69	1.44	2.44
VALUE ADDED (\$M)	0.19	0.14	0.15	0.29	0.48
<i>Type IIA Ratio</i>	1.00	0.75	0.80	1.54	2.54
INCOME (\$M)	0.06	0.08	0.08	0.16	0.22
<i>Type IIA Ratio</i>	1.00	1.47	1.44	2.91	3.91
EMPL. (No.)	0.84	0.89	0.96	1.85	2.69
<i>Type IIA Ratio</i>	1.00	1.05	1.14	2.20	3.20

Note: Totals may have minor discrepancies due to rounding.

Using the regional IO table, the direct and indirect agricultural impacts of the project during construction are less than 0.1%⁷ of agricultural activity in the region and a fraction of the economic activity gains from the project.

⁷ Any inconsistency with the estimated impact in The HTP Agriculture impact assessment (Minesoil 2025) is because this estimate includes direct and indirect impacts, is relevant across all the economic indicators, not just output, and the value of agriculture in the IO table is estimated based on the National IO tables rather than ABS LGA data.

5.1.4 Forestry

During construction, the project would impact 661 hectares of production native forests and 49 hectares of plantation forests (assumed to be hardwood). From Forestry Corporation of NSW (2024), 1.834 million hectares of hardwood multi use and plantation forests in NSW yielded \$89 million from timber and extractive resources (i.e. \$49 per hectare per year). On this basis, the annual forestry cost (foregone revenue ignoring salvage value of cleared timber) during project construction would be in the order of \$35,902 per annum. The regional impacts associated with this level of reduced economic activity are immaterial.

In terms of any permanent losses in private plantation, owners would be compensated under just terms under the *Land Acquisition (Just Terms Compensation) Act 1991* for any loss of forest.

5.1.5 Other impacts

The construction of the project would create demand for regional labour resources and regional inputs to production. Where there is excess capacity in the regional economy, or the region has access to labour and other resources from outside the region, this demand would increase economic activity in the region as reported in Section 5.1.1.1.

Non-marginal changes in labour demand from an individual project can in the short term potentially lead to increased construction wages, attraction of workers from other relevant sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), and rising costs as firms pass wage costs onto consumers. The extent of these impacts for regional economies would depend on the balance of labour supply from inside the region and outside the region (drive-in drive-out (DIDO) / fly-in fly-out (FIFO)), as well as adjustment of the overall labour market to respond to increased demand (e.g. increased labour force participation). In addition, in the short-term excess demand for inputs to construction of an individual project such as quarry materials and concrete, can result in rising costs for these factor inputs and potentially shortages for other uses.

Notwithstanding, whether, and the extent to which, these types of effects would arise from an individual project is uncertain. For instance, a study by Deloitte Access Economics (2011) for Singleton Council found no evidence of price rises (house prices, rents, or groceries) in the Singleton economy relative to non-mining regional economies. In any case, any 'crowding out' of other economic activities represents the operation of the market system where scarce resources are reallocated to where they are most highly valued and where society would benefit the most from them. This reallocation of resources is, therefore, positive for the economy not negative. Notwithstanding, it may be associated with social impacts.

5.2 Assessment of potential operation benefits and impacts

5.2.1 Project benefits

The Australian and State Governments are managing significant changes in electricity generation within the National Electricity Market (NEM). As Australia progresses towards a net zero emissions future, coal-fired and other fossil fuel-based generation are being replaced by renewable energy sources, energy storage, and other forms of firming capacity.

Large scale renewable energy projects will be located within Renewable Energy Zones (REZs) across Eastern Australia including 5 within New South Wales (NSW). The implementation of large-scale transmission infrastructure is imperative to ensure the viability of the REZs as they are not located in the immediate vicinity of load centres and, in many cases, existing transmission infrastructure is not equipped to carry the amount of energy expected to be generated. For this reason, the creation of additional transmission infrastructure is required if the REZs are to meet the aims of the *NSW Electricity Strategy* (DPIE 2019).

The HTP would provide the necessary transmission infrastructure to connect renewable energy generation projects in the Central West-Orana and New England REZs into the NEM. It will provide up to 5 GW of transfer capacity.

It is therefore an integral component of the NSW Electricity Strategy which aims to deliver reliable, affordable and sustainable electricity systems for NSW.

5.2.2 Transmission and other infrastructure

Project operation will also provide economic activity to the regional and NSW economies. For the analysis of the operational phase of the project, a new project operation sector was inserted into regional and NSW IO tables reflecting average annual operation.

This sector was based on an estimated project operational workforce of 10 (100% of which are assumed to reside in the region) and an output and expenditure profile as per the coefficients in the *Electricity Transmission, Distribution, On Selling and Electricity Market Operation* sector of the regional and NSW IO models. The direct and indirect impact of this sector was estimated using the *EconImp* program.

5.2.2.1 Impacts

The total and disaggregated average annual economic impacts of the project on the regional and NSW economies (in 2024 dollars) are shown in Table 5-6 and Table 5-7.

Table 5-6 Annual economic impacts of the project on the regional economy

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	13	11	3	15	27
Type 11A Ratio	1.00	0.89	0.26	1.15	2.15
VALUE ADDED (\$M)	4	4	2	6	10
Type 11A Ratio	1.00	0.98	0.44	1.42	2.42
INCOME (\$M)	1.4	1.7	0.8	2.6	3.9
Type 11A Ratio	1.00	1.25	0.60	1.85	2.85
EMPL. (No.)	10	17	13	30	40
Type 11A Ratio	1.00	1.72	1.29	3.01	4.01

Note: Totals may have minor discrepancies due to rounding.

Table 5-7 Annual economic impacts of the project on the NSW economy

	Direct Effect	Production Induced	Consumption Induced	Total Flow-on	TOTAL EFFECT
OUTPUT (\$M)	13	15	9	24	37
Type 11A Ratio	1.00	1.15	0.71	1.86	2.86
VALUE ADDED (\$M)	4	6	5	11	15
Type 11A Ratio	1.00	1.41	1.16	2.57	3.57
INCOME (\$M)	1.4	3.2	2.6	5.8	7.2
Type 11A Ratio	1.00	2.30	1.92	4.21	5.21
EMPL. (No.)	10	26	32	57	67
Type 11A Ratio	1.00	2.57	3.17	5.73	6.73

Note: Totals may have minor discrepancies due to rounding.

The project is estimated to make up to the following total annual contribution to the regional economy during operation:

- \$27M in annual direct and indirect output
- \$10M in annual direct and indirect value-added
- \$4M in annual direct and indirect household income
- 40 direct and indirect jobs.

The project is estimated to make up to the following total annual contribution to the NSW economy during operation:

- \$37M in annual direct and indirect output.
- \$15M in annual direct and indirect value-added
- \$7M in annual direct and indirect household income
- 67 direct and indirect jobs.

The impacts are larger for the NSW economy because there is less leakage of direct and indirect expenditure out of the NSW economy compared to the regional economy.

5.2.2.2 Multipliers

The Type 11A ratio multipliers for the project's impact on the regional economy range from 2.15 for output up to 4.01 for employment. Capital-intensive industries such as electricity transmission⁸ tend to have a high level of linkage with other sectors in an economy thus contributing substantial flow-on employment and income while at the same time only having a lower level of direct employment and income (relative to output levels). This tends to lead to a relatively high ratio multiplier for employment and income. Capital-intensive projects also typically have a relatively low ratio multiplier for output and value-added reflecting the relatively high direct output and value-added compared to that in flow-on sectors.

The NSW Type 11A ratio multipliers for the project range from 2.86 for value-added up to 6.73 for employment. The multipliers are large for the NSW economy because of the greater level of intersectoral linkages in the larger economy and hence larger level of flow-on impacts (i.e. less leakages compared to the regional economy).

5.2.2.3 Main sectors affected

Project operation is most likely to directly impact the *Electricity Transmission, Distribution, On Selling and Electricity Market Operation* sector. Flow-on impacts from the operation of the project are likely to affect several different sectors of the regional and NSW economy.

The sectors of the regional economy most impacted by output, value-added, income and employment production induced flow-ons, are likely to be as follows:

- *Electricity Generation*
- *Electricity Transmission, Distribution, On Selling and Electricity Market Operation*
- *Construction Services*
- *Professional, Scientific, and Technical Services*
- *Finance*
- *Auxiliary Finance and Insurance Services*
- *Wholesale Trade*
- *Employment, Travel Agency and Other Administrative Services.*

⁸ Electricity transmission is a capital-intensive industry because it requires little labour in comparison to its economic output.

For the NSW economy the *Non-Residential Property Operators and Real Estate Services*, and *Computer Systems Design and Related Services* sectors are also important production induced flow-on sectors.

Consumption-induced flow-on effects in the region, associated with employing people who subsequently buy goods and services as households would be mainly experienced in the following sectors:

- *Retail and Wholesale Trade*
- *Food and Beverage Services*
- *Health Care Services*
- *Primary And Secondary Education*
- *Residential Care and Social Assistance Services*
- *Road Transport*
- *Professional, Scientific, and Technical Services.*

For the NSW economy the *Finance, Insurance and Superannuation*, and *Employment, Travel Agency and Other Administrative Services* sectors are also important consumption induced flow-on sectors.

Businesses that can provide the inputs to the production process required by the project and/or the products and services required by the workforce would directly benefit from the project by way of an increased economic activity. However, because of the inter-linkages between sectors, many indirect businesses also benefit.

5.2.3 *Worker accommodation*

The temporary workers accommodation would not operate during the operation phase of the project and hence no regional or NSW economic impacts would occur.

5.2.4 *Agriculture*

Agricultural activities would be able to occur under the transmission line and so project operation would only result in a minor reduction (189 hectares) in land available for agriculture - 13 hectares for dairy cattle and 176 hectares for meat cattle/sheep (Minesoils 2025). This reduction in area available for agriculture is associated with the transmission tower footprints, upgraded substations and operational access roads.

As provided in the Agriculture impact assessment (Minesoils 2025) the estimated direct impact of the project operation on gross agricultural production is \$88,937 per year. Using revenue, expenditure and employment ratios in the *sheep, grain, beef and dairy cattle* sector of the regional and NSW IO table, the direct and indirect impact of this level of gross regional production is summarised in Table 5.8 and 5.9.

Table 5-8 Annual regional economic impacts of foregone agriculture during project operation

	Direct	Production induced	Consumption induced	Total Flow on	Total Effect
OUTPUT (\$M)	0.09	0.03	0.02	0.05	0.14
<i>Type IIA Ratio</i>	1.00	0.38	0.23	0.61	1.61
VALUE ADDED (\$M)	0.04	0.02	0.01	0.03	0.07
<i>Type IIA Ratio</i>	1.00	0.36	0.28	0.65	1.65
INCOME (\$M)	0.01	0.01	0.01	0.01	0.02
<i>Type IIA Ratio</i>	1.00	0.71	0.46	1.17	2.17
EMPL. (No.)	0.19	0.11	0.08	0.19	0.37
<i>Type IIA Ratio</i>	1.00	0.57	0.43	1.01	2.01

Note: Totals may have minor discrepancies due to rounding.

Table 5-9 Annual NSW economic impacts of foregone agriculture during project operation

	Direct	Production induced	Consumption induced	Total Flow on	Total Effect
OUTPUT (\$M)	0.09	0.07	0.06	0.13	0.22
<i>Type IIA Ratio</i>	1.00	0.75	0.69	1.44	2.44
VALUE ADDED (\$M)	0.04	0.03	0.03	0.06	0.11
<i>Type IIA Ratio</i>	1.00	0.75	0.80	1.54	2.54
INCOME (\$M)	0.01	0.02	0.02	0.04	0.05
<i>Type IIA Ratio</i>	1.00	1.47	1.44	2.91	3.91
EMPL. (No.)	0.19	0.19	0.21	0.41	0.59
<i>Type IIA Ratio</i>	1.00	1.05	1.14	2.20	3.20

Note: Totals may have minor discrepancies due to rounding.

Using the regional IO table, the direct and indirect agricultural impacts of the project during operation are less than 0.02%⁹ of agricultural activity in the region and a fraction of the economic activity gains from the project operation.

5.2.5 Forestry

During operation, the project would impact 449 hectares of production native forests and 33 hectares of plantation forests (assumed hardwood). From Forestry Corporation (2024), 1.834 million ha of hardwood multi use and plantation forests in NSW yielded \$89 million from timber and extractive resources (i.e. \$49 per hectares per year). On this basis, the annual forestry cost during project operations would be \$23,387. The regional impacts associated with this reduced economic activity are immaterial.

⁹ Any inconsistency with the estimated impact in the HTP Agriculture impact assessment (Appendix Q to the EIS) is because this estimate includes direct and indirect impacts, is relevant across all the economic indicators, not just output, and the value of agriculture in the IO table is estimated based on the National IO tables rather than ABS LGA data.

In terms of any permanent losses in private plantation, owners would be compensated under just terms under the *Land Acquisition (Just Terms Compensation) Act 1991* for any loss of forest.

5.2.6 *Other impacts*

The operation of the proposed transmission and other infrastructure would create only a small demand for regional labour resources and regional inputs to production relative to the project construction. Consequently, no ‘crowding out’ effects on other industry sectors are anticipated.

5.3 Assessment of potential cumulative impacts

5.3.1 *Introduction*

Cumulative impacts of multiple projects in the region and NSW would result in the magnification of impacts addressed in this report and competition for resources, including labour and non-labour inputs to production. These are discussed qualitatively below based on general principles of supply and demand.

5.3.2 *Initial cumulative labour stimulus*

Attachment 3 identifies 14 projects that may have cumulative impacts with the project. The main cumulative economic impact of these projects would be the generation of a large demand for a suitably qualified construction workforce in regional areas.

This labour demand would be met from:

- the regions:
 - the unemployment pool
 - increased labour force participation
 - workers from other industries.
- the rest of NSW and Australia, with labour:
 - moving into the region to live during the employment period
 - commuting from outside the region (e.g. FIFO and DIDO)
- the rest of the world.

5.3.3 *Population impact*

It is unlikely all the cumulative labour demand can be met from the existing residents of the regions only. The project may result in temporary population gains during construction. As identified in Section 5.1, population growth is an important driver of the health of regional economies. To the extent that the cumulative job stimulus results in workers (and their families) relocating to regional areas, even temporarily, or workers from the region not emigrating from the region in search of work, this can provide population growth (or abate population decline), including in areas experiencing population decline. Population growth can in turn lead to increased demand for goods and services and thus more jobs. It can also lead to increasing local multiplier effects, scale economies and an increase in the rate of innovation and capital availability (Sorensen 1990). While cumulative regional population impacts are likely to be temporary, they may still occur over many years.

5.3.4 *Accommodation impacts*

Temporary cumulative regional population changes driven by cumulative temporary regional employment growth would increase demand for short-term and long-term accommodation. Impacts could include increases in housing prices and rents, and shortages of short-term accommodation that might otherwise be used for tourism or other purposes.

From an economic perspective, increases in the cost of housing are predominantly a transfer between local owners and renters, or local owners and buyers. The existing homeowners and accommodation providers of the property benefit when this happens, and the renters/buyers lose (Deloitte Access Economics 2012). However, price rises also impact

lower income households who may get squeezed out of the market. In situations where there are no market distortions, and cumulative population changes are longer term, the local housing supply would normally adjust to demand, and prices return to their previous levels (Deloitte Access Economics 2012). However, given the more temporary nature of population change resulting from the cumulative project demand, normal longer term housing supply adjustments may be tempered and so there would be a need to encourage and facilitate the provision of additional accommodation including temporary worker accommodations, adaptive reuse or extension of existing buildings, use of existing granny flats and spare bedrooms, or use of vacant housing.

The extent of residual housing price impacts for regional economies would depend on the balance of labour supply from inside the region, outside the region and DIDO/FIFO, the level of provision of workforce accommodation facilities, and other accommodation options, as well as adjustment of the overall housing supply in response to increased demand. Early provision of additional accommodation can reduce housing price impacts.

5.3.5 *Regional job growth*

Cumulative demand for labour in regional areas can help address the jobs growth imbalance between Australia's biggest cities which have grown by an average of 2.4% per annum since 2000 and the regions which have grown at 1.0% per annum (Sobyra 2022). This imbalance has been attributed to the economy creating relatively more demand for high skilled jobs than previously with the vast majority of these located in big cities rather than regions (Sobyra 2022).

Regional jobs growth from the cumulative project demand can partly offset this trend by providing opportunities for the existing and future regional workforces, attracting middle-and high-skilled workers and families to regional areas, reducing outmigration of the regional workforce to look for employment in cities, and increase regional labour force participation. Regional projects can, therefore, provide a boom to non-coastal regional economies that have experienced low growth or decline because of globalisation and associated structural adjustment.

Notwithstanding, there are likely to be regional skills shortages in a range of key occupations including construction managers, electrical engineers, civils engineers, transmission line workers, and electricians.

5.3.6 *Stimulus to regional economic activity*

Cumulative projects in regional NSW would provide a substantial boost in direct economic activity in the region as well as flow-on economic activity to businesses that are able to supply the goods and services:

- required for project construction and operation
- demanded by workers (i.e. expenditure of wages).

Based on the economic impact assessment in this report, cumulative project construction is most likely to directly impact the *Heavy and Civil Engineering Construction Sector, Construction Services Sector and Non-Residential Building Construction Sector*.

The sectors of regional economies most impacted by production induced flow-ons, associated with firms buying goods and services from each other, are likely to be as follows:

- *Professional, Scientific and Technical Services*
- *Wholesale and Retail Trade*
- *Cement Lime and Ready-Mixed Concrete Manufacturing*
- *Structural Metal Product Manufacturing*
- *Employment, Travel Agency and Other Administrative Services*
- *Road Transport.*

Consumption-induced flow-on effects in the region, associated the expenditure of wages will be mainly experienced in the following sectors:

- *Retail and Wholesale Trade*

- *Food and Beverage Services*
- *Health Care Services*
- *Primary and Secondary Education*
- *Residential Care and Social Assistance Services*
- *Employment, Travel Agency and Other Administrative Services.*

However, any business that can provide the goods and services demanded for project construction and operation, and by workers, would benefit from the cumulative economic activity.

5.3.7 *Impacts on other sectors of the economy*

Notwithstanding the above, large increases in demand for construction workers can in the short run lead to increased construction sector (and other sector) wages, attraction of workers from other relevant sectors of the economy leading to labour shortages in these other areas of the economy (and associated shortages of goods and services), and rising prices as firms pass wage costs onto consumers.

In addition, large increases in demand for inputs to construction such as plant and equipment, quarry materials and concrete can result in rising costs (prices) for these factor inputs and potentially shortages for other uses. The extent of these short run impacts for regional economies would depend on the balance of labour supply from inside the region, outside the region and DIDO/FIFO, as well as adjustment of the overall labour market, and other markets, in response to increased demand. However, in the medium-term markets would adjust to some extent (e.g. increased labour force participation, new quarry proposals to supply demand for aggregate) and enable wages and prices to return to previous levels.

Notwithstanding, any price increases and ‘crowding out’ of other economic activities in the region represents the operation of the market system (within the constraints of government regulation) where scarce resources are reallocated to where they are most highly valued and where society would benefit the most from them. This reallocation of resources is, therefore, a positive thing for the economy not a negative. Notwithstanding, it may be associated with social impacts.

5.3.8 *Distribution of cumulative impacts*

From Attachment 3 it is evident that the majority of future projects in the region are located in the northern part of the study area, including New England REZ Transmission Project, Hunter Valley Operations (HVO) Continuation Projects and Maison Dieu Solar Farm. Consequently, impacts will be more concentrated in this area and therefore this area will be the focus of the Energy Corporation of NSW’s (EnergyCo’s) cumulative impact mitigation measures.

6 Management

Construction and operation of the Hunter Transmission Project (HTP, the project) would provide positive economic activity to the regional and State economies. However, at the same time, it would create a large demand for a suitably qualified construction workforce in the region.

The inclusion of temporary worker accommodation has been proposed to mitigate the risk that the project significantly increases competition for labour and housing in the region. Notwithstanding, it is the intention of the project to provide positive local employment and business opportunities for the region.

These benefits can be maximised via the promotion of local workforce and industry participation, the preparation and implementation of a Local Workforce Participation Strategy and Industry Participation Plan.

Mitigation measures proposed to avoid or minimise economic impacts during construction and operation of the project are listed in Table 6-1. These measures will be included in the issue-specific environmental management plans for the project.

Table 6-1 Proposed mitigation measures – technical assessment issue

Identification No.	Project element	Issue	Mitigation measure	Timing
E.1	Construction and operation	Local employment opportunities	A local workforce development plan, a local industry participation plan and an Australian industry participation plan will be developed for the project to promote local worker participation.	Detailed design Construction Operation
E.2	Construction and operation	Local business opportunities	Consultation will be carried out with local councils, economic development organisations and local chambers of commerce to: • Inform local business of the goods and services required for the project, the service provision opportunities and compliance requirements of business to be able to secure contracts • Encourage local businesses to meet the requirements of the project for supply contracts • Develop relevant networks to assist qualified local and regional businesses to tender for the provision of goods and services to support the project.	Detailed design Construction

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Attachments

Attachment 1 - The GRIT System for Generating Input-Output Tables

The Generation of Regional Input–Output Tables (GRIT) system was designed to:

- combine the benefits of survey based tables (accuracy and understanding of the economic structure) with those of non–survey tables (speed and low cost)
- enable the tables to be compiled from other recently compiled tables
- allow tables to be constructed for any region for which certain minimum amounts of data were available
- develop regional tables from national tables using available region–specific data
- produce tables consistent with the national tables in terms of sector classification and accounting conventions
- proceed in a number of clearly defined stages
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well–defined steps. Of particular significance are those that involve the analyst incorporating region–specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study.

An important characteristic of GRIT–produced tables relates to their accuracy. In the past, survey–based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen 1980). This means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in Table A1.1 (Powell and Chalmers 1995).

Table A1.1 The GRIT Method

Phase	Step	Action
PHASE I		ADJUSTMENTS TO NATIONAL TABLE
	1	Selection of national input–output table (1114–sector table with direct allocation of all imports, in basic values).
	2	Adjustment of national table for updating.
	3	Adjustment for international trade.
PHASE II		ADJUSTMENTS FOR REGIONAL IMPORTS <i>(Steps 4–14 apply to each region for which input–output tables are required)</i>
	4	Calculation of ‘non–existent’ sectors.
	5	Calculation of remaining imports.
PHASE III		DEFINITION OF REGIONAL SECTORS
	6	Insertion of disaggregated superior data.
	7	Aggregation of sectors.
	8	Insertion of aggregated superior data.
PHASE IV		DERIVATION OF PROTOTYPE TRANSACTIONS TABLES
	9	Derivation of transactions values.
	10	Adjustments to complete the prototype tables.
	11	Derivation of inverses and multipliers for prototype tables.
PHASE V		DERIVATION OF FINAL TRANSACTIONS TABLES
	12	Final superior data insertions and other adjustments.
	13	Derivation of final transactions tables.
	14	Derivation of inverses and multipliers for final tables.

Source: Bayne and West (1988).

Attachment 2 - Underlying Assumptions and Interpretations of Input-Output Analysis and Multipliers

1. 'The *basic assumptions* in IO (input-output) analysis include the following:

- there is a fixed input structure in each industry, described by fixed technological coefficients (evidence from comparisons between IO tables for the same country over time have indicated that material input requirements tend to be stable and change but slowly; however, requirements for primary factors of production, that is labour and capital, are probably less constant)
- all products of an industry are identical or are made in fixed proportions to each other
- each industry exhibits constant returns to scale in production
- unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost (in reality, constraints such as limited skilled labour or investment funds lead to competition for resources among industries, which in turn raises the prices of these scarce factors of production and of industry output generally in the face of strong demand)
- there are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.

2. The multipliers, therefore, describe average effects, not marginal effects, and thus do not take account of economies of scale, unused capacity or technological change. Generally, average effects are expected to be higher than the marginal effects.

3. The IO tables underlying multiplier analysis only take account of one form of interdependence, namely the sales and purchase links between industries. Other interdependence such as collective competition for factors of production, changes in commodity prices which induce producers and consumers to alter the mix of their purchases and other constraints which operate on the economy as a whole are not generally taken into account.

4. The combination of the assumptions used and the excluded interdependence means that IO multipliers are higher than would realistically be the case. In other words, they tend to overstate the potential impact of final demand stimulus. The overstatement is potentially more serious when large changes in demand and production are considered.

5. The multipliers also do not account for some important pre-existing conditions. This is especially true of Type II multipliers, in which employment generated and income earned induce further increases in demand. The implicit assumption is that those taken into employment were previously unemployed and were previously consuming nothing. In reality, however, not all 'new' employment would be drawn from the ranks of the unemployed; and to the extent that it was, those previously unemployed would presumably have consumed out of income support measures and personal savings. Employment, output and income responses are therefore overstated by the multipliers for these additional reasons.

6. The most appropriate interpretation of multipliers is that they provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the economy which arises solely from purchases and sales of industry output based on estimates of transactions occurring over a (recent) historical period. Progressive departure from these conditions would progressively reduce the precision of multipliers as predictive device' (ABS 1995 p.24).

Multipliers indicate the total impact of changes in demand for the output of any one industry on all industries in an economy (ABS 1995). Conventional output, employment, value-added and income multipliers show the output, employment, value-added and income responses to an initial output stimulus (Jensen and West 1986).

Components of the conventional output multiplier are as follows:

- *Initial effect* – which is the initial output stimulus, usually a \$1 change in output from a particular industry (Powell and Chalmers 1995; ABS 1995)
- *First round effects* – the amount of output from all intermediate sectors of the economy required to produce the initial \$1 change in output from the particular industry (Powell and Chalmers 1995; ABS 1995)
- *Industrial support effects* – the subsequent or induced extra output from intermediate sectors arising from the first round effects (Powell and Chalmers 1995; ABS 1995)

- *Production induced effects* – the sum of the first round effects and industrial support effects (i.e. the total amount of output from all industries in the economy required to produce the initial \$1 change in output) (Powell and Chalmers, 1995; ABS, 1995)
- *Consumption induced effects* – the spending by households of the extra income they derive from the production of the extra \$1 of output and production induced effects. This spending in turn generates further production by industries (Powell and Chalmers, 1995; ABS, 1995)
- The *simple multiplier* is the initial effect plus the production induced effects
- The *total multiplier* is the sum of the initial effect plus the production–induced effect and consumption–induced effect.

Conventional employment, value-added and income multipliers have similar components to the output multiplier; however, through conversion using the respective coefficients show the employment, value-added and income responses to an initial output stimulus (Jensen and West 1986).

For employment, value-added and income, it is also possible to derive relationships between the initial or own sector effect and flow-on effects. For example, the flow-on income effects from an initial income effect or the flow-on employment effects from an initial employment effect, etc. These own sector relationships are referred to as ratio multipliers, although they are not technically multipliers because there is no direct line of causation between the elements of the multiplier. For instance, it is not the initial change in income that leads to income flow-on effects, both are the result of an output stimulus (Jensen and West 1986).

A description of the different ratio multipliers is given below.

$$\text{Type 1A Ratio Multiplier} = \frac{\text{Initial} + \text{First Round Effects}}{\text{Initial Effects}}$$

$$\text{Type 1B Ratio Multiplier} = \frac{\text{Initial} + \text{Production Induced Effects}}{\text{Initial Effects}}$$

$$\text{Type 11A Ratio Multiplier} = \frac{\text{Initial} + \text{Production Induced} + \text{Consumption Induced Effects}}{\text{Initial Effects}}$$

$$\text{Type 11B Ratio Multiplier} = \frac{\text{Flow-on Effects}}{\text{Initial Effects}}$$

Source: Centre for Farm Planning and Land Management (1989).

Attachment 3 – Cumulative Projects

Table A3.1 Anticipated schedule overlap with relevant future projects during construction

Project	Approx distance from HTP	2025				2026				2027				2028				2029			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
HTP	N/A																				
New England REZ Transmission Project	0 km																				
Liddell Future Land Use and Enabling Works	1 km																				
HVO North Open Cut Coal Continuation Project	0 km																				
HVO South Open Cut Coal Continuation Project	0 km																				
Maison Dieu Solar Farm	1 km																				
Hunter-Central Coast REZ Transmission Project	0 km																				

Project	Approx distance from HTP	2025				2026				2027				2028				2029			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Muswellbrook Solar Farm	14 km																				
Bowmans Creek Wind Farm	9 km																				
Central- West Orana REZ Transmission Project	80 km																				
Edderton Solar Project ¹	5 km																				
Intertrade Project	>50 km																				
Mandalong Road Upgrade*	6 km																				
Muswellbrook Pumped Hydro Energy Storage Project	<u>15 km</u>																				
Bayswater Power Station Upgrade ²	<u>0 km</u>																				

1: Anticipated timing of the Edderton Solar Project is not known based on available documentation. Construction of this project is anticipated to take around 20 months and is anticipated to commence as soon as necessary approvals are obtained. Potential overlap with HTP has been assumed

2: Construction of the Bayswater Power Station upgrade is anticipated to have finished construction prior to construction of the HTP. Ongoing operational activities may occur intermittently