



Transport
for NSW

Gulgong – Maryvale Line Construction Feasibility Study

Executive Summary

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The Gulgong to Maryvale Line Construction Feasibility Study has found that the project is economically viable.

The economic assessment of the project scenarios returns a BCR of between 0.65 (Scenario 1) and 1.02 (Scenario 4), discounted at 7% real, depending on the scenario adopted. This means that up to \$1.02 is returned in Scenario 4 for every dollar invested.

Project benefits are derived primarily from the travel time savings for freight movements, except for Scenario 4, which derives most of its benefit from the freight demands that can be attracted to the corridor. Based on the market and demand analysis for the base Scenario 1 the project will generate benefits of \$175m over the life of the project, compared against a cost to achieve this benefit of \$270m (Scenario 1) - both in present value terms, discounted at 7% real leading to the BCR of 0.65. Similarly, Scenario 4 incurs NPV costs of \$280m to deliver benefits of \$285m leading to the 1.02 BCR. These costs and benefits vary by demand scenario and include the upfront and ongoing costs of providing the necessary rail infrastructure and the services and facilities required to deliver and manage this freight along the corridor.

The proposed rail corridor is around 72 kilometres long and generally passes through open farmland with limited areas of significant environmental value. The engineering requirements are manageable, though there are opportunities for enhancement of some sections of the route and there are sections that will require full reconstruction of formation that has deteriorated significantly over the years since it was first constructed. Stakeholders have generally indicated support for the project as it will provide flexibility within the NSW rail network and optimise freight transport costs to/from the mid-western areas of NSW and beyond.

Recommendation: The Gulgong to Maryvale Line Construction project should progress to the next stage of investigation (as acceptable to Fixing Country Rail): Design and Planning (inclusive of REF, if required), to further develop and refine the cost estimate for the work.

The **Gulgong to Maryvale Line** is a partially completed 72-kilometre section of the proposed Sandy Hollow to Maryvale line. While the Sandy Hollow to Gulgong section was completed in the 1980s, construction of the Gulgong to Maryvale section of the line was suspended in the 1950s and includes semi-complete earthworks, bridges, platforms and a tunnel.

Construction of the Sandy Hollow to Gulgong line was originally to support the movement of coal from the Ulan mine to Newcastle. This line now supports a number of other mines including Wilpinjong and Moolarben¹. The most recent study into completing the line from Gulgong to Maryvale was undertaken by the Bureau of Transport Economics in 1979. Transport for NSW (TfNSW) has engaged Ontoit to develop the Gulgong to Maryvale Line Construction Feasibility Study (the Study).

Originally surveyed over 150 years ago, the Gulgong to Maryvale corridor has been defined for a significant period of time. The construction of the line between Sandy Hollow and Maryvale was commenced in 1937, but was abandoned in 1951 due to funding, resource and procurement limitations. During that period, some major assets such as bridges and tunnels were constructed, as well as major earthworks being completed, but no track infrastructure was installed on the line.

In the 1980s, with the incentive to enable rail freight between the Western Coalfields and the Port of Newcastle, the Sandy Hollow to Gulgong section was completed and commissioned, however the Gulgong to Maryvale section of the line has remained untouched and is currently in the format in which it was abandoned, though the assets have continued to deteriorate with the passage of time.

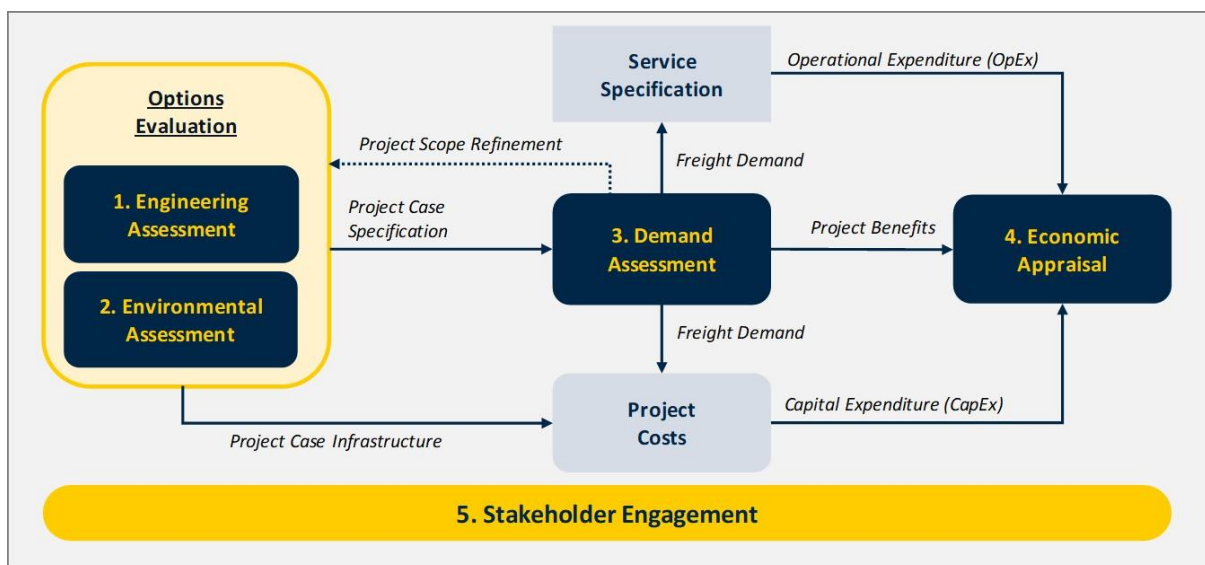
The NSW Government has funded this study to assess the feasibility of completing the construction of the railway line from Gulgong to Maryvale. John Holland Rail (JHR), appointed by Transport for NSW (TfNSW) to manage and operate the State's regional rail network, has commissioned a consultant to undertake the Gulgong to Maryvale Line Construction Feasibility Study (the Study). The Study needs to assess the engineering requirements for new and upgraded infrastructure to implement a functional rail corridor, investigate land use and environmental planning issues along the route, assess potential demand for the line and undertake an economic assessment of the rail corridor.

¹ This study refers to the three mines at Ulan, Wilpinjong and Moolarben as the 'western coalfields'

The scope of the Study includes an analysis of the engineering requirements for completing the construction of the rail line (including the permanent way, cuttings, embankments and associated structures), a demand assessment, economic and financial modelling, assessment of operating and maintenance costs and detailing of land use and environmental planning issues.

The approach to this study includes several parallel and interdependent streams of work, providing an overarching project appraisal framework as shown below. The project appraisal framework includes:

1. **Engineering assessment and costing**
2. **Environmental and land use assessment**
3. **Market and demand assessment**
4. **Economic appraisal (Financial and Economic)**
5. **Stakeholder engagement**



Engineering assessment and costing

The engineering assessment and costing analysis was conducted through a combination of condition assessments, engineering investigations and route development to determine a recommended line configuration and capital cost estimate for the construction of the Gulgong to Maryvale line.

The report determines an estimated capital cost of between \$328.0 and \$343.1 million, depending on maximum tonne axle load to be adopted and is programmed for completion by mid-2025.

The recommended maximum TAL level to be adopted is dependent on the findings of the Market and Demand Assessment and the Economic Appraisal. The analysis conducted as part of these sections of the study, suggest that **reinstatement of the line to 25TAL** is the most feasible solution to achieve the defined objectives of the project.

The key recommendations of the engineering assessment are to implement the following solutions to deliver a railway from Gulgong to Maryvale:

- Three passing loops to be constructed along the line at locations to be defined as Castlereagh Loop, Goolma Loop and Bodangora Loop
- Retain the existing track alignment of the non-operational line
- Train Order Working to be re-established as the line signalling system, with six track blocks recommended for the line section

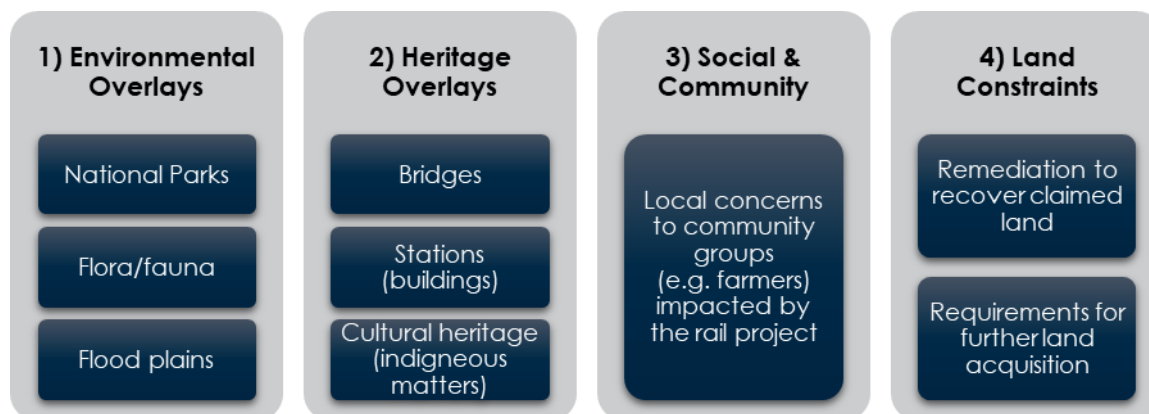
The final capital cost estimate for the line reinstatement to 25TAL is provided below, along with the +50% estimate.

TAL Limit	Final Cost Estimate	Final Cost Estimate (+50%)*
25	\$328.0m	\$421.7m

*Note: The final cost estimate is inclusive of a 20% contingency, but contingency is removed prior to calculation of the plus 50% costs

Environmental and land use assessment

The environmental assessment involved a desktop assessment that examined key environmental constraints as part of the evaluation of the route. The environmental considerations fall under four categories, with the specific elements of each.



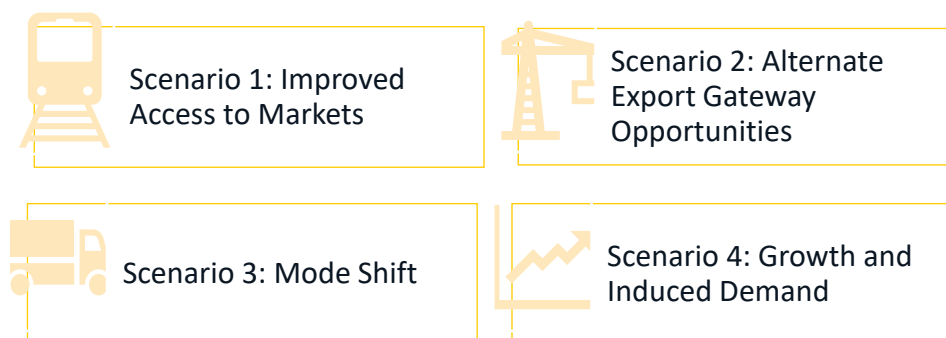
The desktop environmental assessment concluded that there will be no significant environmental issues associated with the operation of freight trains along this route as summarised below.

- **Protected areas:** The closest National Park to the rail line is to the north of the rail corridor and will not be impacted by this line.
- **Flora and Fauna:** Flora and Fauna Reserves and koala habitats will not be affected by this corridor.
- **Soil and contaminations:** According to available data, there are no hazardous sites in the vicinity of the railway.
- **Heritage:** The existing route avoids World, Commonwealth and Aboriginal Heritage sites.
- **Social and community:** The extent of noise and air emissions effects on the community will need to be further investigated if the Gulgong to Maryvale rail proposal is to proceed further.

The assessment of the planning approval pathways indicates that an REF may be required, but the project will not require an EIS, as none of the consideration factors for an EIS are relevant in this case.

Market and demand assessment

The purpose of the freight demand assessment is to quantify the potential freight movements that could use the new rail corridor. This analysis was based on a publicly available data source from TfNSW/TPA known as 'Strategic Freight Forecasts - NSW freight commodity demand volume forecasts for the 40-year period between 2016 to 2056'. A bespoke model was developed to consider potential markets and origin-destination pairs that could be attracted to the Gulgong to Maryvale route.



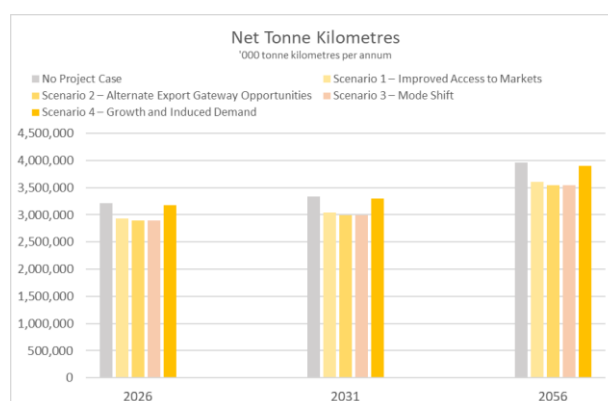
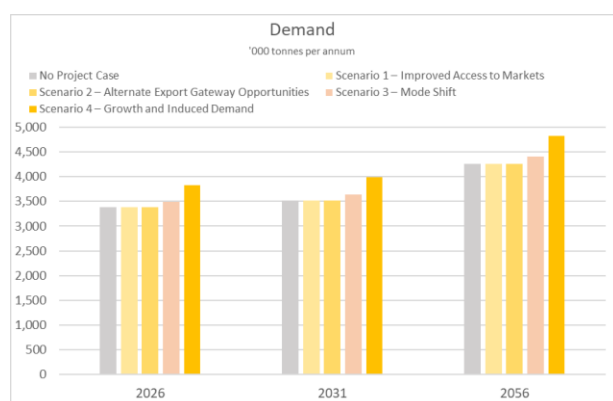
Four project case scenarios were modelled to assess the viability of the project, noting that scenarios for Gulgong to Maryvale are cumulative and hence Scenario 2 builds on Scenario 1 and so forth. The scenarios are summarised as:

- **Scenario 1: Improved Access to Markets** – directly provided by the new rail coming online and the presently forecast freight task in the area having the ability to use it
- **Scenario 2: Alternate Export Gateway Opportunities** – directly provided by the new rail coming online and the ability of freight movements to access the Port of Newcastle more directly (includes the Scenario 1 demand)
- **Scenario 3: Mode Shift** – provided by the enhanced ability to move road freight on to the rail line from the line coming online (includes the Scenario 2 demand)

- **Scenario 4: Growth and Induced Demand** – from the increased economic productivity in the area provided by the new rail line, allowing for an increase in production of commodities (includes the Scenario 2 demand, but not the Scenario 3 mode shift)

A summary of the results in annual freight demand (in kilotonnes per annum) and freight transport (in net tonne-kilometres) is shown in the following table and graphs.

Year	No Project Case	Scenario 1 – Improved Access to Markets	Scenario 2 – Alternate Export Gateway Opportunities	Scenario 3 – Mode Shift	Scenario 4 – Growth and Induced Demand
Annual freight demand (in kilotonnes per annum)					
2026	3,378	3,378	3,378	3,491	3,829
2031	3,522	3,522	3,522	3,640	3,992
2056	4,255	4,255	4,255	4,404	4,829
Annual freight transport (in net tonne-kilometres)					
2026	3,219,291	2,931,165	2,892,698	2,893,479	3,182,749
2031	3,339,069	3,040,088	2,997,689	2,998,508	3,298,277
2056	3,965,307	3,606,227	3,546,295	3,547,306	3,901,935



Financial analysis

Four scenarios have been considered as part of this assessment, as outlined in the demand analysis:

- Scenario 1 – Improved Access to Markets
- Scenario 2 – Alternate Export Gateway Opportunities
- Scenario 3 – Mode Shift
- Scenario 4 – Growth and Induced Demand

Scenario 4 has the highest financial cost of the considered scenarios, though in net present value terms, this difference is only marginal, with an estimated NPC of \$282.5m (discounted at 7 per cent real), approximately only \$3.0m higher than the other considered solutions

Project Scenarios	Financial Analysis Results, 50 years \$m			
	Real \$m	Net Present Cost 4%	Net Present Cost 7%	Net Present Cost 10%
Scenario 1 – Improved Access to Markets	\$392.5	\$314.3	\$278.9	\$251.8
Scenario 2 – Alternate Export Gateway Opportunities	\$397.2	\$315.7	\$279.7	\$252.2
Scenario 3 – Mode Shift	\$396.6	\$315.5	\$279.5	\$252.2
Scenario 4 – Growth and Induced Demand	\$410.6	\$320.8	\$282.5	\$254.0

Economic analysis

The Cost Benefit Analysis (CBA) has generated the economic Net Present Values (NPV) and Benefit Cost Ratios (BCR) for the project scenarios as outlined below.

Component	Discounted @ 4%	Discounted @ 7%	Discounted @ 10%
Scenario 1 – Improved Access to Markets			
Economic NPV	(\$8.8)	(\$94.4)	(\$126.4)
BCR	0.97	0.65	0.49
Scenario 2 – Alternate Export Gateway Opportunities			
Economic NPV	\$84.4	(\$43.4)	(\$95.3)
BCR	1.29	0.84	0.61
Scenario 3 – Mode Shift			
Economic NPV	\$79.9	(\$45.9)	(\$96.9)
BCR	1.27	0.83	0.60
Scenario 4 – Growth and Induced Demand			
Economic NPV	\$173.2	\$5.2	(\$65.5)
BCR	1.55	1.02	0.74

All scenarios (except Scenario 1, that is marginal) are considered economically feasible at a discount rate of 4 per cent (or less). At a 7 per cent discount rate, only Scenario 4 manages to generate a dollar for every dollar spent, achieving a BCR of 1.02. In each of the scenarios the BCR decreases as the discount rate increases.

Stakeholder engagement

Transport planning studies such as this rail feasibility study requires engagement with key stakeholders to inform the study processes and analysis. There is a need to collect information from key stakeholders on matters such as:

- Local issues of concern to the residents and stakeholders, including constraints, issues and opportunities
- Inputs that might add value to key aspects of the study, particularly the demand analysis.

Stakeholder engagement sessions were held with representatives from Mid-Western Regional Council, Dubbo Regional Council, Rail Freight Industry Group Forum, TfNSW Freight Network Design and various others who attended sessions in Mudgee, Dubbo, Sydney and Newcastle in late November 2019. The engagement with these stakeholders generally supported the proposal to complete the construction of the Gulgong to Maryvale rail, with suggestions that it would provide substantial operational benefits and cost savings for transport of grain, minerals, fertiliser and mine-related chemical products to/from the Dubbo and Mid-Western regional areas, and steel from the broader ARTC rail network.

Conclusion

There was generally support for the Gulgong to Maryvale rail at each of the stakeholder engagement sessions, though they were not well attended. However, while anecdotal comments were provided in the sessions there was little additional empirical information generated from the sessions, and the comments effectively confirmed the approach adopted for the demand analysis outlined in this report.

The engineering assessment, demand analysis and financial and economic analysis conducted through this study indicate that the Gulgong to Maryvale Line is a viable proposition at a 4% discount rate but is only a marginal proposition at a 7% discount rate in Scenario 4. The costs of construction of the railway are significant but are generally offset by the benefits generated that would be delivered to the freight industry. No significant environmental constraints have been identified that would adversely affect the delivery of the railway from Gulgong to Maryvale. While an REF may be required to achieve the necessary planning approvals, the project is not expected to require an EIS.

It should be noted that there are some key assumptions that underpin the CBA and findings. Development of a subsequent business case coupled with associated investigation and planning activities would be a prudent approach to further test and validate these assumptions and constraints.

Recommendation: The Gulgong to Maryvale Line Construction project should progress to the next stage of investigation (as acceptable to Fixing Country Rail): Design and Planning (inclusive of REF, if required), to further develop and refine the cost estimate for the work.