An Australian Government Initiative

Regional Development Australia

ORANA

Dubbo to Newcastle Rail Corridor

Connecting Orana - Hunter and Beyond

March 2024

Local people developing local solutions **rda.gov.au**

Acknowledgements

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Acknowledgement of Country

Regional Development Australia Orana acknowledges First Nations peoples as the Traditional Owners and Custodians of Australia. We respect and celebrate the inherent strengths of Aboriginal and Torres Strait Islander peoples, and their commitment to the land, waters and their communities. We pay our respects to their Elders past and present.

Table of Contents

Overview

The Business Case for Construction of Maryvale – Gulgong Rail Line and Upgrade of Gulgong – Ulan Rail Line.

The Dubbo Newcastle Rail Business Case proposes the construction of the incomplete Maryvale-Gulgong line and upgrade of the Gulgong-Ulan line to a 25 Tonne Axle Load (TAL) to ensure a reliable and resilient freight rail network. Reliability is achieved by providing capacity that allows consistently acceptable performance levels.

The proposal aligns with State strategies for critical minerals and freight transport, ensuring efficient and reliable service.

The improvements are expected to boost freight transit efficiency, competitiveness, and overall capacity through travel time savings, reduced gross tonne kilometres, and diversion from overcrowded rail networks.

Additionally, environmental and safety benefits, including lower carbon emissions and fewer road accidents and deaths, are anticipated by transitioning freight from road to rail.

The project is particularly important given increases in future freight demand (Golden Highway Corridor total freight volumes are anticipated to grow from 2.5Mtpa in 2023 to 6.3Mtpa in 2033) and population growth in NSW. Between 2021 and 2061 NSW's freight task is only expected to grow by 34%, highlighting the need to focus effort on the Orana – Hunter Region.

With an estimated $1.935 billion in benefits over 30 years, a net present value of $403.7 million, and a benefit-cost ratio of 1.91, the proposal demonstrates a positive impact on regional infrastructure and the export sector.

1. Executive Summary

This Business Case for Dubbo Newcastle Rail Improvements was funded by the NSW Government's Regional Business Case and Strategy Development Fund. It has been developed by The Stable Group on behalf of RDA Orana. This Proposal includes construction of the incomplete Maryvale – Gulgong line and upgrade of the Gulgong – Ulan line to 25 TAL.

The construction of this section of railway line completes a corridor that was first identified over 150 years ago and it provides the foundation for the necessary and imminent expansion of Australia's critical mineral export capacity.

Investing in improved rail infrastructure is integral to achieving the objectives of a reliable export supply chain outlined in the Commonwealth and New South Wales critical mineral strategies. By facilitating efficient, reliable, and cost-effective transportation of critical minerals, enhanced rail networks support the growth and sustainability of Australia's critical minerals industry while strengthening its position as a leading supplier in the global market.

The railway line from Maryvale to Gulgong, covering a distance of 73 km, remains an unfinished segment of the intended Sandy Hollow to Maryvale route. The portion connecting Sandy Hollow with Gulgong was finalised in the 1980s, but the continuation to Maryvale ceased in the 1950s. This unfinished segment has some incomplete structures such as earthworks, bridges, station platforms, and a tunnel. The research supporting this Business Case identifies that now is the time to complete this line to Maryvale as a more direct and efficient route for the movement of freight between the Orana region and the Port of Newcastle.

Gulgong to Ulan is a 24.8 km railway line currently operating with a capacity of 23 TAL. Upgrading it to 25 TAL will increase the line capacity to match the adjoining network, thus allowing transport of higher freight loads across the network.

In the process of formulating the Business Case, The Stable Group engaged in extensive consultation with various stakeholders, including the Port of Newcastle, more than thirty businesses functioning as freight generators, transport operators, and freight terminal operators, as well as a Project Reference Group (PRG). The objective was to develop a clear understanding of the future freight needs of the Orana Region.

The objectives of this proposal are to:

- Provide insights and recommendations that will inform the region's transportation planning and help to address the challenges facing the freight industry.
- Establish a plan of infrastructure improvements that ensure freight moves efficiently from the Orana region to the Hunter Region and Port of Newcastle.

The assessment of the costs involved in constructing and upgrading the proposed infrastructure are detailed in this Business Case, and include:

- Capital costs to construct the Maryvale – Gulgong line and upgrade the Gulgong – Ulan line.
- Operating and maintenance costs of the new Maryvale – Gulgong line and the upgraded Gulgong – Ulan line, compared to the cost of a "do nothing" approach.

The assessment of the benefits evaluates the positive impacts that infrastructure construction and upgrade would bring to the community, stakeholders, and the overall region. These include:

- Improved transit time for freight between Dubbo and Newcastle.
- Improved competitiveness of international exports.
- Improved capacity for freight services.
- Reduced distance, cycle time, and improved train configuration, making Dubbo to the Port of Newcastle favourable over Dubbo to Port Botany.
- Reduced road accidents and fatalities consequent of freight diversion from road to rail.
- Reduced road maintenance and vehicle operating costs consequent of freight diversion from road to rail.
- Environmental benefits such as lower carbon emissions from freight diversion from road to rail and shorter travel distances for freight.
- Induced demand, particularly growth in rail freight usage driven by enhanced infrastructure efficiency and capacity.

The proposal is particularly important given increases in future freight demand (Golden Highway Corridor freight volumes are anticipated to grow from 2,934,600 tpa in 2023 to 6,421,700 tpa in 2050) and population growth in NSW. Between 2021 and 2061 NSW's freight task is only expected to grow by 34%, highlighting the need to focus effort and funding in the Orana – Hunter Region where the growth is expected to exceed the State average.

Figure 1: Maryvale Gulgong Corridor in the NSW Road and Rail Network Context

The Business Case presents a strong net positive case for construction and upgrades in the Dubbo Newcastle Rail Corridor. It is estimated to cost $674 M (including capital, operational, and maintenance costs). The project is expected to generate $1,935 M (inclusive of residual value) in benefits over a thirty-year period. In present value terms at the core 5% discount rate, this amounts to $845.3 M in benefits and $441.6 M in costs. Thus, the project has a net present value (NPV) of $403.7 M and a benefit cost ratio (BCR) of 1.91.

Table 1: Project Costs & Benefits Real Values

Discount Rate	Proposal
Project Costs ($m)	
Capital Costs	327
Operating Costs	150
Maintenance Costs	197
Total Project Costs ($m)	**674**
Project Benefits ($m)	
Safety benefits – Avoided crashes	126
Avoided Vehicle operating costs	828
Avoided Road maintenance costs	118
Environmental benefits	159
Freight Travel time Savings	532
Producer Margin	66
Total Project Benefits ($m)	**1829**
Residual value	106
Total Project Benefits inclusive Residual value ($m)	**1935**

Table 2: Net Present Value (NPV) & Benefit Cost Ratio (BCR)

Discount Rate	3%	5%	7%
PV Costs ($m)	512.1	441.6	388.9
PV Benefits ($m)	1156	845.3	632.4
NPV ($m)	643.9	403.7	243.5
BCR	2.26	1.91	1.63

2. Case for Change

2.1 Background

RDA Orana is a not-for-profit association governed by a regional Board consisting of industry and government representatives whose primary focus is to promote economic development in the Orana region. The Orana Region is the largest and most diverse region in New South Wales, covering 25% of its area and serving a population of over 123,000; the main service centre is Dubbo. Dubbo is also the starting point of the Dubbo-Newcastle railway line, which is an essential corridor between the Orana Region and the Port of Newcastle and beyond, meeting the Inland Rail at Narromine west of Dubbo.

The Dubbo-Newcastle railway line is a 472 km railway line. The proposal is to construct the Maryvale – Gulgong line at 25 TAL, which would shorten the Dubbo-Newcastle route by 72 kms, through avoiding the currently used 20.25 TAL Merrygoen – Gulgong line.

The Stable Group, a strong and trusted team of skilled professionals committed to creating change in Regional Australia, undertook a desktop assessment and review of past studies and data on current freight flows and the performance of existing infrastructure. Previous studies on freight network, infrastructure and transport were reviewed to gather data before conducting stakeholder consultation across the region. Consultation with a range of stakeholders including the Port of Newcastle, road users including freight and rail industries, and a Project Reference Group (PRG) was undertaken.

Following this process, it was identified that:

- Dubbo-Newcastle rail facilitates the movement of export commodity flows to Newcastle, and the inbound flow of goods and services across the region.
- Economic activities between the Orana and Hunter regions continue to expand beyond previous growth estimates.
- With many significant infrastructure projects planned in the Orana Region and developments at the Port of Newcastle the projections are for growth estimates to increase at greater rate in years to come.
- Construction of Maryvale – Gulgong and upgrade of Gulgong – Ulan lines would provide a more direct route to the Port of Newcastle, improving efficiency and reducing reliance on road transport. This is particularly important for the growing mining (non-coal) sector.
- The rail construction would also add redundancy and flexibility to the network, able to act as a contingency route to maintain supply chain resilience against natural disasters and disruptions.

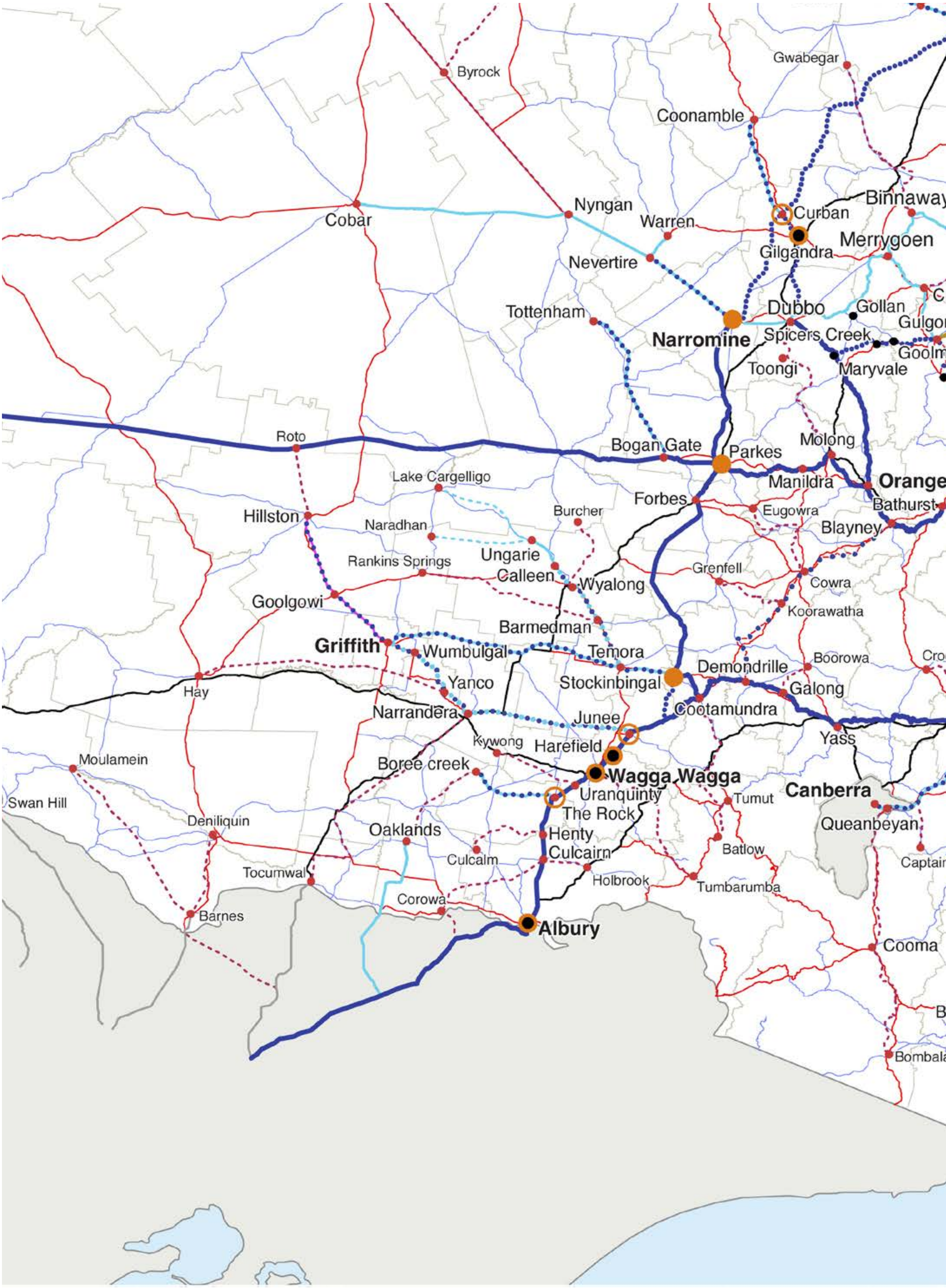
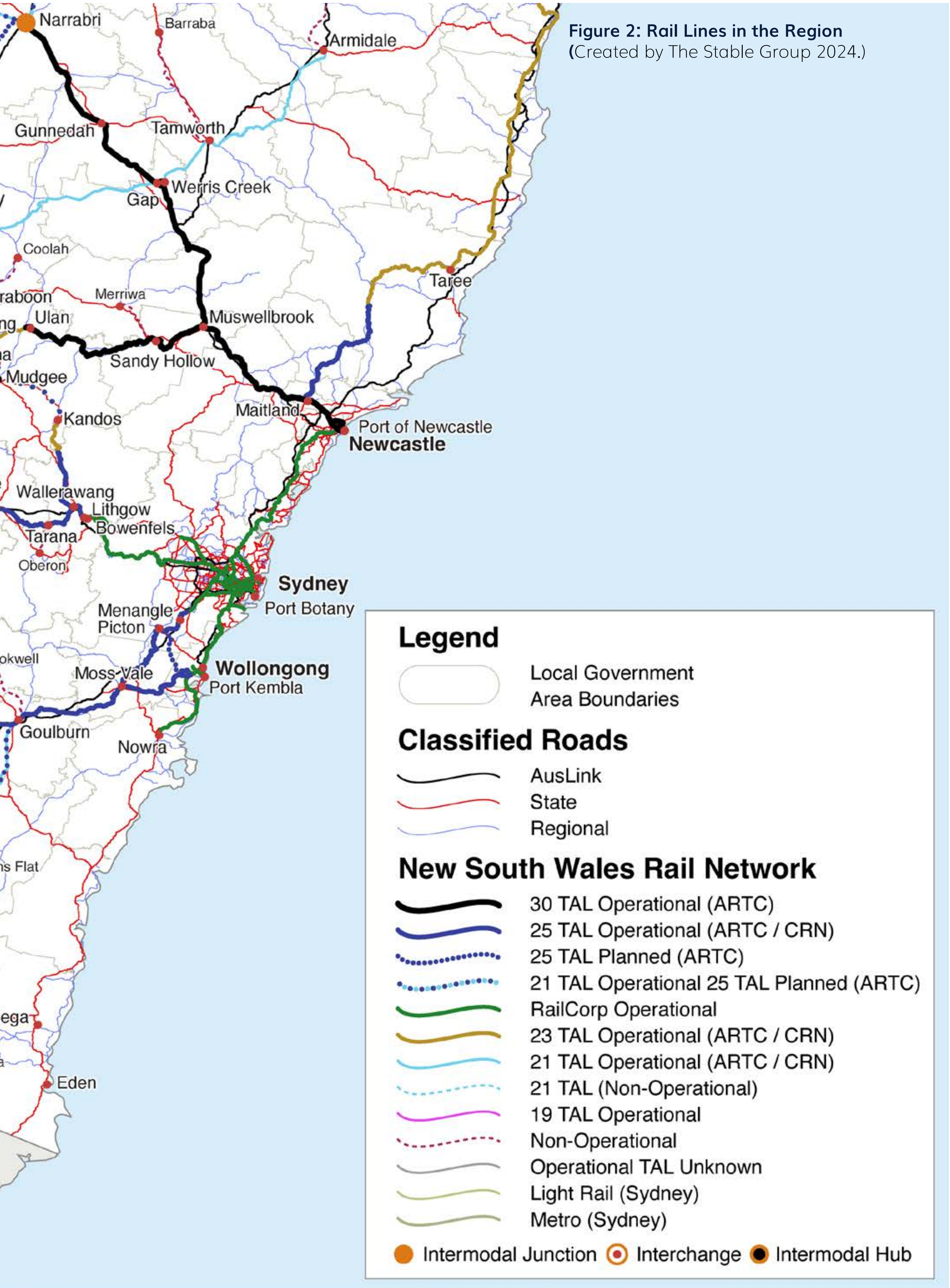

Byrock
Gwabegar
Coonamble
Binnaway
Nyngan
Warren
Curban
Cobar
Gilgandra
Merrygoen
Nevertire
Tottenham
Dubbo
Gollan
Narromine
Spicers Creek
Toongi
Maryvale
Roto
Bogan Gate
Parkes
Molong
Lake Cargelligo
Manildra
Orange
Forbes
Bathurst
Hillston
Burcher
Eugowra
Naradhan
Blayney
Ungarie
Rankins Springs
Calleen
Grenfell
Wyalong
Cowra
Goolgowi
Koorawatha
Barmedman
Griffith
Wumbulgal
Temora
Boorowa
Demondrille
Hay
Yanco
Stockinbingal
Galong
Cootamundra
Narrandera
Junee
Yass
Kywong
Harefield
Moulamein
Boree creek
Wagga Wagga
Canberra
Swan Hill
Uranquinty
Tumut
The Rock
Queanbeyan
Deniliquin
Oaklands
Henty
Culcairn
Batlow
Culcalm
Tocumwal
Holbrook
Tumbarumba
Corowa
Barnes
Albury
Cooma
Bombala

Figure 2: Rail Lines in the Region
(Created by The Stable Group 2024.)



2.1.1 Current Freight Task of the Golden Highway Corridor

The Golden Highway Corridor (GHC) is an integrated transport network that encompasses both rail and road traffic in Australia. It includes the rail traffic on the Australian Rail Track Corporation (ARTC) network that stretches through the Hunter Valley, connecting Gulgong, Dubbo, and Narromine, along with the Country Regional Network's branch lines to Cobar and Coonamble. This rail network runs parallel to the Golden Highway, a key road corridor, for significant stretches, facilitating the movement of freight and providing essential connectivity between various regions.

The current freight task for the GHC has been estimated at 2,934, 600 tonnes per annum. 1,980, 000 tonnes per annum (67%) is transported by rail, while the remaining 954,600 tonnes per annum (33%) is transported by road. This volume includes inbound and outbound volumes to the catchment area. It is estimated that 85% of volume is outbound freight from the region, while 15% is inbound freight.

In the Orana region, the freight demand is predominantly driven by agriculture and mining-related commodities. The majority of the volume transported by rail consists of agricultural products destined for the Port of Newcastle, with the remainder comprising mineral and mine-related commodities. On the road, the primary volume transported consists of fuel, agricultural inputs, and some mine input and agriculture.

2.1.2 Future Freight Task of the Golden Highway Corridor

The GHC will witness a surge in volumes, especially in the transportation of general freight flows. Future freight demand within the study catchment area is estimated to increase from 2.5Mtpa in 2023 to 6.3Mtpa in 2033. This increase encompasses mining inputs like fuel, reagents, and cement as well as food and non-food consumer goods, business inputs, farm inputs, bulk fuel, and transport equipment and machinery. The shift to renewable energy will necessitate transportation of equipment and machinery along the GHC.

There will be a shift from agriculture prominence to mining and mining inputs dominating the increased demand. Specifically, the expected growth in mining inputs is ~2.0Mtpa between 2023 and 2033. By 2033 mining inputs are likely to account for ~37% of all volumes being transported thereby bringing an increase of imports to the Orana region which has previously been assumed to be predominantly focused on export.

This future dynamic will overwhelmingly favour transport routes to/from the Port of Newcastle due to the type of commodity, both existing and planned port infrastructure and asset cycle time related to distance and congestion factors. It is expected that some agricultural volumes will continue on existing routes to Manildra and Port Kembla from locations such as Coonamble and Narromine.

Table 3: Future Freight Task of the Golden Highway Corridor (Road + Rail)

Commodity	2023	2033	2050
Agricultural Input	90,000	90,000	90,000
Fuel	113,200	121,700	121,700
Mine Input	131,400	2,184,000	2,184,000
Non-Coal Minerals	460,000	1,627,000	1,627,000
Other	100,000	350,000	500,000
Agriculture	1,640,000	1,919,500	1,817,000
Grand Total	**2,534,600**	**6,292,200**	**6,339,700**

Total Forecast Freight Volumes Golden Highway Corridor (tonnes per annum)

Note: Coal transport is not included in data due to dedicated methodology for rail infrastructure provision via ARTC Hunter Valley Access Undertaking. The decrease in fuel transport is directly related to forecast reduction in coal production within the Ulan area.

Figure 3: 2023 GHC Commodity Volumes (Percentage of Total Task)

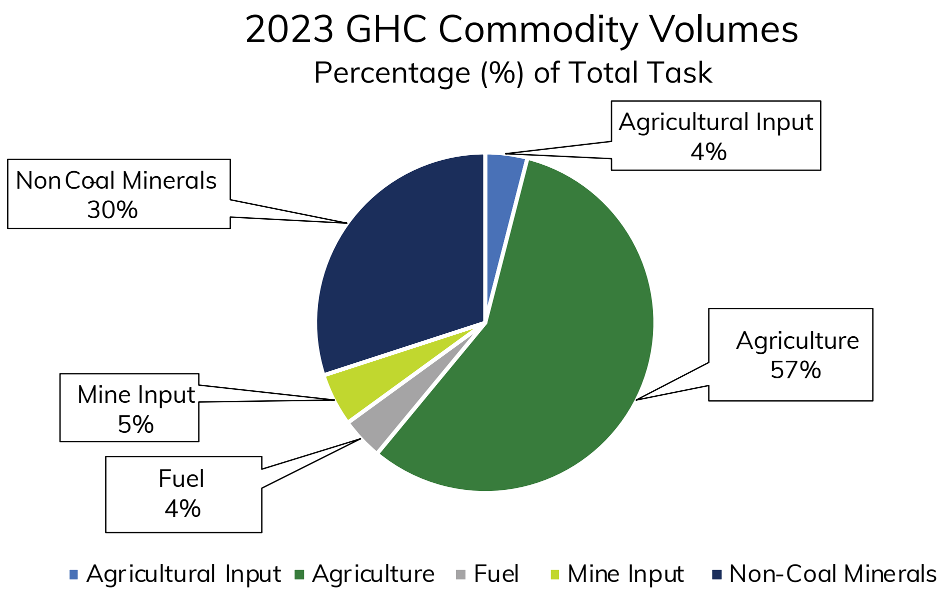
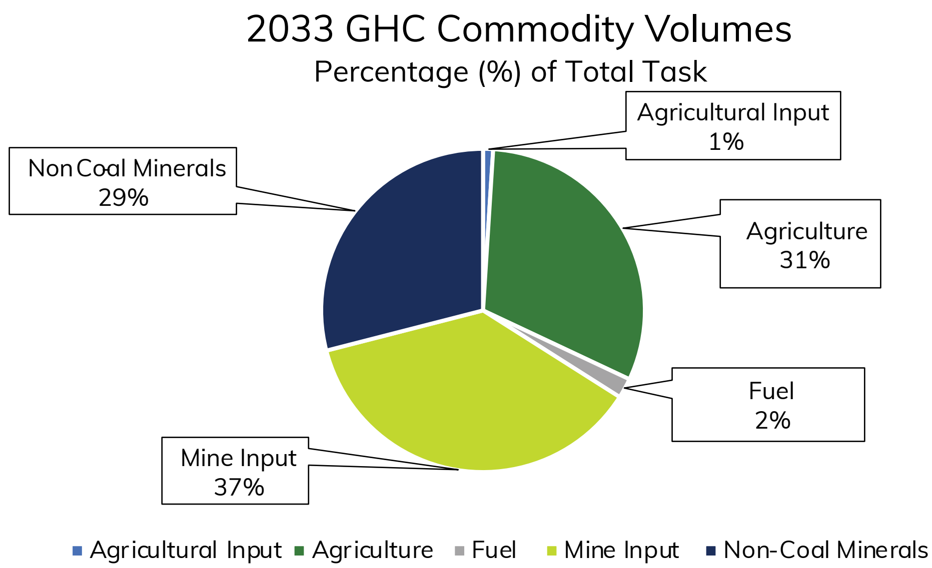


Figure 4: 2033 GHC Commodity Volumes (Percentage of Total Task)

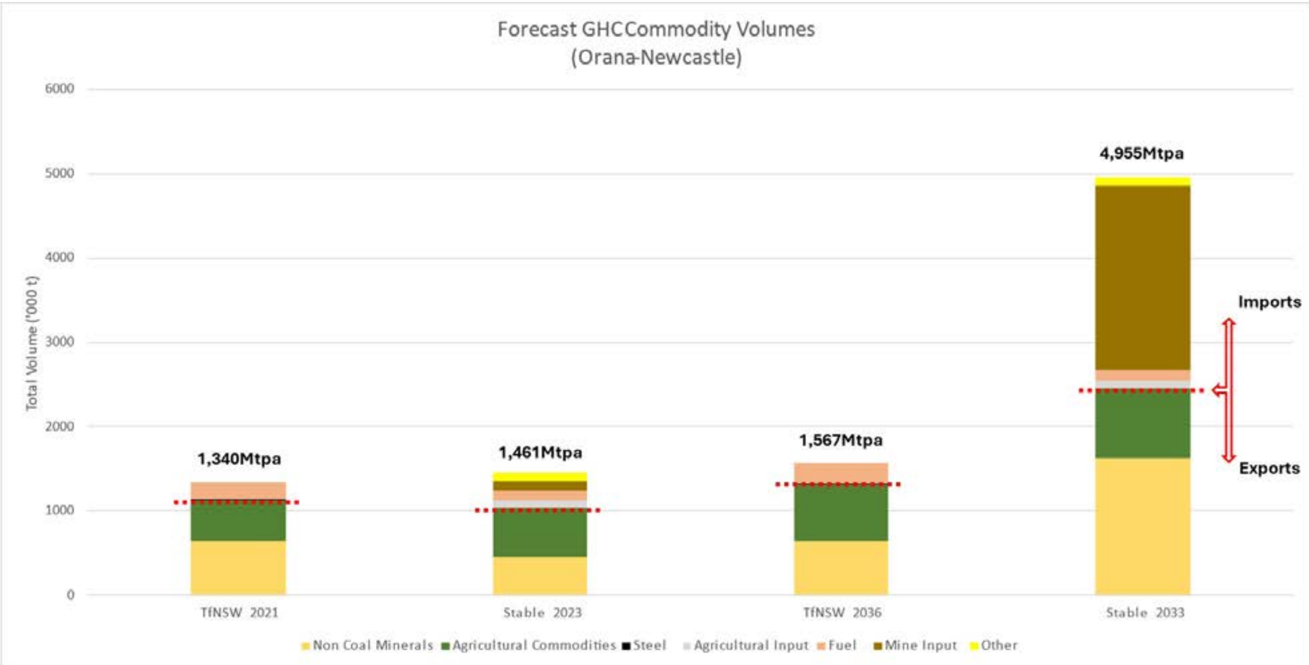


Additionally, an extensive intra-regional freight task will persist, characterized by movements of grains and livestock from farms, distribution from local wholesalers to farms, commercial enterprises, and construction activities. Given the relatively short distances and smaller consignments associated with these flows, road transportation will continue to dominate the scene.

Toward 2040, the transport sector anticipates a continuation of existing patterns, albeit on a larger scale, driven significantly by the heightened demands of mining-related activities. The reliance on road transport, especially for short-distance and smaller consignment flows, is expected to persist, while the challenges and opportunities associated with rail transportation will continue to be shaped by its proximity to freight generators.

Comparing the dataset to Transport for NSW Data[1] included in the Freight Forecast from the Strategic Freight Model for Origin/Destination sets of Dubbo, Bourke - Cobar – Coonamble, Newcastle it is apparent there is a significant disparity of both assumed volumes and commodity share.

Figure 5: Forecast Volumes Orana - Newcastle (Source: TfNSW 2019, Stable 2023). These volumes reflect volume movement between Dubbo and Newcastle given forecast mine commencement.



2.2 Rationale for Investment

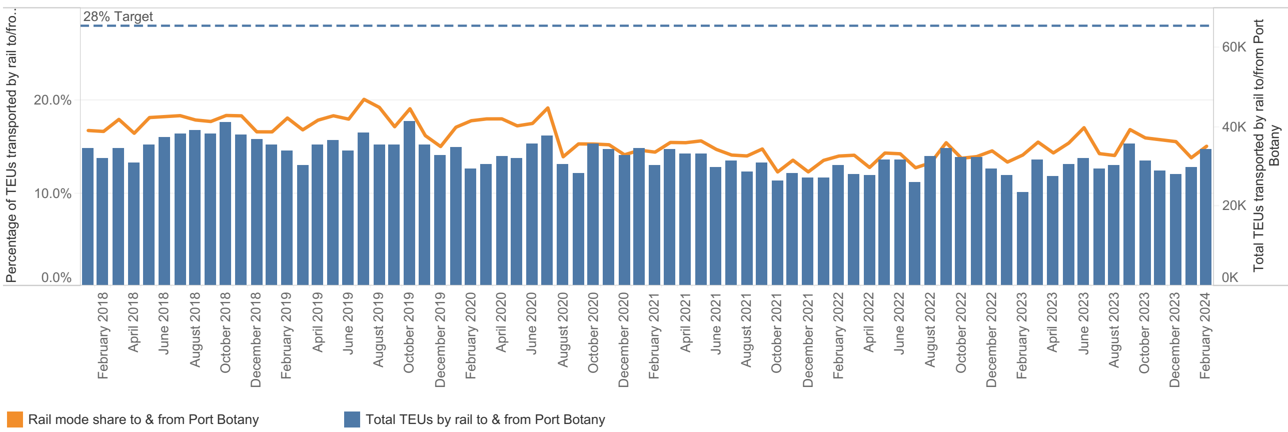
The Dubbo Newcastle Rail Corridor is an essential conduit for the freight movement of commodities between the Orana Region and Port of Newcastle. The proposal addresses key problems:

- The current 177 km Dubbo – Gulgong (via Merrygoen) rail line to Newcastle is of 20.25 TAL capacity, requiring shunting at Merrygoen. The need for shunting at Merrygoen results in increased handling times, potential delays, and a consequent reduction in the throughput capacity of the rail line. This impacts the ability of the rail network to serve as an efficient freight corridor between these points, affecting the speed at which goods can be transported from Dubbo to Newcastle and ultimately limiting the competitiveness of the corridor.

1 TPA-DAR-SFM-0011 Freight Forecast from the Strategic Freight Model, Release Date: February 2020
Transport Performance Analytics, Transport for NSW https://opendata.transport.nsw.gov.au/dataset/5da0e3b9-e46a-4aa3-96c9-2574d83fe6fb/resource/85eb1768-207d-49df-a736-331b9c4b623c/download/sfm-dataset-nov-2019_2.xlsx

- Current networks to both Port Kembla and Port Botany are becoming constrained by congestion, prioritisation of passenger traffic and natural disasters. There are few alternative routes and few alternative ports[2]. "*By the mid to late 2020s rail freight on the Main West Rail Line will be constrained as passenger needs continue to take priority. Without new rail freight capacity, more goods will be transported by road to and from Regional NSW.*"[3] Port Kembla and Sydney freight networks are increasingly under pressure due to rising passenger traffic, particularly on the Main West and Illawarra Lines, limiting freight services mainly to night-time. "*Regional and interstate freight using the Main West Rail Line would shift from rail to road from 2025 onwards without an increase of available rail capacity for freight movements, and the quantity of freight transported by rail would diminish.*" [4]
- Currently, about 30-36 freight services run weekly from the Central West, struggling for limited availability through the congested network. With laws giving priority to passenger services, the situation is expected to worsen, pushing more freight onto roads from the mid to late 2020s due to a lack of increased rail freight capacity.
- The Port Botany Rail Optimisation Group was established to "...advise on strategies and actions to optimise the movement of containers by rail to and from the container terminals at Port Botany."[5] Some evidence showed significant improvement from 13.5% rail mode share in FY 14/15 to 20.8% in 2017. However, the overall performance of the port did not appear to continue along this pathway. The strategic target in the NSW Freight and Ports Plan 2018-2023 aims to achieve 28% rail mode share, particularly with the introduction of the Southern Sydney Freight Line and the Western Sydney Freight Line. Unfortunately the NSW Freight Dashboard shows that rail mode share to and from Port Botany has not yet increased.

Figure 6: Use of Rail Freight (Source https://www.transport.nsw.gov.au/data-and-research/freight-data/freight-performance-dashboard/port-botany).



2 "Our population is set to increase to 12 million people by 2056. Freight volumes are estimated to double in the Greater Sydney area and increase by 25 per cent in regional NSW. The passenger network is preparing for 28 million trips a day" Future Transport Strategy 2056, March 2018.

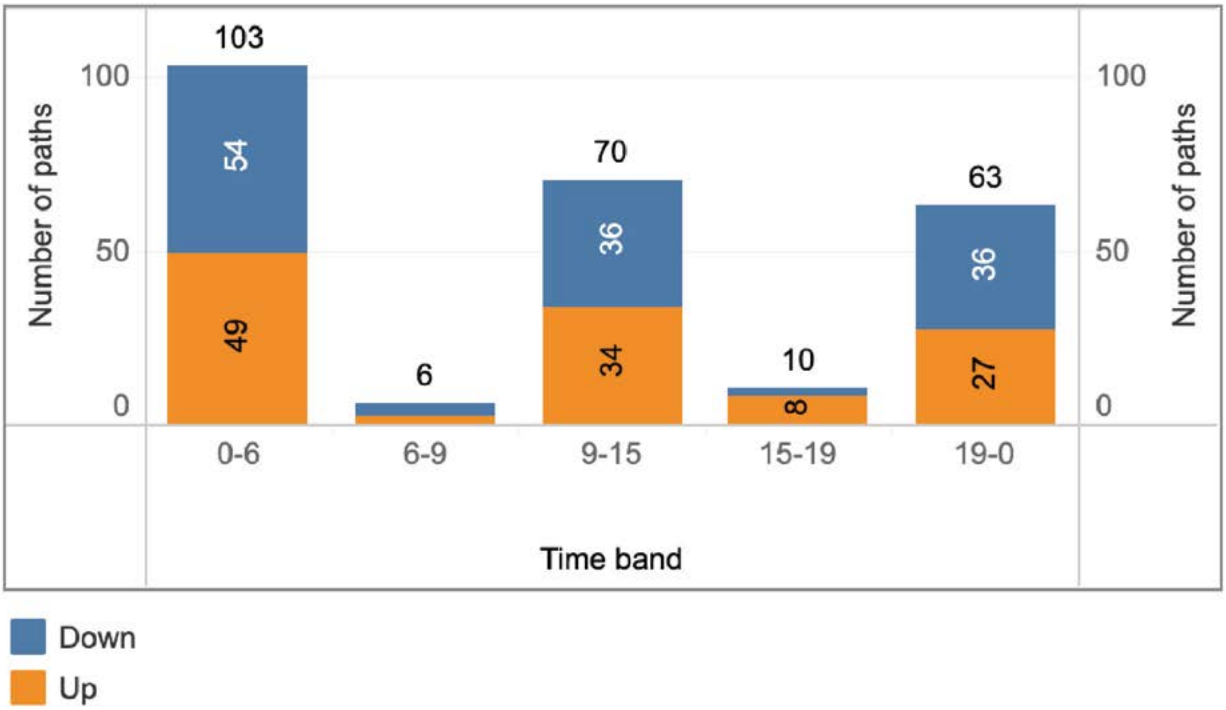
3 Strategic Environmental Assessment (SEA) for the Western Sydney Freight Line Corridor eleased on 26 March 2018

4 SEA for the Western Sydney Freight Line, op cit

5 https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/pbrog-communique-december-2016.pdf

- The number of containers on rail in the last financial year appears to have been about 350,000, representing about 17.5% of the total number of containers. This indicates that the throughput of Port Botany has not exceeded about 2.3 million containers in the last seven years. Despite TEU movements expected to reach 7.34 million by 2056. "*... the forecast demand for container movements, particularly exports, is assumed to be unconstrained*."[6] When in fact constraints on the road and rail network are limiting the Orana regions opportunities for import and export.
- The Main West Rail Line, essential for transporting around 6.2 million tonnes of freight annually, including 4 million tonnes of coal, will face severe constraints. This situation threatens to increase transport costs for non-coal freight by up to $21 million per year, emphasising the urgent need for more freight routes and enhanced rail capacity to cope with Sydney's growing population and demand. "*Regional and interstate freight using the Main West Rail Line would shift from rail to road from 2025 onwards without an increase of available rail capacity for freight movements, and the quantity of freight transported by rail would diminish*."[7]

Figure 7: Limitations of Main West and Sydney Passenger Network.



- The Orana region's reliance on the congested Sydney network for exporting goods through Port Botany exacerbates freight inefficiency. Most of Orana's exports pass through Port Botany, but the capacity for freight services there is significantly diminished by passenger traffic, especially on the Main West line. This has led to freight services being scheduled mainly for off-peak and overnight hours, as passenger services are prioritised by law. Without an expansion in rail capacity, expected to start affecting freight by 2025, more goods will be transported by road. . Increased volumes through road transport would increase operating costs, transport costs per tonne, reduce supply chain efficiency, and degrade the competitiveness of Australian exports from regional areas. The situation at Port Botany, with container movements expected to reach 7.34 million TEUs by 2056 and current rail mode share not meeting targets, highlights the need for alternative transport networks and ports.

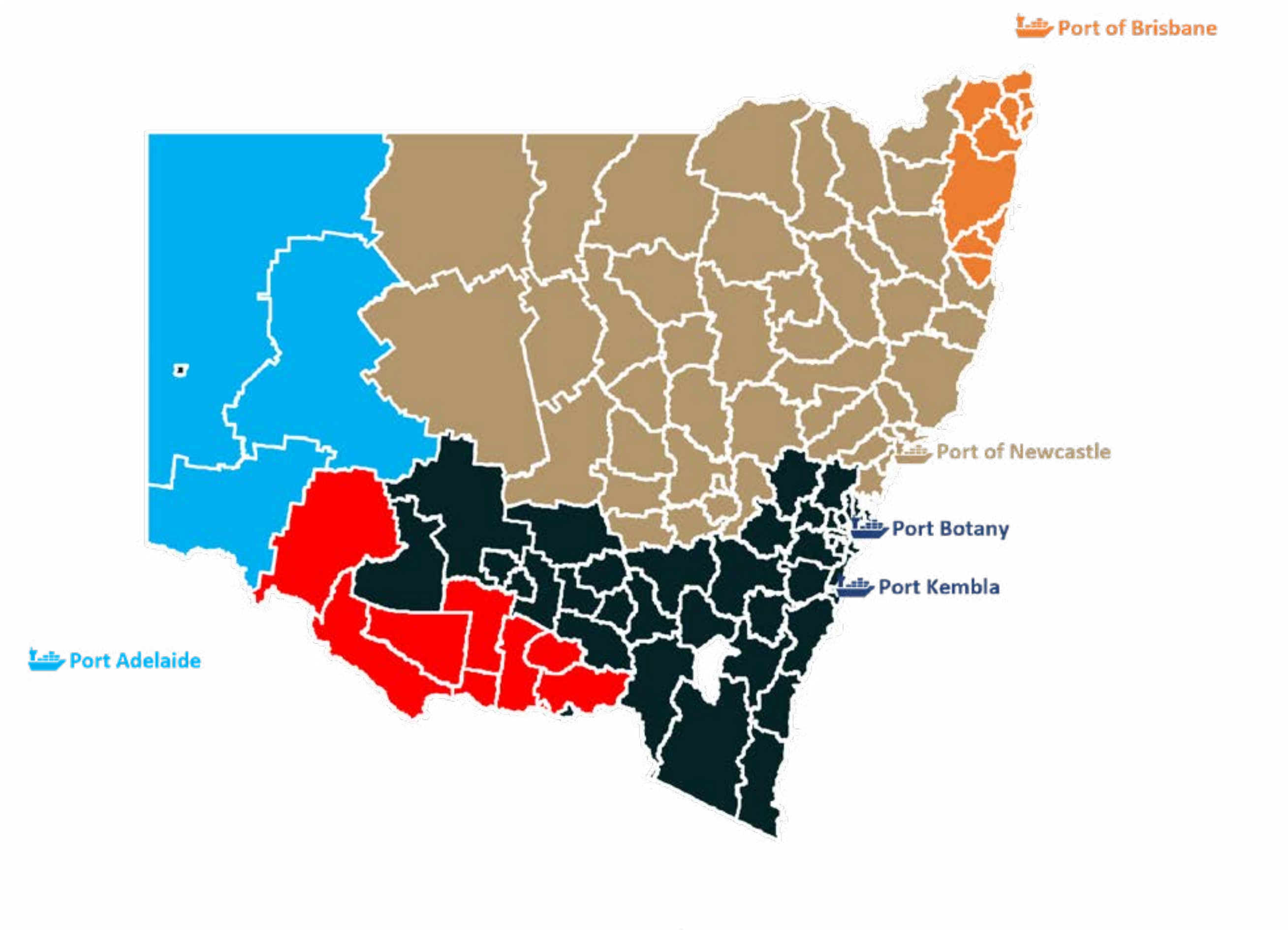
6 Transport for NSW Performance and Analytics, August 2018, op cit, p26
7 SEA for the Western Sydney Freight Line, op cit

- Congestion delaying freight to and from Port Kembla and Port Botany will be exacerbated by population growth, wherein NSW will have 3.5 million more residents, reaching a total of 11.5 million in 2061. Relatedly, there will be growth in NSW's freight task of 34% between 2021 to 2061. The construction of Maryvale – Gulgong would enable a sub-24-hour turn-around time for trains from Dubbo to the Port of Newcastle making it preferable to Port Botany. This route does not face congestion issues.
- The intersection of the Sydney Greater Metropolitan Area (GMA) and Regional NSW underscores significant logistical and infrastructure challenges, particularly regarding transport solutions and distribution from ports. The current freight infrastructure in NSW faces significant gaps, including the absence of a dedicated rail freight line to the Port of Brisbane until 2045 and a similar lack of rail extension beyond North Star in Northwestern NSW. Furthermore, the Inland Rail project, while beneficial for NSW Freight, won't provide a direct connection between Sydney and major cities like Brisbane or Melbourne, limiting the options for rail freight originating from Brisbane. Consequently, road freight becomes an essential alternative. With regard to road, Coffs Harbour is about equidistant from Newcastle and Brisbane. Thus, the distances from Newcastle to destinations south of Coffs Harbour indicate that communities (Northern Rivers, Mid North Coast, New England, Orana, Hunter, Central West, etc) are best serviced for imports from Newcastle than from Brisbane or other NSW Ports. This situational analysis emphasises the pressing need for enhanced road and rail networks supporting the Port of Newcastle. By doing so, up to 4.4 million people across various regions (listed above), currently reliant on overburdened ports and networks, could enjoy more productive and efficient import services. This necessity for improvement is a critical infrastructure imperative to support the anticipated population growth and economic demands in the region.
- Reliance on road freight transport incurs substantial economic costs, in terms of road maintenance and vehicle operation. This includes expenses related to the repair and upkeep of road infrastructure, which is subjected to wear and tear by heavy freight vehicles, and the operational costs associated with these vehicles, such as fuel consumption, maintenance, and depreciation.
- The environmental costs associated with a dependence on road freight transport are considerable, stemming from emissions of greenhouse gases, pollutants, and noise pollution.
- Reliance on road freight transport carries significant safety costs, evident in the higher incidence of traffic accidents and road fatalities.

If the proposal does not proceed, these current safety and productivity issues are expected to be exacerbated by an increased future freight task detailed in Annex B (Project Memo 3 – Future Freight Flows) arising from:

- An increase in demand for agricultural commodities, driven by a growing population and increased domestic income.
- An increase in demand for critical minerals, of which the Orana region hosts plentiful reserves.
- The construction of the Central-West Orana Renewable Energy Zone, which will require transportation of imported components.
- An increase in demand for Fast Moving Consumer Goods (FMCG) to cater to the needs of an increasingly urbanised population and to sustain economic growth and improved living standards. This demand will be driven by the projected population growth of inland areas, including Dubbo, as well as the Hunter, City of Newcastle, and Central Coast. Projected population figures for these areas, available from 2024 to 2041, indicate ~22% population growth in Dubbo, ~14% in City of Newcastle, ~10% in the Hunter, and ~16% in Central Coast, in the specified time period.

Figure 8: NSW Port Network: LGA's serviced (by largest council faction)



- The Sydney Greater Metropolitan Area (GMA), as defined by both TfNSW and the Greater Cities Commission[8], comprises Lower Hunter and Greater Newcastle City, Central Coast City, Illawarra Shoalhaven City, Western Parkland City, Central River City, Eastern Harbour City. Effectively this means that the land to Shoalhaven in the south and the Hunter in the north are considered as part of Sydney, particularly for statistical purposes.[9] The Sydney Greater Metropolitan Area (GMA), encompassing regions from Shoalhaven to Hunter, is expected to undergo significant population growth, increasing from 8.294 million[10] in 2023 to an estimated 11.9 million by 2056, with the Sydney GMA alone projected to house 7.84 million people. This projection is based on a Compound Annual Growth Rate (CAGR) of about 1.2% for the Sydney GMA and 0.4% for Regional NSW[11]. However, it is anticipated that there might be 2 million more residents in Regional NSW and 2 million fewer within the Sydney GMA[12]. This demographic shift underlines the urgency for more efficient freight transport to accommodate the increased demand and ensure the seamless movement of goods across an expanding and more densely populated area.

8 Previously the Greater Sydney Commission, dissolved 1 January 2024 https://greatercities.au/

9 "Discussion Paper, The Six Cities Region, Delivering global competitiveness and local liveability", Greater Cities Commission, September 2022, Sydney, p 6.

10 https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/mar-2023#states-and-territories

11 "NSW Freight Commodity Demand Forecasts 2016-2056, Final Report," Transport for NSW Performance and Analytics, August 2018, p 10

12 ABS data show a population of 5.2 million at 2021 with a CAGR of 1.2%. This results in about 8 million people.

2.3 The Orana Region Network Options

Regional transport networks are essential for linking communities and economic centres together, ensuring that people and goods can move efficiently, reliably, and safely between different areas. This Business Case includes a comprehensive review of the entire network, focusing on enhancing its efficiency, reliability, and resilience. A resilient network often depends on the interconnectedness of its various components, allowing for alternative routes and methods of transport that can keep the system functional in the face of challenges.

In NSW the Central West and North West regions are of critical importance as significant generators of Gross State Product. Logistics costs ex farm gate and ex mine are highly dependent on reliable and resilient transport networks that provide as direct access to ports as possible. The relevant networks are the Blue Mountains (A32 and Main Western Rail) and in combination, the Golden Highway (B84) and part of the Hunter Rail network. These are explored further here.

2.3.1 Blue Mountains

The key transport infrastructure along this corridor is dominated by both road (A32) and rail (Main West) closely intertwined, driven by the rugged topography, and following the ridgeline. They provide a critical transport artery for the regional economy, including agricultural operators, forestry, mining industry and tourism.

The road and rail corridors also provide a vital link for the local communities to other town centres within the Blue Mountains and beyond. Hence, these two transport corridors perform a vital function for local and regional traffic and support the livelihood of a number of communities. This is highlighted by the variety of traffic types, ranging from heavy vehicles, commuting traffic, local traffic, tourism etc.

However, the rugged terrain, ribbon urban development, multiple purposes of the transport corridor mean that it is often congested, running at high levels of service and/or at capacity with poor travel times and extremely vulnerable to disruption from traffic accidents and natural events. Further investment in this corridor to gain substantive capacity and travel time improvements is prohibitive and includes options such as tunnels and/or major urban impacts to communities.

2.3.2 Mitchell Highway and Great Western Highway (A32)

This road passes through the Blue Mountains. The section from Katoomba to Hartley, at the foot of Victoria Pass is narrow and winding and subject to frequent interdiction, mostly from crashes, but also from natural events including bushfires and extreme rain.

2.3.3 Main Western Railway

The Main Western Railway suffers from low freight reliability and resilience thus adversely affecting efficient movement through the network. This rail system is subject to frequent interruption from weather events and is compromised by the high proportion of passenger trains which are legislated as the priority on the network. Freight trains using this route are limited by the train management limitations in and at the entrance to Port Botany. Freight train reliability on this system is reported as poor, with up to 70% of trains missing their slot times. This situation is exacerbated by human incidents on the metropolitan passenger network, where some or all services may be suspended for a period. Freight trains will be held until the passenger timetable is recovered.

2.3.4 The Golden Highway (B84)

This road in conjunction with the eastern end of A15 links Dubbo with Newcastle. It carries a relatively high proportion (30%) of heavy vehicles. It features very few overtaking lanes, narrow (some very narrow) bridges and inadequate intersections. It should serve as a relief route to and from Sydney when A32 is unavailable.

The more moderate terrain, open road alignment and limited urban ribbon development make investment in this corridor a much more cost-effective way to gain substantial capacity and productivity improvements for connectivity for the Central West and North West regions to the coast, Newcastle and port facilities. B84 features the most favourable topography of any road route through the Great Dividing Range.

2.3.5 Hunter Rail

The Hunter Rail network is mature, primarily delivering coal to Newcastle. However, this network provides the opportunity for value to non-coal exporters and importers of containerised supplies and equipment and for outbound product. The significant opportunity for regional exporters and importers is to ensure an effective connection from the central west to the Hunter Valley rail network. Examples of this include an effective connection to Inland Rail and a genuine review of the incomplete rail corridor between Maryvale and Gulgong.

2.3.6 The Importance of These Networks

The above assets should be viewed as a system and in that sense, they need to be reliable and resilient. Reliability is achieved by providing capacity that allows consistently acceptable performance levels.

They should also provide relief for parts of the network that are forced into degraded mode, such as via a natural event, a crash or another form of human event.

The Main Western and Hunter networks are insufficiently interdependent primarily due to Newcastle being currently unable to provide an alternative destination to Port Botany. The Golden Highway itself lacks the capacity to enable reliable reasonably free flow. It also lacks resilience, as exemplified by the diversions necessary to allow urgent major remedial works on the Denman bridge in 2019. These works required a wide diversion via Wybong Road that could not accommodate heavy vehicles.

It is considered that resilience, greater capacity and travel times on the transport network from the Central West/North West can more cost effectively be improved including with much more limited social and environmental impact by investing in the Golden Highway corridor from both a road and rail perspective. Such investment would also provide the Great Western Highway through the Blue Mountains with much needed relief.

2.4 Strategic Alignment

The proposal aligns with the following Federal, NSW State, Regional and Local plans:

Table 5: Strategic Alignment of the Transport Strategy

Strategy	Alignment
Federal Government	
National Freight and Supply Chain Strategy (Transport and Infrastructure Council, 2019) and its complementary **National Action Plan (Transport and Infrastructure Council, 2019)**	The strategy notes "improved efficiency and international competitiveness" and "safe, secure and sustainable operations" as two key goals. The proposal will contribute to these strategic goals under their proposed actions: Action 1: Targeted infrastructure investment • Ensure domestic supply chains are serviced by resilient and efficient key freight corridors and assets (Action 1.1) • Providing regional and remote Australia with infrastructure capable of connecting regions and communities to major gateways through land links (Action 1.2) • Advance heavy vehicle road reform to facilitate efficient investment in infrastructure (Action 1.4) Action 2: Enabling improved supply chain efficiency. • Building "a supply chain approach to freight planning" (Action 2.1) by improving efficiency and capacity to access the Port of Newcastle, which will support interoperability along the supply chain. • Building community acceptance of freight operations (Action 2.4) through reduced disruption to community travel Action 3: Better planning • Provides a proactive analysis of planning and operational solutions to improve freight access (Action 3.3)

Strategy	Alignment
2021 Australian Infrastructure Plan (Infrastructure Australia, 2021)	The proposal aligns with the following recommendations on the Reform Priority List: • Strengthening smaller cities and regional centres (Recommendation 1.2) by providing reliable and efficient freight and transport links • Attracting and retaining residents and businesses by identifying appropriate infrastructure requirements according to local community characteristics (Activity 1.2.1.3) actioned in the proposal through thorough stakeholder engagement. • Lifting access in small towns, rural communities, and remote areas (Recommendation 1.3) by improving road infrastructure • Maximise the overall benefits of transport investments by aligning transport programs with place-based objectives (Recommendation 4.1), such as those expressed in the Orana and Hunter Regional Plans • Connecting regional and remote Australia (Recommendation 4.2) through reducing the total time taken by people in a rural or remote area to travel to and access services in Regional Centres and return home (Activity 4.2.3.1)
Critical Minerals Strategy 2023-2030	Create diverse, resilient and sustainable supply chains through strong and secure international partnerships

Strategy	Alignment
NSW Government	
State Infrastructure Strategy 2022 - 2042 (Infrastructure NSW, 2022)	The proposal aligns with the following objectives and strategic directions, and contributes progress towards the following recommendations: • Boost economy-wide productivity and competitiveness (Objective 1): • Deliver efficient transport networks to support thriving cities, businesses, and communities (Strategic Direction) • Improve freight efficiency, security, and capacity to support NSW's industries and supply chains (Strategic Direction), including increasing freight rail mode share to create greater economies of scale. • Plan and deliver projects to increase the efficiency and reliability of freight networks in regional NSW (Recommendation 6), by "leveraging existing strengths of regional NSW" through rail and road passenger transport connectivity, addressing the "Golden Highway challenges" and freight link enhancements. Embed reliability and resilience in infrastructure (Objective 3): • Apply a structured and systematic approach to resilience across multiple asset types (Strategic Direction) • Deliver assets that reduce the risk and impact of major natural hazards and shocks (Strategic Direction) • Improve transport network response and recovery performance (Recommendation 20) Achieve an orderly and efficient transition to Net Zero (Objective 4): • Support a new wave in transmission infrastructure in a manner consistent with community expectations (Strategic Direction) • De-risk the planned delivery of a large program of new transmission infrastructure (Recommendation 23), such as the Far West-Orana Renewable Energy Zone
Restart NSW	The proposal aligns with the following fund principles: • Funding for infrastructure projects that improves the State's economic growth and prosperity (Aim) as evidenced by the positive BCR and outcomes highlighted. • 30% of funding is to be targeted at regional and rural areas (Target), aligning with the proposal's geographic location

Strategy	Alignment
20 Year Economic Vision for Regional NSW – Refresh	The proposal aligns with two key Principles for Future Investment: Principle 1: Improved travel between regional centres and from cities and international gateways • Making regional travel faster, easier and safer between and within regional centres, and to metropolitan areas (Aim) • The investigation of rail and road upgrades on lines between regional centres (5–10-year Priority) Principle 2: Freight networks that will increase the competitiveness of key regional sectors. • Improve freight networks from regional NSW to global gateways, to increase exports (Aim) • More efficient transport between inland intermodals and global gateways, which the proposal addresses by connecting Dubbo intermodals to the Port of Newcastle (5-year Priority) • More efficient east-west transport connections, including between inland NSW and Newcastle (5–10-year Priority) • Elevating regional NSW as a supplier by enabling supply chain infrastructure to improve export efficiency and access from regional NSW (5-year Priority updated in the Refresh)
Future Transport Strategy (Transport for NSW, 2022)	The proposal delivers value in the following strategic directions: • Improve connectivity across NSW (C1) • Connect our regional cities, centres, towns and villages (C1.2) • Facilitate efficient freight connectivity and access (C2.4) • Deliver strategies to achieve ambitious safety targets (C4.1) • Improve freight efficiency, access and reliability on roads (E1.1) • Increase rail freight capacity and reliability (E1.2) • Improve access and experiences in the visitor economy (E3.1) • Reduce cost pressures by enhancing spending efficiency (E4.2) through the proposals extensive stakeholder engagement targeting the most effective infrastructure improvements

Strategy	Alignment
NSW Freight and Ports Plan 2018-2023 (Transport for NSW, 2018)	The proposal is aligned with all five stated objectives, and the following underlying actions: Objective 1: Economic growth • Enhancing productivity through investment in freight infrastructure Objective 2: Efficiency, connectivity, and access • Improve safety and efficiency. • Improve travel times and reliability. • Boost the efficiency of the rail network and trade gateways, including the Port of Newcastle Objective 3: Capacity • Make capacity boosting investments in the rail freight network by improving the capacity of east-west movements. Objective 5: Sustainability • Improving freight sustainability outcomes by improving productivity
Critical Minerals and High-Tech Metals Strategy	The proposal is aligned with the Key Action Plan of Activate the industry through proactive development of supply chains
Regional	
Central West and Orana Regional Transport Plan (Draft) (Transport for NSW, 2021)	The proposal is aligned with the following objectives: • Improve multi-modal connectivity within the region (Objective 2) and beyond the region (Objective 3) • Enable appropriate freight connections to Inland Rail, Special Activation Precincts and major freight hubs (Objective 13), by reinstating the Maryvale-Gulgong line and upgrading the Gulgong-Ulan line. • Strengthen connections to major freight destinations beyond the region (Objective 15), with the Dubbo-Newcastle Rail being a key route to Newcastle
Hunter Regional Transport Plan 2041 (Draft) (Transport for NSW, 2021)	The proposal is aligned with the following objectives: • Improve connectivity between key centres and towns within the region (Objective 1) • Improve multimodal connectivity beyond the region (Objective 2) • Provide a more productive freight network within the region (Objective 15) • Build greater resilience into the transport network (Objective 17)

Strategy	Alignment
Local Government	
Dubbo Transportation Strategy 2020 (Dubbo Regional Council, 2020)	The strategy highlights the continued population growth expected for Dubbo and surrounds, which the proposal will support by offering improved access to services and safer, more efficient linkage to Newcastle. It will also improve freight efficiency of fast-moving consumer goods into the city.
Dubbo Local Strategic Planning Statement (Dubbo Regional Council, 2020)	The proposal aligns with the following priorities: • Support for the growth and development of Dubbo as a mining services centre for the Orana and Western NSW (Plan Priority), allowing for the safe and efficient import of mine equipment, processing inputs and export of metals and minerals. • Continue to grow and develop agribusiness, transport and logistics and recognise the importance of these sectors to the regional, State, and national economy (Plan Priority) • Quality freight, transport, and infrastructure networks (Goal 3) • Improve freight connections to markets and global gateways (Plan Direction)
Mid-Western Regional Strategic Planning Statement (Mid-Western Regional Council, 2020)	The proposal aligns with the following priorities: • Identify resources and infrastructure required to drive investment and economic growth in the Region (Planning Priority 8) • Develop a regional transport network in partnership with government agencies, that grows with the needs of residents and businesses (Planning Priority 10)

2.5 Expected Outcomes

The expected quantifiable outcomes arising from the proposal include:

Table 6: Expected Quantifiable Outcomes

Benefit Category	Benefit Description	Expected Quantifiable Outcome
Economic	Vehicle operating cost savings	$41,399,837.54 / year
Economic	Road maintenance cost savings	$5,900,590.47 / year
Economic	Freight travel time savings	$17,032,706.02 to $22,104,455.49 / year
Economic	Induced demand	$3,317,355 / year
Economic	Higher cargo payload transported per journey	2,467.50 tonnes / journey
Economic	Reduction in Gross Tonne Kilometres (GTK)	603,488,730 tonnes
Economic / Social	Increase in average train speeds	+50 km/hr
Economic / Social	Reduction in overall length of rail freight journey from Dubbo to Gulgong	4 h 45 mins
Social	Crash cost reduction	$6,309,504.62 / year
Environmental	General environmental cost reduction	$7,944,814.21 / year

Note: Where outcomes are variable or have a range, the lowest quantifiable outcome has been given.

Additional outcomes arising from the proposal include:

- Stimulated economic activity, enhancing the Orana and Hunter region's investment prospects,
- Improved trade workability within the multi-modal transport network between Orana and Hunter,
- Increased network resilience,
- Improving competitiveness of regionally based businesses,
- Improvement in regional connectivity, facilitating better access to workplaces, essential services, recreational activities, and a reduction in major disruptions from post-crash road closures,
- Improved quality of life for residents, enhanced by safer road conditions and reduced congestion,
- Contribution to attaining a 'social license' for the construction of major projects in the Orana region, such as critical minerals projects and renewable energy projects, due to a reduction in disruption from increased over-size over-mass movements,
- Improving the likelihood of timely construction of projects in the Far West-Orana Renewable Energy Zone, which is anticipated to add 6 GW of renewable energy capacity to the network by 2038.

2.6 Stakeholder and Community Support

2.6.1 Outline and Objectives

Outline

The overall level of community support for the proposal is considered to be high. The proposal has been developed through iterative consultation processes, including:

- A Project Reference Group
- Stakeholder Engagement – Processes and Report

Further information on stakeholder engagement activities and their findings are detailed in Annex C (Stakeholder Engagement Report).

Objectives

Stakeholder Engagement included the following agreed objectives:

- Gain an understanding of community and commercial views and suggestions as to the preferred mode of freight transport, infrastructure barriers, risks and opportunities across the Orana and Hunter regions,
- Identification of potential network efficiencies, priority infrastructure upgrades and essential safety improvements,
- Active engagement with a broad cross section of local communities and businesses to ensure their input, insights, needs and concerns are considered and recorded as supporting evidence for subsequent business case development,
- Develop a broad understanding the Regions' preferred mode of freight transport, infrastructure rationalisation or development goals, barriers to delivery and broad commercial and community opportunities,
- Identify the potential for short- and medium-term network efficiencies, pressing infrastructure upgrade requirements and essential safety improvements,
- Maintenance of ongoing engagement and feedback with stakeholders to support and clarify the business case development.

Consultation Activities Undertaken

A series of meetings were organised with the key stakeholders to delve into company, departmental or community workings. The Stable Group used our local professionals for the stakeholder engagement. The stakeholder selection and insights collected were agreed with a Project Reference Group, which consisted of 15 community and business leaders consulted on a monthly basis.

If this proposal is to go ahead, it is recommended that the relevant state bodies embed complementary stakeholder consultation processes in all phases of development, construction, and maintenance.

2.6.2 Key Stakeholders

Table 7: Key Stakeholders and Organisations

Stakeholder	Type of Entity	Sector
Australian Food and Fibre	Business	Large Ag Corporate
Maas Group	Business	Construction
ACE Energy	Business	Energy
Squadron Energy	Business	Energy
Inland Petroleum	Business	Fuel
Fletcher International Exports	Business	Large Ag Corporate
Grain Corp	Business	Large Ag Corporate
Manildra Flour Mill	Business	Large Ag Corporate
Robinson Grain Trading Co	Business	Large Ag Corporate
QUBE Agri	Freight	Large Ag Corporate
Energy Co	Government	Local Government
Maverick Biosciences	Business	Manufacturer
Alkane Resources	Business	Mining
Australian Strategic Materials	Business	Mining
CSA Mine (Metals Acquisition Ltd)	Business	Mining
Endeavour Mine (CBH Ltd)	Business	Mining
Hera Mine (Aurelia Metals)	Business	Mining
Peak Gold Mine (Aurelia Metals)	Business	Mining
Sunrise Energy Metals	Business	Mining
Tritton Copper Mines (Aeris Resources)	Business	Mining
Australia Post	Government Business	Postal service
Pacific National	Freight	Rail freight
Port of Newcastle	Business	Trade
Aurizon	Freight	Rail freight
Coles	Business	Retail
Woolworths/Primary Connect	Business	Retail
QUBE Logistics	Freight	Road freight
SSR	Freight	Road freight
Australian Peak Shippers Association	Association	Shipping
Transport for NSW	Government	State Government

2.6.3 Key Issues/Concerns and Proposal Adaptation

Stakeholder insights and their influence on the proposal development are summarised as follows:

Table 8: Proposal Adaption Based on Stakeholder Insight of Current and Future Freight

Insight	Description	Proposal Adaptation
Current Freight	There is a broader variety of commodity groups in the Orana Region than what is represented in the Transport for NSW (TfNSW) current freight volumes, including fuel, mining inputs, and mineral concentrate. This is demonstrated in Figure 1 and Figure 2 under Section 2.1.2 (Future Freight Task of the Golden Highway).	These insights highlight the necessity of regional preparedness and the development of more efficient freight transport infrastructure.
Future Freight	An 11% increase in mineral concentrate for bulk export is anticipated from the Bourke/Cobar/Coonamble region over the next five years, with no growth indicated by TfNSW. Pre-construction mines in the Dubbo region are not included in TfNSW freight volumes estimates, resulting in an underestimation of imports for mining inputs and export of mineral concentrate from the region. Stakeholder consultation indicated an overall 17% increase in commodity volumes from the Orana region, while TfNSW indicated 6% growth.	

3. Analysis of the Proposal

3.1 Objectives and Indicators

The proposal objectives and success indicators are:

Table 9: Identified Issues, Proposal Objectives and Success Indicators

Key Problem/Issue	Key Proposal Objective	Key Success Indicator
Inefficiencies in rail freight transport.	Enhance efficiency of rail freight transport by reducing journey length and increasing train speeds and load per journey.	Quantifiable increase in average train speeds across the network, a higher amount of cargo transported per journey (measured in tonnage), a reduction in the overall length of journeys (measured in travel time or distance), freight travel time savings, and reduction in Gross Tonne Kilometres (GTK).
Reliance on the congested Sydney freight network and Port Botany for Orana freight.	Reduce reliance on the congested Sydney freight network and Port Botany.	Increased freight diversion from Port Botany to Port of Newcastle.
Crashes and fatalities from road transport.	Decrease crashes and fatalities by mode shift from road to rail.	Quantifiable reduction in road crashes and fatalities.
Significant economic costs of road maintenance and vehicle operation from reliance on road freight transport	Decrease road maintenance and vehicle operation costs.	Quantifiable reduction in road maintenance and vehicle operation costs.
Air pollution, greenhouse gas emissions, noise, and water pollution.	Decrease air pollution, greenhouse gas emissions, noise, and water pollution, through lowered GTK and mode shift from road to rail.	Quantifiable reduction in air pollution, greenhouse gas emissions, noise, and water pollution.

3.2 The Base Case

The Base Case assumes that **current transport modes will continue** on a "business as usual basis" for the evaluation period to 2052 in this current condition.

Current transport modes available include:

- Road transport along the Mitchell Highway and Great Western Highway (A32) to Sydney, including access to Port Botany for freight;
- Road transport via the Golden Highway (B84) to the Hunter and Newcastle, including access to Port of Newcastle;
- Rail transport by the Main Western Line over the Blue Mountains to Sydney, including access to Port Botany for freight;
- Rail transport via the Merrygoen line to Newcastle, including access to Port of Newcastle for freight.

The Base Case assumes only announced, required, and/or committed upgrade projects will be included in the forward program for the Base Case. This includes replacement of 3 bridges on the Merrygoen – Gulgong line, namely Elong Creek, Beni Creek, and Talbragar River #2, as well as new sleepers and rail for 50% of the railway line (~88.5 km).

The Base Case assumes the current estimated total freight task utilising the Golden Highway Corridor is approximately 2.5 million tonnes per annum (Mtpa) for all commodities inbound and outbound in 2023

The Base Case assumes there will be significant increase in demand for freight transport by 2033 along the Golden Highway Corridor from 2.5Mtpa to 6.37Mtpa. Both the size of the task and its components will significantly alter over the next decade; with a shift from agriculture prominence to mining and mining inputs.

Base Case Projections to 2050 indicate a future freight task of approximately 6.37Mtpa, encompassing both inbound and outbound volumes to and from the catchment area.

Table 10: Total Forecast Freight Volumes Golden Highway Corridor (tonnes per annum)

Commodity	2023	2028	2033	2050
Agricultural Input	90,000	90,000	90,000	90,000
Fuel	113,200	157,450	121,700	121,700
Mine Input	131,400	2,256,500	2,184,000	2,184,000
Non-Coal Minerals	460,000	1,427,000	1,627,000	1,627,000
Other	100,000	200,000	350,000	500,000
Agriculture	1,640,000	1,880,000	1,919,500	1,817,000
Grand Total	**2,534,600**	**6,010,950**	**6,292,200**	**6,339,700**

3.3 Options Considered

3.3.1 Do-nothing option

In the do-nothing option, which involves the usual upgrade and, operation and maintenance of the Dubbo – Gulgong (via Merrygoen) line, the increased freight load over time would exacerbate current problems: inefficiencies in rail freight transport, reliance on the congested Sydney freight network, crashes and fatalities from road transport, significant economic costs of road maintenance and vehicle operation, and significant greenhouse gas and other emissions from road transport.

The increased freight load over time, combined with a 20.25 TAL rail line, would also mean volumes forecast for rail transport would be constrained and likely gravitate to road. This would increase heavy vehicle movements and further deteriorate the service level of the Golden Highway, resulting in more crashes and fatalities.

This option is not considered feasible.

3.3.2 Do-later option

In the do-later option, which involves constructing the Maryvale – Gulgong line in 2033 and upgrading the Gulgong – Ulan line in 2033, the delay would result in continued reliance on the existing infrastructure with its inherent limitations.

In the interim period before construction and upgrade, the Dubbo – Gulgong (via Merrygoen) line would continue to experience the same inefficiencies described in the do-nothing option. This may lead to a rise in the economic costs associated with delays, road maintenance, and vehicle operation. Additionally, the environmental impact would not be mitigated, as the emissions from road transport would remain high due to the ongoing dependence on trucking.

Furthermore, the safety concerns due to increased heavy vehicle traffic would persist, potentially leading to a higher incidence of crashes and fatalities. By postponing necessary improvements, the do-later option might also result in opportunity costs related to potential economic benefits from an upgraded rail network. Although this option allows for future infrastructure development, it does not address the immediate and medium-term issues that will continue to escalate as freight demand grows.

This option is not considered feasible.

3.3.3 Invest in Other Freight Network between the Orana Region and Port

In the alternative freight network option, improving the Blue Mountains corridor/network for freight transport between the Orana Region and the Port of Newcastle, is not deemed a feasible option due to several critical challenges.

The key transport infrastructure, including both road (A32) and rail (Main West), is constrained by the rugged topography of the area, closely following the ridgeline. This geographical limitation, coupled with ribbon urban development along the corridor, results in a transport system that is frequently congested, operates at high capacity, is susceptible to poor travel times, and experiences frequent interdiction, mostly from crashes but also from natural events including bushfires and extreme rain. Moreover, the corridor serves multiple purposes, supporting not just regional but also local traffic, including heavy vehicles, commuting traffic, and tourism, which further complicates any potential upgrades.

The variety of users and the critical role the infrastructure plays in connecting communities highlight its importance but also underscore its vulnerability to disruption from traffic incidents and natural events. Given these constraints, significant improvements to capacity and travel times would require extensive and costly measures, such as constructing tunnels or imposing major impacts on urban communities.

In contrast, investment to enhance the Golden Highway corridor from both a road and rail perspective offers a more viable solution for improving resilience, capacity, and travel times for the transport network from the Central West/North West. This investment allows for the strategic enhancement of the freight network to better support the economic activities in the region, including agriculture and mining, without the severe drawbacks associated with trying to upgrade the constrained Blue Mountains corridor. This investment would also provide the Great Western Highway through the Blue Mountains with much needed relief.

3.3.4 Preferred Option

The preferred option and proposal is to construct the incomplete Maryvale – Gulgong line to 25 TAL, commencing in 2024, with planned 2028 completion, and upgrade the Gulgong – Ulan line, commencing in 2026, with planned 2028 completion.

This is preferred because it allows for an immediate start to addressing the capacity constraints and inefficiencies of the current rail network. By commencing the construction of the Maryvale – Gulgong line to 25 TAL in 2024, the project can capitalise on the current economic conditions and technological advancements, ensuring the infrastructure is built to meet the future demands of freight transport. The concurrent upgrade of the Gulgong – Ulan line ensures that the entire route is optimized for higher axle loads, leading to increased efficiency, lower costs per ton, and improved competitiveness of rail transport against road haulage.

Furthermore, this option supports the environmental sustainability goals by reducing greenhouse gas emissions through a shift from road to rail, which is generally more fuel-efficient per tonne-kilometre.

Safety will also be enhanced by reducing the number of heavy vehicles on the road, thus potentially decreasing the number of road accidents and fatalities.

The economic benefits include not only direct cost savings in freight transportation but also indirect benefits such as increased economic activity in the region due to improved logistics.

3.4 Information about the proposal

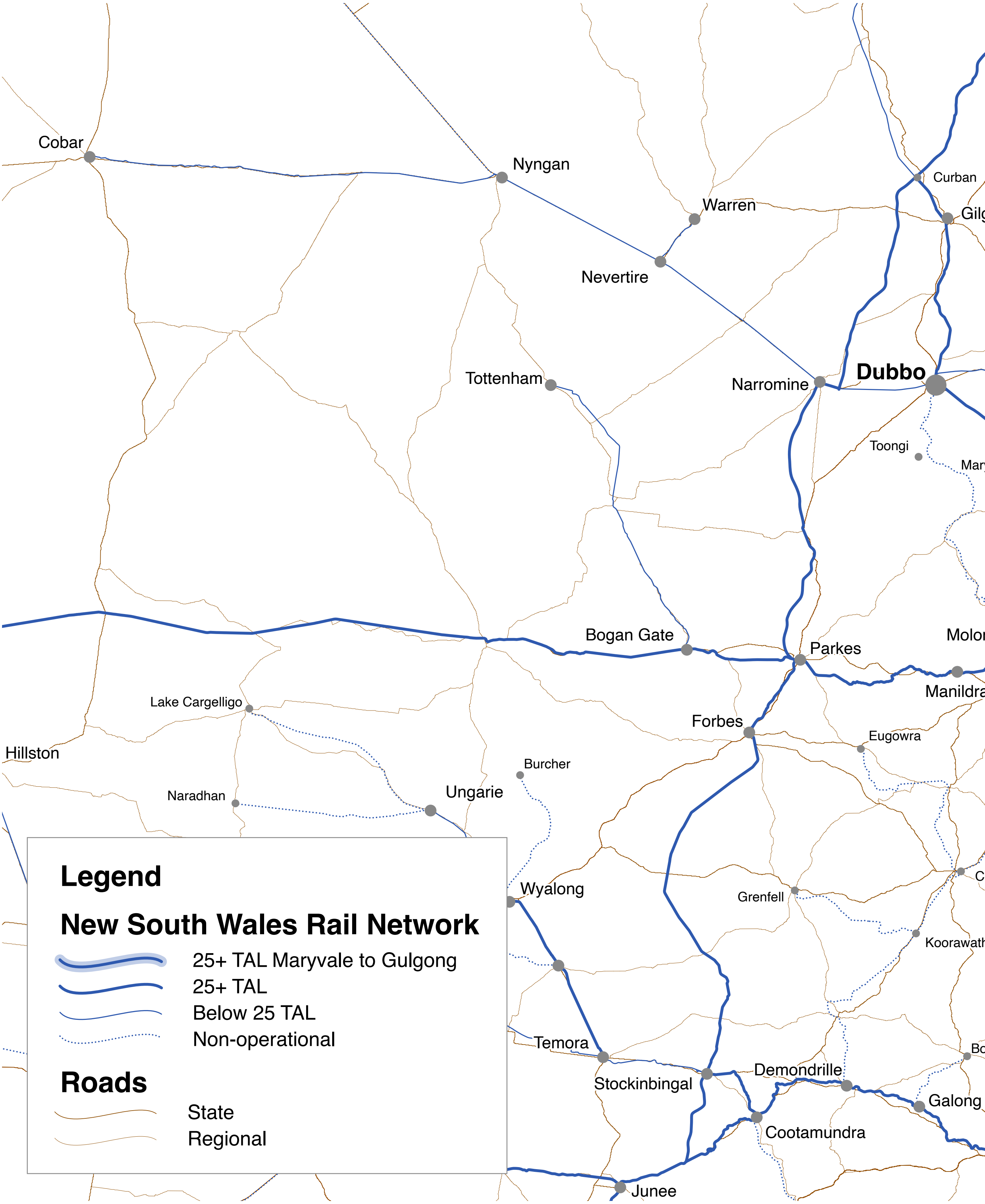
3.4.1 Scope of Works

Proposal suggested scope of work and relevant design standards include:

- 73km of track to 25 TAL specifications (60 kg/m rail on concrete sleepers with min 450 mm ballast depth)
- Earthworks
- 1 loop (60 kg/m rail on concrete sleepers with min 450 mm ballast depth)
- 9 bridges (concrete bridge construction)
- 1 tangential turnout (60 kg/m on concrete bearers)
- 60 culverts (Reinforced Concrete Box Culverts (RCBCs))
- 1 tunnel (Single ballasted track, bored tunnel concrete lined)
- 8 level crossings (active)
- 11 level crossings (passive)
- 15 level crossings (private, passive)
- Signalling (TOW, TMACS Modification)
- 146km of wire fencing (four-strand barbed wire with steel posts installed on both sides of the track)
- Major periodic maintenance on the 24.8 km Gulgong-Ulan line to 25 TAL specifications

Location of the Proposal

The study area is the Dubbo-Newcastle railway corridor, a 472 km line. The proposal is for construction of the Maryvale – Gulgong line, which is 72 km in length, and upgrades to the Gulgong – Ulan line, which is 24.8 km in length.




Tamworth
Werris Creek
Gap
Binnaway
gandra
Merrygoen
Coolah
Dunedoo
Cassilis
Elong Elong
Merriwa
Gollan
Ulan
Muswellbrook
Goolma
Gulgong
Sandy Hollow
Denman
yvale
Mudgee
Singleton
Maitland
Kandos
Newcastle
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Orange
Wallerawang
Bathurst
Lithgow
Blayney
Bowenfels
Tarana
Oberon
owra
Sydney
Port Botany
Menangle
Picton
Crookwell
Wollongong
Port Kembla
Moss Vale
Goulburn
Yass
Nowra

Relevant Design Standards

- ARTC Standard ETF-05-01
- Country Regional Network Standard CS 200

Quantifiable Details (including area/length, capacity)

Disclaimer- Accuracy: Dimensions and distances quoted in this study are estimates only based on visual estimate and some range finding. They are not a reliable basis for design or estimating beyond the strategic level.

Table 11: Suggested Scope of Works and Cost Estimates

Scope	Quantifiable Details	Notes	Cost Estimate
73km of Track to 25 TAL Specifications	60 kg/m rail on concrete sleepers with min 450 mm ballast depth	No current track infrastructure along Maryvale – Gulgong	@ $1,180,679.53/km x 73 km = $86,189,605.69
Earthworks	Cut, fill (150, 000 m3) Slope stability (Restorative only) 10km Imported fill (300, 000 m3)	Mid-20th century earthworks mark the construction start. Corridor traceable by intact cuttings and embankments. Minimal large-scale earthworks; low stability risks. Notable wear; suggests need for refurbishment.	Various rates. Total = $9,375,500.00
1 Loop and 1 Spur	60 kg/m rail on concrete sleepers with min 450 mm ballast depth	Absence of any point and crossing unit. 1 Loop and 1 Spur to be constructed. Castlereagh Loop and Maryvale Southern Spur Another 3 Loops are volume related, proponents to fund Goolma, Bodangora and Extended Gulgong Loops.	@ $1,180,679.53/km x 2.75 km = $3,246,868.71
9 Bridges	3km new road on embankment including 1 incremental launch bridge. Road including earthworks. Assume land acquisition not costed	Bridge conditions vary along the line. Some bridges fully built-in initial construction phase. Others only have the substructure completed. Some locations lack any bridge components. For safety, calculations 100% bridge construction to be undertaken.	@ $1,892,120.35/bridge x 9 = $17,029,083.15

Scope	Quantifiable Details	Notes	Cost Estimate
1 Tangential Turnout	60 kg/m on concrete bearers	Absence of any points and crossing units. 1 tangential turnout to be constructed; tangential to meet Class 1 XC design standard requirements. Another 3 Tangential turnouts are volume related, proponents to fund turnouts and loops.	@ $2,958,957.07/turnout x 1 = $2,958,957.07
60 Culverts	Reinforced Concrete Box Culverts (RCBCs)	Culverts along the line made of concrete, generally serviceable. To ensure safety, calculations assume 100% culvert	@ $23,593.41 /culvert x 60 = $1,415,604.60
1 Tunnel	Total of 4 lanes This item is deliberately not quantified as it will depend on a safety assessment.	Tunnel Number 5. Constructed mid-20th century, no track installed, around 70 years old. 250m length, cross-section fits maximum rolling stock.	@ $26,603,091.62/tunnel x 1 = $26,603,091.62
Level Crossings	8 level crossings (active) 11 level crossings (passive) 15 level crossings (private, passive)	34 level crossings required.	Various rates. Total = $8,269,328.62
Capital works and Major Periodic Maintenance on the 24.8 km Gulgong-Ulan Line		Current track configuration and structures able to run 25 TAL. However, line currently rated to 23 TAL. Assuming 50% new Rail and sleepers and major periodic maintenance required to restore line back to 25 TAL specification	50% line and sleeper replacement @ $1,180,679.53 per km x 12.4km = $14,640,426.17 Major periodic maintenance based on Track km and GTK @ $4,183,030.428 Total = $18,823,456.60
Utility Adjustments or Property Acquisitions	5 ha land acquisition required.		

Table excludes wire fencing and signaling, as no explanatory commentary needed.

3.4.2 Proposal Exclusions

Excluded from this proposal is cost of construction of Toongi rail and Alkane (Boda-Kaiser) sidings as well as the reconstruction of rail line through the Dubbo Maintenance Facility to service Toongi.

Also excluded is the infrastructure required for private projects.

3.4.3 Related Projects

This proposal is not contingent on the success of other projects, although the cumulative impact of these projects add to the scale of the benefit that will be derived from the construction of and upgrades to Dubbo Newcastle Rail.

Stakeholder consultation revealed a projected growth in commodity volumes over the next half-decade suggesting a substantial 17% increase. The study corridor movements will evolve from a majority of agricultural related bulk commodities to that dominated by mining. Specifically, the growth in mining inputs is expected to be in the vicinity of 1.2Mtpa or a 1400% increase by 2033.

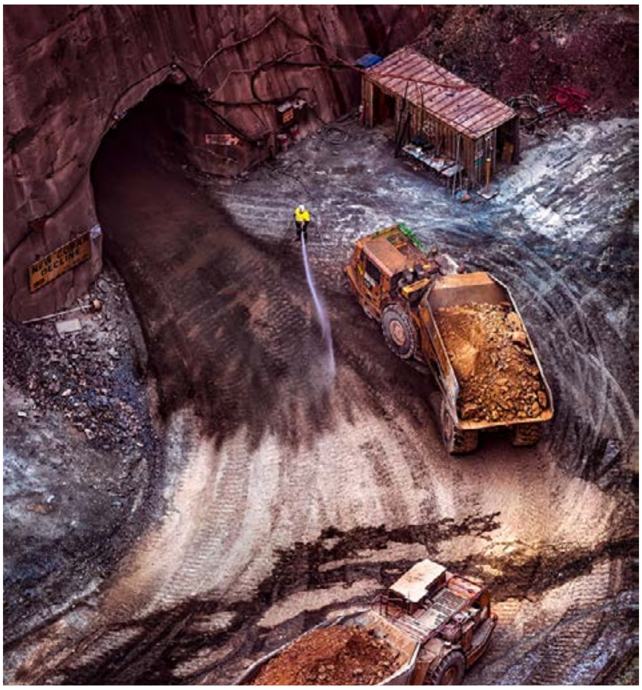
This information highlights the importance of regional preparedness and the need for development of infrastructure funding plans to accommodate the future projects that are under construction or in the proposal stage which will require Dubbo Newcastle Rail Corridor to provide efficient and reliable access between the Orana Region and the Port of Newcastle.

Future projects assumed in this Business Case include, but are not limited to the following:

- Inland Rail: Ongoing construction of Inland Rail for the Narromine to Narrabri section.
- Mining Projects: Discussions with stakeholders reveal an anticipated 11% increase in mineral concentrate for bulk export from the Bourke/Cobar/Coonamble region over the next five years. Cobar emerges as a significant hub, especially for mining-related commodities, featuring multiple indicators for mining inputs, fuel, and mineral concentrate.
- Mining Projects for the Dubbo region: stakeholder consultations signal the beginning of mining operations at The Dubbo Project (ASM mine) near Toongi and the further development of mining exploration and operations near Parkes. This indicates a need for significant volumes of mining inputs imported via the Golden Highway and concentrate for export to the Port of Newcastle.
- REZ: The construction of the Central-West Orana Renewable Energy Zone, which will require transportation of imported components.
- Port of Newcastle (PoN): Development of containerised shipping of general freight through the PoN combined with demand by mining projects and the CW-Orana REZ will see the PoN expand in capacity. In tandem, the demand for Fast Moving Consumer Goods (FMCG) through the PoN is poised for substantial growth, in line with the anticipated population surges within the PoN footprint. For example, by 2061, 11.5 million people will be living in NSW, 40% more people than today. This will significantly impact the PoN's import needs, particularly in construction materials and infrastructure goods, as well as FMCG, to support the expanding urban and residential development within the PoN footprint. Similarly, Australia's population is projected to increase to 37.27 million by 2061. Subsequently, PoN will face a substantial rise in import demands, including energy resources and FMCG, to cater to the needs of an increasingly urbanised population and to sustain economic growth and improved living standards.
- Agricultural production: Coonamble, Nyngan, Gilgandra, Narromine, Dubbo, Warren, Dunedoo, Mudgee, and Walgett agricultural production plays a pivotal role in underpinning the broader economy and would benefit from a more efficient, cost effective and safer network for access and egress to the Port of Newcastle.

More Freight from Related Projects than Prior Estimates

Prior studies including Transport for NSW future freight estimates have overlooked key data and projections for related projects, leading to the current situation where infrastructure doesn't meet the real-time needs and will not meet future needs. Stakeholder engagement verified that there will be a significant increase in annual freight volumes. As producers in the region have acknowledged, this increase will expose the shortfall in the current transportation infrastructure. If not addressed, the inefficiencies and bottlenecks will cause an increase in freight costs, environmental impacts, and safety incidents. The stakeholder engagement activities identified an urgent need for infrastructure solutions to ensure the efficient movement of freight required for the related projects.



3.5 Projected Costs

The below table summarizes the estimated construction costs with overheads and contingencies applied.

Rates Reference: GHD Developing a Regulatory Asset Base Value for the Australian Rail Track Corporation Interstate Network, using the Depreciated Optimised Replacement Cost Method Draft Public Report (2021).

Table 12: Estimated Construction Costs ($m) plus overheads and contingency.

Item	Cost ($ million)
Track and Loops	104.07
Earthworks / Civil	9.38
Points and Crossings	2.95
Bridges	17.03
Culverts	1.42
Tunnel	26.60
Crossings	8.27
Signaling	1.34
Railway Corridor	23.51
Land Acquisition	0.82
Design and Development (5%)	8.75
Contingency (60%)	122.48
Total	**326.62**

Project Timeframe and Escalation

- Project start: 2024
- Duration: 4 years, completed in 2028.
- Escalation: See table below.

Table 13: Inflation

NSW Treasury Economic Outlook Parameters	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
Inflation % per annum	3.5	2.8	2.5	2.5	2.5	2.5

Total Cost with Contingency and Escalation:

- Construction cost, other costs and contingency: $326.62 m
- Escalation (2023-28) $27.86 m
- **Total estimated cost:** **$354.48 m**

3.6 Cost-Benefit Analysis

The Business Case presents a strong net positive case for construction and upgrades in the Dubbo Newcastle Rail Corridor. It is estimated to cost (capital, operational, and maintenance costs) $674 M.

The project is expected to generate $1,935 M (inclusive of residual value) in benefits over a thirty-year period. In present value terms at the core 5% discount rate, this amounts to $845.3 M in benefits and $441.6 M in costs. Thus, the project has a net present value (NPV) of $403.7 M and a benefit cost ratio (BCR) of 1.91.

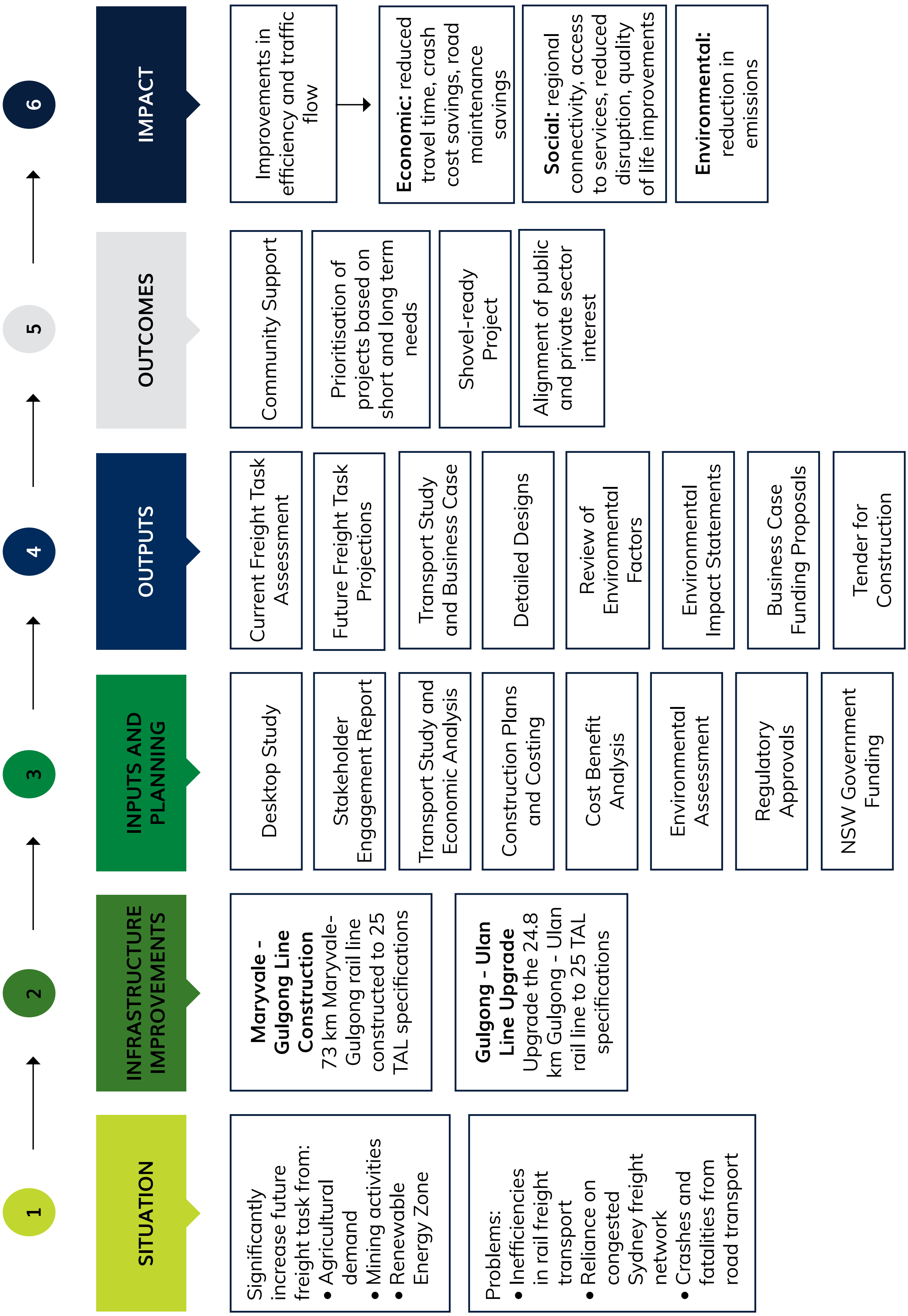
Upon conducting sensitivity testing with a 15% variance in costs and benefits — specifically, a 15% reduction in benefits to approximately $718.5M and a 15% increase in costs to about $507.8M — the project's financial viability remains robust. Despite these adjustments, the net present value (NPV) stands at $210.7M and the benefit cost ratio (BCR) at 1.41. This analysis confirms the project's resilience, strategic value, and economic justification under adverse financial scenarios.

Benefits of the project include:

Table 14: Benefits of the Projects

Benefit	Outcome Description
Economic	Freight travel time savings
Economic	Vehicle operating cost savings
Economic	Road maintenance cost savings
Economic	Crash cost reduction
Social	Safer road conditions and reduced congestion
Social	Improvement in regional connectivity
Environmental	Reduction in pollution and emissions

Figure 9: Regional Transport Strategy – Benefits Realisation.



3.7 Financial Appraisal

Table 15: Nominal Capital Cost Projections

Nominal Capital Costs	2023-24	2024-25	2025-26	2026-27	2027-28	Total
Nominally:	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	
Project Design and Development		$8,757,518.75				$8,757,518.75
Construction						
Land Acquisition		$821,799.90				$821,799.90
Cut		$694,500.00				$694,500.00
Fill		$1,020,000.00				$1,020,000.00
Slope Stability		$5,000,000.00				$5,000,000.00
Imported Fill		$2,661,000.00				$2,661,000.00
Agricultural Wire Fence		$5,209,798.30				$5,209,798.30
Access/Maintenance Road		$5,008,910.90				$5,008,910.90
Vegetation Management		$1,393,257.15				$1,393,257.15
Tunnel			$26,603,091.62			$26,603,091.62
Concrete Culverts			$1,415,604.60			$1,415,604.60
Track Construction				$64,642,204.27	$21,547,401.42	$86,189,605.69
Bridges				$12,771,812.36	$4,257,270.79	$17,029,083.15
Maryvale Southern Spur					$649,373.74	$649,373.74
Loop 1					$2,597,494.97	$2,597,494.97
Tangential Turnout					$2,958,957.07	$2,958,957.07

Nominal Capital Costs	2023-24	2024-25	2025-26	2026-27	2027-28	Total
Nominally:	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	
Active Crossings					$5,116,129.28	$5,116,129.28
Level Crossing (passive)					$1,922,116.79	$1,922,116.79
Private Crossing (passive)					$1,231,082.55	$1,231,082.55
TMACS Modifications					$473,253.11	$473,253.11
TOW Infrastructure					$866,204.87	$866,204.87
Corridor Rehabilitation					$11,875,683.34	$11,875,683.34
Gulgong-Ulan Upgrade and Maintenance				$14,640,426.17		
Nominal Capital Investment	**$0.00**	**$30,566,785.00**	**$28,018,696.22**	**$92,054,442.80**	**$53,494,967.93**	**$204,134,891.95**
Contingency (60%)	**$0.00**	**$18,340,071.00**	**$16,811,217.73**	**$55,232,665.68**	**$32,096,980.76**	**$122,480,935.17**
Real Total Capital Investment	**$0.00**	**$48,906,856.00**	**$44,829,913.95**	**$147,287,108.48**	**$85,591,948.69**	**$326,615,827.12**
Escalation	**$0.00**	**$1,711,739.96**	**$2,845,018.41**	**$13,263,066.04**	**$10,039,960.32**	**$27,859,784.73**
Nominal Total Capital Investment	**$0.00**	**$50,618,595.96**	**$47,674,932.37**	**$160,550,174.52**	**$95,631,909.02**	**$354,475,611.86**
Capacity Utilisation (%)	0.00	0.09	0.18	0.46	0.27	

Table 16: Nominal Direct Cost Projections

Direct Operating Cost Projections	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
Nominally:	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Below Rail Maintenance (Maryvale-Gulgong)						
Fixed Track Maintenance						$3,164,819.51
Variable Track Maintenance						$1,279,893.66
Periodic Maintenance (p.a.)						$343,929.14
Sub-Total:		$0.00	$0.00	$0.00	$0.00	$4,788,642.30
Above Rail Maintenance (Maryvale-Gulgong)						
Locomotive maintenance						$887,052.41
Wagon maintenance						$746,318.13
Sub-Total:		$0.00	$0.00	$0.00	$0.00	$1,633,370.54
Fuel and Crew Costs (Maryvale-Gulgong)						
Fuel consumption		$0.00	$0.00	$0.00	$0.00	$3,558,744.00
Crew cost		$0.00	$0.00	$0.00	$0.00	$629,039.57
Sub-Total:		$0.00	$0.00	$0.00	$0.00	$4,187,783.57
Below Rail Maintenance (Gulgong-Ulan)						
Fixed Track Maintenance					$747,500.23	
Variable Track Maintenance					$3,354,297.41	
Periodic Maintenance (p.a.)					$81,232.79	
Sub-Total:		$0.00	$0.00	$0.00	$4,183,030.43	
Total Real Direct Cost Projections	$0.00	$0.00	$0.00	$0.00	**$4,183,030.43**	**$10,609,796.40**
Escalation	$0.00	$0.00	$0.00	$0.00	**$490,670.68**	**$1,540,890.40**
Total Nominal Direct Cost Projections	$0.00	$0.00	$0.00	$0.00	**$4,673,701.11**	**$12,150,686.80**
						$16,824,387.91

3.8 Proposed Funding Arrangements

The proposal is expected to be funded by the NSW State Government as it concerns a state rail corridor. An argument could be made to the Federal Government to co-fund given the national significance of the freight that will travel on rail.

Mining companies such as Alkane, ASM, or others that benefit from the rail way may contribute to the proposal by funding loops and tangential turnouts, dependent on commodity volume levels at their mines.

3.9 Financial Health and Support

The lead organisation of this proposal is RDA Orana, but they will not be a funder of this proposal and their financial viability will not provide any risk to its implementation.

While there is no direct financial incentive for RDA Orana, the company's interest in the proposal success is derived from the direct alignment of proposal objectives and outcomes with their mission. RDA Orana's mission is to:

- Increase regional economic output.
- Increase investment into existing businesses.
- Attract new businesses.
- Attract and retain the regional workforce and population.

4. Implementation Case

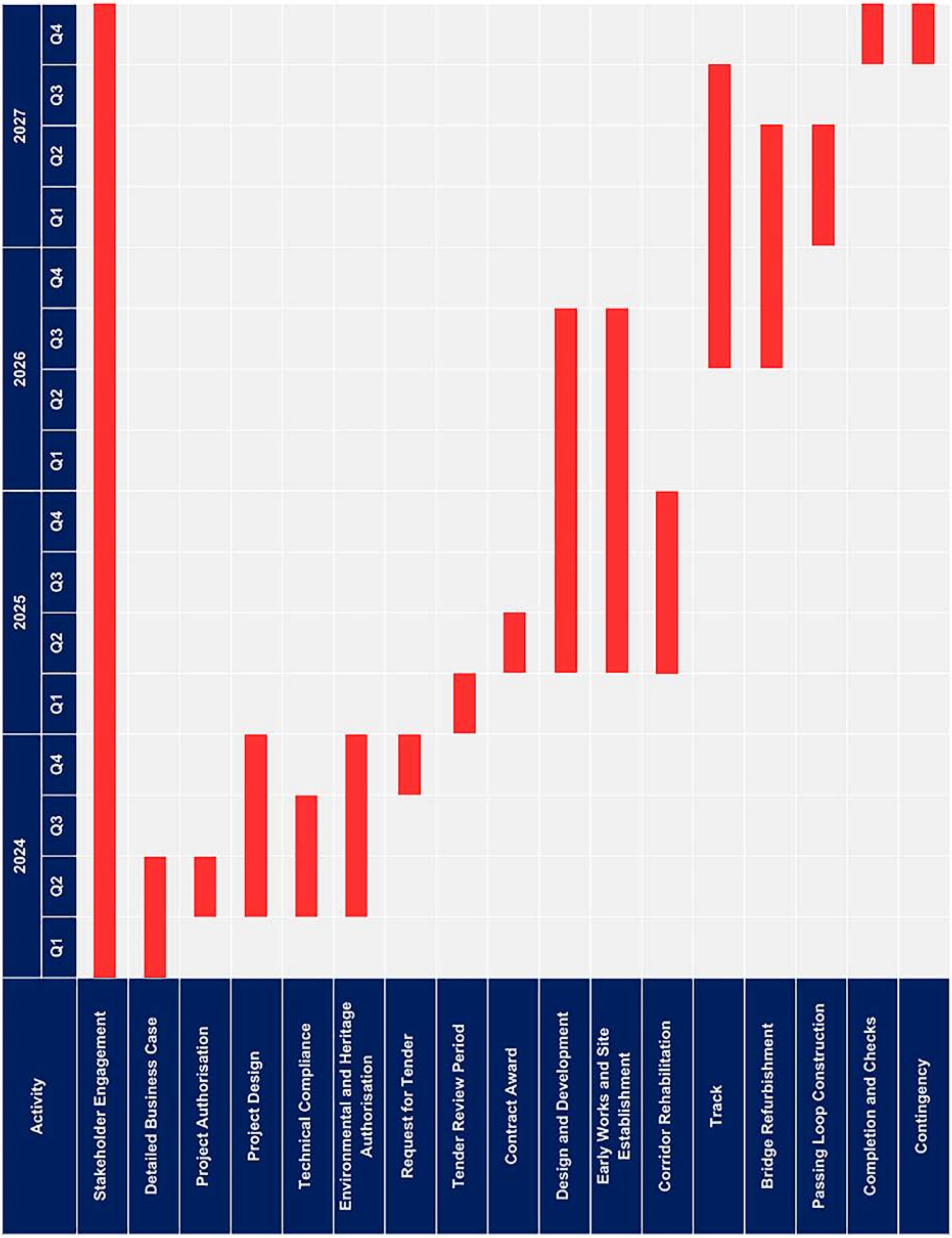
4.1 Program and Milestones

The program of key events and milestones follow. Refer to Figure 4.

Table 16: Proposal Key Events

Event	Start	Finish
Stakeholder Community Engagement	Q1 2024	Q4 2027
Detailed Business Case and Approvals	Q1 2024	Q2 2024
Project Approval	Q2 2024	Q2 2024
Project Reference Design	Q2 2024	Q4 2024
PS&TR Development	Q2 2024	Q3 2024
Environmental and Heritage Process/Approvals	Q2 2024	Q4 2024
RFT Release	**Q4 2024**	
Tender Review Period	Q1 2025	Q1 2025
Contract Award	**Q2 2025**	
Detailed Design	Q2 2025	Q3 2026
Early Works and Site Establishment	Q2 2025	Q3 2026
Corridor Earthworks Rehabilitation	Q2 2025	Q4 2025
Bridge Constructions	Q3 2026	Q3 2027
Track Renewals (including Level Crossings)	Q3 2026	Q2 2027
Passing Loop Construction	Q1 2027	Q3 2027
Handover and Commissioning	Q4 2027	Q4 2027
Contingency	Q4 2027	Q4 2027

Figure 10: Draft Project Schedule 2024 – 2027 (Gantt Chart)



4.2 Governance

Transport for NSW is likely to be the project sponsor as the proposal concerns a state rail corridor. If the project is approved by Cabinet, Transport for NSW is likely to appoint its regional office at Newcastle to manage the project. This is known to be an experienced team.

The project team is likely to comprise a Project Director, Construction Director, Design Director, and Project Manager.

The proposed project governance and delivery structures and business operating models follow.

4.2.1 Project Governance and Delivery Arrangements

The proposed project governance and delivery arrangements include:

Table 17: Project – Roles and Key Tasks

Role	Key Tasks & Outcomes Focus
Project Sponsor (likely Transport for NSW)	• Leads the project. • Is accountable for the delivery of planned benefits associated with the project. • Ensures resolution of the issues escalated by the Project Manager and the Project Reference Group. • Ensures resolution, or escalation, of the issues raised by external reviewers/advisers. • Sponsors all communication about the project to all stakeholders, in particular Local Government, RDA Orana and RDA Hunter. • Makes key organisational/commercial decisions for the project. • Ensures availability of essential project resources. • Approves the budget and decides tolerances. • Has ultimate authority and responsibility for the project. • Ensures the project is closed correctly and a Post-Implementation Review is scheduled and undertaken. • Ensures alignment with all policies. • Manages relationships with key external stakeholders.
Project Reference Group	• Oversees the delivery of the project, providing feedback and insights about the critical needs to their representative body. • Reviews and evaluates the established recommendations to ensure they align with the project intentions. • Participates in the project closure and Post-Implementation Review.

Role	Key Tasks & Outcomes Focus
Project Manager	• Managing and leading the project team. • Recruiting project staff and consultants. • Managing the coordination of the partners and working groups engaged in the project. • Detailed project planning and controlling including: • Developing and maintaining the detailed Project Execution Plan (including project schedule). • Managing project deliverables in line with the project plan. • Recording and managing project issues and escalating issues where necessary. • Managing project scope and change control and escalating issues where necessary. • Monitoring project progress and performance. • Management of contractor performance to schedule, budget and required quality. • Providing status reports to the Project Sponsor. • Liaising with and providing updates on progress to the Project Reference Group. • Managing other project evaluation and dissemination activities. • Managing consultancy input and variations within the defined budget.
Project Team	• Having a clear understanding of the project objectives and requirements prior to commencing any project work. • Having a detailed understanding of the expectations of the quality, timing and extent of the work required of them by the Project Manager and the Corporation prior to commencing work. • Obtaining input, advice and agreement of Council Representatives as required. • Raising issues which impact on the quality, timing or extent of the work to be undertaken, as they arise, with the Project Manager. • Completing the work, on-time, to budget and to quality standards. • Initiating and maintaining project documentation as required by the Project Manager. • Working with the stakeholders, as required, to ensure the project meets business needs. • Completion of all regulatory applications (registration and licences) as required in a timely manner.

4.3 Key Risks

The key risks to the delivery of the Regional Transport Strategy are detailed below. They have been generally derived from the: 'PESTLE' perspective (political, economic, social, technological, legal and environment), and 'SABRE' perspective (safety, asset, business output, reputation and environment).

Refer to Annex D (Risk Management Methodology) for the methodology and risk management process to determine the Consequence, Likelihood and Rating.

Table 18: Key Proposal Risks

Project Key Risks	Proposed Mitigation	Risk Rating after Mitigation		
		Consequence	Likelihood	Rating
Time required for upfront and ongoing consultation with community and industry stakeholders is under-estimated resulting in delays to commencement of the project.	• Project team onsite and in community at the start of the project • Early identification of relevant stakeholders to consult. • Project Reference Group in place from the start of the project	Moderate	Unlikely	Medium
Project budget underestimated or cost overrun through delay in project planning and approvals	• Allocate suitable contingency funding. • Effective and timely communication with decision makers	Moderate	Likely	Medium
Property acquisition process results in delays and requires legal intervention, For example, Localised dissent where a new easement or right of way is required to cross high value agricultural land	• Project team onsite and in community at the start of the project • Early identification of relevant land acquisition requirements and the stakeholders to consult with	Minor	Likely	Medium
Scope of the project is too broad making it unachievable	• The project is managed in stages by a competent team from Transport NSW • The project is funded by the NSW State Government	Moderate	Very unlikely	Low

Project Key Risks	Proposed Mitigation	Risk Rating after Mitigation		
		Consequence	Likelihood	Rating
Proposed associated projects that would be beneficiaries of the rail project do not go ahead or are delayed. For example, critical minerals projects or containerisation at the Port of Newcastle	• Each project's development is equally contingent on the efficiency and safety afforded by the Maryvale – Gulgong line. • Establishing memoranda of understanding with key stakeholders of the proposed associated projects to align timelines and objectives, ensuring mutual commitment to proceeding	Minor	Very unlikely	Low
Australia reaches its emissions reduction target and therefore the demand to pursue renewable technologies does not occur	• Current indications are that emissions reductions to net zero will not be met till 2050. • Road and rail infrastructure are unlikely to become obsolete especially with the push for electrification of cars, trains and trucks	Moderate	Unlikely	Low
Regional weather not fully taken into account in the development of detailed project/ Programme schedules and budgets	• Incorporate comprehensive climate data analysis into the planning stages to create more accurate weather models specific to the region and build in buffer periods to account for seasonal variances and extreme weather events. • Establish contingency funds specifically for weather-related delays and include clauses in contractor agreements that clearly define protocols for weather-related work stoppages, ensuring financial and schedule risks are shared and managed.	Moderate	Unlikely	Low

Project Key Risks	Proposed Mitigation	Risk Rating after Mitigation		
		Consequence	Likelihood	Rating
Delays due to unknown environmental, Indigenous or heritage constraints and/or items found during construction	• Conduct thorough environmental and heritage surveys prior to finalizing the project schedule and budget, engaging with local experts and historians to identify potential sites of concern that may require preservation or special handling. • Develop an action plan for encountering unexpected environmental or heritage items, including rapid assessment protocols, engagement with relevant authorities, and predefined mitigation strategies to minimise construction delays.	Moderate	Unlikely	Low

4.4 Legislative, Regulatory Issues and Approvals

The project will require several approvals and agreements with Federal, State and Local Government agencies during the design development phase.

Legislation relevant to the construction of the Maryvale to Gulgong line and upgrade of the Gulgong to Ulan line includes:

- *Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act)*
- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*
- *Land Acquisition (Just Terms Compensation) Act 1991 No 22*
- *Rail Safety (Adoption of National Law) Act 2012 No 82*
- *Heritage Act 1977 (NSW)*

The project may require a State Significant Infrastructure (SSI) application and an Environmental Impact Statement (EIS) under the NSW EP&A Act and/or approval from the Department of the Environment and Energy (DoEE) and Ministerial approval (under the EPBC Act).

The construction and upgrade proposal may require approval and consultation with ARTC and/or UGL-Linx regarding interface connections and regulatory compliance.

4.5 Proposed Management Activities

4.5.1 Risk Management

An example of a risk management strategy that could be applied for the proposal follows.

A Risk Management Plan and Register[13] to be developed by the Project Team will guide risk reporting, monitoring and mitigation activities during the delivery phase of the Project, that is during pre-construction to completion.

Day-to-day risk monitoring will be overseen by the Project Team, led by the Project Manager, with risk monitoring and reporting included within the monthly Project Reference Group meetings.

The risk monitoring and escalation framework will comprise:

- Project Team members to the Project Manager,
- Project Manager to the Project Reference Group, and
- Project Reference Group to the Project Sponsor.

A risk management activity/workshop may be held for the project prior to the commencement of each Pre-Construction activity, and subsequently at key progression points during the construction phase of the project.

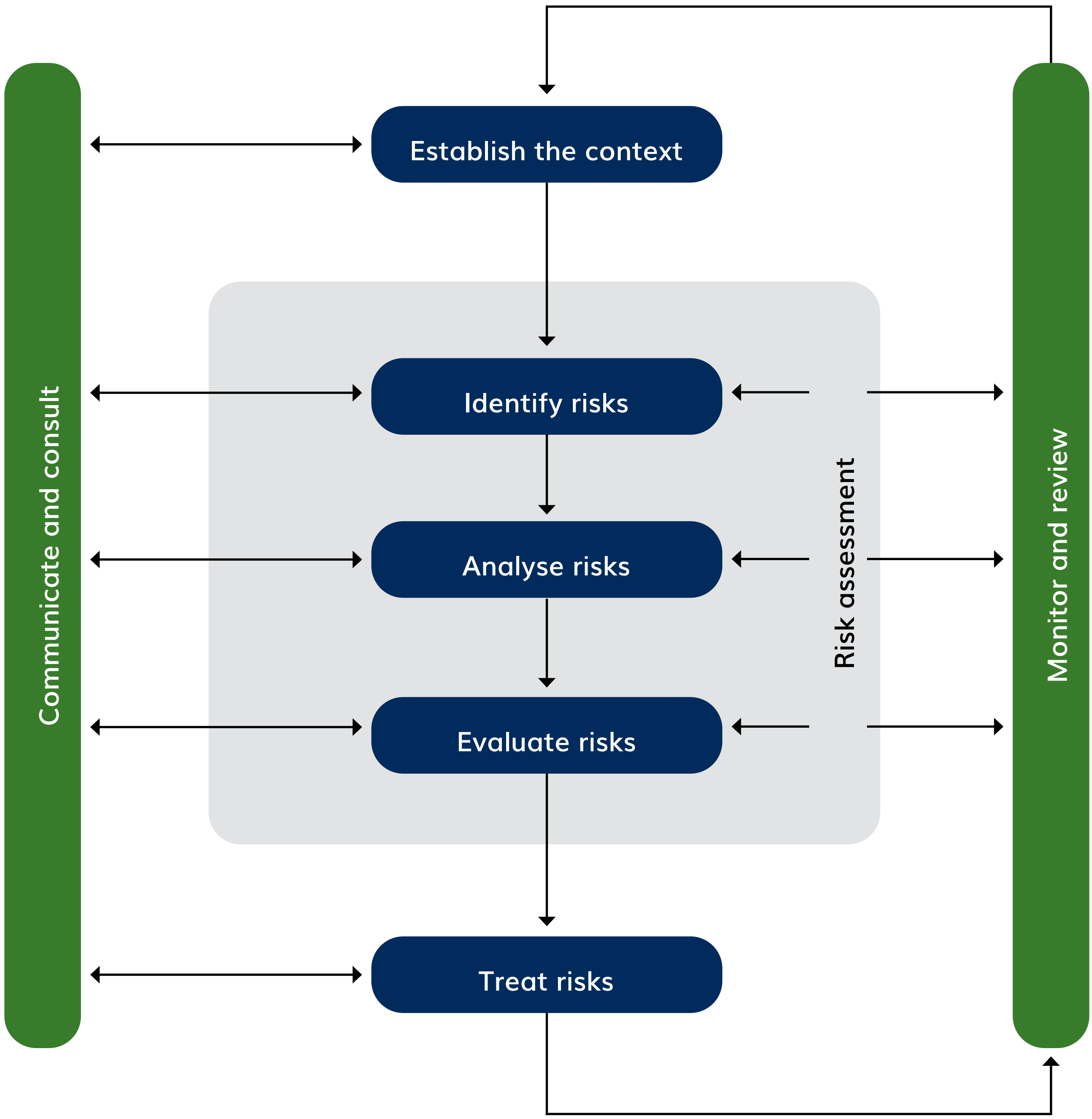
Projects that have a 'Very High' and 'High' risk rating will be monitored by the Project Manager on a weekly basis and updated in the 'weekly' progress report to the Project Control Group members.

In summary the project will address the management of risk by:

- Making risk and opportunity management an integral component of the project management systems to ensure excellence in risk and opportunity management is reflected in all elements of the project.
- Identifying risks and opportunities, recognise potential impacts and to ensure that appropriate steps are in place to manage the risk or to capitalise on the opportunity.
- Ensuring that the responsibilities for identifying and managing risks and opportunities are clearly structured and included in the management of the project.
- Implementing continuous improvement through the adoption of the elements of AS/ NZS ISO 31000: 2009 (see Figure 5: Risk Management Context)
- Incorporating risk functions/requirements into the roles and responsibilities of key staff and external suppliers with the project governance structure.
- The Project Manager ensuring all risks are recorded and monitored, with input from the Team members' Contractors and Councils.

13 To be based on the NSW Treasury TPP12-03c_Risk_Management toolkit for the NSW Public Sector.

Figure 11: Risk Management Context



4.5.2 Project Management Reporting

During the delivery phase of the proposal, project reporting should be undertaken in line with Transport for NSW guidelines and procedures.

4.5.3 Asset Management and Operations

The assets delivered, as an outcome of the construction activities will be owned, operated, and maintained jointly by the relevant state agencies.

Summary of Attachments and Annexes

Annex A: Socio-Economic Context

Regional Population and Demographics (Table A.1)

According to the 2021 Census, the Maryvale's estimated population was 192, Gulgong 2680 and Ulan had a total population of 81 residents. The three small localities had median age ranges of 37 – 41 years old and median weekly household income of between $1371 and $1687.

Regional Industry Profile and Gross Regional Product (Graph A.1, Graph A.3, Table A.1 and Table A.3)

Mining is the biggest industry in the Mid-Western employing over 64% of workers in Ulan and 19% in Gulgong. In Maryvale (19%), Dubbo Regional (19%) and Orana (15%) regions the healthcare and social assistance sector holds the largest proportion of workers. Accommodation and Food services (23%, Ulan) and Construction (14%, Maryvale) also hold a significant portion of workers.

The Dubbo Regional Council's Gross Regional Product (GRP) was approximately $4.55 billion in 2021 and therefore the highest contributor to RDAO GRP. Within this region, the Rental, Hiring and Real Estate Services (14%) and Health Care and Socials Assistance (14%) industry equally added the most value to GRP. The GRP of the Mid-Western Regional Council was estimated to be $3.2 billion and Orana Regional Development Area $11.33 billion in 2021 with the mining industry contributing the most value to GRP (47% and 22% respectively).

Rail in The Region (Image A.1 and Image A.2)

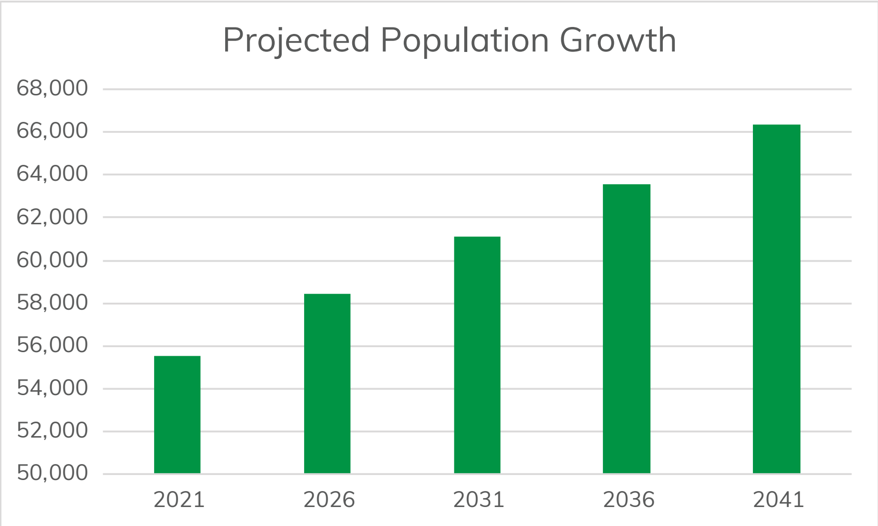
The three primary rail operators in NSW are: The Australian Rail Track Corporation (ARTC), The Country Regional Network (CRN) and Sydney Trains. As pictured in Image A.1, ARTC manage and maintain the majority of rail infrastructure within the region (Hunter Valley Corridor).

Demand Drivers in the Region (Table A.4, A.5 and A.6)

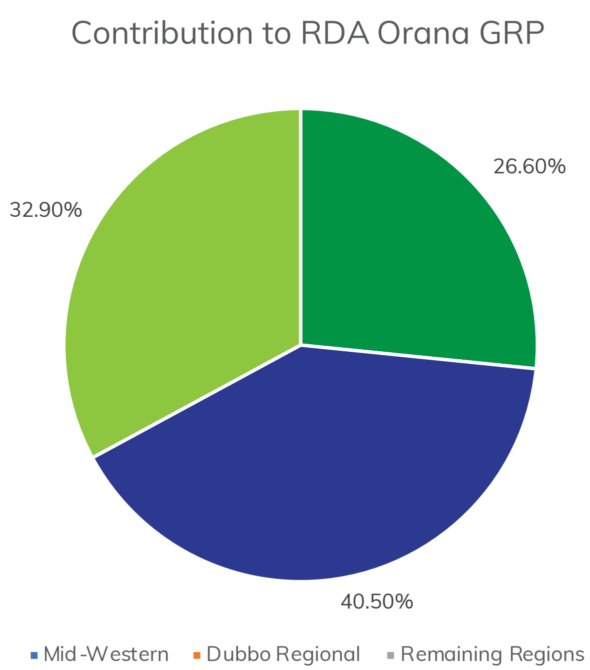
There are an extensive range of energy (wind, solar), mining (coal, metals and minerals) and freight hub projects existing or expected to commence in 2023.

Graph A.1: Projected Population Growth – Dubbo Regional Council

Source: Remplan Dubbo Forecast Profile[14] Dubbo Regional Council population is projected to grow by 19.5% between 2021-2041.



Graph A. 2: Region contribution to RDA Orana GRP



Source: Remplan Economic

14 Remplan Dubbo Economic Profile

Table A.1: Demographic Data

Town/Regional Council	Population (2021)	Estimated Population (2023)	Land Area (sq km)	Median Age (2021)	Median Weekly Household Income ($) (2021)
Orana Regional Development Area	122272	123862	199000	40	N/A
Dubbo Regional LGA	54922	55894	7535	36	1597
Mid-Western Regional LGA	25713	25795	8752	42	1486
Gulgong	2680	N/A	102	41	1371
Maryvale	190	N/A	100	37	1687
Ulan	81	N/A	295	38	1624

Source: Maryvale, Gulgong, Ulan, Mid-Western Regional, Dubbo Regional: ABS 2021 Census Community Profiles[15] Orana Regional Development Area, 2023 Population Forecasts: Remplan Community Profiles (ABS includes Far West and Orana, where Far West is not within scope)[16]

15 https://abs.gov.au/census/find-census-data/community-profiles/2021/SAL12527
16 https://app.remplan.com.au/regionaldevelopmentorana/community/population/age?state=g7Zvsj!GPmatP9K2HgKGX1IWABvMtLUNFgXJU9FbF2FliaF9R7

Table A.2: Employment Data

Town/ Regional Council	Industry ranking of employment sector, by number of workers (2021)					Unemployment rate (2021)
	1	2	3	4	5	
Orana Region	Health Care and Social Assistance (15%)	Agriculture, Forestry and Fishing (12%)	Education and Training (10%)	Retail Trade (9%)	Construction (9%)	4.1%
Dubbo Regional Council	Health Care and Social Assistance (19%)	Retail Trade (10%)	Education and Training (9%)	Construction (9%)	Public Administration and Safety (8%)	3.6%
Mid-Western Regional Council	Mining (16%)	Health Care and Social Assistance (11%)	Retail Trade (9%)	Construction (8%)	Education and Training (8%)	4.0%
Gulgong	Mining (19%)	Health Care and Social Assistance (11%)	Retail Trade (10%)	Accommodation and Food Services (9%)	Education and Training (8%)	4.5%
Maryvale	Health Care and Social Assistance (19%)	Construction (14%)	Agriculture, Forestry and Fishing (12%)	Education and Training (12%)	Arts and Recreation Services (5%)	0.0%
Ulan	Mining (64%)	Accommodation and Food Services (23%)	Health Care and Social Assistance (18%)	Retail Trade (14%)	N/A	0.0%

Source: Maryvale, Gulgong, Ulan, Mid-Western Regional, Dubbo Regional: ABS 2021 Census Community Profiles Orana Region: Remplan Economic Profiles (ABS includes Far West and Orana, where Far West is not within scope)[17]

17 https://app.remplan.com.au/regionaldevelopmentorana/economy/industries/value-added?state=DL1NFv!wDJ0Hdo03hrvpgecw5oJBHmTASIbwFpJ2JKTXjEj3IWSVgiaSMIAAVRTXZN

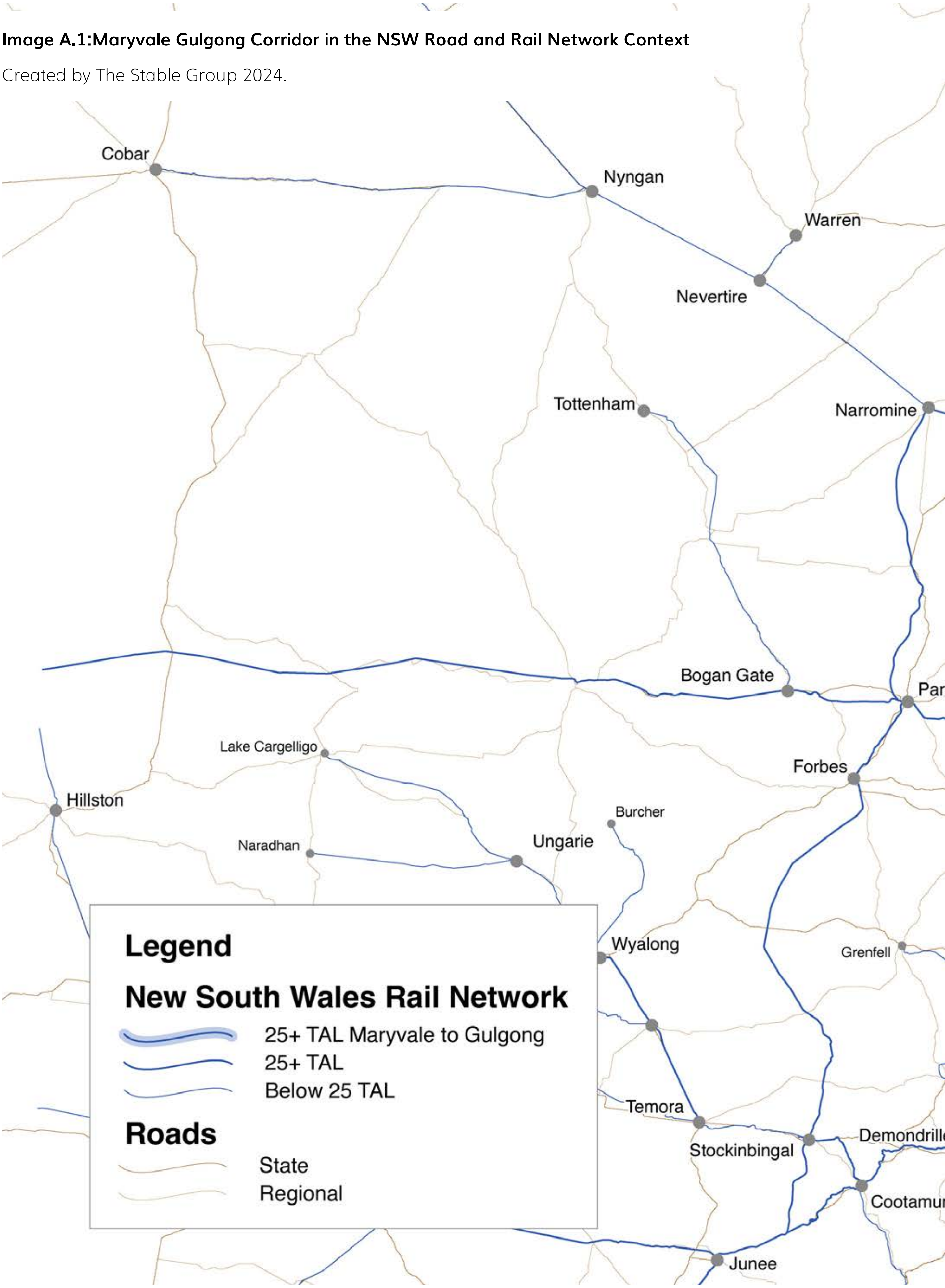
Table A.3: Gross Regional Product Data

Town/ Regional Council	Industry ranking of value add to Gross Regional Product (2023)					Gross Regional Product (GRP) (2021)
	1	2	3	4	5	($bn)
Orana Regional Development Area	Mining (22%)	Rental, Hiring and Real Estate Services (12%)	Agriculture, Forestry and Fishing (10%)	Health Care and Social Assistance (9%)	Construction (8%)	11.336
Dubbo Regional Council	Rental, Hiring and Real Estate Services (14%)	Health Care and Social Assistance (14%)	Construction (11%)	Public Administration and Safety (9%)	Education and Training (7%)	4.552
Mid-Western Regional Council	Mining (47%)	Rental, Hiring and Real Estate Services (10%)	Construction (6%)	Agriculture, Forestry and Fishing (5%)	Health Care and Social Assistance (5%)	3.208

Source: Remplan Economic Profiles (ABS 2021 census data, scaled to 2023)

Image A.1:Maryvale Gulgong Corridor in the NSW Road and Rail Network Context

Created by The Stable Group 2024.



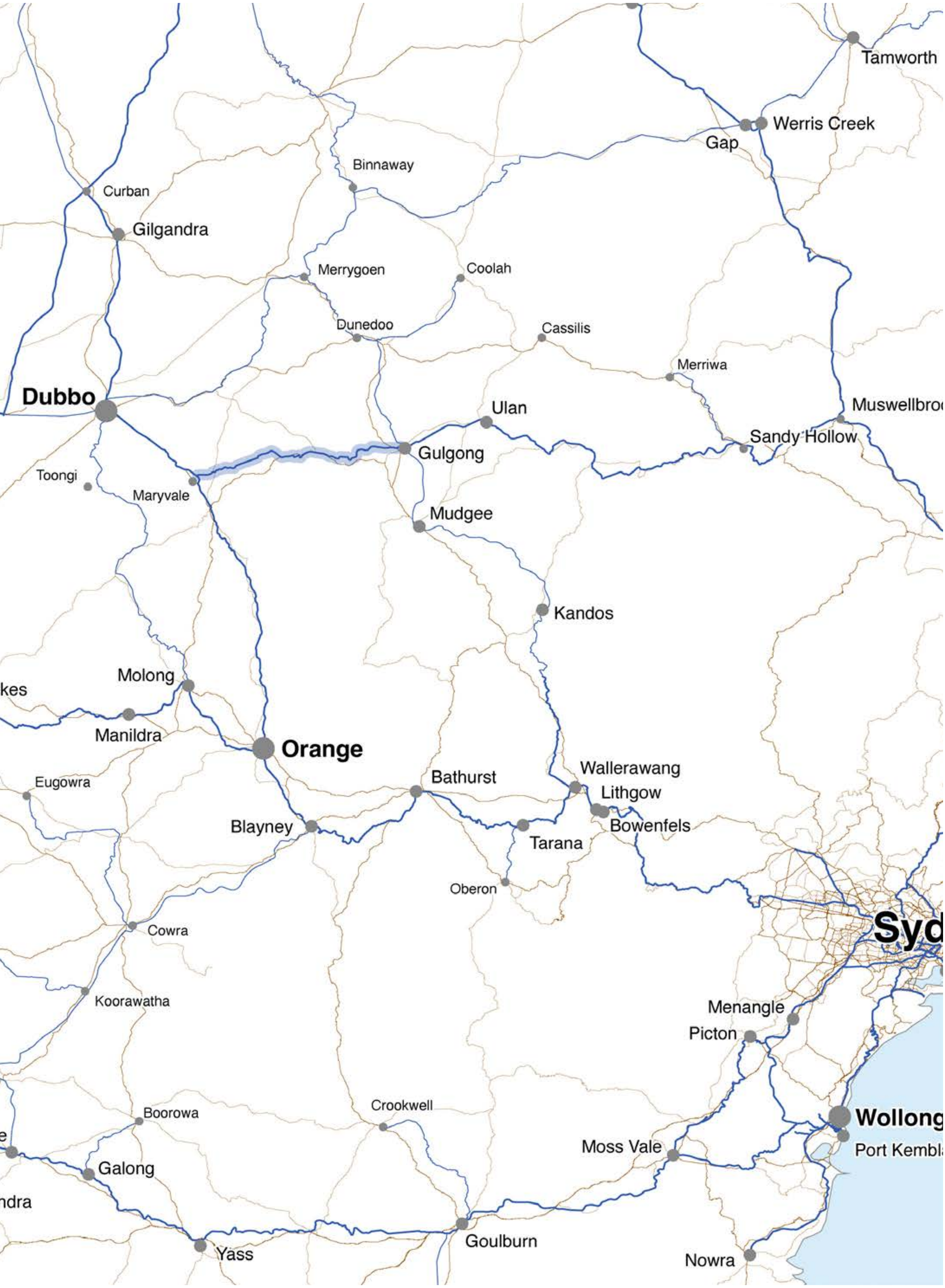
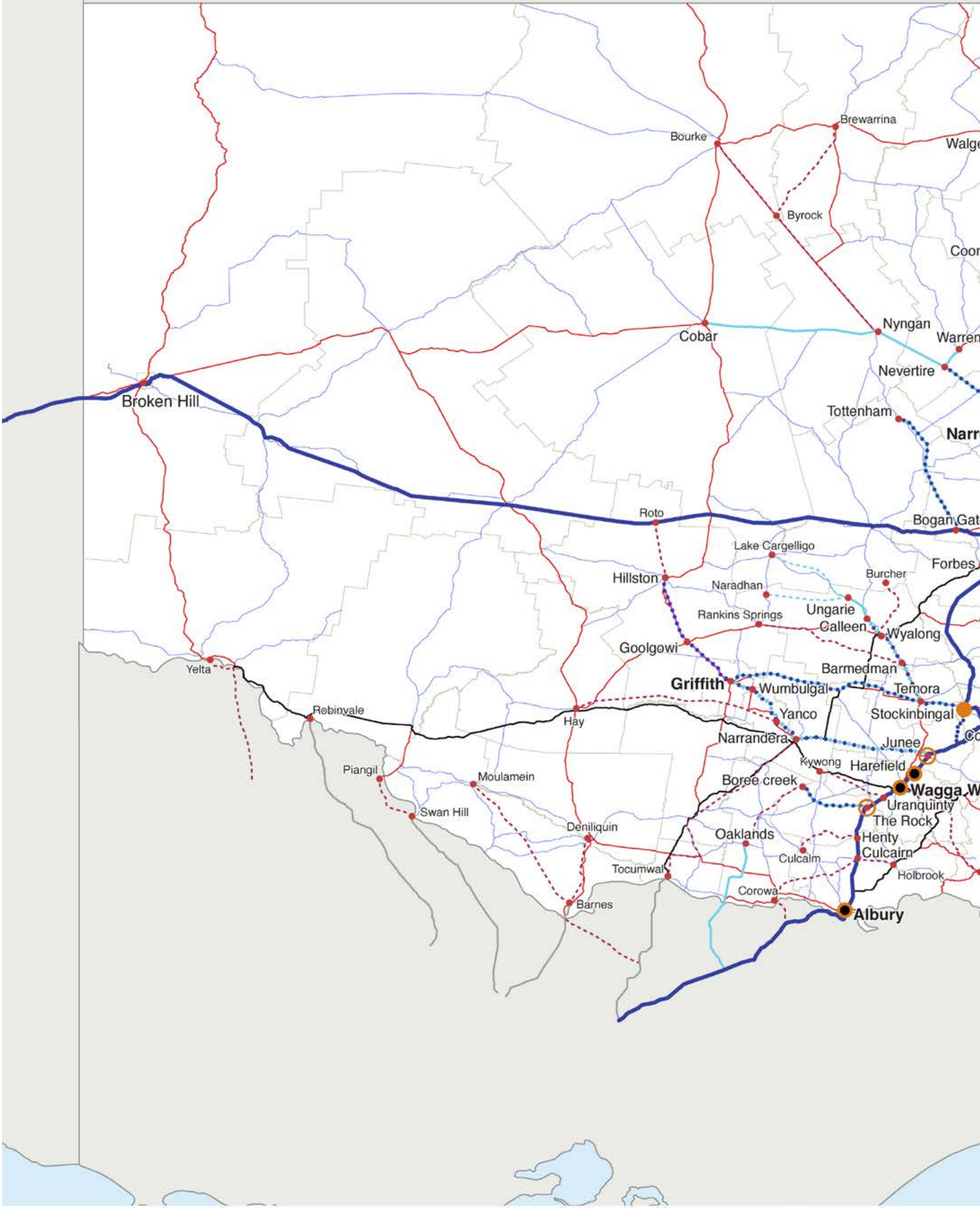

Tamworth
Werris Creek
Gap
Binnaway
Curban
Gilgandra
Merrygoen
Coolah
Dunedoo
Cassilis
Merriwa
Dubbo
Ulan
Muswellbro
Sandy Hollow
Gulgong
Toongi
Maryvale
Mudgee
Kandos
Molong
kes
Manildra
Orange
Wallerawang
Bathurst
Lithgow
Eugowra
Blayney
Bowenfels
Tarana
Oberon
Cowra
Syd
Koorawatha
Menangle
Picton
Crookwell
Boorowa
Wolloncg
Moss Vale
Port Kembl
Galong
ndra
Goulburn
Yass
Nowra

Image A. 2: NSW Rail Network Map




Goondiwindi (QLD)
Boggabilla
Texas
Wallangarra
Tenterfield
Murwillumbah
Casino
Weemelah
Mungindi
North Star
Camurra
Moree
Pokataroo
Merrywinebone
Inverell
Burren
Wee Waa
Narrabri
Barraba
Armidale
Gwabegar
Gunnedah
Tamworth
Gap
Werris Creek
Binnaway
Curban
Gilgandra
Merrygoen
Coolah
Craboon
Merriwa
Dubbo
Gollan
Gulgong
Ulan
Muswellbrook
Spicers Creek
Goolma
Sandy Hollow
Toongi
Maryvale
Mudgee
Taree
Kandos
Maitland
Port of Newcastle
Newcastle
Parkes
Molong
Manildra
Orange
Wallerawang
Bathurst
Lithgow
Bowenfels
Eugowra
Blayney
Tarana
Oberon
Grenfell
Cowra
Koorawatha
Sydney
Port Botany
Menangle
Picton
Boorowa
Crookwell
Demondrille
Galong
Moss Vale
Wollongong
Port Kembla
Goulburn
Yass
Nowra
Canberra
Tumut
Queanbeyan
Batlow
Captains Flat
Tumbarumba
Cooma
Bega
Bombala
Eden
Legend
Local Government Area Boundaries
Classified Roads
AusLink
State
Regional
New South Wales Rail Network
30 TAL Operational (ARTC)
25 TAL Operational (ARTC / CRN)
25 TAL Planned (ARTC)
21 TAL Operational 25 TAL Planned (ARTC)
RailCorp Operational
23 TAL Operational (ARTC / CRN)
21 TAL Operational (ARTC / CRN)
21 TAL (Non-Operational)
19 TAL Operational
Non-Operational
Operational TAL Unknown
Light Rail (Sydney)
Metro (Sydney)
Intermodal Junction
Interchange
Intermodal Hub

Graph A.3: Industry Contribution to GRP (2023)

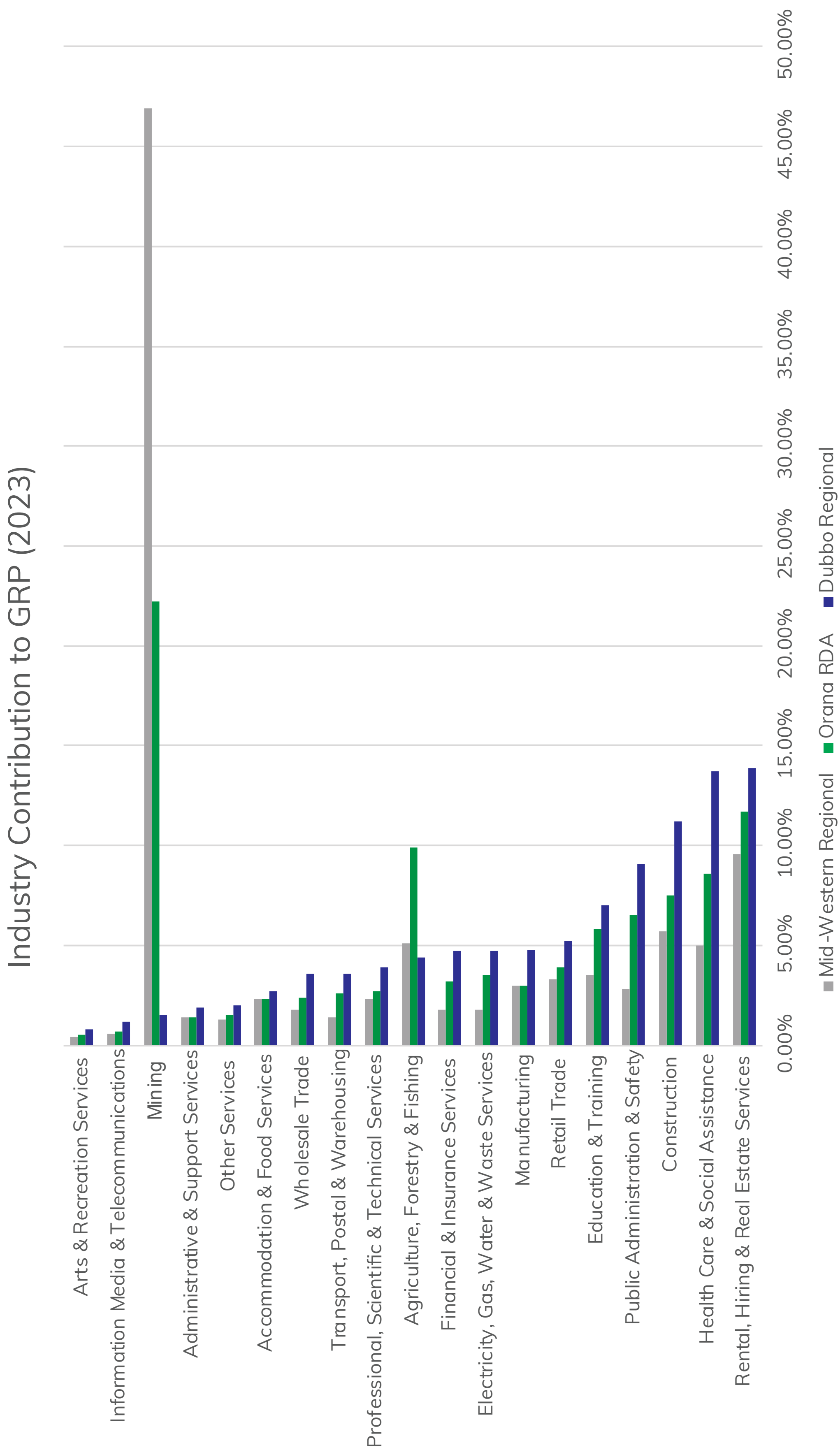
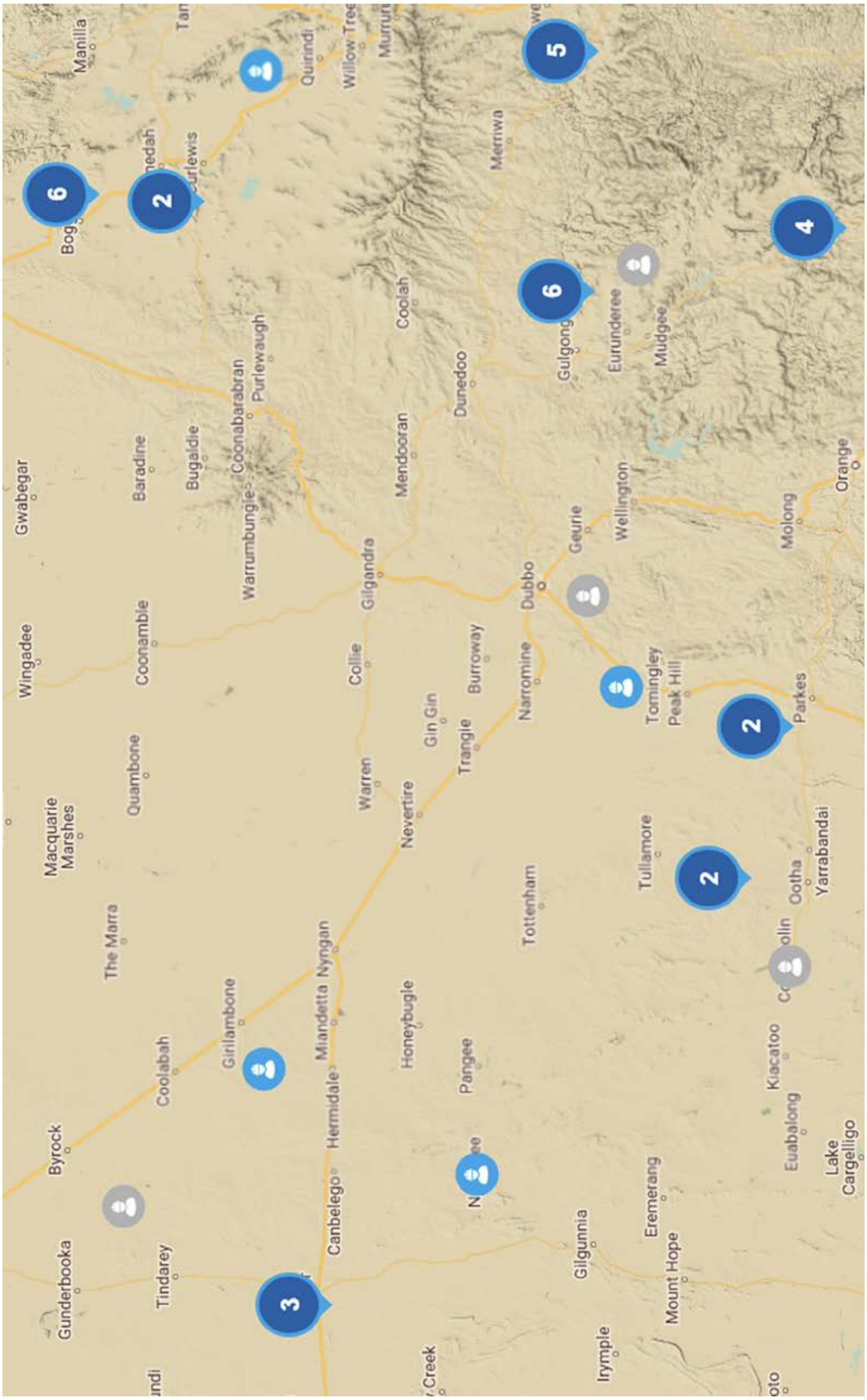


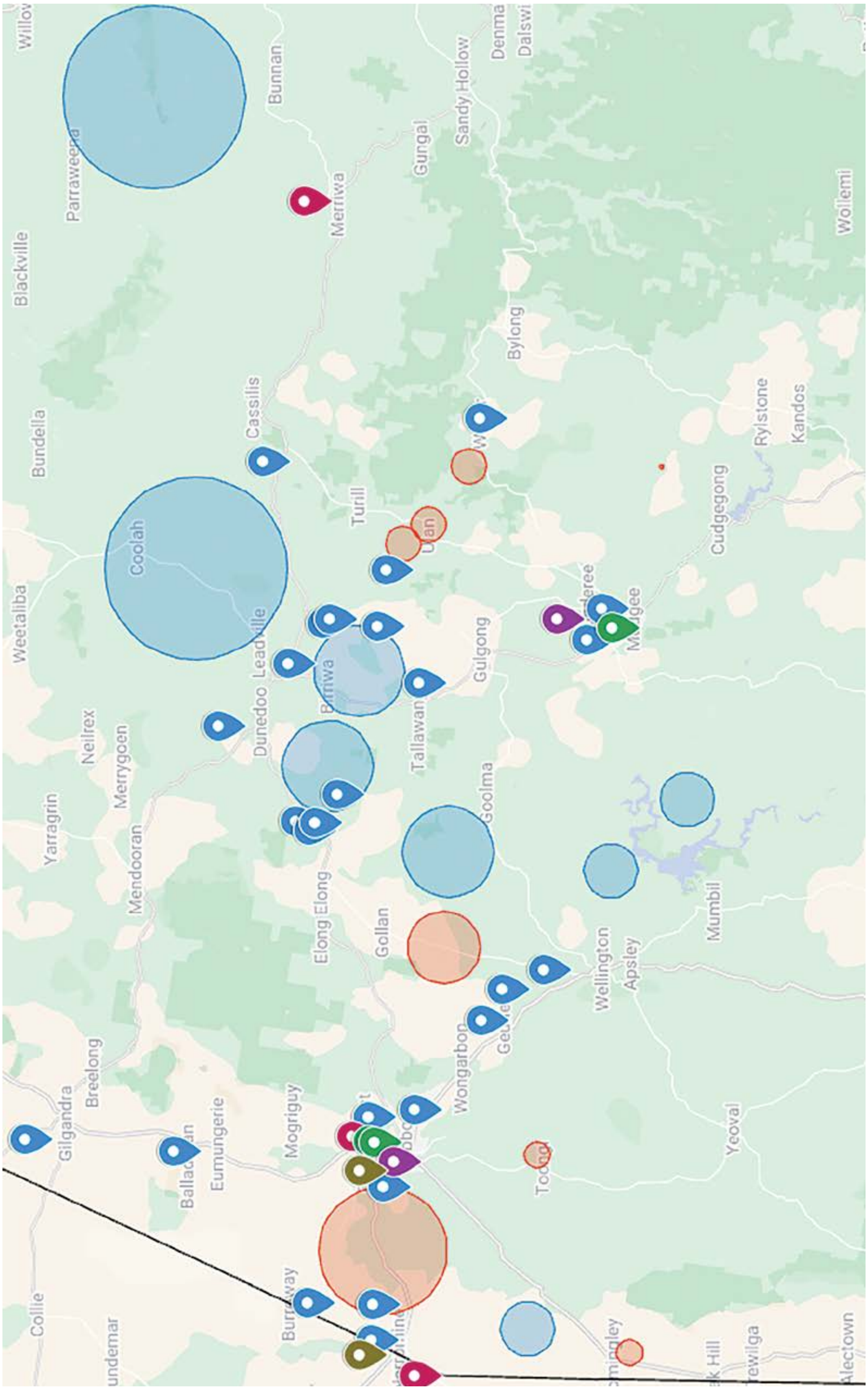
Image A.3: Mines in the Region



Source: Mining NSW[18]

18 https://www.nswmining.com.au/map-of-nsw-mines

Image A.4: Demand Drivers (including mines, renewable projects)



Source: The Stable Group[19]

19 Interactive map of demand drivers: https://www.google.com/maps/d/u/0/viewer?mid=1QOxnBS1RwlmPoWuE3Z5C2sdl8pznvcg&ll=-32.449847597767929%2C149.37950079282297&z=9 https://www.google.com/maps/d/u/0/viewer?mid=1QOxnBS1RwlmPoWuE3Z5C2sdl8pznvcg&ll=-32.449847597767929%2C149.37950079282297&z=9

Table A.4: Demand Drivers – Energy Projects

Energy Projects	Existing Projects/Projects Expected to 2033		Speculative Projects
Wind	Wallaby Creek Spicers Creek Wind Farm Orana Wind Farm Barneys Reef Wind Farm	Valley of the Winds Wind Farm Burrendong Wind Farm Uungula Wind Farm Liverpool Range Wind Farm	
Solar	Gilgandra Solar Farm Tallawang Solar Farm Narragamba Solar Dunedoo Solar Farm Wellington North Solar Farm Maryvale Solar Farm Wahroonga Solar Farm Burroway Solar Farm Sheraton Road Solar Farm Forest Glen Solar Farm	Cobbora Solar Farm Sandy Creek Solar Farm Dapper Solar Farm Burrundulla Solar Farm Blain Road Solar Farm Ulan Solar Farm Stubbo Solar Farm Geurie Solar Farm Wellington Road Solar Farm Birriwa Solar Farm and Battery Energy Storage System	
Other energy (battery, hydrogen)	Merotherie Energy Hub Site Neeleys Lane Ancillary Site	Elong Elong Energy Hub Site Wollar Switching Station Site	Narromine APWS - Renewable Energy and Circular Chemicals Facility Development Port of Newcastle Clean Energy Precinct

Table A.5: Demand Drivers – Mining

Mining Projects	Existing Projects/Projects Expected to 2033	Speculative Projects
Coal	Ulan Coal Mine (Mid-Western Council) Wilpinjong Mine (Peabody Energy) Moolarben Coal (Mid-Western Council)	
Metals	Bowden Silver Mine Alkane Resources Tomingley Gold Project Alkane Resources Northern Molong Porphyry Project CSA Mine (Metals Acquisition Ltd) Endeavour Mine (CBH Ltd) Hera Mine (Aurelia Metals) Peak Gold Mine (Aurelia Metals) Tritton Copper Mines (Aeris Resources)	Sunrise Energy Metals Cobar Superbasin Project (Peel Mining) Wonawinta Silver Project (Manuka Resources) Mallee Bull Copper Deposit (Peel Mining)
Minerals	Australian Strategic Materials Dubbo Project/Mine	
Gravel	MAAS Group Quarries	

Table A.6: Demand Drivers – Others

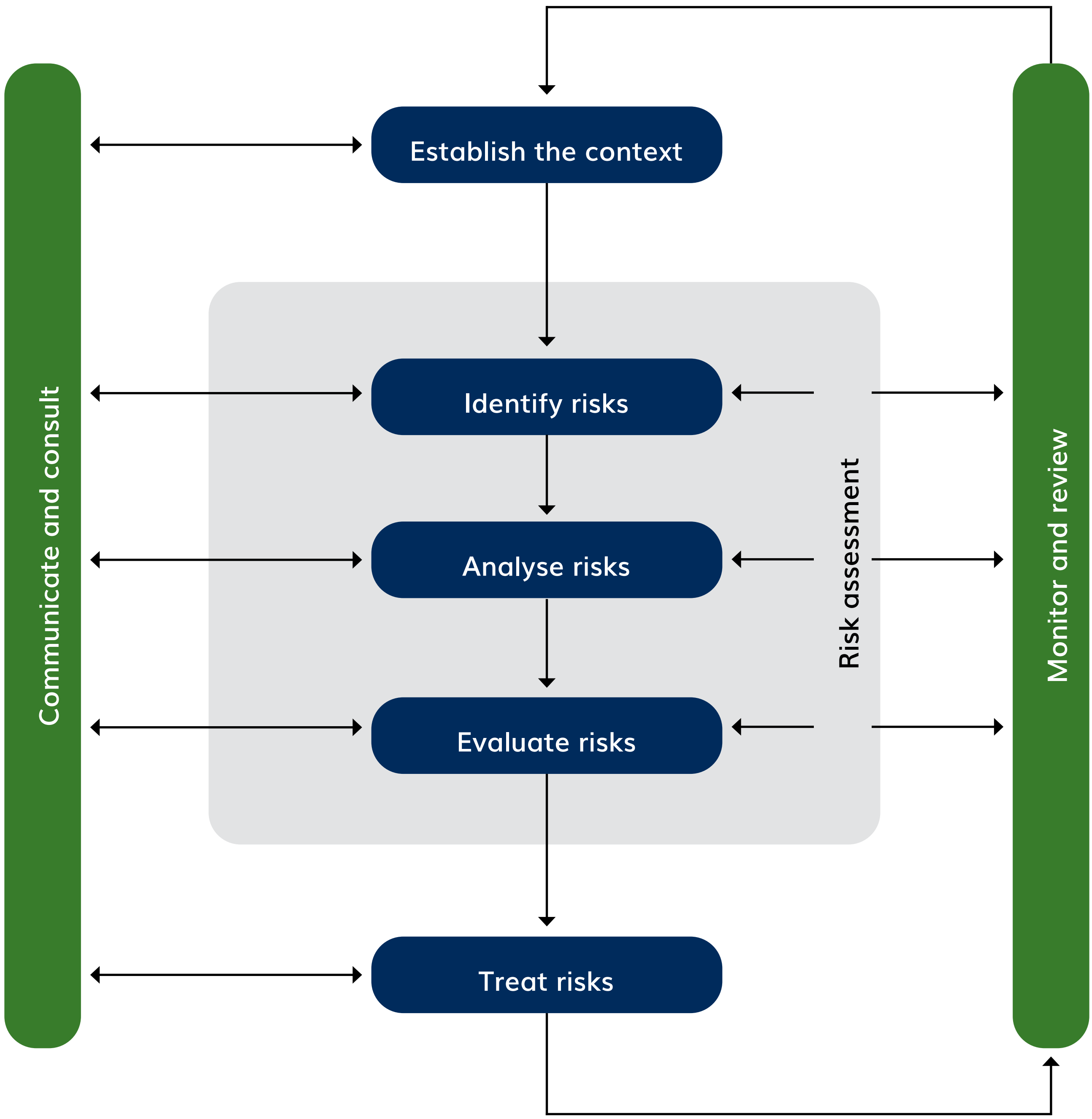
Sector	Existing Projects/Projects Expected to 2033	Speculative Projects
Freight Hubs/ Intermodals (grain, meat and livestock, cotton)	Fletcher International Exports Dubbo/Intermodal Dubbo sale yards Fletchers Abattoir Cotton gins Inland Rail Albury to QLD Border Port of Newcastle Empty Container Park & Deepwater Container Terminal	Inland Rail QLD border to Toowoomba/ Brisbane Beresfield freight distribution facility Merriwa Industrial Precinct Curban Intermodal GrainCorp Narromine Intermodal
Health	John Hunter Hospital Innovation Precinct Dubbo Hospital	
Education	University of Newcastle Charles Sturt University Dubbo Dubbo TAFE Country University Centre Mudgee	
Tourism	Dubbo Zoo Mudgee & Hunter wine regions Newcastle tourism hub	
Aviation/ Defence	Narromine Aerodrome and Aviation Business Park Newcastle Airport Expansion Dubbo Airport Williamtown ADF Singleton Military Area	

Annex B: Risk Management Methodology

The methodology for managing risk within the context of the Transport Strategy project follows.

The methodology is based on implementing continuous improvement through the adoption of the elements of AS/ NZS ISO 31000: 2009 (Risk Management Context refers)

Figure B.1: Risk Management Context



The initial Risk ratings and level of action to the be applied to the Activity is based on the **'overall risk'** (Risk Table 1) rating for an identified risk.

Risk Table B. 1 - 'Risk Matrix Evaluation'

Risk Table 1: Risk Matrix Evaluation							
Risk Ratings:		**Risk Tolerance Rating**:	**Consequence**				
A – Very High	=	Generally intolerable	**Minor**	**Moderate**	**Major**	**Severe**	**Catastrophic**
B – High	=	Undesirable					
C – Medium	=	Tolerate	**C1**	**C2**	**C3**	**C4**	**C5**
D - Low	=	Broadly Acceptable					
Likelihood	**Almost Certain**	**L5**	B	B	A	A	A
	Very Likely	**L4**	C	B	B	A	A
	Likely	**L3**	C	C	B	B	A
	Unlikely	**L2**	D	C	C	B	B
	Very Unlikely	**L1**	D	D	C	C	B

The rating is determined by firstly considering the '**likelihood**' (Risk Table 2) that the risk will occur, and then the '**consequence**' (Risk Table 3) of the event to the business, from a financial, reputational, business, legal, community, project, and staff perspective.

Risk Table B.2 – 'Risk Likelihood Table'

Risk Table 2: Risk Likelihood Table					
Likelihood Rating		**Likelihood Description**			
		Qualitative		**Quantitative**	
		Expectation	**Experience**	**Probability (Single activity)**	**Frequency (Continuous operation)**
Almost Certain	L5	You expect it will definitely be a regular & repeated feature of the life of the project, activity, or task.	Has occurred frequently at the location	10 times or more every year	More than once a year at location or continuously
Very Likely	L4	You expect it will very likely occur during the life of the project, activity, or task.	Has occurred frequently in the Organisation	1-10 times every year	Once every 1 – 10 years at location
Likely / Possible	L3	You would expect it will more likely occur, than not occur during the life of the project, activity, or task.	Has occurred once or twice in the Organisation 'could happen'	Once each year	Once every 10 – 100 years at location
Unlikely	L2	You would expect it will more likely not occur than occur during the life of the project, activity, or task.	Has occurred many times in the 'industry', but not in the organisation	Once every 1 to 10 years.	Once every 100 – 1,000 years at location
Very Unlikely /Rare	L1	You do not expect it to occur during the life of the project, activity, or task. 'conceivable', but only in extreme circumstances'	Is unheard of, or has occurred once or twice in the 'industry'	Less than once, to once every 100 years.	Once every 1,001 or greater at location

Risk Table B.3 – 'Risk Consequence Table'

Risk Table 3: Risk Consequence Table		
Consequence Level		**Impacts**
Extreme / Catastrophic	C5	Failure to meet the initiatives core outcomes. The organisation's viability is threatened. Severe reputational sensitivity. Failure to deliver on funding partner's expectations and requirements. Future operations curtailed. Very significant fines and prosecutions. Very serious litigation. Critical delays with the project which adversely affects publicly announced operations of a client, council, or funding partner. Single fatality or permanent total disability. Impacts on highly valued ecosystems, species, or habitat.
Severe	C4	Major threat to the delivery of the project's core outcomes. Major reputation sensitivity. Current operations curtailed. Serious breach of legislation, regulation, or contract. Major litigation. Major delays with the project which causes adverse impact to a client and requires rescheduling. Permanent partial disability. Impacts on ecosystems, species, or habitat.
Major	C3	Moderate impact on some outcomes and strategies. Close scrutiny of operations or future proposals. Breach of legislation or regulation with investigation, or report to authority with prosecution and/or moderate fine possible. Several delays with the project, no impact on client project/program/supply critical path. Major injury or Occupational illness or lost work case > 4 days. Impact on environment, but not effecting ecosystem function.

Risk Table 3: Risk Consequence Table		
Consequence Level		**Impacts**
Moderate	C2	Isolated or short-term local concern. Some impact on asset level non-service activities. Minor time delay and/or minor decrease in benefits. No delay on other projects or initiatives. Breach of contract or legislation or regulation or internal standard. First Aid Case to Moderate Injury/Occupation illness, Restricted workday case or Lost work case < 4 days or Medical Treatment Case. Localised effect to species or habitat but not effecting ecosystem function.
Insignificant / Minor	C1	Minimal impact on initiatives. No delay on key project milestones. Minimal reputational sensitivity. Consequences can be dealt with, within project processes.

The business sponsor then must determine the level of overall risk that the business is prepared to accept or take action to reduce through elimination, transfer, or mitigation actions (refer to Risk Table 4) having evaluated the risk rating (Risk Table 1).

For the management of a project, Project Risks – that is the risks related to a specific project, or phase, or activity of a project are to be considered within the categories detailed at Risk Table 5 (to be included in the project's Risk Register) and the relevant management actions (generally detailed at Risk Table 6).

Risk Table B.4 – 'Risk Tolerance and Response Table'

Risk Table 4: Risk Tolerance and Response Table					
Risk Rating	**Risk Tolerance Rating**	**Very High Risk**	**Initial Response Strategy**	**Response Qualification**	**Review Frequency** (if other than fortnightly)
A	**Generally intolerable**		**Terminate**	Very high risks, generally intolerable and are to be avoided except in extraordinary circumstances. Where the risk has health, safety or environmental consequences the activity should not be undertaken.	
B	**Undesirable**		**Transfer**	High risks are undesirable. Only to be tolerated if it is not reasonably practicable to reduce the risk further. Where the risk has environmental, health, or safety consequences the activity should not be undertaken, without agreement of the Manager. High risks are considered to be on the verge of being unacceptable and must be given immediate priority.	
C	**Tolerable**		**Treat**	Medium risks are tolerable if it is not reasonably practicable to reduce the risk further. Where the risk has health, safety or environmental consequences the activity should be reviewed to determine if the risk can be reduced further and whether all reasonable and practicable controls have been considered and /or applied. Additional treatment measures should be sought if significant benefit can be demonstrated and/or there is an additional treatment measure which is recognised as good practice in another like environment.	
D	**Broadly acceptable**		**Tolerate**	Low risks are considered broadly acceptable. Where the risk has health, safety or environmental consequences control measures should be effective, reliable, and subject to appropriate monitoring. If options for further risk reduction exist and costs are proportionate to the benefits, then implementation of such measures should be considered. The risks and its treatments should be subject to appropriate degrees and forms of monitoring to ensure that it remains at this level.	
		Negligible Risk			

Risk Table B.5 – 'Project Risk Categories and Definitions/Examples'

Risk Table 5: Project Risk Categories and Definitions/Examples	
Category	**Examples of types of risk that would fall in this category**
Financial Risk	Failure to generate or obtain funding to implement; Failure to realise projected benefits. Extended delay in realisation of projected benefits. Significant overrun on projected cost of implementation.
Schedule / Time	Time / Schedule delays in project activities.
Quality	Deliverables do not meet stated requirements, formats, or required detail.
Safety	WHS risks.
Execution Risk	Lack of, or ineffective Commitment; Support; Sponsorship; or Alignment with other initiatives; or ineffective Organisational alignment; Business process redesign; Change management; Communication; Application control; Staffing; Training; Business continuity; facility availability; material requirement not planned/delivered.
Governance / Initiative Management Risk	Lack of, or ineffective Initiative Management, Planning; Monitoring; Controls; Scope; Tools and methodologies; or Decision making.
Functional Risk	Missing requirements. Adverse impact on Business process controls; Promised functionality, reliability, usability is realised; Adverse impacts on Customer requirements, expectations or experience., WH&S.
Resourcing Risk	Staffing or Contractor availability; lack or response from market
Regulatory Risk	Lack of compliance with regulatory and local compliance requirements
Technical Risk	Production equipment, Hardware; Software; Data conversion; System architecture; Networking; Performance; Security; Availability; or Disaster Recovery risks; Technology Integration, interoperability, or compatibility and commissioning risks.

Risk Table B.6 – 'Project Management Actions'

Table 6: Project Management Actions	
Risk Category	Management Actions
A - Very High	Risk mitigated by Project Sponsor and Project control Group
B - High	Risk mitigated by Project Control Group and Project Manager as required
C - Medium	Risk managed, mitigated, and contained by the Project Team, Reported to the Project Control Group /Project Sponsor
D - Low	Managed by Project Team

Annex C: Business Case Cash Flow

ITEM PIC	Item Cost* $M	$M @3%	Present Value $M @5%	$M @7%
A. Capital Costs:				
1. Railway Line				
1.1 Construction	195	178.8	68.8	159.5
1.2 Contingencies	122	112.4	106.3	100.6
SUB-TOTAL BUILDING & CONSTRUCTION	318	291.1	275.0	260.2
1.3 Design, supervision & approval	9	8.5	8.3	8.2
Total Capital Cost	327	299.6	283.4	268.3
B. Other Costs:	-	-	-	-
1. Operating costs	150	91.1	67.2	50.7
1.1 Fuel Consumption	128	77.4	57.1	43.1
1.2 Crew Cost	23	13.7	10.1	7.6
2. Maintenance Cost	197	121.5	91.0	69.9
1.1 Below Rail Maintenance Cost	138	88.4	67.9	53.4
1.2 Above Rail Maintenance Cost	59	35.5	26.2	19.8
TOTAL OTHER COSTS	347	212.5	158.2	120.5
C. TOTAL PROJECT COSTS	674	512.1	441.6	88.9
D. BENEFITS:	-	-	-	-
1. Producer Margin	66	37.8	26.6	19.1
2. Safety	126	71.9	50.7	36.4
3. Avoided Vehicle Operating Costs	828	472.1	332.6	238.6
4. Avoided Road Maintenance Costs	118	67.3	47.4	34.0
5. Environment	159	90.6	63.8	45.8
6. Travel Time Savings	532	324.7	241.0	182.9
7. Access Charges	-	-	-	-
8. Residual Value	106	91.6	83.2	75.7
TOTAL BENEFITS	1,829	1,064.4	762.1	556.7
E. NET BENEFITS	1,156	552.3	320.5	167.9
			NET PRESENT VALUE ($'000)	
		@3%	@5%	@7%
Base Case		-444.3	-362.3	-300.9
Increment to Base Case		996.6	682.8	468.7
Costs Up 15%		567.0	337.5	185.2
Benefits Down 15%		470.4	276.9	148.7
Costs Up 15%/Benefits Down 15%		393.6	210.7	90.3

ITEM	Expenditure in '000 of Dollars (2023 values)				
	2024	2025	2026	2027	2028
PIC	2	3	4	5	6
A.Capital Costs:					
1. Railway Line					
1.1 Construction	821.8	49,006.2	92,054.4	53,495.0	-
1.2 Contingencies	5,747.6	29,403.7	55,232.7	32,097.0	-
SUB-TOTAL BUILDING & CONSTRUCTION	6,569.4	78,409.9	147,287.1	85,591.9	-
1.3 Design, supervision & approval	8,757.5	-	-	-	-
Total Capital Cost	15,326.9	78,409.9	147,287.1	85,591.9	-
B. Other Costs:					
1. Operating costs	-	-	-	-	4,187.8
1.1 Fuel Consumption	-	-	-	-	3,558.7
1.2 Crew Cost	-	-	-	-	629.0
2. Maintenance Cost	-	-	4,183.0	-	6,422.0
1.1 Below Rail Maintenance Cost	-	-	4,183.0		4,788.6
1.2 Above Rail Maintenance Cost	-	-	-	-	1,633.4
TOTAL OTHER COSTS	-	-	4,183.0	-	10,609.8
C.TOTAL PROJECT COSTS	15,326.9	78,409.9	151,470.1	85,591.9	10,609.8
D. BENEFITS:					
1. Producer Margin	-	-	-	-	-
2. Safety	-	-	-	-	-
3. Avoided Vehicle Operating Costs	-	-	-	-	-
4. Avoided Road Maintenance Costs	-	-	-	-	-
5. Environment	-	-	-	-	-
6. Travel Time Savings	-	-	-	-	17,032.7
7. Access Charges	-	-	-	-	
8. Residual Value	-	-	-	-	
TOTAL BENEFITS	-	-	-	-	17,032.7
E. NET BENEFITS	-15,326.9	-78,409.9	-151,470.1	-85,591.9	6,422.9

ITEM	Expenditure in '000 of Dollars (2023 values)				
	2029	2030	2031	2032	2033
PIC	7	8	9	10	11
A.Capital Costs:					
1. Railway Line					
1.1 Construction	-	-	-	-	-
1.2 Contingencies	-	-	-	-	-
SUB-TOTAL BUILDING & CONSTRUCTION	-	-	-	-	-
1.3 Design, supervision & approval	-	-	-	-	-
Total Capital Cost	-	-	-	-	-
B. Other Costs:					
1. Operating costs	4,242.3	4,296.9	4,351.5	4,412.9	6,520.4
1.1 Fuel Consumption	3,605.1	3,651.5	3,697.8	3,750.0	5,541.0
1.2 Crew Cost	637.2	645.4	653.6	662.8	979.4
2. Maintenance Cost	6,460.0	6,497.9	6,535.9	6,578.6	8,044.7
1.1 Below Rail Maintenance Cost	4,805.3	4,822.0	4,838.7	4,857.4	5,501.5
1.2 Above Rail Maintenance Cost	1,654.7	1,675.9	1,697.2	1,721.2	2,543.2
TOTAL OTHER COSTS	10,702.3	10,794.8	10,887.4	10,991.4	14,565.1
C.TOTAL PROJECT COSTS	10,702.3	10,794.8	10,887.4	10,991.4	14,565.1
D. BENEFITS:					
1. Producer Margin	-	-	-	-	3,317.4
2. Safety	-		-		6,309.5
3. Avoided Vehicle Operating Costs	-	-	-	-	41,399.8
4. Avoided Road Maintenance Costs	-	-	-	-	5,900.6
5. Environment	-	-	-	-	7,944.8
6. Travel Time Savings	17,258.4	17,484.1	17,709.7	17,935.4	22,379.2
7. Access Charges					
8. Residual Value					
TOTAL BENEFITS	17,258.4	17,484.1	17,709.7	17,935.4	87,251.3
E. NET BENEFITS	6,556.1	6,689.2	6,822.4	6,944.0	72,686.2

ITEM	Expenditure in '000 of Dollars (2023 values)				
	2034	2035	2036	2037	2038
PIC	12	13	14	15	16
A. Capital Costs:					
1. Railway Line					
1.1 Construction	-	-	-	-	-
1.2 Contingencies	-	-	-	-	-
SUB-TOTAL BUILDING & CONSTRUCTION	-	-	-	-	-
1.3 Design, supervision & approval	-	-	-	-	-
Total Capital Cost	-	-	-	-	-
B. Other Costs:					
1. Operating costs	6,513.6	6,506.8	6,493.1	6,486.3	6,479.5
1.1 Fuel Consumption	5,535.2	5,529.4	5,517.8	5,512.0	5,506.2
1.2 Crew Cost	978.4	977.4	975.3	974.3	973.3
2. Maintenance Cost	8,040.0	8,035.2	8,025.7	8,021.0	8,016.2
1.1 Below Rail Maintenance Cost	5,499.5	5,497.4	5,493.2	5,491.1	5,489.0
1.2 Above Rail Maintenance Cost	2,540.5	2,537.8	2,532.5	2,529.9	2,527.2
TOTAL OTHER COSTS	14,553.5	14,542.0	14,518.8	14,507.3	14,495.7
C.TOTAL PROJECT COSTS	14,553.5	14,542.0	14,518.8	14,507.3	14,495.7
D. BENEFITS:					
1. Producer Margin	3,317.4	3,317.4	3,317.4	3,317.4	3,317.4
2. Safety	6,309.5	6,309.5	6,309.5	6,309.5	6,309.5
3. Avoided Vehicle Operating Costs	41,399.8	41,399.8	41,399.8	41,399.8	41,399.8
4. Avoided Road Maintenance Costs	5,900.6	5,900.6	5,900.6	5,900.6	5,900.6
5. Environment	7,944.8	7,944.8	7,944.8	7,944.8	7,944.8
6. Travel Time Savings	22,363.1	22,346.9	22,330.7	22,314.6	22,298.4
7. Access Charges					
8. Residual Value					
TOTAL BENEFITS	87,235.2	87,219.0	87,202.8	87,186.7	87,170.5
E. NET BENEFITS	72,681.6	72,677.0	72,684.0	72,679.4	72,674.8

ITEM	Expenditure in '000 of Dollars (2023 values)				
	2039	2040	2041	2042	2043
PIC	17	18	19	20	21
A.Capital Costs:					
1. Railway Line					
1.1 Construction	-	-	-	-	-
1.2 Contingencies	-	-	-	-	-
SUB-TOTAL BUILDING & CONSTRUCTION	-	-	-	-	-
1.3 Design, supervision & approval	-	-	-	-	-
Total Capital Cost	-	-	-	-	-
B. Other Costs:					
1. Operating costs	6,472.6	6,465.8	6,459.0	6,445.4	6,438.5
1.1 Fuel Consumption	5,500.4	5,494.6	5,488.8	5,477.2	5,471.4
1.2 Crew Cost	972.2	971.2	970.2	968.1	967.1
2. Maintenance Cost	8,011.5	8,006.8	8,002.0	7,992.5	7,987.8
1.1 Below Rail Maintenance Cost	5,487.0	5,484.9	5,482.8	5,478.6	5,476.5
1.2 Above Rail Maintenance Cost	2,524.5	2,521.9	2,519.2	2,513.9	2,511.2
TOTAL OTHER COSTS	14,484.1	14,472.6	14,461.0	14,437.9	14,426.3
C.TOTAL PROJECT COSTS	14,484.1	14,472.6	14,461.0	14,437.9	14,426.3
D. BENEFITS:					
1. Producer Margin	3,317.4	3,317.4	3,317.4	3,317.4	3,317.4
2. Safety	6,309.5	6,309.5	6,309.5	6,309.5	6,309.5
3. Avoided Vehicle Operating Costs	41,399.8	41,399.8	41,399.8	41,399.8	41,399.8
4. Avoided Road Maintenance Costs	5,900.6	5,900.6	5,900.6	5,900.6	5,900.6
5. Environment	7,944.8	7,944.8	7,944.8	7,944.8	7,944.8
6. Travel Time Savings	22,282.3	22,266.1	22,250.0	22,233.8	22,217.7
7. Access Charges					
8. Residual Value					
TOTAL BENEFITS	87,154.4	87,138.2	87,122.1	87,105.9	87,089.8
E. NET BENEFITS	72,670.2	72,665.6	72,661.1	72,668.0	72,663.4

ITEM	Expenditure in '000 of Dollars (2023 values)				
	2044	2045	2046	2047	2048
PIC	22	23	24	25	26
A. Capital Costs:					
1. Railway Line					
1.1 Construction	-	-	-	-	-
1.2 Contingencies	-	-	-	-	-
SUB-TOTAL BUILDING & CONSTRUCTION	-	-	-	-	-
1.3 Design, supervision & approval					
Total Capital Cost	-	-	-	-	-
B. Other Costs:					
1. Operating costs	6,431.7	6,424.9	6,418.1	6,411.3	6,404.4
1.1 Fuel Consumption	5,465.6	5,459.8	5,454.0	5,448.2	5,442.4
1.2 Crew Cost	966.1	965.1	964.0	963.0	962.0
2. Maintenance Cost	7,983.0	7,978.3	7,973.5	7,968.8	7,964.1
1.1 Below Rail Maintenance Cost	5,474.4	5,472.4	5,470.3	5,468.2	5,466.1
1.2 Above Rail Maintenance Cost	2,508.6	2,505.9	2,503.3	2,500.6	2,497.9
TOTAL OTHER COSTS	14,414.8	14,403.2	14,391.6	14,380.1	14,368.5
C. TOTAL PROJECT COSTS	14,414.8	14,403.2	14,391.6	14,380.1	14,368.5
D. BENEFITS:					
1. Producer Margin	3,317.4	3,317.4	3,317.4	3,317.4	3,317.4
2. Safety	6,309.5	6,309.5	6,309.5	6,309.5	6,309.5
3. Avoided Vehicle Operating Costs	41,399.8	41,399.8	41,399.8	41,399.8	41,399.8
4. Avoided Road Maintenance Costs	5,900.6	5,900.6	5,900.6	5,900.6	5,900.6
5. Environment	7,944.8	7,944.8	7,944.8	7,944.8	7,944.8
6. Travel Time Savings	22,201.5	22,185.3	22,169.2	22,153.0	22,136.9
7. Access Charges					
8. Residual Value					
TOTAL BENEFITS	87,073.6	87,057.4	87,041.3	87,025.1	87,009.0
E. NET BENEFITS	72,658.8	72,654.3	72,649.7	72,645.1	72,640.5

ITEM	Expenditure in '000 of Dollars (2023 values)			
	2049	2050	2051	2052
PIC	27	28	29	30
A. Capital Costs:				
1. Railway Line				
1.1 Construction	-	-	-	-
1.2 Contingencies	-	-	-	-
SUB-TOTAL BUILDING & CONSTRUCTION	-	-	-	-
1.3 Design, supervision & approval				
Total Capital Cost	-	-	-	-
B. Other Costs:				
1. Operating costs	6,390.8	6,384.0	6,384.0	6,384.0
1.1 Fuel Consumption	5,430.9	5,425.1	5,425.1	5,425.1
1.2 Crew Cost	960.0	958.9	958.9	958.9
2. Maintenance Cost	7,954.6	7,949.8	7,949.8	7,949.8
1.1 Below Rail Maintenance Cost	5,461.9	5,459.9	5459.9	5459.9
1.2 Above Rail Maintenance Cost	2,492.6	2,490.0	2490.0	2490.0
TOTAL OTHER COSTS	14,345.4	14,333.8	14,334	14,334
C. TOTAL PROJECT COSTS	14,345.4	14,333.8	14,334	14,334
D. BENEFITS:				
1. Producer Margin	3,317.4	3,317.4	3,317.4	3,317.4
2. Safety	6,309.5	6,309.5	6,309.5	6,309.5
3. Avoided Vehicle Operating Costs	41,399.8	41,399.8	41,399.8	41,399.8
4. Avoided Road Maintenance Costs	5,900.6	5,900.6	5,900.6	5,900.6
5. Environment	7,944.8	7,944.8	7,944.8	7,944.8
6. Travel Time Savings	22,120.7	22,104.5	22,104.5	22,104.5
7. Access Charges				
8. Residual Value				106,150.1
TOTAL BENEFITS	86,992.8	86,976.6	86,976.6	86,976.6
E. NET BENEFITS	72,647.5	72,642.8	72,642.8	72,642.8

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