



Griffith Heavy Vehicle Strategy

August 2013

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Adoption Date: 27 August 2013

Distribution: Griffith City Council



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1. Introduction

The freight industry forms an important part of the national, regional and local economies of Australia, playing an especially vital role in the agricultural and manufacturing industries. Australia's freight task is expected to increase dramatically in the near future, supposedly almost doubling by 2020. The complexity of transporting freight is also expected to increase, with both urban and rural industries adapting to incorporate more efficient ways to work and increasing freight's role in the production process. The evolution of Australia's industries has resulted in a shift of the nation's freight pattern impacting upon the travel and loads of the heavy vehicles on the roads.

The increasing freight task has resulted in the development of larger combination vehicles beginning with the road train, the first 'modern' version of the road train was invented by Kurt Johansson during the 1940's for cattle transportation. Since then there has been constant development of higher productivity vehicles resulting in the creation of the B-Double and more recently the B-Triple, AB-Triple and BAB-Quad. These combinations carry larger payloads and perform more efficiently creating greater economic and community benefits. While these higher productivity vehicles are able to carry large payloads and increase the efficiency of the freight industry there are also a range of environmental, safety, cost and amenity outcomes.

The introduction of the higher productivity vehicles to the road network and freight task is generally beneficial however the use of unsuitable roads by heavy vehicles can lead to several complications. These complications can include infrastructure damage, increased infrastructure maintenance costs and a decline of the safety of the road network for all road users. Therefore to ensure that the introduction of the higher productivity vehicles into the freight network is suitable all proposed routes are required to be assessed to ensure that it meets criteria developed by Austroads, state government agencies and local councils.

In order to properly manage the impact of higher productivity vehicles and ensure that the proposed freight network is suitable for these vehicles there is a need to plan for their introduction. Griffith City Council has recognised this and has commissioned the development of a heavy vehicle strategy, focusing on B-Doubles and Road Trains, for Griffith and the surrounding area. The strategy will briefly consider the impact of the larger combinations, B-Triples, AB-Triples and BAB-Quads; however there are still a number of concerns regarding the actual impact these vehicles will have on the local road network.

1.1 Study Aims

The main aim of this study is to develop a strategic heavy vehicle route network plan around Griffith and the surrounding areas to provide coherent, direct and safe access for heavy vehicles.

1.2 Study Objectives

The NSW Government released the Integrated Land Use and Transport Policy in 2001. The

plan included 12 action points with the intent of facilitating B-Double, Road Train and since then larger more efficient vehicles, such as B-Triples and AB-Triples, have been developed to address the action points. Therefore, pressure to improve access and provide greater freedom of movement across the road network will increase under the NSW Government stated objectives. So whilst the transport industry continues to lobby for greater access to the network for larger vehicles there are many residents concerned with the issues of access, safety, environment and sharing the roadways with heavy vehicles.

In order to address the expansion of heavy vehicle access to the road network and the concerns of the community Griffith City Council commissioned the development of a Heavy Vehicle Strategy. Four broad strategic goals were developed by Griffith City Council to ensure that the strategy addressed all of the community's concerns. They are:

- *A transport system that supports the economic development of Griffith.*
 - Develop a transport network that assists economic development;
 - Provide a transport network that allows goods to be effectively transported to market in a fit purpose condition;
 - Reduce operating costs for freight transport;
- *An equitable and accessible transport network that allows for consistent and reliable travel.*
 - Provide good connectivity to the arterial road network;
 - Improve transport links between regions;
 - Improve accessibility to and between industries within Griffith;
- *A safe transport network where the severity and risk of accidents are minimised.*
 - Reduce conflicts between freight, commuter and tourist traffic;
 - Improve safety for all road users;
- *A transport network that minimises the impacts on the environment and communities.*
 - Reduce heavy vehicle movements in the CBD;
 - Minimise heavy vehicle movements in residential and other sensitive areas;
 - Provide a road network suitable for heavy vehicles.

2. Background

The freight task across Australia is expected to increase dramatically in the near future, almost doubling by 2020. To combat this, the transport industry has begun the development of higher productivity vehicles through Australia's Performance Based Standards (PBS) initiatives. These vehicles include the B-Double, Road Train, B-Triple, AB-Triple and BAB-Quad; and there is an increasing push from the transport industry and state government agencies to introduce these vehicles on to the local road network despite the concerns of local road authorities.

A B-Double is a combination vehicle consisting of a prime mover and two trailers which are combined by B-couplings. A B-coupling is used to permit quick coupling or uncoupling and provide articulation in the vehicle. The B-Double's main distinguishing feature is the double articulation provided by the vehicles couplings. B-Double configurations are typically between 23 to 26 metres provided that they meet the requirements of NSW Roads and Maritime Services. The gross vehicle mass of a B-Double is restricted to 62.5 tonnes in NSW.

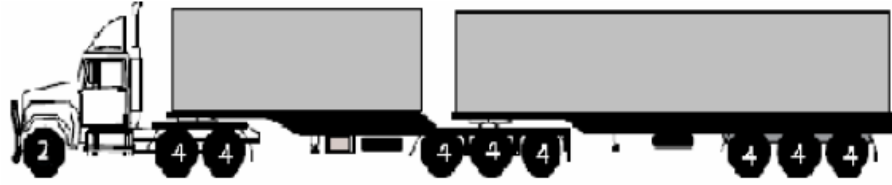
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Figure 1 – Typical 26m B-Double Configuration and Axle Loads (tonnes)

A Road Train is a combination vehicle, other than a B-Double, consisting of a prime mover towing at least two trailers. A converter dolly is used to connect the two trailers and consists of one axle group, a B-coupling and a forward connection in the form of a draw bar. Traditionally the Type 1 A-double road train is typically used in NSW. A-Double Road Train configurations cannot exceed 36.5 metres provided that they meet the requirements of NSW Roads and Maritime Services. The gross vehicle mass of an A-Double Road Train is restricted to 79 tonnes in NSW. A-Triple Road Train combinations, which can be between 36.5 and 53.5 metres and have a gross vehicle mass up to 115.5 tonnes, have been approved in far western NSW where there is limited traffic.

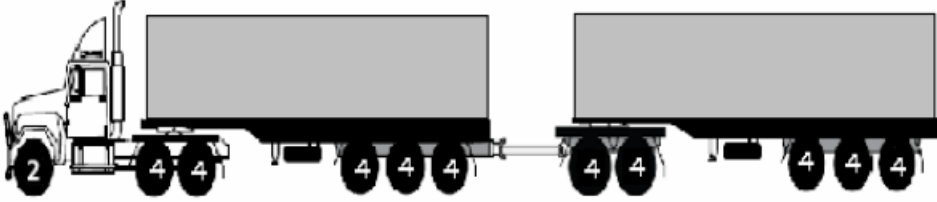
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| CML | 6 | 17 | 21 | 17 | 21 | 81t ^{(9) ♂} | |
| HML | 6 | 17 | 22.5 | 17 | 22.5 | 85t IAP ^{(9) †} | |

Figure 2 – Typical A-Double Road Train Configuration and Axle Loads (tonnes)

A B-Triple is a combination vehicle consisting of a prime mover towing three trailers which are combined by B-couplings. The B-Triple's main distinguishing feature is the triple articulation provided by the vehicles couplings. B-Triple configurations typically do not exceed 36.5 metres provided that they meet the requirements of NSW Roads and Maritime Services. The gross vehicle mass of a B-Triple is restricted to 82.5 tonnes in NSW.


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| CML | 6 | 17 | 21 | 21 | 21 | 84.5t IAP ^{(9) ♂} | |
| HML | 6 | 17 | 22.5 | 22.5 | 22.5 | 90.5t IAP ^{(9) †} | |

Figure 3 – Typical B-Triple Configuration and Axle Loads (tonnes)

An AB-Triple is a combination vehicle consisting of a prime mover and semi-trailer connected by a converter dolly to a B-Double trailer configuration. AB-Triple configurations typically do not exceed 36.5 metres, though there are examples of combinations up to 45 metres in length being used outside of NSW, provided that they meet the requirements of NSW Roads and Maritime Services. The gross vehicle mass of an AB-Triple is restricted to 102.5 tonnes in NSW.

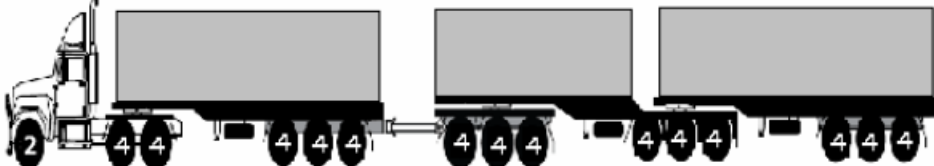
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| CML | 6 | 17 | 21 | 21 | 21 | 21 | 104.5t IAP ^{(9) ♂} |
| HML | 6 | 17 | 22.5 | 22.5 | 22.5 | 22.5 | 113t IAP ^{(9) †} |

Figure 4 – Typical AB-Triple Configuration and Axle Loads (tonnes)

The BAB-Quad is a combination vehicle consisting of two (2) B-Double configurations connected by a converter dolly drawn by a prime mover. BAB-Quad configurations typically do not exceed 53.5 metres provided that they meet the requirements of NSW Roads and Maritime Services. The gross vehicle mass of a BAB-Quad is restricted to 122 tonnes in NSW.

The heavy vehicles identified form the basis of the higher productivity vehicle fleet in NSW, although currently the majority of the fleet is B-Doubles and Road Trains. These vehicles have been introduced as they increase the efficiency of freight transport along the road network as they reduce the total lane occupation, risk of accident and environmental impact per tonne of payload and improve transport productivity when compared to semi-trailers. Though these vehicles increase the efficiency of transport the road network required for their operation must be able to safely accommodate these larger vehicles.

The introduction of the higher productivity vehicles on local roads is being encouraged by the NSW Roads and Maritime Services and the transport industry despite a lack of support from the majority of regional Councils in NSW, including Griffith City Council, due to concerns over the capacity of existing infrastructure. These concerns relate to the impact these larger vehicles will have on the safety and longevity of the local road network if allowed access on local road networks.

Despite the impacts that may occur as a result of allowing higher productivity vehicle access on the local road network, their introduction will minimise the impact of the expected freight task increase. Therefore there is a need to plan for higher productivity access throughout the local road network in order to manage their impact and ensure that the network is suitable for these vehicles. As a result Council has commissioned the development of a heavy vehicle strategy, focusing on B-Doubles and Road Trains, for Griffith and the surrounding area to manage the impact heavy vehicles will have on the local road network. The study focuses on developing a strategic freight route network through Griffith and will include the identification of a suitable city by-pass.

2.1 The 'Modernised' Road Train

The concept of the 'modernised' Road Train has recently begun to gain momentum in Australia, to address the ever increasing freight task in the country. The term refers to the B-Triple, AB-Triple and BAB-Quad vehicles. The transport industry and state government agencies are supporting the introduction of these vehicles on to the road network despite the concerns of local road authorities across Australia.

Recently the Roads and Maritime Services and the larger operators in the transport industry have begun to push for allowing access of the 'modernised road train' configurations, the B-Triple and AB-Triple configurations, in NSW. There are still significant concerns at a local level regarding the impact these larger vehicles will have on the safety and longevity of local road networks. The major issue that is required to be addressed is the impact such vehicles will have on irrigation structures as well as the impact upon the road pavement through intersections and the safety of the rural road network.

The impact B-Triple or AB-Triple vehicles would have upon the irrigation structures present throughout the regional road network has not been properly addressed. These vehicles possess a larger axle loading than either B-Doubles or Road Trains and it is anticipated that

these higher loadings may adversely affect the structural capacity of the irrigation structures. In many cases structures in regional areas are not owned by the local road authority but by a private irrigation company; such as Murrumbidgee Irrigation in Carrathool Shire Council, Griffith City Council, Leeton Shire Council, Narrandera Shire Council and Murrumbidgee Shire Council; who generally do not approve access for these higher productivity vehicles over any of their structures unless it has passed a technical structural assessment. These companies are not willing to burden their shareholders with the costs associated with undertaking a technical assessment of the structures.

There are also serious concerns regarding the impact these larger vehicles would have upon the intersections they are required to travel through. Currently intersections have been designed and constructed to cater for at most traditional Type 1 Road Trains, with several intersections probably not suitable for these vehicles despite approval. The manoeuvring area required for the B-Triple and AB-Triple is larger than that of a Type 1 Road Train at slow speeds. There is not sufficient evidence that the addition of B-Triples and AB-Triples to the road network will not hamper the performance, durability and safety of any intersection they travel through.

Concerns regarding the trailer length and lateral trailer movement of the larger B-Triples and AB-Triples have also been raised by regular motorists. The typical motorist will be intimidated by the size and length of these larger vehicles especially when attempting to overtake. There are also concerns over the lateral movement of the vehicles trailers and even though the industry and RMS advocate that there is minimal movement of the trailers across the road several reports indicate that significant movement occurs. These are significant problems that are required to be addressed before these vehicles can be allowed on the local road network.

While consideration may be given to allow either the B-Triple or AB-Triple along the local road network once the above matters have been addressed there are serious reservations regarding access for BAB-Quads. This is due to the significant difference in size to other vehicles, especially B-Doubles. While an argument can be made for B-Triples and AB-Triples as they are approximately the same size as the Type 1 Road Train the size of the BAB-Quad severely restricts the areas that the vehicle may access.

There are a number of issues which are required to be resolved prior to local road authorities allowing 'modernised' road trains onto the road network, especially in regional irrigation areas such as the Murrumbidgee and Coleambally Irrigation Areas. These issues include the impact the vehicles will have on the road pavement through intersections, the impact on the structural capacity of bridges and the impact upon the safety of the road network especially in rural areas where traffic will be required to overtake these larger vehicles.

2.2 Griffith

Griffith is the regional service centre for the Murrumbidgee Irrigation Area and has become one of regional NSW's major industrial centres. Located at the junction of the Kidman Way, Burley Griffin Way and Irrigation Way, three major highways through the Riverina area, the Griffith City Council area covers approximately 1640.5 square kilometres and has a population of 26,000 people. Griffith and the surrounding area plays a significant role in the nations agricultural, engineering and transport industries, with the region contributing to domestic and

international markets. The continued development of the heavy vehicle network around Griffith is required to create an efficient freight network through the area and ensure the ongoing competitiveness of the area's industries in the domestic and foreign markets.

Griffith and the surrounding area is a significant agricultural region in south-western New South Wales. The area has made significant contributions to the establishment and development of vineyards, orchards, cereal crops, pasture, rice, cotton and the emerging nut industry in the region and across the nation. The area's extensive agricultural sector is supplemented by Griffith's manufacturing, retail and commercial sectors. Recently there has been significant growth in the food processing, manufacturing, transport and logistics industries, which can be attributed to the decline of agricultural industries during the recent drought period and businesses diversifying in order to become more sustainable.

Griffith and the surrounding area accounts for over 90% of Australia's rice production, over 25% of NSW fruit and vegetable production, 70% of NSW citrus products and 75% of NSW wine and grape products. Typically, the regions agricultural and horticultural production is worth over \$1 billion, which accounts for 20% of NSW crop production and two thirds of its total value.

The area generates in excess of 250,000 tonnes of road freight annually, in addition to this a further 36,000 containers of produce are transported to and from the Patrick Port Logistics Freight Terminal situated in Griffith's Central Business District. The transport industry has been investing heavily in developing measures to combat the increasing running costs of heavy vehicles, the decreasing numbers of transport operators across Australia, increase heavy vehicle access and transport efficiency throughout Griffith.

As home for some of Australia's leading agribusiness companies such as McWilliams Wines, De Bortoli Wines, Casella Wines, Beelgara Estate Westend Estate, Harvey Fresh, Summertime Fruit Juices, Real Juice, Baiada Poultry and the multitude of grain, rice, livestock, cotton, nut and vegetable farms in the area, Griffith needs an effective general freight network to provide connectivity for transport operators to access these businesses and the supply networks that support them. Griffith City Council is seeking to ensure Griffith develops a safe and coherent strategic heavy vehicle route network to provide significant access for the general freight task.

The transport industry has frequently applied to Griffith City Council for increased access for heavy vehicles, such as B-Doubles and Road Trains, around Griffith. Council's assessment of the majority of the industries applications deemed the local road network unsuitable for these larger vehicles. Recently the transport industry has begun to introduce the larger B-Triples and AB-Triples as part of increasing the efficiency of the transport industry across Australia. Previously applications for either B-Double or Road Train were assessed on an individual basis by Griffith City Council staff with very little thought to the future road network taking place.

Council realised the need to provide a framework for heavy vehicle access around Griffith but with increasing congestion problems in the city centre and the inconsistent nature of the applications Council believed there was a need to develop a heavy vehicle bypass around Griffith. Council approved the development of a Heavy Vehicle Bypass study for Griffith. The

objective of the study was to determine the preferred heavy vehicle routes around Griffith and the surrounding areas including the identification of the City By-Pass route.

Council staff began a detailed investigation of the issues that are currently hindering the travel of heavy vehicles around Griffith and the surrounding areas. Council's investigation determined that the main issues around the area centred on the movement of freight of locally and regionally (general freight) not interstate (key freight) as previously identified. Therefore, the objectives of the Heavy Vehicle By-Pass study were altered to focus on developing a strategic general heavy vehicle route network which would include the development of a city by-pass for the key freight task.

Griffith City Council formed the Heavy Vehicle Working Party in October 2009 to assist Council staff with the development of the heavy vehicle network for Griffith and to provide the transport industries perspective on the issues identified. The Heavy Vehicle Working Party's main role is the identification of heavy vehicle routes through Griffith, which would be the most beneficial to the transport industry. This involved additions to Griffith's B-Double and Road Train route network to improve their access through the city, especially the Road Train network.

Griffith City Council is working with the Heavy Vehicle Working Party to develop an effective heavy vehicle strategy for Griffith. The strategy shall address the transport industries concerns regarding access around Griffith and Council's concerns regarding the suitability and performance of the local road network if heavy vehicles are allowed continued access.

2.2.1 Griffith's Existing Heavy Vehicle Network

Griffith is a major junction of the Kidman Way, Irrigation Way and the Burley Griffin Way. Griffith is primarily and historically the regional service centre for the Murrumbidgee Irrigation Area. Griffith has also become a major industrial centre in regional New South Wales. Griffith and the surrounding area was initially a significant agricultural region in south-western New South Wales. This extensive agricultural sector has been supplemented with the development the manufacturing, retail and commercial sectors within the city. The development of a comprehensive, coherent and safe heavy vehicle network is vital to development of an efficient freight transport network in the region.

Griffith as a major agricultural and industrial centre in regional NSW has a fairly significant B-Double network providing access to the major industrial and agricultural sites in the region. The network caters to the majority of the transport industry's needs around Griffith. There are a small number of roads that could be extremely beneficial to freight transport in the area.

Griffith has very limited Road train access with routes providing access to the south and west of the city through the Kidman Way, Willandra Avenue and Kookora Street. This route carries the majority of Road Train Traffic in Griffith. Limited access for Road Trains has been given along the eastern boundary of the Griffith's Local Government Area. Whitton Stock Route Road, Irrigation Way and North Kooba Settlers Road and the majority of the Benerambah area form the remaining Road Train Routes through Griffith. There is a need to increase the access for heavy vehicles, especially Road Trains, in Griffith's road network.

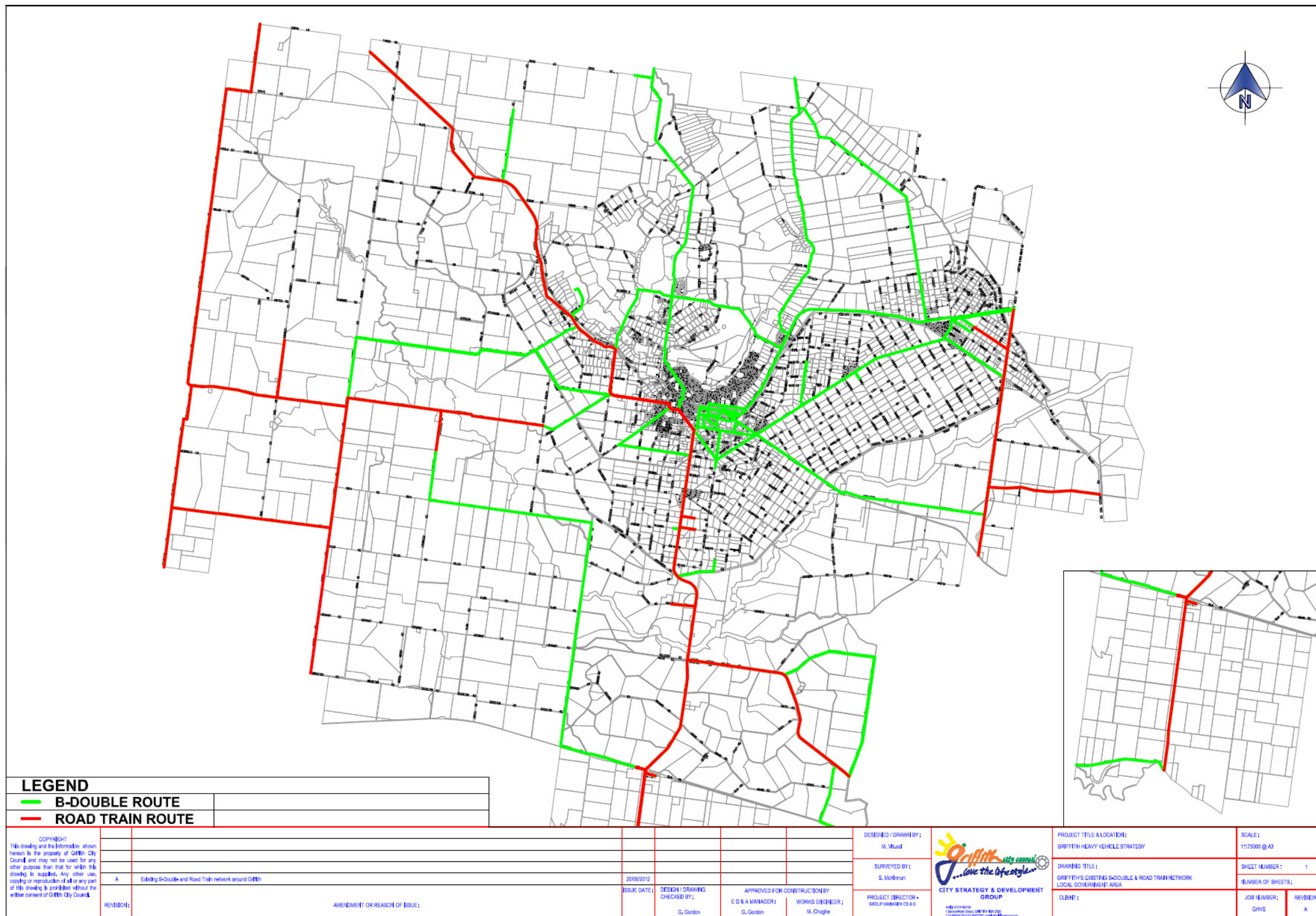


Figure 5 - Griffith's Existing Heavy Vehicle Network, Shire

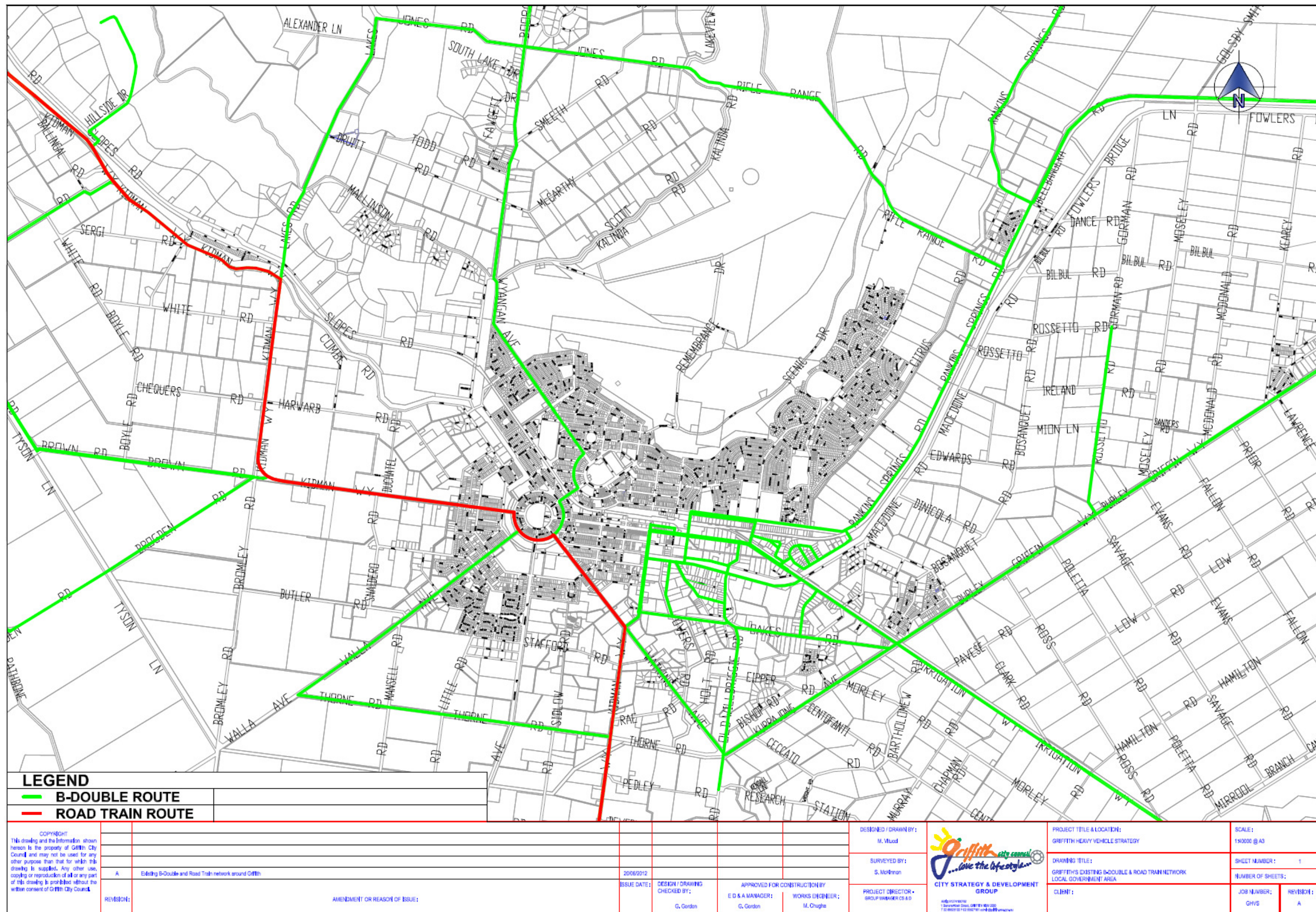


Figure 6 - Griffith's Existing Heavy Vehicle Network, City

3. Literature Review

In order to properly develop a heavy vehicle strategy, research regarding the guidelines and processes developed by national and state road authorities has been conducted. Freight is a key component of Australia's industry and a significant amount of research has been conducted into providing guidelines to the development of efficient and safe access for heavy vehicles around the country.

Research has been conducted to establish the measures implemented by regional centres across Australia to allow heavy vehicle access. Council's research determined that the majority of regional centres have conducted studies addressing freight transport for the surrounding area, which not only includes heavy vehicles but rail transport and intermodal facilities.

Research regarding Griffith's road network and the transport planning Griffith City Council has previously completed has also been conducted. Although freight is a key component of Griffith's industry very little planning has been conducted into providing an efficient and safe access for heavy vehicles around the city. Previously studies focus upon the general transport network and only address heavy vehicle access in Griffith briefly.

3.1 *Austroads Guidelines*

The introduction of the higher productivity vehicles, B-Doubles, Road Trains, B-Triple and AB-Triples, has led to the development of a significant amount of literature regarding the assessment of proposed heavy vehicles routed by a variety of agencies, chief among these is Austroads. Austroads has developed several guides regarding heavy vehicle access in urban and rural environments and the management of freight within urban areas. These documents establish the minimum standards required for heavy vehicle access and provide management techniques to minimise the impact of heavy vehicles on a road network. These guidelines include:

- *Guidelines for Multi-Combination Vehicle Route Access* (2000)
- *Guidelines for Assessing Heavy Vehicle Access to Local Roads* (2009)
- *Planning for Freight in Urban Areas* (2003)
- *Guideline for Freight Routes in Urban and Rural Areas* (2007)
- *Guide to Road Transport Planning* (2009)
- *Guide to Traffic Management – Part 4 Network Management* (2009)

Each of these guides addresses the issues concerning freight transport in urban areas and provides details on the minimum road characteristics required for heavy vehicle access. These guides also provide a guide on the development of a road network to accommodate the transport of freight by heavy vehicles.

3.1.1 *Guidelines for Multi-Combination Vehicle Route Access*

The purpose of these guidelines is to assess the current assessment procedures used to determine the road networks suitability for multi-combination vehicles, at the time of the investigation these included B-Double and both A-Double and A-Triple Road Trains. The objective was to develop a set of performance measures to assist in determining the suitability of heavy vehicle access that could be applied across Australia. The investigation process involved the examination of relevant literature and discussions with state road authorities.

The guidelines provide a brief review of the respective route assessment procedures currently undertaken at a national level for Road Trains and B-Doubles and the main aspects identified in previous assessments, lane widths and safety. The 1980 National Association of Australia State Road Authorities (NAASRA) study into the operation of large combination vehicles dealt mainly with road rains as B-Doubles were only introduced in the late 1980's. Austroads conducted a similar study for B-Doubles in 1992. These two studies formed the basis of route assessment practices at the time of the guidelines development, though the methods and procedures used may have varied. Using these guidelines the road authorities of each state and territory developed a suitable network for four (4) different vehicle classes; General Access, B-Doubles, A-Double (Type 1) Road Trains and A-Triple (Type 2) Road Trains. Both Tasmania and South Australia introduced additional vehicle classes to cater for specific requirements of the states transport network.

The guidelines developed a list of issues that can be addressed when assessing multi-combination vehicles access through urban, rural and remote areas based upon the 1980 NAASRA study, the 1992 Austroads study and the review of the states and territories current practices. The guidelines were developed to assist the assessment of proposed routes by applying local knowledge to the issues to determine its suitability. The existing processes focused on four (4) route access issues these were traffic volumes, road alignment and overtaking opportunities, road space and structural requirements and interaction with urban traffic. The guidelines have identified ten key issues that should be addressed during the assessment of proposed multi-combination vehicle routes. These issues include dimensional capacity, geometry, road safety, structural capacity, railway issues, traffic conditions, community concerns, operational issues, environmental issues and future development.

The Guidelines for Multi-Combination Vehicle Route Access provides a good understanding of the history behind the assessment process used to determine the suitability of heavy vehicle routes in Australia. There is also a summary of the procedures used in each state, which highlights the differences and similarities of assessment across Australia. The issues identified as part of the study form the basis of multi-combination vehicle route assessment today. The guidelines also assisted in the development of the Engineering Assessment, conducted as part of this study, to determine the suitability of the proposed routes.

3.1.2 Guidelines for Assessing Heavy Vehicle Access to Local Roads

The purpose of the guidelines is to provide road authorities, including local government and state agencies, and the freight industry with information and a standard process for the assessment of heavy vehicle access to improve the consistency and transparency of the process across the country. The guidelines aim to improve the understanding of all parties regarding the assessment of heavy vehicle access to local roads. The guidelines also provide information to assist staff, either local or state government, in the assessment of applications for heavy vehicle access. The guidelines form part of a package of Austroads guidelines that assist in the management of freight transport and reducing the impact on local communities.

These guidelines were developed based on consultation with local councils, state agencies and the transport industry and demonstrate that there are many competing objectives, economical, environmental or social, when assessing heavy vehicles access from either of these viewpoints. The first section of the guidelines details the several of the most prominent perceptions of heavy vehicles on the road network identified through

consultation and explores the reasoning behind these. The guidelines improve the understanding between road authorities and the freight industry and develop appreciation for objectives of each sector. The guidelines improve the understanding of these views and facts behind them which create a more effective application of the principles and processes utilised in decision making outlined further in the text.

The second section of the guidelines focuses on the principles of freight access planning and the importance of considering individual applications in the broader context of the transport network. The guidelines identify a set of key principles which should be applied to the development of new road networks or the assessment of existing problems associated with heavy vehicles. The guidelines demonstrate a strategic approach to access for heavy vehicles, which enables the provision of more supportive outcomes for councils and a greater understanding of the impact upon industry. The guidelines advocate a three tiered strategic approach; these tiers are state wide, network and route views. These views rely upon the development of freight network plans across the national, state and local levels, which also assist in the assessment of applications, the identification of significant routes and possible alternatives to requested routes. The guidelines also provide information on the significant roles land-use planning plays in transport planning and vice versa. There is significant need to increase the amount of integrated planning especially with the increasing freight demand and growing urban areas across Australia.

The final section of the guidelines outlines a generic process which can be used for the assessment of heavy vehicle access on local roads. The process is designed to support and adapt to the procedures of local government as Councils is road authority determining whether local roads are suitable for heavy vehicle traffic. The process outlined by the guidelines is five steps and involves understanding the standards and processes relevant to Council, identify the application inputs and process, apply a transparent assessment process, decide on the application and access conditions and implement and monitor. These five steps form the basis of the procedure however the guidelines do not provide detailed technical directions or specifications in regards to these step.

The Guidelines for Assessing Heavy Vehicle Access to Local Roads provides a good understanding of the assessment process used to determine the suitability of heavy vehicle routes and the influence of the conflicting objectives of road authorities and the transport industry on these assessments. The guidelines also outline the importance of establishing a network for the heavy vehicles to successfully manage the introduction of heavy vehicles onto the local road network. The guidelines also establish the basis for the procedures that should be used to assess heavy vehicle routes and assisted in developing the process used to develop the Griffith Heavy Vehicle Strategy.

3.1.3 Planning for Freight in Urban Areas

The report was developed by Austroads to act as a best practice guide for the managing the planning issues associated with freight through urban areas. The report has been broken into three (3) parts Part A: Understanding the Freight Task, Part B: Resource Package and Part C: Guidelines. The report highlights the fact that the entire freight task should be considered when planning for urban freight due to the strong interrelationship between urban, regional and rural areas.

The first part of the report examines the history of the freight task in Australia and the changes that have occurred over the years; based upon this examination the report also projects the state of the freight task in the year 2020. The report found that urban freight traffic accounts for approximately seventy-five percent (75%) of all freight movements in

Australia. The report details the trends of freight movements in Australia over the past thirty years and details the key aspects of freight movement in urban areas.

The second part of the report provides useful data sources, resources, approaches and examples to assist in the understanding of freight movement through urban areas. The report discusses the transport planning issues and needs of urban areas in relation to freight movement and provides information on methods to collect data on freight movements in urban areas. The report details several new approaches that employ technological advances in logistics, distribution and management to increase the productivity and efficiency of freight nationally. The report demonstrates how land-use and transport planning are being developed in conjunction with one another in order to deliver an urban environment which has catered for the movement of larger vehicles throughout.

The third part of the report provides guidelines on how to successfully plan for freight in an urban environment and incorporate this into transport, land-use and environmental planning structures. The guidelines provide a summary of the key issues associated with freight movement within urban areas and provides a multi-disciplinary approach to planning for urban freight.

The report provides an excellent source of information on planning for freight movements through urban areas. The report details the issues that regularly encountered in regards to freight movement in urban areas and provide a variety of resources and approaches that can be used to address these issues. The report provides guidelines focusing on the key issues of freight movement in urban areas and ways to address these issues.

3.1.4 Guideline for Freight Routes in Urban and Rural Areas

The guideline has been developed by Austroads to assist road authorities in the identification and planning of freight routes in urban and rural areas around Australia. The determination of freight route networks is an important component of transport management in both urban and rural areas and the guidelines outline the benefits of establishing a network. These guidelines outline the processes required for identifying and planning the freight route network in urban and rural areas. The guidelines also provide a framework for the management of freight movement across all levels of government to ensure economic growth while minimising the impact upon the community.

The growing freight task in Australia is a growing concern and the identification and protection of the major freight route networks is vital to meeting the transport industry's needs. These guidelines outline the reasons behind the identification and protection of the road freight route network and develop the processes required to achieve this. The identification and protection of the economically important road freight routes is achieved through implementing various planning approaches and the development of statutory planning policies.

The guidelines provide a number of case studies depicting the development and planning of freight route networks in a variety of settings to demonstrate the desired outcomes of planning a freight work network. The case studies demonstrate the different approaches required for the various types of networks, such as the major freight route, the high wide load and the commodity based networks. The case studies also demonstrate approaches which have been successful at the national, regional, metropolitan and provincial levels. These approaches can be adapted to address the issue within the federal, state or local jurisdictions.

The guideline provides an excellent source of information on planning freight route networks for a variety of areas. The guidelines detail the issues that commonly are required to be addressed in the process of identifying and creating freight route network plans. These guidelines tend to focus on the impact on urban areas; this is most likely due to the fact that a higher proportion of the community will be affected by freight traffic.

3.1.5 Guide to Road Transport Planning

The guide reviews the developments in transport planning across Australia and New Zealand and identifies the issues which are required to be addressed when developing network or route infrastructure. The highlights the key issues of transport planning identified through consultation with the relevant government authorities and literature review from around the globe. The guide identified the development of 'planning processes consistent with the expectations of both the community and industry, interface between planning and operations within road agencies at the national and state/territory levels and principles for road transport planning adopted for urban and rural areas at the different levels of the network, in particular road route and link-level planning'.

The guide identifies the critical aspects of good transport planning by examining the current guidelines, processes and practices of road authorities. The guide provides an introduction into road transport planning initially focusing upon network and corridor planning. The guide then details the concepts required to undertake proper road route and link planning focusing on the planning principles and processes currently used. The aim of the guide is to compare current Australian practices with the best practices from across road transport planning.

The guide provides an insight into the issues required to be addressed in all forms of road transport planning, including freight transport planning. The guide also identifies the processes and practices in road transport planning considered to be best-practice and applies them to those currently utilised in Australia.

3.1.6 Guide to Traffic Management – Part 4 Network Management

The guide forms part of the Austroads *Guide to Traffic Management* series and is concerned with the management of traffic at the network level. The guide identifies the different categories and characteristics of road user and network, the needs of the road user and the processes used to balance/prioritise the needs of the competing users. The guide also identifies different traffic engineering solutions that are used to address traffic needs at the network level, including access, traffic signals, parking and lane allocation measures.

The guide briefly discusses the management of the heavy vehicle transport network, identifying the significance of freight to national, regional and local economies in Australia. The report identifies the issues of freight movements through urban areas and provides several strategies used to manage freight networks. The guide divides heavy vehicles into several broad categories, including truck, high productivity, high wide load and hazardous load routes, and methods to manage these networks. The guide also provides an insight into the restrictions placed upon the heavy vehicle networks.

The guide provides an insight into the management of all forms of road transport networks, including the heavy vehicle network. The guide identifies the processes and practices used to successfully manage heavy vehicle networks.

3.2 Regional Traffic Studies

Griffith's situation is not unique in Australia, as a major regional centre required to provide significant heavy vehicle access throughout the city and surrounding area without detrimentally impacting upon the safety, performance or durability of the existing road network. Several regional centres across Australia have had to address this issue however freight transport as a whole has been addressed as part of these plans. These studies address not only heavy vehicles but rail transport and intermodal facilities for the city and the surrounding area. A study also addresses the impact of losing rail transport upon freight transport in the region which addresses several issues common in Griffith. These plans include:

- *A Plan for Freight Transport for the South East/Limestone Coast Region of South Australia* - Government for South Australia Department of Transport, Energy and Infrastructure
- *Lower Hunter Transport Needs Study* - Hyder Consulting Pty Ltd
- *Mildura Derailed* - GHD Consulting
- *Townsville–Thuringowa Integrated Regional Transport Plan* - Queensland Department of Transport
- *Green Triangle Region Freight Action Plan* – State of Victoria

Each of these reports has addressed the different issues concerning freight transport in the area of the study. The investigations have addressed vehicular movements and behaviour and formulated recommendations for the improvement of freight transport throughout the area.

3.2.1 A Plan for Freight Transport for the South East / Limestone Coast Region of South Australia

The south east region of South Australia extends from the coast south of Mt Gambier, north to Bordertown and west to Robe, this area is also known as the Limestone Coast. The focus of the plan is to assess the future transport needs of the timber, agricultural and tourism industries in the Limestone Coast region. The plan has assessed the current and future freight flows based upon research data collected in various transport studies of the area and potential upgrades and their affects to the network.

The plan assesses the current and future transport needs of the region and the impacts this will have upon the existing transport network. The report acknowledged that there would be a significant increase of freight transport in the region which would have to be addressed. The plan identified several scenarios for the improvement of the network to cater for the increased freight transport. These scenarios included the use of heavy vehicles and / or rail services along the existing road network with significant improvements occurring and the creation of new links in the regions road network to better serve freight transport. Each of these options was assessed to determine the best option to cater for the anticipated increase in freight transport.

The Freight Transport Plan for the Limestone region addresses freight transport in the region by identifying the current and future needs of the transport industry and providing suitable infrastructure to meet these needs. Substantial research has been conducted to complete the report as proven by the analysis and justification of the proposed improvements to the freight network. The plan provides an example of the process involved in developing a freight network plan and several key points can be taken from the report for the development of Griffith's Heavy Vehicle Strategy.

The Department of Transport, Energy and Infrastructure appears to have conducted extensive research into existing reports on the regions transport network, the needs of the

industry (transport, agricultural, timber and tourism) and the capacity of the existing network to develop the Freight Transport Plan. While the report extensively details the latter, very little data is provided regarding the former. There is little evidence provided in the report that the plan addresses the concerns of the industry, though there would be little point to developing the plan otherwise.

The plan addresses situations similar to those faced in Griffith. Mt Gambier is a major regional centre, similar to Griffith, where the majority of heavy vehicles are originating or destined for locations in the city and the development of a bypass around the city would not necessarily be beneficial to heavy vehicle traffic in the area. The plan identifies this and determines that a north eastern bypass would be beneficial to the flow of traffic in the region as well as discussing several options to improve heavy vehicle access and traffic flow within the city. The plan identifies this despite also assessing two additional regional centres with different traffic patterns.

The plan does not individually address the access of B-Doubles or Road Train routes throughout the region. The plan instead focuses upon developing a freight network to meet the future needs of the region. The report provides a general heavy vehicle network for the region leaving the assessment of the B-Double and Road Train routes to individual councils.

3.2.2 Lower Hunter Transport Needs Study

The Lower Hunter region is located at the junction of two national freight corridors, the north-south route linking Sydney to Brisbane and the east-west corridor linking regional Australia to the Port of Newcastle. A significant amount of freight, specifically grain and minerals, is transported from Central, Western and North Western NSW to the Port of Newcastle. The Lower Hunter region itself generates a significant amount of freight as Australia's primary source of coal, the local manufacturing and processing industry and its role as a regional distribution centre for bulk commodities.

The purpose of the study is to identify the needs of passenger and freight transport in the Lower Hunter region and identify the transport strategies to meet the needs of transport in the area. The study also involves developing design options and assessing these options to determine the best outcome for transport in the Lower Hunter region.

The study clearly identifies major routes through Lower Hunter region and provides a detailed analysis on their performance. The study also develops proposals to improve the network so that the regions transport needs are sufficiently catered. The options developed to improve transport throughout the region are analysed utilising a stylised cost-benefit ratio method and highlights the need to consider local factors when assessing such options rather than applying a broad brush approach.

The study develops individual strategies and initiatives to be completed in order to meet the regions future transport needs for each component of the transport network studied, i.e. road, rail, passenger and freight. There is significant benefit in highlighting the initiatives which will be most beneficial to each component of the transport network, obviously there will be a fair amount of overlapping but this assists in the development of appropriate priorities.

Hyder Consulting have conducted extensive research on the regions transport network, the needs of the industry (transport, agricultural, timber and tourism) and the capacity of the existing network to develop the study. The report details the research and analysis

undertaken by Hyder Consulting through the use of technical papers appended to the document. The report details the shortcomings of the Lower Hunter's existing transport network and provides significant detail on the analysis and assessment of the network and the strategies developed for its improvement.

The plan does not individually address the access of B-Doubles or Road Train routes throughout the region. The plan instead focuses upon addressing the transport needs of the entire Lower Hunter region, including freight, and developing the strategies to meet those needs.

3.2.3 Mildura Derailed

Mildura is located at the junction of Victoria, New South Wales and South Australia and plays an important role in Australia's domestic economy. The region's industries contribute to national and international markets. The main industries in the region include agriculture, food processing, manufacturing and mining. The region produces 95% of Australia's dried vine fruit, 69% of table grapes, 55% of almonds, 33% of olives, 21% of citrus and 23% of Australia's wine grape crush. There is also significant grain and livestock, consisting mostly of cattle and sheep, industries in the region. Mining is a more contemporary industry to the area, with the areas salt, extracted from saline groundwater, and mineral sands, abundant in the Murray Darling Basin, attracting a number of mining companies to the region.

Rail transport plays an important role in the transport of freight throughout the Mildura region, with links to the ports in Melbourne and Geelong. The purpose of the Mildura Derailed Report is to assess the impact of the speculated cessation of rail services to Mildura on the regions freight network. Due to the significant amount of freight produced in the region the cessation of rail services in the region will have a significant impact on the road network and the transport industry. Various government agencies and industry leaders have raised concerns regarding the capacity of the network and the size of the existing heavy vehicle fleet being unable to cater for the increase should rail services to Mildura cease.

The plan details the existing rail services and infrastructure used in Mildura and details the impacts this would have upon the region should services cease. The plan details the environmental and amenity issues that could be created if the services cease as well as the impacts that this would have upon the region's freight task.

The plan does not individually address the access of B-Doubles or Road Train routes throughout the region. The plan instead indicates that the loss of rail services to the Mildura region will increase the size of the heavy vehicle fleet accessing the region and include a higher proportion of larger vehicles such as B-Doubles and Road Trains.

3.2.4 Townsville–Thuringowa Integrated Regional Transport Plan

The Townsville-Thuringowa Integrated Regional Transport Plan establishes the future development and management of the regions transport system with a view to integrate transport across the region. The plan achieves this by considering the transport system in conjunction with urban development, regional requirements and lifestyle choices. The plan identifies the issues faced by the regions communities and develops strategies required to negate these issues.

The Townsville-Thuringowa region is Queensland's largest population base outside of south east Queensland, with a large commercial and industrial base servicing the regions community. The region is growing a significant tourism industry as part of Queensland's

north coast. The region is an extremely important industrial centre with major mineral processing industries, such as copper and zinc refineries and nickel plant, located in the region as well as a major port in Townsville. Townsville traditionally services North Queensland as the major industrial port, exporting minerals From Central Queensland, beef and wool from the western plains and sugar and timber from the coastal regions.

The Queensland Department of Transport have conducted extensive research on the regions transport network, the needs of the community (including freight) as well as community consultation to develop the integrated transport plan. The report clearly details the consultation undertaken and report on the issues which form the basis for the development of the integration strategy.

The Department of Transport has developed individual strategies and initiatives to be completed in order to provide an integrated transport network for the region, these strategies have been divided into separate categories. Though the plan has an extensive strategy plan the presentation of these strategies is very difficult to follow due to the formatting of the report through this section.

The plan also develops strategies to encourage the use of the regions rail system as the main method of freight transport in Townsville. The plan also acknowledges that rail transport for the short to medium trips within the region, such as the farm to market freight task, will be conducted by heavy vehicles but encourages the development of safer, more efficient transport methods in the area. There are several different initiatives identified in the plan that will improve the freight task include road works programs on routes with a high percentage of heavy vehicles and various infrastructure proposals to improve the transport network across the region.

The plan does not individually address the access of B-Doubles or Road Train routes throughout the region. The plan instead focuses upon addressing the transport issues of the entire Townsville-Thuringowa region, including freight, and developing the strategies to negate these issues and develop an integrated transport network for the region.

3.2.5 Green Triangle Region Freight Action Plan

The Green Triangle region consists of southwest Victoria and southeast South Australia and includes Warrnambool, Horsham, Mount Gambier, Portland, Hamilton, Naracoorte, Bordertown, Millicent and Penola. The Green Triangle is a major contributor to the agriculture and timber industries and has been largely unaffected by drought for 100 years. Plantation forestry and wood processing form the region's largest industry sector, contributing 16% of Gross Regional Product (GRP) and 12% of employment, with around 340,000 ha of hardwood and softwood plantations. The region's economy sectors also include aquaculture, agriculture, tourism, transport and mining; these industries form a diverse base for the region with strong potential for future growth. A suitable transport network is required to accommodate the region's industry and its growth.

The plan determines the current freight task of the region and anticipates the future growth of this task. The report acknowledged that there would be a significant increase of freight transport in the region which would have to be addressed. The plan assesses the existing road and rail transport networks of the Green Triangle region to determine whether they are suitable for the region's current and future freight transport needs.

The plan assesses the road and rail networks of the region and determines how they can be developed to improve the freight transport network in the Green Triangle region. These

improvements relate to the enhancement of both the road and rail infrastructure present, with the road infrastructure improvements focused upon the development of the regions highway network to make it more accessible for heavy vehicles.

The plan considers the existing network of B-Double routes throughout the region and whether these routes will be sufficient to cater for the anticipated freight task. The plan does not go into any discussion regarding the inclusion of Road Trains as part of the heavy vehicle fleet in either Victoria or South Australia. An assessment of the existing routes and development of appropriate road improvement works has also been conducted as part of the plan.

3.3 Griffith Traffic Studies

Griffith City Council has engaged in several investigations of traffic behaviour throughout the city and its surrounds. These reports form the basis of traffic management around Griffith but they have not addressed in detail the movement of freight throughout the city. These reports include:

- *Assessment of Traffic Growth and Impacts in Griffith* – Scott Wilson Nairn (2002)
- *Griffith Road Rail Interchange* – Maunsell (2004)
- *Traffic Impact Study, Kidman way* – Brown Consulting (2002)
- *Griffith Growth Strategy* – Griffith City Council (2000)
- *Feasibility Study to relocate the Western Riverina Intermodal Terminal* – PricewaterhouseCoopers (2009)

Each of these reports has addressed different issues concerning traffic in Griffith and all have identified a southern by pass as an integral strategy to manage traffic including heavy vehicles around Griffith. While the investigations have addressed vehicular movements and behaviour and formulated recommendations for the improvement of traffic flow throughout the city, they have not developed a strategy for heavy vehicle movement within the existing city road network.

3.3.1 Assessment of Traffic Growth and Impacts in Griffith

The Scott Wilson Nairn report was commissioned by Griffith City Council and formed part of the development of the Section 94 Contribution Plan for Griffith City Council. The report investigated the transport routes and facilities required to service the growth of Griffith to the year 2030. This included the development of a ten-year capital works infrastructure to improve the city's key road and traffic infrastructure and improve the road network for future urban expansion.

The report addressed the improvements required to Griffith's road and traffic infrastructure to ensure that the city's road network is able to operate effectively in the future. The study does not differentiate between the different types of traffic and therefore has not considered the impacts of the heavy vehicle travel through Griffith. The report provides a good framework for the development of key road and traffic facilities however, Griffith's heavy vehicle routes should be considered alongside the recommendations of the study.

The report also identified several projects to improve the travel time across the entire road network. One of these projects was the development of a southern by-pass to divert traffic from Griffith's Central Business District (CBD). The by-pass involved the upgrade of Kurrajong Avenue, Thorne Road and Bromley Road to provide a route between the Irrigation Way (MR 80) and the Kidman Way (MR 80).

3.3.2 Griffith Road Rail Interchange

The Griffith Road-Rail Interchange report was completed by Maunsell in June 2002. The aim of the report was to determine the current operation of the Rail Freight Terminal and its viability into the future.

The report includes a Freight Market Study, which collated data on the freight generators in Griffith and the surrounding areas. The study identified the total volumes and movements of heavy vehicles around Griffith. However, the study does not identify the routes used by heavy vehicles to transport freight from the source to the destination, i.e. market, freight terminal, packing shed etc.

Council staff have updated the freight transport data utilising the knowledge of the Heavy Vehicle Working Party. This information assisted in the development of the heavy vehicle network around Griffith. This information can also be used by Council's Strategic Planning staff to develop the future zoning of Griffith to encourage development in areas that are accessible to heavy vehicles.

The report also analyses the recommendations of Scot Wilson Nairn's Assessment of Traffic Growth and Impacts in Griffith. The report states that the southern by-pass proposed by Scott Wilson Nairn would result in a major reduction of heavy vehicle traffic within the CBD of Griffith. A small percentage of heavy vehicles requiring access to the rail freight terminal would remain until the terminal is relocated.

3.3.3 Traffic Impact Assessment, Kidman Way

Griffith City Council commissioned Brown Consulting to undertake a Traffic Impact Assessment of the Kidman Way between Griffith and Hanwood. The assessment was conducted to identify the current and future impacts of traffic along the Kidman Way and produce a strategy to provide the best level of transport service to the community. The assessment focused on traffic efficiency, minimising traffic conflict and improving road safety along this section of the Kidman Way.

The report details the strategies and improvements required to the road network to the south of Griffith to ensure that future traffic demands are met. The report assumes that the land between Griffith and Hanwood will be developed for commercial and retail purposes. The completion of the report's recommendations is required to cater for this development. The report states that should this development not occur; Griffith's economy may not be able to support the proposed improvements.

The report includes an assessment of how a southern by-pass of Griffith would benefit traffic along the Kidman Way. The report identifies the proposed route as Kurrajong Avenue, Thorne Road, and Bromley Road to connect the Burley Griffin Way and Irrigation Way with the Kidman Way. The by-pass would significantly reduce the traffic pressure on Willandra Avenue and Watkins Avenue and reduce the amount of traffic entering the CBD of Griffith as they travel along the Kidman Way, Burley Griffin Way and Irrigation Way.

The report also states that should the development of the Highway Service Zone occur in accordance with the Growth Strategy 2030 the southern by-pass would play a more significant role. The by-pass would carry vehicles generated by the development and distribute the increased traffic resulting from the growth of Griffith. Brown Consulting recommends that the southern by-pass be addressed as part of the Growth Strategy's Structure Plan.

3.3.4 Griffith Growth Strategy

The Growth Strategy 2030 was completed in 2000 to provide a framework for the development of Griffith until the year 2030. The strategy was developed to ensure that the continued growth of the city conformed to a strategic plan that allowed Griffith City Council to develop the services this growth required.

The Growth Strategy included the development of a Long Term Infrastructure plan for Griffith prepared by Hyder Consulting. The plan included a section dedicated to the improvement of Griffith's Road network. This included the identification of two possible city by-passes, the Southern By-Pass and the Yenda By-Pass, to remove the majority of heavy vehicle traffic from the city centre.

3.3.5 Relocation of the Griffith Freight Terminal

The Griffith freight terminal is currently located in the CBD of Griffith requiring heavy vehicles to travel within the city centre to deliver freight. Due to the size and speed of the heavy vehicles, they contribute significantly to the congestion in Griffith's city centre. Griffith City Council in association with the NSW Ministry of Transport and the Sydney Ports Corporation engaged PricewaterhouseCoopers to investigate the feasibility of the relocation of the Griffith Freight Terminal.

The study assessed the suitability of the current site and three alternate sites located at Yenda, Yoogali and Widgelli. The study determined that the freight terminal should be relocated to the Yoogali site. More recently, detailed site investigations conducted as part of a funding bid for a new Freight Intermodal and Logistics Hub (GHD and Griffith City Council, 2013) have identified sites at Wumbulgal and Widgelli as preferred sites, with the Yoogali site no longer preferred.

Based upon the feasibility study the freight terminal will be relocated from the CBD of Griffith to a Greenfield site east of Griffith. This will remove the need for heavy vehicles to access the city centre and increase the need for the development of Griffith heavy vehicle network especially in the Yoogali and Widgelli regions.

Griffith City Council commissioned Thomson Stanbury Associates to conduct a traffic impact and feasibility study for the possible relocation of the terminal to the Yoogali site in 2006. Although the Yoogali site is no longer preferred, this study remains relevant should a new site east of Griffith be developed.

The Thomson Stanbury study indicates that the road network surrounding the site for the proposed relocation is not suitable for the traffic generated by the freight terminal. The study proposed several options for the development of the network to provide safe and efficient access to the site. The majority of the options revolved around upgrading Ross Road, Hamilton Road and Irrigation Way to provide access to the site. The major issues identified with upgrading these roads are the location of the existing railway line and the associated level crossings and the current standard of the roads. It is partly for these reasons that the Yoogali site is no longer preferred for a new Freight Intermodal. Another issue identified is the additional traffic utilising the Yoogali Intersection (the intersection of Burley Griffin Way(MR 84), Irrigation Way (MR 80), Mackay Avenue (MR 80) and Kurrajong Avenue) created by the proposed freight terminal.

The relocation of the Griffith Freight Terminal and any associated development in the region east of Griffith, such as storage/packaging facilities or transport depots, will result in

an increase of heavy vehicle traffic utilising the area. This will require the creation of greater access for Road Trains and B-Doubles throughout the Griffith City Council area especially in the region east of Griffith. The relocated freight terminal would also benefit from the creation of a Griffith By-Pass, either to the north or south of the city as identified in Griffith's Growth Strategy 2030.

4. Methodology

Griffith and the surrounding region are home to a number of significant regional and local industrial hubs. These hubs generate a large amount of heavy vehicle traffic every day therefore access to and from these facilities is critical to the freight task around the region. The objective of the heavy vehicle strategy is to develop a direct, coherent and safe heavy vehicle network that will provide access through Griffith to these industrial centres. Heavy vehicles currently have problems when accessing these centres including infrastructure deficiencies.

Identifying and protecting transport infrastructure and corridors is critical to sustaining current transport operations and meeting future transport needs as proposed in the NSW Governments Integrating Land Use and Transport Policy 2001. It is important that potential conflicts between key transport infrastructure and urban development are managed to maximise the benefits of this infrastructure while minimising impacts on adjacent land uses. To date this has not been fully achieved because of the absence of a planning framework integrating land-use and transport planning for Griffith and a shortfall of investment in infrastructure to meet the current and future transport growth in the region.

Previous studies have identified a number of infrastructure upgrades required to Griffith's road network to ensure that it is capable of handling the future traffic flows of the city. The upgrades identified are in key locations around Griffith and have been incorporated into the planning of the heavy vehicle strategic network. While the upgrades previously identified have been taken into consideration the development of the network will require upgrades to parts of Griffiths road infrastructure not previously identified.

During the initial stages of the development of Griffith's Heavy Vehicle Strategy, the heavy vehicle generators and attractors around the area were identified. These included the many wineries, pack houses, grain silos/receiving points and various other industries located around Griffith. The identification of these generators and attractors determined the level of heavy vehicle access that existed in an area and whether additional access would be required. The Heavy Vehicle Working Party was formed by Council's Transport and Logistics Committee to assist with this process.

The Heavy Vehicle Strategy focuses on providing the future transport needs of Griffith and the surrounding area, by commissioning the gazettals, engineering actions and recommendations required to complete the network. Engineering assessments of the potential heavy vehicle routes will provide the basis for determining the suitability of the proposed routes. The assessments consider a variety of issues relevant to the heavy vehicle travel, these include:

- **Environment and Community Amenity**
 - Noise
 - Impact on the Existing Road Network
- **Dimensional Capacity**
 - Lane and Shoulder Widths
 - Railway Crossings and Adjacent Intersections
 - Terminals
- **Road Safety and Traffic Management**

- *Vehicle Swept Path Requirements*
- *Overtaking Opportunities – Rural Areas*
- *Sight Distance*
- **Structural Capacity**
 - *Road Suitability*
 - *Bridges, Channel Crossings and Culverts*

The engineering assessment of the proposed network, based upon the above issues, will determine each routes suitability for heavy vehicles and identify any upgrades required it be made across the network. These upgrades will ensure safe and efficient access for heavy vehicles and shall be completed prior to the gazettal of network as either a B-Double or a Road Train route.

The Heavy Vehicle Working Party suggested that in addition to the engineering assessments a trial of several key routes should occur. The Working Party were in favour of the trial as it provided empirical evidence on the suitability of heavy vehicles along the proposed routes and the trial would provide an opportunity to determine whether upgrades to the road network were required to the extent indicated by the engineering assessments. The trial would be conducted utilising a Road Train, as they are larger than a B-Doubles and B-Doubles are legally able to travel along any road gazetted as a Road Train route.

The implementation of Griffith's Heavy Vehicle Strategy will not be a short term endeavour. Certain aspects of the strategy may be acted upon immediately however there will be several aspects that will require considerable planning and funding. Therefore an action plan for the implementation of the Heavy Vehicle Strategy shall be developed based upon the outcomes of the engineering assessments and input from the Heavy Vehicle Working Party. The action plan shall identify the issues associated with the route, develop engineering works to rectify these issues and prioritise these works in order of importance to Griffith's transport needs.

Transport Authorities, including the RTA and Griffith City Council, must compete for funding with other levels of government. Funding for the upgrade of road infrastructure for heavy vehicle traffic can usually be facilitated if the wider community benefits are identified. Many expensive initiatives are applicable only to a small range of problems. The wider range of low cost minor measures must also be given due consideration. Securing funding ensures implementation of the plan and subsequent monitoring of its success. Potential funding sources for the recommended works are required to be identified.

Griffith's current heavy vehicle network requires greater connectivity between the existing Road Train and B-Double routes. Due to the nature of the freight task in Griffith heavy vehicles are required to transport freight across the city; therefore heavy vehicles are required to either break the combination down to individual trailers or travel an inefficient route to reach the destination. The strategy aims to increase the connectivity of Griffith's heavy vehicle network and improve the access between the freight generators and attractors.

4.1 Heavy Vehicle Working Party

During the initial stages of the development of Griffith's Heavy Vehicle Strategy Griffith City Council's Assistant Traffic Engineer, Mr Mathew Vitucci, began identifying the heavy vehicle generators and attractors around the area. These included the many wineries, pack houses, grain silos/receiving points and various other industries located around Griffith. The identification of these generators and attractors determined the level of heavy vehicle access that existed in an area and whether additional access would be required. The Heavy Vehicle

Working Party was formed by Council's Transport and Logistics Committee to assist with this process.

The Heavy Vehicle Working Party was formed as a sub-committee of Council's Transport and Logistics Committee in October 2011 to assist with the development of the Heavy Vehicle Strategy and assist Council with other matters related to Heavy Vehicles around Griffith. The Heavy Vehicle Working Party consists of the Transport and Logistics Committee, five (5) Councillors and four (4) staff, and six (6) transport operators from around the area.

The inaugural meeting of the Heavy Vehicle Working Party addressed the transport operators concerns with the current heavy vehicle network around Griffith. The transport operators provided Council with a list of routes that they believed should be gazetted as either a Road Train or B-Double route to improve access around Griffith. The key routes identified by the transport operators included:

B-Doubles

- Old Willbriggie Rd – from Research Station Rd to Mirrool Branch Canal Rd;
- Murray Rd – Access to the Elders packing shed;
- Bob Irvin Rd – Access to Atkinson's Farm;
- Walla Avenue to Drew Rd – via Walla Ave and Bowditch Rd;
- White Rd;
- Access to West End Estate – via Merrigal St and Brayne Rd;
- Drew Rd – from Woodside Rd to Barber Rd; and
- Access from Koorlingal Ave to Crossing St – via Binya St, Burrell Pl and Wakaden Street.

Road Trains

- By-Pass route from East to West;
- By-Pass route from North to South;
- Carrathool Shire to Baiada Poultry – via Rankins Springs Rd, Wakaden St, Crossing St, Bridge Rd and Jondaryan Ave;
- Carrathool Shire to Whitton Stock Route Rd – via Rankins Springs Rd, Beelbanger Rd, Twigg Rd and Burley Griffin Way;
- Yenda to Kidman Way – via Burley Griffin Way, Kurrajong Ave, Old Willbriggie Rd and Watkins Ave or Burley Griffin Way, Kurrajong Ave, Oakes Road, Lenehan Rd, Oakes Rd and Jondaryan Avenue;
- Access to the wineries, esp. De Bortoli's, Orlando's and Casella's;
- Brogden Rd;
- Hanwood to Brogden Rd – via Beaumont Rd, Joncondon Rd and Tyson Ln;
- Beelbanger Rd to Tharbogang – via Rifle Range Rd, Jones Rd and Lakes Rd;
- Beelbanger Rd to Hanwood – via Rankins Springs Rd, Wakaden St, Crossing St, Bridge Rd and Jondaryan Ave or Rankins Springs Rd, Wakaden St, Blumer Ave, Banna Ave, Lenehan Rd, Old Willbriggie Rd; and
- Carrathool Shire to Willandra Ave – via Boorga Rd, Wyangan Ave, Palla St, Koorlingal Ave and Kookora St.

The working party were also in favour of investigating the possibility of applying a blanket B-Double gazettal over an area such as Benerembah for harvest periods. Also a large number of packing sheds are littered around Griffith and the surrounds that will require B-Double access in the near future.

An assessment of each proposed route was performed by Griffith City Council's Assistant Traffic Engineer, Mr Mathew Vitucci, in order to determine its suitability for heavy vehicle access. The strategic heavy vehicle network was then synthesised from these routes to provide the most suitable network using the existing road network. The strategic network was

then prioritised based upon the assessments undertaken for each route and the level of work required to the route to ensure that it was suitable for heavy vehicle access. The draft strategic heavy vehicle network was presented to the next meeting of the Heavy Vehicle Working Party.

The draft strategic network was presented to the Heavy Vehicle Working Party in two stages, Griffith's B-Double network and Griffith's Road Train network. The working party suggested several additional routes that could be considered as part of the B-Double network. These routes would be used to access packing sheds and wineries not covered by the initial draft network. These routes were assessed to determine their suitability as B-Double routes.

The draft Road Train network was also presented to the working party for their review. The working party suggested that in addition to the network supplied, Council should investigate providing access to Yenda, especially Casella's Wines and part of the Burley Griffin Way to provide access to De Bortoli Wines. The working party also suggested access to the Willbriggie Silos from Benerembah should be investigated.

The earlier assessment of the proposed network revealed that several major upgrades are required across the identified network to ensure safe and efficient access for heavy vehicles. These upgrades should be completed prior to the gazettal of network as either a B-Double or a Road Train route. Based upon this information the Heavy Vehicle Working Party decided to hold a trial of the proposed network to determine the extent of work required to provide safe heavy vehicle access. The trial determined the extent of work required along the proposed routes and the routes which do not require upgrading. The trial route included the key routes identified by the Heavy Vehicle Working Party.

4.2 Engineering Assessment

Engineering assessments of the potential heavy vehicle routes will provide the basis for determining the suitability of the proposed routes. The heavy vehicle network and action plan will be developed primarily through the engineering assessments conducted on the proposed routes throughout Griffith, by Council's Assistant Traffic Engineer Mr Mathew Vitucci. The assessments consider a variety of issues relevant to the heavy vehicle travel.

Engineering assessments of the potential heavy vehicle routes will provide the basis for determining the suitability of the proposed routes. The assessments consider a variety of issues relevant to the heavy vehicle travel, these include:

- **Environment and Community Amenity**
 - Amenity
 - Noise
 - Impact on the Existing Road Network
- **Dimensional Capacity**
 - Lane and Shoulder Widths
 - Railway Crossings and Adjacent Intersections
 - Terminals
- **Road Safety and Traffic Management**
 - Vehicle Swept Path Requirements
 - Overtaking Opportunities – Rural Areas
 - Sight Distance
- **Structural Capacity**
 - Road Suitability
 - Bridges, Channel Crossings and Culverts

The engineering assessments conducted are based upon the NSW Roads and Maritime Services heavy vehicle assessment criteria as set out in the NSW *Route Assessment Guideline for Restricted Access Vehicles* and *Freight Route Investigation Levels for Restricted Access Vehicles*. The Austroads guidelines *Guidelines for Multi-Combination Vehicle Route Access* and *Guidelines for Assessing Heavy Vehicle Access to Local Roads* were also provided information used to develop the engineering assessment criteria. The assessment also considers Griffith City Council's concerns regarding heavy vehicles accessing the local road network.

4.3 Road Train Trials

Griffith City Council in conjunction with the Heavy Vehicle Working Party developed a heavy vehicle strategy for Griffith and the surrounding area. The strategy considered Griffith's B-Double and Road Train network individually to ensure that each network provided a suitable level of access within the city and surrounding area. During the development of the heavy vehicle network, engineering assessments of the proposed routes were conducted. The assessments determined the suitability of a proposed route for heavy vehicle travel and the type and extent of any upgrades required prior to gazetting the route as a Road Train or B-Double route.

The assessments of the proposed Road Train routes determined that road trains may have difficulty fitting on the proposed network without a significant amount of upgrades being completed. Based on this, trials of the proposed Road Train network were organised on the recommendation of the Heavy Vehicle Working Party, to determine the accuracy of the assessments undertaken. The trials determined whether a road train could travel along the proposed network without upgrades and the extent of the upgrades if they are required. The trials also assisted in determining the impact road trains would have on the traffic through the area.

The road train trial involved a full thirty-six and a half (36.5) metre road train, loaded to seventy-five percent (75%) of capacity, travelling along the routes requiring additional consideration. The Road Train was loaded to give a proper indication of the tracking of the vehicle through corners and the impacts a loaded road train would have on the road and the surrounding environment. Initiating the trial involved applying for a trial permit from the Roads and Maritime Services for the proposed dates and routes of the trial, along with approval for the trial from Griffith's Local Traffic Committee.

The Road Train used for the trial was provided by GA & JG Young Pty Ltd and was driven by Mr Greg Young. Members from Griffith's Heavy Vehicle Working Party and Transport and Logistics Committee were present at the trial along with representatives from the Roads and Maritime Services and the Griffith Local Area Command Highway Patrol. Griffith City Council's Assistant Traffic Engineer, Mr Mathew Vitucci, travelled in the vehicle to navigate through the trial route. A Highway Patrol car escorted the road train along the route and filmed the trial and the remaining participants followed in passenger vehicles.

4.3.1 Road Train Trial – Wednesday 8 June 2010

The Road Train Trial was conducted on Wednesday 8 September 2010. Present at the trial were representatives from the Heavy Vehicle Working Party, the RMS, Griffith Highway Patrol and Griffith City Council. The trial route covered the core of the networks identified, travelling through possible alternate routes through Griffith before heading out to Hanwood and travelling to Bilbul and back via Tharbogang, Lake Wyangan, Beelbanger and Yenda.

The trial included both existing and proposed road train routes and was conducted along the following roads:

- Kidman Way (MR321) – between Willandra Ave and Beaumont Rd;
- Beaumont Road – between Kidman Way (MR321) and Joncondon Rd;
- Joncondon Road – between Beaumont Rd and Walla Ave;
- Tyson Lane – between Walla Ave and Brogden Rd;
- Brogden Road – between Tyson Ln and Brown Rd;
- Brown Road – between Brogden Rd and Kidman Way (MR80);
- Kidman Way (MR80) – between Brown Rd and Lakes Rd;
- Lakes Road – between Kidman Way and Jones Rd;
- Jones Road – between Lakes Rd and Rifle Range Rd;
- Rifle Range Road – between Jones Road and Rankins Springs Rd;
- Rankins Springs Road – between Wakaden St and Beelbanger Rd;
- Beelbanger Rd – between Rankins Springs Rd and Myall Park Rd;
- Myall Park Road – between Beelbanger Rd and Railway Pde;
- Railway Parade – between Myall Park Rd and Mirrool Ave;
- Burley Griffin Way (MR84) – between Whitton Stock Route Rd and DeBortoli Rd;
- Wood Road – between Burley Griffin Way (MR84) and Whitton Stock Route Rd;
- Whitton Stock Route Road – between Wood Rd and Burley Griffin Way;
- Doug McWilliam Road – between Burley Griffin Way and Cremasco Rd;
- DeBortoli Road – between Burley Griffin Way and DeBortoli Wines Entrance;
- Wakaden Street – between Rankins Springs Rd and Blumer Ave;
- Blumer Avenue – between Wakaden St and Mackay Ave;
- Mackay Avenue (MR80) – between Blumer Ave and Kurrajong Ave;
- Kurrajong Avenue – between Mackay Ave and Old Willbriggie Rd;
- Old Willbriggie Road – between Kurrajong Ave and Watkins Ave;
- Watkins Avenue – between Old Willbriggie Rd and Jondaryan Ave;
- Jondaryan Avenue (MR321) – between Watkins Ave and Bridge Rd;
- Bridge Road – between Jondaryan Ave and Lenehan Rd;
- Lenehan Road – between Bridge Rd and Banna Ave; and
- Banna Avenue (MR80) – between Lenehan Rd and Blumer Ave.

The trial determined that the majority of the proposed network was suitable for road train traffic however key intersections would require significant treatment and several of the roads identified will require upgrading prior to allowing Road Train access. The intersections which require treatment include:

- Banna Avenue and Lenehan Road;
- Irrigation Way, Burley Griffin Way, Mackay Avenue and Kurrajong Avenue;
- Kurrajong Avenue, Old Willbriggie Road and Watkins Avenue;
- Watkins Avenue and the Kidman Way;
- Tyson Lane and Brogden Road;
- Brogden Road and Brown Road;
- Lakes Road and Jones Road;
- Rifle Range Road and Rankins Springs Road,
- Beelbanger Rd and Myall Park Road;
- Whitton Stock Route Road and the Burley Griffin Way; and
- Burley Griffin Way and Doug McWilliam Road.

The roads which will require upgrading include:

- Tyson Lane;
- Lakes Road; and
- Jones Road.

At the completion of the trial discussions were held regarding the performance of the trial and the next step in the development of Griffith's Road Train and B-Double network. During the discussions short term and long term networks were identified. These networks identified the extent of works required along each problem area of the route and determined which could be completed almost immediately and the works which would require a significant amount of time and money to complete.

There was also discussion of trialling an alternate route through Griffith in order to provide access from the north to the south of the city. The proposed route would involve travelling south along one route and travelling north along an alternate route. The Working Party agreed that a trial of the proposal should take place in order to determine its suitability.

4.3.2 Road Train Trial – Friday 8 July 2011

The Road Train Trial was conducted on Friday 8 July 2011. The trial was conducted to investigate the suitability of a number of possible alternate routes through the city of Griffith. The trial began in South Griffith and travelled to Beelbanger and back. Due to time constraints and the unavailability of trailers the Road Train trial was conducted with a thirty-four and a half (34.5) metre vehicle rather than a thirty-six and a half (36.5) metre vehicle. The shorter length of the vehicle was taken into consideration when determining the performance of the trial. The trial was conducted along the following roads:

- Jondaryan Avenue (MR321) – between Willandra Ave and Bridge Rd;
- Bridge Road – between Jondaryan Ave (MR321) and Lenehan Rd;
- Crossing Street – between Bridge Rd and Wakaden St;
- Lenehan Road – between Bridge Road and Banna Ave (MR80);
- Banna Avenue (MR 80) – between Crossing St and Blumer Ave;
- Blumer Avenue – between Banna Ave (MR80) and Wakaden Street;
- Wakaden Street – between Crossing St and Rankins Springs Rd; and
- Rankins Springs Road – between Wakaden St and Beelbanger Rd.

The trial determined that the majority of the proposed network was suitable for road train traffic however key intersections would require significant treatment prior to allowing Road Train access. The intersections which require treatment include:

- Jondaryan Avenue (MR321) and Bridge Road;
- Wakaden Street and Crossing Street;
- Wakaden Street and Blumer Avenue; and
- Lenehan Road and Bridge Road.

At the conclusion of the trial discussion were held regarding the outcomes of the trial and the suitability of Road Trains travelling through Griffith in order to achieve a north south connection in the area. Based upon the trial significant infrastructure works would be required in order to allow Road Train access along any of the proposed routes through Griffith. While the Road Train performed reasonably well throughout the majority of the trial, the shorter vehicle may have performed better through the route than a full thirty-six and a half (36.5) metre vehicle.

The members of the Heavy Vehicle Working Party believe that providing a connection between the north and the south of Griffith is vital to the transport industry in the area. Significant upgrades would be required to achieve this if the route were to pass through Griffith however there is comparatively minor work required to allow access along a route around Griffith. Therefore the routes around Griffith will be prioritised to provide a

connection between the north and south of Griffith, with ongoing investigation being conducted into the best heavy vehicle route through Griffith.

The strategic heavy vehicle network was then developed based upon the outcomes of the engineering assessments, Road Train Trials and the input of the Heavy Vehicle Working Party. The network has also been prioritised based upon the level of work required to the route to ensure that it was suitable for heavy vehicle access and the input of the Heavy Vehicle Working Party.

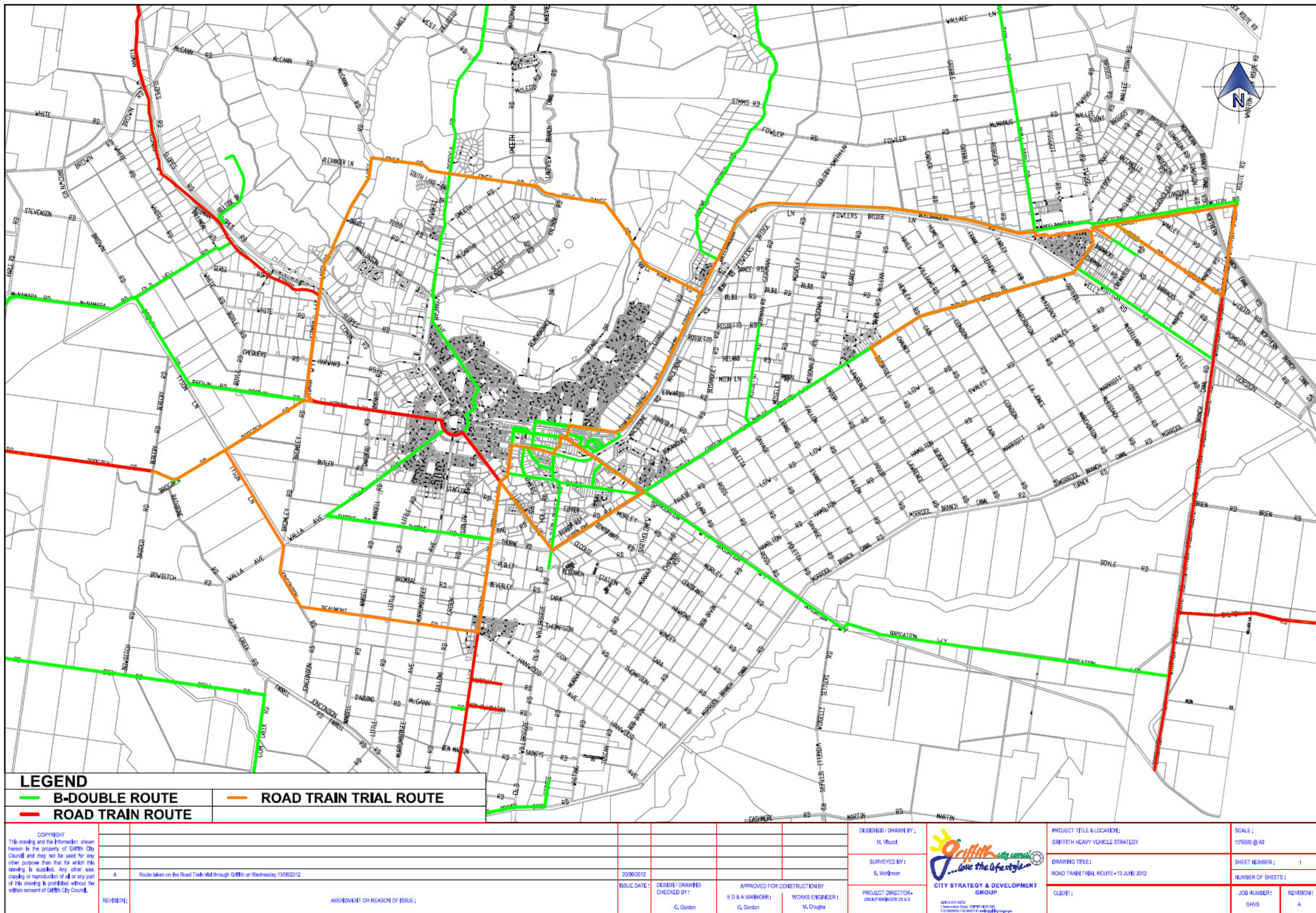


Figure 7 - Road Train Trial Route 2010

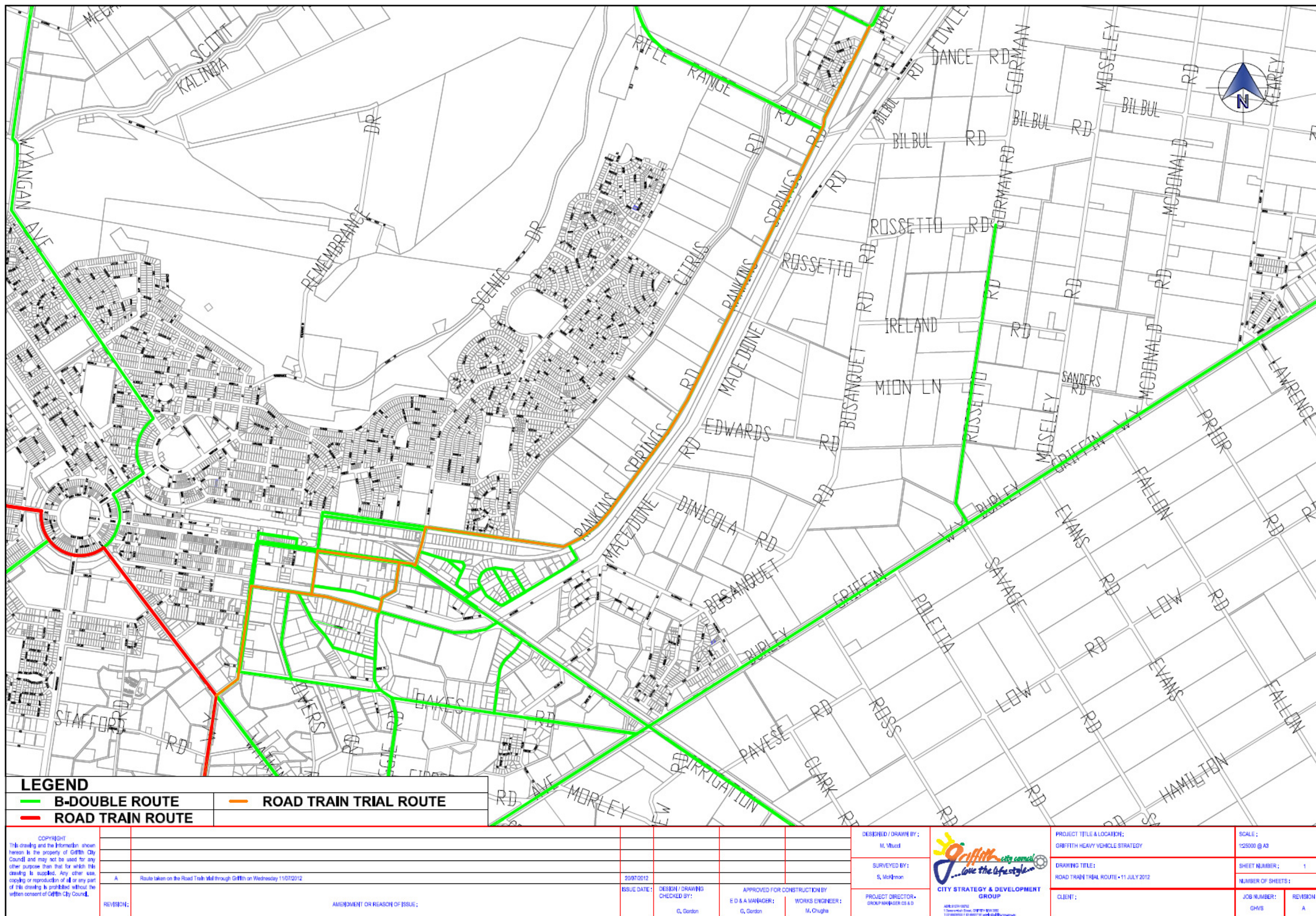


Figure 8 - Road Train Trial Route 2011

5. Network Analysis

The Griffith Heavy Vehicle Strategy employed a number of methods to identify and analyse potential heavy vehicle routes. The process involved identifying potential heavy vehicle attractors and generators and the formation of the Heavy Vehicle Working Party to assist with the needs of the industry. Engineering assessments and road train trials were conducted to analyse the proposed routes and determine their suitability. While the majority of routes identified were included as part of the strategy, a minority were not included for a number of reasons.

During the initial stages of the development of Griffith's Heavy Vehicle Strategy the Heavy Vehicle Working Party provided Council with a list of routes that they believed should be gazetted as either a Road Train or B-Double route to improve access around Griffith. The key routes identified by the transport operators included:

B-Doubles

- Old Willbriggie Rd – from Research Station Rd to Mirrool Branch Canal Rd;
- Murray Rd – Access to the Elders packing shed;
- Bob Irvin Rd – Access to Atkinson's Farm;
- Walla Avenue to Drew Rd – via Walla Ave and Bowditch Rd;
- White Rd;
- Access to West End Estate – via Merrigal St and Brayne Rd;
- Drew Rd – from Woodside Rd to Barber Rd; and
- Access from Koorringal Ave to Crossing St – via Binya St, Burrell Pl and Wakaden Street.

Road Trains

- By-Pass route from East to West;
- By-Pass route from North to South;
- Carrathool Shire to Baiada Poultry – via Rankins Springs Rd, Wakaden St, Crossing St, Bridge Rd and Jondaryan Ave;
- Carrathool Shire to Whitton Stock Route Rd – via Rankins Springs Rd, Beelbanger Rd, Twigg Rd and Burley Griffin Way;
- Yenda to Kidman Way – via Burley Griffin Way, Kurrajong Ave, Old Willbriggie Rd and Watkins Ave or Burley Griffin Way, Kurrajong Ave, Oakes Road, Lenehan Rd, Oakes Rd and Jondaryan Avenue;
- Access to the wineries, esp. De Bortoli's, Orlando's and Casella's;
- Brogden Rd;
- Hanwood to Brogden Rd – via Beaumont Rd, Joncondon Rd and Tyson Ln;
- Beelbanger Rd to Tharbogang – via Rifle Range Rd, Jones Rd and Lakes Rd;
- Beelbanger Rd to Hanwood – via Rankins Springs Rd, Wakaden St, Crossing St, Bridge Rd and Jondaryan Ave or Rankins Springs Rd, Wakaden St, Blumer Ave, Banna Ave, Lenehan Rd, Old Willbriggie Rd; and
- Carrathool Shire to Willandra Ave – via Boorga Rd, Wyangan Ave, Palla St, Koorringal Ave and Kookora St.

Engineering assessments of these routes were performed to determine their suitability. The engineering assessment determined very few of these routes were able to cater for either B-Doubles or Road Trains in their current condition. While the assessments identified that engineering works would be required for the majority of the identified network there were several routes which were discounted entirely. This was for a variety of reasons, based on the extent the heavy vehicles would impact upon amenity, road safety and network of the surrounding area. These routes included:

- Lake Wyangan to Central Griffith – the proposed Road Train route travelled along Boorga Road, Wyangan Avenue, Palla Street, Koorringal Avenue and Kookora Street to reach the existing Road Train network. The proposed route passed through significant pockets of residential area, including Lake Wyangan, North Griffith and Central Griffith. The effect road trains would have on the amenity and road safety through this area would have

been significant especially as the intersection treatments and several roads along the route cannot cater for Road Trains geometrically.

- Old Willbriggie Road – a proposed Road Train and B-Double Route which travelled along Old Willbriggie Road and Mirrool Branch Canal Road to provide an alternate southern route. The initial section of the route had previously been gazetted as a B-Double route the remainder of the road is in questionable condition, with the road shoulders on both sides very deteriorated and drainage and supply channels are located in close proximity to either side. In addition the route would create a parallel/default main road as the road would duplicate the majority of the Kidman Way between Griffith and Mirrool Branch Canal, creating an extra maintenance burden on Council and impact on the local traffic flows through the area.
- Griffith Central Business District – a number of Road Train routes were the Griffith's CBD, these included Banna Avenue, Lenehan Road, Crossing Street and Bridge Road. The proposed route passed through significant commercial and retail area in the CBD. The effect road trains would have on the amenity and road safety through this area would have been significant especially as the intersection treatments and several roads along the route cannot cater for Road Trains geometrically.
- Twigg Road – a Road Train route proposed to utilise Twigg Road through Yenda. There were several concerns regarding the route however the main detractor was the proximity between the intersection of Twigg Road with both the Burley Griffin Way and Beelbanger Road and the Temora-Roto railway line. A Road Train is unable to stop at one of these facilities without impacting on at least one other.
- North Griffith to East Griffith - the proposed B-Double route travelled along Binya Street, Burrell Place and Wakaden to reach the existing B-Double network. The entire route passes through residential area, including North Griffith and East Griffith. The effect road trains would have on the amenity and road safety through this area would have been significant especially as the intersection treatments and several roads along the route cannot cater for Road Trains geometrically.
- Yoogali Access – proposed B-Double routes along both Bob Irvin Road and Murray Road to provide access to businesses along these routes. The condition of either road is in questionable condition, with the road shoulders on both sides very deteriorated and the very narrow sealed pavement in poor condition.

Based upon these assessments these routes were not included into the heavy vehicle strategy. In addition, the majority of these routes had questionable value in the achievement of the strategy's goals.

The remaining routes were assessed to be of significant value strategically and have been included as part of the Heavy Vehicle Strategy.

6. Heavy Vehicle Network

The Heavy Vehicle Strategy has developed a coherent, safe network for heavy vehicles to travel around Griffith. The network provides access to the key industrial areas and businesses of Griffith to cater for both local and regional traffic. The Heavy Vehicle Strategy was developed with the assistance of Griffith City Council's Transport and Logistics Advisory Committee and the Heavy Vehicle Working Party.

The heavy vehicle network was categorised into B-Double and Road Train routes and includes both existing and proposed routes. Several of the proposed routes do not require upgrade works, while the remaining routes will require varying degrees of upgrade works to ensure safe access for Road Trains and B-Doubles along the route.

The routes identified as not requiring any upgrade work do not form any specific corridor which is easily identifiable. These routes however are concentrated in the south-western section of Griffith's Local Government area, covering sections of Tharbogang, Benerembah, Willbriggie and Hanwood. These routes can be gazetted as heavy vehicle routes without any work being completed. The works have been split into B-Double and Road Train gazettals.

- **B-Double Routes**
 - *Barber Road* – between Brogden Road and McNamara Road;
 - *Beaumont Road* – between the Kidman Way (MR 321) and Joncondon Rd;
 - *Bowditch Road* – between Gum Creek Road and Drew Road;
 - *Brown Road* – between the Kidman Way (MR 80) and White Road;
 - *Drew Road* – between Barber Road and Woodside Road;
 - *Joncondon Road* – between Beaumont Road and Walla Avenue;
 - *Old Well Road* – between the Kidman Way (MR 80) and Brown Road;
 - *Research Station Road* – 600 metres east of Old Willbriggie Road;
 - *Walla Avenue* – between Thorne Road and Gum Creek Road; and
 - *White Road* – from 600m south of Old Well Road to Tyson Road
- **Road Train Routes**
 - *Brogden Road* – between Brown Road and Badoco Road;
 - *Brown Road* – between the Kidman Way (MR 80) and Brogden Road;
 - *Coppard Road* – between the Kidman Way (MR 321) and Gum Creek Road;
 - *Cush Crescent* – between the Kidman Way and the Grain Storage Facility;
 - *Drew Road* – between Barber Road and Gum Creek Road;
 - *Gum Creek Road* – between Drew Road and Coppard Road; and
 - *Woodside Road* – between Drew Road and Brogden Road.

The remaining routes all require the completion of upgrade works prior to their gazettal as heavy vehicle routes. The works identified have been divided into two groups, which relate to the

- Priority 1 – short term (within 2-5 years)
- Priority 2 – long term (more than 5 years)

Council may consider seeking funding from other government agencies to assist in the completion of the Heavy Vehicle Strategy. It is evident that the implementation of the strategy will require a long term commitment for ongoing funding from Council.

6.1 Short Term Heavy Vehicle Network

The Road Train Trial determined that a number of infrastructure upgrades are required to the proposed network prior to being gazetted as a permanent Road Train route. There were, however several sections where either no upgrades or only minor works are required for Road Train access. These routes are focused into a northern and southern corridor and will form the basis of the heavy vehicle network.

6.1.1 Wood Road (Access to Casella's Winery)

Currently Wood Road is gazetted as a Road Train route between Whitton Stock Route Road and Casella's Winery heavy vehicle access. The gazetted section of Wood Road is an unsealed gravel road approximately 5.5 metres wide with a one way cross fall. This section of Wood Road is unsuitable for Road Train Travel in its current condition and this is amplified by the large volume of traffic Casella's receives during the vintage season.

Casella's Winery recently upgraded the section of Wood Road between the Burley Griffin Way and the heavy vehicle access into the winery. The upgraded section of Wood Road is suitable for heavy vehicles travel. Therefore the Road Train access to Casella's will be altered to reflect the suitability of the current road network. Therefore heavy vehicle access to Casella's will be via Whitton Stock Route Road, Burley Griffin Way and Wood Road and the existing route along Wood Road will be rescinded.

The intersection of Whitton Stock Route Road and the Burley Griffin Way will require minor works in order to allow heavy vehicle traffic. These works consist of the widening of the existing culvert on Whitton Stock Route Road and the widening of the intersection to accommodate the turning movements of a Road Train.

6.1.2 Southern Corridor

The southern corridor focuses on providing heavy vehicle access to the south of Griffith. The southern corridor will allow vehicles to access Benerembah and form a city bypass between the southern leg (MR 321) and western leg (MR 80) of the Kidman Way. The southern corridor includes:

- **Beaumont Road** – between the Kidman Way and Joncondon Road;
- **Joncondon Road** – between Beaumont Road and Walla Avenue;
- **Tyson Lane** – between Walla Avenue and Brogden Road;
- **Brogden Road** – between Tyson Lane and Brown Road;
- **Brown Road** – between Brogden Road and the Kidman Way;
- **Thorne Road** – between the Kidman Way (MR 321) and Walla Avenue; and
- **Walla Avenue** – between Kookora Street and Joncondon Road

Brogden Road shall be included as part of the heavy vehicle network between Bringagee Road and Brown Road.

There are several sections of the proposed corridor, which will require minor works in order to allow heavy vehicle traffic. These works include road upgrades and intersection treatments at key points along the route. These include:

One road upgrade required along the route.

- 1) **Tyson Lane**; between Walla Avenue and Brogden Road

The gravel section of Tyson Lane should be upgraded to a minimum width of seven (7) metres wide with 1.2 metre shoulders upon either side. Tyson Lane should be sealed however widening of the pavement to these dimensions should be undertaken as a minimum.

Four intersection treatments required along the route.

1) Tyson Lane and Walla Avenue

The intersection is currently too narrow to allow Road Trains safe access through the intersection. Therefore, treatment is required at the intersection to accommodate Road Trains.

2) Tyson Lane and Brogden Road

The intersection is currently too narrow to allow Road Trains safe access Tyson Lane. Therefore, Tyson Lane shall be widened at the intersection with Brogden Road, including both returns, to accommodate Road Trains.

3) Brogden Road and Brown Road

The intersection is currently too narrow to allow Road Trains to safely turn left into Brogden Road. Ultimately, intersection realignment and widening is required to accommodate Road Trains. Until this is completed, the centreline of Brogden Road should be moved three (3) metres to the west to accommodate the turning movements of a Road Train.

4) Kookora Street and Walla Avenue

The permanent introduction of Road Trains along the route will require the removal the existing medians controlling traffic at the intersection of Kookora Street and Walla Avenue. The removal of the medians will have a detrimental affect on the safety and amenity of the surrounding area. The removal of the medians will allow road trains to manoeuvre through the intersection effectively, however the medians have been installed at the intersection properly manage traffic through the intersection and assist in the reduction of accidents in the vicinity. The removal of the medians may allow road trains to utilise the intersection effectively however at the expense of the safety of smaller vehicles utilising the intersection.

These works will improve the safety and performance of heavy vehicles travelling along the proposed route. The upgrades listed shall be completed prior to the gazettal of the proposed route as a Road Train Route.

6.1.3 Northern Corridor

The northern corridor focuses on providing heavy vehicle access to the north of Griffith. The Northern corridor will connect the Burley Griffin Way (MR 84), Rankins Springs Road (MR 321 Regional) and the Kidman Way (MR 80). The northern corridor includes:

- **Burley Griffin Way** – between Whitton Stock Route Road and Railway Parade;
- **Railway Parade** – between the Burley Griffin Way and Myall Park Road;
- **Myall Park Road** – between Railway Parade and Beelbanger Road;
- **Beelbanger Road** – between Myall Park Road and Rankins Springs Road;
- **Rankins Springs Road** – between Griffith/Carrathool Shire Boundary and Rifle Range Road;
- **Rifle Range Road** – between Rankins Springs Road and Jones Road;
- **Jones Road** – between Rifle Range Road and Lakes Road; and
- **Lakes Road** – between Jones Road and the Kidman Way

Rankins Springs Road shall be included as part of the heavy vehicle network between the Council's boundary and

There are several sections of the proposed corridor which will require minor works in order to allow heavy vehicle traffic. These works include road upgrades and intersection treatments at key points along the route.

There are three road upgrades required along the route. They are:

- 1) Jones Road;** between Rifle Range Road and Boorga Road
The gravel section of Jones Road should be upgraded to a minimum width of seven (7) metres wide with 1.2 metre shoulders upon either side. Jones Road should be sealed however widening of the pavement to these dimensions should be undertaken as a minimum.
- 2) Jones Road;** between Boorga Road and Lakes Road
The existing causeway along Jones Road should be widened to accommodate two-way heavy vehicle traffic. Until this occurs, the causeway should be treated as a one way bridge.
- 3) Lakes Road;** between Jones Road and Mallinson Road
The gravel section of Lakes Road should be sealed to form a minimum seven (7) metre carriageway, with 1.2 metre gravel shoulders. Lakes Road should be sealed however widening of the pavement to these dimensions should be undertaken as a minimum.

There are four intersection treatments required along the route. They are:

- 1) Whitton Stock Route Road and the Burley Griffin Way**
The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Whitton Stock Route Road. Therefore intersection widening is required at both returns of the intersection to accommodate Road Trains.
- 2) Myall Park Road and Beelbanger Road**
The intersection is currently too narrow to allow Road Trains to safely turn left into Beelbanger Road. Therefore intersection widening is required at the south-western return of the intersection to accommodate Road Trains.
- 3) Rankins Springs Road and Rifle Range Road**
The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Rifle Range Road. Therefore intersection widening, including culverts, is required at both returns of the intersection to accommodate Road Trains.
- 4) Jones Road and Lakes Road**
The intersection is currently too narrow to allow Road Trains to safely turn left into Lakes Road. Therefore intersection widening is required at the south-eastern return of the intersection to accommodate Road Trains.

The intersection of Boorga Road and Jones Road will require significant upgrades as well even though the intersection was not identified as part of the engineering assessment or the Road Train Trial. Griffith City Council recently approved residential subdivisions north of Boorga Road, surrounding Lake Wyangan's north lake. The proposed subdivisions will

create approximately three hundred (300) additional lots, significantly increasing the amount of traffic travelling along Boorga Road. This combined with the anticipated increase in heavy vehicle traffic once the bypass is gazetted will require the intersection of Jones Road and Boorga Road to be upgraded to a rural roundabout.

These works will improve the safety and performance of heavy vehicles travelling along the proposed route. The upgrades listed shall be completed prior to the gazettal of the proposed route as a Road Train Route.

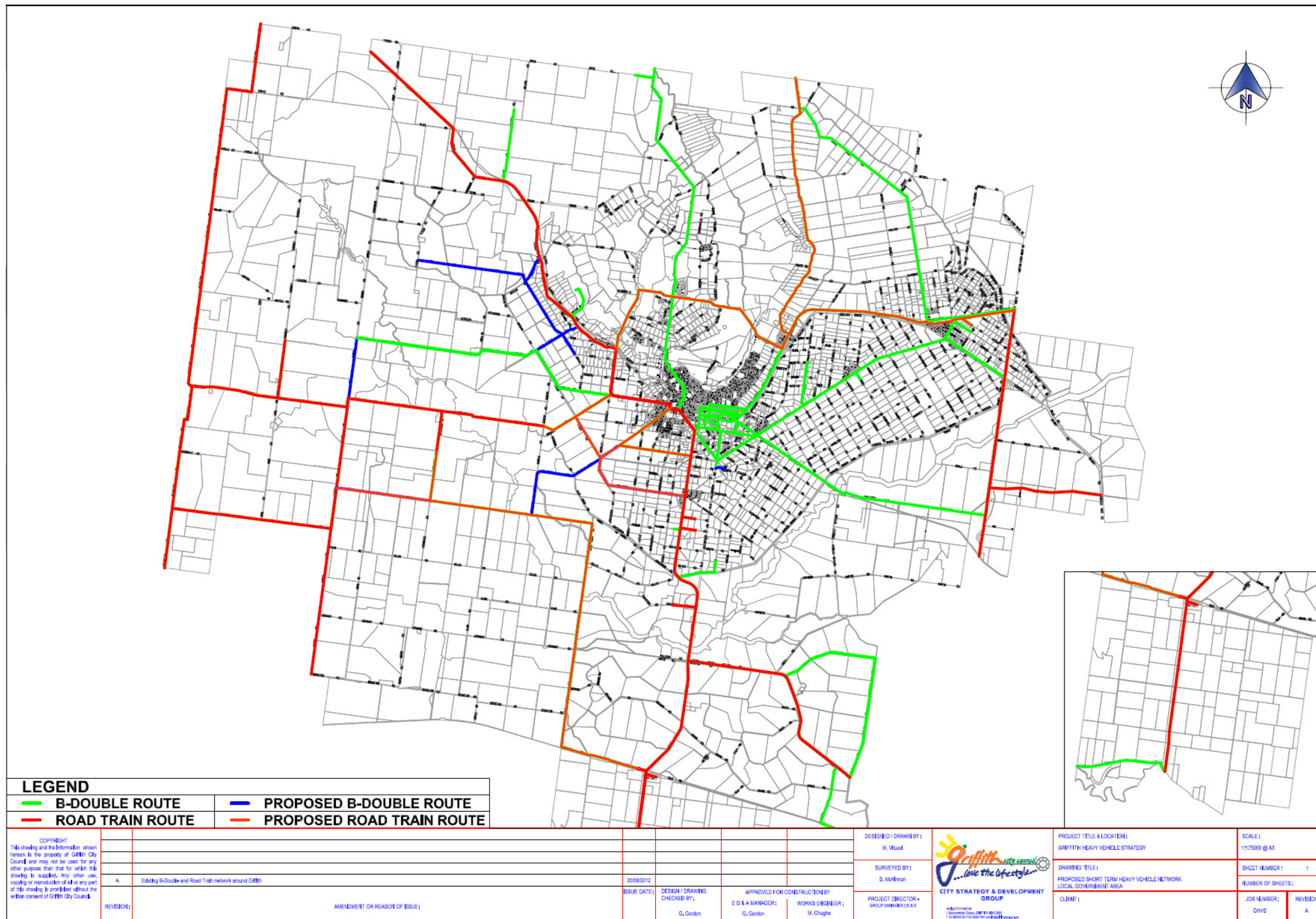


Figure 10 - Proposed Short Term Heavy Vehicle Network

6.2 Long Term Heavy Vehicle Network

The remaining routes trialled require significant upgrades to be completed prior to being gazetted as a Road Train Route. The focus of these routes is to expand upon the routes developed in the short term and provide more direct and efficient routes between the north, Yenda and Rankins Springs, and the south, Hanwood. These routes can be divided into three corridors, the Beelbanger Corridor, the Bilbul Corridor and the Southern Corridor.

6.2.1 Beelbanger Corridor

The Beelbanger corridor focuses on providing road train access to Rankins Springs from Griffith. The Beelbanger Corridor will connect Rankins Springs Road (MR 321 Regional) and Mackay Avenue (MR 80). The Beelbanger Corridor includes:

- **Rankins Springs Road** – between Griffith/Carrathool Shire Boundary and Wakaden Street;
- **Wakaden Street** – between the Rankins Springs Road and Blumer Avenue;
- **Blumer Avenue** – between Wakaden Street and Mackay Avenue;
- **Mackay Avenue** – between Blumer Avenue and Kurrajong Avenue; and
- **Irrigation Way** – between Burley Griffin Way and Whitton Stock Route Road

There are several sections of the proposed corridor which will require upgrade works in order to allow heavy vehicle traffic. These works include intersection treatments at key points along the route.

There are three intersection treatments required along the route. They are:

1) Mackay Avenue, the Burley Griffin Way, Kurrajong Avenue and the Irrigation Way

The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Burley Griffin Way or Kurrajong Avenue. Therefore, intersection widening is required at the intersection to accommodate Road Trains. Due to the proximity of the railway line to the intersection, north of Mackay Avenue and the perceived hazards at the intersection it is recommended that Traffic Control Signals be constructed at the intersection to increase the safety of all vehicles utilising the intersection.

2) Mackay Avenue and Blumer Avenue

The proximity of the railway line to the intersection north of Mackay Avenue does not allow Road Trains to safely utilise the intersection. Traffic Control Signals be constructed at the intersection to increase the safety of all vehicles utilising the intersection.

3) Wakaden Street and Blumer Avenue

The roundabout at the intersection currently does not cater for the right turn movement of Road Trains heading east along Wakaden Street from Blumer Avenue. Therefore alteration to the annulus of the roundabout should be altered to accommodate Road Trains.

These works will improve the safety and performance of heavy vehicles along the route and the gazettal of the route shall not take place prior to the works being completed.

6.2.2 Bilbul Corridor

The Bilbul Corridor focuses on providing road train access to Yenda from Griffith. The Bilbul Corridor will connect the Burley Griffin Way (MR 84) and Mackay Avenue (MR 80). The Bilbul Corridor includes:

- **Burley Griffin Way** – between Griffith/Carrathool Shire Boundary and Twigg Road;
- **Mirrool Avenue** – between Twigg Road and Whitton Street; and
- **Burley Griffin Way** – between Whitton Street and Mackay Avenue

There are several sections of the proposed corridor which will require upgrade works in order to allow heavy vehicle traffic. These works include an intersection treatment at a key point along the route.

There is one intersection treatment required along the route. These include:

1) **Mackay Avenue, the Burley Griffin Way, Kurrajong Avenue and the Irrigation Way**

The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Burley Griffin Way or Kurrajong Avenue. Therefore intersection widening is required at the intersection to accommodate Road Trains. Due to the proximity of the railway line to the intersection north of Mackay Avenue and the perceived hazards at the intersection it is recommended that Traffic Control Signals be constructed at the intersection to increase the safety of all vehicles utilising the intersection.

These works will improve the safety and performance of heavy vehicles along the route and the gazettal of the route should not take place prior to the works being completed.

6.2.3 Southern Corridor

The southern corridor focuses on providing heavy vehicle access to the south of Griffith. The southern corridor will connect the Burley Griffin Way (MR 84) and the Irrigation Way (MR 80) to the Kidman Way (MR 321). The southern corridor includes:

- **Kurrajong Avenue** – between Mackay Avenue and Old Willbriggie Road;
- **Old Willbriggie Road** – between Kurrajong Avenue and Watkins Avenue; and
- **Watkins Avenue** – between Old Willbriggie Road and the Kidman Way.

There are several sections of the proposed corridor which will require minor works in order to allow heavy vehicle traffic. These works include intersection treatments at key points along the route.

There are two intersection treatments required along the route. These include:

1) **Mackay Avenue, the Burley Griffin Way, Kurrajong Avenue and the Irrigation Way**

The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Burley Griffin Way or Kurrajong Avenue. Therefore intersection widening is required at the intersection to accommodate Road Trains. Due to the proximity of the railway line to the intersection north of Mackay Avenue and the perceived hazards at the intersection it is recommended that Traffic Control Signals be constructed at the intersection to increase the safety of all vehicles utilising the intersection.

2) Kurrajong Avenue, Old Willbriggie Road and Watkins Avenue

Road Trains currently cannot safely travel through the intersection due to the close proximity of the two T-intersections. A large rural roundabout is recommended for this intersection, this should also cater for the eventual construction of Thorne Road between Old Willbriggie Road and the Kidman Way as per the Southern Bypass.

These works will improve the safety and performance of heavy vehicles along the route and the gazettal of the route shall not take place prior to the works being completed.

6.2.3 Southern Corridor

The southern corridor focuses on providing heavy vehicle access to the south of Griffith. The southern corridor will connect the Burley Griffin Way (MR 84) and the Irrigation Way (MR 80) to the Kidman Way (MR 321). The southern corridor includes:

- **Kurrajong Avenue** – between Mackay Avenue and Old Willbriggie Road;
- **Old Willbriggie Road** – between Kurrajong Avenue and Watkins Avenue; and
- **Watkins Avenue** – between Old Willbriggie Road and the Kidman Way.

There are several sections of the proposed corridor which will require minor works in order to allow heavy vehicle traffic. These works include intersection treatments at key points along the route.

There are two intersection treatments required along the route. These include:

1) Mackay Avenue, the Burley Griffin Way, Kurrajong Avenue and the Irrigation Way

The intersection is currently too narrow to allow Road Trains to safely turn left into or out of Burley Griffin Way or Kurrajong Avenue. Therefore intersection widening is required at the intersection to accommodate Road Trains. Due to the proximity of the railway line to the intersection north of Mackay Avenue and the perceived hazards at the intersection it is recommended that Traffic Control Signals be constructed at the intersection to increase the safety of all vehicles utilising the intersection.

2) Kurrajong Avenue, Old Willbriggie Road and Watkins Avenue

Road Trains currently cannot safely travel through the intersection due to the close proximity of the two T-intersections. A large rural roundabout is recommended for this intersection, this should also cater for the eventual construction of Thorne Road between Old Willbriggie Road and the Kidman Way as per the Southern Bypass.

These works will improve the safety and performance of heavy vehicles along the route and the gazettal of the route shall not take place prior to the works being completed.

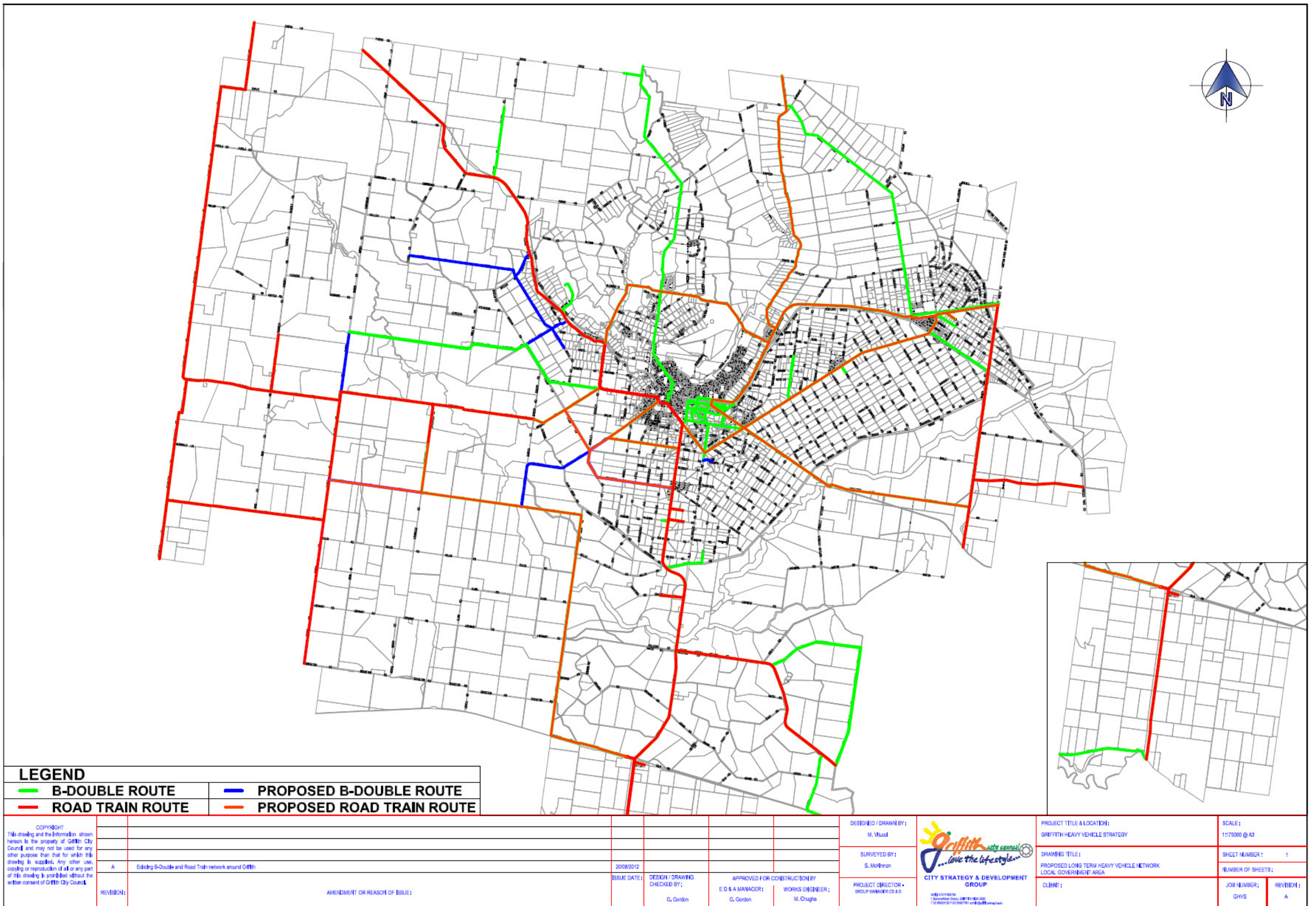


Figure 11 - Proposed Long Term Heavy Vehicle Network

6.3 Griffith By-Pass

Key objectives of the Heavy Vehicle Strategy are to reduce the number of heavy vehicles travelling within the CBD and residential areas of Griffith. The strategy has developed network which achieves these objectives using the existing road network, however as a long term strategy the development of a by-pass around Griffith to satisfy the objectives of the strategy would be preferable.

Council has conducted several traffic studies in the past which have addressed in passing the development of a by-pass around Griffith. These studies identified several possible options for the by-pass including a southern by-pass, a northern by-pass and a Yenda by-pass. Usually several alternative routes are considered for a by-pass, however based upon Council's research the most beneficial location for the by-pass is to the south of Griffith.

6.3.1 Southern Bypass

The proposed southern by-pass would generally utilise the existing road network. Significant upgrading would be required along several sections of the route to ensure the route is suitable for road train traffic. The proposed southern by-pass will cater for the majority of movements conducted by heavy vehicle traffic through Griffith; east, west and south. The by-pass would significantly reduce the traffic pressure on Willandra Avenue and Watkins Avenue and reduce the amount of traffic entering the CBD of Griffith as they travel along the Kidman Way, Burley Griffin Way and Irrigation Way.

The proposed route for the southern by-pass has previously been identified in several different studies undertaken by Griffith City Council. Road Trains and eventually B-Triples will travel along the proposed southern by-pass. Therefore sections of the proposed by-pass will require significant upgrades to ensure that the network can cater for the size and volume of traffic which will ultimately utilise the southern by-pass. The proposed route and associated works include;

- **Kurrajong Avenue;** between Irrigation Way (MR 80) and Old Willbriggie Road;
 - The intersection of Kurrajong Avenue, Irrigation Way, Burley Griffin Way and Mackay Avenue should be upgraded to traffic control signals; and
 - The intersection of Kurrajong Avenue, Old Willbriggie Road, Watkins Avenue and Thorne Road is required to be upgraded to a rural roundabout.
- **Thorne Road;** between Old Willbriggie Road and Bromley Road;
 - Thorne Road between Old Willbriggie Road and the Kidman Way is currently an unformed section of road. This section of road will be required to be constructed to a suitable standard;
 - The intersection of Thorne Road and the Kidman Way will be required to be upgraded to cater for the additional traffic that will utilise the by-pass and the new section of Thorne Road;
 - The intersection of Thorne Road and Walla Avenue will be required to be upgraded to cater for the additional traffic that will utilise the by-pass and the new section of Thorne Road; and
 - Thorne Road currently terminates at Walla Avenue not Bromley Road. Council will be required to acquire a portion of Lot 882 DP 751709 to continue Thorne Road through to Bromley Road. This section of road and the intersection with Bromley Road will be required to be constructed to a suitable standard.
- **Bromley Road;** between Thorne Road and Brown Road;
 - Bromley Road is currently an unsealed gravel road. This section of road will be required to be constructed and sealed to a suitable standard; and
 - The intersection of Bromley Road, Brown Road and Brogden Road is required to be upgraded to cater for the additional traffic that will utilise the by-pass.
- **Brown Road;** between Bromley Road and the Kidman Way

Council received a submission from the community regarding the alteration of the proposed Southern Bypass to include a new road connection between Old Willbriggie Road and Kidman Way approximately two hundred (200) metres south of Pedley Road. The proposed alteration would service the potential future development of a tourist facility and truck service centre located at the western end of the proposed new road.

The proposed route will require the construction of a new road capable of accommodating heavy vehicles and acceptable treatments for the road's intersections with the Kidman Way and Old Willbriggie Road. The proposed route will also require treatment of Old Willbriggie Road between Kurrajong Avenue and the new road. These works are in addition to those already required above as part of the Southern Bypass.

The assessment of the alternate route determined that the proposal added little to no benefit to the Southern Bypass. The proposed route detours vehicles away from the most direct path of travel decreasing the efficiency of the bypass. Vehicles taken away from the direct path of travel are more likely to take short cuts or get lost, therefore the proposed route will almost certainly increase the number of restricted access vehicles travelling off route. The alternate route does not negate the need for the intersection treatments and the majority of road works identified above but requires the upgrade of Old Willbriggie Road and additional intersection treatments on the Kidman Way and Old Willbriggie Road in addition to these works. The additional road works required as part of the proposed alternate route will increase the cost of the Southern Bypass significantly.

Based upon the above factors the proposed alternate route was not included as part of the Southern Bypass, as the route provided little to no benefit to function or efficiency of the bypass and would only benefit the potential future development of a tourist facility and truck service centre. It is advised that the investigation into providing the alternate route be revisited once the proposed tourist facility and truck service centre reaches development application stage.

6.3.2 Northern Bypass

The northern or Yenda by-pass has effectively been achieved through the provision of the Northern, Bilbul and Beelbangera corridors identified in the short- and long-term strategies. These corridors effectively create a northern bypass for vehicles travelling through Griffith. In addition to these corridors, the identification of a possible route through the Bilbul and Beelbangera areas to develop a more direct route around Griffith may be required in the future.

A preliminary route through the Bilbul and Beelbangera area has been identified along Rossetto Road, Gorman Road and Bilbul Road which is required to be extended to form a four way intersection with Rankins Springs Road and Rifle Range Road. Due to the restricted width and service locations present along the proposed route there will be large costs associated with the routes construction to ensure it is suitable for Road Train access. The provision of this link creates completes the bypass around the city of Griffith and will benefit the freight transport across the region. The proposed northern bypass route and associated works include;

- **Lakes Road;** between Kidman Way (MR 80) and Jones Road;
 - Lakes Road is required to be constructed and sealed to a suitable standard; and
 - The intersection of Jones Road and Lakes Road should be upgraded to cater for the additional traffic that will utilise the by-pass.
- **Jones Road;** between Lakes Road and Rifle Range Road;
 - The existing causeway along Jones Road should be widened to accommodate two-way heavy vehicle traffic; and
 - Jones Road is required to be constructed and sealed to a suitable standard.

- **Rifle Range Road;** between Jones Road and Rankins Springs Road (MR 321 Regional);
 - The intersection of Rifle Range Road, Rankins Springs Road and Bilbul Road should be upgraded to cater for the additional traffic that will utilise the by-pass.
- **Bilbul Road;** between Rankins Springs Road (M R321 Regional) and Gorman Road;
 - Bilbul Road should be extended to meet Rifle Range Road at Rankins Springs Road. This will require the construction of a channel crossing and a railway level crossing; and
 - Bilbul Road is required to be constructed and sealed to a suitable standard.
- **Gorman Road;** between Bilbul Road and Rossetto Road;
 - Gorman Road is required to be constructed and sealed to a suitable standard; and
 - The intersection of Gorman Road and Bilbul Road should be upgraded to cater for the additional traffic that will utilise the by-pass.
- **Rossetto Road;** between Gorman Road and Burley Griffin Way (MR 84);
 - Rossetto Road is required to be reconstructed and sealed to a suitable standard; and
 - The intersection of the Burley Griffin Way (MR 84) and Rossetto Road should be upgraded to cater for the additional traffic that will utilise the by-pass.

The provision of the Bypasses corresponds well with the ultimate relocation of the Griffith Freight Terminal to a location east of Griffith. The relocation of the freight terminal will result in the transfer of heavy vehicle traffic from Griffith's Central Business District to the new site. As the majority of freight will no longer travel within Griffith once the freight terminal is relocated, the bypasses will allow heavy vehicles to travel around Griffith without entering the city.

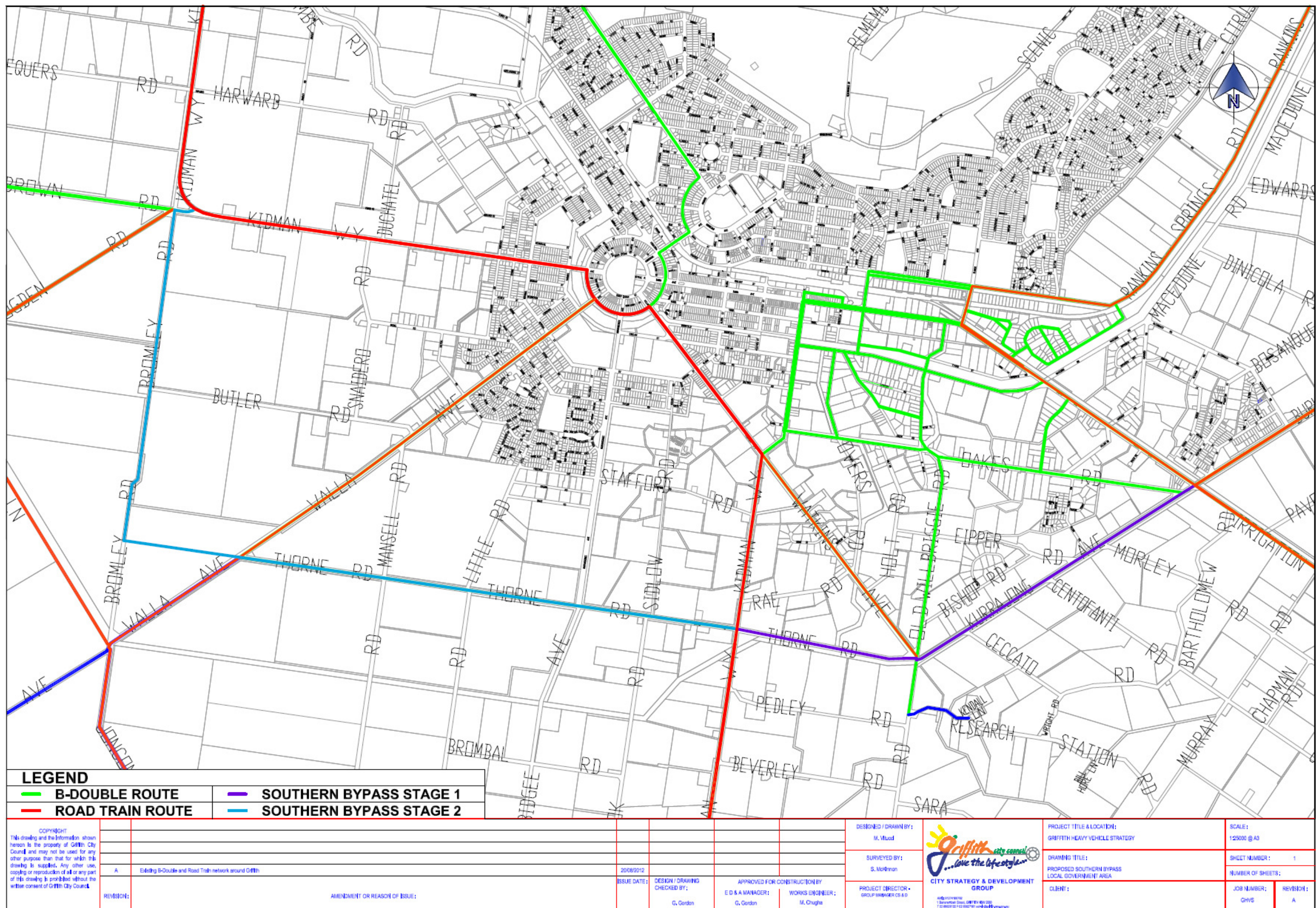


Figure 12 - Proposed Southern Bypass

7. Implementation Strategy

The heavy vehicle network identified by the Griffith Heavy Vehicle Strategy can be achieved through the staged implementation of gazettals and engineering actions. These actions have been divided into three separate stages, with the initial stage involves gazetting the routes which do not require any engineering actions to occur. The second stage focuses on providing the city's most important heavy vehicles links, such as the connecting the north and south of the city, in the short term and involves completing the engineering actions to achieve this. The final stage is focused on the development of the accessibility, directness and connectivity of Griffith's heavy vehicle network in the long term and involves the completion of the remaining engineering actions. The Griffith Bypass also forms part of the final stage.

The implementation strategy was developed with the assistance of the Heavy Vehicle Working Party; this ensured that the needs of the transport sector were properly addressed with the development of the network. The implementation strategy has been separated in to the following categories, the Short Term Heavy Vehicle Network which includes Wood Road, the Southern Corridor and the Northern Corridor; the Long Term Heavy Vehicle Network which includes the Beelbanger Corridor, the Bilbul Corridor and the Southern Corridor; and the Griffith Bypass which includes the Southern Bypass and the Northern Bypass. The implementation strategy provides a suitable framework for the engineering actions required to develop Griffith's Heavy Vehicle network. The initial step Council is to take is the gazettal of the proposed routes which do not require any upgrade works to occur.

Table 1 - Prioritised Engineering Actions

| Priority | Road | From | To | Route Type | Engineering Actions |
|----------|------------------------------|--------------------|---------------------------------|------------|---|
| | Barber Road | Brogden Rd | McNamara Rd | B-Double | |
| | Beaumont Road | Kidman Way | Joncondon Rd | B-Double | |
| | Bowditch Road | Gum Creek Rd | Drew Rd | B-Double | |
| | Brown Road | Whites Rd | Kidman Way | B-Double | |
| | Coppard Road | Kidman Way | Gum Creek Rd | Road Train | |
| | Cush Crescent | Kidman Way | Railway Siding | Road Train | |
| | Drew Road | Woodside Rd | Barber Rd | B-Double | |
| | Drew Road | Gum Creek Rd | Barber Rd | Road Train | |
| | Gum Creek Road | Drew Rd | Coppard Rd | Road Train | |
| | Joncondon Road | Beaumont Rd | Walla Ave | B-Double | |
| | Old Well Road | Kidman Way | Brown Rd | B-Double | |
| | Research Station Road | Old Willbriggie Rd | 680m East of Old Willbriggie Rd | B-Double | |
| | Walla Avenue | Thorne Rd | Gum Creek Rd | B-Double | |
| | White Road | Brown Rd | Tyson Rd | B-Double | Access to or from White Road Prohibited |

| Short Term Network | | | | | |
|--------------------------|-----------------------------|---------------------------------|---------------------------------------|------------|---|
| <i>Wood Road</i> | | | | | |
| 1 | Burley Griffin Way | Whitton Stock Route Rd | Twigg Rd | Road Train | Intersection Upgrade Whitton Stock Route Road |
| 2 | Wood Road | Burley Griffin Way | 850m East of Burley Griffin Way | Road Train | Intersection Upgrade Burley Griffin Way |
| 3 | Wood Road | 850m East of Burley Griffin Way | Whitton Stock Route Rd | Road Train | Rescind Gazettal |
| <i>Southern Corridor</i> | | | | | |
| 4 | Beaumont Road | Kidman Way | Joncondon Rd | Road Train | |
| 5 | Joncondon Road | Beaumont Rd | Walla Ave | Road Train | Intersection Upgrade Walla Avenue |
| 6 | Tyson Lane | Walla Ave | Brogden Rd | Road Train | Intersection Upgrade Road Upgrade |
| 7 | Brogden Road | Badoco Rd | Brown Rd | Road Train | Intersection Realignment Brown Road |
| 8 | Brown Road | Kidman Way | Brogden Rd | Road Train | |
| 9 | Thorne Road | Kidman Way | Walla Ave | Road Train | |
| 10 | Walla Avenue | Kookora St | Thorne Rd | Road Train | Intersection Upgrade Kookora Street |
| <i>Northern Corridor</i> | | | | | |
| 11 | Mirrool Avenue | Twigg Rd | Whitton St | Road Train | |
| 12 | Burley Griffin Way | Whitton St | De Bortoli Road | Road Train | Intersection Upgrade DeBortoli Road |
| 13 | DeBortoli Road | Burley Griffin Way | Southern entrance to DeBortoli Winery | Road Train | Intersection Upgrade Burley Griffin Way |
| 14 | Railway Parade | Myall Park Rd | Mirrool Ave | Road Train | Intersection Upgrade Myall Park Road |
| 15 | Myall Park Road | Beelbangera Rd | Railway Pde | Road Train | Intersection Upgrade Beelbangera Road & Myall Park Road |
| 16 | Beelbangera Road | Rankins Springs Rd | Myall Park Road | Road Train | Intersection Upgrade Myall Park Road |
| 17 | Rankins Springs Road | Rifle Range Rd | Griffith/Carr athool Shire Boundary | Road Train | Intersection Upgrade Rifle Range Road |
| 18 | Rifle Range Road | Rankins Springs Rd | McCarthy Rd | Road Train | Intersection Upgrade Rankins Springs Road |
| 19 | Jones Road | Lakes Rd | McCarthy Rd | Road Train | Intersection Upgrade Boorga Road & Jones Road. Causeway Upgrade |

| | | | | | |
|----------------------------|----------------------|--------------------|------------------------|------------|--|
| 20 | Lakes Road | Kidman Way | Jones Rd | Road Train | Intersection Upgrade Jones Road. Road Upgrade |
| Long Term Network | | | | | |
| <i>Beelbanger Corridor</i> | | | | | |
| 21 | Rankins Springs Road | Wakaden St | Rifle Range Rd | Road Train | Intersection Upgrade Rifle Range Road |
| 22 | Wakaden Street | Blumer Ave | Rankins Springs Rd | Road Train | Intersection Upgrade Blumer Avenue |
| 23 | Blumer Avenue | Banna Ave | Wakaden St | Road Train | Intersection Upgrade Wakaden Street |
| 24 | Mackay Avenue | Blumer Ave | Burley Griffin Way | Road Train | Intersection Upgrade Burley Griffin Way |
| <i>Bilbul Corridor</i> | | | | | |
| 25 | Burley Griffin Way | DeBortoli Rd | Mackay Avenue | Road Train | Intersection Upgrade Mackay Avenue |
| 26 | Irrigation Way | Burley Griffin Way | Whitton Stock Route Rd | Road Train | Intersection Upgrade Burley Griffin Way Road Upgrade Widgelli S-Bends |
| <i>Southern Corridor</i> | | | | | |
| 27 | Kurrajong Avenue | Mackay Ave | Old Willbriggie Rd | Road Train | Intersection Upgrade Mackay Avenue & Old Willbriggie Road |
| 28 | Old Willbriggie Road | Kurrajong Ave | Watkins Ave | Road Train | Intersection Upgrade Kurrajong Avenue |
| 29 | Watkins Avenue | Jondaryan Ave | Old Willbriggie Rd | Road Train | Intersection Upgrade Old Willbriggie Road & Jondaryan Avenue |
| Griffith Bypass | | | | | |
| <i>Southern Bypass</i> | | | | | |
| 30 | Thorne Road | Old Willbriggie Rd | Kidman Way | Road Train | Intersection Upgrade Old Willbriggie Road & Kidman Way. Road Construction |
| 31 | Thorne Road | Walla Ave | Bromley Rd | Road Train | Intersection Upgrade Kidman Way & Walla Avenue. Road Construction |
| 32 | Bromley Road | Thorne Rd | Brown Rd | Road Train | Intersection Upgrade Brown Road. Road Upgrade |
| <i>Northern Bypass</i> | | | | | |
| 33 | Bilbul Road | Rankins Springs Rd | Macedone Rd | Road Train | Intersection Upgrade Rankins Springs Road. Road Construction |
| 34 | Bilbul Road | Macedone Rd | Gorman Rd | Road Train | Intersection Upgrade Gorman Road. Road Upgrade |

| | | | | | |
|----|----------------------|-----------|--------------------|------------|--|
| 35 | Gorman Road | Bilbul Rd | Rossetto Rd | Road Train | Intersection Upgrade Bilbul Road. Road Upgrade |
| 36 | Rossetto Road | Gorman Rd | Burley Griffin Way | Road Train | Intersection Upgrade Burley Griffin Way. Road Upgrade |

The gazettal of the routes identified as part of the Heavy Vehicle Strategy hinge upon the completion of the engineering actions identified above as part of the key network or individual works identified as part of the assessment process. The staging and implementation of any strategic plan is dependent on the availability of funding.

7.1 Funding Sources

The staging and implementation of any strategic plan is dependent on the availability of funding. Securing funding ensures implementation of the plan and subsequent monitoring of its success. Griffith City Council currently funds projects out of a combination of the community rates and external funding from various sources most significantly the NSW Roads and Maritime Services.

The implementation of the heavy vehicle routes, Road Train or B-Double, requires the adoption of the Heavy Vehicle Strategy by Griffith City Council. The development of individual projects identified by the strategy will require the allocation of Council funding and resources. Preliminary costings of the proposed works have been completed by Council, they are detailed below.

Table 2 - Preliminary Costings

| Road | Engineering Actions | Cost |
|---------------------------|---|----------------|
| Short Term Network | | |
| <i>Wood Road</i> | | |
| Burley Griffin Way | Construction of a Basic Left Turn (BAL) Intersection Treatment for the turns into and out of Whitton Stock Route Rd | \$150,000.00 |
| Wood Road | | |
| Wood Road | Rescind Road Train and B-Double Gazettal | |
| <i>Southern Corridor</i> | | |
| Beamont Road | | |
| Joncondon Road | Construction of Basic Right and Left Turn (BAR & BAL) Intersection Treatments for the intersection of Joncondon Road, Walla Avenue and Tyson Lane | \$300,000.00 |
| Tyson Lane | Reconstruction and sealing of the road carriageway to a suitable pavement depth and width | \$1,800,000.00 |
| | Construction of a Basic Left Turn (BAL) Intersection Treatment for the turns into and out of Brogden Rd | \$150,000.00 |
| Brogden Road | Realignment of Brogden Road and widening of Brown Road to form a BAL Intersection Treatment | \$150,000.00 |
| Brown Road | | |
| Thorne Road | | |
| Walla Avenue | Intersection Treatment of Kookora Street and Walla Ave, Roundabout | \$300,000.00 |

| | | |
|-----------------------------|--|----------------|
| <i>Northern Corridor</i> | | |
| Mirrool Avenue | | |
| Burley Griffin Way | | |
| DeBortoli Road | Construction of a Basic Left Turn (BAL) Intersection Treatment for the turns into and out of De Bortoli Rd. (Part of works to improve DeBortoli Road being conducted by De Borotli's Winery) | \$800,000.00 |
| Railway Parade | Intersection widening at Myall Park Road | \$100,000.00 |
| Myall Park Road | Construction of a Basic Left Turn (BAL) Intersection Treatment for the turn into Beelbanger Rd | \$150,000.00 |
| Beelbanger Rd | | |
| Rankins Springs Road | Construction of a Channelised Intersection Treatment for the turns into and out of Rifle Range Rd | \$300,000.00 |
| Rifle Range Road | | |
| Jones Road | Reconstruction and sealing of the road carriageway, between Rifle Range Rd and Boorga Rd, to a suitable pavement depth and width | \$1,000,000.00 |
| | Signposting the causeway along Jones Rd as a one way bridge | \$500.00 |
| | Construction of a Basic Left Turn (BAL) Intersection Treatment for the turn into and out of Lakes Rd | \$150,000.00 |
| Lakes Road | Reconstruction and sealing of the road carriageway, between Jones Rd and Mallinson Rd, to a suitable pavement depth and width | \$1,500,000.00 |
| Long Term Network | | |
| <i>Beelbanger Corridor</i> | | |
| Rankins Springs Road | | |
| Wakaden Street | Construction of a mountable reinforced concrete annulus around the roundabout to cater for the turning circle of a Road Train | \$50,000.00 |
| Blumer Avenue | | |
| Mackay Avenue | Construction of Traffic Control Signals synched with the railway line north of Mackay Avenue. Includes the construction of a Basic Left Turn (BAL) Intersection Treatment for the turn into and out of Kurrajong Ave | \$4,000,000.00 |
| <i>Bilbul Corridor</i> | | |
| Burley Griffin Way | | |
| Irrigation Way | Realignment of the S-Bends at Widgelli | \$2,000,000.00 |
| <i>Southern Corridor</i> | | |
| Kurrajong Avenue | Construction of a rural roundabout encompassing Kurrajong Ave, Old Willbrigg Rd, Watkins Ave and Thorne Rd | \$2,000,000.00 |
| Old Willbrigg Rd | | |
| Watkins Avenue | Widening of the south-eastern kerb return, between the Kidman Way and Watkins Ave, to allow for the left turn movement out of Watkins Ave | \$50,000.00 |

| Griffith Bypass | | |
|------------------------|--|------------------------|
| <i>Southern Bypass</i> | | |
| Thorne Road | Reconstruction and sealing of the road carriageway, between Old Willbriggie Rd and Kidman Way, to a suitable pavement depth and width | \$2,000,000.00 |
| | Construction of a rural roundabout encompassing Kidman Way and Thorne Rd | \$2,000,000.00 |
| | Construction of a Channelised Intersection Treatment for the Walla Ave and Thorne Rd Intersection | \$500,000.00 |
| Thorne Road | Construction and sealing of the road carriageway, between Walla Avenue and Bromley Rd, to a suitable pavement depth and width. Will include the acquisition of Lot 882 DP 751709 to continue the road | \$2,500,000.00 |
| | Construction of a Channelised Intersection Treatment for the Bromley Road and Thorne Road Intersection | \$700,000.00 |
| Bromley Road | Reconstruction and sealing of the road carriageway, between Walla Ave and Brown Rd, to a suitable pavement depth and width | \$2,500,000.00 |
| | Intersection Treatment encompassing Brogden Rd, Brown Rd and Bromely Rd | \$1,500,000.00 |
| <i>Northern Bypass</i> | | |
| Bilbul Road | Construction of a rural roundabout encompassing Rifle Range Rd, Rankins Springs Rd and Bilbul Rd | \$1,500,000.00 |
| | Construction and sealing of the road carriageway, between Macedone Rd and Rankins Springs Rd, to a suitable pavement depth and width. Will include the acquisition of Lot 553 DP 751743 to continue the road and the construction of an additional channel crossing and railway level crossing | \$4,000,000.00 |
| Bilbul Road | Reconstruction and sealing of the road carriageway, between Macedone Rd and Gorman Rd, to a suitable pavement depth and width | \$1,500,000.00 |
| | Construction of a Channelised Intersection Treatment for the Bilbul Rd and Gorman Rd Intersection | \$800,000.00 |
| Gorman Road | Reconstruction and sealing of the road carriageway, between Macedone Rd and Gorman Rd, to a suitable pavement depth and width | \$700,000.00 |
| Rossetto Road | Reconstruction and sealing of the road carriageway, between Burley Griffin Way and Gorman Rd, to a suitable pavement depth and width | \$2,000,000.00 |
| | Construction of a Channelised Intersection Treatment for the Rossetto Rd and Burley Griffin Way Intersection | \$500,000.00 |
| Total | | \$37,350,500.00 |

The implementation of the Heavy Vehicle Strategy will cost in excess of \$37million. Given Griffith City Council limited budget and the scope of the proposed works alternate funding sources are required for the implementation of the strategy. Potential funding sources have been identified by Griffith City Council Staff. Possible funding sources for the recommended works include the following:

- Developers of new projects within Griffith LGA;
- NSW Roads and Maritime Services;
- Transport for NSW;
- NSW Department of Trade and Investment, Regional Infrastructure and Services;

- Australian Trucking Association;
- Australian Road Transport Suppliers Association;
- Australian Livestock and Rural Transporters' Association;
- National Transport Commission;
- Commonwealth Department of Infrastructure and Transport; and
- Commonwealth Department of Regional Australia, Local Government, Arts and Sport.

The implementation of the Heavy Vehicle Strategy is subject to funding and comprehensive scoping of the proposed works. The action plan is a schedule of works and indicates prioritised items that can be implemented by Council as funds become available.

8. Conclusion

The freight industry forms an important part of the national, regional and local economies of Australia, playing an especially vital role in the agricultural and manufacturing industries. Australia's freight task is expected to increase dramatically in the near future, supposedly almost doubling by 2020. The complexity of transporting freight is also expected to increase, with both urban and rural industries adapting to incorporate more efficient ways to work and increasing freight's role in the production process. The evolution of Australia's industries has resulted in a shift of the nation's freight pattern impacting upon the travel and loads of the heavy vehicles on the roads.

The introduction of the higher productivity vehicles, such as B-Doubles and Road Trains, to the road network and freight task is generally beneficial however the use of unsuitable roads by heavy vehicles can lead to several complications. These complications can include infrastructure damage, increased infrastructure maintenance costs and a decline of the safety of the road network for all road users. Therefore to ensure that the introduction of the higher productivity vehicles into the freight network is suitable all proposed routes are required to be assessed to ensure that it meets criteria developed by Austroads, state government agencies and local councils.

In order to properly manage the impact of higher productivity vehicles and ensure that the proposed freight network is suitable for these vehicles there is a need to plan for their introduction. Griffith City Council has recognised this and has commissioned the development of a heavy vehicle strategy, focusing on B-Doubles and Road Trains, for Griffith and the surrounding area. The strategy will briefly consider the impact of the larger combinations, B-Triples, AB-Triples and BAB-Quads; however there are still a number of concerns regarding the actual impact these vehicles will have on the local road network.

The Griffith area generates in excess of 250,000 tonnes of road freight annually, in addition to this a further 36,000 containers of produce are currently transported from Patrick Port Logistics Intermodal Freight Terminal situated in Griffith's Central Business District with this volume expected to grow. The transport industry has been investing heavily in developing measures to combat the increasing running costs of heavy vehicles, the decreasing numbers of transport operators across Australia, increase heavy vehicle access and transport efficiency throughout Griffith.

Griffith's current heavy vehicle network requires greater connectivity between the existing Road Train and B-Double routes. Due to the nature of the freight task in Griffith heavy vehicles are required to transport freight across the city; therefore heavy vehicles are required to either break the combination down to individual trailers or travel an inefficient route to reach the destination. The strategy aims to increase the connectivity of Griffith's heavy vehicle network and improve the access between the freight generators and attractors.

Griffith City Council formed the Heavy Vehicle Working Party in October 2011 to assist Council staff with the development of the heavy vehicle network for Griffith and to provide the transport industries perspective on the issues identified. The Heavy Vehicle Working Party's main role was the identification of heavy vehicle routes through Griffith, which would be the most beneficial to the transport industry. This involved additions to Griffith's B-Double and Road Train route network to improve their access through the city, especially the Road Train network. The Heavy Vehicle Working Party assisted in the development of an effective heavy vehicle strategy for Griffith. The strategy addresses the transport industries concerns regarding access around Griffith and Council's concerns regarding the suitability and performance of the local road network if heavy vehicles are allowed continued access.

During the initial stages of the development of Griffith's Heavy Vehicle Strategy, the heavy vehicle generators and attractors around the area were identified. These included the many wineries, pack houses, grain silos/receiving points and various other industries located around Griffith. The identification of these generators and attractors determined the level of heavy vehicle access that existed in an area and whether additional access would be required.

The Heavy Vehicle Working Party was formed by Council's Transport and Logistics Committee to assist with this process. The Heavy Vehicle Strategy focuses on providing the future transport needs of Griffith and the surrounding area, by commissioning the gazettals, engineering actions and recommendations required to complete the network. Engineering assessments of the potential heavy vehicle routes will provide the basis for determining the suitability of the proposed routes. The strategic heavy vehicle network and an action plan for its implementation will be developed utilising the engineering assessments conducted on the proposed routes throughout Griffith. The assessments consider a variety of issues relevant to the heavy vehicle travel, these include:

- **Environment and Community Amenities**
 - *Amenity*
 - *Noise*
 - *Impact on the Existing Road Network*
- **Dimensional Capacity**
 - *Lane and Shoulder Widths*
 - *Railway Crossings and Adjacent Intersections*
 - *Terminals*
- **Road Safety and Traffic Management**
 - *Vehicle Swept Path Requirements*
 - *Overtaking Opportunities – Rural Areas*
 - *Sight Distance*
- **Structural Capacity**
 - *Road Suitability*
 - *Bridges, Channel Crossings and Culverts*

The engineering assessment of the proposed network, based upon the above issues, will determine each routes suitability for heavy vehicles and identify any upgrades required it be made across the network. These upgrades will ensure safe and efficient access for heavy vehicles and shall be completed prior to the gazettal of network as either a B-Double or a Road Train route.

In addition to the engineering assessments a trial of several key routes occurred. The Working Party were in favour of the trial as it provided empirical evidence on the suitability of heavy vehicles along the proposed routes and the trial provided an opportunity to determine whether upgrades to the road network were required to the extent indicated by the engineering assessments. The trials were conducted utilising a Road Train, as they are larger than a B-Doubles and B-Doubles are legally able to travel along any road gazetted as a Road Train route.

The study concluded that the objectives of the Griffith Heavy Vehicle Strategy can be achieved in the Griffith LGA by a staged implementation of gazettals and engineering actions. These actions have been given a priority; short term or long term; to provide a suitable timeframe for the completion of the different stages of the strategy. The implementation strategy provides a suitable framework for the engineering actions required to develop Griffith's Heavy Vehicle network. The initial step Council is to take is the gazettal of the proposed routes which do not require any upgrade works to occur. After this, the required actions can be broken down into the following categories:

- **Short Term Heavy Vehicle Network**
 - *Wood Road*
 - *Southern Corridor*
 - *Northern Corridor*
- **Long Term Heavy Vehicle Network**
 - *Beelbanger Corridor*
 - *Bilbul Corridor*
 - *Southern Corridor*
- **Griffith Bypass**
 - *Southern Bypass*
 - *Northern Bypass*

The implementation of Griffith's Heavy Vehicle Strategy will not be a short term endeavour. Certain aspects of the strategy may be acted upon immediately however there will be several aspects that will require considerable planning and funding. Therefore an action plan for the implementation of the Heavy Vehicle Strategy shall be developed based upon the outcomes of the engineering assessments and input from the Heavy Vehicle Working Party. The action plan shall identify the issues associated with the route, develop engineering works to rectify these issues and prioritise these works in order of importance to Griffith's transport needs.

Transport Authorities, including the RMS and Griffith City Council, must compete for funding with other levels of government. Funding for the upgrade of road infrastructure for heavy vehicle traffic can usually be facilitated if the wider community benefits are identified. Many expensive initiatives are applicable only to a small range of problems. The wider range of low cost minor measures must also be given due consideration.

Securing funding ensures implementation of the plan and subsequent monitoring of its success. Potential funding sources for the recommended works are required to be identified. The success of the Griffith Heavy Vehicle Strategy will be dependent upon Griffith City Council securing external funding as well as a commitment from Council funds to deliver the proposed heavy vehicle network in a timely manner. The implementation of the strategy will benefit a wide variety of organisations; Griffith City Council should investigate the possibility of sourcing funding from these organisations and government agencies. The Griffith Heavy Vehicle Strategy is currently in the process of being accepted by Griffith City Council. The process is currently in its initial stages of consultation with a report being presented to an informal meeting of Council to detail the projects work and recommendations.

The progress of the Heavy Vehicle Strategy should be regularly reviewed and monitored to ensure that the network is performing efficiently and continues to cater for the freight task in Griffith. The monitoring process should include recording of completed works and ongoing analysis of Griffith's traffic information. The monitoring and review of the strategy shall become the responsibility of Griffith's Heavy Vehicle Working Party and Council's Transport and Logistics Committee.

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Appendices

Appendix 1 – Higher Mass Limits

Higher Mass Limits

Higher Mass Limits (HML) is a national scheme investigated and developed by Australia's National Transport Commission and implemented by the Federal Government and State Governments and Territories. The HML scheme allows properly accredited vehicles to operate on approved road networks with a greater axle loading, allowing vehicles to operate with greater payloads. The HML scheme is available to standard six-axle semi-trailers, B-Doubles, Road Trains and suitable vehicles operating as part of the Performance Based Standards Scheme. Operating under HML permits a heavy vehicle to carry an increased payload capacity of between ten (10) to thirteen (13) percent.

A heavy vehicle must possess approved road friendly suspension before being allowed to operate under HML. Road friendly suspension reduces vibration caused by the road while maintaining a vehicle's stability including roll stability. Road friendly suspension systems produce at least seventy-five (75) percent of the systems spring effect through pressurised compressible fluid or a recognised equivalent. The most common form of road friendly suspension is air suspensions, which feature air bags, hanger brackets, trailing arms and shock absorbers. There are also several types of steel spring suspensions that meet the road friendly suspension criteria.

The Australian Federal Government committed to the introduction of Higher Mass Limits along the national highway network by 1 January 1999 in July 1998. The federal government also committed to bridge upgrade program to ensure that the network would be able to cater for the increased axle loadings. South Australia was the first state government to introduce HML, introducing the program to suitable vehicles in January 1999. Queensland introduced HML in July 1999, with access limited to the national highway network and connecting B-Double routes within a radial distance of five hundred (500) metres. The New South Wales and ACT State Governments introduced HML in July 2006, after the several concerns the NSW Roads and Traffic Authority (RTA, now the Roads and Maritime Services) initially raised had been addressed.

The State and Federal governments have approved HML routes along the national and state highway network, local government control the status of the local road network. In regional and rural irrigation areas councils and shires are not approving the introduction of HML on the local road network unless certain the increased axle loadings will not serious damage the network, usually this is in relation to irrigation structures. There are still significant concerns at a local level regarding the impact HML vehicles will have on the safety and longevity of local road networks. The major issue is the impact such vehicles will have on irrigation structures.

In New South Wales, the RMS (the Roads and Traffic Authority at the time) introduced HML on the condition that vehicles were also registered as part of the national Intelligent Access Program (IAP) once the IAP was introduced in April 2008. The IAP was developed by a partnership of all Australian road agencies and involves the use of the Global Navigational Satellite System to monitor the road use of heavy vehicles. The IAP was originally intended to be used by governments to manage the potential risk of damage to sensitive infrastructure from heavy vehicles and equipment remotely. According to the Australian Trucking Association 'the IAP was implemented in NSW in as ad hoc, disjointed manner' and is extremely expensive for operators wishing to register to register to the program.

As a result of the poor implementation and management of the IAP in NSW has resulted in a lack of confidence from both the Local Government and transport industry sectors. Local councils currently do not receive any information regarding the compliance of vehicles registered to the

IAP despite being led to believe that the IAP would manage compliance by the RMS. The administration of the IAP is an expensive, convoluted and confusing process for transport companies, as a result a significant number of companies have chosen not to implement HML in their fleet.

The impact vehicles operating under HML would have upon the irrigation structures present throughout the regional road network has not been properly addressed. These vehicles possess a larger axle loading than generally accepted and it is anticipated that these higher loadings may adversely affect the structural capacity of the irrigation structures.

In many cases irrigation structures in regional areas are not owned by the local road authority but by a private irrigation company; such as Murrumbidgee Irrigation in Carrathool Shire Council, Griffith City Council, Leeton Shire Council, Narrandera Shire Council and Murrumbidgee Shire Council; who generally do not approve access for these higher productivity vehicles over any of their structures unless it has passed a technical structural assessment.

The responsibility of conducting a technical assessment of any structure is debatable, as the initial applicant may conduct the assessment however there is no way to reimburse them once additional vehicles begin to utilise the route. The irrigation companies are not willing to burden their shareholders with the costs associated with undertaking a technical assessment of the structures. Local Council's are in a similar position, with limited funding to conduct the assessment and the minimal benefit to the community gained by funding the assessment Council's are unwilling to pay for an assessment to be conduct.

There are also serious regarding the impact HML vehicles would have upon the road pavements of the local road network, especially as they are designed and constructed to a lower standard than the state and national highway network. Currently many of the pavements on local roads have been designed and constructed to cater for the general mass limit axle loading of heavy vehicles or lower. The impact of HML on these vehicles is expected to be detrimental to the durability of the local road network.

Several Councils are refusing to accept HML on local roads for a combination of the above reasons which are required to be resolved prior to local road authorities allowing HML vehicles onto the road network. The main concern in irrigation areas is the structural capacity of the structures preset in the area in addition to the state wide issue of pavement suitability. Also the RMS will have to address the problems identified with the IAP or remove the restriction limiting HML to IAP vehicles before gaining greater support for HML in NSW.

Appendix 2 – The Impact of Heavy Vehicles on Urban Amenity

The Impact of Heavy Vehicles on Urban Amenity

Urban amenity refers to the aspects of the urban environment which are valued or appreciated by people within a community. These aspects can include tangible items such as parks, clean air, schools or shopping centres and intangible items such as feelings of safety and community. Several aspects are desirable in all communities, such as clean air and safety, especially in an urban environment. There are a significant number of aspects whose values are subjective to the community's opinions of the urban amenity; these include open spaces or footpaths. The value placed upon these aspects can differ between communities and between people due to the differing opinions of the desirable aspects of a community.

There is no set definition of urban amenity due to its subjective nature and the various aspects which can influence the perceived urban amenity. To define urban amenity in a community, consultation of the people living in that community is required. Therefore heavy vehicles will have an impact upon the urban amenity of a community based upon the public's perception of heavy vehicles and their affect on the road network and the surrounding environment. Heavy vehicles have the greatest impact on amenity in areas where a proposed route passes through residential or urban land uses.

While urban amenity cannot be explicitly defined as part of a broader scope there are certain aspects or attributes which play a significant role on the community's perception despite the local environment. These factors are universally regarded as playing key role in the management of urban amenity in most locations. These factors include safety, heritage, open space, neighbourhood, mobility and accessibility, environment, community, economy, aesthetics and infrastructure. Of these factors several can be affected, either directly or indirectly, by the presence of heavy vehicles in a community.

Safety forms a key component of urban amenity and is affected by the introduction of heavy vehicles should access along an unsuitable route be granted. Safety as part of urban amenity refers to a person's perceived security from harm in the urban environment. Threats to the safety of an environment can include environmental, occupational and social hazards. Introducing heavy vehicles to an environment affects the environmental and social hazards to a person's safety, especially where it has been determined that they may be unsuitable to travel on the network.

The introduction of heavy vehicles to an urban environment may increase the incidence of traffic accidents occurring and increases the chances of serious injury or property damage occurring should a traffic accident occur. The size and mass difference of heavy vehicles compared to passenger vehicles significantly increases the severity of an accident's consequences. A significant proportion of heavy vehicle crashes occur in urban environments, in addition at the majority of these incidents the driver of the heavy vehicles was not at fault.

Public awareness of the impacts of heavy vehicles have on a road networks safety has increased significantly due to the greater numbers of heavy vehicles utilising the road network and their interaction with traffic, as well as the media attention heavy vehicle accidents receive. The introduction of heavy vehicles is perceived by the community to adversely affect the safety of the road network within an urban environment.

The introduction of heavy vehicles into an urban environment will also affect the neighbourhood aesthetic of the areas urban amenity. Neighbourhood refers to the collection of attributes which together constitute the value of an urban neighbourhood. These attributes include noise, density, sunlight, privacy, views, traffic, housing variety and design. The main attributes of neighbourhood

affected by the introduction of heavy vehicles are the noise and traffic aspects; though there is limited impact on neighbourhood's other attributes.

Heavy vehicles tend to generate a significant amount of road noise when compared to a regular passenger vehicle. Although recently there has been a tightening of the Australian design standards for noise emissions from heavy vehicles they are still considerably louder than a passenger vehicle especially in an urban environment. The increased noise levels have a negative impact upon the neighbourhood aspect of urban amenity, especially in an urban environment.

The impacts of heavy vehicles in an urban environment vary depending upon the capacity of the existing network and the type of neighbourhood. The impact of heavy vehicles on traffic through industrial or rural areas is generally minimal, as the majority of the land uses and road network in these areas have been developed over the years to utilise and cater for larger vehicles. Generally, heavy vehicles in residential or commercial/retail areas have a negative impact on traffic depending on the nature and capacity of the road network and the existing traffic. It is generally accepted that heavy vehicles tend to affect the efficiency, congestion, delays and capacity of a road network.

Heavy vehicles impacts on traffic also extend into driver behaviour and perceptions, especially in areas where motorists are unfamiliar with the larger vehicles. The presence of heavy vehicles on a road network affects the lateral positioning of other vehicles on the network this is a result of motorists attempting to create separation between the vehicles. This is especially true of vehicles travelling in the opposite direction to a heavy vehicle. There is also a tendency for motorists to reduce speed and behave more cautiously around heavy vehicles. While these factors usually have a positive affect on the safety of the road network they may be detrimental to the performance of the network.

The mobility and accessibility of an urban environment refers to the ability to travel in the area for a variety of purposes utilising differing modes of transport, including walking and cycling, within a reasonable time frame. The introduction of heavy vehicles can affect this aspect of urban amenity should they increase the congestion of the road network and subsequently increase travel times on the road network, reducing the mobility and accessibility of the area. Heavy vehicles also affect the pedestrians and cyclists in an area, by reducing the available road space and restricting their travel, especially at intersections and crossing points.

Heavy vehicle contribute significantly to the health of an urban environment, with emissions from heavy vehicles forming a major component of air pollution in urban areas. Air pollution is associated with several serious long term effects on both people and the environment. Diesel vehicles are of significant concern due to the large contribution of these vehicles to the road networks emissions of particle matter. The impacts of heavy vehicles on the health of the environment are significant and have resulted in the tightening of the Australian Design Standards regarding vehicle emissions; however there is still significant room for improvement.

The freight industry forms an important part of an areas economy, playing an especially vital role in the agricultural and manufacturing industries. Australia's freight task is expected to increase dramatically in the near future, supposedly almost doubling by 2020. The complexity of transporting freight is also expected to increase, with industries adapting to incorporate more efficient ways to work and increasing freight's role in the production process. The increasing freight task has resulted in the development of larger combination vehicles beginning with the road train.

Since the introduction of the first road train in 1940, there has been constant development of higher productivity vehicles resulting in the creation of the B-Double and more recently the B-Triple, AB-Triple and BAB-Quad. These combinations carry larger payloads and perform more efficiently creating greater economic benefits. The freight industry will be required to cater to the increased demands with shrinking force of qualified drivers; by utilising the larger combination vehicles the industry is able to obtain optimal efficiency from the drivers.

The introduction of the higher productivity vehicles to the road network and freight task is generally beneficial however the use of unsuitable roads by heavy vehicles can lead to several complications. These complications can include infrastructure damage, increased infrastructure maintenance costs and a decline of the safety of the road network for all road users. Therefore to ensure that the introduction of the higher productivity vehicles into the freight network is suitable all proposed routes are required to be assessed to ensure that it meets criteria developed by Austroads, state government agencies and local councils.

Appendix 3 – Engineering Assessment

Engineering Assessment

Engineering assessments of the potential heavy vehicle routes will provide the basis for determining the suitability of the proposed routes. The heavy vehicle network and action plan will be developed primarily through the engineering assessments conducted on the proposed routes throughout Griffith, by Council's Assistant Traffic Engineer Mr Mathew Vitucci. The assessments consider a variety of issues relevant to the heavy vehicle travel. The engineering assessment of the proposed network will determine each routes suitability for heavy vehicles and identify any upgrades required it be made across the network.

The engineering assessments conducted are based upon the NSW Roads and Maritime Services heavy vehicle assessment criteria as set out in the NSW *Route Assessment Guideline for Restricted Access Vehicles* and *Freight Route Investigation Levels for Restricted Access Vehicles*. The Austroads guidelines *Guidelines for Multi-Combination Vehicle Route Access* and *Guidelines for Assessing Heavy Vehicle Access to Local Roads* were also provided information used to develop the engineering assessment criteria. The assessment also considers Griffith City Council's concerns regarding heavy vehicles accessing the local road network.

Environmental and Community Amenity

The engineering assessments assess the impact the introduction of B-Doubles or Road Trains will have on the environmental and community amenity along a route. The assessment relies upon the nature of the land uses surrounding the proposed route and whether a similar vehicle is already approved to use the route, for example if B-Double access has already been approved along a route then the impact of introducing Road Trains along this route will not have as large an impact to the surrounding community than if the route only allowed general access vehicles like a semi-trailer.

The assessment shall detail any safety concerns along the route, especially in regards any schools in the surrounding area. Safety of the road network is paramount and schools tend to be the most dangerous area during school hours and any potential conflict is exacerbated by the presence of heavy vehicles. The assessment shall investigate the incident history of a proposed route to determine the extent of the risks along a proposed route and the impact the introduction of heavy vehicles will have on the route. The assessment will determine if introducing larger vehicles along the route exacerbate the existing risks along the route. The assessment shall also identify any measures which will remove or mitigate the risks identified along the proposed route.

The noise emissions from the proposed vehicle should be no more than from the typical vehicle being replaced. Modern restricted access vehicle tend to be 'greener' and quieter than older vehicles. The tailpipe and emission noise standards for new freight vehicles in Australia, ADR83 and ADR80 respectively, have been progressively tightened. Amendments to these Australian Design Rules are considered by the Land Transport and Environment Committee and are ratified by the Australian Transport Council. Griffith City Council currently owns a ... noise meter, this has been used to measure the existing noise levels along the proposed routes. An assessment of the effect of heavy vehicles on the noise levels along the proposed routes will then be conducted.

Environmental concerns along the route, such as the presence of threatened flora or fauna, will also be addressed by the engineering assessment. Liaising with Council's Environmental Planning Department the threats posed to the environment by allowing heavy vehicles to

access the proposed network were assessed. The impacts of any proposed works identified around the network are to be considered separately as part of the design process.

Additional community concerns shall be addressed if it becomes apparent that the introduction of heavy vehicles shall impact them. Previously there has been little problem in this regard.

Dimensional Capacity

Heavy vehicles are significantly larger than general motor vehicles and therefore not all roads are able to cater for the increased dimensions of these vehicles. The engineering assessment details the dimensional capacity of the proposed route and determines whether or not it is suitable for heavy vehicle access. This takes into account the width of the road, the presence of rail crossings and intersections and access into the final terminal.

The suitability of the roads width depends upon the roads surfacing, unsealed or sealed. The 'road width' refers to the clear width between guide posts (the carriage way width) for an unsealed road and either the sealed width (the sealed lanes and sealed shoulders) or the carriageway width (the width of the sealed lanes and the unsealed shoulders) are used when assessing unsealed roads. The minimum road widths to be used are specified in the Roads and Maritime Services *Freight Route Investigation Levels for Restricted Access Vehicles*.

The road widths indicated by the tables below were developed by the Roads and Maritime Services. There are several factors that were taken into consideration during the development of these widths these included the horizontal and vertical movement of the trailers when travelling at speed. Additional width is required at horizontal curves in addition to the widths detailed below. This is due to the nature of the heavy vehicles tracking and the increase of the effective vehicle width when travelling along a curve due to the vehicles tracking.

| Traffic | Rural AADT | Unsealed Carriage Way Width (m) | | |
|----------|------------|---------------------------------|--|------------------------|
| | | 25m B-Doubles | 36.5m Road Trains | 36.5m AB- or B-Triples |
| Low | 1-100 | 5.5 | 5.5 | 5.5 |
| | 100-500 | 7.0 | 7.0 | 7.0 |
| Moderate | 500-1000 | 8.0 | 8.0 | 8.0 |
| Higher | 1000-2000 | 8.0 | Unsuitable except where temporary speed limits exist | |

Table A3.1 – Road widths for 25m B-Doubles and 36.5m Road Trains on Unsealed Roads

| Traffic | Rural AADT | 25m B-Double | |
|----------|------------|------------------|-----------------------|
| | | Sealed Width (m) | Carriageway Width (m) |
| Low | 1-100 | 3.5 | 5.5 |
| | 100-500 | 6.0 | 7.0 |
| Moderate | 500-1000 | 6.0 | 8.0 |
| | 1000-2000 | 6.0 | 8.0 |
| Higher | 2000-6000 | 6.0 | 8.4 |
| | > 6000 | 6.5 | 8.9 |

Table A3.2 – Road widths for 25m B-Doubles on Sealed Roads

| Traffic | Rural AADT | 36.5m A-Double | | 36.5m AB or B-Triple | |
|----------|------------|--------------------|-----------------------|----------------------|-----------------------|
| | | Sealed Width (m) | Carriageway Width (m) | Sealed Width (m) | Carriageway Width (m) |
| Low | 1-100 | 3.7 | 5.5 | 3.7 | 5.5 |
| | 100-500 | 6.0 | 7.0 | 6.0 | 7.0 |
| Moderate | 500-1000 | 6.0 | 8.0 | 6.0 | 8.0 |
| | 1000-2000 | 6.0 | 8.0 | 6.0 | 8.0 |
| Higher | 2000-6000 | 6.5 | 8.9 | 6.5 | 8.5 |
| | 6000-10000 | Investigate widths | | 7.0 | 8.9 |

Table A3.3 – Road widths for 36.5m Road Trains (A-Doubles, AB- or B-Triples) on Sealed Roads

A restricted access vehicle changes the operating environment of a road, where performance is less favourable compared with the general access vehicles. This is most prominent at intersections and rail crossings where the size and low speed of the vehicle can impact on the performance of an intersection or become a hindrance to traffic at railway crossings. The main areas assessed in regards to intersections and railway crossings are the impacts upon queuing of traffic, storage, sight distance, and intersection or crossing performance.

The introduction of heavy vehicles may impact upon an intersection or rail crossing in a variety of different ways. The increased length of these vehicles will increase the traffic queue length, this can restrict traffic flow through an intersection crossed by the lengthened queue or block train travel should the queue cross a railway line. This increased queue length requires additional storage space for any queues occurring along the proposed route. The storage spaced is assessed to ensure that any intersection or rail crossing is not restricted by the introduction of heavy vehicles. The approach and stopping sight distance of any intersection or railway crossing are assessed based upon Austroads *Guide to Road Design*. These factors are then combined in addition to the performance of the intersection heavy vehicles to determine the impact the introduction of heavy vehicles will have on the intersection or railway crossing.

Usually through individual applications the access points to the road network are assessed to ensure that there is provision for heavy vehicles to safely enter and leave the local road network. However as the Heavy Vehicle Strategy is an initiative of Griffith City Council and there is not set origin or destination for the heavy vehicles this has not been assessed. Instead the onus to provide suitable access is placed upon property owners that require heavy vehicle access.

Road Safety and Traffic Management

The impact of increased size and weight of B-Doubles and Road Trains on the local road network is required to be determined to ensure that the network's safety is not compromised by their introduction. The engineering assessment details the geometry of the proposed route and its suitability of heavy vehicles, this includes vertical and horizontal curves, the vehicle swept path requirements at intersections, sight distances along the route and the amount of opportunities present to overtake safely along the route. The along the route is assessed based upon Austroads *Guide to Road Design*, as stated above.

The alignment and general geometry of the proposed route is assessed to ensure that heavy vehicles can travel the route safely. Due to the multiple connections required to form a heavy vehicle there is a lot of vertical and horizontal movement in the trailers when travelling at speed and the effective width of the vehicle increases. Therefore the route is assessed to ensure that it can cater for these factors.

The turning manoeuvres of the heavy vehicles through intersections, roundabouts and other traffic management devices along a route are assessed to determine whether they are able to accommodate these larger vehicles. The intersections are assessed utilising Austroads *Design Vehicles and Turning Path Templates* and the turning templates provided. The AutoTURN program is also used to assist in determining the swept path of heavy vehicles through intersections.

Overtaking slower vehicles relies upon a suitable break in oncoming traffic, sufficient sight distance to determine that it's safe to overtake and finally appropriate centre line marking. The proposed route is assessed to determine whether there are a sufficient number of safe overtaking opportunities along the proposed route. Overtaking sight distance should occur once every five (5) kilometres on medium to high traffic routes (> 2000 vehicles per day AADT), to reduce driver frustration and avoid risk taking.

Structural Capacity

Heavy vehicles are significantly larger than general motor vehicles and therefore not all roads are able to cater for the increased dimensions of these vehicles. The engineering assessment details the structural capacity of the proposed route and determines whether or not it is suitable for heavy vehicle access. This takes into account the road pavement and bridges or structures along the route.

The engineering assessment of the proposed heavy vehicle network includes an assessment of the road pavement based upon Council's knowledge of the condition of the existing pavement and the actual details of the pavement itself (such as age, depth and material). Council understands that heavy vehicles although heavy vehicle carry a greater payload they also carry a greater number axles to distribute this load to road surface which results in minimal impact on the road pavement when operating at speed. Council's major concern is the effects that the heavier loads will have when the heavy vehicle operates at low speeds, especially accelerating from a stop. The assessments will reflect where there is need to rehabilitate the road pavement.

Griffith forms part of the Murrumbidgee Irrigation Area, as such there is a large number of drainage and supply structures, including bridges and culverts, crossing the road network. The majority of these structures are owned by Murrumbidgee Irrigation, the engineering assessments determine that the number of structures along the Route and the effect of placing these heavy vehicles on them under mass limits. Any future upgrades to these structures will have to be approved by Murrumbidgee Irrigation.