

Traffic and transport **M**

Enter ▶

Go back to contents ▶



Traffic and Transport Assessment Technical Report

Gas Field Development Project –
Environmental Impact Statement

Prepared for
Santos GLNG

October 2014



Document Information

Prepared for Santos GLNG
Project Name Gas Field Development Project – Environmental Impact Statement
File Reference 20140802 GFD Project EIS-M Transport_Final.docx
Job Reference CEB06417
Date October 2014

Contact Information

Cardno (Qld) Pty Ltd
ABN 57 051 074 992

Level 11 Green Square North Tower
515 St Paul's Terrace
Locked Bag 4006
Fortitude Valley Qld 4006

Telephone: 07 3369 9822
Facsimile: 07 3369 9722
International: +61 7 3369 9822
transportqld@cardno.com.au
www.cardno.com.au

Document Control

Version	Date	Author	Author Signature	Reviewer	Reviewer Signature
Final	29 October 2014	Alex Sargent		Brett McClurg (RPEQ: 7628)	
		John Peace			

Table of contents

Abbreviations	7
Glossary	8
Executive summary	11
1 Introduction	1
1.1 Context	1
1.2 Existing GLNG Project	1
1.3 GFD Project overview	1
1.4 Project schedule	4
2 Legislation and policy framework	5
2.1 Legislation	5
2.2 Santos GLNG policy framework	5
2.3 Post EIS field planning process	6
2.4 Existing Santos GLNG project management tools	7
3 Existing transport network infrastructure	11
3.1 GFD Project area	11
3.2 State-controlled roads	11
3.3 State-controlled intersections	12
3.4 Future road network planning	14
3.5 Road safety review	18
3.6 Road network rest areas	22
3.7 Multi-combination vehicle routes	24
3.8 School bus routes	26
3.9 Rail crossings	28
3.10 Stock routes	30
3.11 Airports	32
3.12 Sea ports	34
3.13 Active transport network	34
3.14 Public transport network	34
4 Current and cumulative road network traffic volumes	35
4.1 Existing traffic volumes	35

4.2	Regionally significant projects	37
4.3	Cumulative traffic volumes	39
4.4	Resultant traffic volumes	40
5	GFD Project activities	41
5.1	Project phases	41
5.2	Construction	41
5.3	Operations	42
5.4	Decommissioning	43
6	GFD Project demands	45
6.1	Traffic generation	45
6.2	Traffic distribution	46
6.3	Forecast traffic volumes	48
7	Assessment methodology	50
7.1	Pavement impact assessment	50
7.2	Intersection assessment	52
7.3	Road link assessment	54
7.4	Level crossing thresholds	55
8	Assessment outcomes	57
8.1	Preliminary pavement assessment	57
8.2	Potential State-controlled intersection upgrades	58
8.3	Potential road link mitigations	60
8.4	Sea ports	64
8.5	Rail crossings	64
8.6	Hazardous goods and risk	66
9	Transport network mitigation strategies	67
9.1	Road safety	67
9.2	Road network rest areas	67
9.3	Multi-combination vehicle routes	67
9.4	School bus routes	68
9.5	Stock routes	68
9.6	Airports	68
9.7	Active transport network	68

9.8	Public transport network	68
9.9	Traffic management	68
9.10	Other mitigation strategies	69
10	Significance assessment	70
10.1	Significance assessment methodology	70
10.2	Environmental values and adopted magnitude criteria	72
10.3	Sensitivity of road network	72
10.4	Management framework	74
10.5	Monitoring	76
10.6	Significance assessment outcomes	76
11	Summary	81
	References	82

Tables

Table 3-1	State-controlled roads used by GFD Project traffic	11
Table 3-2	State-controlled intersections used by GFD Project traffic	12
Table 3-3	QTRIP planned works	15
Table 3-4	Planned DTMR works	17
Table 3-5	Crash occurrences by DCA groups	20
Table 3-6	Rail crossing locations	28
Table 4-1	Regionally significant projects included for assessment	39
Table 6-1	Gas field traffic distribution	48
Table 6-2	GFD Project total transport task on SCR	48
Table 8-1	Preliminary SCR pavement impact assessment – results summary	57
Table 8-2	Preliminary intersection safety assessment – results summary	58
Table 8-3	Rail level crossing analysis summary table	65
Table 10-1	Sensitivity criteria	70
Table 10-2	Magnitude criteria	71
Table 10-3	Significance matrix	71
Table 10-4	Environmental values and sensitivity (pre-implementation of management strategies)	73
Table 10-5	Management plan commitments	74
Table 10-6	Significance values pre and post-implementation of management strategies	79

Figures

Figure 1-1 Proposed GFD Project gas fields and infrastructure	3
Figure 1-2 Proposed development schedule	4
Figure 2-1 Field development process	7
Figure 3-1 Crash Rates on State-controlled roads	21
Figure 3-2 Road network rest areas	23
Figure 3-3 Multi-combination vehicle routes – State-controlled roads	25
Figure 3-4 School bus routes	27
Figure 3-5 Rail crossing locations	29
Figure 3-6 Stock routes	31
Figure 3-7 Airport locations	33
Figure 4-1 Existing traffic volumes on State-controlled roads	36
Figure 7-1 Austroads turn treatment warrants	53
Figure 7-2 Types of turn treatment	54
Figure 7-3 Installation and intervention limit score thresholds	56
Figure 8-1 Roads potentially requiring rehabilitation within ten years due to background traffic	62
Figure 8-2 Roads and intersections potentially requiring Santos GLNG contribution to rehabilitation	63
Figure 8-3 Rail crossing analysis summary	66

Appendices

Appendix A	GFD Project traffic volumes
Appendix B	Cumulative impact volumes
Appendix C	Trip generation
Appendix D	Intersection analysis
Appendix E	Pavement impact assessment
Appendix F	Mid-block assessment
Appendix G	Oversize vehicle escort warrants
Appendix H	Crash data
Appendix I	ALCAM assessment

Abbreviations

Abbreviation	Description
AADT	Annual average daily traffic
ALCAM	Australian Level Crossing Assessment Model
AUL	Auxiliary left turn
AUL(S)	Auxiliary left turn (short)
BAL	Basic left turn
BAR	Basic right turn
CHL	Channelised left turn
CHR	Channelised right turn
CHR(S)	Channelised right turn (short)
CHRC	Central Highlands Regional Council (local government)
CMDG	Capricorn Municipal Development Guidelines
DCA	Definitions for Coding Accidents
DTMR	Department of Transport and Main Roads, Queensland Government
EDROC	Eastern Downs Regional Organisation of Councils
EHP	Department of Environment and Heritage Protection (Queensland State Government)
EIS	Environmental impact statement
EP Act	<i>Environmental Protection Act 1994 (Qld)</i>
ESAs	Equivalent standard axle
ESCMP	Erosion and Sediment Control Management Plan
EV	Environmental value
GFD Project	Gas Field Development Project
GLNG Project	Gladstone Liquefied Natural Gas Project
HV	Heavy vehicle
IVMS	In-vehicle monitoring system
km	Kilometre
km/h	Kilometres per hour
m	Metres
PWMP	Pest and Weed Management Plan
QR	QR
QTRIP	Queensland Transport Roads Investment Program 2013-14 to 2015-16
RIA	Road impact assessment
RCCC	Regional Community Consultative Committees
RMP	Road-use management plan
SCR	State-controlled road
SIMP	Social Impact Management Plan
vpd	Vehicles per day
vph	Vehicles per hour

Glossary

Word, Phrase or Term	Definition
Annual average daily traffic (AADT)	The average traffic volume expected over a 24-hour period in a given year.
Austroroads	The association of Australian and New Zealand road transport and traffic authorities that aims to promote improved road transport outcomes and produces nationally accepted guidelines.
Auxiliary lane	The portion of the carriageway adjoining the through traffic lanes, used for speed change or for other purposes supplementary to through-traffic movement.
AUL/AUR	An AU xiliary Left or Right turn lane (see Figure 7-2).
Background traffic	The expected volume of traffic at a particular point without the addition of the traffic associated with the project under consideration.
CHL/CHR	A Ch annelised Left or Right turn lane. Turn lane form is characterised by raised islands protecting the turn lane. (See Figure 7-2)
CHL(S)CHR(S)	A Ch annelised Left or Right turn lane (short). Turn lane form is characterised by a shorter length than the CHL/CHR and islands are line marked rather than raised islands. (See Figure 7-2)
Coal seam water	Groundwater produced at the surface by the depressurisation of coal seams during gas production.
Council	Banana Shire Council (BSC), Central Highlands Regional Council (CHRC), Maranoa Regional Council (MRC) or Western Downs Regional Council (WDRC), as appropriate.
Council-controlled road	Roads which are administered funded and maintained by local government.
Crash rate	A crash rate is a ratio of the number of crashes to some common denominator, usually vehicle kilometres travelled, head of population or period of time. Crash rates allow more meaningful comparisons to be made between crash locations.
Exposure score (VT)	The product of the daily traffic volume and the daily train volume utilising the rail crossing.
Gas compression facility	A facility that houses multiple compressor units, either nodal or hub compressors or a mixture of both used to increase the pressure of gas for the purpose of transmission; may be collocated with a gas treatment facility and/or water management facility.
Gas gathering lines	High-density polyethylene pipelines through which natural gas flows from a wellhead to gas compression facility under low pressure.
Gladstone gas transmission pipeline	The 420 kilometre long gas pipeline that transmits compressed gas at high-pressure, typically 10 to 15 megapascals, from gas compression facilities in the gas fields to export facilities at Gladstone; part of the GLNG Project approved via the 2009 EIS.
Growth rate	The annual percent change in the number of vehicles passing a given point on a road.
Heavy vehicles (HV)	Vehicles with three or more axles or with dual tyres on the rear axle. Also referred to as commercial vehicles (CV).
Hub gas compression facility	Second stage gas compression; compresses gas to the pressure required for transmission via the Gladstone gas transmission pipeline (or third party transmission pipeline); minimum inlet pressure is 1,500 kilopascals; typically operated remotely.
Infrastructure agreement (IA)	An agreement established between the proponent (Santos GLNG) the Department of Transport and Main Roads and all relevant regional councils impacted by the Santos GLNG Project. The IA establishes a framework for negotiating road impact mitigation; how to conduct road impact assessments (RIAs); establishes the forward work schedule to confirm costs and timing of road treatments; and how to manage variations and disputes.

Word, Phrase or Term	Definition
Intersection capacity	The maximum sustainable traffic flow rate at which vehicles can reasonably be expected to traverse an intersection under given roadway, geometric, traffic, environmental and control conditions; usually expressed as vehicles per hour.
Interrupted traffic flow	Where the flow of traffic is stopped or interrupted periodically by fixed external elements, such as traffic signals or signage, irrespective of the traffic volume. This traffic engineering term does not describe operating conditions.
Light vehicles (LV)	Cars, motorcycles and cars towing caravans.
LNG Facility	The gas liquefaction, storage and export facility of approximately 10 million tonnes per annum capacity on Curtis Island, Gladstone. A three-train LNG Facility was approved as part of the GLNG Project via the 2009 EIS, and a two-train facility is currently under construction.
Nodal gas compression facility	First stage gas compression; compresses gas collected in the gathering lines to the pressure required for transport via infield transmission pipelines to second stage compression; often co-located with hub compressors at gas compression facilities; typically operated remotely.
P&G Act	<i>Petroleum and Gas (Production and Safety) Act 2004</i> (Qld)
Permanent infrastructure	Infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstands areas, airstrips, helipads, pipelines etc.), which is to be left by agreement with the landowner.
Priority-controlled intersection	An intersection where the movement of vehicles is controlled by road rules and traffic signs only, for example stop or give way signs, as opposed to traffic signals or a roundabout.
Production well	A well that is designed to extract gas from one or more natural underground reservoirs.
Quantitative	An assessment based on the amount or number of something.
Queensland stock route	Network of facilities established to facilitate the movement of livestock on foot between grazing areas and markets. The network consists of areas for stock to travel along (often within existing road corridors, adjacent to roadways) as well as areas for livestock to rest overnight including water facilities and holding yards.
Road impact assessment (RIA)	An assessment which identifies the potential road impacts of a proposed development and appropriate mitigation measures in accordance with the requirements of the Department of Transport and Main Roads <i>Guidelines for Assessment of Road Impacts of Development</i> .
Road link	A section of public road, typically referring to a road excluding intersections.
Road-use management plan (RMP)	This document summarises and updates traffic generation data, describes foreseeable road-use for the construction and operation of the GLNG/GFD Project and details impact mitigation strategies
Sealed road	Generic terminology adopted within the Road Impact Assessment to identify a road that has generally been constructed using a bituminous material to form a protected road surface.
Sensitive place	A sensitive place means any of the following places: <ul style="list-style-type: none"> ▪ A dwelling ▪ A library, childcare centre, kindergarten, school, college, university or other educational institution ▪ A hospital, surgery or other medical institution ▪ A protected area or an area identified under a conservation plan as a critical habitat or an area of major interest, under the <i>Nature Conservation Act 1992</i> (Qld) ▪ A marine park under the <i>Marine Parks Act 1982</i> (Qld) ▪ A park or garden that is open to the public.
State-controlled road (SCR)	A road declared to be controlled by the Department of Transport and Main Roads, including AusLink National Roads in Queensland.

Word, Phrase or Term	Definition
State-controlled intersection	For the purposes of this assessment, an intersection where at least one leg is a State-Controlled Road. It is noted that some such intersections may not be under the jurisdiction of the Department of Transport and Main Roads.
Transmission pipelines	Engineered pipelines used to transmit gas or water under pressure downstream of any gas compression or water pumping process.
Uninterrupted traffic flow	Where the flow of traffic is not stopped or interrupted by any fixed external elements, such as traffic signals. This traffic engineering term does not describe operating conditions.
Unsealed road	Generic terminology adopted within the Road Impact Assessment to identify roads that have been generally constructed to a formed and gravelled standard or a higher quality formed but ungravelled standard. In the context of this assessment the adopted terminology relates to the construction standard of the road not the ownership of the road (i.e. gazetted road versus private access road).
Unsealed track	Generic terminology adopted within the Road Impact Assessment to identify roads that have been generally constructed to an unformed standard. In the context of this assessment the adopted terminology relates to the construction standard of the road not the ownership of the road (i.e. gazetted road versus private access road).
Vehicle kilometres of travel (VKT)	A measure of traffic demand and is the length of a section of road in kilometres multiplied by the AADT on it. The yearly VKT is the daily VKT multiplied by the number of days in that year (365 or 366 days).
Vehicles per day (vpd)	The number of vehicles associated with a given location or activity during a 24-hour period.
Vehicles per hour (vph)	The number of vehicles associated with a given location or activity during a one hour period.
Water gathering lines	High-density polyethylene lines through which coal seam water flows from a wellhead under low or medium pressure to water transfer, storage and/or treatment infrastructure.
Water management facility	The collective term to refer to the major infrastructure components involved in water storage and treatment.
Water storage	Water storage is a regulated or unregulated structure that provides temporary storage and balancing of flow rates and quality characteristics between various points of water management infrastructure. To refer to a specific type of water storage facility, preface the descriptor before storage. For example: Water management storage, coal seam water storage.
Well lease	Area where a well and associated surface infrastructure is located.

Executive summary

Santos GLNG is proposing an expansion of its gas field operations in south central Queensland through the Gas Field Development Project (the GFD Project). As part of the environmental impact statement (EIS) preparation, Cardno (Qld) Pty Ltd (Cardno) was commissioned to assess the significance of the potential traffic and transport impacts associated with the GFD Project and produce a report on the assessment.

Although the precise facility and infrastructure locations are not yet known, assumptions were provided by Santos GLNG allowing modelling to be performed that allows for both a high level overview as well as a more detailed analysis of the expected traffic volumes and impacts. This enables an assessment of the significance of residual road impacts post implementation of the planned management strategies and provides road authorities certainty that the planned management strategies will preserve key road environmental values (EVs) whilst also meeting or exceeding typical traffic engineering practice requirements.

The *Terms of reference* (ToR) for preparation of an EIS for the GFD Project have been defined by the Coordinator General. This report addresses Section 4.3 of the ToR as well as other items indirectly related to this report. The outcomes of this assessment in reference to the ToR are summarised below.

State-controlled roads (SCRs) are specifically addressed in this report with local council road impacts to be addressed under existing infrastructure agreements. This is seen as appropriate given the preliminary nature of the development schedule, and the need for further exploration and appraisal of the gas fields (i.e. it is unclear at this stage of the project, which local roads will be impacted on).

The traffic and transport assessment establishes if there are likely to be road impacts that cannot be effectively managed through either the application of appropriate approval conditions, or through the application of the planned management strategies. The traffic and transport assessment seeks to identify the planned management strategies required to allow for approval of the GFD Project. To provide an additional level of assessment, the traffic and transport report includes detailed analysis of the expected traffic volumes and impact to identify likely upgrades that may be necessary throughout the life of the Project. It is important to recognise that the latter, despite being of some detail, is preliminary advice on the basis that the impacts are derived from the traffic operations of the project as best known at the time of this assessment. The latter may change as project planning evolves.

The traffic and transport assessment details existing traffic conditions: i.e. the existing traffic volumes, multi-combination vehicle routes, school bus routes, rail crossings, stock routes, pedestrian, cycle and public transport networks, motorist rest areas and a road safety assessment of historical crash data. To assess cumulative traffic impacts, other projects that will increase traffic demands in the region were also considered to ensure that traffic growth forecasts accommodated these effects.

With regard to the potential traffic generation of the GFD Project, the assessed project infrastructure includes:

- > Production wells and gathering infrastructure
- > Gas compression and associated facilities
- > Water management facilities
- > Worker accommodation facilities.

Some assets will be multi-use encompassing a number of the above activities where practical.

The GFD Project traffic generating potential was determined through modelling based on an understanding of the activities associated with the construction, operation and decommissioning of facilities, wells and gathering lines and the assignment of origins and destinations.

The modelling process determined the volume of GFD Project traffic on each road link over the project life including the annual average daily traffic (AADT) volume and a peak year AADT volume on each link over the project life. This process identified the effect of GFD Project traffic on the road network.

To assess the effectiveness of the management strategies, both an environmental values (EVs) approach and a traffic engineering approach were applied. Roads defined as rural connecting roads and rural access roads were identified as more susceptible to potential impacts of high significance on efficiency, safety and amenity. Roads defined as regional connecting roads and highways were identified as having moderate and low significance impacts respectively on efficiency, safety and amenity. Post implementation of the management strategies, the significance of the various road types to changed traffic impacts is reduced.

Through the application of management strategies it was determined that the overall significance of the GFD Project's road impacts would be reduced from a range of negligible-to-high to a range of negligible-to-moderate. The developed management strategies are therefore considered effective at reducing the significance of the GFD Project's impact on the safety, efficiency and amenity of the road network. Hence, the EVs assessment has identified that there are unlikely to be impacts so significant (high or major) that they cannot be effectively managed through the implementation of the planned management strategies.

The intent of this assessment was to identify a preliminary list of the works potentially required to support the GFD Project on the SCR network. Finalisation of such a list for local roads is premature as the specific location and delivery timing of GFD Project infrastructure is yet to be finalised. Identification of a local road list will occur as part of the road impact assessments (RIAs) prepared post-approval of the EIS to inform the road authority's infrastructure agreements. The assessment undertaken confirms that the planned management strategies will ultimately result in significant GFD Project impacts being addressed in accordance with traffic engineering practice requirements.

This traffic and transport assessment is a strategic assessment of the significance of the road impacts associated with the GFD Project. Through application of the EVs and traffic engineering approaches, this assessment identified no high or major residual impacts on the safety, efficiency and amenity of the assessed road networks following the application of management strategies. This assessment has identified that there are no impacts so significant that they cannot be effectively managed through the implementation of appropriate management strategies.

1 Introduction

1.1 Context

Santos GLNG intends to further develop its Queensland gas resources to augment supply of natural gas to its existing and previously approved Gladstone Liquefied Natural Gas (GLNG) Project.

Cardno (Qld) Pty Ltd (Cardno) has been commissioned by URS Australia Pty Ltd, on behalf of Santos GLNG, to complete the traffic and transport assessment for the environmental impact statement (EIS) for the Santos GLNG Gas Field Development Project (the GFD Project).

This report addresses Section 4.3 of the *Terms of reference* (ToR) issued by the Coordinator-General in March 2013, as well as other items that relate indirectly to this report.

1.2 Existing GLNG Project

Santos GLNG has existing approvals for the exploration, and in some areas production, of gas from the petroleum tenures making up the Arcadia, Fairview, Roma and Scotia gas fields.

To develop gas supply for LNG export markets, Santos GLNG completed an environmental impact statement (EIS) for the GLNG Project in 2009 (2009 EIS), and received approval from the State and Commonwealth Governments in 2010.

The GLNG Project involves the construction and operation of 2,650 exploration and production wells and supporting infrastructure across 6,887 square kilometres (km²) of the Arcadia, Fairview and Roma gas fields, plus a 420 kilometre (km) gas transmission pipeline connected to an LNG facility at Curtis Island, Gladstone.

The approved production wells and associated infrastructure, the Gladstone gas transmission pipeline and the LNG facility are currently under construction.

Through the GLNG Project, Santos GLNG has contributed over \$50 million towards upgrading and maintaining roads impacted by the GLNG Project traffic.

1.3 GFD Project overview

The GFD Project is an extension of the existing approved gas field development and will involve the construction, operation, decommissioning and rehabilitation of production wells and the associated supporting infrastructure needed to provide additional gas over a project life exceeding 30 years.

Specifically, the GFD Project seeks approval to expand the GLNG Project's gas fields from 6,887 km² to 10,676 km² to develop up to an additional 6,100 production wells beyond the currently authorised 2,650 wells; resulting in a maximum of up to 8,750 production wells.

The GFD Project will continue to progressively develop the Arcadia, Fairview, Roma and Scotia gas fields across 35 Santos GLNG petroleum tenures in the Surat and Bowen basins, and associated supporting infrastructure in these tenures and adjacent areas. The location of the GFD Project area, primary infrastructure and impacted roads are shown on Figure 1-1.

This GFD Project will include the following components:

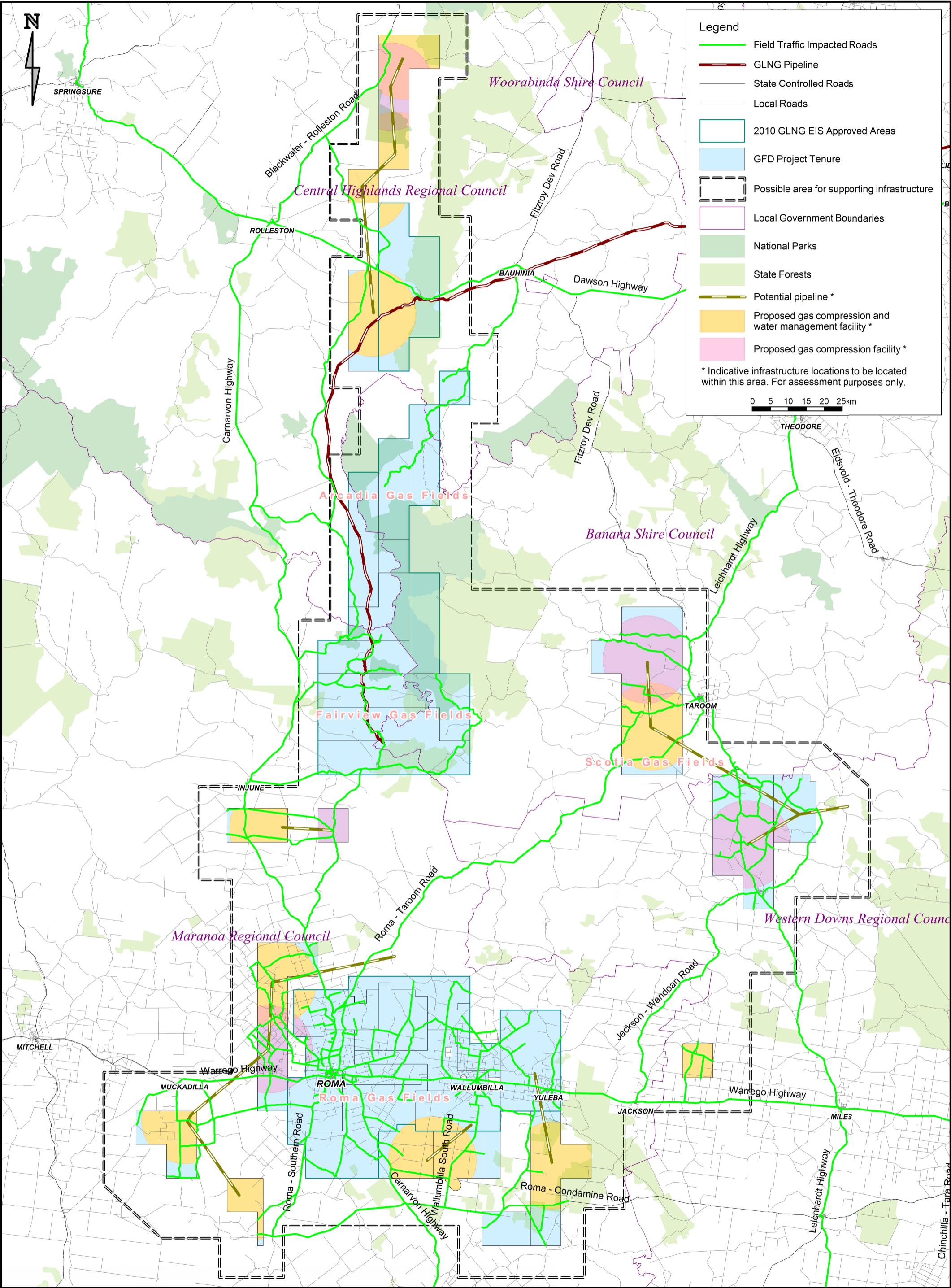
- > Production wells
- > Fluid injection wells, monitoring bores and potentially underground gas storage wells
- > Gas and water gathering lines
- > Gas and water transmission pipelines
- > Gas compression and treatment facilities
- > Water storage and management facilities
- > Access roads and tracks
- > Accommodation facilities and associated services (e.g. sewage treatment)
- > Maintenance facilities, workshops, construction support, warehousing and administration buildings
- > Utilities such as water and power generation and supply (overhead and/or underground)
- > Laydown, stockpile and storage areas
- > Borrow pits and quarries
- > Communications.

The final number, size and location of the components will be determined progressively over the GFD Project life and will be influenced by the location, size and quality of the gas resources identified through ongoing field development planning processes, which include consideration of land access agreements negotiated with landholders, and environmental and cultural heritage values.

Where practicable, the GFD Project will utilise existing or already approved infrastructure (e.g. accommodation camps, gas compression and water management facilities) from the GLNG Project or other separately approved developments. The GFD Project may also involve sourcing gas from third-party suppliers, as well as the sharing or co-location of gas field and associated facilities with third parties.

For the purposes of transparency this EIS shows an area off-tenure that may be used for infrastructure such as pipelines and temporary camps (supporting infrastructure area). While not assessed specifically in this EIS, any infrastructure that may be located within this area would be subject to further approval processes separate to this EIS. Potential pipelines interconnecting the gas fields have also been shown within this technical report for the sake of completeness. The tenure applications and environmental authorities for the pipelines within the supporting infrastructure are not being sought at this time.

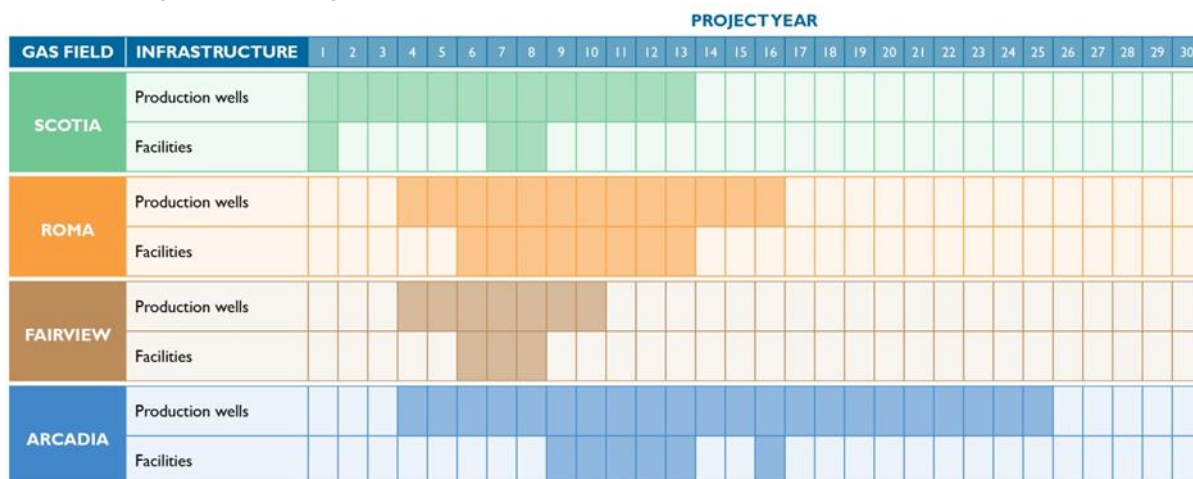
Approved exploration and appraisal activities are currently underway across the GFD Project's petroleum tenures to improve understanding of the available gas resources. As the understanding of gas resources increases, investment decisions will be made about the scale, location and timing of the next stages of field development.



1.4 Project schedule

For the purposes of this EIS, a scenario based on the maximum development case was developed at the approval of the ToR. This scenario assumed that production from the wells and upgrading of the gas compression facilities in the Scotia gas field would commence in 2016, followed by the GFD Project wells in the Roma, Arcadia and Fairview gas fields in mid-2019. This schedule is indicative only and was used for the purpose of the impact assessment in this EIS. The proposed GFD Project schedule is illustrated on Figure 1-2. This schedule provides an overall field development scenario for the purpose of assessment in this EIS.

Figure 1-2 Proposed development schedule



Decommissioning and rehabilitation will occur progressively throughout the life of the GFD Project as construction activities cease and exhausted gas wells are decommissioned. However, final decommissioning and rehabilitation will occur at the end of gas production in accordance with relevant approvals and regulatory requirements.

1.5 Terms of reference

Upon review of the initial advice statement and project description, the Coordinator General has seen fit to require Santos GLNG to address certain criteria in the GFD Project EIS. These criteria are known collectively as the ToR. This report addresses Section 4.3 of the ToR, as well as other items that relate indirectly to this report.

2 Legislation and policy framework

2.1 Legislation

The legislative framework and powers used by the State to assess, oversee and regulate road impacts of development in Queensland include:

- > *Environmental Protection Act 1994* (EP Act)
- > *Transport Infrastructure Act 1994*
- > *Land Act 1994*
- > *Transport Operations (Road Use Management) Act 1995*
- > *Land Protection (Pest and Stock Route Management) Act 2002*
- > *Petroleum and Gas (Production and Safety) Act 2004* (P&G Act)
- > *Sustainable Planning Act 2009*
- > *Guidelines for Assessment of Road Impacts of Development.*

2.2 Santos GLNG policy framework

2.2.1 Policy statements

Santos GLNG has adopted the Santos Limited policy statements for the environment and community that are applicable to transport. The policy statements include the adoption of sustainable development principles and a commitment by Santos GLNG to manage and mitigate community and environmental impacts resulting from their activities. These policies, as overarching Santos GLNG values, will be adopted for GFD Project activities.

The Environmental Policy Statement, 2012 states:

At Santos we are adopting the principles of sustainable development. We recognise our responsibility to meet community expectations and we are committed to the continuous improvement of our environmental performance. We believe that environmental stewardship is both a management obligation and the responsibility of every employee.

Santos GLNG activities are also governed by the Community Policy, which seeks to establish and maintain enduring and mutually-beneficial relationships with communities within which they operate. The policy states:

We work to be a valued member of the communities of which we are a part.

Santos is committed to upholding its reputation as a trusted energy company. It will continue to provide clean energy solutions for Australia and Asia while operating in an environmentally sustainable and socially responsible manner.

Santos seeks to establish and maintain enduring and mutually beneficial relationships with the communities of which it is a part; ensuring that Santos's activities generate positive economic and social benefits for and in partnership with these communities.

2.2.2 Management standards

Santos GLNG has in place health and safety hazard management standards for the governance of project activities. These standards ensure that activities under Santos GLNG operate to the same high standard of delivery, ensuring the overall risk of the GFD Project is kept to a minimum.

Management standards provide a set of principles to which activities must adhere to. The two standards governing activities within the scope of this report are as follows:

- > Land Transportation - To manage the risks associated with land transportation activities.
- > Air Transportation - To manage the risks associated with air transportation activities.

2.3 Post EIS field planning process

The constraints approach is based upon the *GFD Project environmental protocol for constraints planning and field development* (Constraints protocol) (Santos GLNG, 2014). The Constraints protocol applies to all gas field related activities. The scope of the Constraints protocol is to:

- > Enable Santos GLNG to comply with all relevant State and Federal statutory approvals and legislation
- > Support Santos' environmental policies and the General Environmental Duty (GED) as outlined in the EP Act
- > Promote the avoidance, minimisation, mitigation and management of direct and indirect adverse environmental impacts associated with land disturbances
- > Minimise cumulative impacts on environmental values.

The Constraints protocol details the process that Santos GLNG will use to identify, assess and manage potential impacts to the environment during field planning and development. This process has been successfully used for the approved GLNG Project, which increases the certainty of GFD Project environmental outcomes.

The general principles of the Constraints protocol, in order of preference, are to:

- > Avoid — avoid direct and indirect impacts
- > Minimise — minimise potential impacts
- > Mitigate — implement mitigation and management measures to minimise adverse impacts
- > Remediate and rehabilitate — actively remediate and rehabilitate impacted areas
- > Offset — offset residual risk in accordance with regulatory requirements.

Consistent with Santos GLNG's environmental management hierarchy, the Constraints protocol prioritises avoidance of environmental impact during field planning by identifying those areas that are not amenable to development. This includes areas of high environmental value as identified in regulatory frameworks and Santos GLNG's baseline surveys. For areas that are considered appropriate to develop, Santos GLNG will identify impacts to environmental values that could potentially occur due to the construction, operations and decommissioning activities of the GFD Project, and determine pre-mitigated impacts (i.e. those that would occur without mitigation).

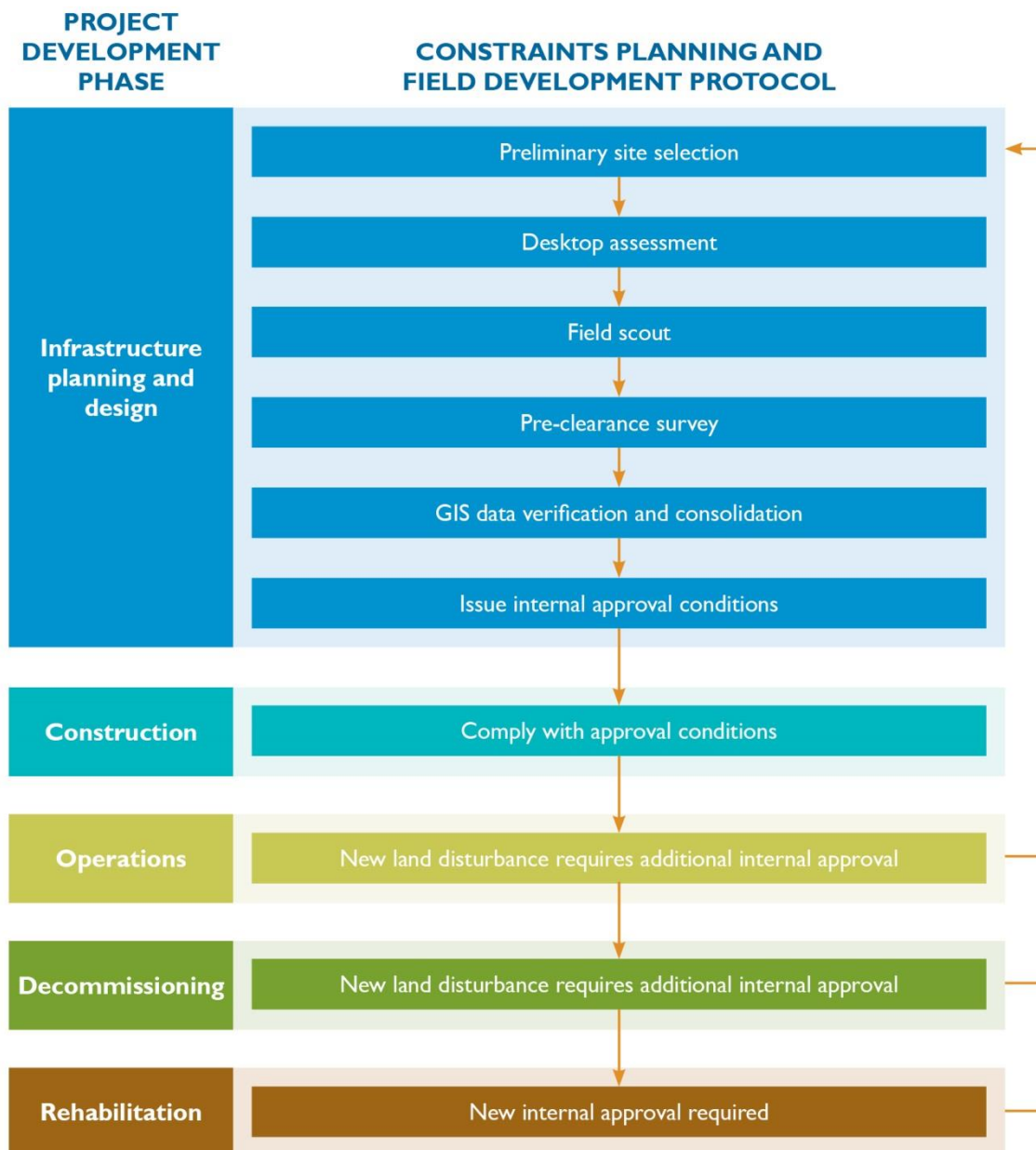
Relevant mitigation and management measures based on the approved environmental management framework already implemented for the GLNG Project are then applied to the pre-mitigated impacts to identify the mitigated (residual) impacts. This process increases certainty about potential impacts by identifying those areas that are not amenable to development, and for those areas where development could occur, how development should proceed.

The post-EIS field development process is a continuation of the field planning process and will be ongoing throughout the life of the GFD Project. The field development process will inform the GFD Project's design, together with a range of other factors including technical feasibility, cost and risk

as required by standards applicable to the design, construction, operations, decommissioning and rehabilitation of gas developments. This information will be used to support the subsequent approvals process such as environmental approval application and the plan of operations.

The tasks involved in the field development process are summarised in Figure 2-1.

Figure 2-1 Field development process



2.4 Existing Santos GLNG project management tools

Santos GLNG has developed and is currently implementing an environmental management framework for the GLNG Project. Where appropriate, the mitigation and management strategies of this environmental management framework will be used and expanded to include the GFD Project. The relevant existing GLNG Project policies and plans relating to traffic and transport are outlined below.

2.4.1 Road impact assessments (State roads)

The Queensland Department of Transport and Main Roads (DTMR) has developed the *Guidelines for Assessment of Road Impacts of Development* (GARID) (DTMR, 2006) that are used in the development of a road impact assessment (RIA). A RIA is completed in conjunction with development applications to quantify impacts and provide mitigation measures.

A RIA is generally required when, as part of the development approval process, a development proposal is referred to DTMR. In general DTMR will consider a development's road impacts to be insignificant if the development generates an increase in traffic on State-controlled roads (SCRs) of less than 5% over existing levels, either measured in terms of AADT or equivalent standard axles (ESAs).

A RIA will identify:

- > Potential transport routes for use by the development
- > Assessment of the condition of the identified roads
- > Estimated forecast of project traffic throughout the phases of the development
- > Thresholds for mitigation intervention
- > Mitigation required as a result of project activities to adequately prepare and/or maintain the condition of the road for development and public use.

2.4.2 Road impact assessments (local roads)

The Santos GLNG Project's (currently approved) RIAs for the regional councils impacted were developed for the construction and operations of the proposed gas field development in the Surat and Bowen basins. Each assessment considered development impacts on the existing road infrastructure. Although not directly applicable to the GFD Project in regards to generated impacts, these documents provide an example of the analysis and assessment previously undertaken by Santos GLNG for mitigation of transport impacts from a project of a similar nature. Those documents detail project activities, expected traffic generation, resulting transport impacts and mitigation measures. Mitigation measures for transport impacts are documented including road upgrades, cost sharing of maintenance and rehabilitation costs and driver behaviour policies and controls.

2.4.3 Infrastructure agreements

Infrastructure agreements between infrastructure operators (DTMR or regional councils) and Santos GLNG relate to road infrastructure works connecting to public roads. The agreements specify financial and other obligations of the two parties in relation to road infrastructure works carried out or required to be carried out on the road network by Santos GLNG or their contractors to mitigate or repair impacts associated with GLNG Project activities.

These obligations include, but are not limited to: the expected operational performance of infrastructure works; construction methods; quality assurance; property access; protection of existing services; practical completion; rectification of defects and maintenance; Coordinator-General requirements; rehabilitation contributions; final certificate and hand over; security; insurance and risk; and indemnity and termination.

The agreements demonstrate that Santos GLNG has a framework for mitigating project impacts.

2.4.4 Road-use management plans

The GLNG Project Road-use Management Plan (RMP), applies for the duration of the GLNG Project. The document summarises and updates traffic generation data, describes foreseeable road-use for the construction and operations of the GLNG Project and details impact mitigation strategies. The RMP outlines the relevant development approval conditions and is updated from the latest RIA and traffic management plans that have been developed for the GLNG Project. The objectives of the RMP and related traffic management plans are to:

- > Minimise and deal with the impact of the project on the efficiency of the road network, both SCRs and local government roads
- > Improve road-user safety and safe operation of project vehicles on and off tenure
- > Minimise impacts on road infrastructure condition
- > Minimise traffic-related complaints and incidents to maintain community amenity.

The RMP document demonstrates that Santos GLNG can appropriately manage project impacts through the development and implementation of appropriate road-use strategies. It is expected that a similar document will be developed for impacts relating to the GFD Project. These arrangements will take the form of amendments to the GLNG Project RMP.

2.4.5 Social licence to operate in regional communities – ‘Regional Rules’

Santos GLNG’s commitment to communities is demonstrated in the provision of the ‘Regional Rules’, which govern the behaviour of Santos GLNG employees and contractors when working in regional areas. The foundation of the rules is a respect for landholders and other stakeholders and the communities in which Santos GLNG operates.

Rule 5 relates to vehicle movements and requires that vehicle movements be planned, monitored and consolidated. A vehicle branding pilot is being implemented in the region with a toll-free 1800 number for the community to comment on driver’s conduct. This branding appears on Santos GLNG and contractor vehicles and a real-time In-Vehicle Monitoring System (IVMS) is being used in Santos GLNG vehicles. This is a key tool in monitoring driver behaviour and location. The Regional Rules will be adopted and applied to the GFD Project.

Increased demand on transport infrastructure (airports and buses) will be managed through the implementation of the Social Impact Management Plan and associated action plans.

2.4.6 Santos GLNG responsibilities

Santos GLNG is responsible for:

- > Applying the Health, Safety and Security (HSS) governance, communications and reporting framework to support senior management in their due diligence requirements
- > Providing strategic and tactical safety direction for senior management
- > Liaison within Santos GLNG and externally with Joint Venture partners, regulators and industry counterparts
- > Providing a functional link to Santos Corporate Safety
- > Providing the functional leadership for HSS across the GLNG Project.

Santos GLNG has taken a key role in the development of safety improvement initiatives such as the Upstream Land Transportation Safety Review Report, Journeyman IT project and development of initiatives including the Light Vehicle Specification and the NLC Heavy Vehicle Code of Practice.

The following Health, Safety and Security documents are in place and will be applied to the GFD Project:

- > Santos GLNG Land Transportation Management Plan
- > Motor Vehicle Incident Details Form
- > How to Guide – Driver Training
- > IVMS Data Key Supply
- > Vehicle Inspection Checklist
- > How to Guide –In Vehicle Monitoring Systems
- > How to Guide – International Land Transport
- > How to Guide – Light Vehicles Specifications
- > How to Guide - Motor Vehicle Investigations
- > How to Guide – Rig Moves
- > How to Guide – Vehicle Recovery
- > How to Guide – Vehicle Tyres, Accessories and Attachments.
- > Air Transportation Management Plan.

3 Existing transport network infrastructure

3.1 GFD Project area

SCRs have been addressed specifically in this assessment. As the development plan for the GFD Project is subject to the results of appraisal works, the final locations of accesses to fields at a local-road level are not yet known. As a result, once development plans are finalised, and approved by Santos GLNG, a detailed assessment of local roads will be addressed in RIAs submitted to each council. A further RIA will be prepared for SCRs, once the project details are confirmed.

3.2 State-controlled roads

Table 3-1 provides a description of each of the SCRs that are expected to be used by GFD Project traffic. DTMR provided traffic count data for 2012.

Table 3-1 State-controlled roads used by GFD Project traffic

Road (DTMR Ref)	Typical form	Urban speed limit (km/h)	Rural speed limit (km/h)	2012 AADT (vpd)	HV (%)
Blackwater-Rolleston Road (469)	Two lane, undivided, sealed	60	100	127-4,935	9-63
Carnarvon Highway (24C) Surat - Roma	Two lane, undivided, sealed	60	100	482-542	24
Carnarvon Highway (24D) Roma - Injune	Two lane, undivided, sealed	60	100	900-2,820	25
Carnarvon Highway (24E) Injune-Rolleston	Two lane, undivided, sealed	60	100-110	415-473	33
Dawson Highway (46C) Banana - Rolleston	Two lane, undivided, sealed	60	100	280-2,190	12-34
Fitzroy Development Road (85B) Bauhinia-Duaringa	Single lane, undivided, sealed, unsealed shoulders	60	100	67-409	14-16
Jackson-Wandoan Road (4302)	Single lane, undivided, sealed, unsealed shoulders	60	100	139-635	27-28
Leichhardt Highway (26A) Westwood - Taroom	Two lane, undivided, sealed	60	100	690-1,000	20-37
Leichhardt Highway (26B) Taroom - Miles	Two lane, undivided, sealed	60	100	830-1,310	20-36
Roma-Condamine Road (4397)	Single lane, undivided, sealed, unsealed shoulders	60	100	132-464	24-35
Roma Southern Road (3501)	Single lane, undivided, sealed, unsealed shoulders	60	100	97-470	17-32
Roma Taroom Road (4397)	Two lane, undivided, sealed	-	100	135-462	25-36
Wallumbilla South Road (3441)	Two lane, undivided, sealed	60-80	100	33-134	12-26

Road (DTMR Ref)	Typical form	Urban speed limit (km/h)	Rural speed limit (km/h)	2012 AADT (vpd)	HV (%)
Warrego Highway (18B) Toowoomba - Dalby	Two lane, undivided, sealed	60-80	100-110	5,979-22,175	17-25
Warrego Highway (18C) Dalby - Miles	Two lane, undivided, sealed	60-80	100-110	2,979-8,502	17-27
Warrego Highway (18D) Miles - Roma	Two lane, undivided, sealed	60-80	100	1,550-5,498	23-35
Warrego Highway (18E) Roma - Mitchell	Two lane, undivided, sealed	60-80	100	941-6,497	20-30

vpd: vehicles per day

3.3 State-controlled intersections

Intersections utilised to provide access to the gas fields from the SCR network have been assumed based on field development activities. These locations may be changed as Santos GLNG gathers information through the appraisal phase and finalises development plans. Plans will be considered final only after Santos GLNG's financial sanction of a particular project area. Appropriate access standards will be sought in order to maintain a safe and efficient road network. Table 3-2 provides an overview of each of the State-controlled intersections (SCIs) assessed as part of this report. It should be noted that roads under council jurisdiction are referenced but only where an SCI is formed.

Table 3-2 State-controlled intersections used by GFD Project traffic

Intersection	Existing form	Existing turn lane treatment
Blackwater-Rolleston Road/Sunlight Road	3-way, Priority	-
Carnarvon Highway/Arcadia Valley Road	3-way, Priority	-
Carnarvon Highway/Barnard Road	3-way, Priority	Auxiliary right turn lane (AUR)/ Channelised left turn lane (CHL)
Carnarvon Highway/Conroys Lane	3-way, Priority	-
Carnarvon Highway/Dawson Highway	4-way, Priority	AUR/Basic left turn (BAL)
Carnarvon Highway/Eumina Road	3-way, Priority	-
Carnarvon Highway/Gunnewin Road	4-way (offset), Priority	-
Carnarvon Highway/Injune Airport Road	3-way, Priority	-
Carnarvon Highway/Injune Taroom Road	4-way, Priority	Channelised right turn lane(CHR(s))*
Carnarvon Highway/Komine Road	4-way, Priority	-
Carnarvon Highway/Mulcahys Road	3-way, Priority	-
Carnarvon Highway/The Range Road	3-way, Priority	-
Carnarvon Highway/Roma Airport Drive	3-way, Priority	CHR(s)/Auxiliary left turn lane(AUL)
Carnarvon Highway /Roma Taroom Road	3-way, Priority	AUR
Dawson Highway/Arcadia Valley Road	3-way, Priority	AUR
Dawson Highway/Blackwater-Rolleston Road	3-way, Priority	AUL
Dawson Highway/Fairfield Road	3-way, Priority	-

Intersection	Existing form	Existing turn lane treatment
Dawson Highway/Meteor Street (Rolleston Airport)	4-way, Priority	-
Dawson Highway/Sunlight Road	3-way, Priority	-
Fitzroy Developmental Road/Glenhaughton Road	3-way, Priority	-
Jackson Wandoan Road/Peakes Road	3-way, Priority	-
Leichhardt Highway/The Boulevard	3-way, Priority	CHR(s)
Leichhardt Highway/Booral Road	3-way, Priority	-
Leichhardt Highway/Broadmere Road	3-way, Priority	-
Leichhardt Highway/Twelve Mile Road	3-way, Priority	-
Leichhardt Highway/Dawson Highway	3-way, Priority	AUR/AUL
Leichhardt Highway/Fitzroy Developmental Road	3-way, Priority	-
Leichhardt Highway/Injune Road	3-way, Priority	-
Leichhardt Highway/Jackson Wandoan Road	4-way, Priority	-
Leichhardt Highway/Murrays Road	3-way, Priority	-
Leichhardt Highway/Nathan Road	3-way, Priority	-
Leichhardt Highway/Number 4 Road	3-way, Priority	-
Leichhardt Highway/Number 7 Road	3-way, Priority	-
Leichhardt Highway/Number 2 Road	4-way (offset), Priority	-
Leichhardt Highway/Roma Taroom Road	3-way, Priority	-
Leichhardt Highway/Taroom Airport Road	3-way, Priority	-
Leichhardt Highway/Windeyer Road	3-way, Priority	-
Leichhardt Highway/Yeovil Road	3-way, Priority	-
Roma Condamine Road/Retreat Road	3-way, Priority	-
Roma Condamine Road/Yuleba Surat Road	3-way, Priority	-
Roma Southern Road/Meegine Road	3-way, Priority	-
Wallumbilla South Road/Bardlomey Road	3-way, Priority	-
Wallumbilla South Road/May Street North	4-way, Priority	-
Wallumbilla South Road/May Street South	3-way, Priority	-
Wallumbilla South Road/Tarrawonga	3-way, Priority	-
Wallumbilla South Road/Wallabella Road	3-way, Priority	-
Wallumbilla South Road/Yarrowonga Road	3-way, Priority	-
Warrego Highway/Blue Hills Road	3-way, Priority	-
Warrego Highway/Carnarvon Highway (West)	4-way, Priority	CHR/Left Slip Lanes
Warrego Highway/Carnarvon Highway (East)	3-way, Priority	AUR/Left Acceleration Lane
Warrego Highway/Duke Street (Roma Southern Road)	4-way, Priority	-
Warrego Highway/Dulacca North Road	3-way, Priority	-
Warrego Highway/Hodgson Lane North	3-way, Priority	-
Warrego Highway/Hodgson Lane South	3-way, Priority	-
Warrego Highway/Jackson Wandoan Road	3-way, Priority	-
Warrego Highway/Kangaroo Creek Road	3-way, Priority	-

Intersection	Existing form	Existing turn lane treatment
Warrego Highway/Leichhardt Highway	3-way, Priority	AUR/Left Slip Lane
Warrego Highway/Massey Lane	3-way, Priority	-
Warrego Highway/Pickanjinie North Road	3-way, Priority	AUL(s)/BAR*-
Warrego Highway/Wallumbilla South	4-way, Priority (Note 4-way offset)	-
Warrego Highway/Warooby Lane	3-way, Priority	CHR(s)/AUL(s)*
Warrego Highway/Yuleba Surat Road	3-way, Priority	-
Warrego Highway/Yuleba Taroom Road	3-way, Priority	CHR(s)

*upgrades proposed to be completed by the commencement of the GFD Project, and contributed to by GLNG Project

3.4 Future road network planning

In order to identify proposed future road-related projects the *Queensland Transport and Roads Investment Program 2013-14 to 2016-17* (QTRIP) was reviewed. This was the program that was available at the time of the EIS and details projects that have had funds allocated to them and the expected timing of these works. There are a number of projects detailed in the QTRIP that fall within the study road network, and these are provided in Table 3-3. Roads where there is expected to be insignificant project traffic, and therefore insignificant impacts, have not been included.

This data has been taken into consideration in completing this assessment.

Table 3-3 QTRIP planned works

Road	From (km)	To (km)	Planned roadworks	Funding \$'000	Year(s)
Dawson Highway (Gladstone – Biloela)	76.43	119.90	Rehabilitate and overlay (>75 mm)	12,683	2013/14
	23.04	73.00	Rehabilitate and overlay (>75 mm)	16,214	2013/14
Dawson Highway (Biloela – Banana)	Dawson Highway / Leichhardt Highway intersection		Widen pavement	1,200	2013/14 to 2014/15
	2.90	40.32	Rehabilitate and overlay (>75 mm)	11,667	2013/14
Dawson Highway (Banana – Rolleston)	45.05	168.38	Rehabilitate and overlay (>75 mm)	1,072	2013/14
	45.05	80.38	Rehabilitate bridge/s and culvert/s	2,227	2013/14
	83.64	168.38			
	83.64	168.38	Rehabilitate and overlay (>75 mm)	1,017	2013/14
	0.50	32.49	Rehabilitate and overlay (>75 mm)	11,907	2013/14
Dawson Highway (Rolleston – Springsure)	0.00	71.13	Rehabilitate bridge/s and culvert/s	3,579	2013/14
	28.86	80.80	Construct overtaking lane/s	4,467	2013/14
Warrego Highway (Toowoomba – Dalby)	0	84.36	Install/replace signs	156	2013/14
	Bridge Street to Tor Street		Improve intersection/s	619	2013/14 to 2014/15
	Rest Areas		Provide heavy vehicle parking	503	2013/14
	17.80	18.50	Install/replace signs	85	2013/14
	0	74.61	Rehabilitate pavement	18,839	2013/14
	0	4.50	Rehabilitate pavement	5,300	2014/15 to 2016/17
	0	84.19	Rehabilitate pavement	431	2013/14
	33.30	44.30	Improve drainage	4,144	2013/14 to 2014/15
	83.00	83.70	Provide heavy vehicle parking	610	2013/14
Leichhardt Highway (Miles – Goondiwindi)	205.21	224.14	Overlay pavement (>75 mm)	210	2013/14
	205.21	224.14	Rehabilitate and overlay (>75 mm)	5,529	2013/14

Road	From (km)	To (km)	Planned roadworks	Funding \$'000	Year(s)
	133.13	205.21	Undertake routine maintenance	908	2013/14
	137.16	169.31	Rehabilitate pavement	1,789	2013/14 to 2014/15
Leichhardt Highway (Taroom – Miles)	29.90	35.01	Widen pavement	1,100	2013/14
	90.90	92.00	Widen pavement	1,980	2013/14 to 2014/15
	28.80	30.70	Widen pavement	1,990	2013/14 to 2014/15
	0	127.61	Undertake routine maintenance	676	2013/14
Leichhardt Highway (Westwood – Taroom)	6.07	254.50	Rehabilitate and overlay (>75 mm)	12,116	2013/14
	0	256.50	Rehabilitate and overlay (>75 mm)	9,607	2013/14
	0	192.22	Rehabilitate bridge/s and culvert/s	1,186	2013/14
	0	192.22	Rehabilitate bridge/s and culvert/s	3,503	2013/14
Carnarvon Highway (Roma – Injune)	0	90.30	Rehabilitate pavement	1,200	2013/14 to 2014/15
	34.64	56.35	Rehabilitate pavement	31,015	2013/14
	0	72.90	Rehabilitate and overlay (>75 mm)	1,773	2013/14
	3.33	3.40	Rehabilitate pavement	320	2013/14
	0	34.64	Rehabilitate pavement	2,945	2013/14
	56.35	72.90	Rehabilitate pavement	624	2013/14
Carnarvon Highway (Injune – Rolleston)	26.60	38.20	Widen and Seal	5,666	2013/14 to 2016/17
	0	61.79	Rehabilitate and overlay (>75 mm)	1,245	2013/14
	0	87.93	Rehabilitate pavement	1,632	2013/14
	68.51	172.31	Rehabilitate pavement	7,897	2013/14
	17.30	153.00	Rehabilitate and overlay (>75 mm)	1,551	2013/14
	68.51	172.31	Rehabilitate bridge/s and culvert/s	1,068	2013/14
	75.10	85.75	Remediate batter slopes	4,290	2013/14
Roma – Condamine Road	Yuleba Creek		Replace bridge/s	4,450	2013/14
	23.20	52.30	Rehabilitate pavement	1,204	2013/14 to 2014/15

Road	From (km)	To (km)	Planned roadworks	Funding \$'000	Year(s)
Jackson – Wandoan Road	0	47.94	Rehabilitate pavement	10,210	2013/14
Roma Southern Road	16.10	25.10	Re-sheet unsealed road	375	2013/14
Fitzroy Developmental Road (Taroom – Bauhinia)	1.40	76.12	Rehabilitate and overlay (>75 mm)	3,248	2013/14
Roma Taroom Road	0	64.90	Rehabilitate pavement	23,146	2013/14
Orallo Road	Various locations		Construct to sealed standard	400	2013/14
Injune Taroom Road	0	2.20	Pave and Seal	96	2012/13
Duck Creek Road	13.60	21.60	Re-sheet unsealed road	400	2013/14
Arcadia Valley Road	3.40	7.80	Reseal - bitumen chip	64	2013/14
Wallumbilla North Road	21.00	25.90	Widen and seal	250	2014/15
Bowen Street	Wyndham Street		Install intersection lighting	50	2015/16 to 2016/17

Table 3-4 Planned DTMR works

Road	From (km)	To (km)	Planned roadworks	Funding \$'000	Year(s)
Carnarvon Highway (Surat – Roma)	0	72.73	Full width reconstruction and patching	7,200	2013
Carnarvon Highway (Roma – Injune)	2.86	90.5	Full width reconstruction, patching and Airport Intersection upgrade	60,200	2013-2014
Wallumbilla South Road	0	38.66	Pavement repairs, road reconstruction and drainage works	5,600	2013-2014
Roma Taroom Road	0	149.42	Pavement and erosion repairs and drainage works	35,000	2013-2014

3.5 Road safety review

Crash statistics for roads potentially impacted by the GFD Project have been obtained from DTMR. Due to processing timeframes, there is a natural lag in the availability of crash data that is able to be provided by DTMR. In this instance, the crash data available covers impacted roads from January 2006 to December 2010.

The data provided by DTMR revealed a total of 624 crashes along the 4,500 km of road impacted by the GFD Project, excluding traffic on the Warrego Highway east of Toowoomba where the GFD Project traffic is insignificant. The data indicates there were 22 fatal crashes within the study area.

The level of severity is one of the major indicators in crash analysis. It is a measure of the seriousness of a road traffic crash derived from the most severe casualty as a result of a crash. There are five severity levels defined in Queensland as follows:

- > Fatality — a person dies within 30 days as a result of injuries sustained in a road crash
- > Hospitalisation — a person is admitted to hospital for at least 24 hours and who does not die from injuries sustained in the crash within 30 days of the crash
- > Medical treatment — a person requiring medical treatment (but not hospitalised) as a result of a crash
- > Minor injury — injuries of a minor nature are sustained by a person in a crash such as sprains and bruises (that is, injuries requires no medical treatment, requiring first-aid treatment only or extent of injury unknown)
- > Property damage only — no person was killed or injured and
 - At least one vehicle is towed away
 - There was \$2,500 damage to property other than vehicles.

A number of factors can contribute to a crash, including driver factors (e.g. fatigue), vehicle factors (e.g. worn tyres) and road environment factors (e.g. road conditions). This section identifies key factors contributing to crashes on roads proposed to be used by the GFD Project.

The crash type is interpreted by using the “Definitions for Coding Accidents” (DCA) codes. The DCA codes are grouped into broad categories as listed in DTMR’s Data Analysis Road Crash Glossary, June 2012 to identify the common crash involvement. Below are the broad categories of DCA codes for reference. A full DCA code description is included with the raw crash data at Appendix H: Crash data.

- > 000s – Pedestrian Crash – on foot, in toy/pram
- > 100s – Intersection Crash – vehicles from adjacent approaches
- > 200s – Vehicles from opposing directions
- > 300s – Vehicles from same direction
- > 400s – Manoeuvring
- > 500s – Overtaking
- > 600s - On path
- > 700s – Non-collision, on straight
- > 800s – Non-collision, on curve

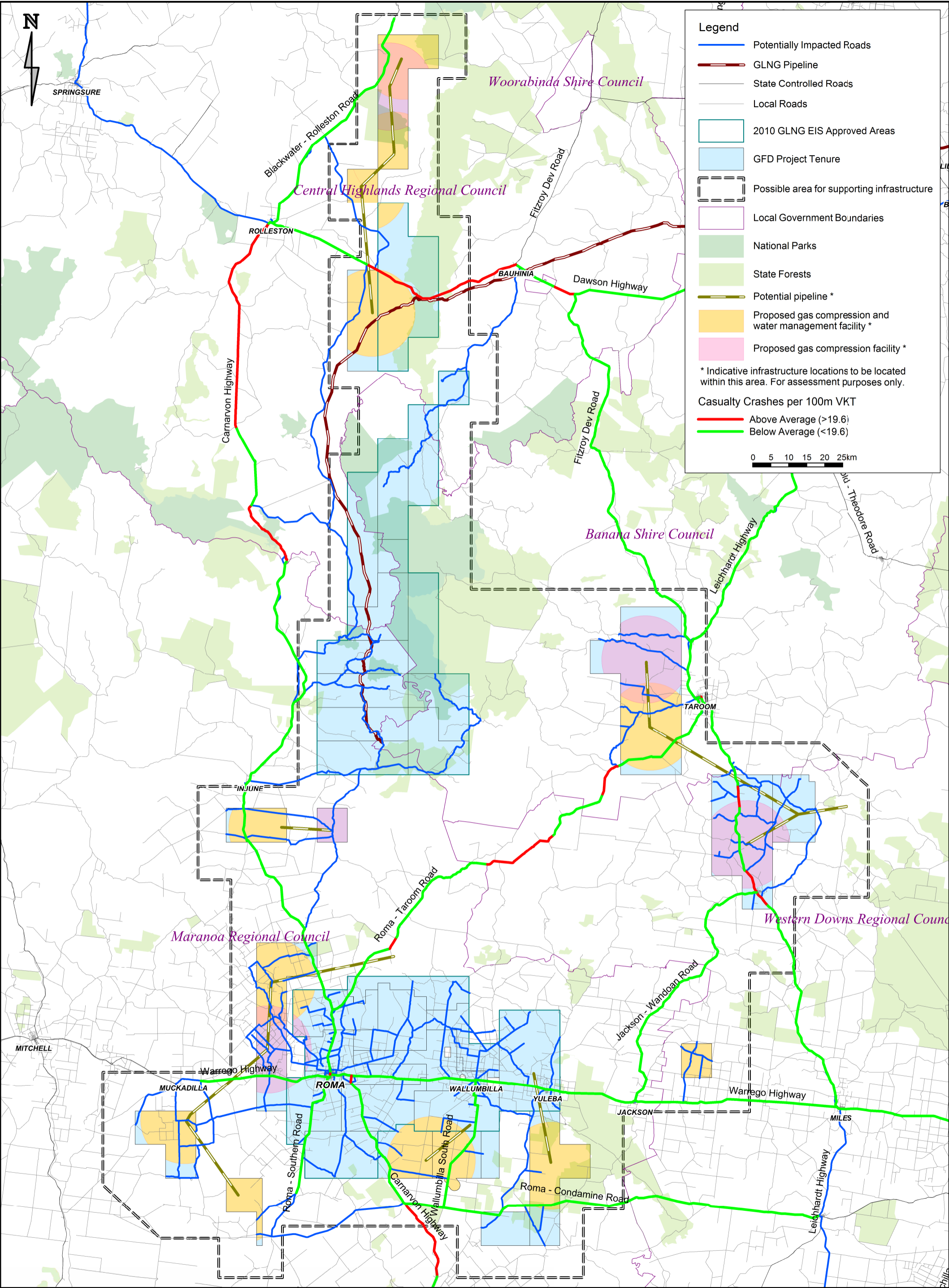
> 900s – Miscellaneous.

Table 3-5 shows the crash occurrences for each SCR broken down into DCA code group. From this breakdown, it is evident that the most common crash type was the 700s group (Non-collision, on straight), accounting for 35% of the total crashes in the study area. A “non-collision” crash is commonly referred to as a single vehicle accident as it does not occur due to two or more vehicles colliding. The 300s group (vehicles – from same direction) was the second most common with 14% of crashes, followed by the 100s group (intersection – from adjacent approaches) with 11% crash rate data figures for the GFD Project area are shown on Figure 3-1.

Figure 3-1 shows which road segments have a crash rate above or below the State average for undivided rural roads, which is 19.6 casualty crashes per 100 million vehicle kilometres travelled. The crash data for crashes on the potentially impacted State roads is shown in Appendix H: Crash data.

Table 3-5 Crash occurrences by DCA groups

DTMR Road	Crash occurrences by DCA group									
	000s	100s	200s	300s	400s	500s	600s	700s	800s	900s
Warrego Highway (18B)	2	25	28	46	9	10	13	29	7	0
	1%	15%	17%	27%	5%	6%	8%	17%	4%	0%
Warrego Highway (18C)	1	12	21	17	1	7	8	38	8	0
	1%	11%	19%	15%	1%	6%	7%	34%	7%	0%
Warrego Highway (18D)	1	9	3	16	3	4	8	41	8	0
	1%	10%	3%	17%	3%	4%	9%	44%	9%	0%
Warrego Highway (18E)	0	6	2	1	2	0	0	1	3	0
	0%	40%	13%	7%	13%	0%	0%	7%	20%	0%
Carnarvon Highway (24C)	0	0	1	0	0	0	1	2	1	0
	0%	0%	20%	0%	0%	0%	20%	40%	20%	0%
Carnarvon Highway (24D)	0	11	2	2	1	0	2	13	2	0
	0%	33%	6%	6%	3%	0%	6%	39%	6%	0%
Carnarvon Highway (24E)	1	0	1	1	0	3	12	31	4	0
	2%	0%	2%	2%	0%	6%	23%	58%	8%	0%
Leichhardt Highway (26A)	0	3	1	0	0	5	5	19	9	0
	0%	7%	2%	0%	0%	12%	12%	45%	21%	0%
Leichhardt Highway (26B)	0	0	0	1	0	2	2	15	8	0
	0%	0%	0%	4%	0%	7%	7%	54%	29%	0%
Dawson Highway (46C)	1	2	1	3	0	1	8	12	8	0
	3%	6%	3%	8%	0%	3%	22%	33%	22%	0%
Fitzroy Development Road (85A)	0	0	0	0	0	0	3	4	1	0
	0%	0%	0%	0%	0%	0%	38%	50%	13%	0%
Roma Condamine Road (344)	0	0	0	0	0	0	0	5	0	0
	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Blackwater Rolleston Road (469)	0	0	0	0	0	0	2	3	0	0
	0%	0%	0%	0%	0%	0%	40%	60%	0%	0%
Wallumbilla South Road (3441)	0	0	0	0	0	0	0	1	0	0
	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%
Roma Southern Road (3501)	0	1	0	0	0	0	0	0	0	0
	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%
Jackson-Wandoan Road (4302)	0	1	0	0	0	0	0	2	1	0
	0%	25%	0%	0%	0%	0%	0%	50%	25%	0%
Roma Taroom Road (4397)	0	0	0	0	1	0	4	3	5	0
	0%	0%	0%	0%	8%	0%	31%	23%	38%	0%
All Roads	6	70	60	87	17	32	68	219	65	0
	1%	11%	10%	14%	3%	5%	11%	35%	10%	0%



The crash characteristics that were most common on the sections of road used by the project are:

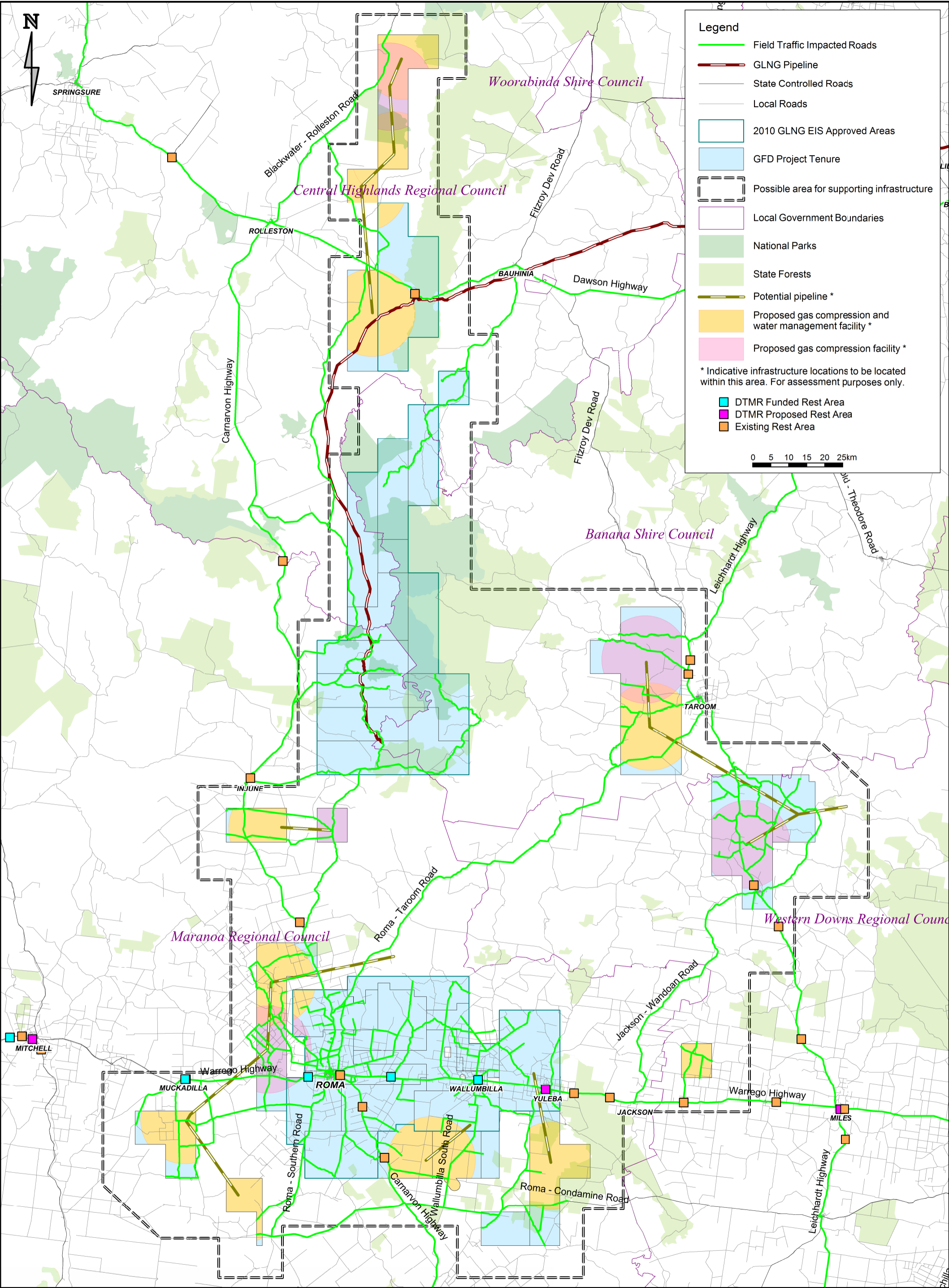
> Inattention	156 crashes (25% of crashes)
> Other (unit (vehicle) circumstance)	130 crashes (21% of crashes)
> Fatigue	125 crashes (20% of crashes)
> Failure to give way	76 crashes (12% of crashes)
> Inexperience	74 crashes (12% of crashes)
> Illegal manoeuvre	64 crashes (10% of crashes)
> Other (driver condition)	52 crashes (8% of crashes).

Crashes may have multiple causes resulting in abnormal percentage breakdowns above.

Speed was a contributing circumstance in only 21 crashes or 3% of crashes.

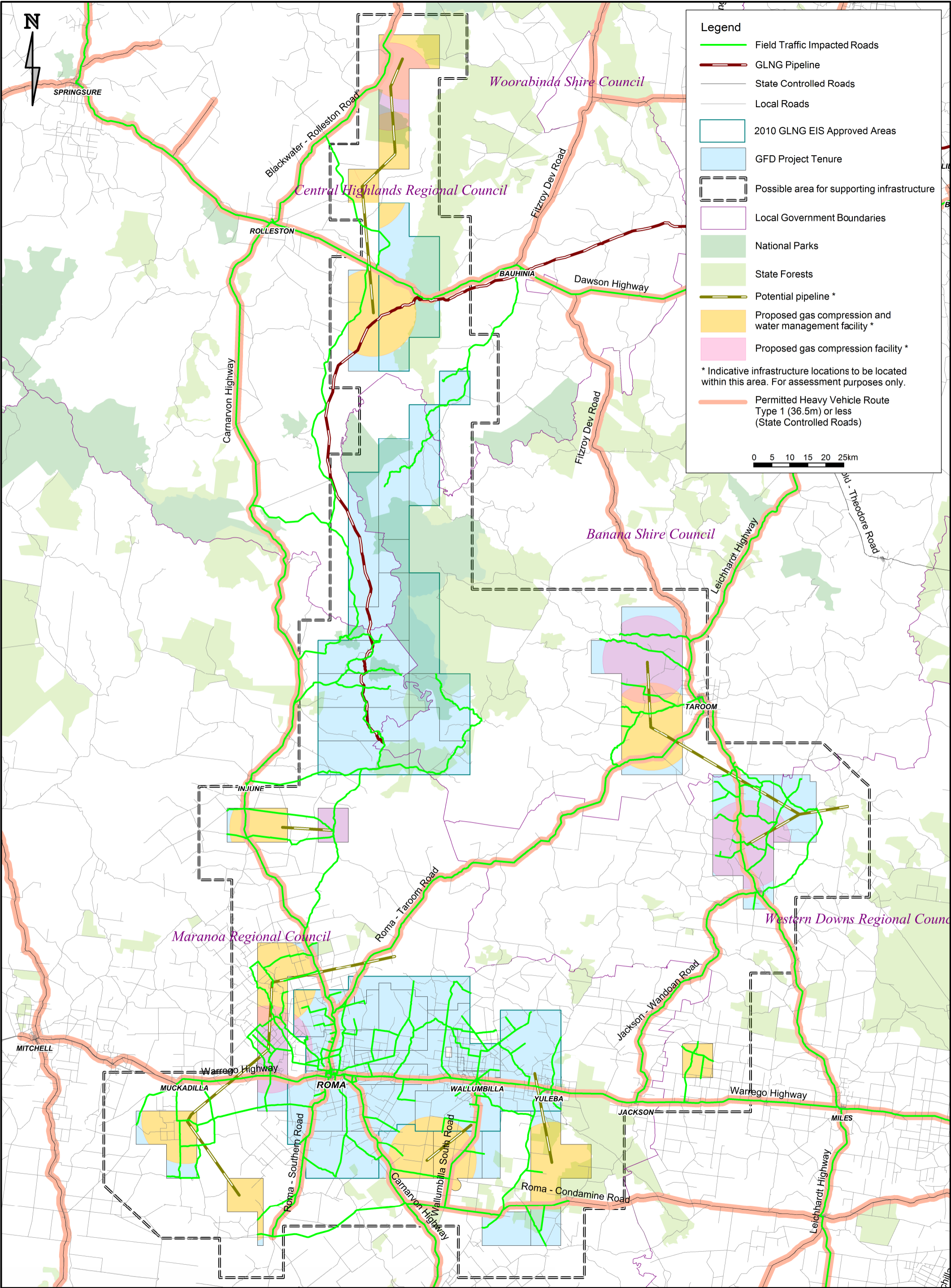
3.6 Road network rest areas

Figure 3-2 identifies each of the DTMR designated road network rest areas, located in proximity to the GFD Project area. These areas allow drivers to stop and have a break before continuing their journey.



3.7 Multi-combination vehicle routes

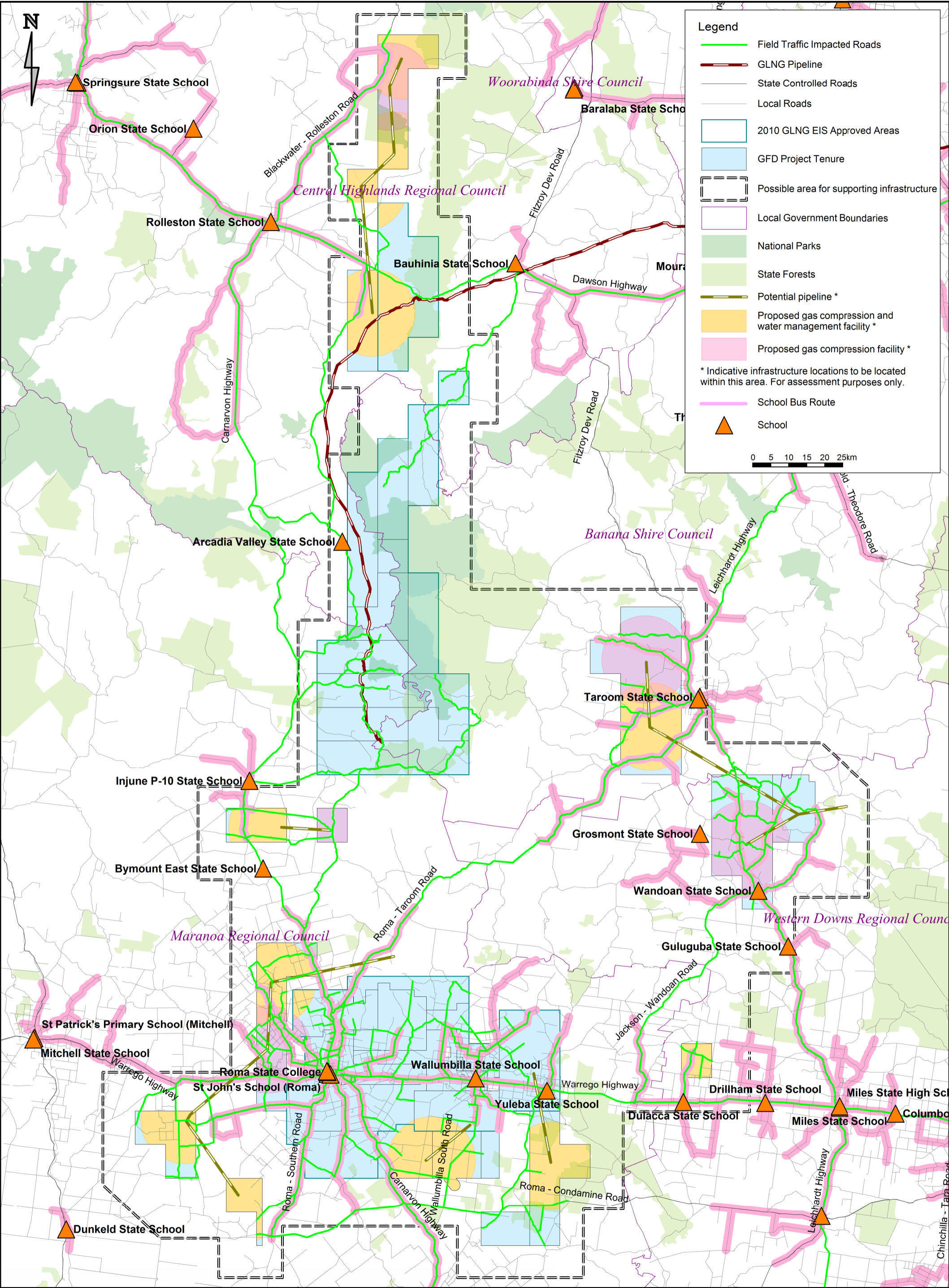
Figure 3-3 identifies each of the DTMR designated multi-combination vehicle routes located in proximity to the GFD Project area. These routes have been approved to be suitable for use by B-doubles or road trains.



3.8 School bus routes

Figure 3-4 identifies each of the school bus routes located in proximity to the GFD Project area. It identifies that routes are concentrated around towns which include educational facilities such as:

- > Arcadia Valley State School, Arcadia Valley
- > Banana State School, Banana
- > Bauhinia State School, Bauhinia
- > Bymount East State School, Bymount
- > Drillham State School, Drillham
- > Dulacca State School, Dulacca
- > Grosmont State School, Grosmont
- > Guluguba State School, Guluguba
- > Injune State School, Injune
- > Miles State High School, Miles
- > Miles State School, Miles
- > Moura State High School, Moura
- > Moura State School, Moura
- > Rolleston State School, Rolleston
- > Roma State College, Roma
- > St Mary's Primary School, Taroom
- > St Johns School, Roma
- > Taroom State School, Taroom
- > Theodore State School, Theodore
- > Wallumbilla State School, Wallumbilla
- > Wandoan State School, Wandoan
- > Yuleba State School, Yuleba.

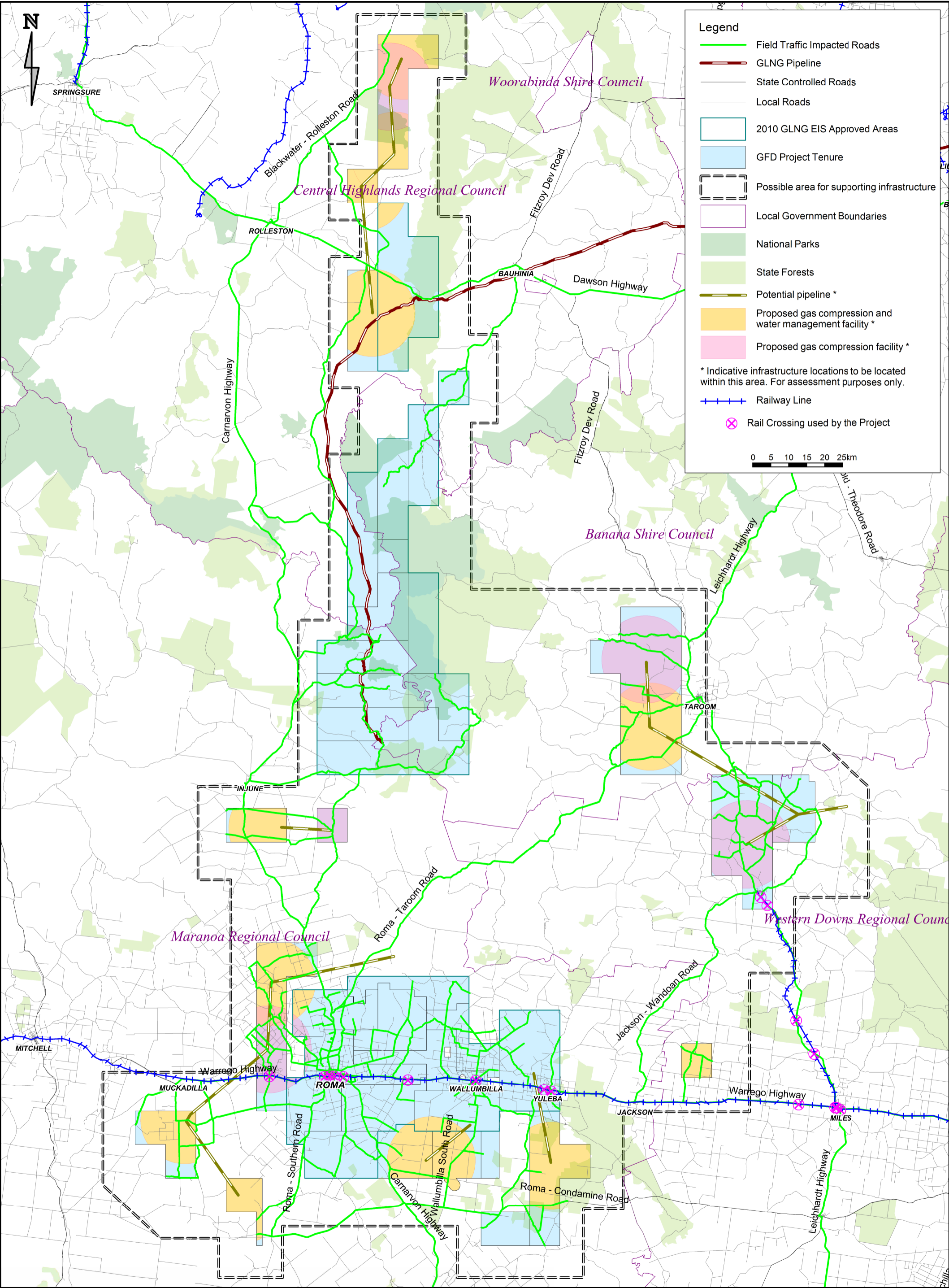


3.9 Rail crossings

Table 3-6 lists level rail crossings intersecting with key road links and control type within the GFD Project area. Grade separated crossings have been omitted as they pose no additional risk with an increase in vehicular traffic. The location of these rail crossings is shown on Figure 3-5.

Table 3-6 Rail crossing locations

Road at crossing	Location	Line crossed	Crossing type
Yuelba Surat Road	At Warrego Highway, Yuelba	Western Line	Level crossing
Wallumbilla South Road	At Warrego Highway, Wallumbilla	Western Line	Level crossing
Blue Hills Road	At Warrego Highway, Blythdale	Western Line	Level crossing
Six Mile Road	At Warrego Highway, Roma	Western Line	Level crossing
Warrego Highway	At Mayne Street, Roma	Western Line	Level crossing
Currey Street	At Warrego Highway, Roma	Western Line	Level crossing
Donnybrook Road	At Warrego Highway, Hodgson	Western Line	Level crossing
Leichhardt Highway	At Dalgowan Williams Road, Kowguran	Wandoan Branch	Level crossing
Leichhardt Highway	At Baileys Road, Gurulmundi	Wandoan Branch	Level crossing
Leichhardt Highway	Near Wubagul	Wandoan Branch	Level crossing
Windeyer Road	At Leichhardt Highway	Wandoan Branch	Level crossing



PROJECT TITLE:
SANTOS GLNG GFD PROJECT EIS

DRAWING TITLE:
Rail Crossing Locations

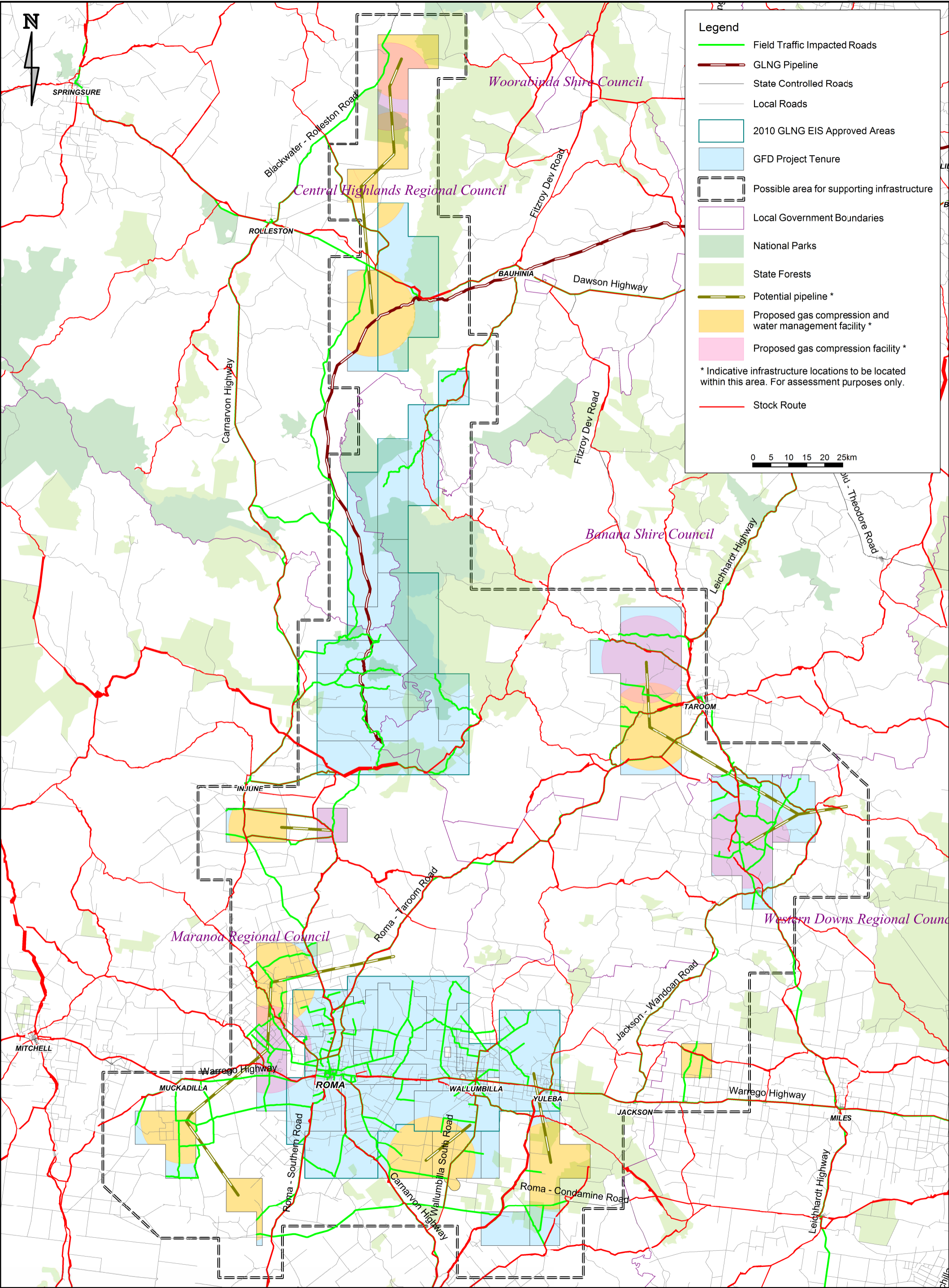
FIGURE NO.
3-5

PROJECT NO.
CEB06417

DATE DRAWN
25/08/2014

3.10 Stock routes

Figure 3-6 identifies each of the stock routes located in proximity to the GFD Project area. Stock routes are regulated under the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld).



3.11 Airports

The following aerodromes are within the proximity of the GFD Project area.

- > Clonduff (Taroom)
- > Injune
- > Rolleston
- > Roma.

The GLNG Project is using Roma airport and the GFD Project is not planning on utilising the other airports. However, for the purposes of this study and analysis of maximum development, their use was considered.

Injune Airport does not currently support public flight services. Current facilities include a sealed runway, two sealed helicopter pads and a sealed apron.

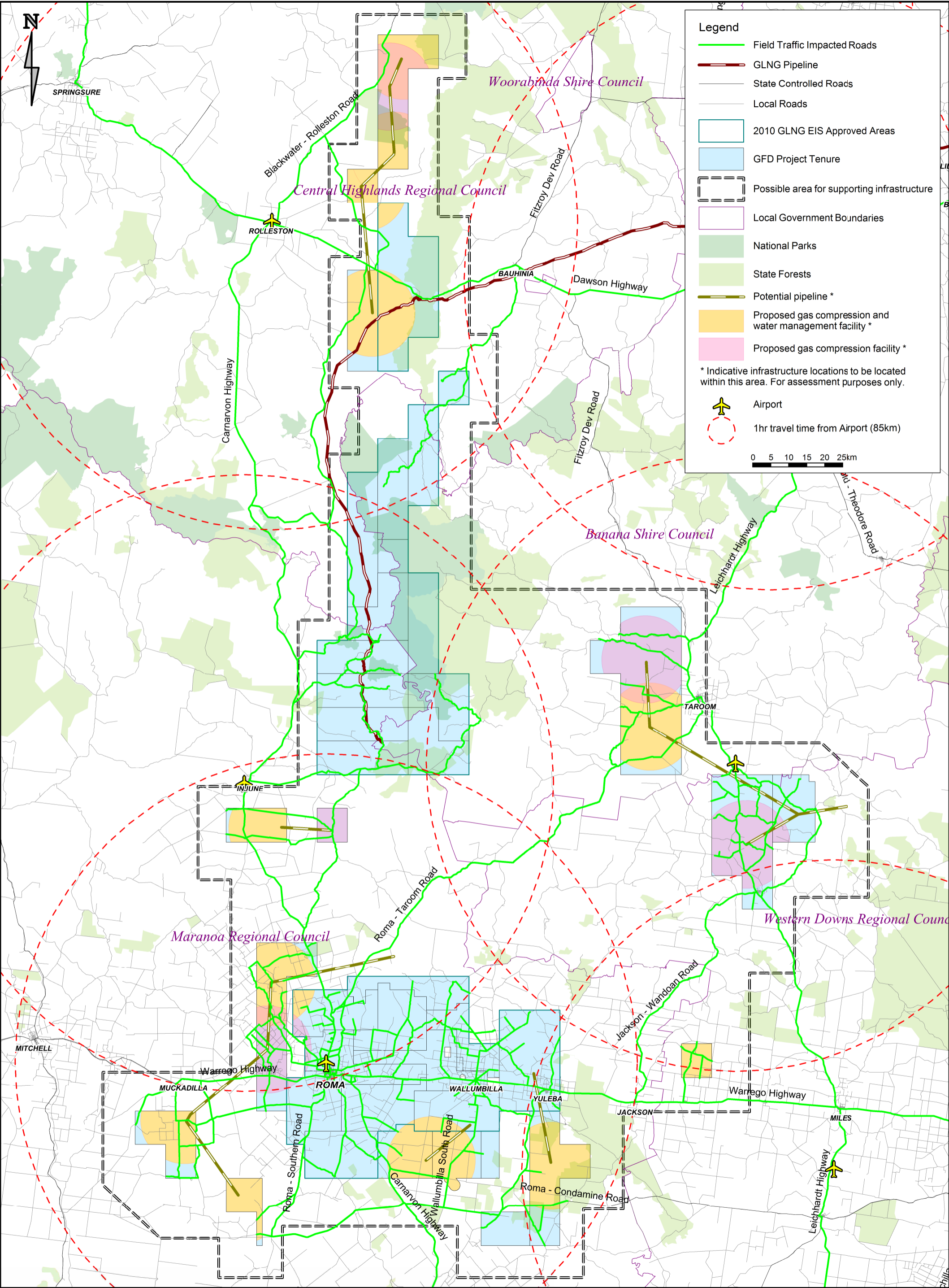
Clonduff Airport has been identified by the Queensland Government as an airport of economic significance. It does not currently support public flight services. Current facilities are modest with an unsealed runway and small, sealed apron.

Rolleston Airport does not currently support public flight services. Current facilities include a sealed runway and small, sealed apron.

Roma Airport has been identified by the Queensland Government as an airport of economic significance and is the only facility that currently provides public services to the region. The Roma Airport has recently undergone a \$14 million upgrade, partly funded by Santos GLNG, to improve airport facilities and accommodate 50 seater aircraft. The Roma Airport currently accommodates 50 seat passenger aircraft and executive jets. Qantas operates approximately 55 flights to and from Brisbane each week, with a capacity of approximately 2,800 seats. These flights are currently used by the general community and resource workers, including those working on the Santos GLNG Project.

As more detailed planning occurs other regional airports may be considered for use and assessed accordingly and the relevant approvals process will be applied.

Figure 3-7 illustrates the location of each airport facility within proximity to the GFD Project area.



3.12 Sea ports

It is expected that the Port of Brisbane will handle the vast majority of imported materials, required for the GFD Project. The Port of Brisbane currently has 31 operating berths and over 7,800 metres (m) of quay line. Of these berths, eight are reserved for containers. Approximately 700 m of the total quay line is dedicated to general-cargo wharves, which can handle break-bulk cargo, containers, motor vehicles and other roll on/roll off cargo.

The Port of Brisbane continually reviews its current shipping demands and future shipping demands. The port has produced publications such as the *Brisbane Port Land Use Plan* and the *Draft Land Use Plan 2013*, which outline future development at the port based on predicted cargo movement demands. The volume of cargo associated with the development of the GFD Project will be greatest during the construction stage, before tapering during the operations stage.

3.13 Active transport network

In rural Queensland there are basic pedestrian and cycle infrastructure requirements inside local townships. However, due to the distances between residential areas and facilities outside of townships, outside of town centres pedestrian and cycle lanes are not provided.

The GFD Project will not influence nor create the need for additional active transport facilities/networks.

3.14 Public transport network

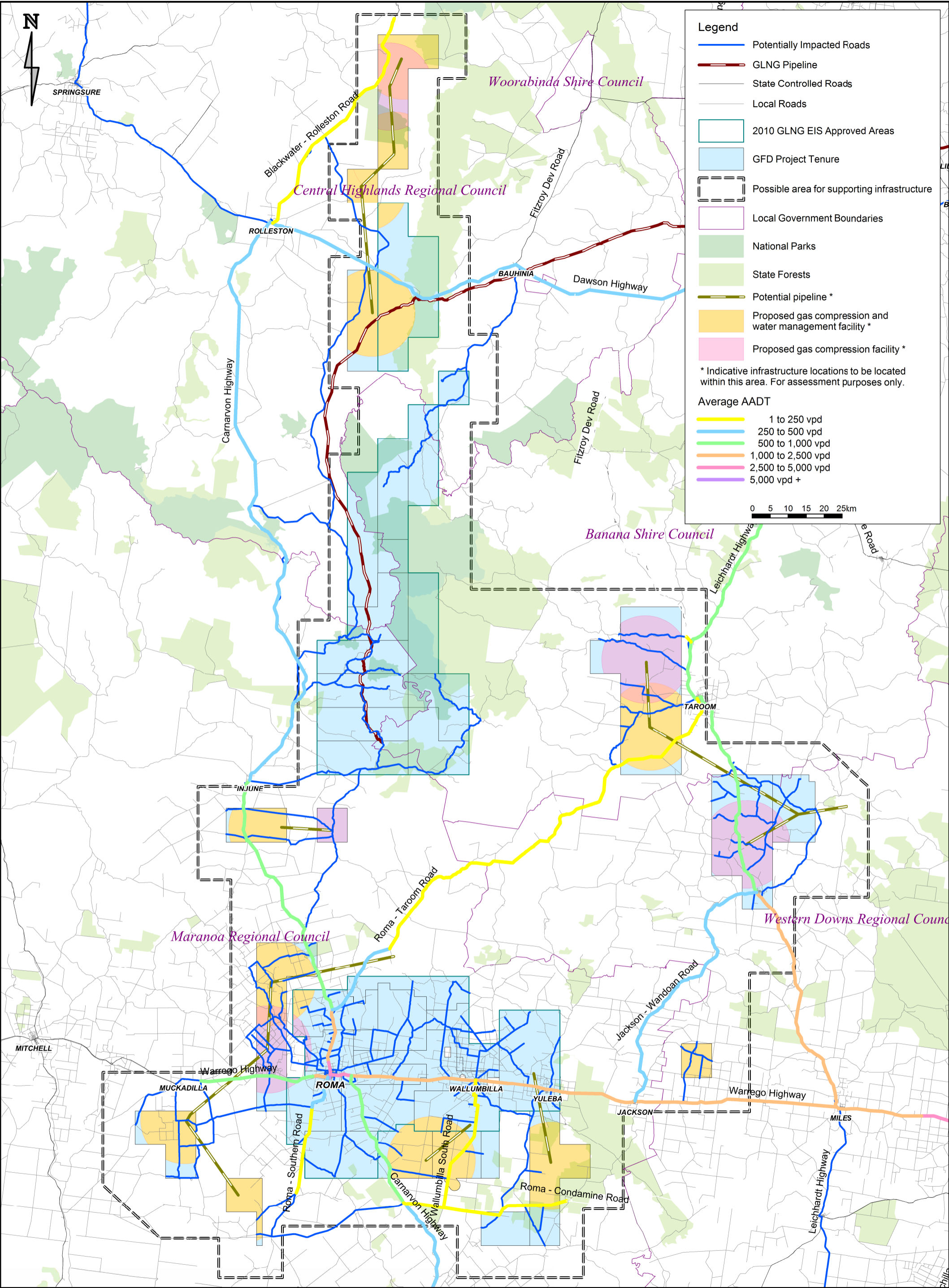
Within the GFD Project area, there are no existing intra-city public transport facilities or networks. Commercial bus services do however operate multiple long-distance commercial bus services within the GFD Project area with stops located at most major townships in the Surat and Bowen basins. Towns serviced include Roma, Dalby, Warra, Chinchilla, Miles, Tara, Tambo and Taroom.

Other than privately operated bus services being used directly by the GFD Project operations, the GFD Project will not influence or create the need for additional public transport facilities/networks.

4 Current and cumulative road network traffic volumes

4.1 Existing traffic volumes

The background daily two-way traffic volumes on each of the road sections were determined based upon existing AADT volumes and intersection counts provided by DTMR and relevant councils. The available count data is typically from years 2011 and 2012. The daily traffic volumes (as existing at 2011/2012) on impacted roads are shown on Figure 4-1.



4.2 Regionally significant projects

Projects for inclusion in the GFD Project's cumulative impact assessment are those within the GFD Project's tenures and within a 50 km buffer around the tenures (or a greater buffer for some broader reaching values) that:

- > Are currently being assessed under Part 1 of the Chapter 3 of the EP Act (Qld) and as a minimum, an IAS is available on the Queensland Department of Environment and Heritage Protection (EHP) website
- > Have been declared a 'coordinated project' by the Coordinator-General under the *Sustainable Development and Public Works Organisation Act 1971* (Qld) and an EIS is currently being prepared or is complete and, as a minimum, an IAS is available on the Queensland Department of State Development, Infrastructure and Planning website
- > Will, or may, use resources located within the region (including material, groundwater, road networks or workforces) that are the same as those to be used by the GFD Project
- > Could potentially compound residual impacts that the GFD Project may have on environmental or social values
- > Are existing or historic projects within the GFD Project area and surrounding buffers, which are considered to constitute part of the baseline environment
- > Projects for which environmental impact statements are public.

The projects listed below fit the above criteria, and are included as part of the baseline traffic volumes to assess cumulative impacts:

- > Australia Pacific LNG Project (APLNG)
- > Arcturus Coal Mine Project
- > Arrow Bowen Gas Project
- > Bundi Coal Project
- > Dingo West Coal Mine
- > Elimatta Coal Mine Project
- > Ergon Energy Blackwater to Emerald Powerline Replacement
- > Gladstone LNG Project
- > Minyango Coal Project
- > Nathan Dam and Pipelines
- > Norwood Coal Mine Project
- > North Surat-Collingwood Coal Mine Project
- > North Surat Taroom Coal Mine Project
- > Powerlink Blythedale, Fairview and Fairview South Substations Project
- > Powerlink Eurombah to Fairview Transmission Line Project
- > Powerlink Wandoan South to Eurombah Transmission Network Project
- > Powerlink Yuleba North to Blythedale Transmission Line Project

- > Queensland Curtis LNG Project (QCLNG)
- > Rolleston Coal Expansion Project
- > Spring Gully Power Station
- > Springsure Creek Coal Mine Project
- > Arrow Surat Gas Project
- > Surat Basin Railway
- > Arrow Surat to Gladstone Pipeline Project
- > The Range Coal Mine Project
- > Wandoan Coal Mine Project.

The traffic generated by these projects is shown in Appendix B: Cumulative impact volumes.

4.3 Cumulative traffic volumes

Table 4-1 below lists the regionally significant projects within the scope of assessment and indicates whether these projects have been included in the assessment of cumulative traffic impacts.

Table 4-1 Regionally significant projects included for assessment

Project name	Status	Included or not
Australia Pacific LNG Project (APLNG)	Approved Nov 2010	Included in assessment
Arcturus Coal Mine Project	Final ToR issued	Not Included in assessment – Information unavailable
Arrow Bowen Gas Project	Notification of EIS	Project impacts are beyond GFD Project area
Bundi Coal Project	Final ToR issued	Not Included in assessment – Information unavailable
Elimatta Coal Mine Project	Public Notification of EIS	Included in assessment
Ergon Energy Blackwater to Emerald Powerline Replacement	Final EIS released	Not Included in assessment – Information unavailable
Gladstone LNG Project	Approved May 2010	Included in assessment
Minyango Coal Project	Proponent Response to Submissions	Not Included in assessment – Information unavailable
Nathan dam and Pipelines	Supplementary EIS being prepared	Project impacts end before GFD Project commences
Norwood Coal Mine Project	Final ToR issued	Not Included in assessment – Information unavailable
North Surat-Collingwood Coal Mine Project	Final ToR issued	Not Included in assessment – Information unavailable
North Surat Taroom Coal Mine Project	Final ToR issued	Not Included in assessment – Information unavailable
Powerlink Blythedale, Fairview and Fairview South Substations Project	Draft design underway	Not included – traffic-related impacts end before GFD Project commences
Powerlink Eurombah to Fairview Transmission Line Project	EIS in preparation	Not included – traffic-related impacts end before GFD Project commences
Powerlink Wandoan South to Eurombah Transmission Network Project	Final EIS released	Not included – traffic-related impacts end before GFD Project commences
Powerlink Yuleba North to Blythedale Transmission Line Project	EIS in preparation	Not included – traffic-related impacts end before GFD Project commences
Queensland Curtis LNG Project (QCLNG)	Approved Jun 2010	Included in assessment
Rolleston Coal Expansion Project	Final ToR issued	Not Included in assessment – Information unavailable
Spring Gully Power Station	Approved 14 Sep 2009	Included in assessment
Springsure Creek Coal Mine Project	Approved 14 Sep 2009	Project impacts are beyond GFD Project area
Arrow Surat Gas Project	Public Notification of EIS	Included in assessment
Surat Basin Railway	SEIS in preparation	Included in assessment
Arrow Surat to Gladstone Pipeline Project	Approved Jan 2010	Traffic information not available in EIS
The Range Coal Mine Project	Notification of EIS	Project impacts are beyond GFD Project area
Wandoan Coal Mine Project	Approved Nov 2010	Included in assessment

4.4 Resultant traffic volumes

A background vehicle growth rate of 3% per annum (compounded annually) has been applied to road segments within the study area, to establish future background traffic volumes. This rate represents the growth in traffic not contributable to major projects.

This growth rate has been derived from historic AADT traffic growth rates of between 2% and 10% per annum. Those roads where a higher growth rate has been experienced have had significant major project activity in recent years, and so a rate at the lower bound of this range has been selected.

Growth attributable to major projects has then been considered separately by collating the cumulative traffic generated by projects outlined in Table 4-1. This traffic has then been added to the background traffic for each relevant road link to form the assessed baseline traffic volumes (i.e. the volumes without the GFD Project). Herein the term background or existing traffic is used to describe traffic not related to GFD Project traffic.

The projected “background” and “background plus GFD Project” traffic volumes are included in Appendix A: GFD Project traffic volumes.

5 GFD Project activities

This section describes the GFD Project activities as they relate to the transport demand for the GFD Project. It represents a maximum impact development scenario, and it is recognised that there may be efficiencies in the transport demand found after the GFD Project is further defined. These efficiencies will be captured in subsequent impact assessments submitted to the relevant authorities for the roads and facilities impacted as the GFD Project is defined and sanctioned by Santos GLNG.

5.1 Project phases

Exploration and appraisal phase activities are not included in this assessment. Gas production will only occur after the appraisal phase has been completed and the business has sanctioned development of a certain part of the GFD Project area.

This assessment splits gas production into three phases for the purposes of the study:

- > Construction
- > Operations
- > Decommissioning.

5.2 Construction

This section gives an overview of the activities undertaken during the construction phase of the GFD Project which constitute the basis of this assessment. The below description describes possible outcomes of development that would present the maximum impact transport assumption. It may not reflect actual outcomes of development that would lessen the transport impact. This phase will generally have the highest number of daily vehicle trips and therefore the greatest impact on roads which the GFD Project uses. Further detail in regard to the likely transport impacts associated with these activities is outlined in Section 6: GFD Project demands.

5.2.1 Production wells and gathering infrastructure

On completion of exploration and pilot well testing, final placement of wells is considered before well construction commences. Approximately 6,100 wells are proposed to be drilled across the GFD Project area. Drilling may be carried out on a 24 hour per day basis, with drilling assumed to take approximately one to three weeks per well depending on the rig used, and the depth and geology of the well. Multiple wells may be drilled from the same drilling lease. The number and type of well drilled at each lease is determined through detailed information gathered during the exploration and appraisal phase.

Each drilling area will require an access track to be constructed from the closest access road. For the purpose of this study, a 1 km long access track is expected to be required for each drilling lease. It has been assumed that aggregate will be required to cover the track before drilling commences.

The size of the drilling area will depend on whether a single well (approximately 1.5 hectares (ha)) or a multi-well pad (approximately 2.5 ha) is constructed. For the purposes of this assessment, wells are distributed evenly across each gas field (Arcadia, Fairview, Roma and Scotia).

Pipelines are proposed to be installed by means of a traditional clearing, trenching, stringing, backfilling and rehabilitation construction method.

In order to support the construction of this infrastructure, small temporary camps and lay down facilities will be built. Camps will consist of modular and relocatable facilities and will generally occupy an area of one hectare or less in size. Laydown yards are likely to be 0.5 ha in size.

5.2.2 Gas compression and associated facilities

This assessment considers each of these facilities to include required infrastructure to support transmission of gas from gathering lines to the Gladstone gas transmission pipeline. This infrastructure includes the following:

- > Petroleum fuel tanks
- > Electricity supply
- > Satellite stations
- > Administration buildings
- > Workshops
- > Storage
- > Construction camp used during the construction phase
- > Hub gas compression facility
- > Nodal gas compression facility
- > Water management facility
- > Concrete plant
- > Laydown facility
- > Operations camp used during the operations phase
- > Borrow pits and quarries.

Semi-permanent camps to support construction activities will be constructed adjacent to work areas and will cover an area of approximately 20 ha and accommodate up to 600 workers. Laydown areas are likely to be 25 ha in size to store construction materials whilst borrow pits will be used to source material to construct access roads, pads, etc. This infrastructure will include associated sanitation, water supply, road network and electrical servicing.

Nodal gas compression facilities will be installed where required to compress gas to the pressure required for transmission via infield transmission pipelines to the hub gas compression facilities. Combined gas compression (and treatment if required) and water management facilities will be developed in each of the gas fields (Arcadia, Fairview, Roma and Scotia). The existing facilities may also be extended to accommodate additional gas production and water management.

Camps to support project operations will also be provided on-tenure.

5.3 Operations

This section gives an overview of the activities undertaken during the operations phase of the GFD Project that are part of this assessment. The following sections describe possible outcomes of development that would present the maximum impact transport scenario. It may not reflect actual outcomes of development that would lessen the transport impact. Furthermore, Santos GLNG has policies and procedures in place to reduce traffic impacts. The estimates in this document are

maximum impacts. Further detail in regard to the likely transport impacts associated with these activities is outlined in Section 6: GFD Project demands.

5.3.1 Production wells and gathering infrastructure

For the purpose of this assessment, wells are expected to be operational for up to 30 years. Wells will be monitored and controlled remotely; however as required, wells will be visually inspected and maintained. Well work overs will be undertaken over the operational life of the well to improve gas flow and maintenance of wells will generally be required every three years.

Gathering lines and infield transmission pipelines are not expected to require major maintenance. Inspection of these lines will be undertaken as part of the routine field maintenance activities (i.e. at the same time as production well inspections).

As inspections of this production well infrastructure will be undertaken occasionally, localised transport network impacts are likely to be relatively minor during this stage, especially when noting that wells will be spread out across the GFD Project area. For the purposes of this assessment, operations activities will be based out of the Roma Logistics Warehouse, located approximately 7 km east of Roma. This includes the staging of equipment deliveries for the purpose of long-term maintenance.

5.3.2 Gas compression and associated facilities

Gas compression facilities will be operated on a continuous basis and will be fully automated. These facilities can be either unmanned facilities or staffed during the day with plants operated and monitored remotely at night. Where the facilities are manned, the operators will generally live in camps near the asset and commute to work on field roads.

Routine inspections and maintenance will be conducted on equipment at the facilities. This will comprise a combination of scheduled inspection and maintenance on select equipment and in some instances a full plant shutdown with more extensive maintenance.

To ensure the smooth operation of these processing facilities, supporting infrastructure such as accommodation facilities, access roads, maintenance areas, storage areas, etc. may also continue to be operated and maintained. Permanent operations camps will accommodate 60 to 100 workers and will be designed for the entire operational life of those facilities which it supports.

5.4 Decommissioning

This section gives an overview of the activities undertaken during the decommissioning phase of the GFD Project that are part of this assessment. The following sections describe possible outcomes of development that would present the maximum impact transport assumption. It may not reflect actual outcomes of the development that would lessen the transport impact. Detail in regard to the likely transport impacts associated with these activities is outlined in Section 6: GFD Project demands.

5.4.1 Production wells and gathering infrastructure

Decommissioning of production wells will occur on an ongoing basis as gas is depleted. Plugging and decommissioning of production wells will be conducted in accordance with the regulatory requirements and Queensland Government's *Code of Practice for Constructing and Abandoning Gas Wells in Queensland* (DEEDI et al., 2011). Surface equipment, for example wellheads, generators, separators, tanks, and other facilities will be removed. This equipment will be made available for reuse on other well leases, sold or disposed of as appropriate for the type and condition of the equipment. Buried pipelines will be decommissioned and left in place to minimise further disturbance. Surface gathering lines will be removed for reuse or disposal.

5.4.2 Gas compression and associated facilities

Gas compression facilities will be decommissioned after wells supplying gas to the facility have been depleted. The modular components of the gas compression facilities and the water management facilities will be reused at other assets, sold or scrapped.

Further, decommissioning will involve the isolation, draining and purging of equipment, the disconnection of pipework, and the disassembly of components for transportation. Underground electrical and piping will be decommissioned. Water storage structure decommissioning activities will involve the removal of coal seam water, with remaining water (which cannot be pumped) allowed to evaporate. Following removal of water from the water storage structure, the accumulated sediment, liner and leakage detection systems will be removed. Waste materials will be transported for disposal at a licensed facility.

6 GFD Project demands

For the purposes of the GFD Project assessment below, the EIS maximum development scenario has been applied and a set of assumptions derived to reflect this approach. These assumptions have been adopted to assist in generating a reasonable traffic generation scenario.

6.1 Traffic generation

The expansion of the gas fields will occur at a steady rate over the next 30+ years as outlined in Section 1.3 of Section 1: Introduction and Section 5: GFD Project activities. It will consist of an ongoing program of well development and associated infrastructure. This will cause the ongoing addition of GFD Project traffic to roads throughout the gas field areas. For this assessment, development is assumed to be undertaken in a migratory fashion to best utilise resources in a certain location, and minimise unnecessary movement of heavy equipment and personnel.

While the nature and location of the development required in the early stages of the GFD Project has been planned, details of the location and nature of the development required further into the future will not be known until further exploration work is undertaken and the scope of development is determined.

Even though the final scope of the development has not been determined, overall traffic generation has been estimated for the gas field construction, operations and decommissioning phase activities. Annual, daily and peak hour trip generation has been estimated, and used in the subsequent analysis of intersections, road links and pavement impacts contained in this report. Summary tables of the expected traffic generation of each project component for each year over the life of the GFD Project are contained in Appendix C: Trip generation.

Below is a description of the two primary generators of traffic for the GFD Project.

6.1.1 Personnel

Construction and operations activities associated with the gas fields are expected to take place seven days a week for 52 weeks of the year. Gas field construction and operations personnel generally work a 21-day on, 7-day off and 14-day on, 14-day off work cycle respectively on a fly-in/fly-out basis. Each construction related worker is assumed to fly into the closest airport once, travel to the worker accommodation by bus (assumed 20 passengers per bus) and work in the gas fields for 21 days before flying out of the closest airport for seven days off. This assessment estimates that rolling shift changes will occur once every two weeks, with half occurring during the combined peak hours (morning and afternoon) of GFD Project traffic generation. It is likely that more frequent shift changes, of fewer personnel, may occur, but this will not significantly change the traffic impacts.

Once on-tenure, field personnel will travel by four-wheel-drive vehicle from the accommodation camps in the gas field area. Most of the movements of personnel on a daily basis are expected to occur within the field access tracks and local roads. Personnel working in the Roma Logistics Warehouse are assumed to be living in Roma. It is expected that these personnel will be travelling to and from the Roma Logistics Warehouse once a day using private vehicles.

The traffic movement patterns described above have been adopted for personnel working in both the construction and operations phases of the gas field development. These assumptions create a robust assessment scenario by assuming that personnel travel will be concentrated on specific days, with the assessment considering these days and their peak travel periods.

6.1.2 Deliveries

Deliveries of supplies, equipment, and materials to the gas field construction areas have been assumed to occur twice a week. Thus, by concentrating deliveries to two days per week instead of splitting evenly across the week, a more conservative scenario has been assessed. As deliveries are likely to be spread throughout the day, this assessment estimates that approximately 10% of construction deliveries will occur during each of the morning and afternoon peak hours.

6.2 Traffic distribution

The distribution of GFD Project traffic considers the origins and destinations of each vehicle trip. Trips in each GFD Project component were broken down by type (cement, equipment, aggregate, pipe, etc.). Travelled routes for each trip type were also assumed. The same distribution assumptions were used in performing the midblock capacity assessment, intersection assessment and pavement impact assessment.

It should be noted that the following key assumptions have been made in relation to GFD Project traffic distribution:

- > Quarry material will originate from areas within each gas field
- > Concrete material will be batched within each gas field
- > Items with an origin or destination defined as “airport” will be assumed to be to/from the closest airport to the facility, based on the following list:
 - Clonduff (Taroom) — beginning use in 2017
 - Injune — beginning use in 2016
 - Rolleston — beginning use in 2017
 - Roma — already in use.
- > Santos GLNG has no plans at present to use airports other than Roma. This assumption has been adopted to assist in generating a reasonable traffic generation scenario.
- > Other material apart from those identified above will be delivered from Brisbane
- > Trips defined herein are two-way trips, that is, each trip includes the vehicle traveling to and from the destination.

6.2.1 Construction deliveries

Traffic movements associated with the gas field construction phase will include deliveries of construction equipment and materials and drilling rig movements. Deliveries associated with construction will include equipment and materials for construction of access roads, fencing, well drilling areas, pipelines, and compressor stations, water management facilities and accommodation facilities. The material and equipment for the gas fields is expected to be sourced from Brisbane. The total traffic movements estimated for the construction of each proposed well lease are presented in Appendix C: Trip generation.

It is expected that almost all movements for construction deliveries and setup will be heavy vehicles, with the exception that half the miscellaneous trips are estimated to be light vehicles.

Rail transportation may be possible and will be considered in the planning stages. The use of ports will be required for the importation of equipment and construction materials.

6.2.2 Operation deliveries

It is not anticipated that significant amounts of materials will be transported to the gas fields after the completion of well lease construction, unless required for more significant repair or maintenance work. A nominal number of operations traffic movements per year not related to personnel transport has been included in the assessment. It is expected that approximately half of these movements will be heavy vehicle, and half light vehicles.

In creating the distribution assumptions a number of routes have been identified. The following describes these various route types, which should be consistent across the various fields.

6.2.3 Traffic distribution routes

6.2.3.1 External trip to hub facility – From Brisbane

These are primarily trips to the hub gas compression facility. These trips will use a major route to the hub gas compression facility, usually a sealed road, with no drop off in volume along the road lengths utilised.

6.2.3.2 External trip to gas field facility – from Roma

These are primarily trips for the gas field facility. These trips will use a major route to the gas field facility, usually a sealed road, with no drop off in volume along the road lengths utilised.

6.2.3.3 External trip to wells – from Brisbane

These are equipment trips that will be directly delivered to a well. These trips will use the roads within a field area, starting off from the major routes and dispersing throughout.

6.2.3.4 External trip to wells – from Roma

These are trips, such as operational trips, that will go directly to a well. These trips will use the roads within a field area, starting off from the major routes and dispersing throughout.

6.2.3.5 External trip to camps – from closest airport

These are the bus and car trips that will go directly to a camp. These trips will use the roads within a field area, starting off from the major route closest to the nearest airport and dispersing throughout the network.

6.2.3.6 Internal trip to well – from hub facility.

These are the trips for the movement of equipment from the hub facility, such as gathering infrastructure from the laydown facility that will then distribute out to the wells.

6.2.3.7 Internal trip to well – from well camps

These are the movement of vehicles from the well camps (bus and light vehicles) that will then distribute out to the wells. This distribution of trips will mean the roads closest to the well camps will have the highest volume of traffic, although these will usually only impact the road closest to the camp.

6.2.3.8 Internal trip to well – from other wells

These are the movement of vehicles from the wells, such as rig movements, that will then distribute out to the other wells. This distribution of trips will mean that roads will be impacted proportionally dependant on the number of wells accessed from it.

6.2.3.9 Well distribution assumptions

Trip distribution per well to roads has been calculated based on the assumption that wells will be evenly distributed across the entire project area.

In distributing the trips, the road assigned to a well is assumed to be the closest geographical road to each well. This process allows the percentage of wells for each road to be highlighted for each of the field areas.

The distribution and assignment of traffic generated by the gas fields to the road network has been determined from the traffic movement patterns above as well as likely sources and destinations for materials and equipment as provided by Santos GLNG. The general origin and route for traffic associated with the gas fields is presented in Table 6-1.

Table 6-1 Gas field traffic distribution

Traffic component	Origin	Route
Material/equipment delivery	Brisbane	Along Warrego Highway to field accesses along Warrego Highway and Carnarvon Highway
Personnel – Roma Logistics Warehouse	Live in Roma	Distributed around Roma to the Santos GLNG Roma Logistics Warehouse located approximately 7km to the east of Roma
Personnel – Roma gas field	Roma	To field accesses along Warrego Highway and Carnarvon Highway at various locations
Personnel – Fairview gas field	Injune	Carnarvon Highway to field accesses at Injune-Taroom Road and Fairview Road
Personnel – Arcadia gas field	Injune and Rolleston	Carnarvon Highway to field access at Arcadia Valley Road and Mulcahys Road
Personnel – Scotia	Taroom	To field accesses along Leichhardt Highway and Jackson Wandoan Road at various locations

6.3 Forecast traffic volumes

The total transport task associated with the GFD Project has been forecast based on the trip generation rates and trip origins/destinations. The total transport task represents the total number of vehicle kilometres likely to be travelled by traffic associated with the GFD Project on the SCR network. The spatial extents of the road network assessed are those shown on Table 6-2. The total transport task statistic provides a strategic overview of the extent of traffic activity generated by the GFD Project over its life.

Table 6-2 summarises the total vehicle kilometres travelled (VKT) estimated for the GFD Project life.

Table 6-2 GFD Project total transport task on SCR

Vehicle	Transport task (VKT) (million)
Light vehicle	890.6
Heavy vehicle including buses	2,346.6
TOTAL	3,237.2

The traffic predicted to occur over the life of each SCR segment is shown on a volume duration graph in Appendix C: Trip generation.

The total expected VKT over the study road network is expected to be 68,626 million VKT between 2013 and 2056. This compares to the total transport task associated with the GFD Project which is expected to be 3,237.2 million VKT, which represents around 4.72% of future traffic on the study network between 2013 and 2056.

For reference, forecasts placed annual VKT on Queensland Roads at 47,420 million VKT in 2010 (Bureau of Infrastructure, Transport and Regional Economics, 2011).

7 Assessment methodology

The overall impact of the GFD Project on the traffic and transport network was determined by creating a GIS based traffic model using the traffic generation and distribution assumptions outlined in Section 6: GFD Project demands. The traffic volumes were then extracted from the model for further analysis. This section describes the process of determining the impact of the GFD Project on the traffic and transport network. The transport model for the GFD Project has been developed as follows:

- > Review of GFD Project description to understand GFD Project traffic demands and likely travel patterns
- > Preparation of GFD Project traffic assumptions based on the GFD Project description and Santos GLNG supplied data
- > Development of a GFD Project traffic demands spreadsheet
- > Development of GFD Project vehicle routes in GIS format based on travel pattern assumptions
- > Distribution of GFD Project traffic throughout the GIS based road network model
- > Identification of major intersections which GFD Project traffic utilises. At the EIS stage, these have been assumed to be State/State or State/council-controlled intersections
- > Combination of GFD Project traffic with, background volumes surveyed or provided by the relevant road authority, and cumulative traffic based on evaluation of other major projects within the GFD Project area.

The traffic model outputs are then used to assess the impact of GFD Project traffic on the road network and identify mitigations required. The following assessments were carried out:

- > Pavement Impact Assessment (PIA)
- > Intersection assessment
- > Road link volume assessment.

The methodology undertaken for each of the above assessments is explained in the following sections.

7.1 Pavement impact assessment

Analysis has been conducted to identify the pavement impacts of heavy vehicles associated with the GFD Project, on SCRs. The assessment includes the assessment of impacts during the construction, operations and decommissioning stages of the GFD Project.

The PIA comprises two components: the impact on the timing of pavement rehabilitation and the increased need for regular maintenance. Each component is calculated based on a comparison of the cumulative ESA load without and with the GFD Project. The methodology for the PIA is based on GARID (DTMR, 2006).

An overview of the methodology adopted to assess pavement impact contributions is as follows:

- > Maintenance
 - Calculate the annual ESAs generated by background traffic volumes based on existing road network traffic volumes and vehicle class ESA assumptions provided by DTMR
 - Calculate the GFD Project's annual heavy vehicle ESA loadings on GFD Project roads based on standard ESA rates for each vehicle class
 - Where ESAs are increased on road sections by more than 5% of existing ESA's due to the GFD Project, the proponent would be required to contribute to the maintenance of the road in proportion to the proponent's impact on the road
 - Determine the mitigation timeframe for potential contributions to be paid – 10 years from the start of use.
- > Rehabilitation
 - Review the existing and terminal roughness for each GFD Project impacted road
 - Estimate the year at which the pavement will reach its terminal roughness both with and without the GFD Project
 - Determine whether this rehabilitation is within the mitigation timeframe of 10 years from start of use
 - If the required timing of road rehabilitation is brought forward by more than one year due to the GFD Project traffic and is within the mitigation timeframe, contribution to the cost of bringing forward rehabilitation works would be required.

The following input values have been assumed for the assessment:

- > Terminal roughness of 120 counts for roads
- > Three counts per year roughness increase for roads
- > A heavy vehicle growth rate of 3% per annum (excluding the GFD Project traffic).

These input assumptions are informed from DTMR advice stating typical pavement roughness patterns and heavy vehicle traffic growth for the Fitzroy and Downs South West regions.

While the GFD Project traffic is likely to use the SCRs, and local government roads shown on Figure 1-1 to access work areas, the timing of use, and volume of GFD Project traffic and load (ESA) cannot be reliably estimated until GFD Project designs are further progressed and sub-projects receive Santos GLNG financial sanction. When project work areas designs and construction schedules are available, Road impact assessments will be prepared and submitted to relevant local government councils and DTMR.

7.2 Intersection assessment

A preliminary intersection assessment was performed, to determine the potential level of impact the GFD Project would have on the intersections within the GFD Project area. As stated previously, mitigation identified is only to provide an idea of the scope of impact of the GFD Project. Required mitigations would be provided after further analysis and after financial sanction of project areas by the GFD Project. The intersection impact assessment was conducted using the following steps:

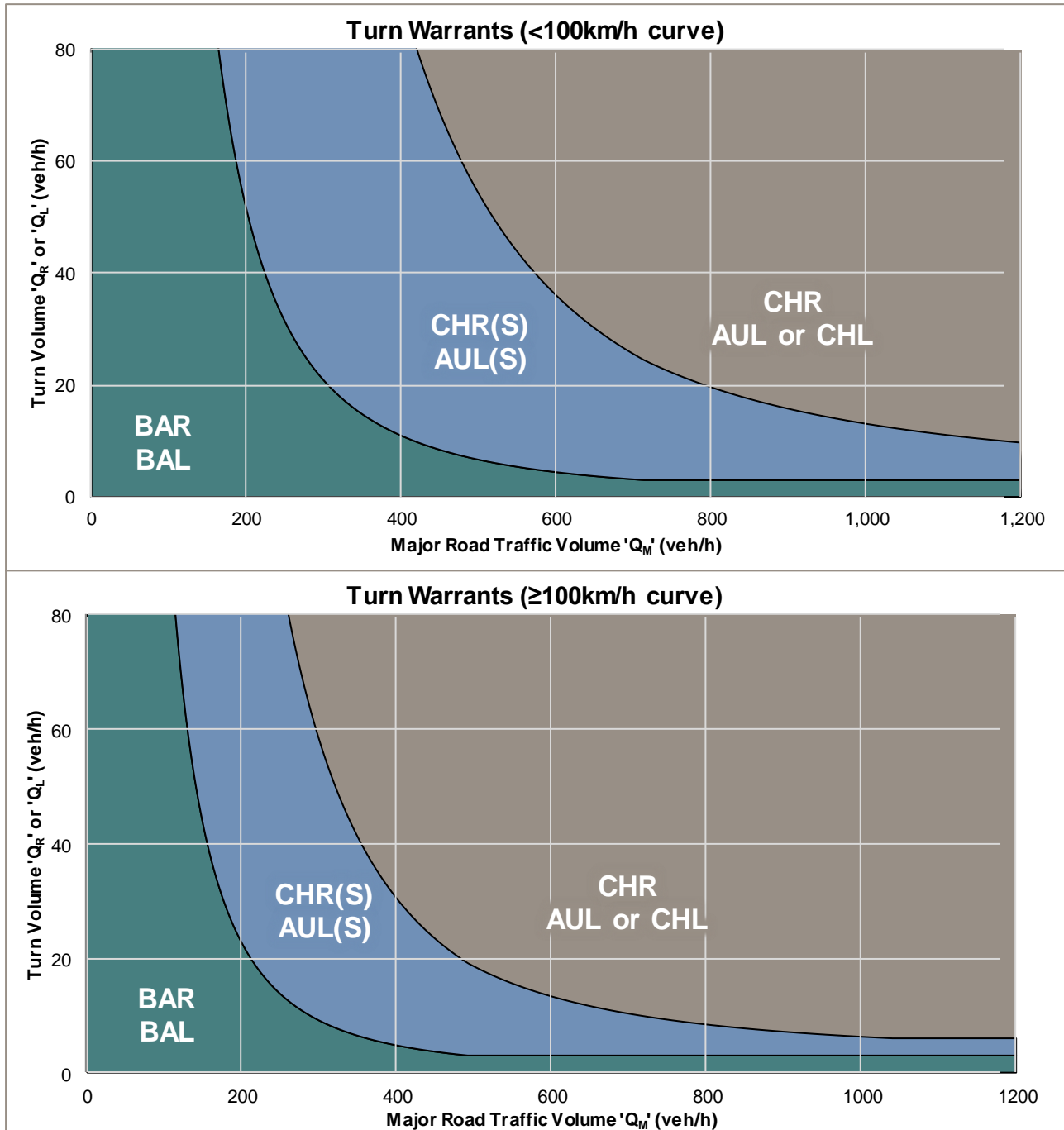
- > Undertake a turn warrant assessment at each study intersection to identify if mitigations are required to meet safety standards
- > If mitigations are required, assess what impact GFD Project traffic has on the need for mitigation
- > Review current road improvement programmes produced by council and DTMR to identify if works are planned at the intersection
- > If mitigations are required, and the GFD Project traffic has a major impact on the need for works and no upgrades are planned by council or DTMR, identify possible mitigation works/strategies.

7.2.1 Turn warrant assessment thresholds

Turn warrant assessment of each of the intersections was conducted according to the Austroads turn warrants for turn treatments at priority controlled intersections. This assessment offers an indication of what physical form of turn treatment will likely provide an appropriate level of safety.

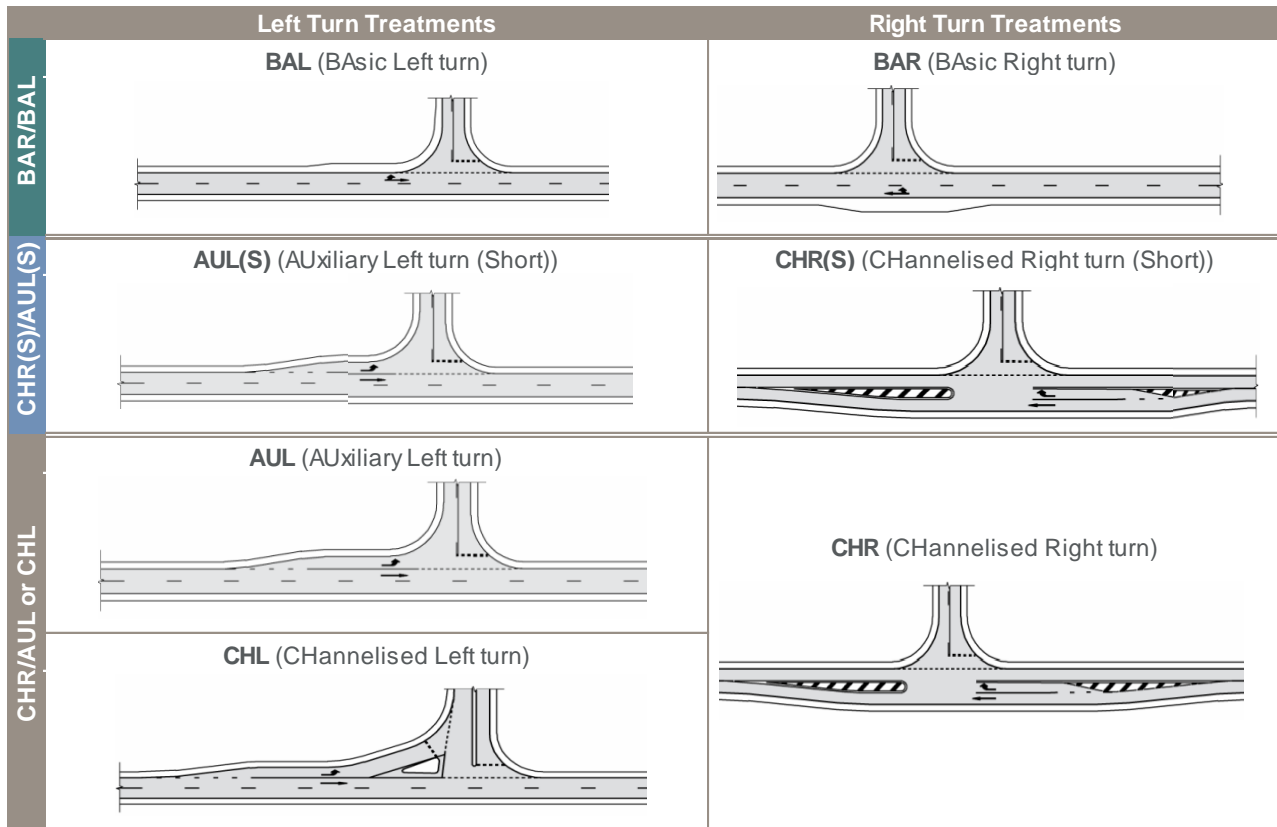
The warrants provide guidance on when auxiliary turn lanes should be used based on traffic volumes. The warrants were developed by Arndt, Troutbeck, Handley & Slattery (2006) and were produced by identifying the location at which the benefits of providing a higher-level treatment (the reduction in estimated accident costs) are equal to the additional construction costs associated with the treatment.

Figure 7-1 Austroads turn treatment warrants



Each type of turn treatment is shown on Figure 7-2.

Figure 7-2 Types of turn treatment



7.3 Road link assessment

An assessment of the impact on each road link has been undertaken as follows:

- > Assess whether volumes are expected to exceed proposed mitigation thresholds based on the current road standard
- > Where the combined background and GFD Project traffic does not exceed the volume threshold adopted, no mitigation strategies are required
- > Where volumes are expected to exceed thresholds, review the expected volume-duration of GFD Project traffic on the road and assess the likely duration of exceedance
- > Where the traffic volume reaches an mitigation threshold but for only a short duration, a significance test is undertaken. This test assesses if project heavy vehicle volumes are greater than 5% of the total heavy vehicle volumes assessed in the road's design
- > Where the GFD Project's impact is significant, mitigation strategies are proposed. The contribution of the GFD Project to these mitigation strategies will depend on the lifetime contribution to traffic volumes as other sources of traffic may be a greater driver for reaching the volume threshold than the GFD Project.

7.3.1 State-controlled road link capacity thresholds

This section considers the road link requirements based on assessment of the daily road link volumes with and without the proposed GFD Project.

The adopted maximum capacity thresholds are based upon the cross section form of the segment and the road environment. These thresholds have been adopted based upon the *Austroads Guide to Traffic Engineering Practice* and previous work. The thresholds adopted for this assessment are as follows:

Rural locations

- > Two lanes: < 7,500 vehicles/day
- > Two lanes with overtaking lanes: < 15,000 vehicles/day
- > Four lanes: > 15,000 vehicles/day.

Urban locations

- > Two lanes: <18,000 vehicles/day
- > Four lanes: 18,000 – 36,000 vehicles/day
- > Six lanes: >36,000 vehicles/day.

Assessment of road link capacity was undertaken for each year of the expected GFD Project life (2016 to 2054).

The GFD Project traffic volumes have been overlain graphically onto indicative background traffic volumes (which are primarily low volume rural roads) to identify expected peak volumes and importantly the duration of this additional traffic impact. This traffic volume-duration data is then compared to the proposed thresholds for mitigations. The graphical overlay of background and GFD Project traffic as well as thresholds for each road used is shown in Appendix F: Mid-block assessment.

7.3.2 Local council road design guidelines

Due to the difference in funding arrangements for local councils and DTMR, it is not appropriate to conduct assessment of the local council roads in the same manner as SCRs. Assessment of local roads is proposed to be undertaken in accordance with the working provisions of existing IAs.

The maintenance of roads is largely influenced by heavy vehicle traffic. Studies by Austroads also indicate that for roads with pavement loading typical of those in the GFD Project area, the volume of heavy vehicles only contributes to a portion of the need for maintenance. The remaining portion is due to weather and general light vehicle traffic. For these reasons, the GFD Project contribution towards pavement maintenance (sealed and unsealed) will be derived using the pavement ESA loadings and the latest research regarding cost apportionment models.

7.4 Level crossing thresholds

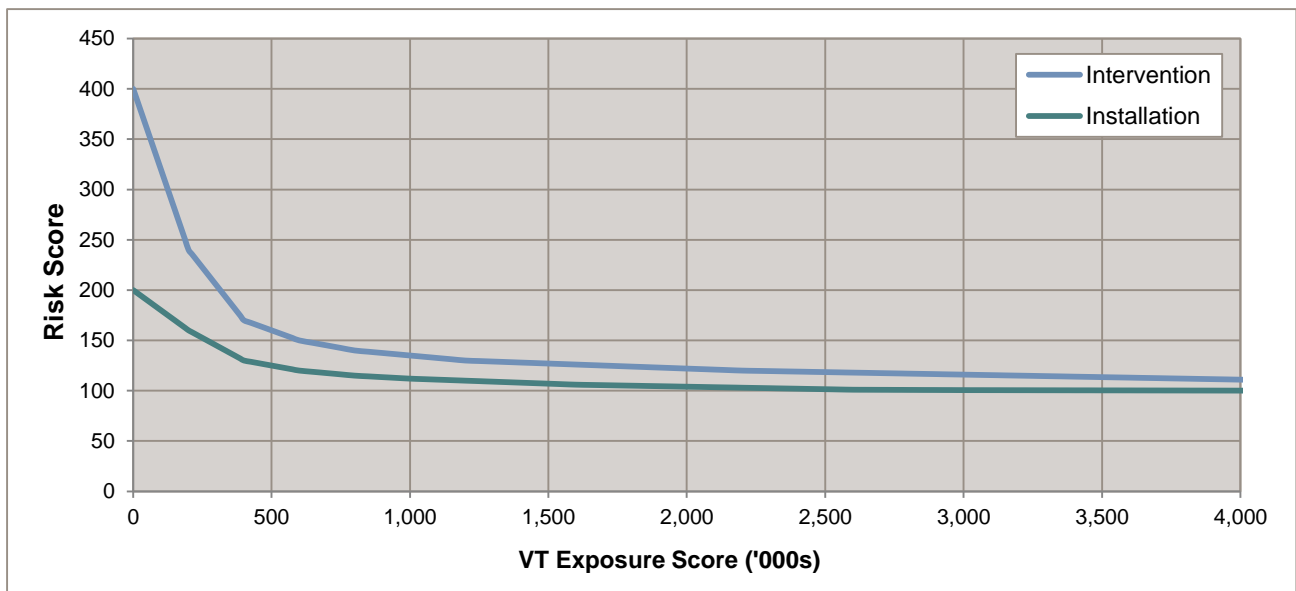
The Australian Level Crossing Assessment Model (ALCAM) is used to produce a risk score for level crossings based on the physical characteristics of a level crossing and the existing warning and control devices. It is primarily a tool for rating level crossing safety in a comparative manner.

To compare the risk scores for a range of crossings, a reference score is used that can provide an indicative assessment of the risk relative to the consequence of a collision. Two reference scores are used: Installation Limit Score and the Intervention Limit Score. It is noted that these scores are not used to determine whether or not a crossing is 'safe' but rather how a risk score compares with the level of risk that may be acceptable at other crossings with a similar traffic and road environment profile.

The Installation Limit Score indicates a level below which the level crossing risk is likely to be within acceptable limits. The Intervention Limit Score indicates a level above which there is likely to be safety hazards that require priority attention to mitigate the level of risk.

As QR conducts safety assessments of level crossings in Queensland exclusively, a thorough project-specific long-term assessment of the level crossings is not possible. Instead the use of each level crossing has been identified along with the ALCAM risk score, to determine the risk of each crossing proposed for use by the GFD Project.

Figure 7-3 Installation and intervention limit score thresholds



Source: Australian Level Crossing Assessment Model: Crossing Assessment Handbook

8 Assessment outcomes

8.1 Preliminary pavement assessment

8.1.1 State-controlled roads

For SCRs where GFD Project traffic has a significant impact, DTMR may incur additional costs that are unforeseen in their long-term future planning.

Pavement impacts may be separated into two categories: maintenance and rehabilitation.

Pavement maintenance is the regular maintenance performed by DTMR, consisting of repairing potholes, shoving and other minor defects. An increase in traffic on a road would correlate to an increased need for maintenance. An unforeseen increase in maintenance due to a major project could result in a funding shortfall for a certain road. According to GARID (DTMR, 2006), the GFD Project would be required to assist DTMR in meeting this shortfall.

Pavement rehabilitation is the reconstruction of a pavement performed at the end of its structural life (typically approximately 20 years). An unforeseen increase in traffic due to a major project could result in rehabilitation works having to be performed sooner than forecast. Due to inflation, the real cost of performing these works is increased by performing the works sooner. According to GARID (TMR, 2006), the project would be required to assist DTMR in meeting this unforeseen cost.

To address this preliminary pavement impact assessment has been performed according to the methodology outlined in Section 7.1 of Section 7: Assessment methodology, to determine where possible significant impacts are on the State-controlled road network.

A summary of the preliminary pavement impact assessment results is outlined below. Detailed assessment results are provided in Appendix E: Pavement impact assessment.

As per GARID (DTMR, 2006), contributions to road maintenance should only be sought from the GFD Project for the first ten years of Project use, so that DTMR can adjust funding levels to cater for the increase in traffic. This is what is referred to as the mitigation timeframe.

Figure 8-1 shows the sections of road that require rehabilitation within the mitigation timeframe due to existing traffic.

The preliminary assessment results summarised in Figure 8-2 and Table 8-1 indicate the State-controlled roads for which maintenance and rehabilitation contributions are likely to be payable. Estimated years of maintenance contributions that may be required are shown in Table 8-1.

Table 8-1 Preliminary SCR pavement impact assessment – results summary

Road (DTMR reference)	Maintenance Contribution Payable	Rehabilitation Contribution Payable
Blackwater-Rolleston Road (469)	2021-2030	✓
Carnarvon Highway (24C) Surat - Roma	2019-2029	✓
Carnarvon Highway (24D) Roma - Injune	2019-2029	✓
Carnarvon Highway (24E) Injune-Rolleston	2019-2030	✓
Dawson Highway (46C) Banana - Rolleston	2019-2030	✓
Fitzroy Development Road (85B) Bauhinia-Duaranga	x	x

Road (DTMR reference)	Maintenance Contribution Payable	Rehabilitation Contribution Payable
Jackson-Wandoan Road (4302)	2013-2023	✓
Leichhardt Highway (26A) Westwood - Taroom	2019-2033	✓
Leichhardt Highway (26B) Taroom - Miles	2013-2030	✓
Roma-Condamine Road (4397)	2022-2031	✗
Roma Southern Road (3501)	2021-2030	✗
Roma Taroom Road (4397)	2019-2028	✓
Wallumbilla South Road (3441)	2019-2031	✓
Warrego Highway (18B) Toowoomba - Dalby	2019-2028	✓
Warrego Highway (18C) Dalby - Miles	2013-2029	✓
Warrego Highway (18D) Miles - Roma	2013-2030	✓
Warrego Highway (18E) Roma - Mitchell	2021-2026	✓

Contributions towards maintenance and rehabilitation costs have not been calculated as part of this assessment due to the uncertainty in the final GFD Project design and resultant traffic demands. Impacts will be assessed during the detailed design phase of the GFD Project, subsequent to the submission of the EIS and approval of the GFD Project to determine if contributions are necessary. This would be a typical approach of a project where volumes of traffic and roads impacted upon would not be known until the project has been further defined in order to reduce the risk of performing upgrades where they are not required.

8.2 Potential State-controlled intersection upgrades

Table 8-2 and Figure 8-2 summarise the potential turn treatment mitigations that may be required at each study intersection both as a result of existing traffic volumes and GFD Project traffic. The assessment of the adequacy of intersection forms focused on the provision of turning lanes using the methodology in Section 7.2 of Section 7: Assessment methodology. Detailed assessment results are provided in Appendix D: Intersection analysis. This table indicates that there are a number of intersections that may require mitigations to enable appropriate operation during GFD Project operations.

Table 8-2 Preliminary intersection safety assessment – results summary

Intersection	Existing form and provision	GFD Project upgrade requirement
Blackwater-Rolleston Road/Sunlight Road	3-way, Priority	-
Carnarvon Highway/Arcadia Valley Road	3-way, Priority	-
Carnarvon Highway/Barnard Road	3-way, Priority	AUR/CHL
Carnarvon Highway/Conroys Lane	3-way, Priority	-
Carnarvon Highway/Dawson Highway	4-way, Priority	AUR/BAL
Carnarvon Highway/Eumina Road	3-way, Priority	-
Carnarvon Highway/Gunnewin Road	4-way (offset), Priority	-

Intersection	Existing form and provision		GFD Project upgrade requirement
Carnarvon Highway/Injune Airport Road	3-way, Priority	-	-
Carnarvon Highway/Injune Taroom Road	4-way, Priority	-	-
Carnarvon Highway/Komine Road	4-way, Priority	-	-
Carnarvon Highway/Mulcahys Road	3-way, Priority	-	-
Carnarvon Highway/The Range Road	3-way, Priority	-	-
Carnarvon Highway/Roma Airport Drive	3-way, Priority	CHR(s)/AUL	-
Carnarvon Highway /Roma Taroom Road	3-way, Priority	AUR	-
Dawson Highway/Arcadia Valley Road	3-way, Priority	AUR	-
Dawson Highway/Blackwater-Rolleston Road	3-way, Priority	AUL	-
Dawson Highway/Fairfield Road	3-way, Priority	-	-
Dawson Highway/Meteor Street (Rolleston Airport)	4-way, Priority	-	-
Dawson Highway/Sunlight Road	3-way, Priority	-	-
Fitzroy Developmental Road/Glenhaughton Road	3-way, Priority	-	-
Jackson Wandoan Road/Peakes Road	3-way, Priority	-	-
Leichhardt Highway/The Boulevard	3-way, Priority	CHR(s)	-
Leichhardt Highway/Booral Road	3-way, Priority	-	-
Leichhardt Highway/Broadmere Road	3-way, Priority	-	-
Leichhardt Highway/Twelve Mile Road	3-way, Priority	-	-
Leichhardt Highway/Dawson Highway	3-way, Priority	AUR/AUL	CHR(s)
Leichhardt Highway/Fitzroy Developmental Road	3-way, Priority	-	-
Leichhardt Highway/Injune Road	3-way, Priority	-	-
Leichhardt Highway/Jackson Wandoan Road	4-way, Priority	-	-
Leichhardt Highway/Murrays Road	3-way, Priority	-	-
Leichhardt Highway/Nathan Road	3-way, Priority	-	-
Leichhardt Highway/Number 4 Road	3-way, Priority	-	-
Leichhardt Highway/Number 7 Road	3-way, Priority	-	-
Leichhardt Highway/Number 2 Road	4-way (offset), Priority	-	-
Leichhardt Highway/Roma Taroom Road	3-way, Priority	-	-
Leichhardt Highway/Taroom Airport Road	3-way, Priority	-	-
Leichhardt Highway/Windeyer Road	3-way, Priority	-	-
Leichhardt Highway/Yeovil Road	3-way, Priority	-	-
Roma Condamine Road/Retreat Road	3-way, Priority	-	-
Roma Condamine Road/Yuleba Surat Road	3-way, Priority	-	-
Roma Southern Road/Meegine Road	3-way, Priority	-	-
Wallumbilla South Road/Bardlomey Road	3-way, Priority	-	-
Wallumbilla South Road/May Street North	4-way, Priority	-	-
Wallumbilla South Road/May Street South	3-way, Priority	-	-
Wallumbilla South Road/Tarrawonga	3-way, Priority	-	-

Intersection	Existing form and provision		GFD Project upgrade requirement
Wallumbilla South Road/Wallabella Road	3-way, Priority	-	-
Wallumbilla South Road/Yarrowonga Road	3-way, Priority	-	-
Warrego Highway/Blue Hills Road	3-way, Priority	-	-
Warrego Highway/Carnarvon Highway (West)	4-way, Priority	CHR/left slip lanes	-
Warrego Highway/Carnarvon Highway (East)	3-way, Priority	AUR/left acceleration lane	-
Warrego Highway/Duke Street (Roma Southern Road)	4-way, Priority	-	AUL(East, South Leg)
Warrego Highway/Dulacca North Road	3-way, Priority	-	-
Warrego Highway/Hodgson Lane North	3-way, Priority	-	-
Warrego Highway/Hodgson Lane South	3-way, Priority	-	-
Warrego Highway/Jackson Wandoan Road	3-way, Priority	-	-
Warrego Highway/Kangaroo Creek Road	3-way, Priority	-	-
Warrego Highway/Leichhardt Highway	3-way, Priority	AUR/left slip lane	CHR
Warrego Highway/Massey Lane	3-way, Priority	-	-
Warrego Highway/Pickanjinie North Road	3-way, Priority	-	-
Warrego Highway/Wallumbilla South	4-way, Priority (Note 4-way offset)	-	-
Warrego Highway/Warooby Lane	3-way, Priority	CHR(s)	-
Warrego Highway/Yuleba Surat Road	3-way, Priority	-	CHR(s)
Warrego Highway/Yuleba Taroom Road	3-way, Priority	CHR(s)	-

8.3 Potential road link mitigations

8.3.1 State roads

A review of the background plus GFD Project volumes revealed that no road links reach the capacity threshold because of the GFD Project traffic. Further detailed examination of the critical road sections was carried out to determine if the capacity breakpoint was reached earlier due to addition of GFD Project traffic. This exercise serves to determine the “bring forward” cost responsibility of the proposed GFD Project on segments it significantly impacts.

It was found that for the road segments that reach capacity, the years when the capacity threshold is reached under “background” as well as “background plus GFD Project” traffic have been identified. Bring forward cost contributions are recommended on sections where the GFD Project creates the need to bring forward upgrades by one year or more, greater than 5% of the design life of a road upgrade, as outlined in the GARID (DTMR, 2006).

As shown in the model outputs in Appendix F: Midblock assessment, the requirement for the change in cross section of a road is not brought forward by more than a year for sections of road where the GFD Project traffic is significant. The only exception to this is the Warrego Highway between Oakey and Dalby. This section of road has had additional overtaking lanes constructed in the year 2013-2014 according to the QTRIP which occurred after assessment data was collected. The overtaking lanes will adequately mitigate the findings of the assessment, meaning no further upgrades are required to cater for potential GFD project traffic.

Therefore the GFD Project traffic does not impact significantly on the road width requirements on SCRs.

8.3.2 Local roads

The GFD Project proposes to ensure that a road's condition at the end of its use by the GFD Project is at a standard equal to pre-construction conditions. The GFD Project mitigation will be managed in accordance with the working provisions of existing IAs.

Figure 8-1 and Figure 8-2 show the local government controlled roads likely to be used by GFD Project traffic to access work areas. No assessment of actual traffic generation on these roads has been undertaken at this point as the detail of project plans is not sufficient to undertake this work (as discussed in Section 7.3.2 of Section 7: Assessment methodology). The following sections set out potential mitigations that may be applied as a result of detailed assessment.

A detailed assessment of GFD Project vehicle impacts on council roads will be undertaken once project designs are further progressed and individual areas of development are internally sanctioned by the GFD Project. These impacts will be addressed in RIAs submitted to each local council as per the existing IA working provisions. Where the need for additional maintenance is identified, the increase in maintenance costs due to the GFD Project would be the responsibility of the Santos GLNG. Potential strategies are discussed in this section.

Some local roads may be of a width that is not wide enough to accommodate both existing traffic volumes, and GFD Project traffic volumes. For example, where background traffic is of the order of 50 vpd, an existing unsealed width of 5.5 m may be acceptable; however for a brief period GFD Project traffic may increase daily volumes to a level that would require pavement widening.

If traffic volumes revert to background traffic volumes after a short period it is considered unreasonable to provide a high cost mitigation such as road widening. Instead, it is proposed that short term mitigations (such as temporary traffic management or specific localised improvements) be used along with regular maintenance to ensure safety and efficiency of the road during its use by GFD Project traffic while not leaving the road authority with a legacy maintenance burden.

For roads with a major long-term impact, other mitigations may be appropriate. Santos GLNG will reach agreement with the relevant local council on an appropriate mitigation response based on the proportion of GFD Project traffic on a road. This process will be undertaken by producing a RIA for inclusion in service level agreements which outline the agreed mitigations for a particular road with each local council.

Whilst there are a number of standards that apply to roads across different local authorities it is the desired intent of the GFD Project overall to adopt one set of standards. The adoption of one set of standards and application of these across impacted roads (irrespective of the local council authority) would ensure consistent road standards throughout the GFD Project life.

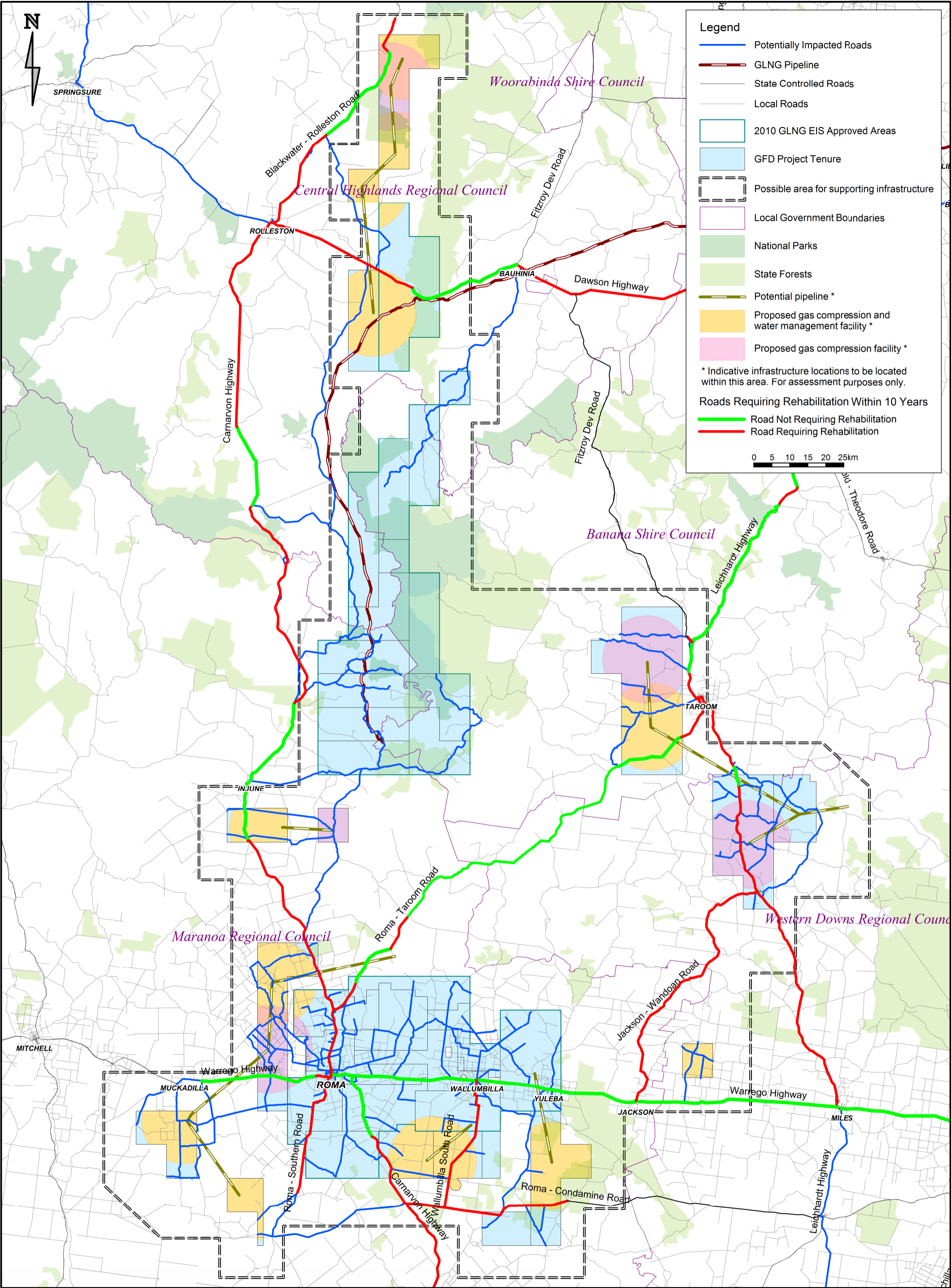
The various standards for each local council road are discussed below.

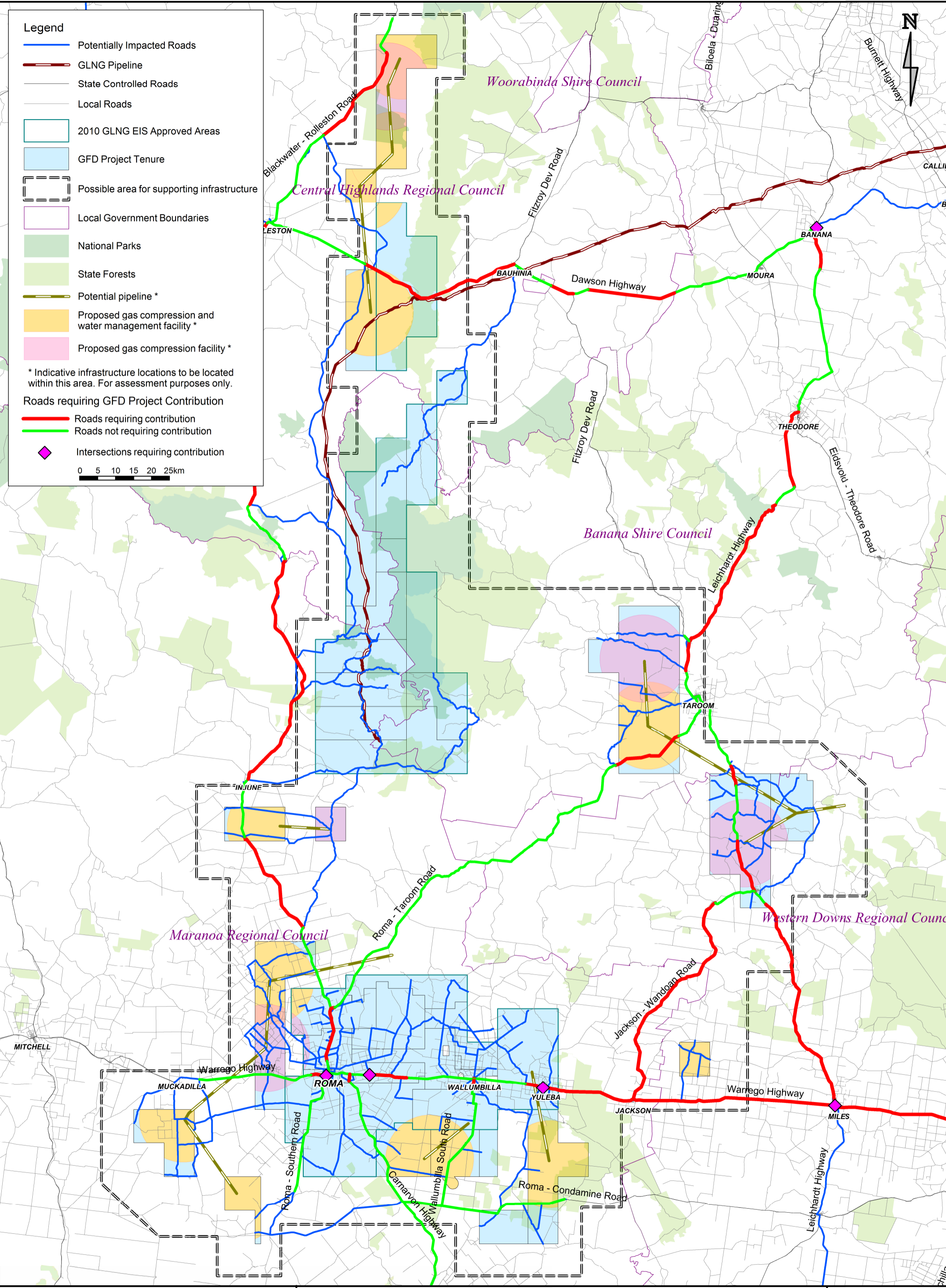
8.3.2.1 Capricorn Municipal Development Guidelines – Geometric Road Design

The Maranoa Regional Council, along with the Central Highlands Regional Council, Banana Shire Council and the Rockhampton Regional Council use the Capricorn Municipal Development Guidelines (CMDG) for their road design. The CMDG has a different geometric road design requirement for each of these regional councils. Discussions with each council will be undertaken when the analysis of the council roads is undertaken.

8.3.2.2 Eastern Downs Regional Organisation of Councils Guidelines

The Western Downs Regional Council uses the Eastern Downs Regional Organisation of Councils (EDROC) guidelines to identify the road design requirements. Discussions with Western Downs Regional Council will be undertaken when the analysis of the council roads is undertaken.





8.4 Sea ports

Peak heavy vehicle movements have been assessed from the Port of Brisbane to determine if additional road impacts will occur on roads that have not been assessed previously. The routes from the Port of Brisbane to the gas fields have been assumed as following along Warrego Highway, on to the Carnarvon Highway, or Leichhardt Highway, with some use of the Dawson Highway.

8.5 Rail crossings

A number of rail level crossings have been analysed in the GFD Project area to provide a high level of understanding of the current level crossing operation and safety.

The risk score matrix and the Australian Level Crossing Assessment Model (ALCAM) are used in the analysis to provide the risk score and risk exposure score for each level crossing. The risk score and risk exposure score are based on:

- > The physical characteristics of a level crossing
- > The existing warning and control devices
- > Road traffic and train volumes at the level crossing.

The scores provide indicative information on risk and safety at level crossings and are a useful evaluation tool to rate level crossings in a comparative manner. For further information on the thresholds refer to Section 7.4 of Section 7: Assessment methodology.

GFD Project traffic has not been added for the assessment as QR limits the analysis of rail crossings to their own engineers. Detailed analysis in conjunction with QR will be performed post EIS approval.

Table 8-3 summarises the assessment data that was provided by QR based on the risk score matrix and ALCAM. The table provides the level crossing risk scores and risk exposure scores for the existing conditions and future conditions with proposed treatment. The table also identifies if the treatment is required for the existing level crossing and if the treatment is adequate with proposed treatment. As advised by QR, the assessment data is up to 10 years old and should only be used as an indicative guide due to possible changes in traffic volumes, road layout, control upgrades, etc.

More detailed assessment information is provided in Appendix I: ALCAM assessment for each analysed level crossing.

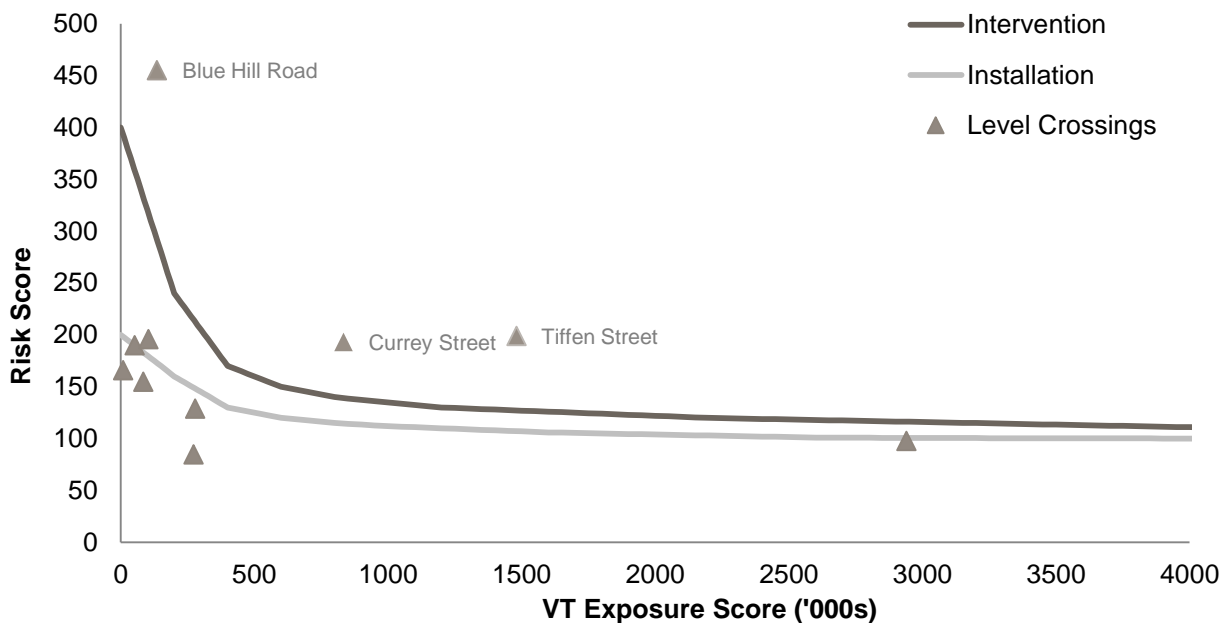
Table 8-3 Rail level crossing analysis summary table

ID	Road at crossing	Road type	Location	Existing conditions			Future conditions with proposed treatment		
				Risk Score	Risk exposure score ('000)	Is treatment required?	Risk score	Risk exposure score ('000)	Is proposed treatment adequate?
2008	Yuleba Surat Road	State Roads	At Warrego Highway, Yuleba	593	30	Yes	166	8	Yes
1997	Blue Hill Road	Unsealed Local Roads	At Warrego Highway, Blythdale	541	162	Yes	455	136	No
1993	Tiffen Street	Local Roads – Sealed	At Warrego Highway, Roma	400	2,980	Yes	199	1,480	Yes
990	Warrego Highway	State Roads	At Mayne Street, Roma	102	3,070	No	98	2,940	Yes
1987	Currey Street	Local Roads – Sealed	At Warrego Highway, Roma	429	1,850	Yes	193	834	Yes
5664	Donnybrook Road	Local Roads – Sealed	At Warrego Highway, Hodgson	405	109	Yes	190	51	Yes
860	Leichhardt Highway (Crossing 1)	State Roads	At Dalgowan Williams Road, Kowguran	156	500	No	85	272	Yes
1802	Leichhardt Highway (Crossing 2)	State Roads	At Baileys Road, Gurilmundi	279	151	No	155	84	Yes
1075	Leichhardt Highway (Crossing 3)	State Roads	Near Wubagul	129	277	No	129	277	Yes
3367	Windeyer Road	Local Roads – Sealed	At Leichhardt Highway	509	265	Yes	196	102	Yes

QR proposes upgrades at each rail crossing on the basis of ALCAM assessment; however some existing rail crossings do not meet contemporary safety standards, and may be upgraded irrespective of whether the ALCAM assessment of the existing rail crossing is satisfactory. Therefore some upgrades are shown as proposed above, even though upgrade of the crossing is not shown required according to risk score.

This assessment will use the assumption that QR will perform the proposed upgrades before the GFD Project commencement. As such the results of the assessments after the proposed upgrades are shown plotted on Figure 8-3. This chart identifies the remaining deficiencies in the level crossings that may be used by the GFD Project. These deficiencies may warrant improvements that should be identified after further analysis performed as part of the road impact assessment process.

Figure 8-3 Rail crossing analysis summary



8.6 Hazardous goods and risk

The movement of hazardous goods is expected to be limited to an increase in fuel cartage proportional to the increase in activity in the region associated with the GFD Project, and specialised inputs for the project. Relevant notifications and restrictions required by State legislation will be enforced upon haulage contractors by the GFD Project.

The risk of spills is expected to be in line with regular traffic currently travelling in the area under current GLNG Project works.

The hazard and risk assessment prepared for the EIS by Sherpa Consulting provides further information about the types of hazardous materials and dangerous goods expected to be required for the GFD Project.

9 Transport network mitigation strategies

As a result of additional traffic and transport use attributable to the GFD Project, this section considers the potential mitigation strategies that the GFD Project may employ to minimise resultant impacts.

9.1 Road safety

A number of factors can contribute to a crash, including, driver factors (e.g. fatigue), vehicle factors (e.g. worn tyres) and road environment factors (e.g. road conditions). Thus it is important that GFD Project has in place measures to check the safety of vehicles used on the contract works and to train staff and contractors on safe driving practices, as well as providing reasonable contributions to the safety of the road network, commensurate with possible safety risks caused by GFD Project traffic. This should not obviate relevant authorities of their need to provide safe road networks for road users.

Measures the GFD Project will implement to ensure acceptable driver behaviour are outlined in Section 10.4 of Section 10: Significance assessment. In addition, the GFD Project proposes to expand the use of an IVMS currently implemented on the GLNG Project to both dictate to staff routes and speed limits to be observed as well as provide a compliance checking tool. The IVMS uses satellite positioning to determine vehicle speeds and locations, as well as other driver behaviours such as harsh acceleration and deceleration.

The IVMS in use since 1 September 2013 currently imposes speed limits as signed on SCR; maximum of 80 km/h on sealed local roads, or Santos GLNG field roads unless otherwise signed; and 60 km/h on unsealed roads unless otherwise signed.

A system to report road conditions to staff is also in place for the GLNG Project. This system consists of on-tenure observations being reported to a central office, from which email reports are issued to regular users and stakeholders. This system would be expanded to include the GFD Project to advise of roads which are designated for its GFD Project traffic use, roads which are considered closed to GFD Project traffic, road conditions and travel advice e.g. weather and notes of caution. This system minimises inappropriate route choices and would advise GFD Project drivers of the road conditions to be expected. This allows school bus routes to be highlighted along with days and hours of operation.

9.2 Road network rest areas

Fatigue management measures will be introduced and enforced for workers. These will be included in the road use management plans that will be prepared to support the GFD Project.

DTMR are currently reviewing existing rest areas and also investigating the provision of additional rest areas on the SCR. Proposed and existing rest areas are shown on Figure 3-2.

9.3 Multi-combination vehicle routes

Routes proposed to be used by the GFD Project area are approved for B-doubles and road trains. Prior to use a review of road widths on multi-combination vehicle routes will be undertaken to determine if there is sufficient pavement width for vehicles to safely pass. Where the pavement width is shown to be inadequate a traffic management plan will be implemented to address this concern.

9.4 School bus routes

It is clear that many roads used by the GFD Project traffic are also used by school bus routes. To maintain safety, the GFD Project will implement traffic management plans and will inform staff on how they are to operate around a school and on school bus routes. The following strategic planning guidance is provided to assist in reducing the potential for conflict between GFD Project traffic, school bus vehicles and students:

- > Use of school bus routes needs to be avoided if possible, or carefully managed to avoid conflicts
- > Consideration will be given to limiting GFD Project traffic on school bus routes during pick-up and set-down times on school days
- > GFD Project staff will be made aware of school bus routes as well as typical pick-up and drop-off times in the vicinity of their work areas.

9.5 Stock routes

The stock route network disturbed or affected by the proposed works will be rehabilitated upon completion of the GFD Project to existing or better than existing standards. Where revegetation is required, native vegetation, including pastures, must be used to return the area to its natural state. This will be addressed at a later stage once final details are determined.

9.6 Airports

While a number of airports have been identified for potential use in this report, until further clarification by Santos GLNG confirming the need for these airports, no decision as to their use can be made.

9.7 Active transport network

As stated in 3.13, the location of the various components of the GFD Project is not likely to influence existing nor create the need for additional active transport facilities/networks.

9.8 Public transport network

Due to the location of the various components of the GFD Project it is not likely that significant use of public transport will be utilised or undertaken. Private buses and coaches will be used to transport construction workers between worksites and accommodation where required.

9.9 Traffic management

Construction works will impact on public roads and the rail network in some locations, generally where linear infrastructure such as a pipeline crosses a public road or the railway track. Under these circumstances the proponent will need to ensure traffic management plans are prepared consistent with the relevant DTMR specification.

Once contractors have been appointed and details of the project delivery determined, a road use management plan will be prepared for construction. This plan will address relevant issues including the standard of the roads proposed to be used, traffic volumes, access conditions, hours of operation, safety provisions, traffic impacts, dust control etc. This plan will be developed in consultation with DTMR and the local councils as appropriate.

9.10 Other mitigation strategies

9.10.1 Over dimensioned vehicles and excess sized vehicles

Vehicles carrying plant and material over SCRs and local roads shall comply with the vehicle mass limit requirements set out in the Transport Infrastructure Act 1994. Heavy vehicle routes in the GFD Project area have been identified by DTMR and have been used to identify the appropriate routes for haulage of equipment and materials to the various GFD Project assets. The approved heavy vehicle routes are included in Figure 3-3, along with the criteria for escorts for over dimensional load vehicle escorts. With the refinement or selection of a preferred construction methodology, Queensland Police Service will be consulted to aid planning/resourcing of police escorts if required.

A new government body called the National Heavy Vehicle Regulator (NHVR) will take over control of heavy vehicle regulation, heavy vehicle routes, and access permits. The GFD Project will ensure compliance with new regulations as they come into effect, and particular issues that arise from this change will be addressed in road impact assessments, and road use management plans issued before the commencement of the GFD Project.

9.10.2 Hazardous Goods and Risk

The movement of hazardous goods will be performed only by transport contractors with the relevant qualifications required for the movement of each category of goods. Haulage will be performed to the satisfaction of relevant legislative requirements, as well as Santos GLNG management framework requirements.

The movement of hazardous goods will be addressed further in the Road-use Management Plan for the GFD Project. For further information on the management framework to be employed by the GFD Project, refer to Section 10.5 of Section 10: Significance assessment.

9.10.3 Dust control

Santos GLNG will take adequate precautions to effectively minimise the generation of dust during GFD Project construction activities as this may affect the safety and general comfort of the travelling public, employees and/or occupants of adjacent buildings.

In this respect, the GFD Project will carry out regular application of water or other palliative measures along the sections of the project's work traversed by the travelling public, as required, to minimise dust in accordance with the relevant DTMR specification.

9.10.4 Weed, pest and disease control

The GFD Project is responsible for maintaining landscape and revegetation works in a weed, pest and disease free condition. Declared plants shall be managed to the level of control required by the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) and the *Land Protection (Pest and Stock Route Management) Regulation 2003* (Qld). Works shall be undertaken in accordance with the relevant DTMR specification.

10 Significance assessment

A significance assessment has been performed in order to qualitatively assess the potential impacts of the GFD Project, and assess the effectiveness of the management framework and mitigations that are proposed.

The significance assessment methodology considers the sensitivity or vulnerability of the environmental value and the magnitude of the impact to be important. This assessment evaluates the potential impacts of the GFD Project infrastructure and activities on the values of efficiency, safety and amenity of the transport network (described in Section 10.2 of Section 10: Significance assessment). The significance of the impacts is reviewed before and after implementation of the management framework (described in Section 10.4 of Section 10: Significance assessment).

10.1 Significance assessment methodology

A significance assessment methodology was applied to ensure that there are no major qualitative impacts of the GFD Project. The process applied was similar to a risk assessment process, but the criteria applied relates to sensitivity and magnitude rather than to likelihood and consequence. These criteria are summarised in Table 10-1 and Table 10-2.

Table 10-1 Sensitivity criteria

Sensitivity	Description
High	<p>The EV is listed on a recognised or statutory State, national or international register as being of conservation significance.</p> <p>The EV is intact and retains its intrinsic value.</p> <p>The EV is unique to the environment in which it occurs. It is isolated to the affected system/area which is poorly represented in the region, territory, country or the world.</p> <p>It has not been exposed to threatening processes, or they have not had a noticeable impact on the integrity of the EV. GFD Project activities would have an adverse effect on the value.</p>
Moderate	<p>The EV is recorded as being important at a regional level, and may have been nominated for listing on recognised or statutory registers.</p> <p>The EV is in a moderate to good condition despite it being exposed to threatening processes. It retains many of its intrinsic characteristics and structural elements.</p> <p>It is relatively well represented in the systems/areas in which it occurs but its abundance and distribution are limited by threatening processes.</p> <p>Threatening processes have reduced its resilience to change. Consequently, changes resulting from GFD Project activities may lead to degradation of the prescribed value.</p> <p>Replacement of unavoidable losses is possible due to its abundance and distribution.</p>
Low	<p>The EV is not listed on any recognised or statutory register. It might be recognised locally by relevant suitably qualified experts or organisations e.g. historical societies.</p> <p>The EV is in a poor to moderate condition as a result of threatening processes, which have degraded its intrinsic value.</p> <p>It is not unique or rare and numerous representative examples exist throughout the system / area.</p> <p>It is abundant and widely distributed throughout the host systems / areas.</p> <p>There is no detectable response to change or change does not result in further degradation of the EV.</p> <p>The abundance and wide distribution of the EV ensures replacement of unavoidable losses is achievable.</p>

Table 10-2 Magnitude criteria

Magnitude	Description
High	An impact that is widespread, long lasting and results in substantial and possibly irreversible change to the EV. Avoidance through appropriate design responses or the implementation of site-specific environmental management controls are required to address the impact. This is primarily based on traffic volumes.
Moderate	An impact that extends beyond the area of disturbance to the surrounding area but is contained within the region where the GFD Project is being developed. The impacts are short term and result in changes that can be ameliorated with specific environmental management controls. This is primarily based on traffic volumes.
Low	A localised impact that is temporary or short term and either results in marginal changes to environmental condition (which could be difficult to quantify) or could be effectively mitigated through standard environmental management controls. This is primarily based on traffic volumes.

The significance of each environmental impact was determined by combining the sensitivity and magnitude criteria in a risk assessment process as shown in Table 10-3.

Table 10-3 Significance matrix

Magnitude of impact	Sensitivity of EV		
	High	Moderate	Low
High	Major	High	Moderate
Moderate	High	Moderate	Low
Low	Moderate	Low	Negligible

The significance classifications used in Table 10-3 (major, high, moderate, low and negligible) are defined as follows:

- > **Major impact:** arises when an impact will potentially cause irreversible or widespread harm to an EV that is irreplaceable because of its uniqueness or rarity. Avoidance through appropriate design responses is the only effective mitigation.
- > **High impact:** occurs when the proposed activities are likely to exacerbate threatening processes affecting the intrinsic characteristics and structural elements of the EV. While replacement of unavoidable losses is possible, avoidance through appropriate design responses is preferred to preserve its intactness or conservation status.
- > **Moderate impact:** results in degradation of the EV due to the scale of the impact or its susceptibility to further change even though it may be reasonably resilient to change. The abundance of the EV ensures it is adequately represented in the region, and that replacement, if required, is achievable.
- > **Low impact:** occurs where an EV is of local importance and temporary or transient changes will not adversely affect its viability provided standard environmental management controls are implemented.
- > **Negligible impact:** does not result in any noticeable change and hence the proposed activities will have negligible effect on EVs. This typically occurs where the activities are located in already disturbed areas.

10.2 Environmental values and adopted magnitude criteria

In the context of this assessment, an EV has been defined as a measure of how we value the environment in which we live and, in particular for this assessment, the roads used in the GFD Project area. The road function relates to how the road network influences the various users, neighbours and road authorities. In this respect, the following road function types were identified within the GFD Project area:

- > Highway
- > Regional connecting road
- > Rural connecting road
- > Rural access road.

The sensitivity to increased traffic volumes by road type was assessed using the following identified values:

- > Efficiency
- > Safety
- > Amenity.

Efficiency describes the aspect of the road network that contributes to function and accessibility which subsequently facilitate the efficient operation of the network. This includes consideration of the function of road links, the overall volume of traffic utilising road links and intersection forms. State and council road authorities have made significant capital investments in developing the road infrastructure so it is important that the existing road infrastructure is managed and used in a manner that maximises its service life and maintains the level of quality expected by road users.

Safety describes the aspects of the road network relating to the location and provision of physical infrastructure. Physical infrastructure incorporates components such as bridges, rail crossings, cattle grids, pavement and road construction standard.

Amenity is the experience afforded to the passive participants of the road network. This primarily includes nearby residents and other land users. Receptors that are sensitive include dwellings, schools, hospitals and churches. These adjacent users can be affected through issues such as light nuisance, dust nuisance and noise due to changes in traffic volumes or road functionality.

The magnitude of potential impacts was determined by considering the percentage increase in traffic (AADT) due to project related activities in accordance with the adopted criteria described below:

- > High Magnitude: greater than 90% increase in AADT
- > Moderate Magnitude: greater than 60% up to 90% AADT increase
- > Low Magnitude: 30% to 60% AADT increase.

Increases in AADT less than 30% are considered negligible in terms of environmental effects.

10.3 Sensitivity of road network

To facilitate classification of the sensitivity of the road network to changed traffic conditions, characteristics were identified that describe the three aspects of efficiency, safety and amenity. These characteristics relate to the more tangible elements of each aspect, which are able to be measured and monitored.

To assess the sensitivity of the road network, each functional road type (highway, regional connecting road, rural connecting road and rural access road) was considered in relation to its response to changes in the identified characteristics. Following this identification, the sensitivity of each road type to changed traffic conditions was classified as high, moderate or low. Table 10-4 summarises the road EVs associated with roads within the GFD Project area.

Table 10-4 Environmental values and sensitivity (pre-implementation of management strategies)

		Value			
Characteristic		Highway	Regional connecting road	Rural connecting road	Rural access road
Description	Function	A high order road of a high standard facilitating connectivity between regional centres	A high order road of a high standard facilitating connectivity between townships	Lower order road facilitating connectivity between higher order roads	Low order road predominately facilitating access to local uses
Typical observations					
Efficiency	Volumes	1,000+ vehicles	150–1,000 vehicles	50–500 vehicles	1–150 vehicles
	Pavement	Sealed	Sealed	Sealed/unsealed	Unsealed
	Standard of intersection control	High order	Varies	Low order	Low order
Sensitivity of efficiency		Low	Moderate	High	High
Safety	Bridges	Common	Common	Uncommon	Uncommon
	Cattle grids	Uncommon	Uncommon	Common	Common
	Standard of rail crossing control	Active	Passive	Passive	Passive
	School bus route presence	Present	Present	Present	Present
	Composition of traffic	High proportion heavy vehicles	Moderate proportion of heavy vehicles	Low number of heavy vehicles	Low number of heavy vehicles
	Driver fatigue controls	Present	Uncommon	Uncommon	Uncommon
Sensitivity of safety		Low	Moderate	High	High
Amenity	Stock route co-location	Present	Present	Present	Present
	Sensitivity of adjacent land uses	Low	Moderate	Moderate	Moderate
	Potential for dust nuisance issues	Low	Low	Potential	Potential
	Potential for light glare issues	Low	Low	Potential	Potential
Sensitivity of amenity		Low	Moderate	High	High

In summary, the roads designed for higher traffic volumes are less sensitive to changing traffic conditions than roads designed primarily to facilitate local traffic. The EVs of highways have been identified as having a **low** sensitivity to a change in traffic conditions given their existing construction standard and higher order purpose. The EVs of regional connecting roads have a **moderate** sensitivity while rural connecting roads and rural access roads are considered as having a **high** sensitivity given their existing construction standard and existing usage.

10.4 Management framework

Santos GLNG has developed and implemented a management framework that manages the impacts of the GLNG Project on transport routes, which are located in the same region as the GFD Project. Management of traffic and transport impacts will be achieved by the implementation of the plans identified in Table 10-5 as well as:

- > Infrastructure Agreement for infrastructure works to connect to SCRs (DTMR , May 2012)
- > Adherence to the internal Santos GLNG protocols for working within regional communities
- > Road-use and traffic management strategies and documents.

The commitments are shown in Table 10-5.

Table 10-5 Management plan commitments

Management plan	Commitment
Road-use and Traffic Management Plans	
Road-use management plan	<p>The Road-use management plan was developed to manage the impact associated with the implementation of the Santos GLNG Project. It will be adapted to manage the potential impacts resulting from the GFD Project. The objectives of the plan include:</p> <ul style="list-style-type: none"> ▪ Manage the efficiency of the road network impacted including State-controlled roads and local government roads ▪ Ensure user safety and safe operation of vehicles ▪ Minimise impacts on road infrastructure condition ▪ Minimise traffic related complaints and incidents to maintain community amenity. <p>This plan will be revised for the GFD Project as appropriate and is not included in this EIS.</p>
Road impact assessments	<p>The RIAs will identify:</p> <ul style="list-style-type: none"> ▪ Potential transport routes for use by the GFD Project that are State and Local Government controlled roads ▪ Assessment of the condition of the identified roads ▪ Estimated forecast of project traffic throughout the phases of the GFD Project ▪ Thresholds for mitigation intervention <p>Mitigation required as a result of GFD Project activities to adequately prepare and/or maintain the condition of the road for GFD Project and public use and the proportion of the required mitigation attributable to the GFD Project.</p>
Infrastructure agreement (IA)	<p>Infrastructure agreement (IA) have been established with the Department of Transport and Main Roads and all relevant regional councils impacted by the Santos GLNG Project.</p> <p>The IAs:</p> <ul style="list-style-type: none"> ▪ Establish a framework for negotiating road impact mitigation ▪ Conducting road impact assessments (RIAs) ▪ Establish the forward work schedule to confirm costs and timing of road treatments ▪ Managing variations and disputes.
Environmental Management Plans	
Social impact management plan (SIMP)	<p>The SIMP established for the GLNG Project will be implemented across the GFD Project. The plan outlines the roles, responsibilities and rights of Santos GLNG, the government, impacted communities and other stakeholders in relation to the GFD Project. In particular, it outlines the framework for community engagement, management strategies to avoid, mitigate or minimise potential impacts and to maximise opportunities and benefits arising throughout the life of the GFD Project, as well as a monitoring and reporting process.</p> <p>The GLNG Project SIMP will be supplemented by issue action plans relating to the GFD Project that focus on the following key areas as agreed with the Coordinated Project Delivery Division of the Coordinator-General's office:</p> <ul style="list-style-type: none"> ▪ Water and environment ▪ Community safety

Management plan	Commitment
	<ul style="list-style-type: none"> ▪ Social infrastructure ▪ Community wellbeing and liveability ▪ Local industry participation and training ▪ Aboriginal engagement and participation. <p>The SIMP is an operational document that is updated to reflect the ongoing needs of Santos GLNG and the communities it operates in. It is available on the web at: http://www.santosglng.com/resource-library/community/social-impact-management-plan-community-handbook.aspx</p>
Pest and weed management plan (PWMP)	<p>The management of pest and weed species will be undertaken in accordance with the PWMP. The plan includes measures such as:</p> <ul style="list-style-type: none"> ▪ Identification of pest and weed species and areas of infestation ▪ Avoidance of traversing and placing infrastructure in areas of known infestation ▪ Prevention of the spread of pest and weed species by implementing appropriate work practices and promotion of risk awareness ▪ Control of identified pest and weeds through containment, reduction or eradication as required by legislation.
Waste management plan (WMP)	<p>The WMP details the strategy, methods and controls for managing waste generated by Santos GLNG activities. The plan identifies the types of wastes generated by Santos GLNG activities, and describes the waste management framework and how the waste management hierarchy is applied to generated waste.</p>
Erosion and sediment control Management Plan (ESCMP)	<p>The ESCMP identifies erosion and sedimentation risk and provides an erosion and sediment control strategy that incorporates understanding of the risk inherent to local land resource characteristics.</p> <p>The ESCMP is supported by the Erosion and sediment control manual, which provides erosion, sediment and drainage controls in line with best practice guidelines.</p>
Contingency plan for emergency environmental incidents	<p>The Contingency plan details the management practices in place within Santos GLNG to minimise environmental harm during an emergency environmental incident. The plan identifies potential incidents, and provides response actions, including escalation, communication, reporting and monitoring.</p>
Emergency response plan	<p>The Emergency response plan forms part of Santos GLNG's overall emergency response, is supplementary to the Queensland Incident Management Plan and provides the necessary information to deal with emergencies at the site and asset level.</p>

Road-use management plan

The Road-use management plan document demonstrates that Santos GLNG can appropriately manage project impacts through the development and implementation of appropriate road-use strategies. It is expected that a similar document will be developed for impacts relating to the GFD Project. These arrangements may take the form of amendments to the GLNG Project Road-use management plan including mitigation measures such as:

- > Manage traffic at and near road work areas through the preparation and implementation of traffic management plans in accordance with DTMR specification MRS11.02 *Provisions for Traffic and the Manual of Uniform Traffic Control Devices*
- > Control dust as specified in MRS11.02 *Provision for Traffic*
- > Control weeds, pest and disease in accordance with DTMR specification MRS11.16E – *Establishment and Monitoring Works*
- > Obtain the necessary permits for excess mass or over-dimensional loads associated with the project as required under the Transport Operations (Road Use Management) Act 1995
- > Provide excess mass and over-dimensional vehicle movement schedules to Queensland Police Service and DTMR in the Heavy Vehicle Road Operations Program Office at least three months in advance of the movements occurring

- > Ensure GFD Project traffic uses the roads approved for use by DTMR and regional councils
- > Implement the traffic management plan during construction and commissioning of the GFD Project and construction of roads and intersections
- > Use buses to transport workers
- > Liaise with local police, schools and school bus operators
- > Erect warning signs and public notices to warn other road users
- > Set safe driving rules and monitor driver behaviour.

Road impact assessment

A RIA is generally required when, as part of the development approval process, a development proposal is referred to DTMR. In general DTMR will consider a development's road impacts to be insignificant if the development generates an increase in traffic on SCRs of less than 5% over existing levels, either measured in terms AADT or ESAs.

Infrastructure agreement

Infrastructure agreement (IA) have been established with the Department of Transport and Main Roads and all relevant regional councils impacted by the Santos GLNG Project.

The IAs:

- > Establish a framework for negotiating road impact mitigation
- > Conducting road impact assessments (RIAs)
- > Establish the forward work schedule to confirm costs and timing of road treatments
- > Managing variations and disputes.

10.5 Monitoring

10.5.1 RMP monitoring by regional community consultative committees

The existing Regional Community Consultative Committees (RCCCs) discuss social impacts and Road-use management plan implementation in the following council areas:

- > Maranoa Regional Council
- > Central Highlands Regional Council
- > Banana Shire Council
- > Gladstone Regional Council
- > Western Downs Regional Council.

The focus of the RCCCs is to respond to social impact mitigation and management strategies and to provide oversight of the implementation of the Social impact management plan.

10.6 Significance assessment outcomes

Having regard to the potential impacts identified during the assessment process, measures such as avoidance, mitigation and management will be applied to reduce the level of impact.

These measures aim to protect the identified values and to achieve established objectives. Mitigation and management measures will be applied, as appropriate, during the design, construction, operations and decommissioning phases of the GFD Project.

The mitigation and management measures applied are based on the existing measures contained within the approved environmental management framework that Santos GLNG has already developed and implemented for the GLNG Project. This approach is supported by the Santos GLNG Environmental, Health and Safety Management System. Applying the same mitigation and management measures from the GLNG Project to the GFD Project will ensure a consistent approach by construction and operations personnel and a common understanding for both regulators and the community of the measures to be applied.

As discussed in section 10.1, impacts were assessed using the significance assessment methodology. For each identified potential impact, the assessment considered:

- The potential pre-mitigated significance, which assumes the impacts are ‘uncontrolled’ and at their greatest
- The mitigation measures that will be used to manage the potential impacts on traffic and transport values. These measures will reduce the (magnitude/likelihood/consequence) of the potential impacts
- The residual significance of the potential impact after the implementation of mitigation measures. The residual significance takes into account the potential for impact that remains after the mitigation measures are applied.

To gauge the effectiveness of the proposed management strategies, the sensitivity values determined in Section 7: Assessment methodology were revisited. The typical characteristics of the road hierarchy types have been reassessed taking into consideration measures that would be implemented on project roads leading to facilities and accommodation camps. Table 10-6 summarises the assessment undertaken for the potential impacts of the GFD Project on traffic and transport values.

In summary, Table 10-6 shows the level of significance of the GFD Project’s potential road impacts based upon the significance assessment approach both pre and post-implementation of the planned management strategies. The table identifies that in the absence of the planned management strategies being implemented, the traffic demands associated with the GFD Project could result to high impacts on the EVs of regional connecting roads, rural connecting roads, and rural access roads. The significance of impacts on highways is expected to be generally negligible.

It is expected that the magnitude of the Project’s impacts will not change as a result of implementation of the planned management strategies as the magnitude is intrinsically linked to the extent of the GFD Project activities which the strategies do not influence. Instead it is expected that through the implementation of the planned management strategies, the sensitivity of the road EVs will typically reduce, thereby resulting in typically reduced significance of impacts.

Following the magnitude criteria defined in Section 10.2 of Section 10: Significance assessment, the magnitude of impacts was based on the peak percentage increase in AADT attributable to the GFD Project. Detailed information on the percentage of AADT from the GFD Project is presented within Appendix C: Trip generation and Appendix F: Mid-block assessment. The various highway sections analysed generally indicate an increase of less than 60% AADT in peak traffic, hence a magnitude of impact categorised as low. Most of the regional connecting roads indicated a peak percentage of AADT that ranged from a magnitude of moderate to high. Data on lower order roads, such as rural connecting roads and rural access roads are not yet available at this stage, but a moderate magnitude of impact, i.e. 60% to 90% increase in AADT was selected for the purposes of significance assessment. This could be further refined when actual data becomes available.

Table 10-6 further shows that the sensitivity of the safety, efficiency and amenity of a highway to changed traffic conditions remains low following implementation of the identified management strategies. The sensitivity of the safety, efficiency and amenity to changed traffic conditions of a regional connecting road is, however, reduced from high to moderate. The sensitivity of a rural connecting road and a rural access road is likewise reduced from high to moderate. This reduces the significance of the GFD Project's impacts from a range of negligible to high to a range of negligible to moderate.

The adopted significance assessment approach constitutes a strategic assessment of the GFD Project's road impacts consistent with the level of GFD Project development certainty available at the EIS planning approval stage. This report has identified that there are no impacts so significant (high or major) that they cannot be effectively managed through the implementation of appropriate management strategies. It is recognised that at this strategic level, specific mitigation works cannot be identified. During the detailed project planning phase, consultation will be undertaken with Councils and DTMR to identify works at specific locations. Through conditioning the preparation of road use management plans and the requirement to enter into infrastructure agreements, the road impacts associated with the project can be effectively managed.

Table 10-6 Significance values pre and post-implementation of management strategies

	Value (Pre-Mitigation)					Value (Post-Mitigation)				
	Characteristic	Highway	Regional connecting road	Rural connecting road	Rural access road	Relevant Mitigation	Highway	Regional connecting road	Rural connecting road	Rural access road
Descriptor	Function	A high order road of a high standard facilitating connectivity between regional centres	A high order road of a high standard facilitating connectivity between townships	Lower order road facilitating connectivity between higher order roads	Low order road predominately facilitating access to local uses	Implementation of the RMP	A high order road of a high standard facilitating connectivity between regional centres	A high order road of a high standard facilitating connectivity between townships	Lower order road facilitating connectivity between higher order roads	Low order road predominately facilitating access to local uses
	Typical observations (Pre-Mitigation)					Typical observations (Post-Mitigation)				
Efficiency	Volumes	1,000+ vehicles	150–1,000 vehicles	50–500 vehicles	1–150 vehicles	Implementation of the RMP to reduce number of trips	1,000+ vehicles	150-1,000 vehicles	50-500 vehicles	1-150 vehicles
	Pavement	Sealed	Sealed	Sealed/unsealed	Unsealed	Preparation of RIA to identify impact of project and potential mitigations	Sealed with improvements	Sealed with improvements	Sealed with improvements	Sealed with improvements
	Standard of intersection control	High order	Varies	Low order	Low order	Preparation of RIA to identify impact of project and potential mitigations	High order	High order	Low order with improvements	Low order with improvements
Sensitivity of efficiency		Low	Moderate	High	High		Low	Low	Moderate	Moderate
Magnitude of impact		Low	High	Moderate	Moderate		Low	High	Moderate	Moderate
Significance of efficiency		Negligible	High	High	High		Negligible	Moderate	Moderate	Moderate
Safety	Bridges	Common	Common	Uncommon	Uncommon	Preparation of RIA to identify impact of project and potential mitigations	Frequent and high standard	Frequent and high standard	Infrequent and high standard	Infrequent and some works
	Cattle grids	Uncommon	Uncommon	Common	Common	Preparation of RIA to identify impact of project and potential mitigations	Uncommon	Uncommon	Frequent and higher standard	Frequent and higher standard
	Standard of rail crossing control	Active	Passive	Passive	Passive	Preparation of RIA to identify impact of project and potential mitigations	Active	Investigate exposure threshold	Investigate exposure threshold	Investigate exposure threshold

Value (Pre-Mitigation)					Value (Post-Mitigation)				
School bus route presence	Present	Present	Present	Present	Implementation of the RMP identifying routes to drivers	Present with improved awareness	Present with improved awareness	Present with improved awareness	Present with improved awareness
Composition of traffic	High proportion heavy vehicles	Moderate proportion of heavy vehicles	Low number of heavy vehicles	Low number of heavy vehicles	Implementation of the RMP to manage vehicle trips	High proportion of heavy vehicles	Moderate proportion of heavy vehicles	Higher number of heavy vehicles	Higher number of heavy vehicles
Driver fatigue controls	Present	Uncommon	Uncommon	Uncommon	Implementation of RMP and hazard and safety management framework	Present plus driver fatigue management plan	Uncommon plus driver fatigue management plan	Uncommon plus driver fatigue management plan	Uncommon plus driver fatigue management plan
Sensitivity of safety	Low	Moderate	High	High		Low	Low	Moderate	Moderate
Magnitude of impact	Low	High	Moderate	Moderate		Low	High	Moderate	Moderate
Significance of safety	Negligible	High	High	High		Negligible	Moderate	Moderate	Moderate
Stock route co-location	Present	Present	Present	Present	Preparation of RIA to identify impact of project and potential mitigations	Present but disturbances managed	Present but disturbances managed	Present but disturbances managed	Present but disturbances managed
Sensitivity of adjacent land uses	Low	Moderate	Moderate	Moderate	Preparation of RIA to identify impact of project and potential mitigations	Low	Low	Moderate	Moderate
Potential for dust nuisance issues	Low	Low	Potential	Potential	Preparation of RIA to identify impact of project and potential mitigations. Implementation of RMP to address additional measures	Low but managed	Low but managed	Potential but managed	Potential but managed
Potential for light glare issues	Low	Low	Potential	Potential	Preparation of RIA to identify impact of project and potential mitigations	Low but managed	Low but managed	Potential but managed	Potential but managed
Sensitivity of amenity	Low	Moderate	High	High		Low	Low	Moderate	Moderate
Magnitude of impact	Low	High	Moderate	Moderate		Low	High	Moderate	Moderate
Significance of amenity	Negligible	High	High	High		Negligible	Moderate	Moderate	Moderate

11 Summary

This traffic and transport assessment constitutes a strategic assessment of the significance of the road impacts associated with the GFD Project. Local impacts can be managed via consultation with road authorities, preparation of RIA, RMPs and potentially through infrastructure agreements. The traffic and transport assessment has established that there is unlikely to be residual road impacts so significant, post implementation of approval conditions and the planned management strategies, that they should preclude approval of the GFD Project. The traffic and transport assessment has confirmed that the planned management strategies will result in intersection and pavement works, which will meet or exceed standard traffic engineering practice requirements. The planned management strategies establish the framework that will inform future assessments of the GFD Project impacts.

While works on SCRs have been identified in this traffic and transport report, a comprehensive list of works ultimately required to accommodate GFD Project traffic can most appropriately be determined during the detailed assessment stage as part of RIAs prepared to inform required infrastructure agreements with both State and council road authorities.

The analysis herein has indicated that prior to the implementation of management strategies, where rural access roads and rural connecting roads are used to access production facilities and accommodation camps, high significance safety, efficiency and amenity impacts are anticipated. With the application of management strategies this will reduce to moderate significance impacts on these types of roads, due to achieving a reduction in road sensitivity.

Regional connecting roads are anticipated to experience high significance safety, efficiency and amenity impacts pre-management strategies. With implementation of management strategies this will reduce to moderate significance impacts.

Highways are anticipated to have a negligible significance of impacts both before and after management strategy implementation. However improvements are still achieved as part of the management strategies.

Management strategies provide localised treatments to reduce sensitivity of the road network types with a preference towards avoiding the impact, then minimising the impact and then managing the impact.

Contribution may still need to be made to road authorities to manage moderate and low safety, efficiency and amenity impacts. This will be further investigated once project planning is further progressed via the development of road use management plans and potential infrastructure agreements.

References

- ARRB Group, 2007. *Road Safety Risk Reporter 7: Development of Crash Rates for Australian Roads*. Brisbane: Queensland Government.
- ARRB Transport Research Ltd, 2009. *Unsealed Roads Manual: Guidelines to Good Practice*. Vermont South, Victoria, ARRB Group Ltd.
- Austroads, 1999. *Guide to Traffic Engineering Practice Part 2: Roadway Capacity*. Sydney, Austroads Incorporated.
- Austroads, 2003. *Rural Road Design: A Guide to the Geometric Design of Rural Roads*. Sydney, Austroads Incorporated
- Austroads, 2006. *Guide to Road Safety Part 5: Road Safety Rural and Remote Areas*. Sydney, Austroads Incorporated.
- Austroads, 2009. *Guide to Road Design – Part 4A: Signalised and Signalised Intersections*. Sydney, Austroads Incorporated.
- Austroads, 2009. *Guide to Traffic Management Part 3: Traffic Studies and Analysis*. Sydney, Austroads Incorporated.
- Austroads, 2009. *Road Safety Engineering Risk Assessment Part 7: Crash Rates Database*. Sydney, Austroads Incorporated.
- Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2011. Road vehicle-Kilometres travelled: estimation from state and territory fuel sales, Canberra ACT.
- Department of State Development, Infrastructure and Planning, 2013. *Economic Directions Statement Queensland Airports 2013-2023*. Brisbane, Queensland Government
- Department of Transport and Main Roads, 2002. *Guide for the Road Safety Management of Rural School Bus Routes and Bus Stops*. Brisbane, Queensland Government.
- Department of Transport and Main Roads, 2006. *Guidelines for Assessment of Road Impacts of Development*. Brisbane, Queensland Government.
- Department of Transport and Main Roads, 2008. *Road Planning and Design Manual*. 2nd edition. Brisbane, Queensland Government
- Department of Transport and Main Roads, 2009. *Manual of Uniform Traffic Control Devices Part 7: Railway Crossings*. Brisbane, Queensland Government.
- Department of Transport and Main Roads, 2009. *Roads Implementation Program 2009-10 to 2013-14*. Brisbane, Queensland Government.
- NA, 2012. *Capricorn Municipal Development Guide Lines: Geometric Road Design: D1 Design Guidelines*. Rockhampton, Cardno.
- QR, 2007. *Australian Level Crossing Assessment Model Crossing Assessment Handbook*. Brisbane, QR.
- RMS/RTA, 2002. *Guide to Traffic Generating Developments*. Sydney, Road and Transport Authority.
- Santos GLNG, 2014. GFD Project Environmental Protocol for Constraints Planning and Field Development. Brisbane

Gas Field Development Project – Environmental Impact Statement

APPENDIX A

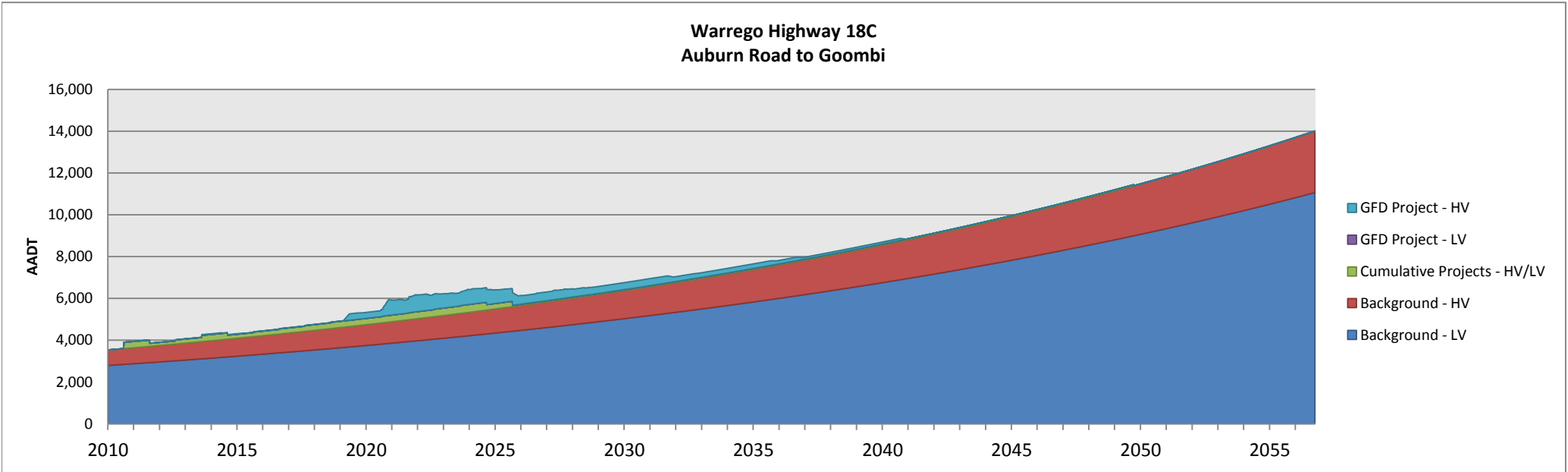
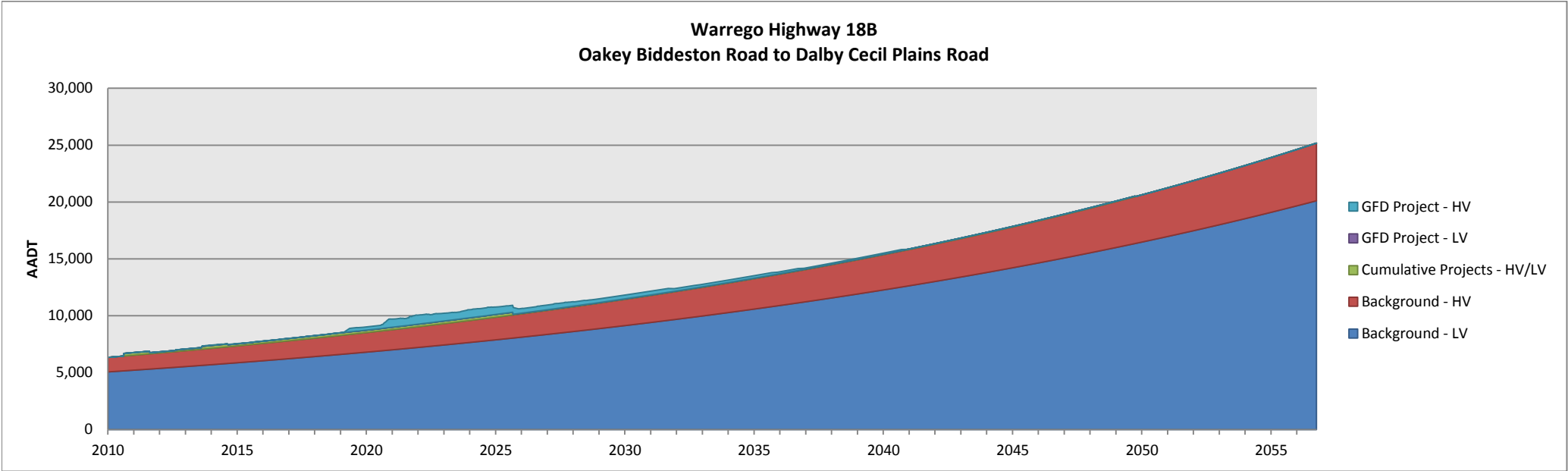
GFD PROJECT TRAFFIC VOLUMES

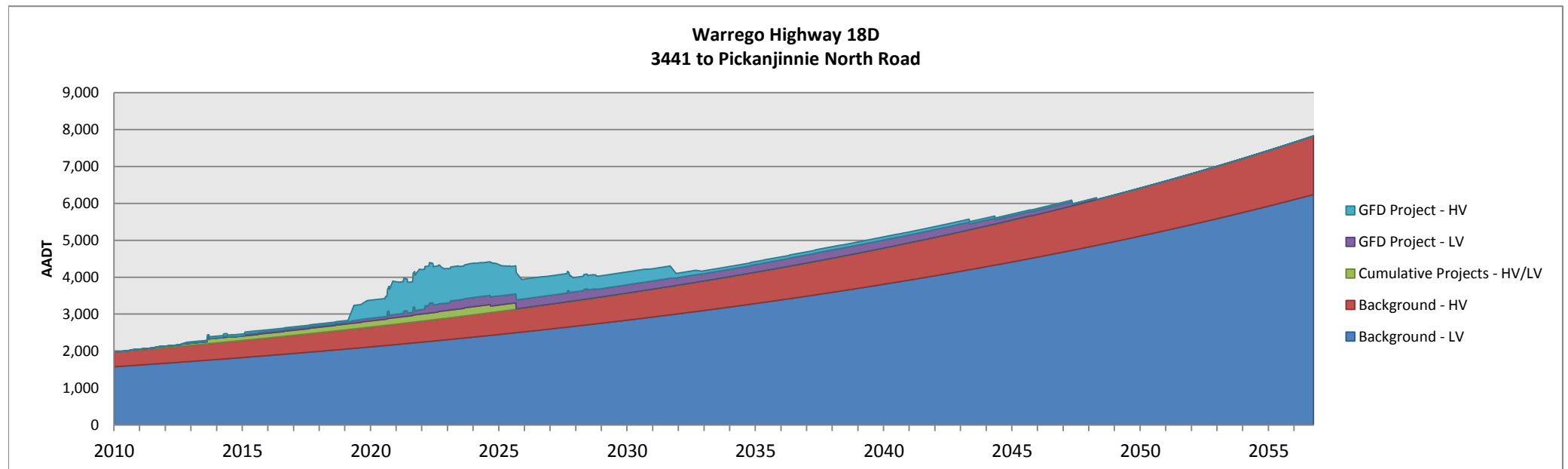
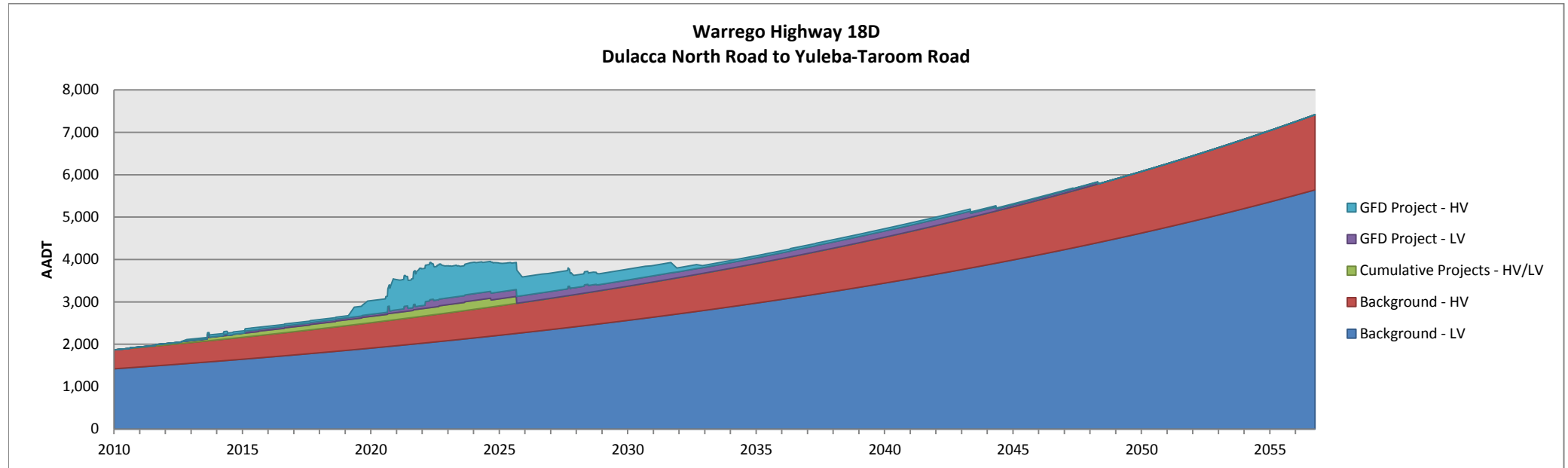
Average Annual Daily Heavy Vehicle Project Traffic

Road	Section	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057			
Warrego Highway 18B	Trays Road to Oakley Biddisdon Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18B	Oakey Biddisdon Road to Dalby Cecil Plains Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Cunningham Street to Rail Line	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Rail Line to Macalister Bell Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Warra Kogan Road to Glasson Street	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Glasson Street to Auburn Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Auburn Road to Goombi	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Goombi to Leichhardt Highway	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18D	Miles to 18D/Dulacca North Intersection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	18D/Dulacca North Intersection to Yuleba-Taroom Rd	31	53	54	45	45	45	122	316	668	837	746	735	669	459	432	311	260	260	243	110	54	50	50	52	54	54	54	54	55	53	45	28	20	20	16	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	31	53	54	45	45	45	165	420	773	848	746	735	670	459	432	311	260	260	243	110	54	50	51	55	55	54	54	54	55	53	45	28	20	20	16	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	31	53	54	45	45	45	200	550	908	965	885	881	774	537	509	389	337	339	317	140	79	74	78	83	83	82	82	81	81	79	70	53	45	45	31	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Kangaroo Ck Rd 18D/3441 Intersection\	31	53	54	45	45	45	153	399	752	948	885	881	774	537	509	389	337	339	317	140	79	74	76	80	81	82	82	81	81	79	70	53	45	45	31	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	18D/3441 Intersection to Pickanjinnee Rd	31	53	54	45	45	45	197	485	834	1049	933	933	821	556	525	405	353	356	332	142	80	75	79	83	84	85	84	83	82	80	71	54	46	46	32	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Pickanjinnee Rd to Latemores Lane	31	53	54	45	45	45	192	472	821	1023	909	909	805	554	525	405	354	356	333	142	80	75	79	83	84	85	84	83	82	80	71	54	46	46	32	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Latemores Lane to Warooby Lane	31	53	54	45	45	45	196	482	831	1056	949	950	833	557	525	405	354	356	333	143	80	75	79	83	85	86	85	84	82	80	71	54	46	46	32	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Warooby Ln to KM135.5	31	53	54	45	45	45	245	601	950	1166	1056	1059	844	557	525	405	354	357	333	143	81	76	82	86	88	89	87	86	82	80	71	54	46	46	32	5	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	KM135.5 to Roma	0	19	20	11	11	11	170	430	1022	1015	935	953	823	328	275	295	285	289	291	292	293	293	298	263	197	188	187	187	107	91	84	69	62	62	44	10	5	5	4	3	2	2	2	1	0			
Warrego Highway 18E	Roma to Roma Southern Road	0	0	0	0	0	0	0	3	211	228	261	219	254	46	24	24	24	24	24	24	24	24	24	26	27	27	27	27	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18E	Roma Southern Road to CH. 5.5	0	0	0	0	0	0	0	3	155	165	166	149	181	32	18	18	18	18	18	18	18	18	19	19	20	20	20	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18E	CH.5.5 to Massey Lane	0	0	0	0	0	0	0	3	91	93	95	75	77	18	11	11	11	11	12	11	11	11	11	12	12	12	12	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	CH. 0.00 (Surat) to Yuleba-Surat Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Roma-Condamine Road to CH. 54	0	0	0	0	0	0	0	0	1	110	142	136	118	118	118	118	118	118	121	112	26	16	16	16	17	17	18	18	18	18	18	18	18	18	17	17	11	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	CH. 54 to Kimbler Road	0	0	0	0	0	0	0	0	1	162	200	196	176	177	177	177	177	181	166	33	17	17	17	18	19	19	19	19	19	19	19	19	19	18	18	11	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Kimbler Road to Warrego Highway	31	34	34	34	34	34	250	545	1070	1283	1242	1300	1116	725	679	539	498	505	486	297	235	230	239	205	143	135	132	142	80	71	54	46	46	32	5	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24D	CH. 0.00 (Roma) to Mcdowall Street	0	0	0	0	0	0	0	159	418	793	758	645	704	576	274	259	258	253	258	262	263	263	263	268	231	164	155	155	155	66	40	39	39	39	39	39	39	39	39	37	37	36	31	21	21	21	13	0
Carnarvon Highway 24D	Mcdowall Street to KM 3.0	0	0	0	0	0	0	0	159	418	795	705	592	650	523	269	258	252	257	262	262	263	263	268	231	163	154	154	154	66	40	39	39	39	39	39	39	39	39	37	37	36	31	21	21	21	13	0	
Carnarvon Highway 24D	CH. 3m to CH. 18 Roma - Taroom Road	0	0	0	0	0	0	0	159	418	744	703	588	649	521	268	258	256	251	256	261	261	262	262	267	230	162	153	153	153	65	39	38	38	38	38	38	37	37	37	36	31	21	21	21	13	0		
Carnarvon Highway 24D	Roma - Taroom Road to West Myall Road	0	0	0	0	0	0	0	103	283	609	468	453	511	265	258	256	251	256	260	251	262	262	265	227	156	151	151	151	31	20	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Carnarvon Highway 24D	West Myall Road to Gunnewin East Road	0	0	0	0	0	0	0	103	283	573	479	394	439	445	252	246	244	240	245	249	250	250	250	253	215	147	139	139	139	57	39	38	38	38	38	38	37	37	37	36	31	21	21	21	13	0		
Carnarvon Highway 24D	Gunnewin East Road to Komine East Road	0	0	0	0	0	0	0	103	283	543	445	360	404	410	248	246	244	240	244	249	250	250	250	253	215	147	138																					

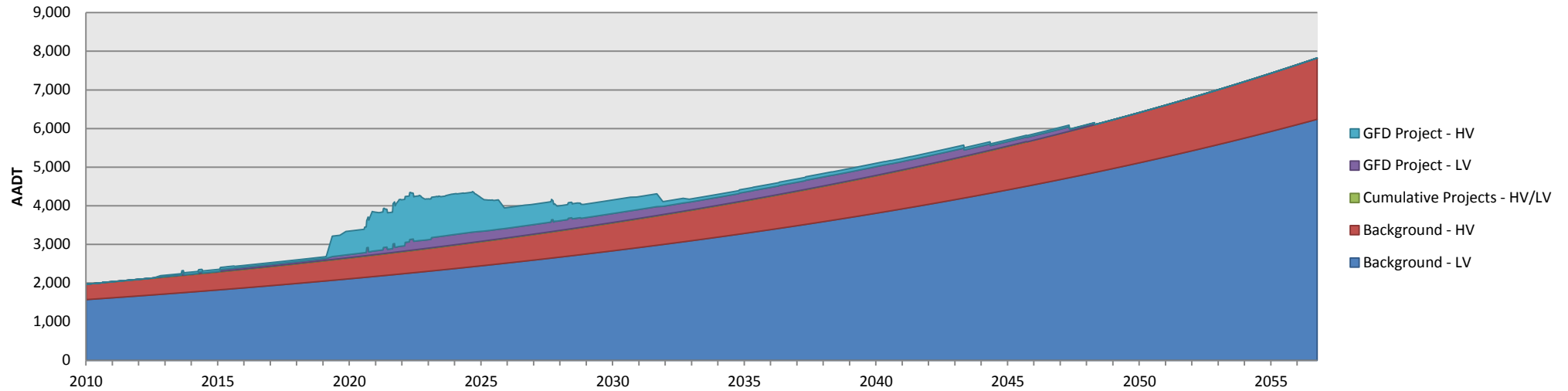
Average Annual Daily Project Traffic

Road	Section	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057			
Warrego Highway 18B	Toys Road to Oakley Biddeson Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18B	Oakey Biddeson Road to Dalby Cecil Plains Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Cunningham Street to Rail Line	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18C	Rail Line to Macalister Bell Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Warra Kogan Road to Glasson Street	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Glasson Street to Auburn Road	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Auburn Road to Goombi	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18C	Goombi to Leichhardt Highway	10	30	20	11	11	11	133	291	662	766	671	710	646	425	422	378	333	339	333	244	220	219	219	175	101	93	93	93	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	Miles to 18D/Dulacca North Intersection	0	0	0	0	0	0	76	245	417	517	430	397	339	129	108	129	108	110	100	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	18D/Dulacca North Intersection to Yuleba-Taroom Rd	34	66	81	92	92	92	170	365	749	964	905	900	831	622	594	485	408	409	389	249	189	184	184	193	198	201	201	201	204	199	171	105	70	69	65	31	0	0	0	0	0	0	0	0				
Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Road	34	66	81	92	92	92	214	474	861	980	910	905	836	626	598	489	412	414	393	254	193	188	184	199	201	201	201	204	199	171	105	70	69	65	31	0	0	0	0	0	0	0	0	0				
Warrego Highway 18D	Yuleba-Surat Road to Kangaroo Ck Rd	34	66	81	92	92	92	251	610	1005	1143	1113	1135	1019	778	750	641	564	569	541	351	285	280	286	295	295	298	298	297	296	289	260	194	159	158	119	31	0	0	0	0	0	0	0	0	0			
Warrego Highway 18D	Kangaroo Ck Rd 18D/3441 Intersection\	34	66	81	92	92	92	205	460	846	1118	1103	1126	1009	768	740	631	555	559	532	342	275	270	277	294	298	298	297	296	289	260	194	159	158	119	31	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	18D/3441 Intersection to Pickanjinnee Rd	34	66	81	92	92	92	254	557	938	1232	1160	1187	1066	796	765	656	580	585	556	350	281	276	289	302	306	309	305	303	300	292	264	198	162	161	121	31	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	Pickanjinnee Rd to Latemores Lane	34	66	81	92	92	92	249	544	925	1207	1136	1161	1046	791	761	653	576	581	552	346	278	272	285	299	304	308	304	303	300	292	264	198	162	161	121	31	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	Latemores Lane to Warooby Lane	34	66	81	92	92	92	253	554	936	1241	1178	1205	1078	797	764	656	579	584	555	349	281	275	288	302	307	311	307	305	301	292	264	198	162	161	121	31	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18D	Warooby Ln to KM135.5	34	66	81	92	92	92	305	681	1064	1364	1299	1330	1101	804	773	664	588	593	563	357	289	284	301	314	317	320	315	309	301	292	264	198	162	161	121	31	0	0	0	0	0	0	0	0	0	0	0	
Warrego Highway 18D	KM135.5 to Roma	0	29	43	54	54	54	223	493	1148	1225	1203	1263	1121	598	541	586	554	561	559	561	561	561	574	547	478	464	461	459	368	336	313	254	220	220	163	45	16	16	14	10	7	6	6	4	0			
Warrego Highway 18E	Roma to Roma Southern Road	0	0	0	0	0	0	0	8	241	259	342	278	335	92	68	68	68	68	68	70	68	68	68	68	78	78	78	77	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18E	Roma Southern Road to CH. 5.5	0	0	0	0	0	0	0	8	180	182	220	203	257	77	62	62	62	62	62	62	62	62	62	68	68	68	68	68	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Warrego Highway 18E	CH.5.5 to Massey Lane	0	0	0	0	0	0	0	8	112	115	143	124	126	62	55	55	55	55	55	55	55	55	55	55	57	58	58	58	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Carnarvon Highway 24C	CH. 0.00 (Surat) to Yuleba-Surat Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Roma-Condamine Road to CH. 54	0	0	0	0	0	0	0	0	0	6	144	189	196	170	170	170	171	171	174	164	71	61	61	61	62	63	66	66	66	67	66	66	65	65	65	65	40	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	CH. 54 to Kimbler Road	0	0	0	0	0	0	0	0	0	6	199	252	260	233	233	233	234	234	239	223	78	62	62	62	63	65	70	70	70	71	69	69	69	68	68	42	0	0	0	0	0	0	0	0	0	0		
Carnarvon Highway 24C	Kimbler Road to Warrego Highway	34	37	37	37	37	38	275	598	1180	1432	1399	1476	1270	841	792	639	595	604	583	378	311	306	335	313	261	254	249	246	141	110	105	96	94	93	65	18	16	16	14	10	7	6	6	4	0			
Carnarvon Highway 24D	CH. 0.00 (Roma) to Mcdowall Street	0	0	0	0	0	0	0	167	442	861	871	821	897	747	470	491	527	521	529	529	530	530	531	544	512	437	423	421	419	289	198	198	197	197	197	197	193	178	178	177	176	153	112	112	112	69	0	
Carnarvon Highway 24D	Mcdowall Street to CH 3.0	0	0	0	0	0	0	0	167	442	810	814	764	839	690	463	490	526	528	528	528	530	530	530	543	511	434	420	418	416	288	198	198	197	197	197	197	193	178	178	178	177	176	153	112	112	112	69	0
Carnarvon Highway 24D	CH. 3m to CH. 18 Roma - Taroom Road	0	0	0	0	0	0	0	167	442	792	779	686	814	658	445	472	492	500	510	510	511	512	512	525	492	416	402	400	398	269	180	180	179	179	179	182	178	178	177	176	153	112	112	112	69	0		
Carnarvon Highway 24D	Roma - Taroom Road to West Myall Road	0	0	0	0	0	0	0	110	302	598	610	544	481	498	498	498	498	498	500	500	500	500	511	511	529	405	394	393	364	269	180	180	179	179	179	182	178	178	177	176	153	112	112	112	69	0		
Carnarvon Highway 24D	West Myall Road to Gunnewin East Road	0	0	0	0	0	0	0	110	302	611	617	447	526	524	375	406	426	434	443	444	446	446	446	457	423	349	337	337	338	233	180	180	179	179	179	182	178	178	177	176	153	112	112	112				

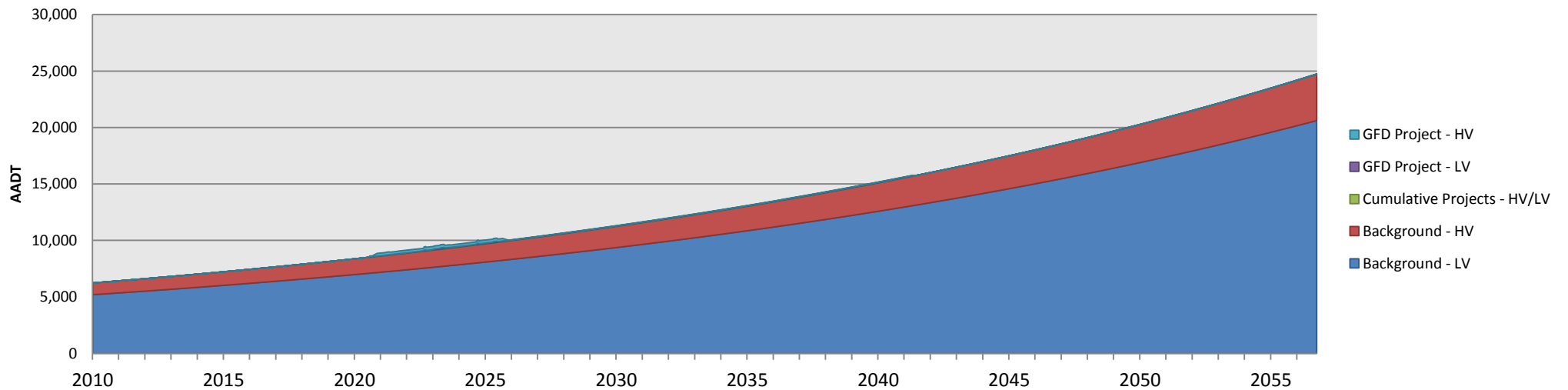


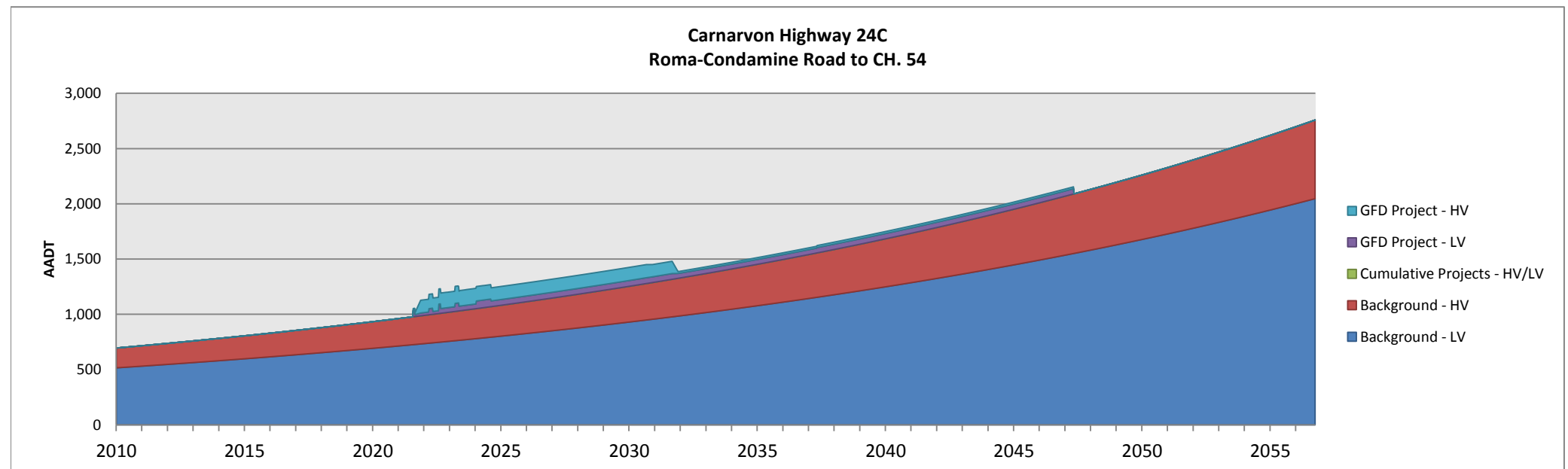
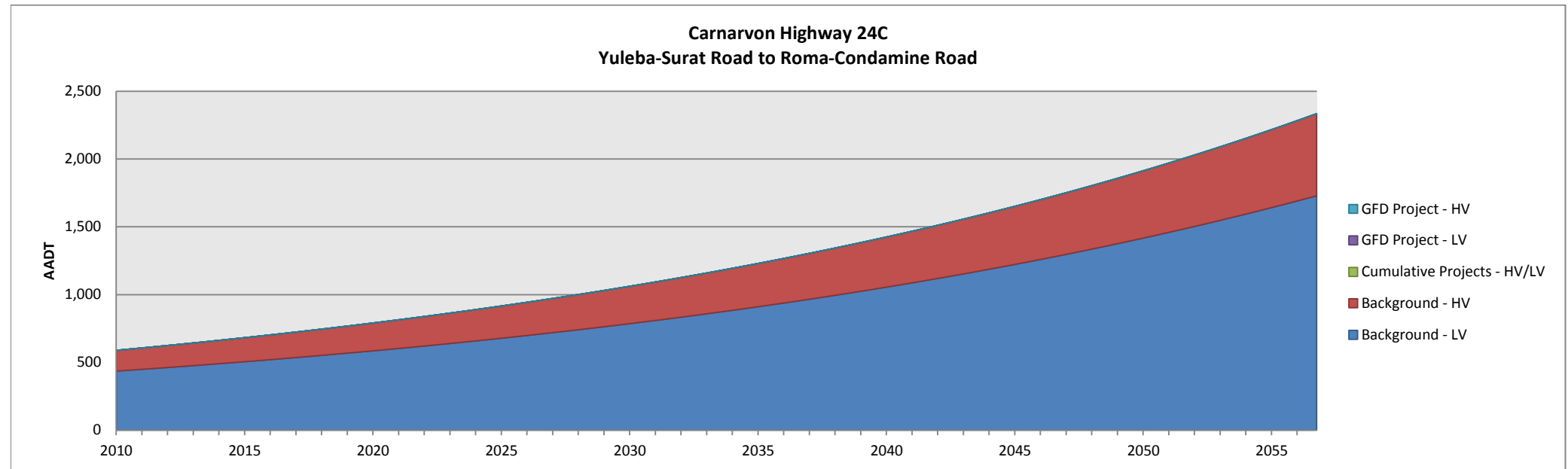


**Warrego Highway 18D
Warooby Ln to KM135.5**

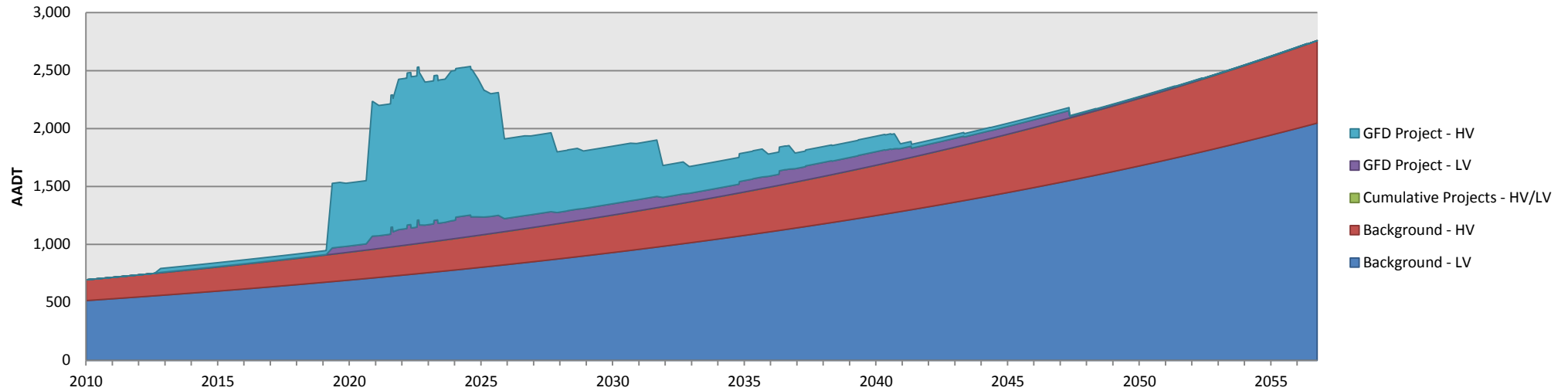


**Warrego Highway 18E
Roma to Roma Southern Road**

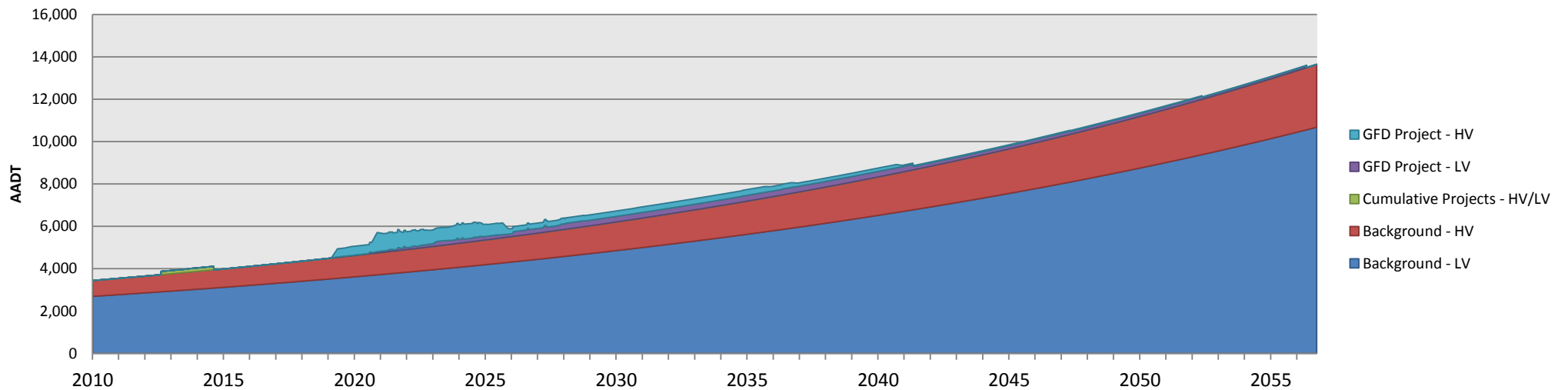


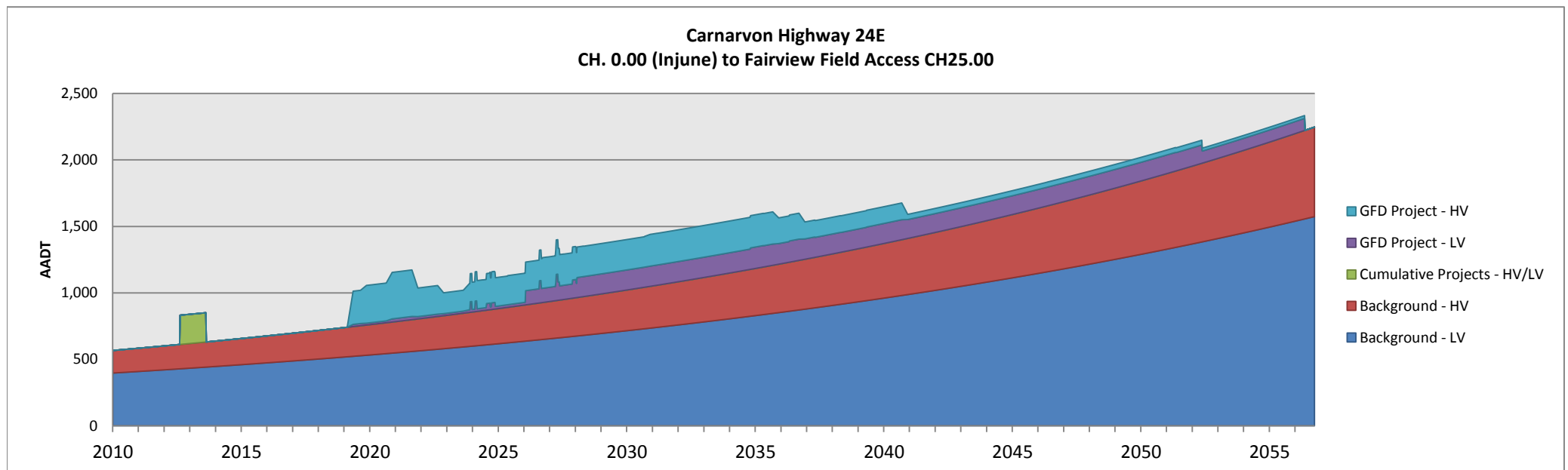
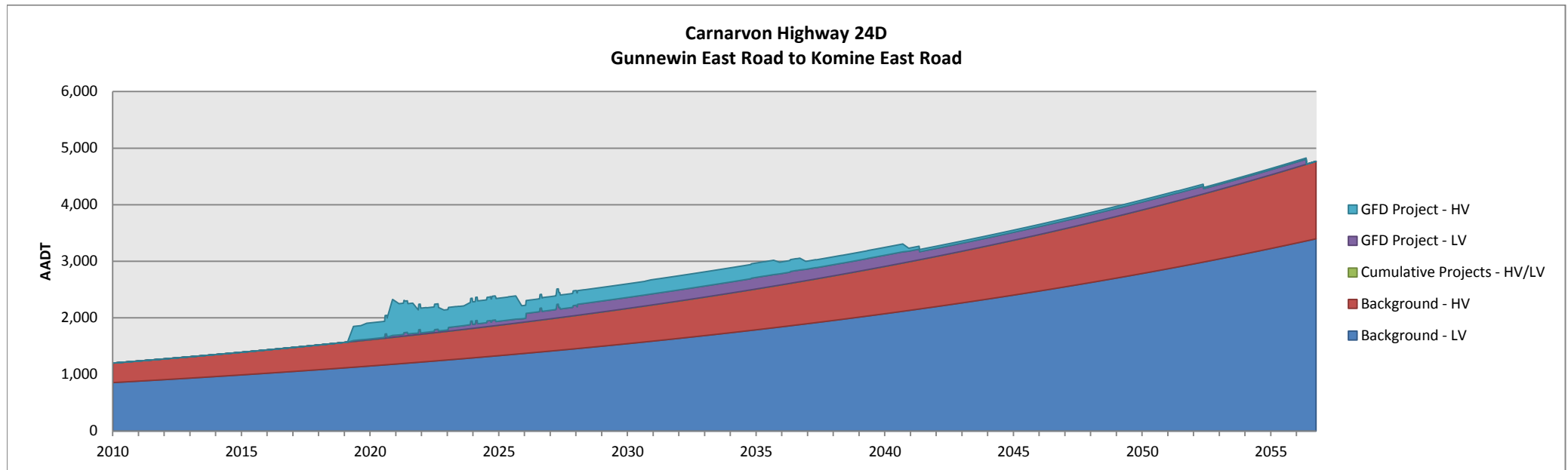


**Carnarvon Highway 24C
Kimber Road to Warrego Highway**

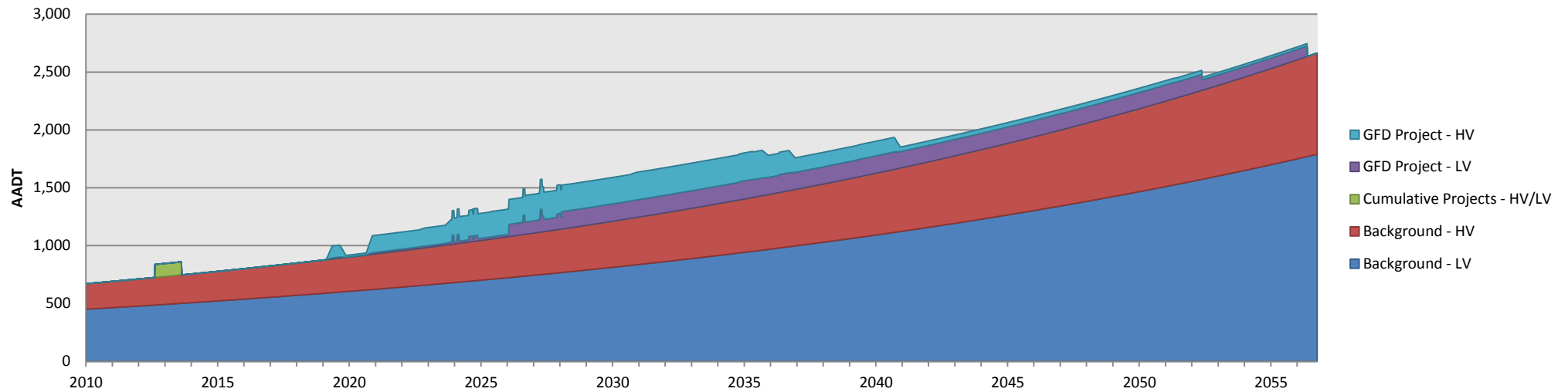


**Carnarvon Highway 24D
CH. 0.00 (Roma) to Mcdowall Street**

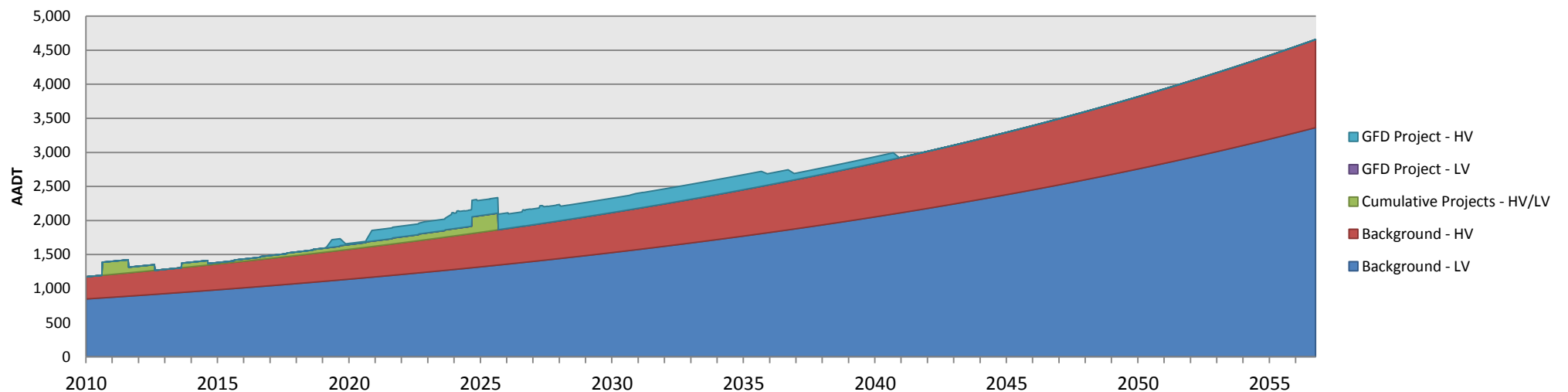




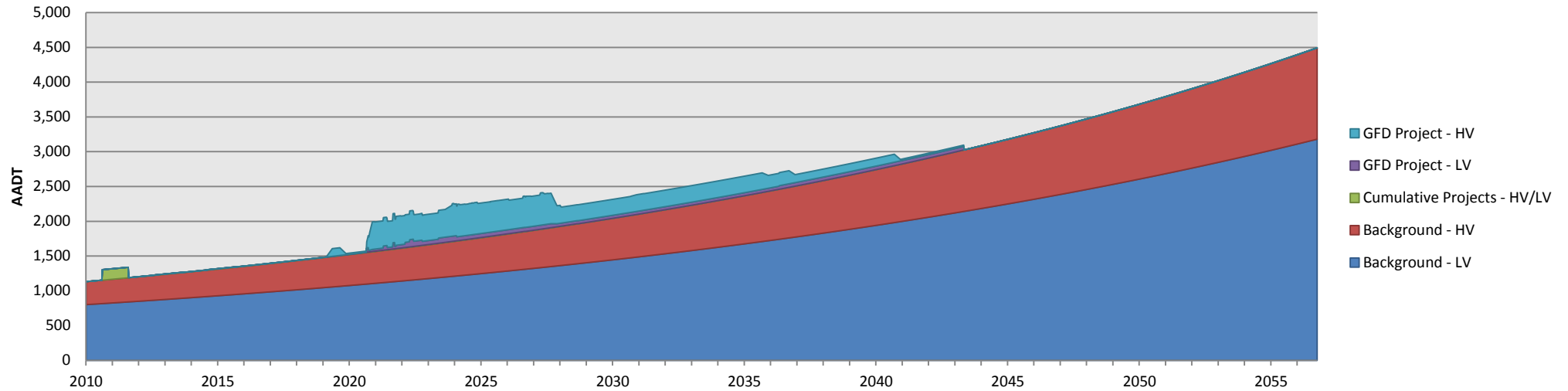
Carnarvon Highway 24E
CH. 111 to CH.172 (Rolleston)



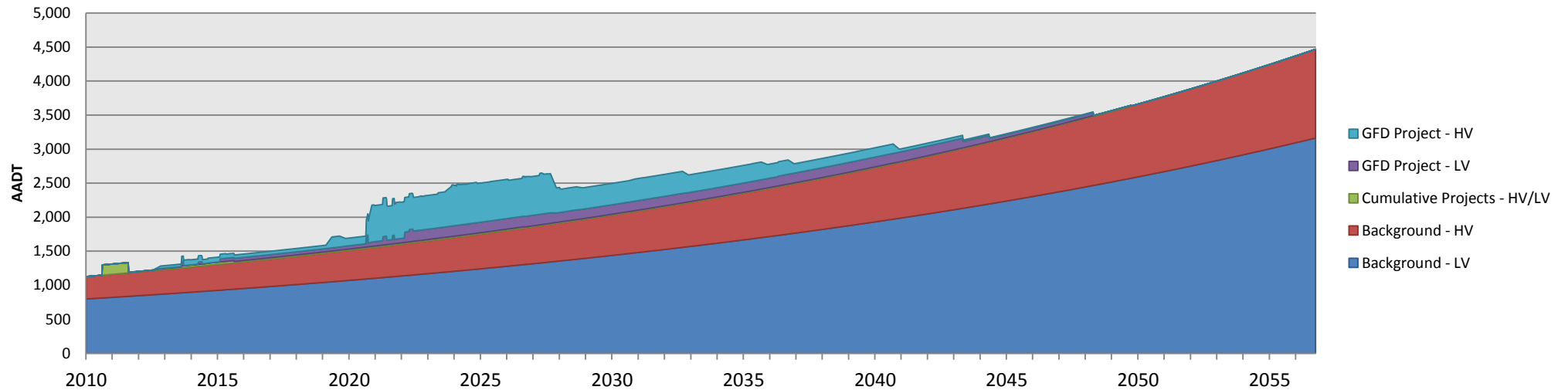
Leichhardt Highway 26A
Banana CH. 105.2 to CH. 117.0



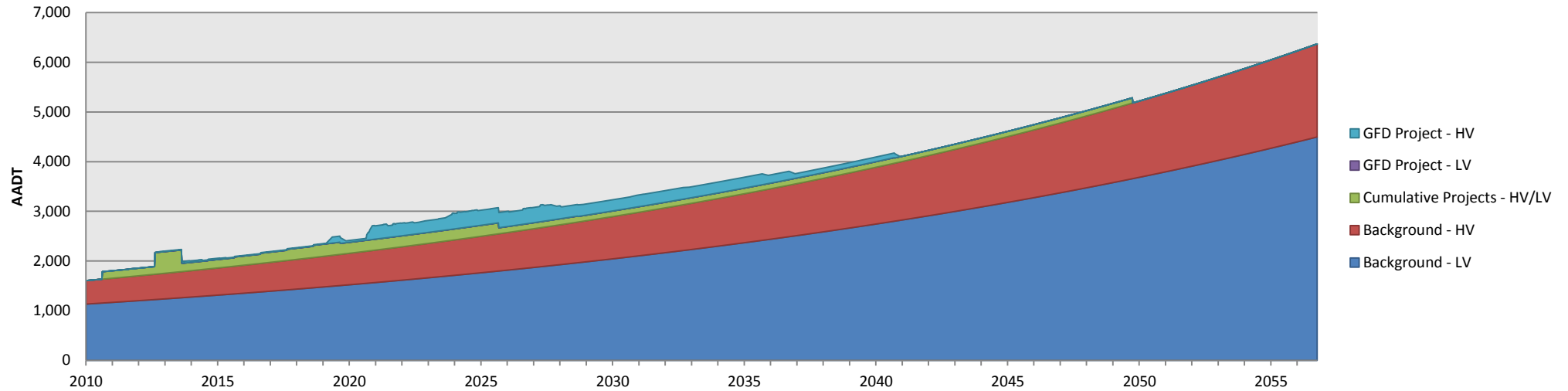
**Leichhardt Highway 26B
Taroom to Cranmer Street**



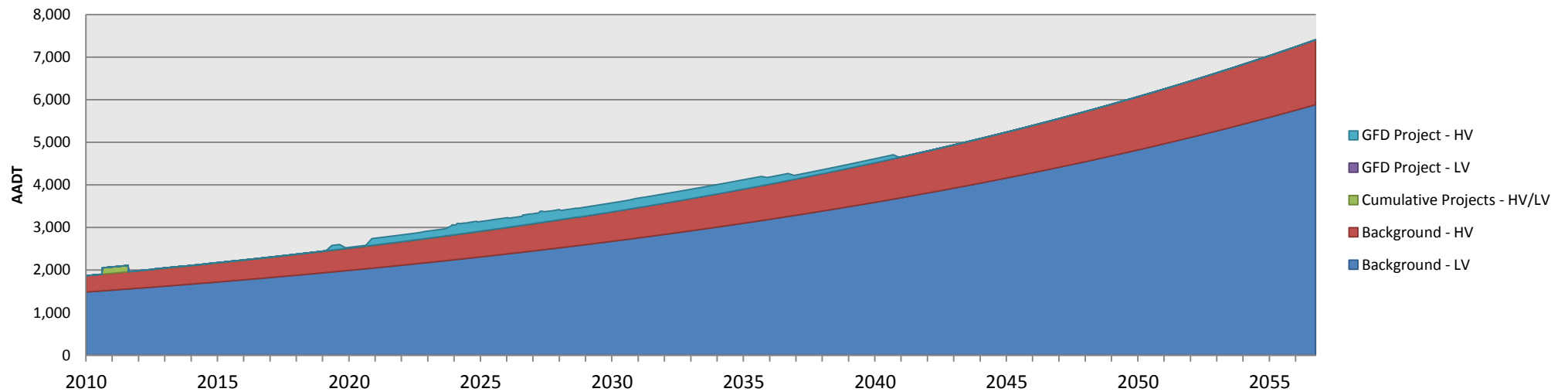
**Leichhardt Highway 26B
Nathan Road to Jackson Wandoan Road**

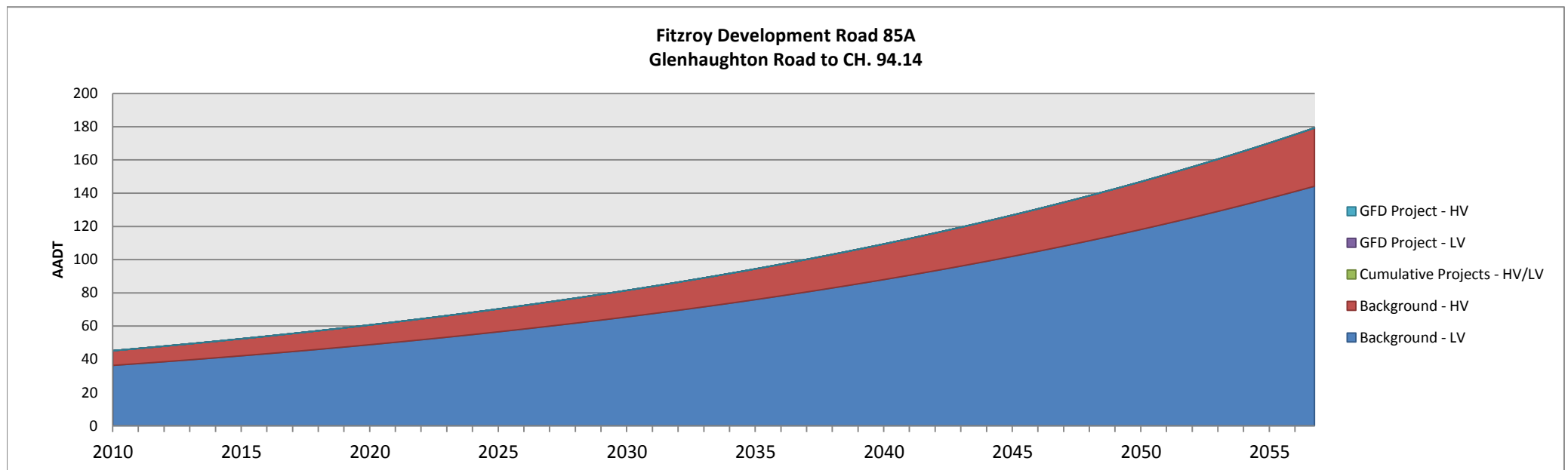
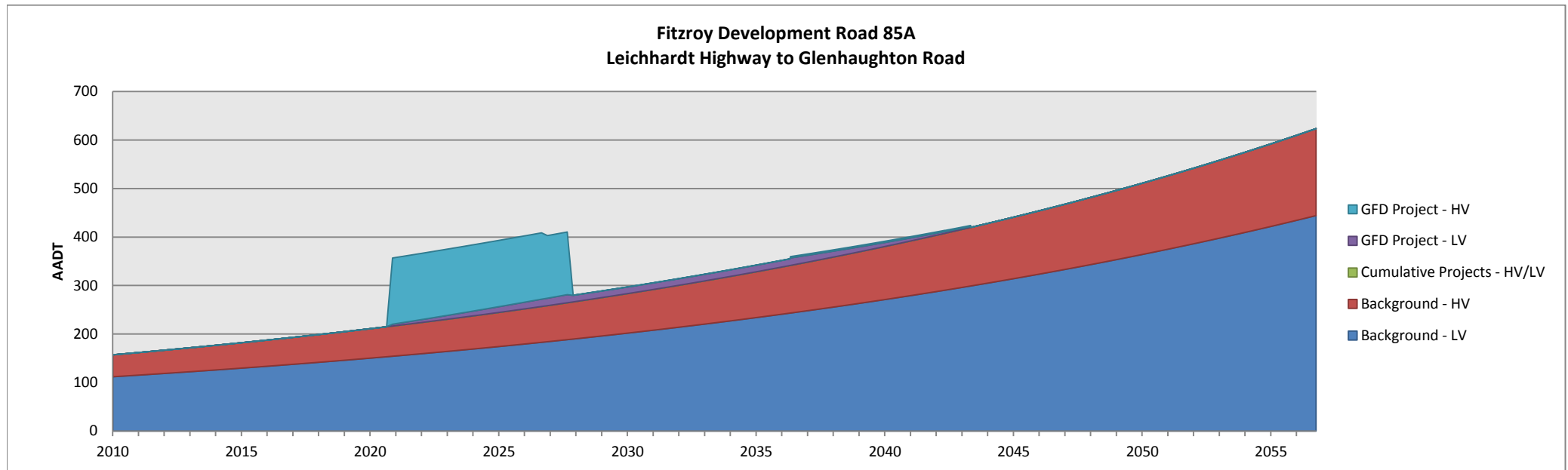


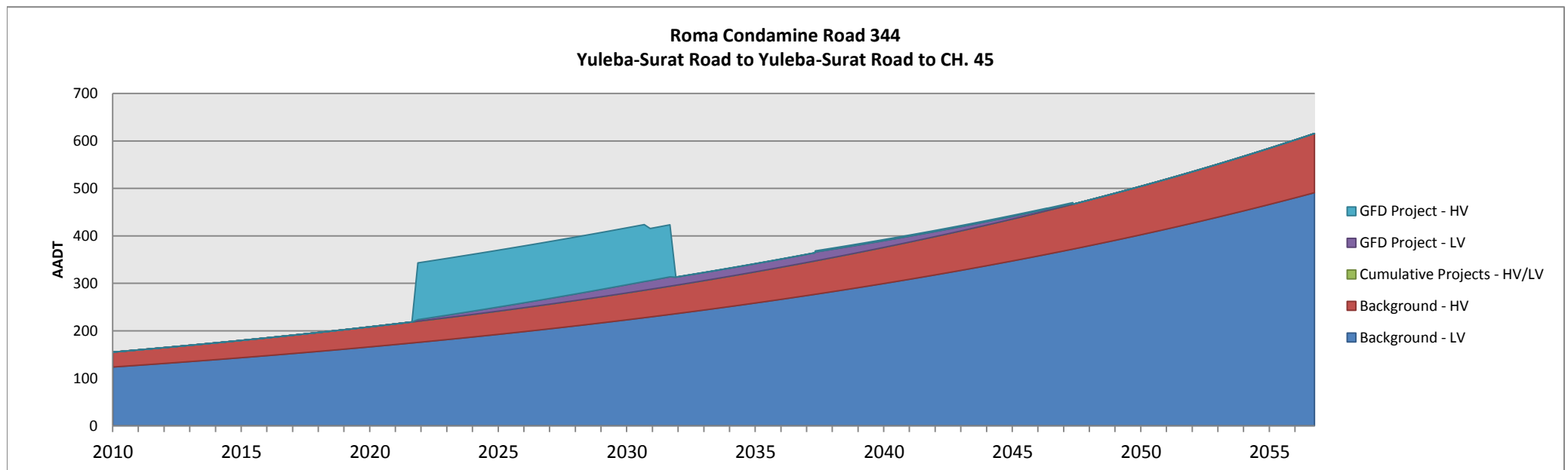
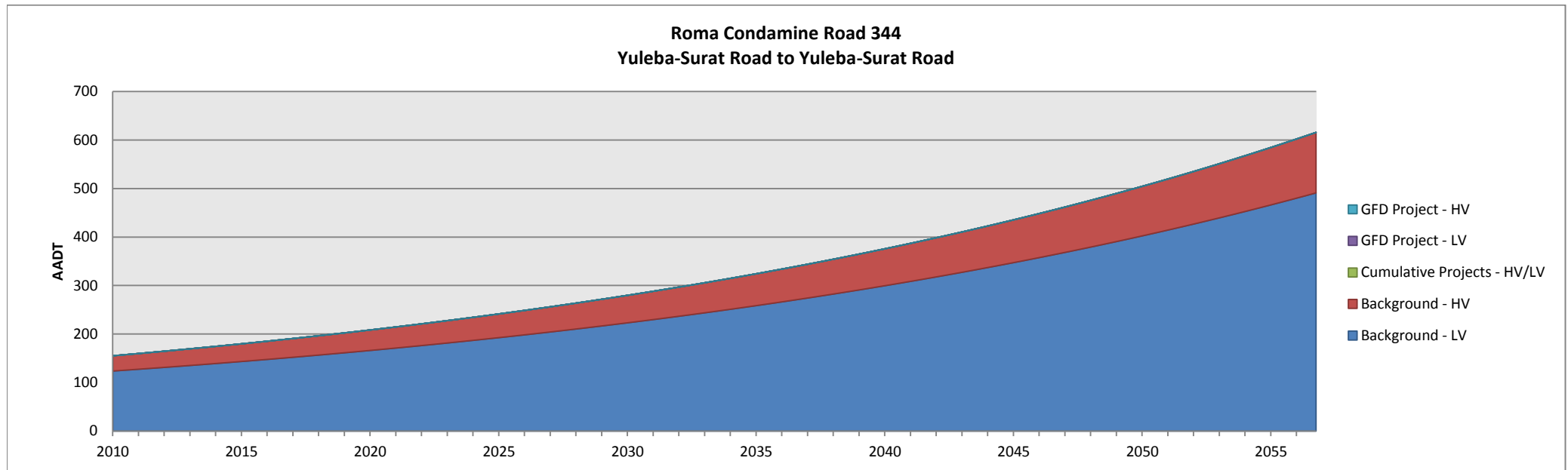
**Leichhardt Highway 26B
Roche Creek Road to Miles**



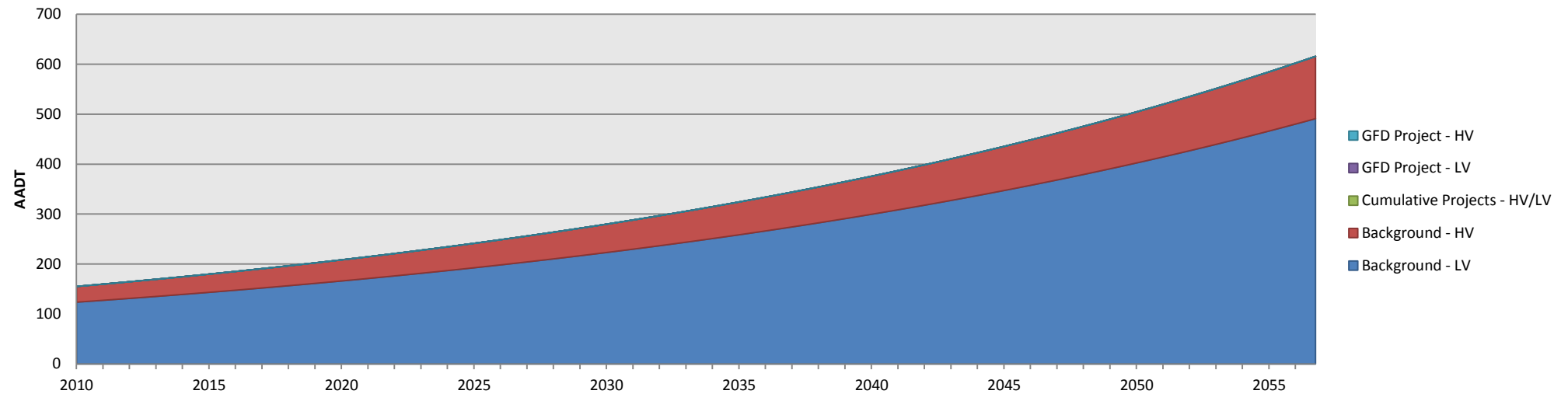
**Dawson Highway 46C
Banana to Moura Mine**



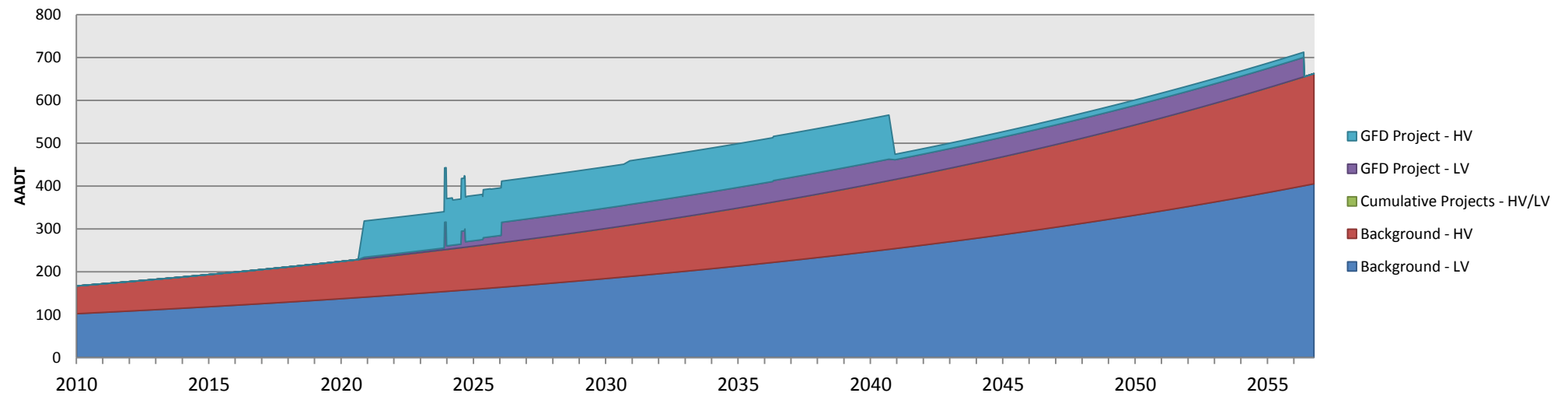




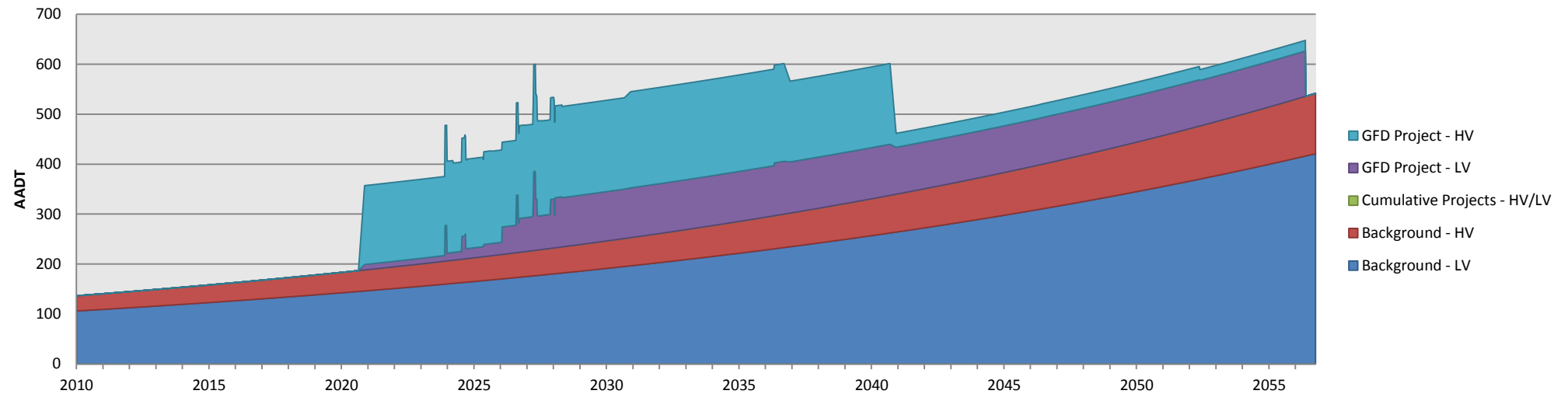
**Roma Condamine Road 344
CH. 45 to CH. 85**



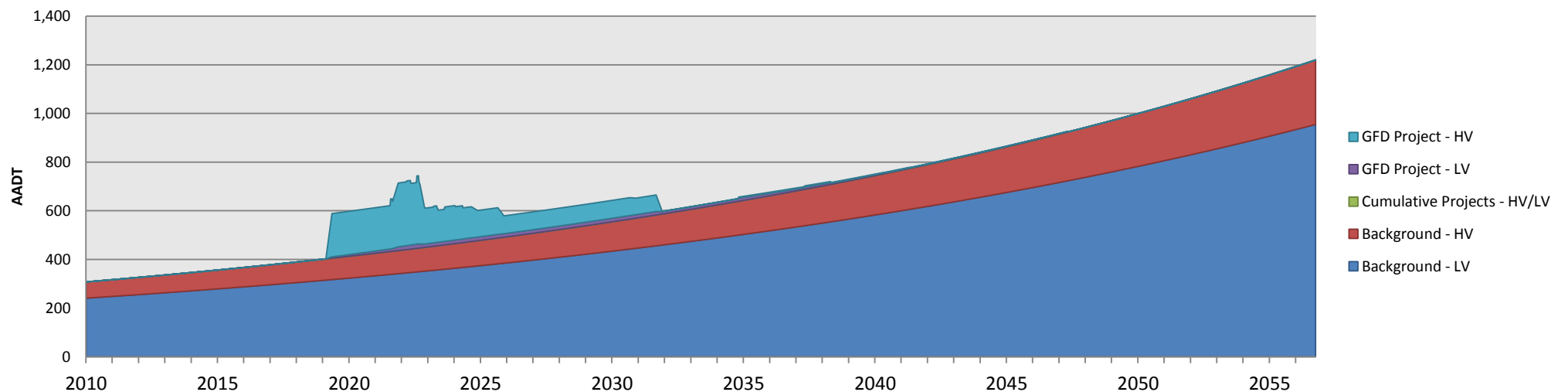
**Blackwater Rolleston Road 469
Penrose Road to Humboldt Road**

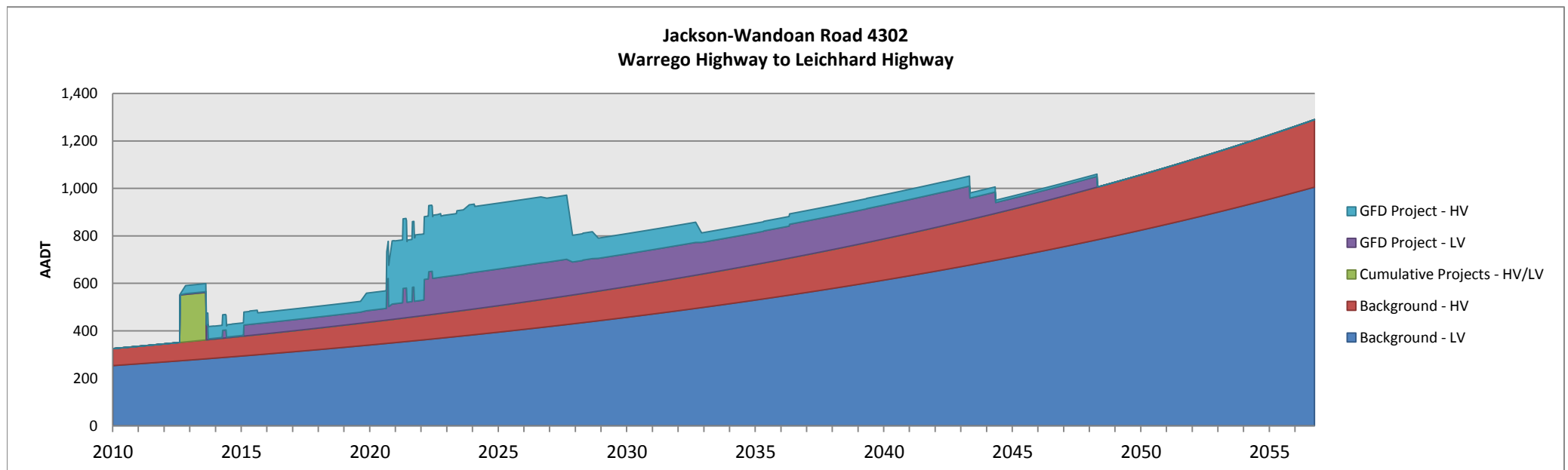
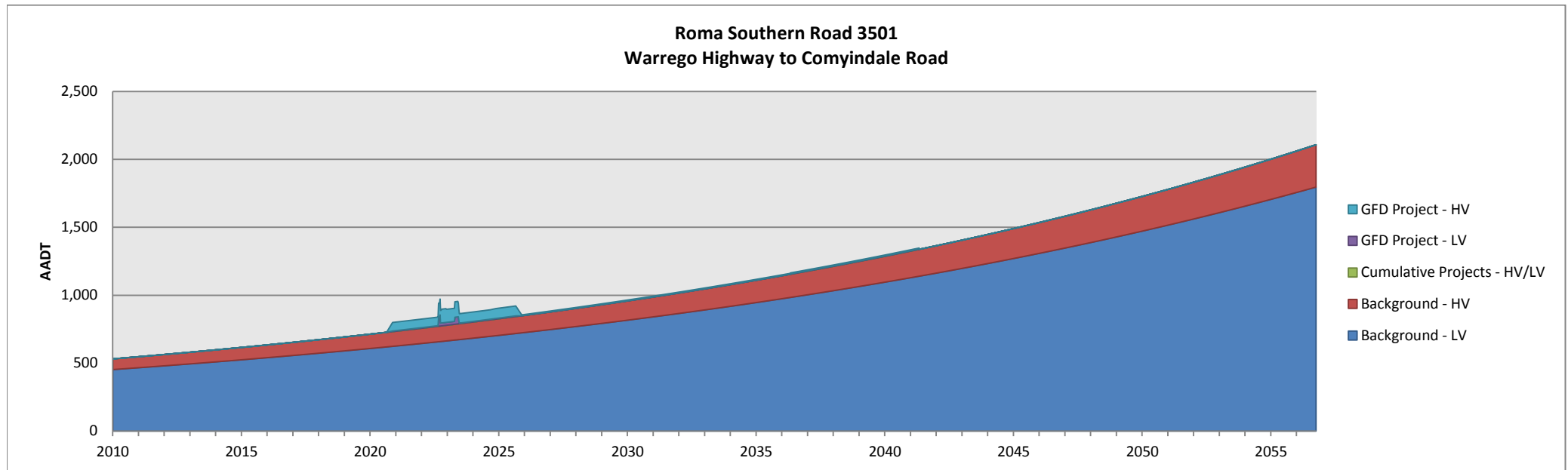


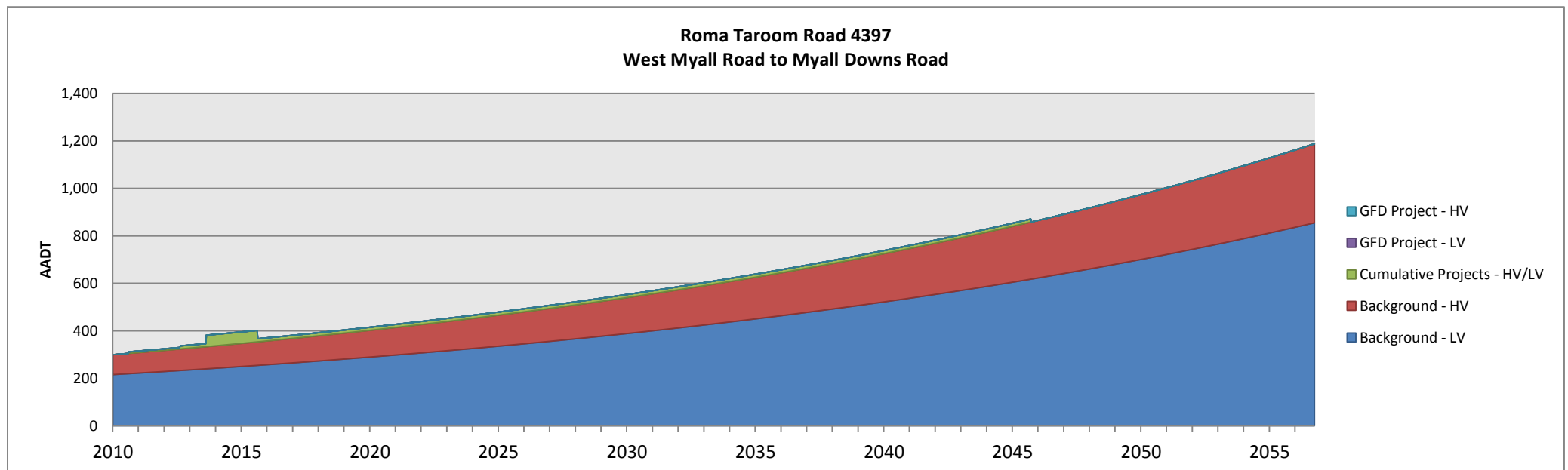
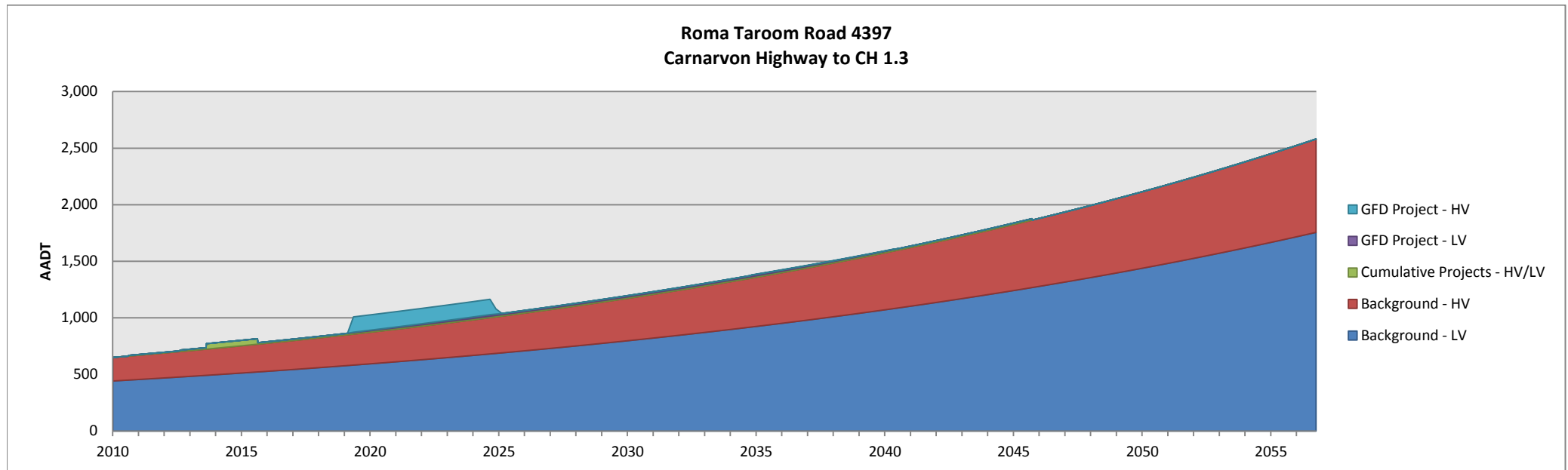
**Blackwater Rolleston Road 469
CH. 107 to Dawson Highway**

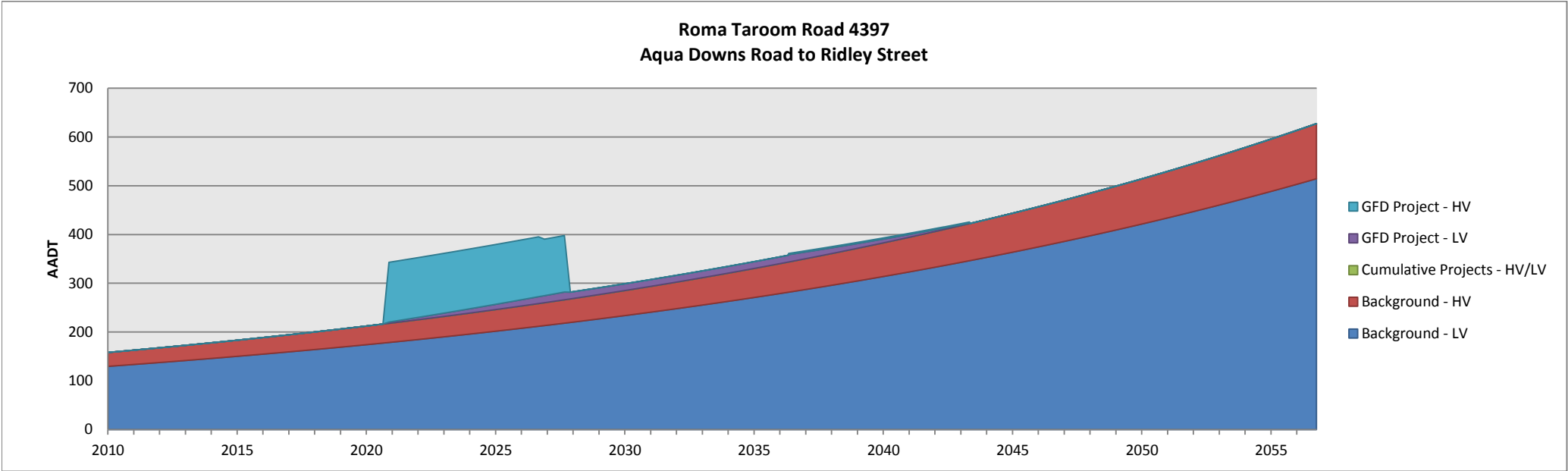


**Wallumbilla South Road 3441
Warrego Highway to Trafford Park Road**









Gas Field Development Project – Environmental Impact Statement

APPENDIX B CUMULATIVE IMPACT VOLUMES

[illegible]

Minimata Coal Project Volume

Section	Direction	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
1	Warrego Highway 18B	Toys Road to Oakley Biddison Road	Gazetted	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Warrego Highway 18B	Toys Road to Oakley Biddison Road	Against-Gazetted	0																																			

SL

Project Name

Section

Description

Direction

2013

2014

2015

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

2026

2027

2028

2029

2030

2031

2032

2033

2034

2035

2036

2037

2038

2039

2040

2041

2042

2043

2044

2045

2046

2047

2048

2049

2050

1

Warrego Highway 18B

Troy Road to Oakley Borden Road

Gazetted

55

55

11

17

22

28

33

39

39

39

39

39

39

[illegible]

8. Surat Gas Project Volume

Warragoo Highway 18B		Section	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050		
1	Warragoo Highway 18B	Tracy Road to Oakley Biddisdon Road	Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
2	Warragoo Highway 18B	Oakley Biddisdon Road to Oakley Biddisdon Road	Against-Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
3	Warragoo Highway 18B	Oakley Biddisdon Road to Dalby Cecil Plains Road	Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
4	Warragoo Highway 18B	Oakley Biddisdon Road to Dalby Cecil Plains Road	Against-Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
5	Warragoo Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
6	Warragoo Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
7	Warragoo Highway 18C	Cunningham Street to Rail Line	Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
8	Warragoo Highway 18C	Cunningham Street to Rail Line	Against-Gazetted	0	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38
9	Warragoo Highway 18C	Rail Line to Macalister Bell Road	Gazetted	0	165	165	165	165	165	165	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
10	Warragoo Highway 18C	Rail Line to Macalister Bell Road	Against-Gazetted	0	165	165	165	165	165	165	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
11	Warragoo Highway 18C	Macalister Bell Road to Warragoo Road	Gazetted	0	38	38	38	38	38	38	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
12	Warragoo Highway 18C	Macalister Bell Road to Warragoo Road	Against-Gazetted	0	38	38	38	38	38	38	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	
13	Warragoo Highway 18C	Warragoo Road to Glasson Street	Gazetted	0	38	38	38	38	38	38	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
14	Warragoo Highway 18C	Warragoo Road to Glasson Street	Against-Gazetted	0	38	38	38	38	38	38	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	
15	Warragoo Highway 18C	Glasson Street to Auburn Road	Gazetted	0	75	75	75	75	75	75	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
16	Warragoo Highway 18C	Glasson Street to Auburn Road	Against-Gazetted	0	75	75	75	75	75	75	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
17	Warragoo Highway 18C	Auburn Road to Goombie	Gazetted	0	38	38	38	38	38	38	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
18	Warragoo Highway 18C	Auburn Road to Goombie	Against-Gazetted	0	38	38	38	38	38	38	25	25	25	25	25	25	25	25	25	25																						

[illegible]

[illegible]

Gas Field Development Project – Environmental Impact Statement

APPENDIX C TRIP GENERATION

Job Number	CEB06417
Job Name	GLNG GFD Project EIS
Prepared By	MAG
Date	17/07/2013

Individual Well Construction and Operation

Trips are one-way trips per well

														Days					Weeks			Ratio of
Item	Sub Item	Sub Description	Description	Item	Assumption	Vehicle Type	Aust-roads Class	Origin	Destination	Peak Daily Trips	Peak Weekly Trips	Peak Annual Trips	Total Trips	Duration	Start Date	End Date	Duration	Start Week	End Week	Wells to trips		
Well Construction	Scouting and Surveying	Scouting	Staff going into field to determine field	Scouting Vehicle	Light Vehicles	4WD, car, utility	1	Roma	Well	2	8	8	8	1	1	1	1	1	2	10		
		Surveying	Survey vehicles	Surveying Vehicle	Survey Equipment	Survey Equipment	4WD, car, utility	1	Roma	Well	2	6	6	6	1	1	1	1	3	4	10	
			Staff going to a farm owner to discuss the proposed development			Three Axle Truck	4	Roma	Well	2	6	6	6	6	1	1	1	1	4	5	10	
	Land Holder Relations	Land Holder Relations		Site Vehicle	Light Vehicles	4WD, car, utility	1	Roma	Well	2	2	8	30	3650	31	3680	522	5	527	1		
	Pilot Well	Rig Movement	Rig Vehicles	Rig	Rig Vehicles	Low Loader	12	Well	Well	2	2	2	2	1	35	35	1	5	6	100		
	(One per 100 Wells)		Supporting Trucks	Oversize Vehicle Materials	Rig and other equipment	Low Loader	12	Well	Well	2	2	2	2	1	35	35	1	5	6	100		
			Supporting Trucks	Large Equipment	Skid mounted units etc.	Six Axle Articulated	9	Well	Well	6	6	6	6	1	35	35	1	5	6	100		
			Supporting Trucks	Well Equipment	Pump, pump head, bulldozer etc.	Six Axle Articulated	9	Well	Well	4	4	4	4	1	35	35	1	5	6	100		
			Pilot Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	2	2	2	2	1	35	35	1	5	6	100			
			Light Vehicles in move	Support Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	2	2	2	2	1	35	35	1	5	6	100		
		Fuel	Fuel	20,000L/well	Three Axle Truck	4	Roma	Well	2	2	2	2	1	35	35	1	5	6	100			
		Well Casing Pipe	Well Casing Pipe	1,400m/well head	Six Axle Articulated	9	Brisbane	Well	2	5	5	5	1	35	35	1	5	6	100			
		Waste	Waste	Drilling waste, human waste, pipe off cuts, pipeline crates etc.	Six Axle Articulated	9	Well	Roma	2	2	2	2	7	35	41	1	5	6	100			
		Water	Water	Water for staff and for drilling	Six Axle Articulated	9	Roma	Well	5	5	5	5	7	35	41	1	5	6	100			
		Miscellaneous	Miscellaneous	Water, concrete, chemicals etc.	Six Axle Articulated	9	Brisbane	Well	3	15	15	15	7	35	41	1	5	6	100			
		Construction Staff	Construction Staff	7 days per well install x 20 staff per well	4WD, car, utility	1	Roma	Well	20	140	140	140	7	35	41	1	5	6	100			
	Core Hole	Monitoring and data collect	Monitoring and data collect	One trip per three months	4WD, car, utility	1	Roma	Well	1	1	3	3	84	42	125	12	6	18	100			
Water Bore Well	Rig Movement	Rig Vehicles	Rig	Rig Vehicles	Low Loader	12	Well	Well	1	1	1	1	7	68	74	1	6	7	20			
(One per 20 Wells)		Supporting Trucks	Oversize Vehicle Materials	Rig and other equipment	Low Loader	12	Well	Well	2	2	2	2	7	68	74	1	6	7	20			
		Supporting Trucks	Large Equipment	Skid mounted units etc.	Six Axle Articulated	9	Well	Well	6	6	6	6	7	68	74	1	6	7	20			
		Supporting Trucks	Well Equipment	Pump, pump head, bulldozer etc.	Six Axle Articulated	9	Well	Well	4	4	4	4	7	68	74	1	6	7	20			
		Pilot Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	2	2	2	2	7	68	74	1	6	7	20				
		Light Vehicles in move	Support Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	2	2	2	2	7	68	74	1	6	7	20			
		Fuel	Fuel	20,000L/well	Three Axle Truck	4	Roma	Well	1	1	1	1	7	68	74	1	8	9	20			
		Well Casing Pipe	Well Casing Pipe	1,000m/well head	Six Axle Articulated	9	Brisbane	Well	1	5	5	5	7	68	74	1	7	8	20			
		Waste	Waste	Drilling waste, human waste, pipe off cuts, pipeline crates etc.	Six Axle Articulated	9	Well	Roma	1	2	8	8	28	68	95	4	6	10	20			
		Water	Water	Water for staff and for drilling	Six Axle Articulated	9	Roma	Well	1	2	8	8	28	68	95	4	6	10	20			
		Miscellaneous	Miscellaneous	Concrete, chemicals etc.	Six Axle Articulated	9	Brisbane	Well	3	15	15	15	28	68	95	4	6	10	20			
		Construction Staff	Construction Staff	7 days per well install x 8 staff per well	4WD, car, utility	1	Roma	Well	8	56	224	224	28	68	95	4	6	10	20			
Early Civil Works, Appraisal and Water Facility (One per 20 Wells)	Early Civil Works	Equipment	Large Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Roma	Well	4	4	4	4	7	85	91	1	32	33	20			
		Aggregate	Large Equipment	50 loads/well average	Six Axle Articulated	9	Quarry	Well	10	50	50	50	7	85	91	1	32	33	20			
		Waste	Waste	Waste	Six Axle Articulated	9	Roma	Well	1	1	1	1	7	85	91	1	32	33	20			
		Water	Water	Water	Six Axle Articulated	9	Roma	Well	1	1	1	1	7	85	91	1	32	33	20			
		Fuel	Fuel	Fuel	Six Axle Articulated	4	Roma	Well	1	1	1	1	7	85	91	1	32	33	20			
		Construction Staff	Construction Staff	7 days per well install x 4 staff per well	4WD, car, utility	1	Roma	Well	4	28	28	28	7	85	91	1	32	33	20			
		Equipment	Large Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Hub	Well	4	4	4	4	7	92	98	1	33	34	20			
		Aggregate	Large Equipment	4 loads/facility	Six Axle Articulated	9	Quarry	Well	2	4	4	4	7	92	98	1	33	34	20			
		Material	Large Equipment	50 loads/facility	Six Axle Articulated	9	Hub	Well	10	50	50	50	7	92	98	1	33	34	20			
		Construction Staff	Construction Staff	7 days per well install x 4 staff per well	4WD, car, utility	1	Roma	Well	4	28	28	28	7	92	98	1	33	34	20			
Appraisal Well	Rig Vehicles	Rig Vehicles	Rig	Rig Vehicles	Low Loader	12	Well	Well	2	2	4	4	7	106	112	1	35	36	20			
	Supporting Trucks	Oversize Vehicle Materials	Rig and other equipment	Low Loader	12	Well	Well	4	4	4	4	7	106	112	1	35	36	20				
	Supporting Trucks	Large Equipment	Skid mounted units etc.	Six Axle Articulated	9	Well	Well	20	20	20	20	7	106	112	1	35	36	20				
	Supporting Trucks	Well Equipment	Pump, pump head, bulldozer etc.	Six Axle Articulated	9	Well	Well	8	8	8	8	7	106	112	1	35	36	20				
	Pilot Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	6	6	6	6	7	106	112	1	35	36	20					
	Light Vehicles in move	Support Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	6	6	6	6	7	106	112	1	35	36	20				
	Rig Vehicles - Completion	Rig Vehicles	Rig	Rig Vehicles	Low Loader	12	Well	Well	2	2	4	4	7	106	112	1	36	37	20			
	Supporting Trucks - Completion	Oversize Vehicle Materials	Rig and other equipment	Low Loader	12	Well	Well	4	4	4	4	7	106	112	1	36	37	20				
	Supporting Trucks - Completion	Large Equipment	Skid mounted units etc.	Six Axle Articulated	9	Well	Well	20	20	20	20	7	106	112	1	36	37	20				
	Supporting Trucks - Completion	Well Equipment	Pump, pump head, bulldozer etc.	Six Axle Articulated	9	Well	Well	8	8	8	8	7	106	112	1	36	37	20				
	Pilot Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	6	6	6	6	7	106	112	1	36	37	20					
	Light Vehicles in move - Completion	Support Vehicles	Light Vehicles	4WD, car, utility	1	Well	Well	6	6	6	6	7	106	112	1	36	37	20				
	Fuel	Fuel	20,000L/well	Three Axle Truck	4	Roma	Well	4	4	4	4	7	106	112	1	36	37	20				
	Well Casing Pipe	Well Casing Pipe	1,000m/well head	Six Axle Articulated	9	Brisbane	Well	1	5	5	5	7	106	112	1	36	37	20				
	Waste	Waste	Drilling waste, human waste, pipe off cuts, pipeline crates etc.	Six Axle Articulated	9	Well	Roma	7	45	45	45	7	106	112	1	35	36	20				
	Water	Water	Water for staff and for drilling	Six Axle Articulated	9	Roma	Well	7	45	45	45	7	106	112	1	35	36	20				
	Miscellaneous	Miscellaneous	Concrete, chemicals etc.	Six Axle Articulated	9	Brisbane	Well	7	50	50	50	7	106	112	1	35	36	20				
	Construction Staff	Construction Staff	60% car x 7 days per well install x 30 staff per well	Light Vehicle	1	Well Camp	Well	1	7	28	28	28	246	273	4	35	39	20				
	Construction Staff	Construction Staff	40% bus x 7 days per well install (20 seat capacity) x 30 staff per well	Bus	3	Well Camp	Well	1	7	28	28	28	246	273	4	35	39	20				
		Appraisal	Monitoring and minor maintenance	Monitoring and minor maintenance	One trip per week	Light Vehicle	1	Roma	Well	1	1	26	26	182	225	406	26	32	58	20		
		Water removal	Water removal	Water removal	Two trips per week	Six Axle Articulated	9	Well	Roma	1	2	52	52	182	225	406	26	32	58	20		
		Monitoring and heavier maintenance	Monitoring and heavier maintenance	Monitoring and heavier maintenance	One off trip	Six Axle Articulated	9	Roma	Well	1	1	1	1	182	225	406	26	32	58	20		
	Feed	Monitoring and scouting trips	Monitoring and scouting trips	Monitoring and scouting trips	One trip per week	Light Vehicle	1	Roma	Well	1	1	52	52	364	225	588	52	32	84	20		
		Pre-work	Pre-work	Pre-work	One trip per month	Six Axle Articulated	9	Roma	Well	1	1	12	12	364	225	588	52	32	84	20		
Well Camp (40 man) (One per 5 Wells)	Earthworks	Equipment	Large Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Roma	Well	8	8	8	8	7	400	406	1	57	58	5			
		Aggregate	Aggregate	68 loads/40 camp	Six Axle Articulated	9	Quarry	Well Camp	5	34	68	68	14	400	413	2	57	59	5			
		Concrete	Concrete	Concrete	Three Axle Truck	4	Hub	Well Camp	2	12	24	24	14	400	413	2	57	59	5			
		Verandah Modules	Module	Module	1 per module	Six Axle Articulated	9	Well Camp	Well Camp	2	12	21	21	21	400	420	3	57	60	5		
		Accommodation Modules	Module	Module	5 staff per module	Six Axle Articulated	9	Well Camp	Well Camp	2	4	8	8	14	400	413	2	57	59	5		
		Mess Hall Modules	Module	Module	6 modules	Six Axle Articulated	9	Well Camp	Well Camp	2	3	6	6	14	400	413	2	57	59	5		

														Days		Weeks			Ratio of	
Item	Sub Item	Sub Description	Description	Item	Assumption	Vehicle Type	Aust-roads Class	Origin	Destination	Peak Daily Trips	Peak Weekly Trips	Peak Annual Trips	Total Trips	Duration	Start Date	End Date	Duration	Start Week	End Week	Wells to trips
Well Operation	Gathering Infrastructure	Gas Pipes	Gathering Pipes	Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	2	15	15	15	28	498	525	4	71	75	1
				Low HDPE Pipes	300mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	3	3	3	28	498	525	4	71	75	1
				Low HDPE Pipes	450mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	28	498	525	4	71	75	1
				General Materials	Pipe connections, construction equipment	Six Axle Articulated	9	Laydown	Well	4	15	15	15	28	498	525	4	71	75	1
			Spine Pipes	Construction Staff	20% \times 1 week x 5staff	Light Vehicle	1	Well Camp	Well	1	7	28	28	28	498	525	4	71	75	1
				Construction Staff	80% \times 1 week x 5 staff (10 seater bus)	Bus	3	Well Camp	Well	1	7	28	30	28	498	525	4	71	75	1
				Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	2	15	15	15	28	505	532	4	72	76	1
				Low HDPE Pipes	450mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	28	505	532	4	72	76	1
				Low HDPE Pipes	600mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	5	5	5	28	505	532	4	72	76	1
			Trunk Pipes	General Materials	Pipe connections, construction equipment	Six Axle Articulated	9	Laydown	Well	4	15	15	15	28	505	532	4	72	76	1
				Construction Staff	20% \times 1 week x 15staff	Light Vehicle	1	Well Camp	Well	3	21	21	21	28	505	532	4	72	76	1
				Construction Staff	80% \times 1 week x 15 staff (20 seater bus)	Bus	3	Well Camp	Well	1	14	30	30	28	505	532	4	72	76	1
				Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	4	30	30	30	56	512	567	8	73	81	1
			Water Pipes	Carbon Steel Pipes	600mm pipe at 250m per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	56	512	567	8	73	81	1
				Carbon Steel Pipes	800mm pipe at 270m per well	Six Axle Articulated	9	Laydown	Well	1	5	5	5	56	512	567	8	73	81	1
				General Materials	Pipe connections, construction equipment	Six Axle Articulated	9	Laydown	Well	5	30	30	30	56	512	567	8	73	81	1
				Construction Staff	20% \times 1 week x 60staff	Light Vehicle	1	Well Camp	Well	12	84	84	84	56	512	567	8	73	81	1
			Gathering Pipes	Construction Staff	80% \times 1 week x 60 staff (20 seater bus)	Bus	3	Well Camp	Well	3	21	84	84	56	512	567	8	73	81	1
				Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	2	15	15	15	28	498	525	4	71	75	1
				High HDPE Pipes	300mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	3	3	3	28	498	525	4	71	75	1
				High HDPE Pipes	450mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	28	498	525	4	71	75	1
			Spine Pipes	General Materials	Pipe connections, construction equipment	Six Axle Articulated	9	Laydown	Well	4	15	15	15	28	498	525	4	71	75	1
				Construction Staff	20% \times 1 week x 5staff	Light Vehicle	1	Well Camp	Well	1	7	28	28	28	498	525	4	71	75	1
				Construction Staff	80% \times 1 week x 5 staff (20 seater bus)	Bus	3	Well Camp	Well	1	7	28	30	28	498	525	4	71	75	1
				Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	2	15	15	15	28	505	532	4	72	76	1
			Trunk Pipes	High HDPE Pipes	450mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	28	505	532	4	72	76	1
				High HDPE Pipes	600mm pipe at 350m per well	Six Axle Articulated	9	Laydown	Well	1	5	5	5	28	505	532	4	72	76	1
				General Materials	Pipe connections, construction equipment	Six Axle Articulated	9	Laydown	Well	4	15	15	15	28	505	532	4	72	76	1
				Construction Staff	20% \times 1 week x 15staff	Light Vehicle	1	Well Camp	Well	3	21	21	21	28	505	532	4	72	76	1
			Electricity and Cables	Construction Staff	80% \times 1 week x 60 staff (20 seater bus)	Bus	3	Well Camp	Well	1	14	30	30	28	505	532	4	72	76	1
				Equipment	Trenching machine, cranes etc.	Six Axle Articulated	9	Well	Well	4	30	30	30	56	512	567	8	73	81	1
				Cable Length	1.4km of powerline per well	Six Axle Articulated	9	Laydown	Well	1	4	4	4	28	498	525	4	71	75	1
				Power Poles	8 power poles, in two sections per well	Six Axle Articulated	9	Laydown	Well	2	4	4	4	28	498	525	4	71	75	1
			Well Pad Restoration	Transformer	1 transformer skip per well	Six Axle Articulated	9	Laydown	Well	1	1	1	1	28	498	525	4	71	75	1
				Fibre Optic Cable	1 truck of fibre optics cable per well	Six Axle Articulated	9	Laydown	Well	1	1	1	1	28	498	525	4	71	75	1
				Construction Staff	2 weeks x 6staff	Light Vehicle	1	Well Camp	Well	6	42	42	42	28	498	525	4	71	75	1
	Well Operation	Operations Traffic	Operations Traffic	Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Roma	Well	4	4	4	4	3	575	577	1	82	83	1
				General Materials	General Materials	Six Axle Articulated	9	Quarry	Well	4	10	10	10	3	575	577	1	82	83	1
				Waste	Waste	Six Axle Articulated	9	Roma	Well	1	1	1	1	3	575	577	1	82	83	1
				Construction Staff	Construction Staff	4WD, car, utility	1	Roma	Well	4	12	24	24	3	575	577	1	82	83	1
		Decommissioning	Well Pad Restoration	Major Maintenance	Average	Three Axle Truck	4	Roma	Well	1	1	1	4	5475	578	6052	783	83	866	1
				Major Maintenance	Average	4WD, car, utility	1	Roma	Well	1	1	1	4	5475	578	6052	783	83	866	1
				Well Inspection	An inspection every month	4WD, car, utility	1	Hub Camp	Well	1	1	12	180	5475	578	6052	783	83	866	1
				Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Roma	Well	4	4	4	4	3	6053	6055	1	867	868	1
			Concrete Plug	Concrete	Concrete plug	Six Axle Articulated	9	Hub	Well	4	4	4	4	3	6053	6055	1	867	868	1
				General Materials	General Materials	Six Axle Articulated	9	Quarry	Well	4	6	6	6	3	6053	6055	1	867	868	1
				Waste	Waste	Six Axle Articulated	9	Roma	Well	1	1	1	1	3	6053	6055	1	867	868	1
				Construction Staff	Construction Staff	4WD, car, utility	1	Roma	Well	4	12	12	12	3	6053	6055	1	867	868	1

Job Number	CEB06417
Job Name	GLNG GFD Project EIS
Prepared By	MAG
Date	17/07/2013

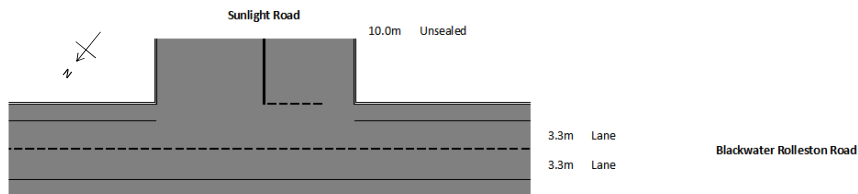
Hub Facility Construction and Operation

TRIPS PER HUB FACILITY CONSTRUCTED
TRIPS ARE THE WHOLE TRIP, COMPRISING TWO MOVEMENTS EACH

															Days		Weeks				
Item	Sub Item	Sub Description	Description	Item	Assumption	Vehicle Type	Aust-roads Class	Origin	Destination	Peak Daily Trips	Peak Weekly Trips	Peak Annual Trips	Total Trips	Duration	Start Date	End Date	Duration	Start Week	End Week		
Hub Facility Construction	Construction Camp (800 Man)	Equipment	Equipment	Large Equipment	Crane, backhoes, graders etc.	Six Axle Articulated	9	Roma	Hub Camp	2	4	16	16	28	1	28	4	1	4		
		Hardstand Aggregates	Aggregate	Aggregate	675 loads/400 camp	Six Axle Articulated	9	Quarry	Hub Camp	49	338	1350	1350	28	1	28	4	1	4		
		Concrete	Concrete	Concrete		Three Axle Truck	4	Hub	Hub Camp	2	12	48	48	28	1	28	4	1	4		
		Modules	Verandah Modules	Module	1 per module	Six Axle Articulated	9	Brisbane	Hub Camp	2	12	101	101	28	1	28	4	1	4		
			Accommodation Modules	Module	5 staff per module	Six Axle Articulated	9	Brisbane	Hub Camp	2	80	160	160	28	1	28	4	1	4		
			Mess Hall Modules	Module	6 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	3	6	6	28	1	28	4	1	4		
			Gym Modules	Module	4 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Common Room Module	Module	4 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Restroom Facilities Module	Module	2 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Laundry Modules	Module	2 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Offices	Module	2 modules	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Power Generation Skid	Module Skid	2 Skids	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Sewerage Treatment Skid	Module Skid	4 skids	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Water Treatment Skid	Module Skid	4 skids	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4		
			Module Supporting Infrastructure																		
				Lay Down Blocks	Lay Down Blocks	4 modules per truck	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4	
				Screw Down Anchors	Screw Down Anchors	4 modules per truck	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4	
				Piping	Piping	4 modules per truck	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4	
				Power Cables	Power Cables	4 modules per truck	Six Axle Articulated	9	Brisbane	Hub Camp	2	2	4	4	28	1	28	4	1	4	
				Compressors and generators etc.	Compressors and generators etc.	4 skids	Low Loader	12	Brisbane	Hub Camp	2	4	8	8	28	1	28	4	1	4	
				Miscellaneous	Miscellaneous	General Materials: 8 per day x 1 month	Six Axle Articulated	9	Brisbane	Hub Camp	2	14	56	56	28	1	28	4	1	4	
				Laundry Facilities	Laundry Facilities	1 per day	Three Axle Truck	4	Hub Camp	Hub Camp	1	7	28	28	28	1	28	4	1	4	
				Food	Food	1 per day	Three Axle Truck	4	Roma	Hub Camp	1	7	28	28	28	1	28	4	1	4	
				Water	Water	1 per day	Six Axle Articulated	9	Roma	Hub Camp	1	7	28	28	28	1	28	4	1	4	
			Other	Waste	Waste	1 per day	Six Axle Articulated	9	Brisbane	Roma	1	7	28	28	28	1	28	4	1	4	
		Water Truck		Water Truck	1 per day	Six Axle Articulated	9	Brisbane	Roma	1	7	28	28	28	1	28	4	1	4		
		Miscellaneous		Miscellaneous	General Materials: 8 per day x 1 month	Three Axle Truck	4	Roma	Hub Camp	2	14	56	56	28	1	28	4	1	4		
		Construction Staff		Construction Staff	months x average 30 staff	Light Vehicle	1	Roma	Hub Camp	30	210	840	840	28	1	28	4	1	4		
		Hub		80TJ Hub Facility	Fuel	Fuel	300,000L	Three Axle Truck	9	Roma	Hub	1	1	24	35	504	28	531	72	4	75
				Aggregate	Aggregate	Assume of land area aggregate: 20%* 220,000m2; Depth: 0.2m; Density: 1500kg/m3; Truck capacity: 20t	Six Axle Articulated	9	Quarry	Hub	1	5	252	378	504	28	531	72	4	75	
				Concrete	Concrete	-	Three Axle Truck	4	Roma	Hub	1	2	60	90	504	28	531	72	4	75	
				Oversize Vehicle Materials	Oversize Vehicle Materials	Compressors, separators, generators etc.	Low Loader	12	Brisbane	Hub	1	1	27	40	504	28	531	72	4	75	
				Large Equipment	Large Equipment	Skid mounted units, TEG units etc.	Six Axle Articulated	9	Brisbane	Hub	1	1	14	21	504	28	531	72	4	75	
				Building Materials	Building Materials	Warehouse, Control Room/Office Materials etc.	Six Axle Articulated	9	Brisbane	Hub	1	1	18	27	504	28	531	72	4	75	
			Pipe	Pipe		Six Axle Articulated	9	Brisbane	Hub	1	1	27	40	504	28	531	72	4	75		
			Miscellaneous	Miscellaneous	General Materials: 2 per day x 18 months	Six Axle Articulated	9	Brisbane	Hub	2	14	728	1,092	504	28	531	72	4	75		
			Construction Staff	Construction Staff	10% x 18 Month x average 150 staff	4WD, car, utility	1	Camp	Hub	16	106	5475	8,213	504	28	531	72	4	75		
			Construction Staff	Construction Staff	90% x 18 Month x average 150 staff (20 seat bus) = 53 buses per week	Bus	3	Camp	Hub	8	53	2756	4,134	504	28	531	72	4	75		
		Nodal	30TJ Hub Facility	Fuel	Fuel	300,000L	Three Axle Truck	9	Roma	Nodal	1	1	15	15	252	49	300	36	7	42	
			Aggregate	Aggregate	Assume of land area aggregate: 20%* 100,000m2; Depth: 0.2m; Density: 1500kg/m3; Truck capacity: 20t	Six Axle Articulated	9	Quarry	Nodal	1	5	172	172	252	49	300	36	7	42		
			Concrete	Concrete	-	Three Axle Truck	4	Roma	Nodal	1	3	90	90	252	49	300	36	7	42		
			Oversize Vehicle Materials	Oversize Vehicle Materials	Compressors, separators, generators etc.	Low Loader	12	Brisbane	Nodal	1	1	5	5	252	49	300	36	7	42		
			Large Equipment	Large Equipment	Skid mounted units, TEG units etc.	Six Axle Articulated	9	Brisbane	Nodal	1	1	4	4	252	49	300	36	7	42		
			Building Materials	Building Materials	Warehouse, Control Room/Office Materials etc.	Six Axle Articulated	9	Brisbane	Nodal	1	1	3	3	252	49	300	36	7	42		
			Pipe	Pipe		Six Axle Articulated	9	Brisbane	Nodal	1	7	364	364	252	49	300	36	7	42		
	Miscellaneous	Miscellaneous	General Materials: 2 per day x 9 months	Six Axle Articulated	9	Brisbane	Nodal	2	14	546	546	252	49	300	36	7	42				
	Construction Staff	Construction Staff	10% x 9 months x average 50 staff	4WD, car, utility	1	Camp	Nodal	5	35	1350	1,350	252	49	300	36	7	42				
	Construction Staff	Construction Staff	90% x 9 months x average 50 staff (20 seat bus) = 14 buses per week	Bus	3	Camp	Nodal	2	14	546	546	252	49	300	36	7	42				
Water Treatment (AWAF)	10-25ML/day Capacity Water Treatment Facility	Fuel	Fuel	150,000L	Three Axle Truck	4	Roma	WTF	1	1	30	30	182	112	293	26	16	42			
	Oversize Vehicle Materials	Oversize Vehicle Materials	Compressors and generators etc.	Low Loader	12	Brisbane	WTF	1	1	10	10	182	112	293	26	7	42				
	Large Equipment	Large Equipment	Skid mounted units, other equipment	Six Axle Articulated	12	Brisbane	WTF	1	1	20	20	182	112	293	26	7	42				
	Building Materials	Building Materials	Miscellaneous Materials	Six Axle Articulated	9	Brisbane	WTF	1	1	10	10	182	112	293	26	7	42				
	Miscellaneous	Miscellaneous	General Materials: 2 per day x 6 months	Six Axle Articulated	9	Brisbane	Storage Yard	2	9	360	360	182	112	293	26	7	42				
	Construction Staff	Construction Staff	10% x 6 months x average 30 staff	4WD, car, utility	1	Camp	WTF	2	14	540	540	182	112	293	26	7	42				
	Construction Staff	Construction Staff	90% x 6 months x average 30 staff (20seat bus) = 14 buses per week	Bus	3	Camp	WTF	2	9	364	364	182	112	293	26	7	42				
RO Plant	5ML RO Plant	Fuel	Fuel	50,000L	Three Axle Truck	4	Roma	RO	2	8	30	30	252	294	545	36	42	77			
	Oversize Vehicle Materials	Oversize Vehicle Materials	Compressors and generators etc.	Low Loader	12	Brisbane	RO	1	3	10	10	252	294	545	36	42	77				
	Large Equipment	Large Equipment	Skid mounted units, other equipment	Six Axle Articulated	12	Brisbane	RO	1	4	15	15	252	294	545	36	42	77				
	Building Materials	Building Materials	Miscellaneous Materials	Six Axle Articulated	9	Brisbane	RO	1	3	10	10	252	294	545	36	42	77				
	Miscellaneous	Miscellaneous	General Materials: 2 per day x 9 months	Six Axle Articulated	9	Brisbane	RO	20	135	540	540	252	294	545	36	42	77				
	Construction Staff	Construction Staff	10% x 9 months x average 20 staff	4WD, car, utility	1	Camp	RO	20	135	540	540	252	294	545	36	42	77				
	Construction Staff	Construction Staff	90% x 9 months x average 20 staff (20seat bus) = 7 buses per week	Bus	3	Camp	RO	1	7	252	252	252	294	545	36	42	77				
Dam	250ML Dam	Fuel	Fuel	50,000L	Three Axle Truck	4	Roma	Dam	2	8	30	30	364	294	657	52	42	93			
	Oversize Vehicle Materials	Oversize Vehicle Materials	Compressors and generators etc.	Low Loader	12	Brisbane	Dam	1	3	10	10	364	294	657	52	42	93				
	Large Equipment	Large Equipment	Skid mounted units, other equipment	Six Axle Articulated	12	Brisbane	Dam	1	4	15	15	364	294	657	52	42	93				
	Building Materials	Building Materials	Miscellaneous Materials	Six Axle Articulated	9	Brisbane	Dam	1	3	10	10	364	294	657	52	42	93				
	Miscellaneous	Miscellaneous	General Materials: 2 per week x 12 months	Six Axle Articulated	9	Brisbane	Dam	1	2	104	104	364	294	657	52	42	93				
	Construction Staff	Construction Staff	10% x 12 months x average 20 staff	4WD, car, utility	1	Camp	Dam	26	182	728	728	364	294	657	52	42	93				
	Construction Staff	Construction Staff	90% x 12 months x average 20 staff (20seat bus) = 7 buses per week	Bus	3	Camp	Dam	1	7	364	364	364	294	657	52	42	93				
Concrete Plant		Fuel	Fuel	50,000L	Three Axle Truck	4	Roma	Concrete Plant	1	2	30	30	252	28	279						

APPENDIX D

INTERSECTION ANALYSIS

Sunlight Road/Blackwater Rolleston Road Intersection**Formation****Intersection Description**

The Sunlight Road/Blackwater Rolleston Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Blackwater Rolleston Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Sunlight Road	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	104	10%	10	10%	10
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			4		4
Q _{T1} =	104	-	14	-	14
Q _{T2} BG=	99	10%	10	10%	10
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			4		4
Q _{T2} =	99	-	14	-	14
Q _L BG=	10	10%	1	10%	1
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _L =	10	-	1	-	1
Q _R BG=	10	10%	1	10%	1
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			6		6
Q _R =	10	-	7	-	7

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

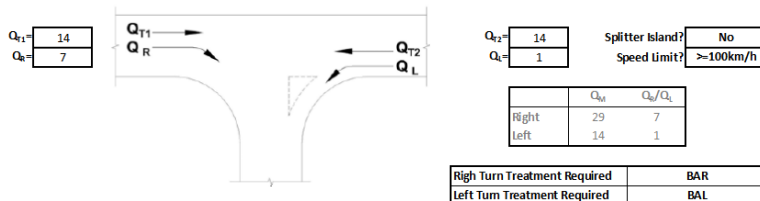
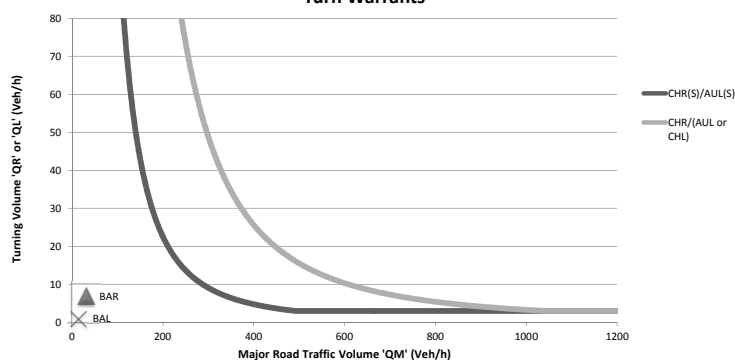
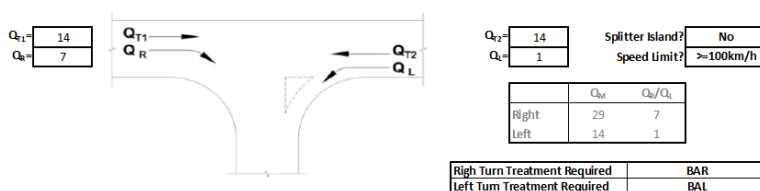
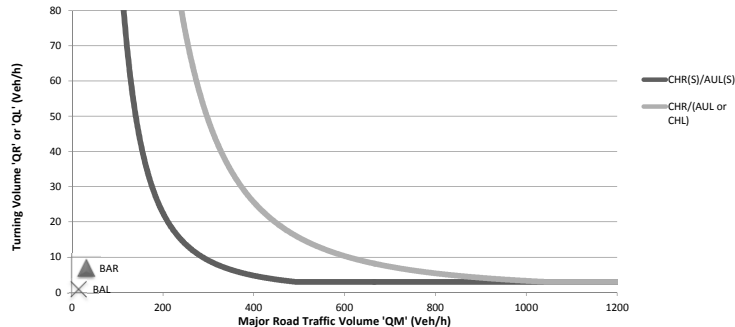
No upgrades are required.

Traffic volume sources

Blackwater Rolleston Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 469.pdf).

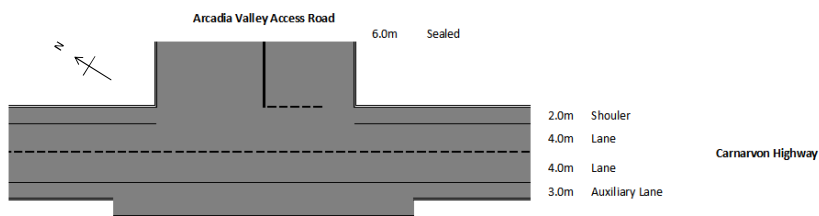
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Sunlight Road/Blackwater Rolleston Road
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Sunlight Road/Blackwater Rolleston Road
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Arcadia Valley Access Road/Carnarvon Highway Intersection

Formation



Intersection Description

The Arcadia Valley Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the north-south movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In

Arcadia Valley Access Rd	80	50%	50%	50%	50%
--------------------------	----	-----	-----	-----	-----

	Daily	PF	AM	PF	PM
Q _{T1} BG=	341	10%	34	10%	34
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			2		2
Q _{T1} =	341	-	36	-	36
Q _{T2} BG=	323	10%	32	10%	32
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			2		2
Q _{T2} =	323	-	34	-	34
Q _L BG=	20	10%	2	10%	2
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _L =	20	-	2	-	2
Q _R BG=	20	10%	2	10%	2
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			6		6
Q _R =	20	-	8	-	8

Assumptions

Assumes Majority of project traffic travels to Roma (worst case scenario)

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

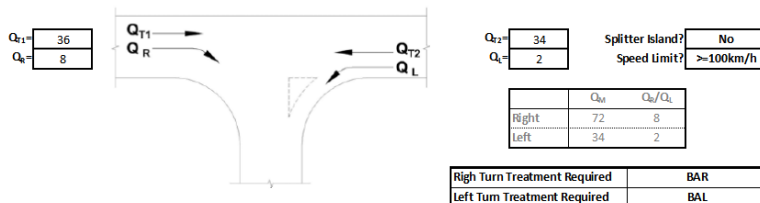
No upgrades are required.

Traffic volume sources

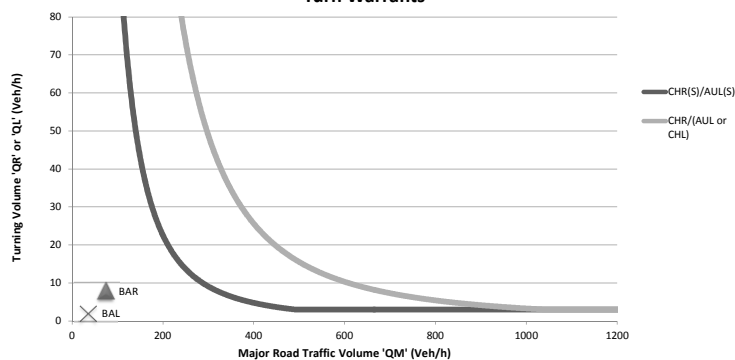
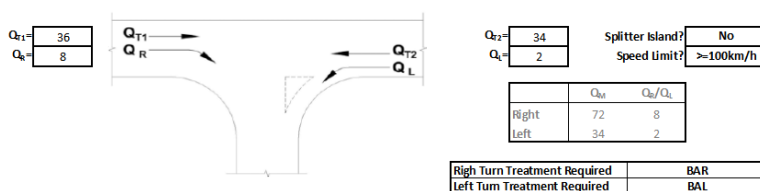
Warrego through traffic volumes come from 2012 DTMR AADT(Annual Volume Report Road Section 24E.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

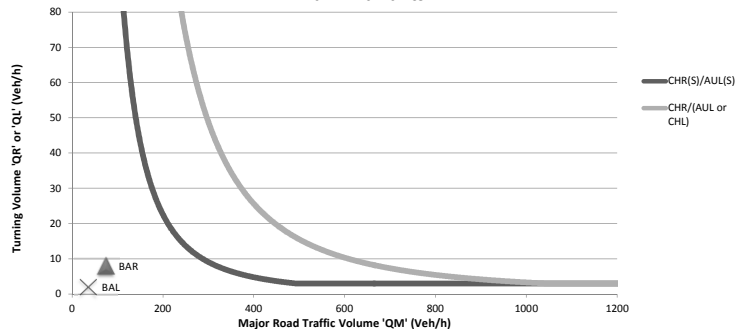
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

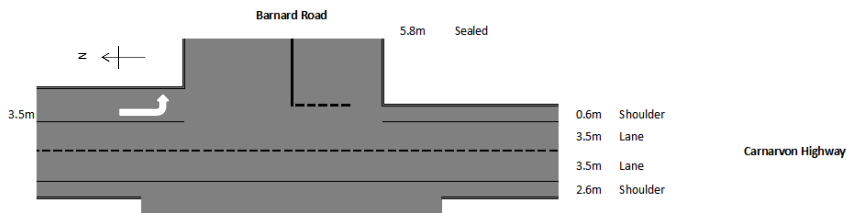
Arcadia Valley Access Road/Carnarvon Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Arcadia Valley Access Road/Carnarvon Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Barnard Road/Carnarvon Highway Intersection**Formation****Intersection Description**

The Barnard Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the north-south movement along the Carnarvon Highway. The intersection includes CHL and AUR treatments for traffic turning into Barnard Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Barnard Road	352	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	429	10%	43	10%	43
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			4		4
$Q_{T1} =$	429	-	47	-	47
$Q_{T2} BG =$	437	10%	44	10%	44
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			4		4
$Q_{T2} =$	437	-	48	-	48
$Q_L BG =$	88	10%	9	10%	9
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			35		35
$Q_L =$	88	-	44	-	44
$Q_R BG =$	88	10%	9	10%	9
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			4		4
$Q_R =$	88	-	13	-	13

Assumptions

Project traffic will access Barnard Road to/from the north along the Carnarvon Highway.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

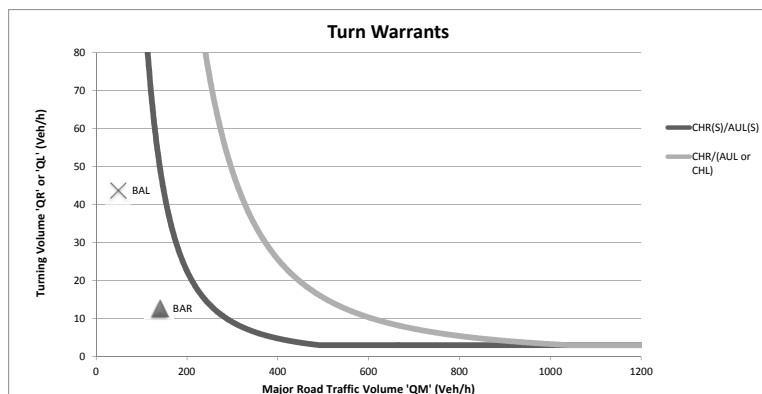
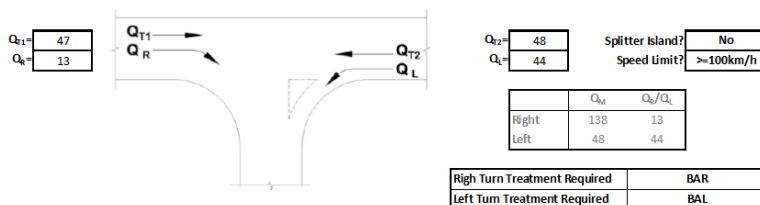
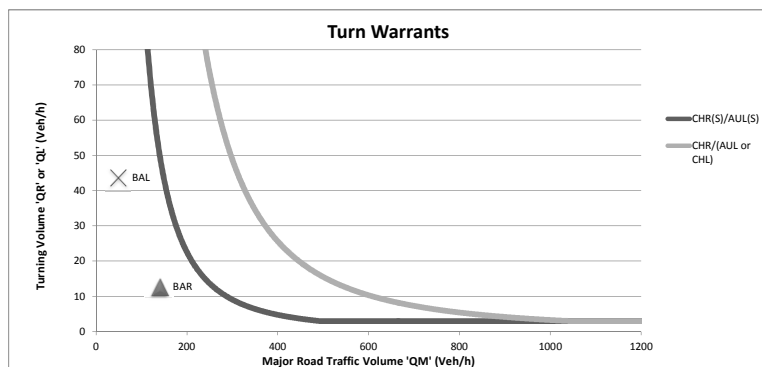
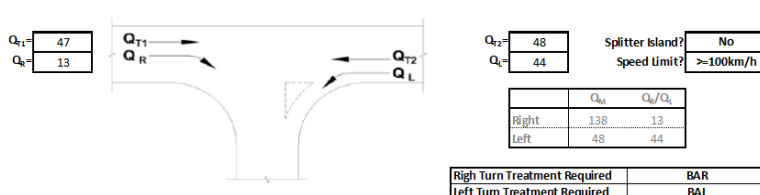
Traffic volume sources

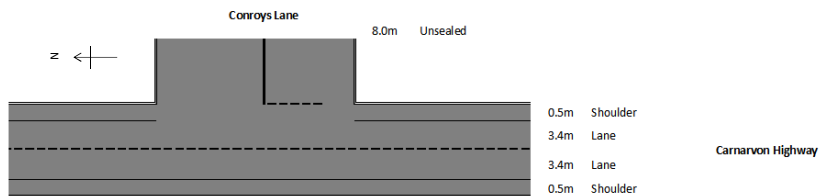
Carnarvon Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24C.pdf).

Barnard Road traffic volumes come from 2012 Maranoa Region Traffic Counts (9148 Austraffic - Maranoa Region Traffic Counts.xlsx)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Barnard Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)

Barnard Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Conroys Lane/Carnarvon Highway Intersection**Formation****Intersection Description**

The Conroys Lane/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Conroys Lane	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	370	10%	37	10%	37
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			6		6
$Q_{T2} =$	370	-	43	-	43
$Q_{T2} BG =$	368	10%	37	10%	37
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			6		6
$Q_{L1} =$	368	-	43	-	43
$Q_L BG =$	15	10%	2	10%	2
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			4		4
$Q_R =$	15	-	6	-	6
$Q_R BG =$	15	10%	2	10%	2
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			0		0
$Q_{L2} =$	15	-	2	-	2

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

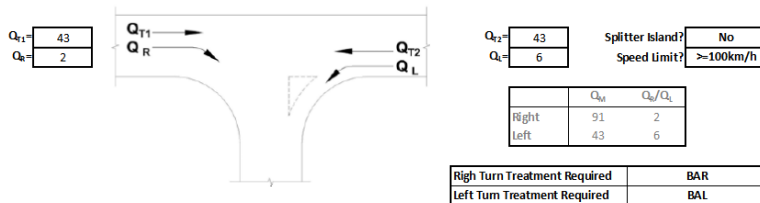
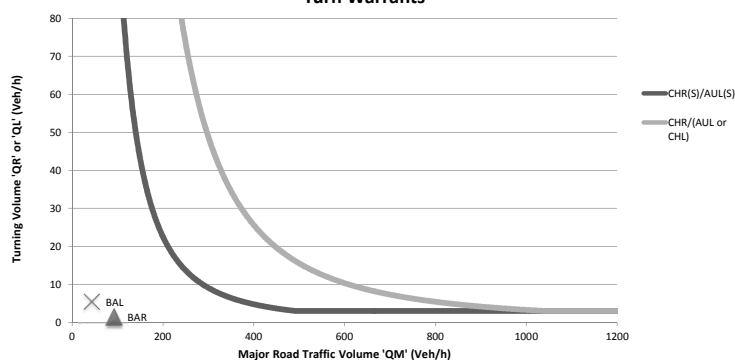
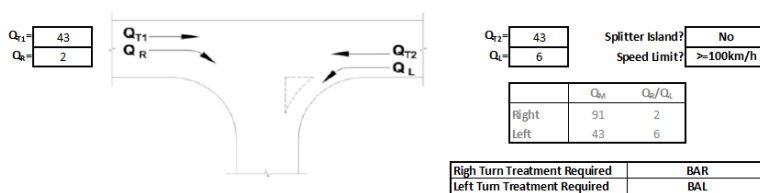
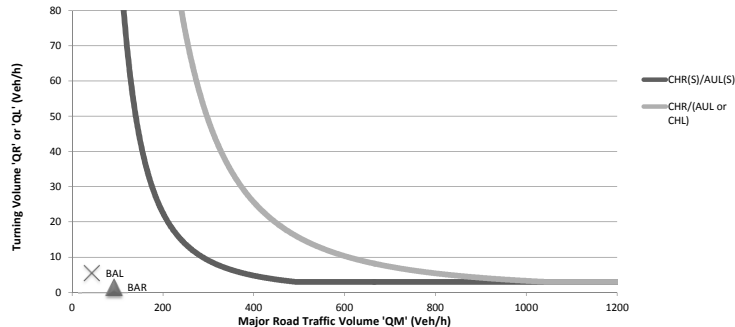
No upgrades are required.

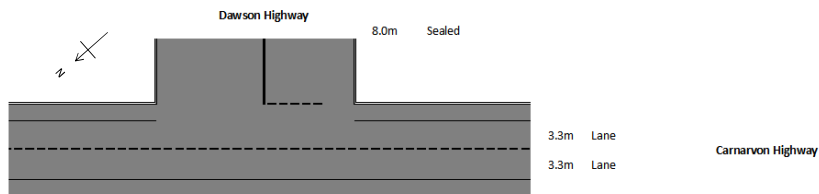
Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24C.pdf)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Conroys Lane/Carnarvon Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Conroys Lane/Carnarvon Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Dawson Highway/Carnarvon Highway Intersection**Formation****Intersection Description**

The Dawson Highway/Carnarvon Highway intersection is a four way priority controlled intersection with the main movement being the east-south movement along the Dawson Highway and Carnarvon Highway. There are no turn facilities or auxiliary lanes.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			53		59
Q_{T1} Cumulative=			0		0
Q_{T1} GLNG GFDP=			0		0
Q_{T2} BG=	0	-	53	-	59
Q_{T2} BG=			40		26
Q_{T2} Cumulative=			0		0
Q_{T2} GLNG GFDP=			0		0
Q_{L1} BG=	0	-	40	-	26
Q_{L1} BG=			0		0
Q_{L1} Cumulative=			0		0
Q_{L1} GLNG GFDP=			0		0
Q_{L2} BG=	0	-	0	-	0
Q_{L2} BG=			0		0
Q_{L2} Cumulative=			0		0
Q_{L2} GLNG GFDP=			11		11
Q_{L3} BG=	0	-	11	-	11
Q_{L3} BG=			0		0
Q_{L3} Cumulative=			0		0
Q_{L3} GLNG GFDP=			0		0

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

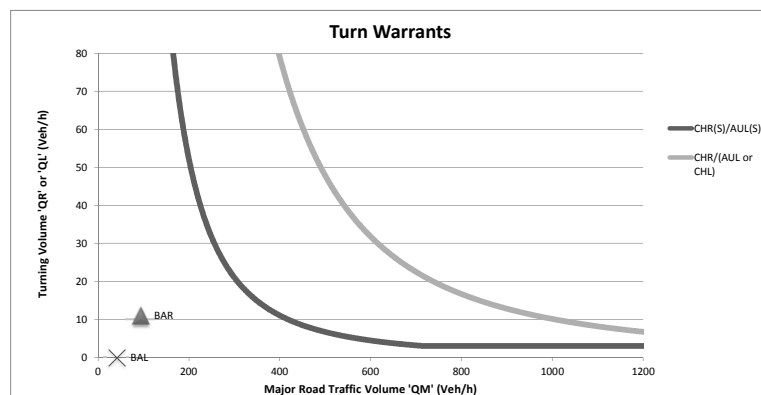
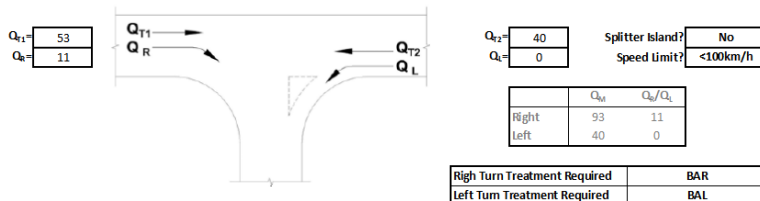
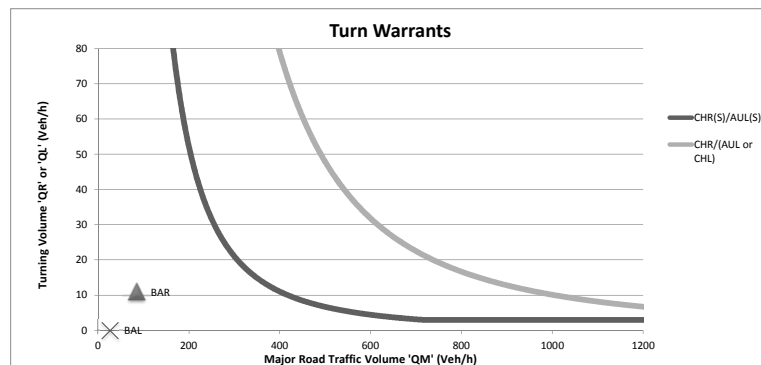
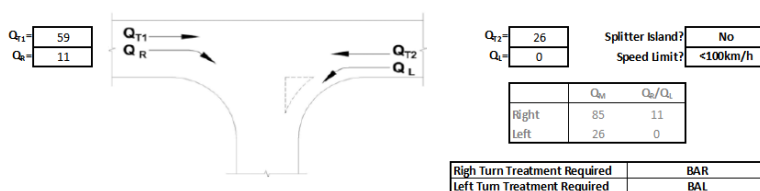
No upgrades are required.

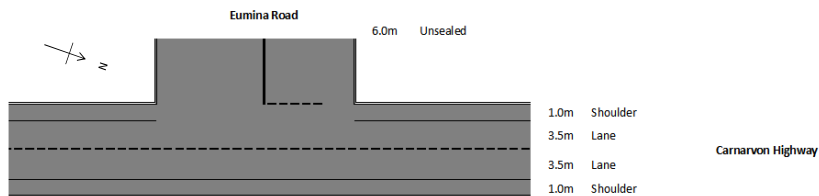
Traffic volume sources

Background Traffic volumes come from 2012 DTMR intersection counts. (Road Section 24E Intersection 45.pdf). Through traffic is estimated from the intersection next to this intersection.

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Dawson Highway/Carnarvon Highway
 2012 Background + GLNG (AM Peak)

Dawson Highway/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Eumina Road/Carnarvon Highway Intersection**Formation****Intersection Description**

The Eumina Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Eumina Road	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1275	10%	128	10%	128
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			15		15
$Q_{T1} =$	1275	-	143	-	143
$Q_{T2} BG =$	1309	10%	131	10%	131
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			15		15
$Q_{T2} =$	1309	-	146	-	146
$Q_L BG =$	10	10%	1	10%	1
$Q_L \text{ Cumulative} =$			0		0
$Q_L GLNG GFDP =$			5		5
$Q_L =$	10	-	6	-	6
$Q_R BG =$	10	10%	1	10%	1
$Q_R \text{ Cumulative} =$			0		0
$Q_R GLNG GFDP =$			0		0
$Q_R =$	10	-	1	-	1

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

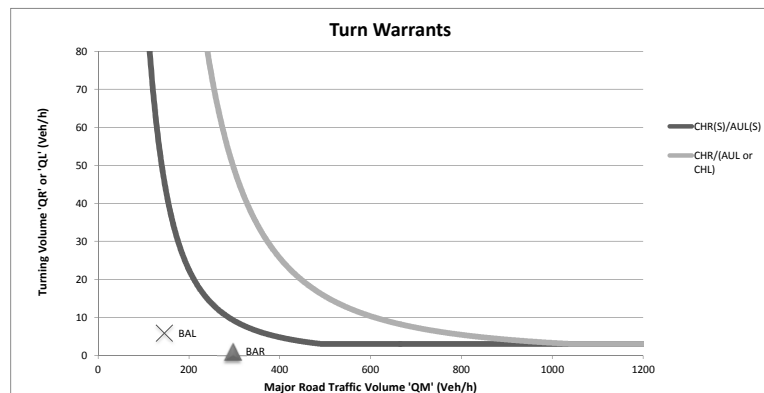
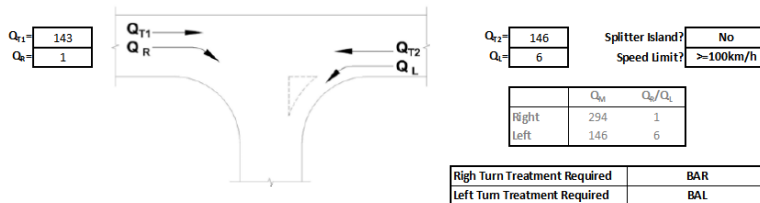
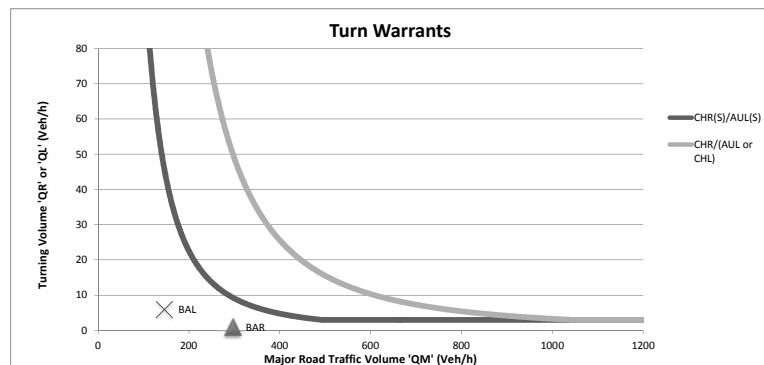
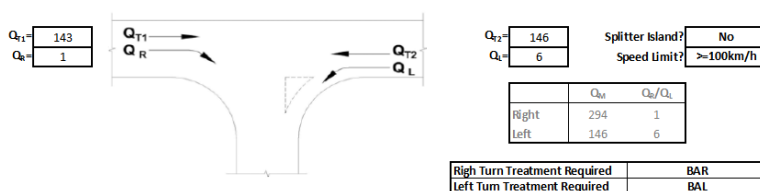
No upgrades are required.

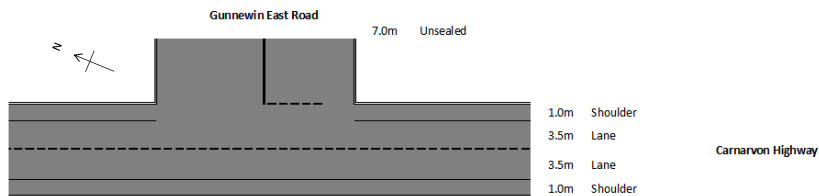
Traffic volume sources

Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Eumina Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)

Eumina Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Gunnewin East Road/Carnarvon Highway Intersection**Formation****Intersection Description**

The Gunnewin East Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Gunnewin East Road	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1309	10%	131	10%	131
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			17		17
$Q_{T2} =$	1309	-	148	-	148
$Q_{T2} BG =$	1275	10%	128	10%	128
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			17		17
$Q_{L1} =$	1275	-	145	-	145
$Q_{L1} BG =$	10	10%	1	10%	1
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			0		0
$Q_{L2} =$	10	-	1	-	1
$Q_{L2} BG =$	10	10%	1	10%	1
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			1		1
$Q_{L3} =$	10	-	2	-	2

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

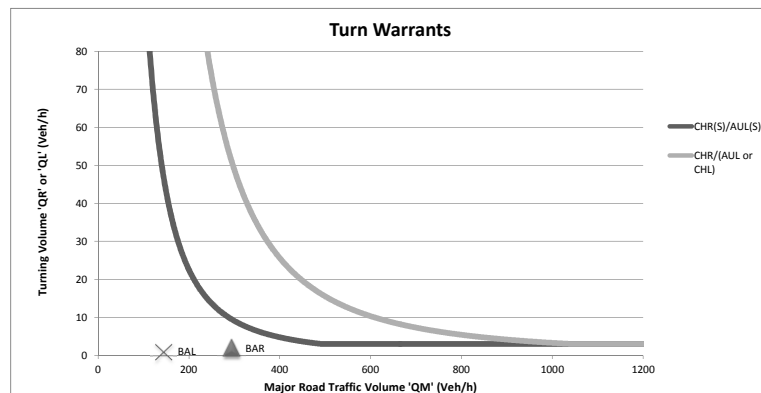
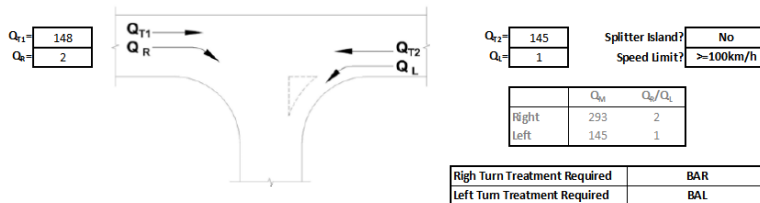
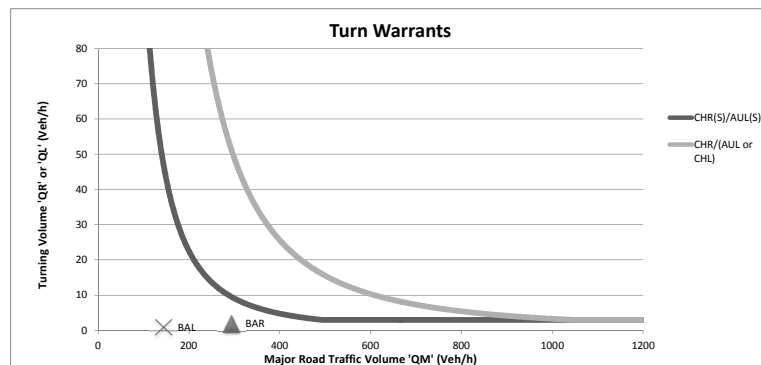
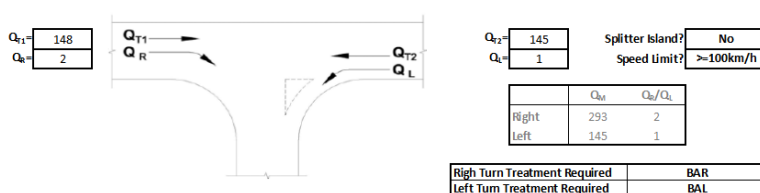
No upgrades are required.

Traffic volume sources

Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

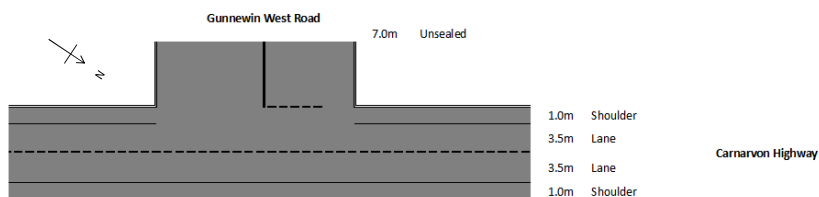
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Gunnewin East Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)

Gunnewin East Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Gunnawin West Road/Carnarvon Highway Intersection

Formation



Intersection Description

The Gunnawin West Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Gunnawin West Road	20	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1275	10%	128	10%	128
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$					
$Q_{T2} =$	1275	-	128	-	128
$Q_{T2} BG =$	1309	10%	131	10%	131
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$					
$Q_{L1} =$	1309	-	131	-	131
$Q_{L1} BG =$	5	10%	1	10%	1
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$					
$Q_{L2} =$	5	-	1	-	1
$Q_{L2} BG =$	5	10%	1	10%	1
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$					
$Q_{L3} =$	5	-	1	-	1

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

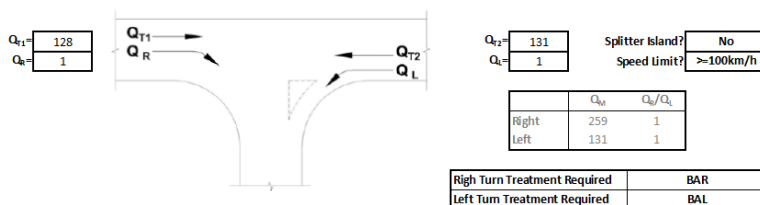
No upgrades are required.

Traffic volume sources

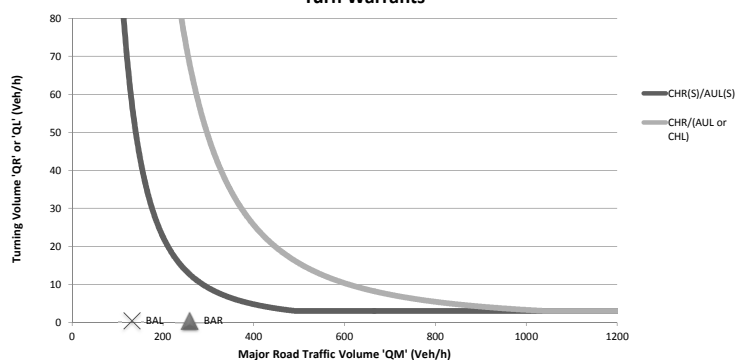
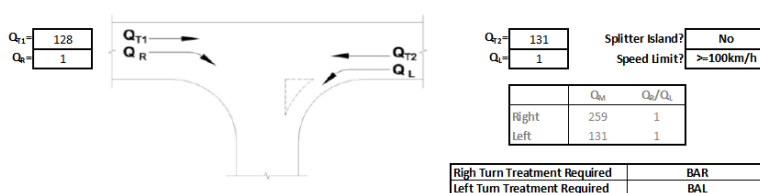
Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

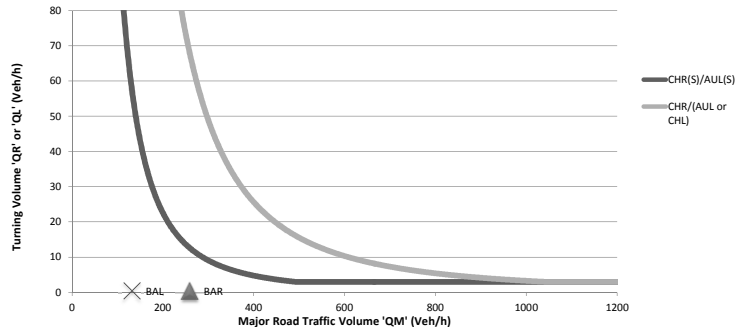
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Gunnawin West Road/Carnarvon Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

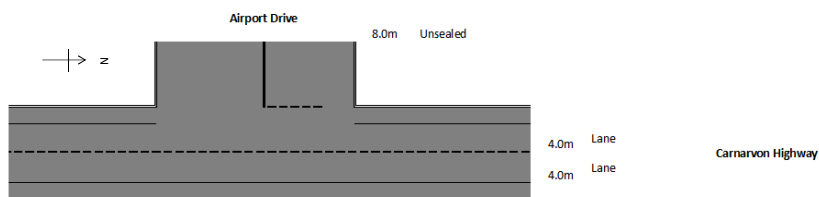
Gunnawin West Road/Carnarvon Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Airport Drive/Carnarvon Highway Intersection

Formation



Intersection Description

The Airport Drive/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Airport Drive	120	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1275	10%	128	10%	128
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			11		11
$Q_{T2} =$	1275	-	139	-	139
$Q_{T2} BG =$	1309	10%	131	10%	131
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			11		11
$Q_{T3} =$	1309	-	142	-	142
$Q_{T3} BG =$	30	10%	3	10%	3
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	30	-	3	-	3
$Q_{T4} BG =$	30	10%	3	10%	3
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	30	-	3	-	3

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

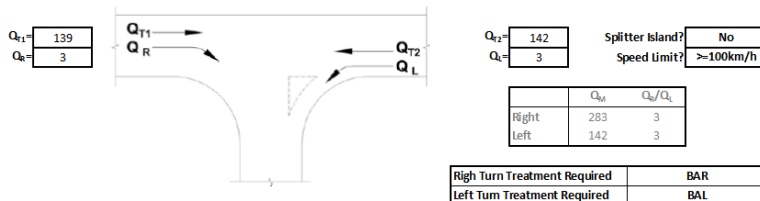
No upgrades are required.

Traffic volume sources

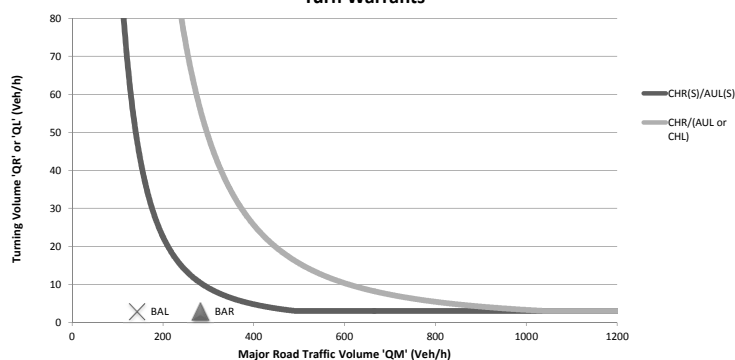
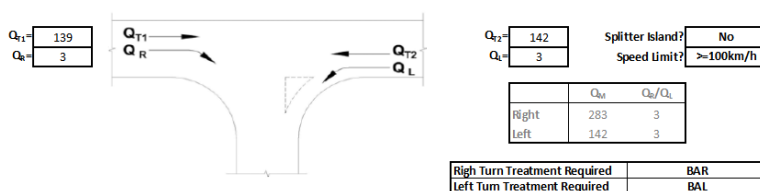
Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

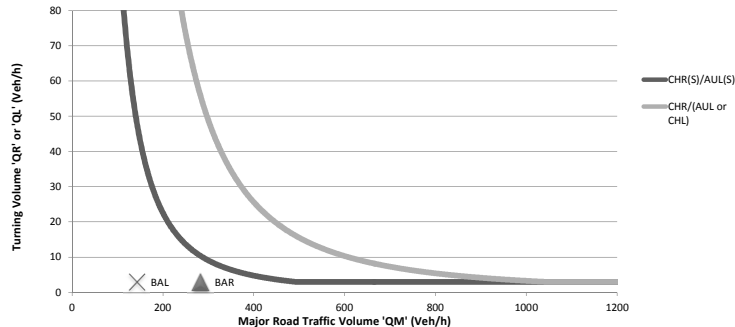
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Airport Drive/Carnarvon Highway
 2012 Background + GLNG (AM Peak)


Turn Warrants

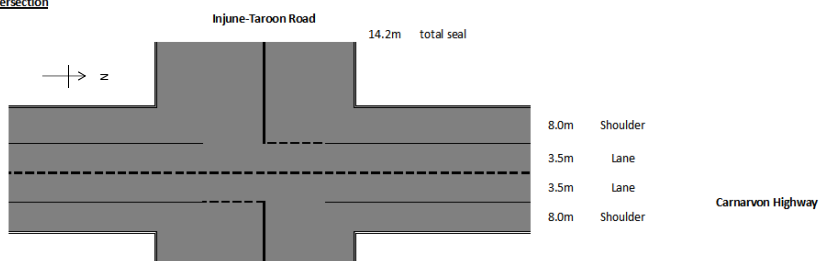

Airport Drive/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Turn Warrants



Carnarvon Highway Intersection

Formation



Intersection Description

The Injune-Taroom Road/Carnarvon Highway intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes provided on Carnarvon Highway, however the wide shoulders can be used by vehicles to avoid turning vehicles at this intersection.

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$			88		101
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			11		11
$Q_{L1} =$	0	-	99	-	112
$Q_{L1} BG =$			83		107
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			11		11
$Q_{T2} =$	0	-	94	-	118
$Q_{T2} BG =$			27		14
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{R1} =$	0	-	27	-	14
$Q_{R1} BG =$			11		18
$Q_{R1} \text{ Cumulative} =$			0		0
$Q_{R1} GLNG GFDP =$			0		0
$Q_{L2} =$	0	-	11	-	18

Assumptions

Project traffic will access Injune-Taroom Road to/from the south along the Carnarvon Highway.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

Traffic volume sources

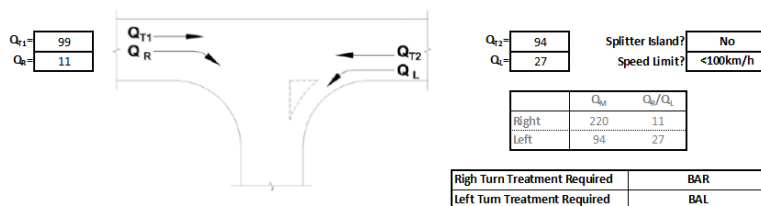
Background Traffic volumes come from 2012 DTMR intersection counts. (12hr Intersection count of 24D and Third Ave Injune 2012.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

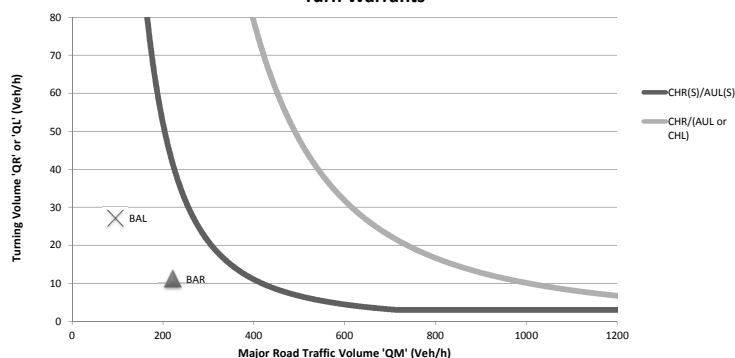
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Injune-Taroom Road/Carnarvon Highway

2012 Background + GLNG (AM Peak)

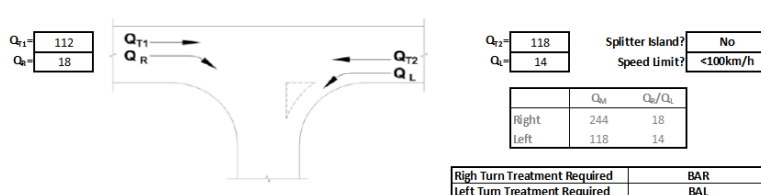


Turn Warrants

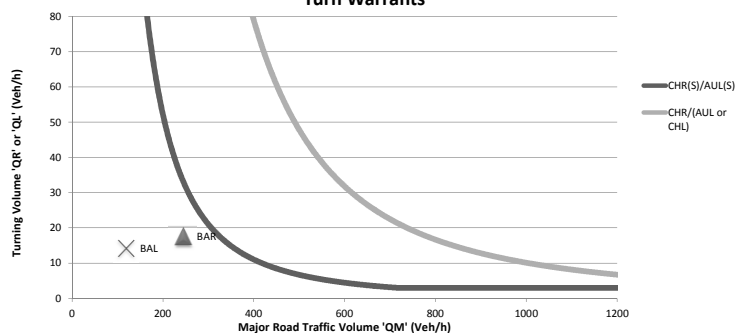


Injune-Taroom Road/Carnarvon Highway

2012 Background + GLNG (PM Peak)

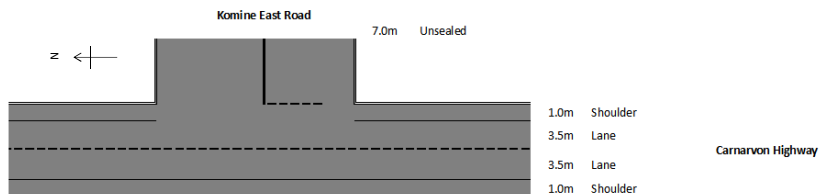


Turn Warrants



Komine East Road/Carnarvon Highway Intersection

Formation



Intersection Description

The Komine East Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Komine East Road	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1309	10%	131	10%	131
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			11		11
$Q_{T2} =$	1309	-	142	-	142
$Q_{T2} BG =$	1275	10%	128	10%	128
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			11		11
$Q_{L1} =$	1275	-	139	-	139
$Q_{L1} BG =$	15	10%	2	10%	2
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			0		0
$Q_{L2} =$	15	-	2	-	2
$Q_{L2} BG =$	15	10%	2	10%	2
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			5		5
$Q_{L3} =$	15	-	7	-	7

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

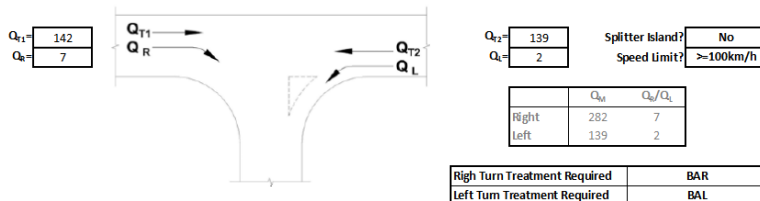
No upgrades are required.

Traffic volume sources

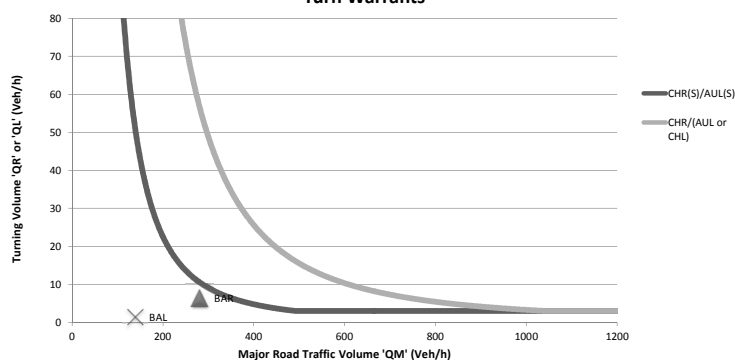
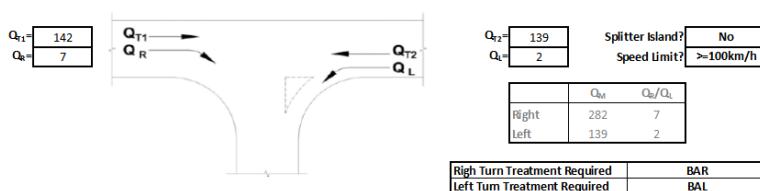
Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

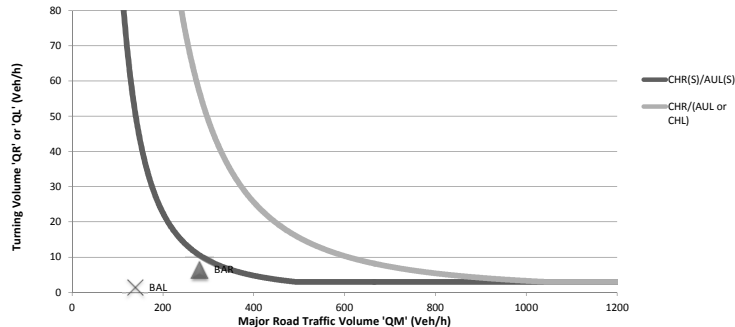
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

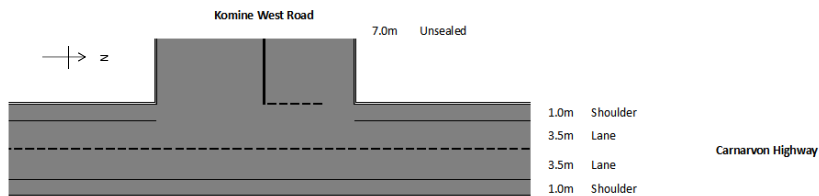
Komine East Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)


Turn Warrants


Komine East Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Turn Warrants



Komine West Road/Carnarvon Highway Intersection**Formation****Intersection Description**

The Komine West Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Komine West Road	30	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1275	10%	128	10%	128
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			11		11
$Q_{T2} =$	1275	-	139	-	139
$Q_{T2} BG =$	1309	10%	131	10%	131
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			11		11
$Q_{T3} =$	1309	-	142	-	142
$Q_{T3} BG =$	8	10%	1	10%	1
$Q_{T3} \text{ Cumulative} =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	8	-	1	-	1
$Q_{T4} BG =$	8	10%	1	10%	1
$Q_{T4} \text{ Cumulative} =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	8	-	1	-	1

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

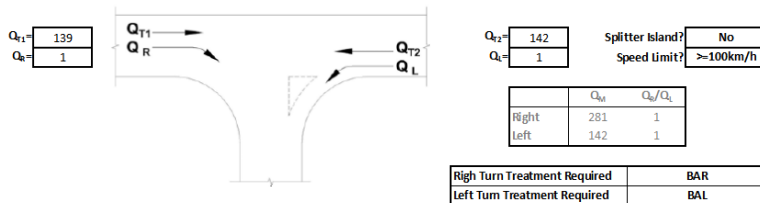
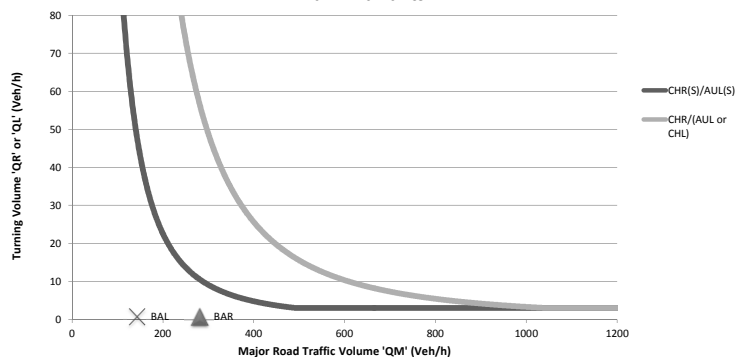
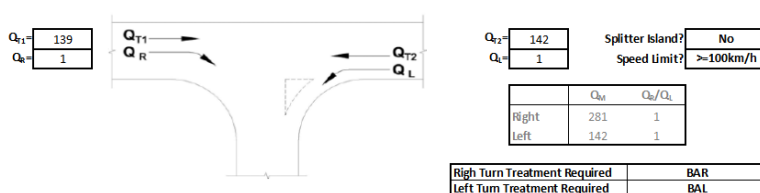
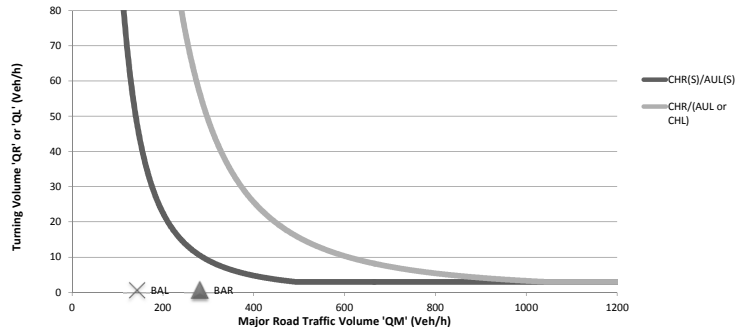
No upgrades are required.

Traffic volume sources

Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

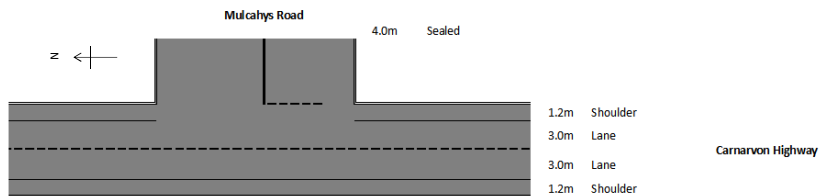
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Komine West Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Komine West Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Mulcahys Road/Carnarvon Highway Intersection

Formation



Intersection Description

The Mulcahys Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes. There is a cattle grid 25m south of the intersection, and Mulcahys Road is sealed.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Mulcahys Road	32	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	344	10%	34	10%	34
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			3		3
$Q_{T2} =$	344	-	37	-	37
$Q_{T2} BG =$	342	10%	34	10%	34
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			3		3
$Q_{T3} =$	342	-	37	-	37
$Q_L BG =$	8	10%	1	10%	1
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			0		0
$Q_R =$	8	-	1	-	1
$Q_R BG =$	8	10%	1	10%	1
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			2		2
$Q_{LR} =$	8	-	3	-	3

Assumptions

Project traffic will access Mulcahys Road to/from the north and south along the Carnarvon Highway.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

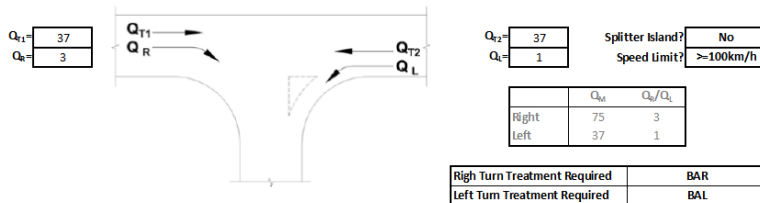
No upgrades are required.

Traffic volume sources

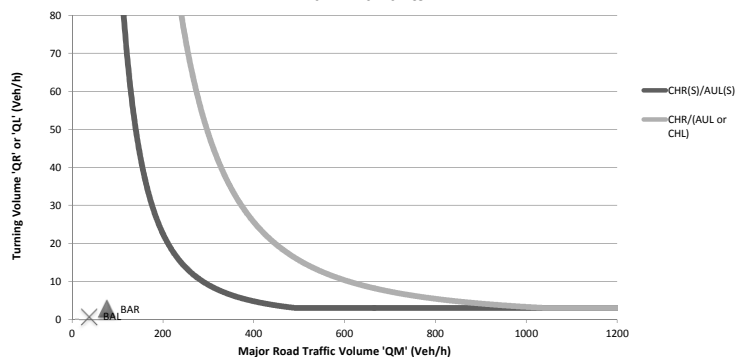
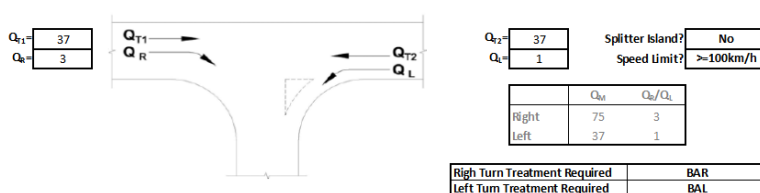
Carnarvon Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24E.pdf).

Mulcahys Road traffic volumes come from 2012 Maranoa Region Traffic Counts(9148 Austraffic - Maranoa Region Traffic Counts.xlsx)

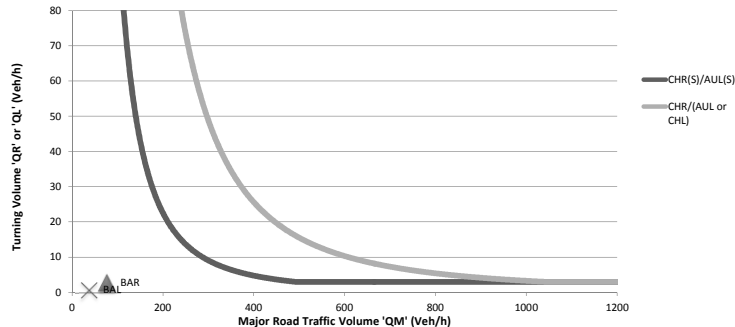
6% annual traffic growth has been applied to increase the background traffic for future traffic.

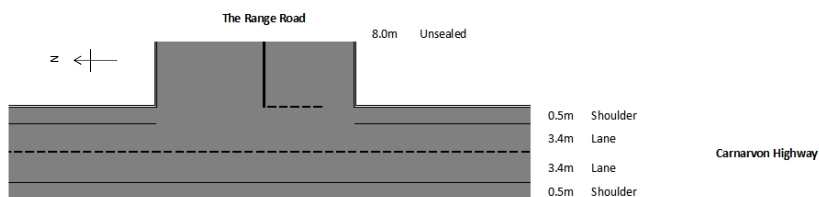
Mulcahys Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)


Turn Warrants


Mulcahys Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)


Turn Warrants



The Range Road/Carnarvon Highway Intersection**Formation****Intersection Description**

The Range Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
The Range Road	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	370	10%	37	10%	37
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	370	-	37	-	37
$Q_{T2} BG =$	368	10%	37	10%	37
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{L1} =$	368	-	37	-	37
$Q_{L1} BG =$	15	10%	2	10%	2
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			6		6
$Q_{L2} =$	15	-	8	-	8
$Q_{L2} BG =$	15	10%	2	10%	2
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			0		0
$Q_{R1} =$	15	-	2	-	2

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

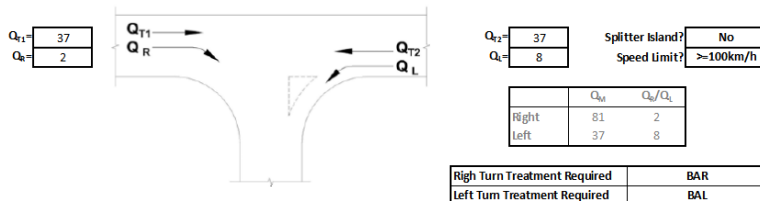
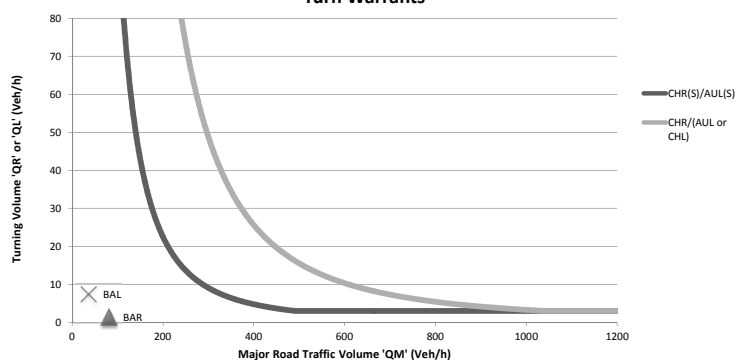
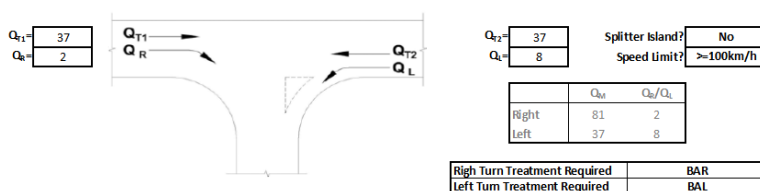
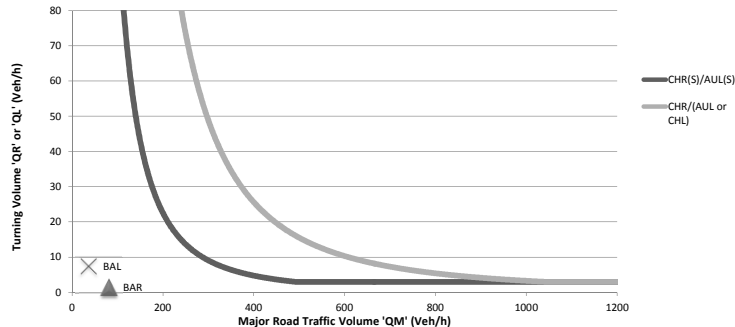
No upgrades are required.

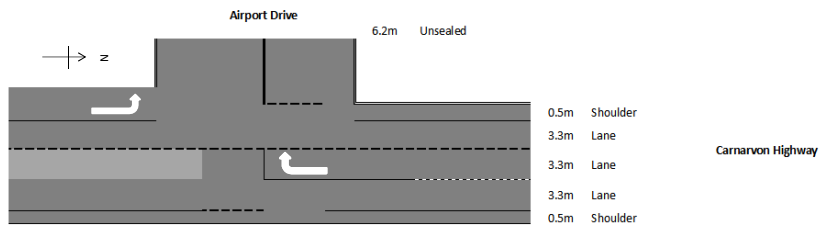
Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24C.pdf)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

The Range Road/Carnarvon Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
The Range Road/Carnarvon Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Airport Drive/Carnarvon Highway Intersection**Formation****Intersection Description**

The Airport Drive/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the north-south movement along the Carnarvon Highway. There are AUL and CHR(S) turning facilities provided for traffic going to Airport Drive.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			234		120
Q_{T1} Cumulative=			1		1
Q_{T1} GLNG GFDP=			23		23
Q_{T1} =	0	-	257	-	144
Q_{T2} BG=			88		125
Q_{T2} Cumulative=			1		1
Q_{T2} GLNG GFDP=			23		23
Q_{T2} =	0	-	112	-	149
Q_L BG=			21		70
Q_L Cumulative=			0		0
Q_L GLNG GFDP=			1		1
Q_L =	0	-	22	-	71
Q_R BG=			11		6
Q_R Cumulative=			0		0
Q_R GLNG GFDP=			0		0
Q_R =	0	-	11	-	6

Assumptions

Project traffic will access Airport Drive to/from the south and north along the Carnarvon Highway.

Turn Warrant Requirement

A AUL(S) and a CHR(S).

Conclusion

No upgrades are required.

Traffic volume sources

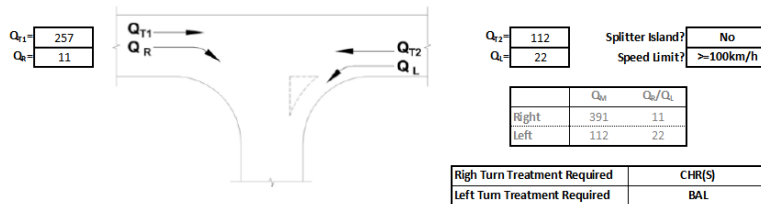
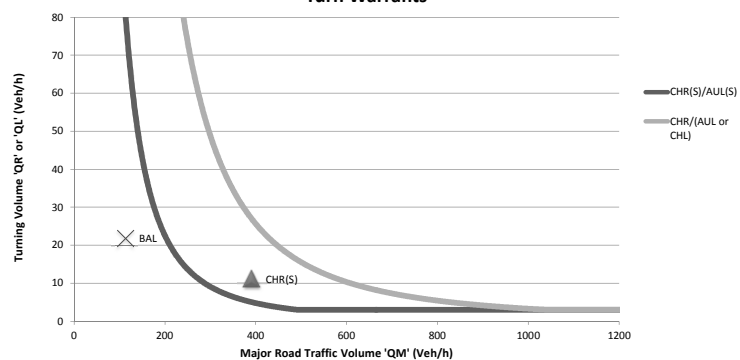
Background Traffic volumes come from 2012 DTMR intersection counts. (Road Section 24D Intersection 183.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

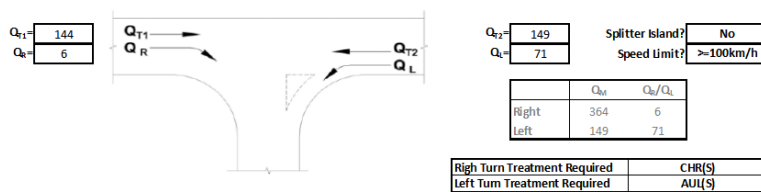
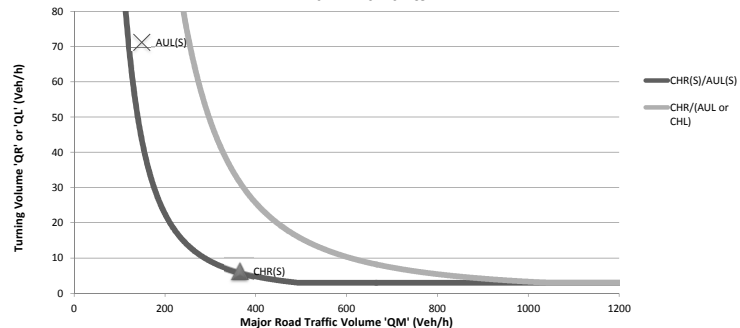
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Airport Drive/Carnarvon Highway

2012 Background + GLNG (AM Peak)

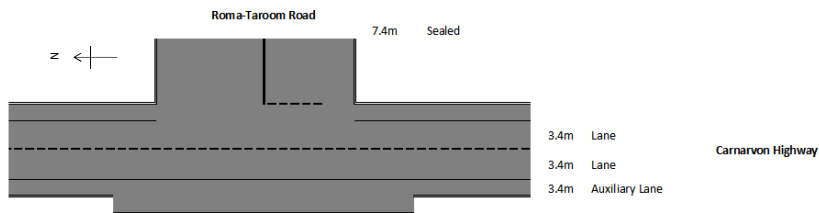
**Turn Warrants****Airport Drive/Carnarvon Highway**

2012 Background + GLNG (PM Peak)

**Turn Warrants**

Roma-Taroom Road/Carnarvon Highway Intersection

Formation



Intersection Description

The Roma-Taroom Road and Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the north-south movement along the Carnarvon Highway. There are BAL and AUR turning facilities provided for traffic going to Roma-Taroom Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Roma-Taroom Road	742	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	1309	10%	131	10%	131
Q _{T1} Cumulative=			1		1
Q _{T1} GLNG GFDP=			20		20
Q _{T1} =	1309	-	152	-	152
Q _{T2} BG=	1275	10%	128	10%	128
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			20		20
Q _{T2} =	1275	-	148	-	148
Q _L BG=	186	10%	19	10%	19
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _L =	186	-	19	-	19
Q _R BG=	186	10%	19	10%	19
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			4		4
Q _R =	186	-	23	-	23

Assumptions

Assumes Majority of project traffic comes from the south along Carnarvon Highway.

Turn Warrant Requirement

A BAL and a CHR(S).

Conclusion

No upgrades are required.

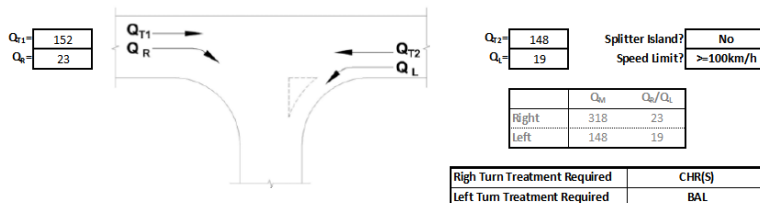
Traffic volume sources

Carnarvon Highway background through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 24D.pdf).

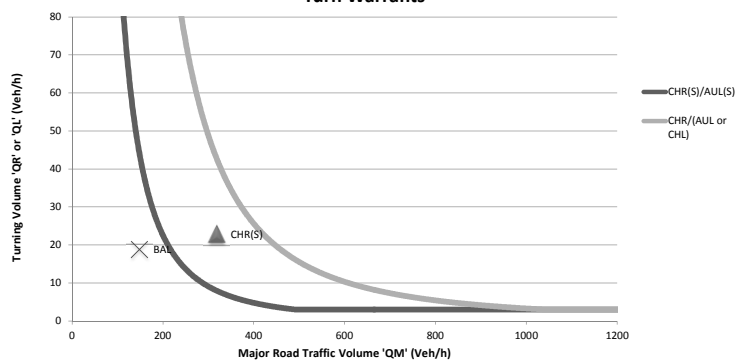
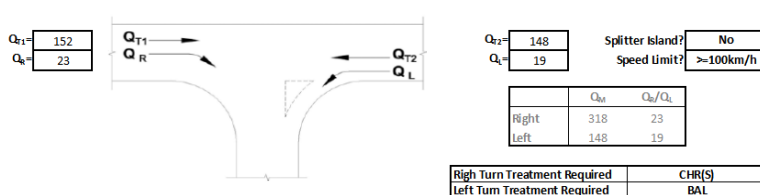
Roma-Taroom background traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 4397.pdf)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

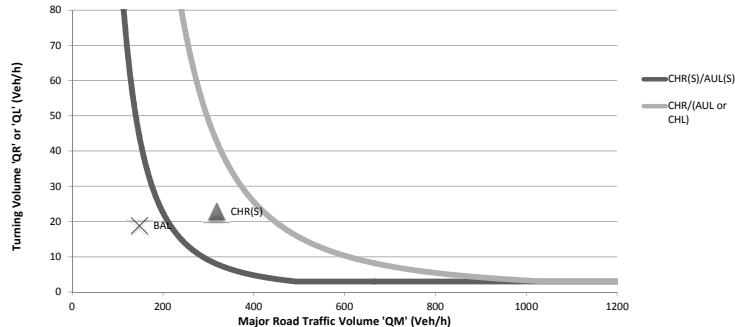
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Roma-Taroom Road/Carnarvon Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

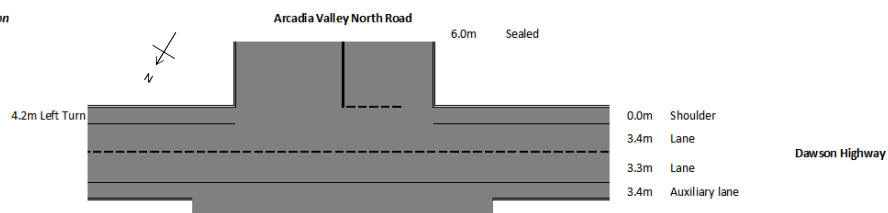
Roma-Taroom Road/Carnarvon Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Arcadia Valley North Road/Dawson Highway Intersection

Formation



Intersection Description

The Arcadia Valley Road/Dawson Highway intersection is a three way priority controlled intersection with the main movement being the east-west movement along the Dawson Highway. There is a left turn pocket into arcadia valley road, and an auxiliary lane provided for through traffic avoiding right turners into Arcadia Valley Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In

Arcadia Valley North Road	120	50%	50%	50%	50%
---------------------------	-----	-----	-----	-----	-----

	Daily	PF	AM	PF	PM
Q _{T1} BG=	221	10%	22	10%	22
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			2		2
Q _{T2} BG=	221	-	24	-	24
Q _{T2} Cumulative=	210	10%	21	10%	21
Q _{T2} GLNG GFDP=			0		0
Q _{T2} GLNG GFDP=			2		2
Q _L BG=	210	-	23	-	23
Q _L Cumulative=	30	10%	3	10%	3
Q _L GLNG GFDP=			0		0
Q _L GLNG GFDP=			4		4
Q _R BG=	30	-	7	-	7
Q _R Cumulative=	30	10%	3	10%	3
Q _R GLNG GFDP=			0		0
Q _R GLNG GFDP=			3		3
Q _B BG=	30	-	6	-	6

Assumptions

Project traffic will access Arcadia Valley Road to/from the east along the Dawson Highway.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

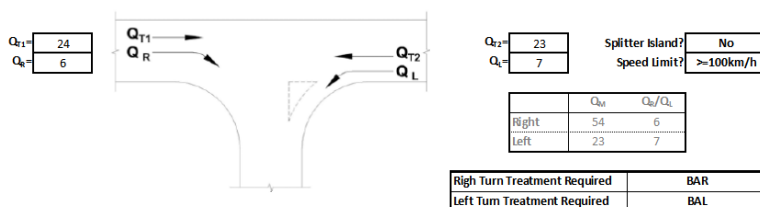
Traffic volume sources

Dawson Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 46A.pdf).

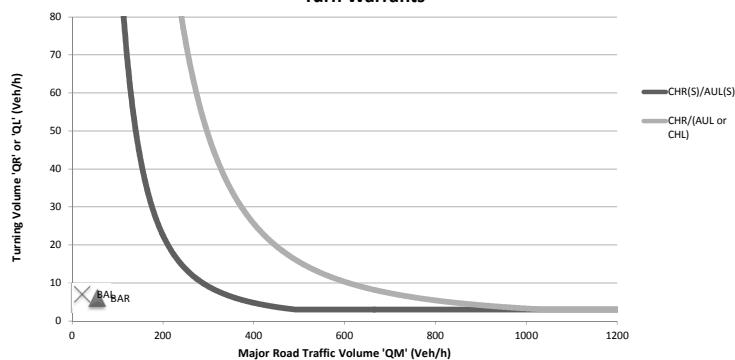
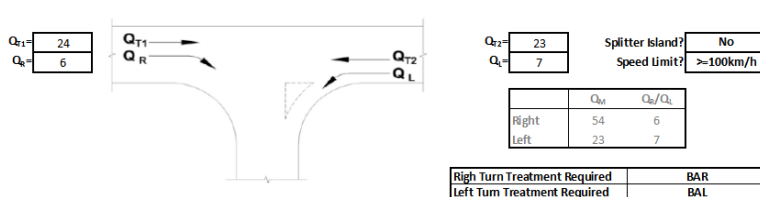
Arcadia Valley Road traffic volumes come from 2012 Arcadia Valley Road AADT (Arcadia valley Rd traffic counter data.xlsx).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

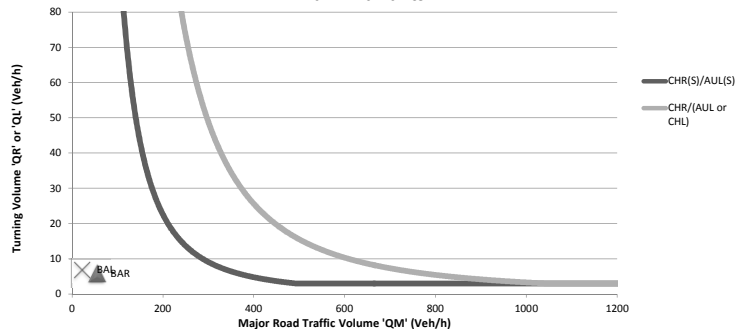
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

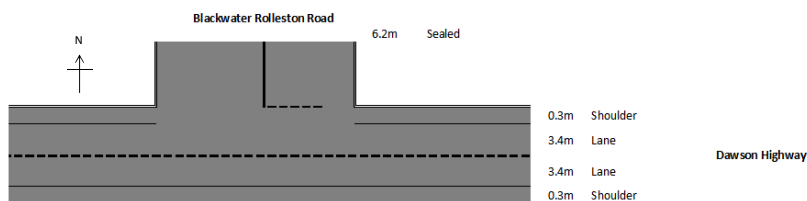
Arcadia Valley North Road/Dawson Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Arcadia Valley North Road/Dawson Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Blackwater Rolleston Road/Dawson Highway Intersection**Formation****Intersection Description**

The Dawson Highway/Blackwater Rolleston Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Dawson Highway. There is an AUL turning treatment provided on Dawson Highway for traffic going into Blackwater Rolleston Road.

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$			29		38
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			4		4
$Q_{T1} =$	0	-	33	-	42
$Q_{T2} BG =$			37		30
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			4		4
$Q_{T2} =$	0	-	41	-	34
$Q_L BG =$			18		26
$Q_L \text{ Cumulative} =$			0		0
$Q_L GLNG GFDP =$			8		8
$Q_L =$	0	-	26	-	34
$Q_R BG =$			2		3
$Q_R \text{ Cumulative} =$			0		0
$Q_R GLNG GFDP =$			1		1
$Q_R =$	0	-	3	-	4

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

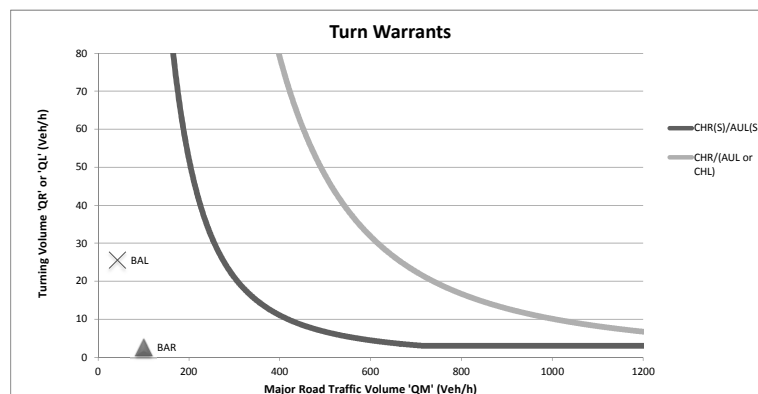
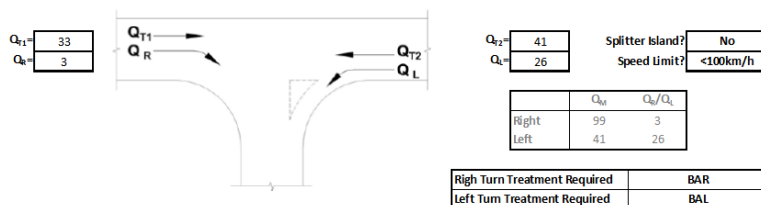
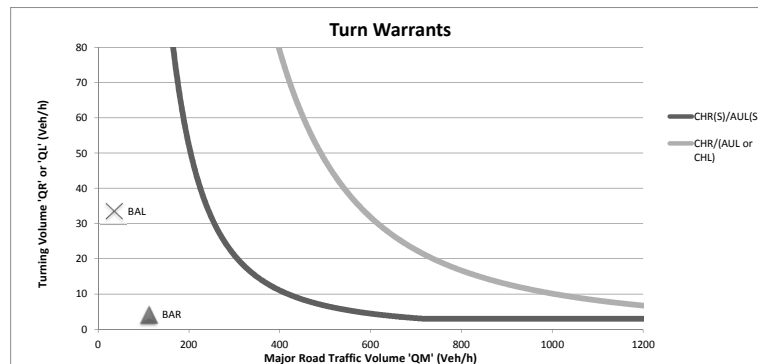
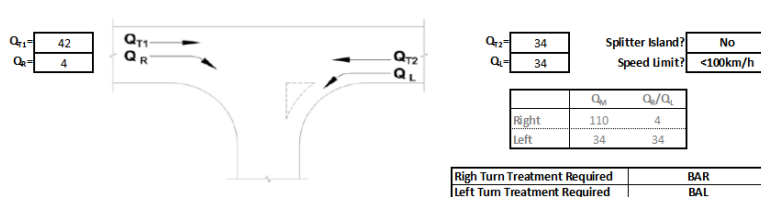
No upgrades are required.

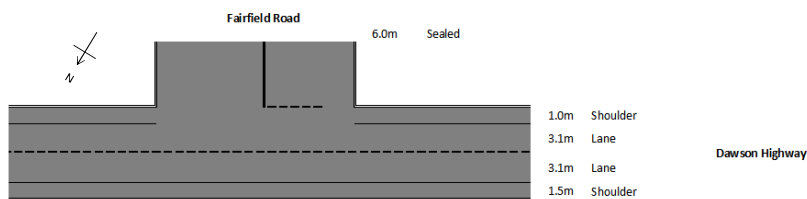
Traffic volume sources

Background Traffic volumes come from 2012 DTMR Intersection counts (Road Section 46C Intersection 57.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Blackwater Rolleston Road/Dawson Highway
 2012 Background + GLNG (AM Peak)

Blackwater Rolleston Road/Dawson Highway
 2012 Background + GLNG (PM Peak)


Fairfield Road/Dawson Highway Intersection**Formation****Intersection Description**

The Fairfield Road/Dawson Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Dawson Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Fairfield Road	138	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	278	10%	28	10%	28
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	278	-	28	-	28
$Q_{T2} BG =$	266	10%	27	10%	27
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{L1} =$	266	-	27	-	27
$Q_{L1} BG =$	35	10%	3	10%	3
$Q_{L1} Cumulative =$			0		0
$Q_{L1} GLNG GFDP =$			3		3
$Q_{L2} =$	35	-	6	-	6
$Q_{L2} BG =$	35	10%	3	10%	3
$Q_{L2} Cumulative =$			0		0
$Q_{L2} GLNG GFDP =$			3		3
$Q_{L3} =$	35	-	6	-	6

Assumptions

Assumes Majority of project traffic comes from the east along Dawson Highway (in the worst case scenario).

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

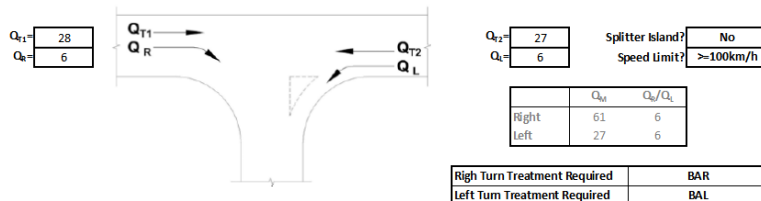
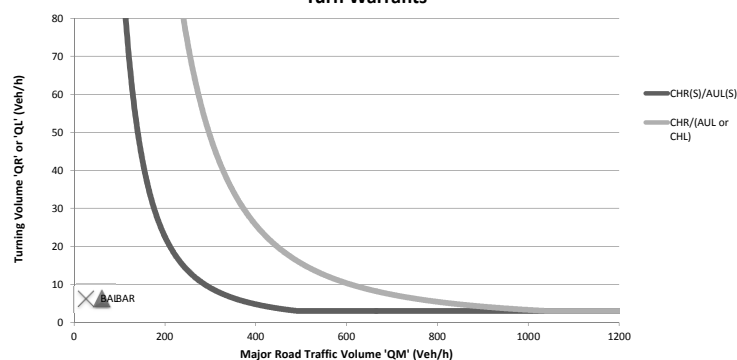
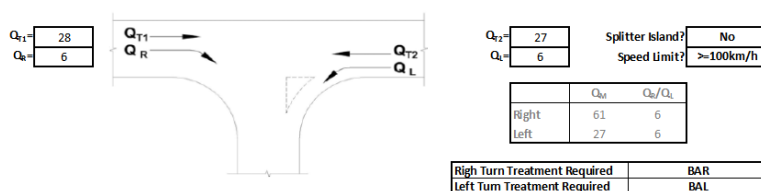
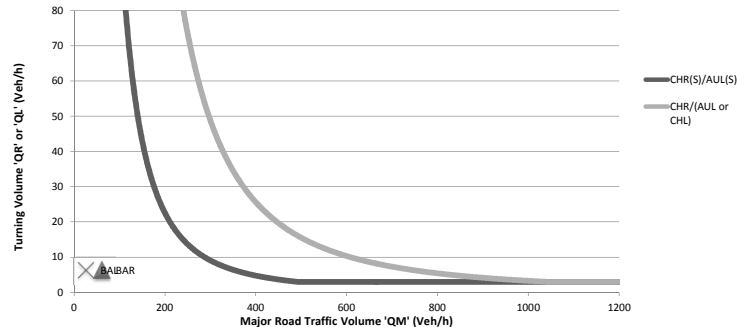
No upgrades are required.

Traffic volume sources

Dawson Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 46C.pdf).

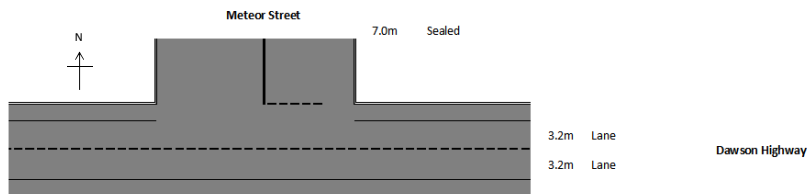
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Fairfield Road/Dawson Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Fairfield Road/Dawson Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Meteor Street/Dawson Highway Intersection

Formation



Intersection Description

The Meteor Street/Dawson Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Dawson Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Meteor Street	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	456	10%	46	10%	46
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			6		6
$Q_{T2} =$	456	-	52	-	52
$Q_{T2} BG =$	507	10%	51	10%	51
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			6		6
$Q_{T3} =$	507	-	57	-	57
$Q_{L} BG =$	10	10%	1	10%	1
$Q_{L} Cumulative =$			0		0
$Q_{L} GLNG GFDP =$			0		0
$Q_{R} =$	10	-	1	-	1
$Q_{R} BG =$	10	10%	1	10%	1
$Q_{R} Cumulative =$			0		0
$Q_{R} GLNG GFDP =$			1		1
$Q_{L} =$	10	-	2	-	2

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

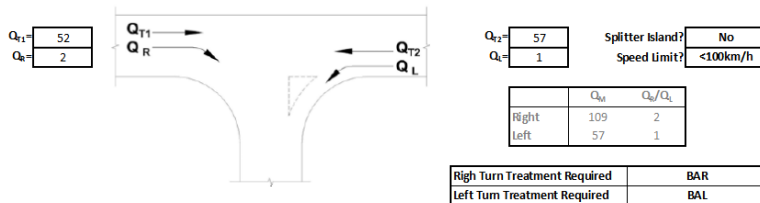
No upgrades are required.

Traffic volume sources

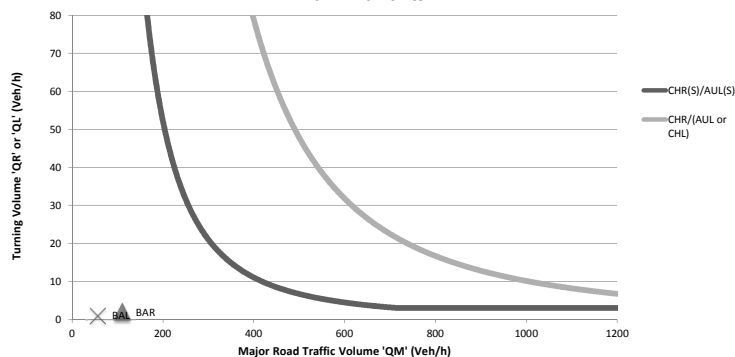
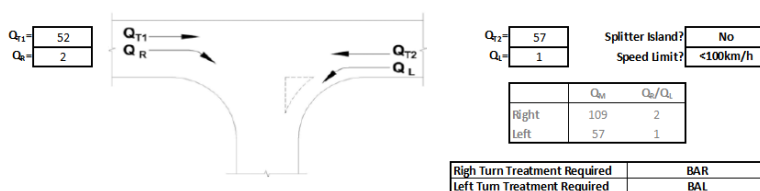
Dawson Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 46C.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

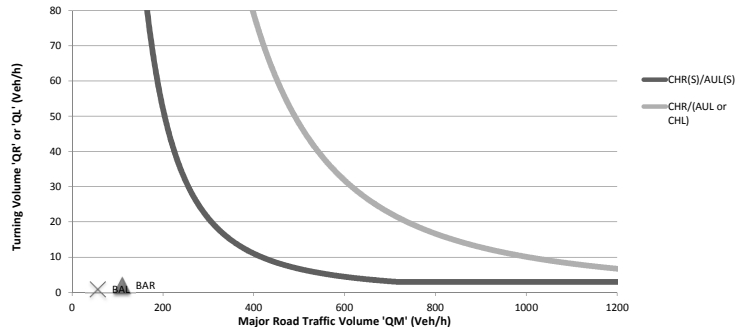
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

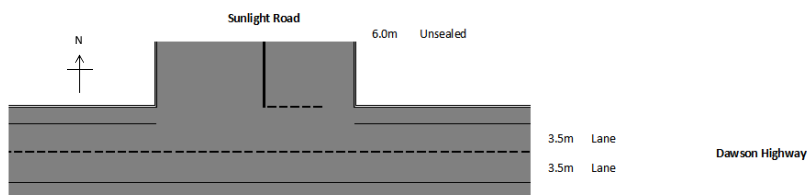
Meteor Street/Dawson Highway
 2012 Background + GLNG (AM Peak)


Turn Warrants


Meteor Street/Dawson Highway
 2012 Background + GLNG (PM Peak)


Turn Warrants



Sunlight Road/Dawson Highway Intersection**Formation****Intersection Description**

The Sunlight Road/Dawson Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Dawson Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Sunlight Road	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	210	10%	21	10%	21
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			4		4
$Q_{T2} =$	210	-	25	-	25
$Q_{T2} BG =$	221	10%	22	10%	22
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			4		4
$Q_{T3} =$	221	-	26	-	26
$Q_L BG =$	15	10%	2	10%	2
$Q_L \text{ Cumulative} =$			0		0
$Q_L GLNG GFDP =$			1		1
$Q_R =$	15	-	3	-	3
$Q_R BG =$	15	10%	2	10%	2
$Q_R \text{ Cumulative} =$			0		0
$Q_R GLNG GFDP =$			3		3
$Q_{L+R} =$	15	-	5	-	5

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

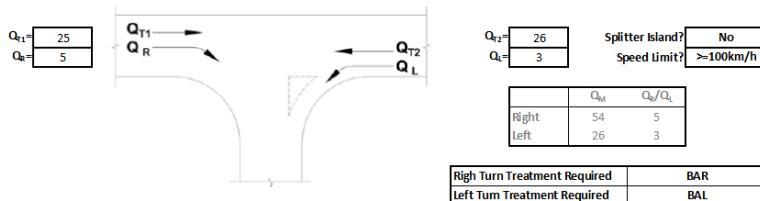
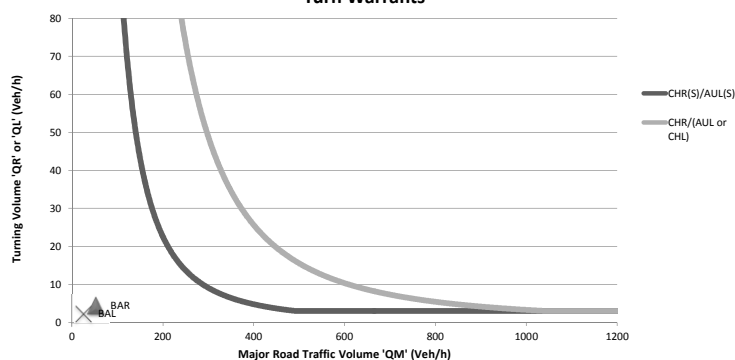
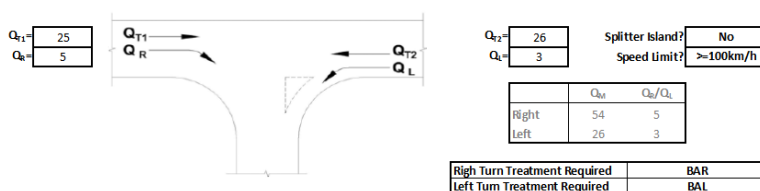
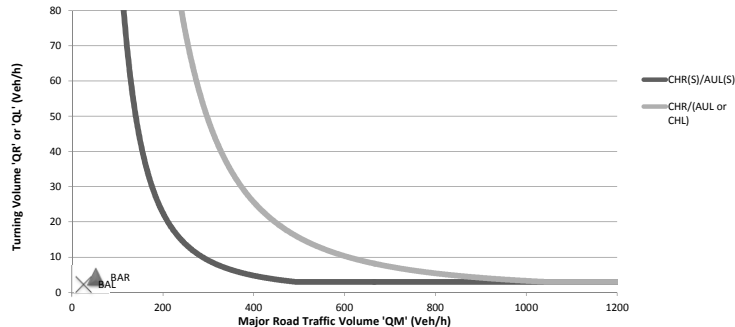
No upgrades are required.

Traffic volume sources

Dawson Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 46C.pdf).

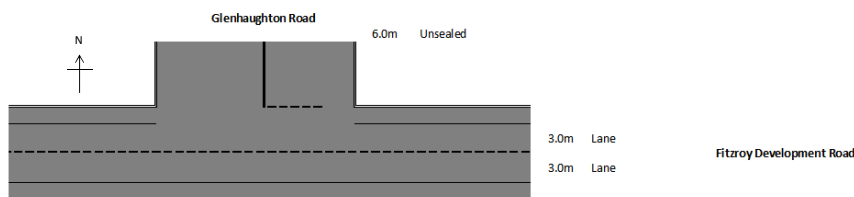
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Sunlight Road/Dawson Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Sunlight Road/Dawson Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Glenhaughton Road/Fitzroy Development Road Intersection

Formation



Intersection Description

The Glenhaughton Road/Fitzroy Development Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Fitzroy Development Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Glenhaughton Road	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	59	10%	6	10%	6
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	59	-	6	-	6
$Q_{T2} BG =$	59	10%	6	10%	6
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{L1} =$	59	-	6	-	6
$Q_{L1} BG =$	10	10%	1	10%	1
$Q_{L1} Cumulative =$			0		0
$Q_{L1} GLNG GFDP =$			4		4
$Q_{L2} =$	10	-	5	-	5
$Q_{L2} BG =$	10	10%	1	10%	1
$Q_{L2} Cumulative =$			0		0
$Q_{L2} GLNG GFDP =$			0		0
$Q_{L3} =$	10	-	1	-	1

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

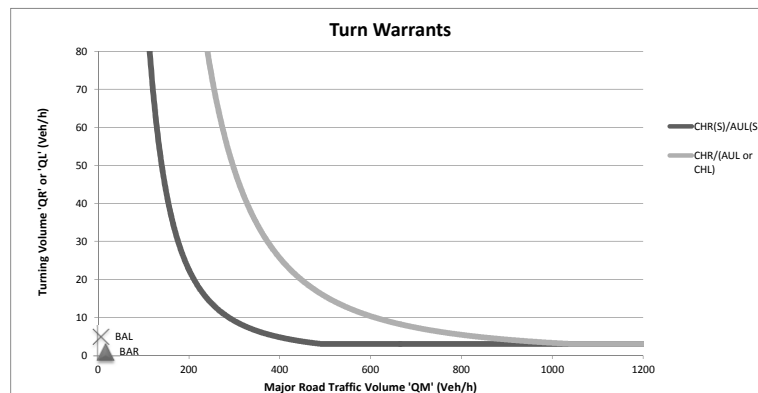
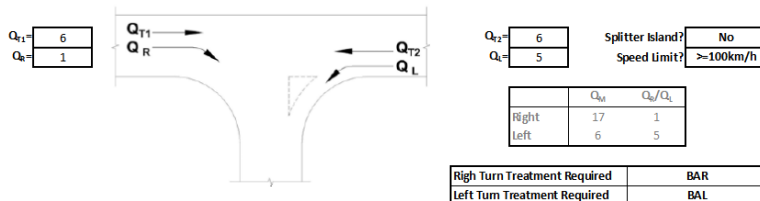
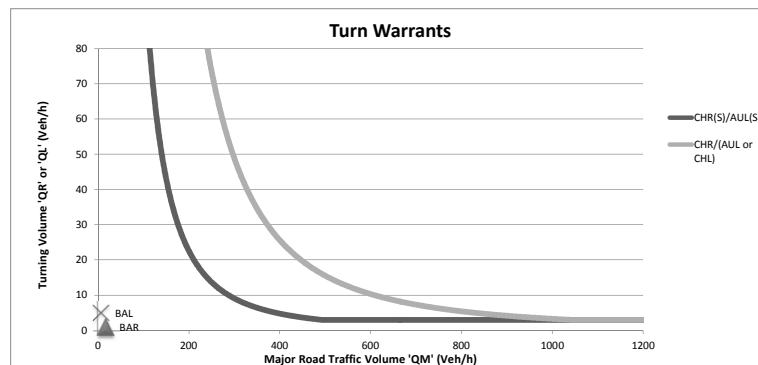
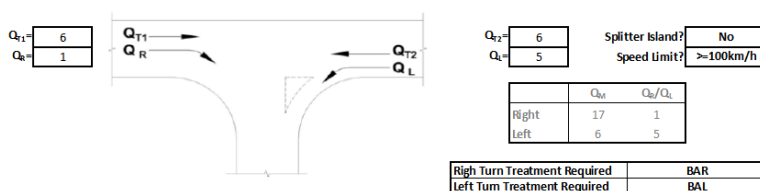
No upgrades are required.

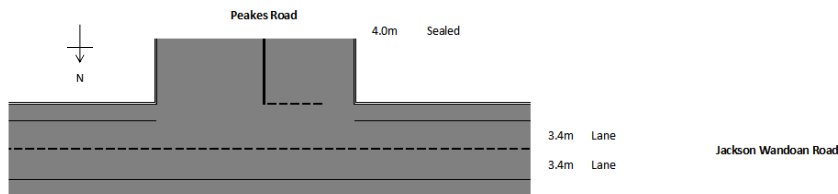
Traffic volume sources

Fitzroy Development Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 85A.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Glenhaughton Road/Fitzroy Development Road
2012 Background + GLNG (AM Peak)Glenhaughton Road/Fitzroy Development Road
2012 Background + GLNG (PM Peak)

Peakes Road/Jackson Wandoan Road Intersection**Formation****Intersection Description**

The Jackson Wandoan Road/Peakes Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Jackson Wandoan Road. There are no turn facilities or auxiliary lanes provided on Jackson Wandoan Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Peakes Road	96	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	501	10%	50	10%	50
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			12		12
$Q_{T2} =$	501	-	62	-	62
$Q_{T2} BG =$	515	10%	52	10%	52
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			12		12
$Q_{T3} =$	515	-	64	-	64
$Q_{T3} BG =$	24	10%	2	10%	2
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	24	-	2	-	2
$Q_{T4} BG =$	24	10%	2	10%	2
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	24	-	2	-	2

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

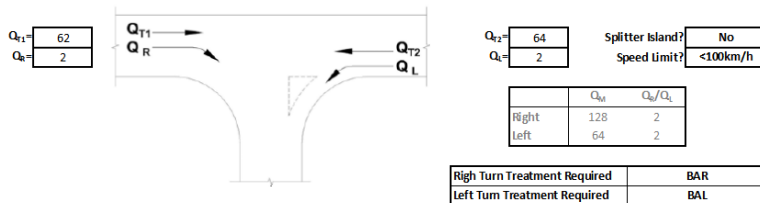
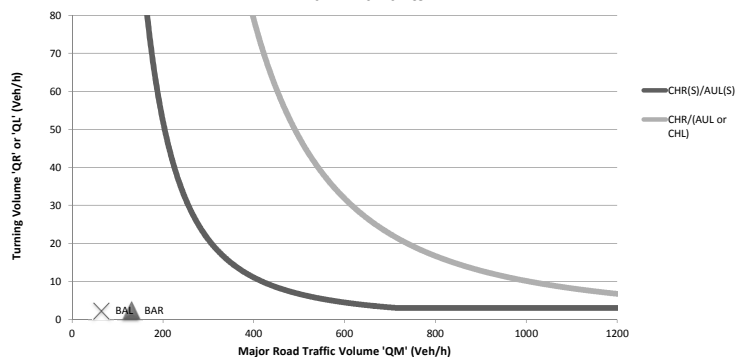
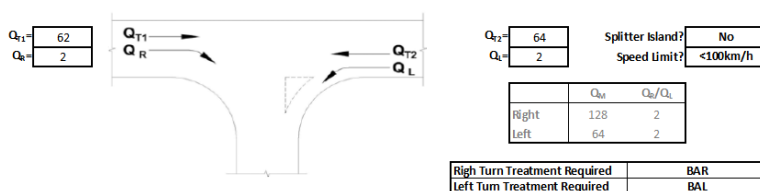
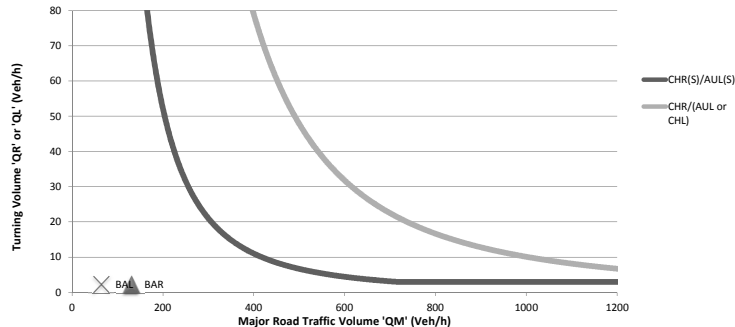
No upgrades are required.

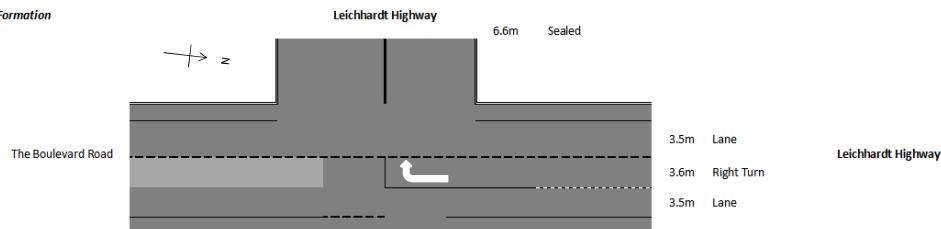
Traffic volume sources

Jackson Wandoan Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 4302.pdf).

Peakes Road traffic volumes come from 2003 Taroom Shire Council counts (Wandoan Traffic Counter Register 160408.xls).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

Peakes Road/Jackson Wandoan Road
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Peakes Road/Jackson Wandoan Road
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Leichhardt Highway/Leichhardt Highway Intersection**Formation****Intersection Description**

The Boulevard Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the West-North movement along the Leichhardt Highway. The road has a right turn lane into the western leg of the Leichhardt Highway.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Leichhardt Highway	733	50%	50%	10%	90%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	690	10%	69	10%	69
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T1} =$	690	-	69	-	69
$Q_{T2} BG =$	342	10%	34	10%	34
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{T2} =$	342	-	34	-	34
$Q_L BG =$	37	10%	4	10%	4
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			0		0
$Q_L =$	37	-	4	-	4
$Q_R BG =$	330	10%	33	10%	33
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			7		7
$Q_R =$	330	-	40	-	40

Assumptions

Assume 10% of traffic on Leichhardt Highway is from Boulevard Road

Turn Warrant Requirement

A BAL and a BAR

Conclusion

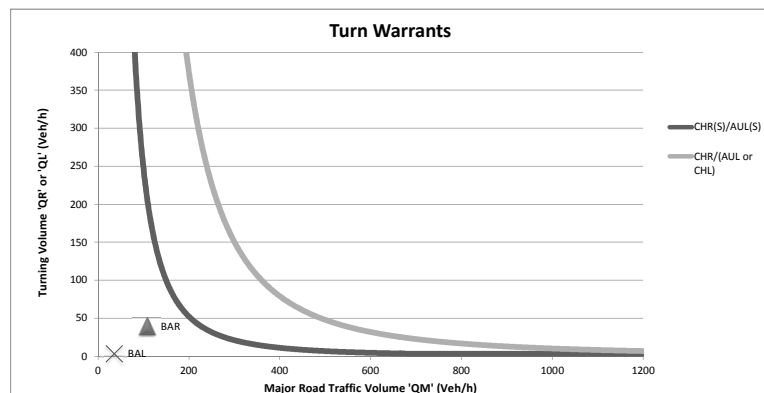
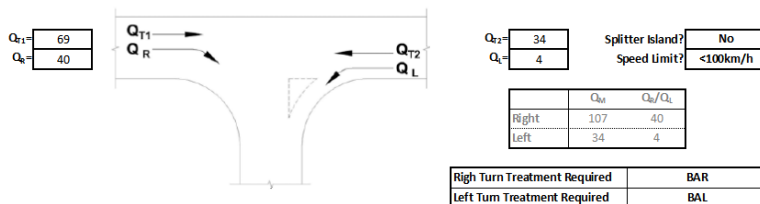
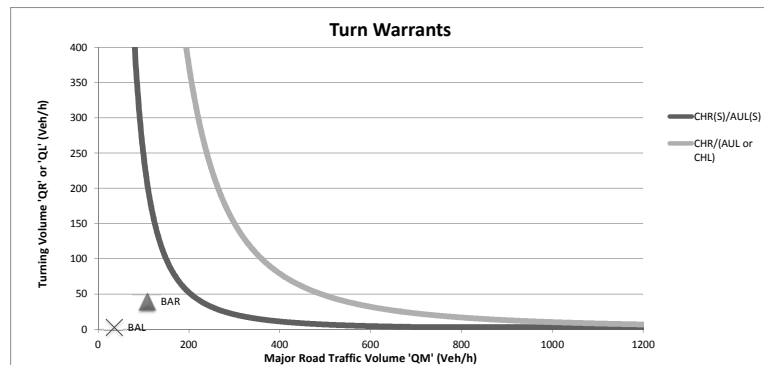
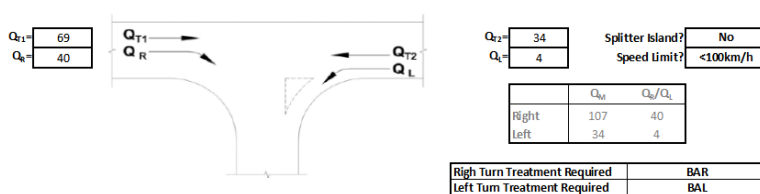
No upgrades required for this intersection.

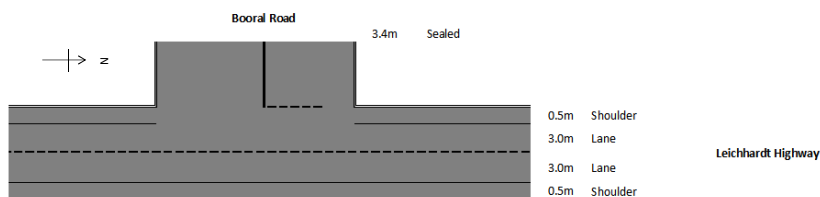
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26A.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx).

Leichhardt Highway/The Boulevard Road
 2012 Background + GLNG (AM Peak)

Leichhardt Highway/The Boulevard Road
 2012 Background + GLNG (PM Peak)


Booral Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Booral Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In

Booral Road	77	50%	50%	50%	50%
-------------	----	-----	-----	-----	-----

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	659	10%	66	10%	66
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			16		16
$Q_{T2} =$	659	-	82	-	82
$Q_{T2} BG =$	678	10%	68	10%	68
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			16		16
$Q_{L1} =$	678	-	84	-	84
$Q_{L1} BG =$	19	10%	2	10%	2
$Q_{L1} Cumulative =$			0		0
$Q_{L1} GLNG GFDP =$			0		0
$Q_{L2} =$	19	-	2	-	2
$Q_{L2} BG =$	19	10%	2	10%	2
$Q_{L2} Cumulative =$			0		0
$Q_{L2} GLNG GFDP =$			1		1
$Q_{L3} =$	19	-	3	-	3

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

No upgrades are required.

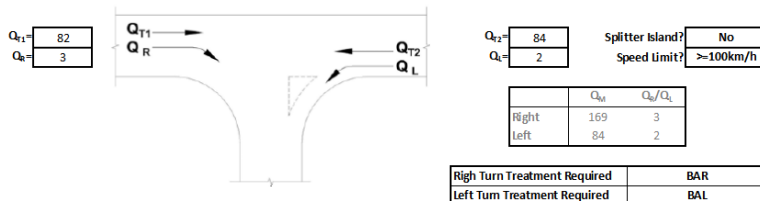
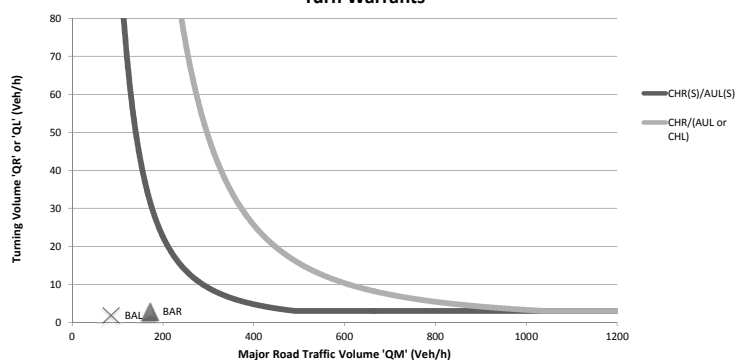
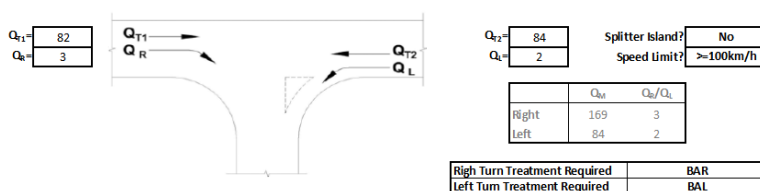
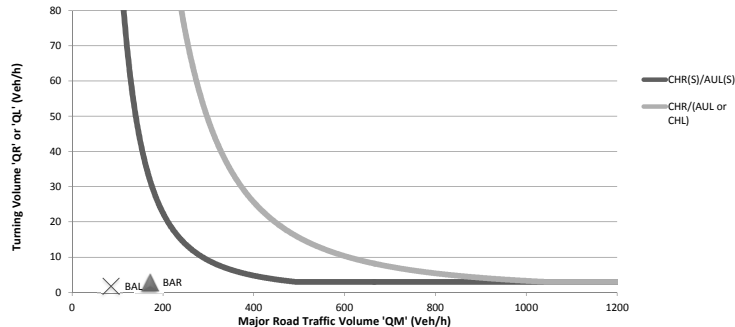
Traffic volume sources

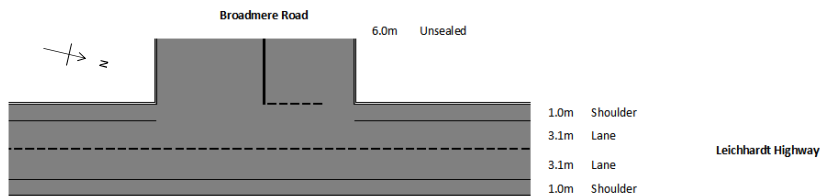
Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

Booral Road traffic volume comes from 2002 Taroom Shire Council's AADT (Wandoan Traffic Counter Register 160408.xls).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Booral Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Booral Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Broadmere Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Broadmere Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Broadmere Road	100	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	565	10%	56	10%	56
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			8		8
Q _{T2} BG=	565	-	65	-	65
Q _{T2} BG=	587	10%	59	10%	59
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			8		8
Q _{T3} BG=	587	-	67	-	67
Q _{T3} BG=	25	10%	3	10%	3
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			2		2
Q _{T4} BG=	25	-	5	-	5
Q _{T4} BG=	25	10%	3	10%	3
Q _{T4} Cumulative=			0		0
Q _{T4} GLNG GFDP=			2		2
Q _{T5} BG=	25	-	5	-	5

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

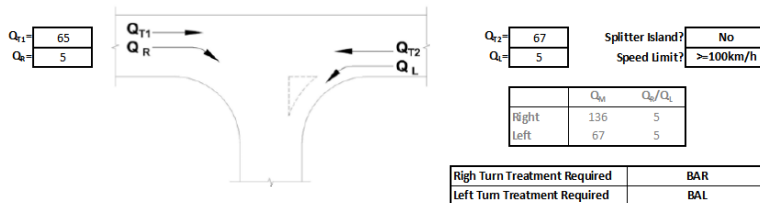
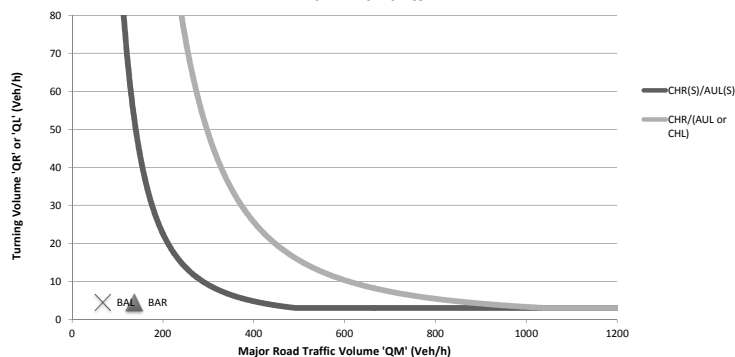
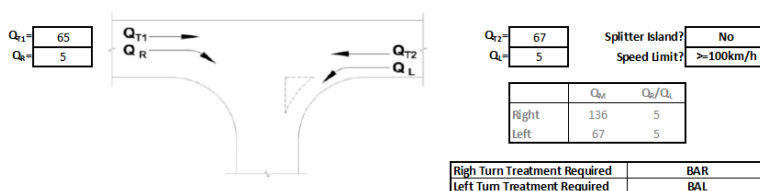
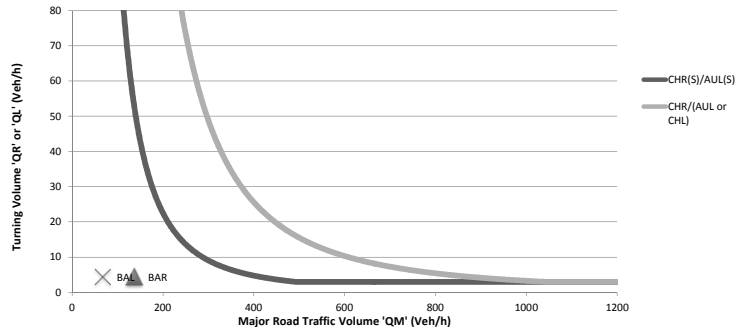
No upgrades are required.

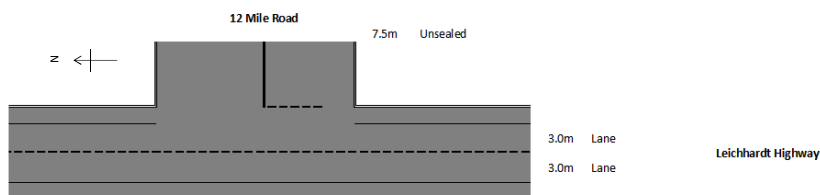
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26A.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Broadmere Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Broadmere Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

12 Mile Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Bungaban 12 Mile Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
12 Mile Road	120	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1080	10%	108	10%	108
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			13		13
$Q_{T2} =$	1080	-	121	-	121
$Q_{T2} BG =$	1008	10%	101	10%	101
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			13		13
$Q_{T3} =$	1008	-	114	-	114
$Q_{T3} BG =$	30	10%	3	10%	3
$Q_{T3} \text{ Cumulative} =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	30	-	3	-	3
$Q_{T4} BG =$	30	10%	3	10%	3
$Q_{T4} \text{ Cumulative} =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	30	-	3	-	3

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

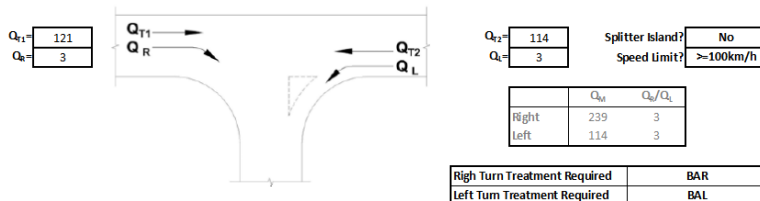
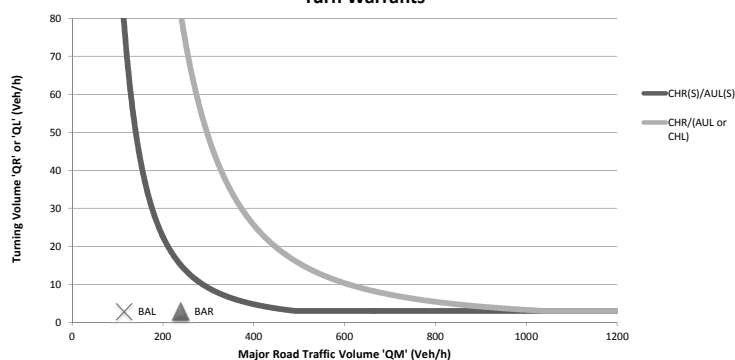
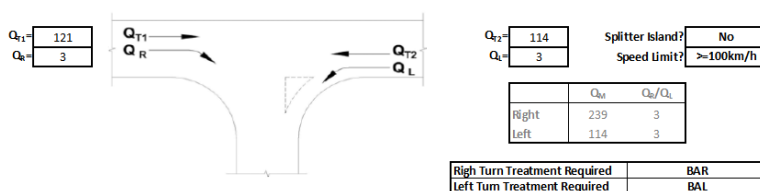
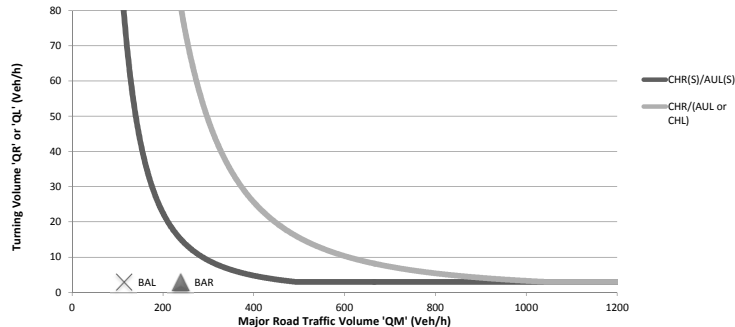
No upgrades are required.

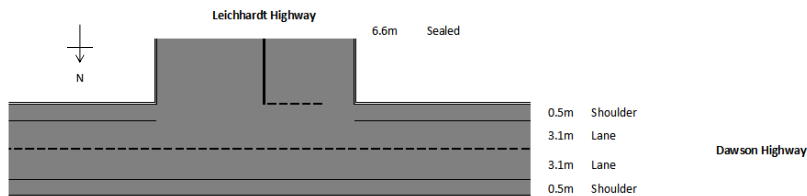
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

12 Mile Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
12 Mile Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Leichhardt Highway/Dawson Highway Intersection**Formation****Intersection Description**

The Leichhardt Highway/Dawson Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Dawson Highway. There are AUL and AUR provided for traffic turning into Leichhardt Highway.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Leichhardt Highway	1275	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1237	10%	124	10%	124
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	1237	-	124	-	124
$Q_{T2} BG =$	1251	10%	125	10%	125
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{L1} =$	1251	-	126	-	126
$Q_{L1} BG =$	319	10%	32	10%	32
$Q_{L1} Cumulative =$			0		0
$Q_{L1} GLNG GFDP =$			0		0
$Q_{L2} =$	319	-	32	-	32
$Q_{L2} BG =$	319	10%	32	10%	32
$Q_{L2} Cumulative =$			0		0
$Q_{L2} GLNG GFDP =$			7		7
$Q_{R1} =$	319	-	39	-	39

Assumptions**Turn Warrant Requirement**

A BAL and a CH(S).

Conclusion

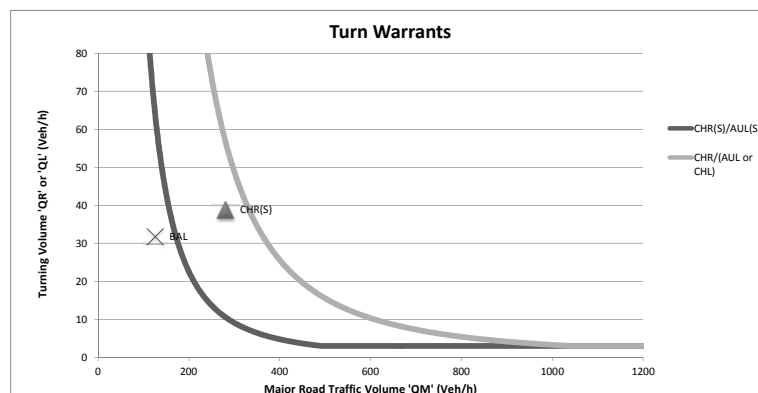
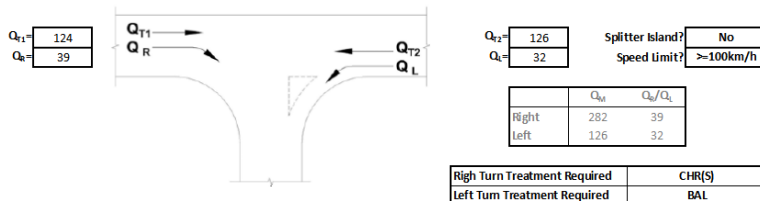
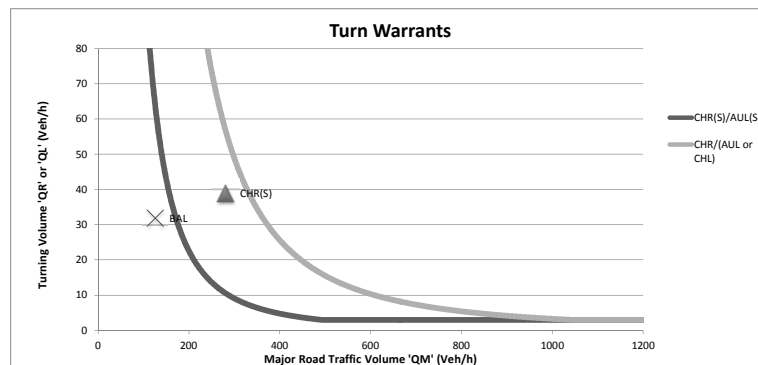
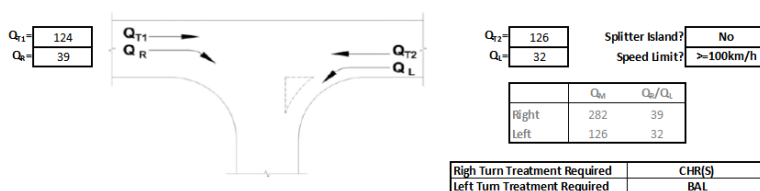
Upgrade to CHR(S).

Traffic volume sources

Dawson Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 46C.pdf).

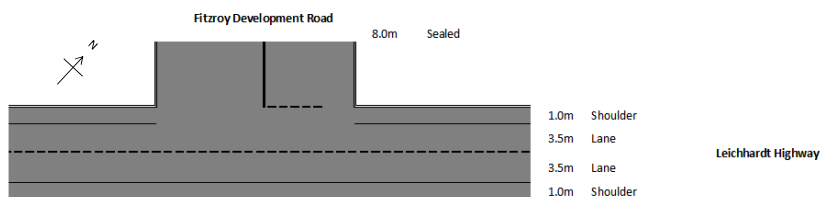
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Leichhardt Highway/Dawson Highway
 2012 Background + GLNG (AM Peak)

Leichhardt Highway/Dawson Highway
 2012 Background + GLNG (PM Peak)


Fitzroy Development Road/Leichhardt Highway Intersection

Formation



Intersection Description

The Leichhardt Highway /Fitzroy Development Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes provided on Leichhardt Highway.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Fitzroy Development Road	118	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	565	10%	56	10%	56
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			7		7
Q _{T1} =	565	-	64	-	64
Q _{T2} BG=	587	10%	59	10%	59
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			7		7
Q _{T2} =	587	-	66	-	66
Q _L BG=	30	10%	3	10%	3
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			4		4
Q _L =	30	-	7	-	7
Q _R BG=	30	10%	3	10%	3
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			0		0
Q _R =	30	-	3	-	3

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

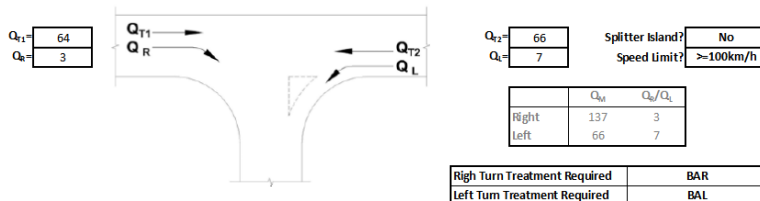
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26A.pdf).

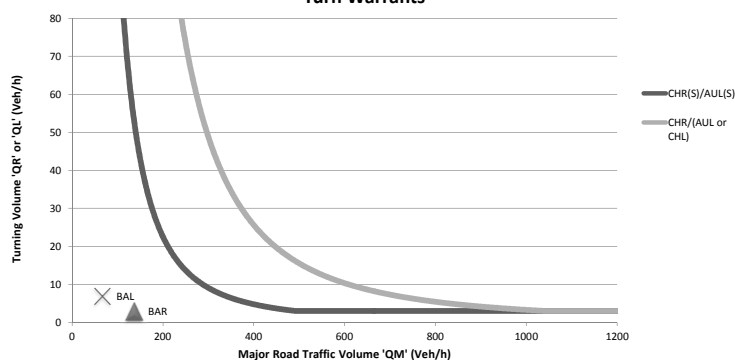
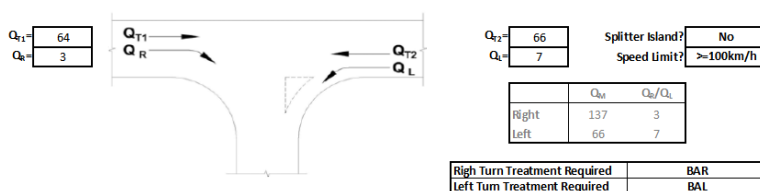
Fitzroy Development Road traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 85A.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

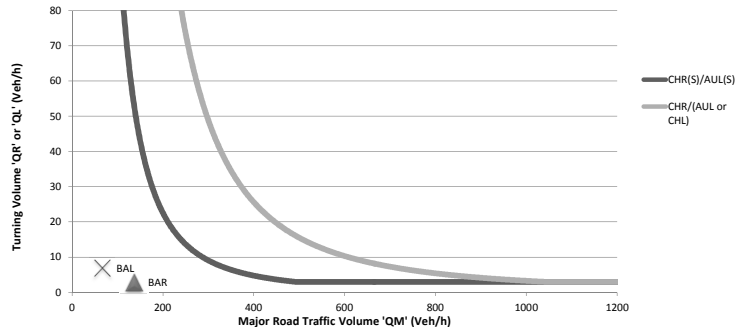
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

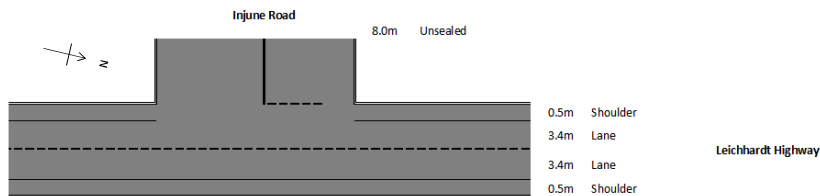
Fitzroy Development Road/Leichhardt Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Fitzroy Development Road/Leichhardt Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Injune Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Injune Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Injune Road	120	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	565	10%	56	10%	56
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			4		4
$Q_{T2} =$	565	-	61	-	61
$Q_{T2} BG =$	587	10%	59	10%	59
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			6		6
$Q_{T3} =$	587	-	65	-	65
$Q_{T3} BG =$	30	10%	3	10%	3
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	30	-	3	-	3
$Q_{T4} BG =$	30	10%	3	10%	3
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			10		10
$Q_{T5} =$	30	-	13	-	13

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

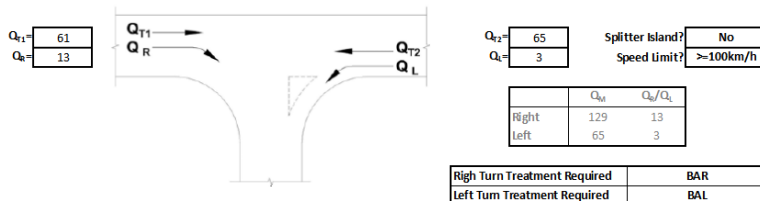
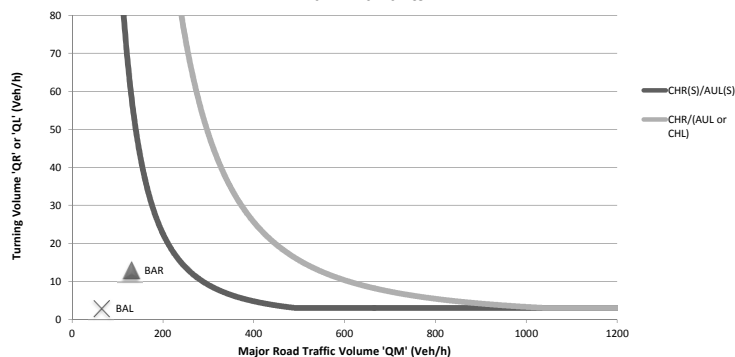
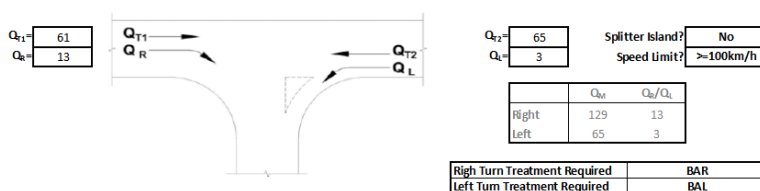
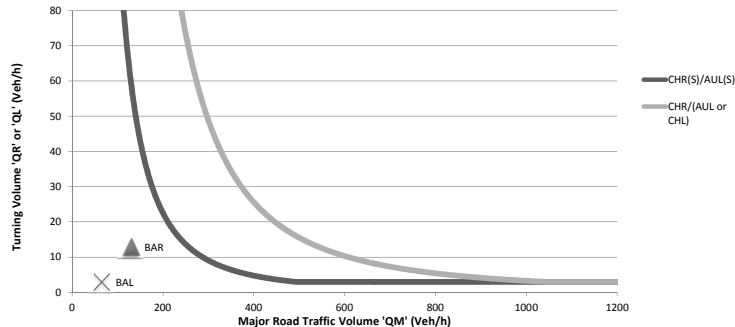
No upgrades are required.

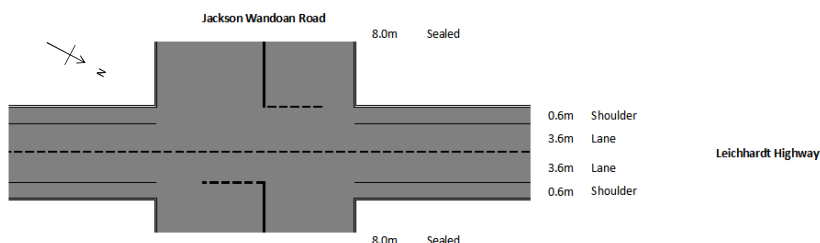
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26A.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Injune Road/Leichhardt Highway
2012 Background + GLNG (AM Peak)**Turn Warrants****Injune Road/Leichhardt Highway**
2012 Background + GLNG (PM Peak)**Turn Warrants**

Jackson Wandoan Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Leichhardt /Jackson Wandoan Road intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes provided on Leichhardt Highway.

Two-way Daily Volume (vpd)	Split Assumption			
	In	Out	Left In	Right In
Jackson Wandoan Road	1016	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	659	10%	66	10%	66
$Q_{T1} Cumulative =$			1		1
$Q_{T1} GLNG GFDP =$			8		8
$Q_{T2} =$	659	-	75	-	75
$Q_{T2} BG =$	678	10%	68	10%	68
$Q_{T2} Cumulative =$			8		8
$Q_{T2} GLNG GFDP =$			8		8
$Q_{T3} =$	678	-	83	-	83
$Q_{T3} BG =$	254	10%	25	10%	25
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	254	-	25	-	25
$Q_{T4} BG =$	254	10%	25	10%	25
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			11		11
$Q_{T5} =$	254	-	36	-	36

Assumptions

All project traffic will use Leichhardt Highway and Jackson Wandoan Road only. No project traffic will travel to Wandoan via Zupps Road.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

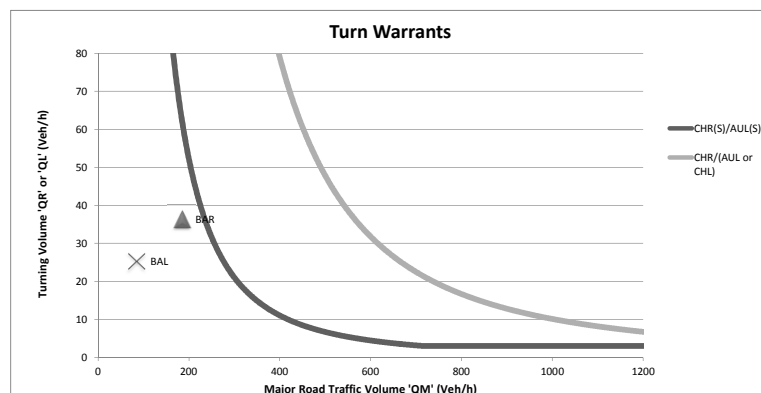
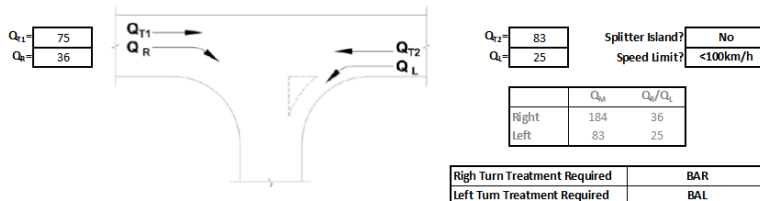
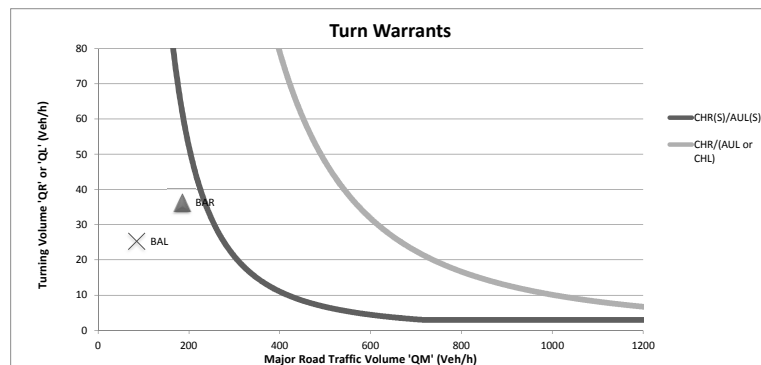
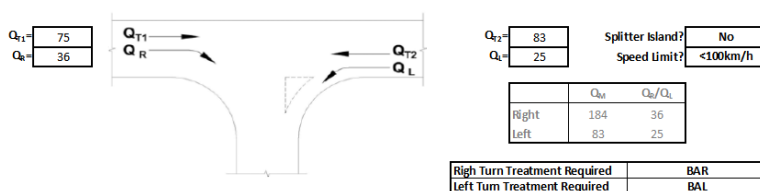
Traffic volume sources

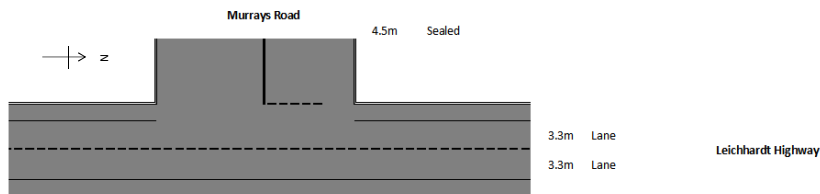
Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

Jackson Wandoan Road traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 4302.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Jackson Wandoan Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)

Jackson Wandoan Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)


Murrays Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Murrays Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Murrays Road	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	1080	10%	108	10%	108
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			13		13
Q _{T2} BG=	1080	-	121	-	121
Q _{T2} BG=	1008	10%	101	10%	101
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			13		13
Q _{T3} BG=	1008	-	114	-	114
Q _{T3} BG=	15	10%	2	10%	2
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			1		1
Q _{T4} BG=	15	-	3	-	3
Q _{T4} BG=	15	10%	2	10%	2
Q _{T4} Cumulative=			0		0
Q _{T4} GLNG GFDP=			0		0
Q _{T5} BG=	15	-	2	-	2

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

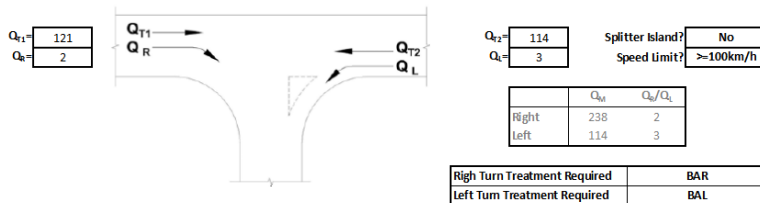
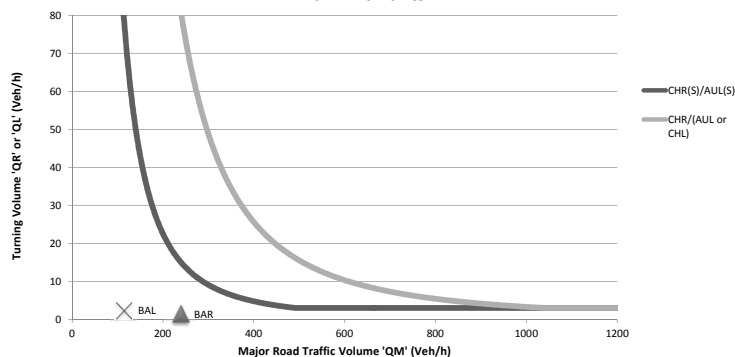
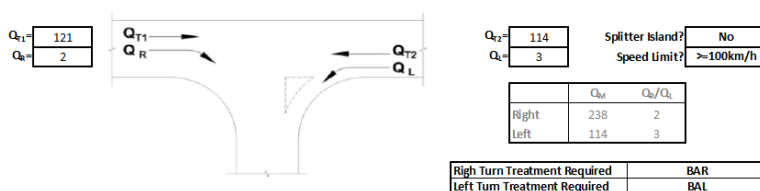
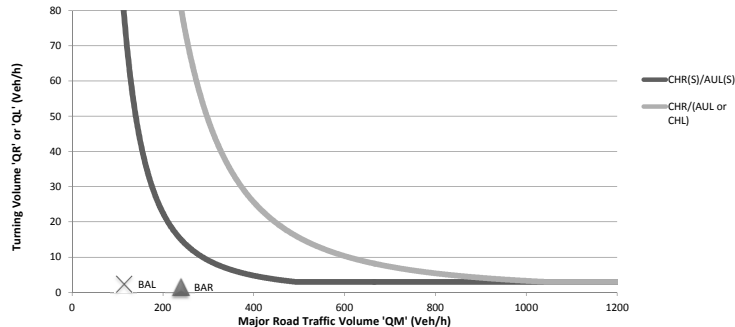
No upgrades are required.

Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

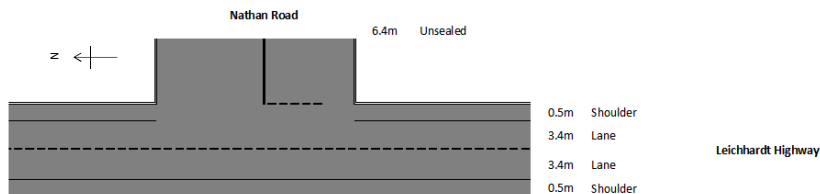
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Murrays Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Murrays Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Nathan Road/Leichhardt Highway Intersection

Formation



Intersection Description

The Nathan Road/Leichhardt Highway intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Nathan Road	630	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	678	10%	68	10%	68
$Q_{T1} Cumulative =$			1		1
$Q_{T1} GLNG GFDP =$			16		16
$Q_{T2} =$	678	-	85	-	85
$Q_{T2} BG =$	659	10%	66	10%	66
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			16		16
$Q_{T3} =$	659	-	82	-	82
$Q_{T3} BG =$	158	10%	16	10%	16
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	158	-	16	-	16
$Q_{T4} BG =$	158	10%	16	10%	16
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			3		3
$Q_{T5} =$	158	-	19	-	19

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

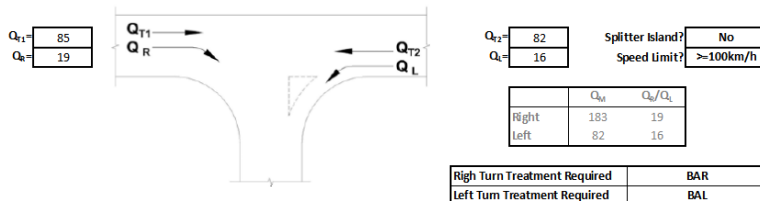
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

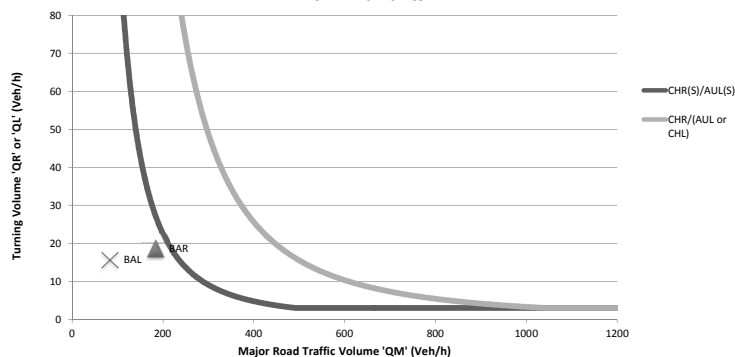
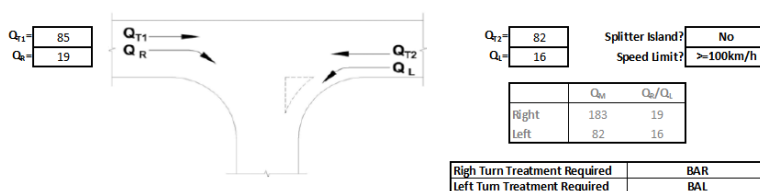
Nathan Road traffic volume comes from 2000 Taroom Shire Council's AADT (Wandoan Traffic Counter Register 160408.xls).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

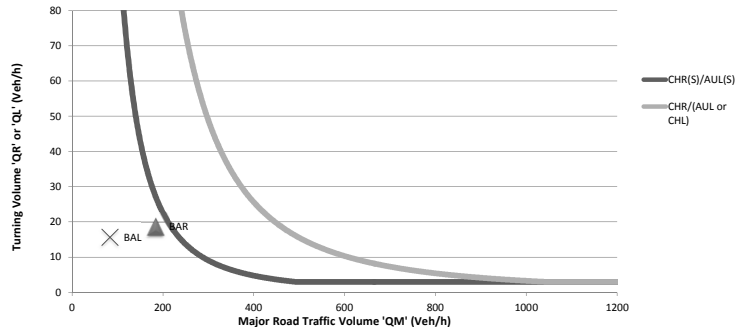
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

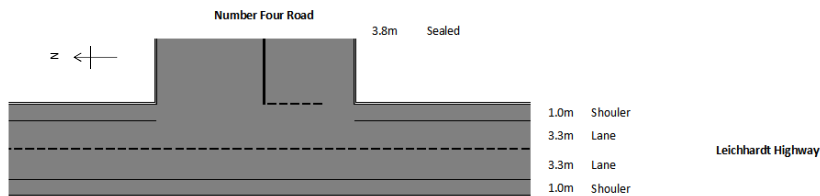
Nathan Road/Leichhardt Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Nathan Road/Leichhardt Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Number Four Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Number Four Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Number Four Road	115	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1080	10%	108	10%	108
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	1080	-	108	-	108
$Q_{T2} BG =$	1008	10%	101	10%	101
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{T3} =$	1008	-	101	-	101
$Q_{T3} BG =$	29	10%	3	10%	3
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			1		1
$Q_{T4} =$	29	-	4	-	4
$Q_{T4} BG =$	29	10%	3	10%	3
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			14		14
$Q_{T5} =$	29	-	17	-	17

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

No upgrades are required.

Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

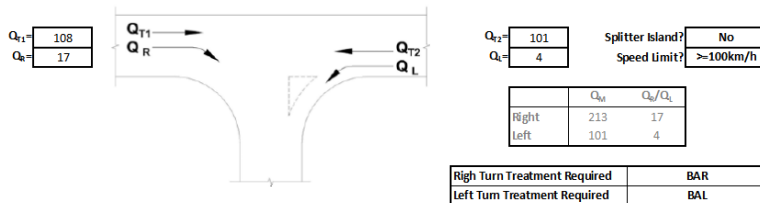
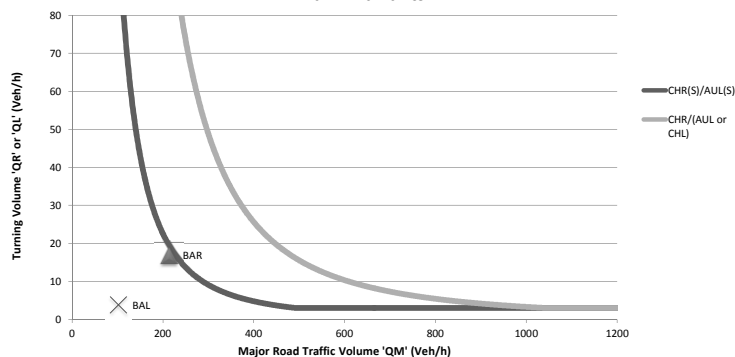
Number Four Road traffic volume comes from 2002 Taroom Shire Council's AADT (Wandoan Traffic Counter Register 160408.xls)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

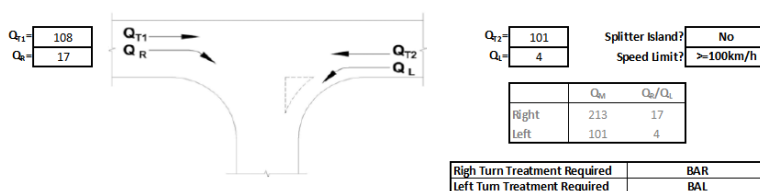
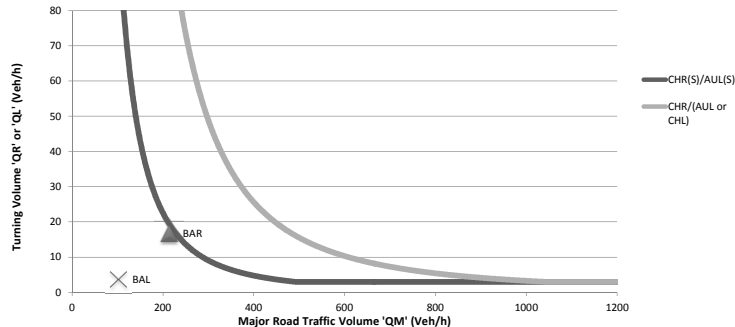
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

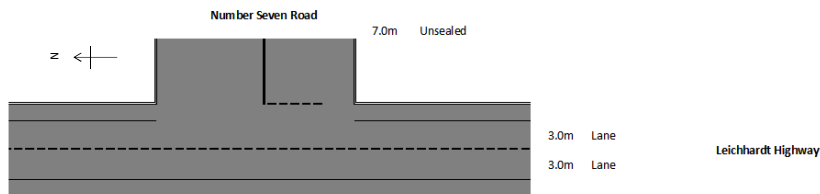
Number Four Road/Leichhardt Highway

2012 Background + GLNG (AM Peak)

**Turn Warrants****Number Four Road/Leichhardt Highway**

2012 Background + GLNG (PM Peak)

**Turn Warrants**

Number Seven Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Number Seven Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Number Seven Road	18	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1080	10%	108	10%	108
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			13		13
$Q_{T2} =$	1080	-	121	-	121
$Q_{T2} BG =$	1008	10%	101	10%	101
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			13		13
$Q_{T3} =$	1008	-	114	-	114
$Q_{T3} BG =$	4	10%	0	10%	0
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	4	-	0	-	0
$Q_{T4} BG =$	4	10%	0	10%	0
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	4	-	0	-	0

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

No upgrades are required.

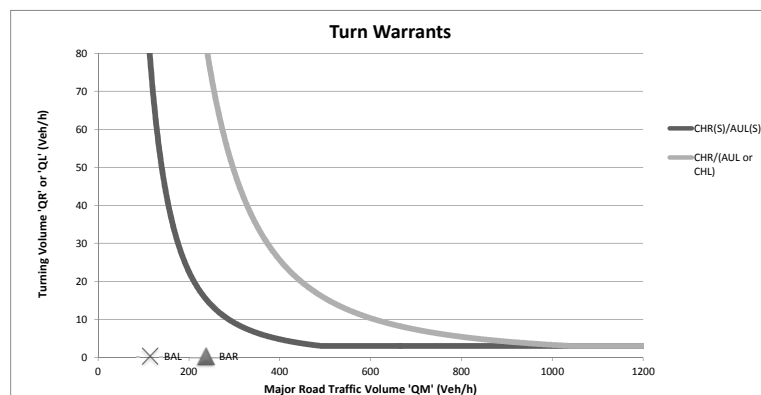
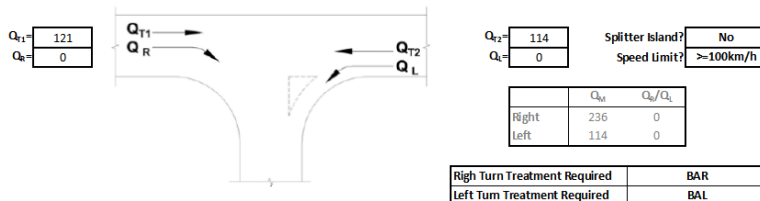
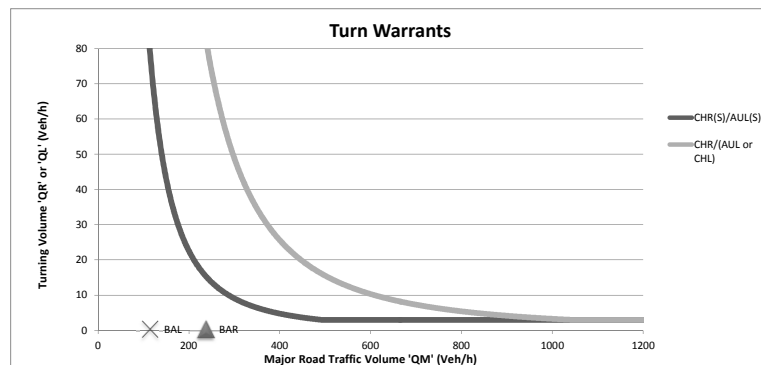
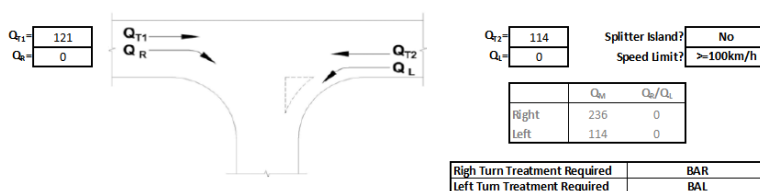
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

Number Seven Road traffic volume comes from 2008 Taroom Shire Council's AADT (Wandoan Traffic Counter Register 160408.xls)

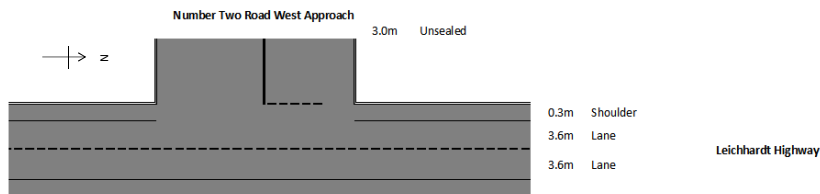
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Number Seven Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)

Number Seven Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)


Number Two Road West Approach/Leichhardt Highway Intersection

Formation



Intersection Description

The Number Two Road/Leichhardt Highway intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Number Two Road West	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	659	10%	66	10%	66
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			14		14
Q _{T2} BG=	659	-	80	-	80
Q _{T2} BG=	678	10%	68	10%	68
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			14		14
Q _{T3} BG=	678	-	82	-	82
Q _{T3} BG=	10	10%	1	10%	1
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			1		1
Q _{T4} BG=	10	10%	1	10%	1
Q _{T4} Cumulative=			0		0
Q _{T4} GLNG GFDP=			1		1

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

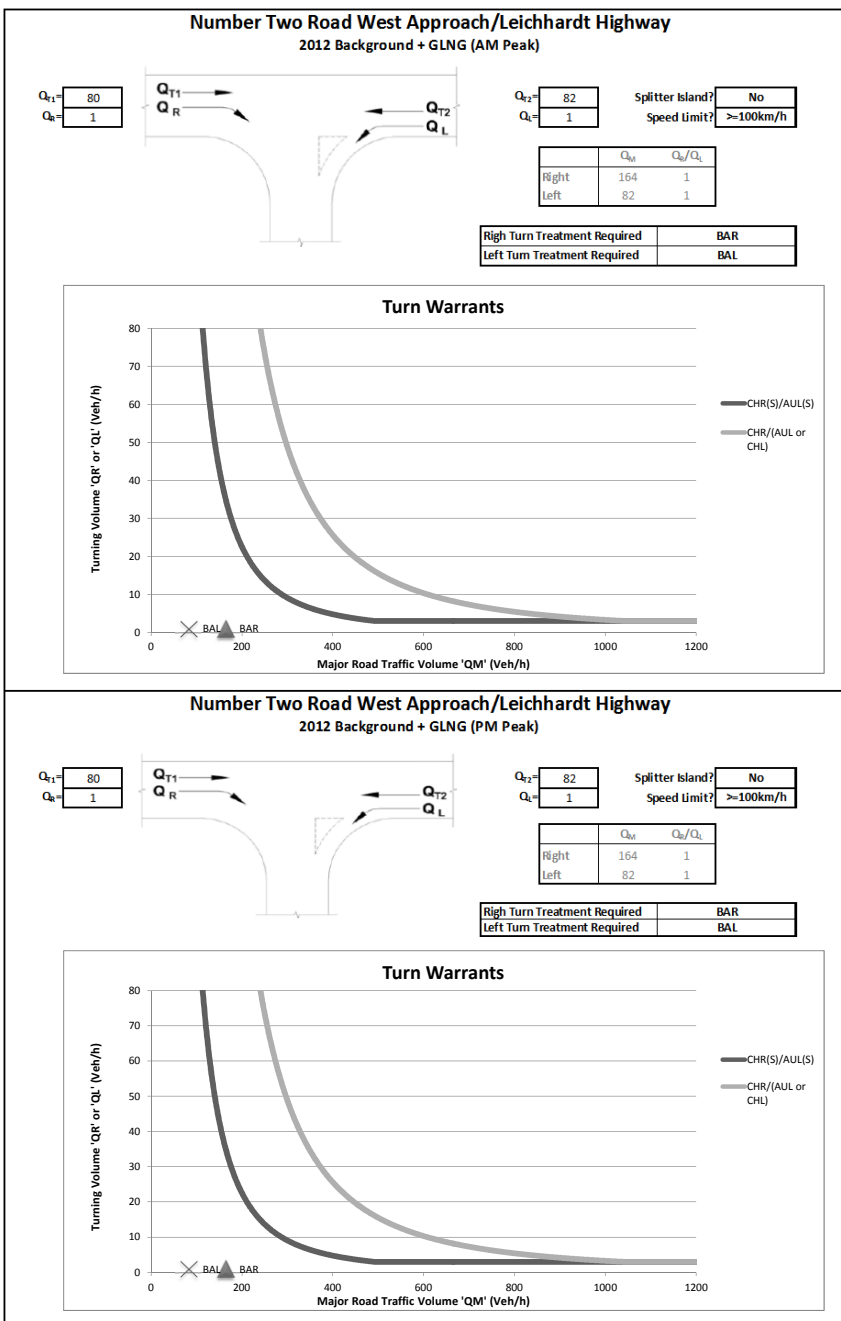
No upgrades are required.

Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

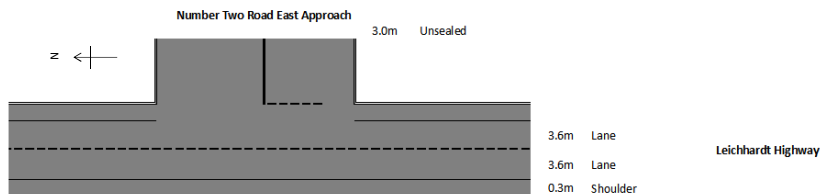
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)



Number Two Road East Approach/Leichhardt Highway Intersection

Formation



Intersection Description

The Number Two Road/Leichhardt Highway intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Number Two Road East A	100	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	678	10%	68	10%	68
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			14		14
$Q_{T2} =$	678	-	82	-	82
$Q_{T2} BG =$	659	10%	66	10%	66
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			14		14
$Q_{L1} =$	659	-	80	-	80
$Q_{L1} BG =$	25	10%	3	10%	3
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			1		1
$Q_{L2} =$	25	-	4	-	4
$Q_{L2} BG =$	25	10%	3	10%	3
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			2		2
$Q_{R1} =$	25	-	5	-	5

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

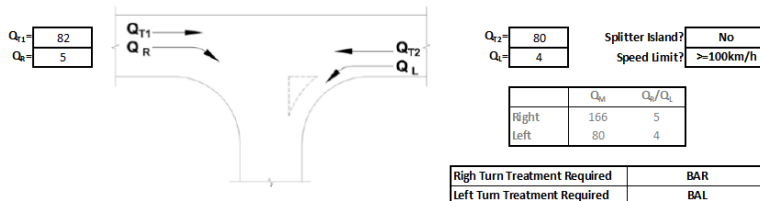
No upgrades are required.

Traffic volume sources

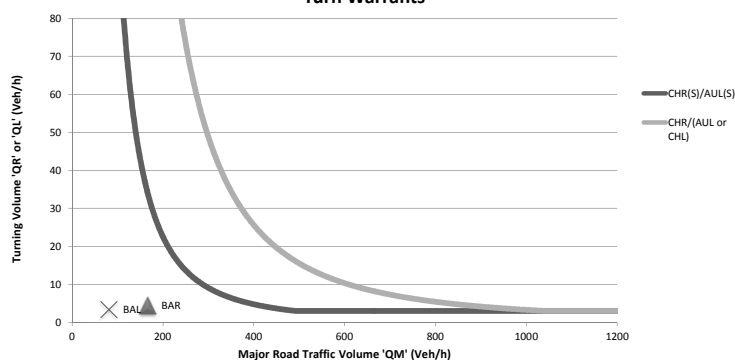
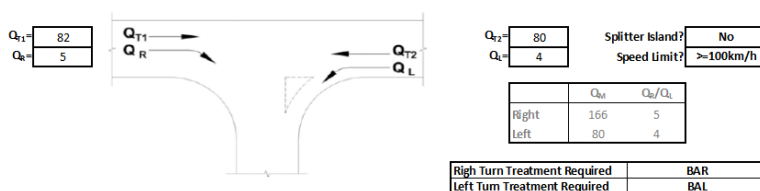
Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

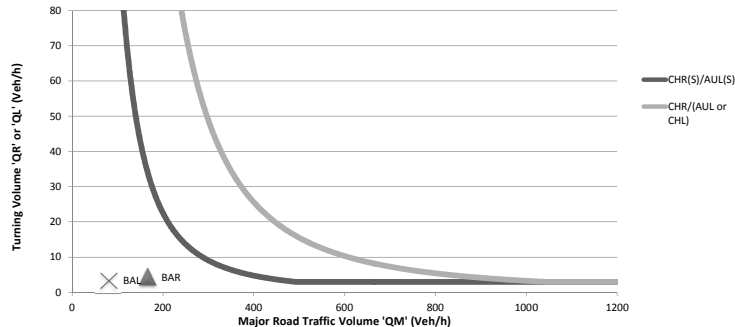
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

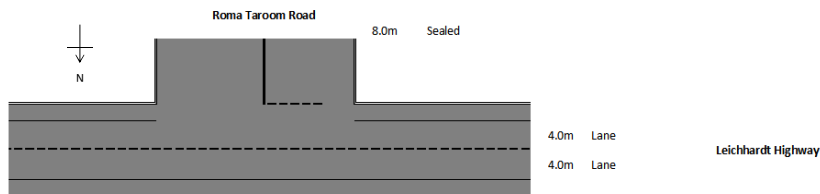
Number Two Road East Approach/Leichhardt Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Number Two Road East Approach/Leichhardt Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Roma Taroom Road/Leichhardt Highway Intersection**Formation****Intersection Description**

The Leichhardt Highway /Roma Taroom Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes provided on Leichhardt Highway.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			66		52
Q_{T1} Cumulative=			0		0
Q_{T1} GLNG GFDP=			1		1
Q_{T1} =	0	-	68	-	53
Q_{T2} BG=			45		36
Q_{T2} Cumulative=			0		0
Q_{T2} GLNG GFDP=			1		1
Q_{T2} =	0	-	46	-	37
Q_L BG=			22		29
Q_L Cumulative=			0		0
Q_L GLNG GFDP=			2		2
Q_L =	0	-	24	-	31
Q_R BG=			4		2
Q_R Cumulative=			0		0
Q_R GLNG GFDP=			13		13
Q_R =	0	-	17	-	15

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

No upgrades are required.

Traffic volume sources

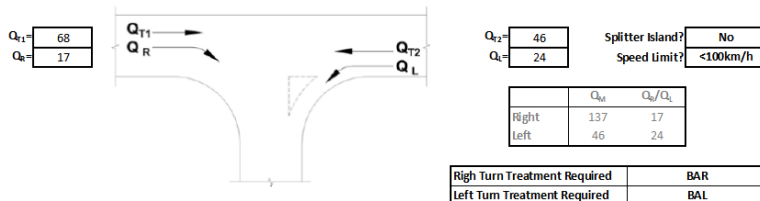
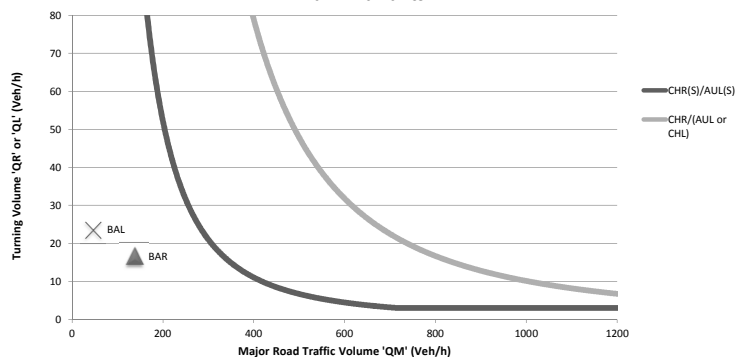
Background Traffic volumes come from 2010 DTMR intersection counts (76_10.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

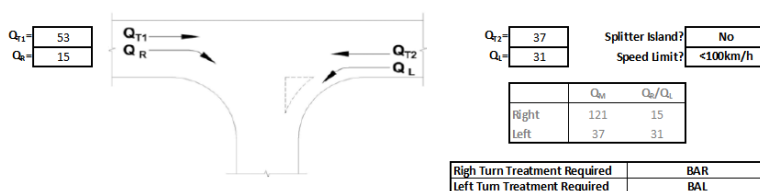
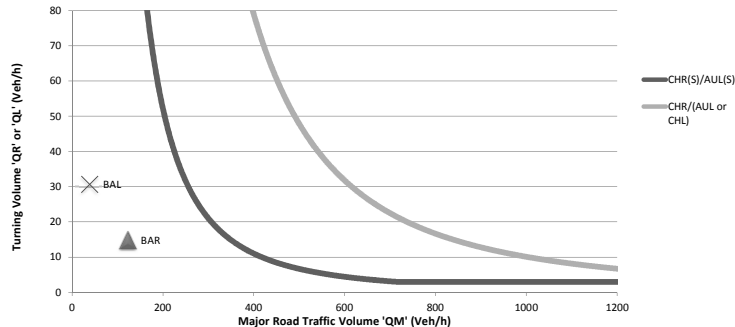
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Roma Taroom Road/Leichhardt Highway

2012 Background + GLNG (AM Peak)

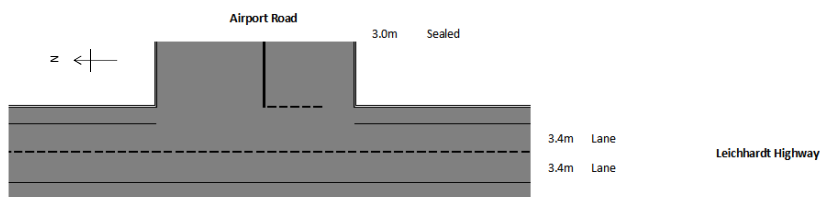
**Turn Warrants****Roma Taroom Road/Leichhardt Highway**

2012 Background + GLNG (PM Peak)

**Turn Warrants**

Airport Road/Leichhardt Highway Intersection

Formation



Intersection Description

The Airport Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Airport Road	20	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	1080	10%	108	10%	108
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			13		13
Q _{T2} BG=	1080	-	121	-	121
Q _{T2} BG=	1008	10%	101	10%	101
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			13		13
Q _{T3} BG=	1008	-	114	-	114
Q _{T3} BG=	5	10%	1	10%	1
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			0		0
Q _L BG=	5	-	1	-	1
Q _L BG=	5	10%	1	10%	1
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _R BG=	5	-	1	-	1
Q _R BG=	5	10%	1	10%	1
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			0		0

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

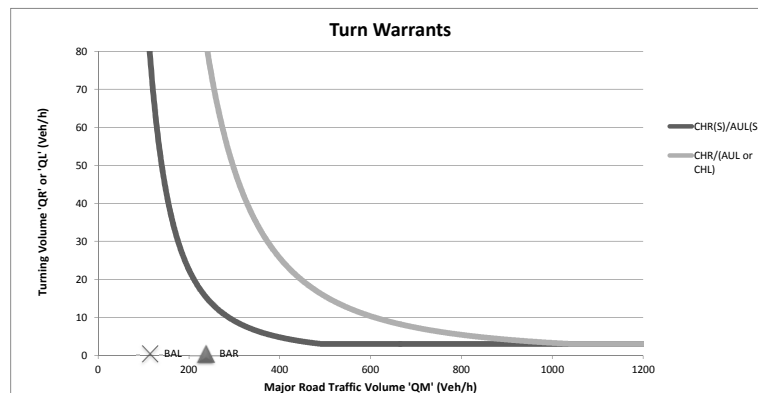
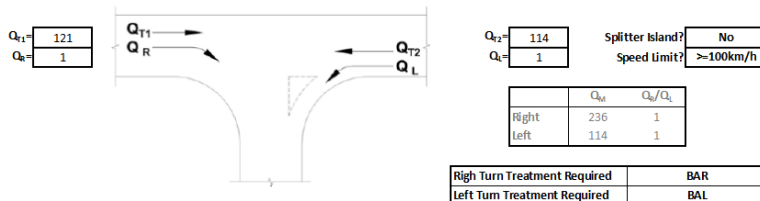
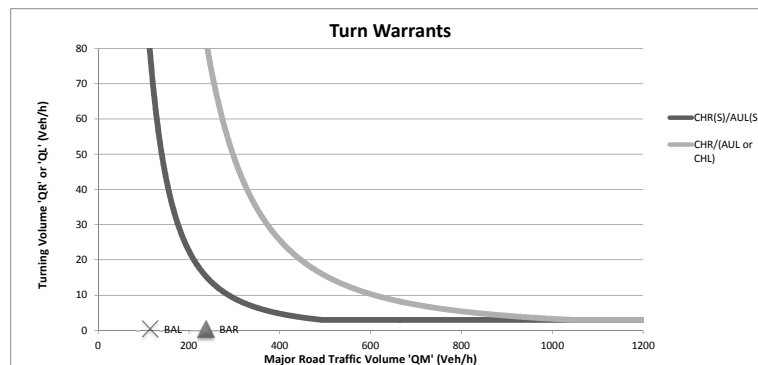
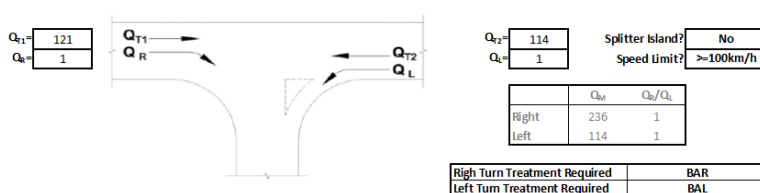
No upgrades are required.

Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

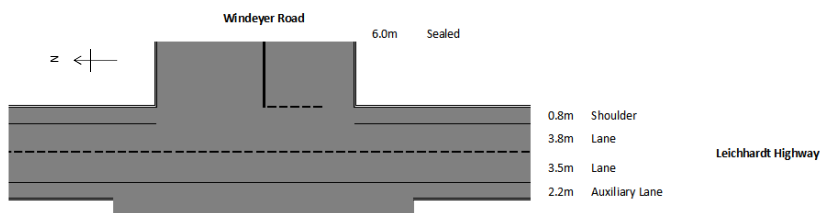
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Airport Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)

Airport Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)


Windeyer Road/Leichhardt Highway Intersection

Formation



Intersection Description

The Carnarvon Highway/Windeyer Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There is an AUR provided on Leichhardt Highway for traffic turning into Windeyer Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Windeyer Road	348	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	678	10%	68	10%	68
$Q_{T1} Cumulative =$			8		8
$Q_{T1} GLNG GFDP =$			8		8
$Q_{T2} =$	678	-	83	-	83
$Q_{T2} BG =$	659	10%	66	10%	66
$Q_{T2} Cumulative =$			8		8
$Q_{T2} GLNG GFDP =$			8		8
$Q_{T3} =$	659	-	81	-	81
$Q_{T3} BG =$	87	10%	9	10%	9
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	87	-	9	-	9
$Q_{T4} BG =$	87	10%	9	10%	9
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	87	-	9	-	9

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

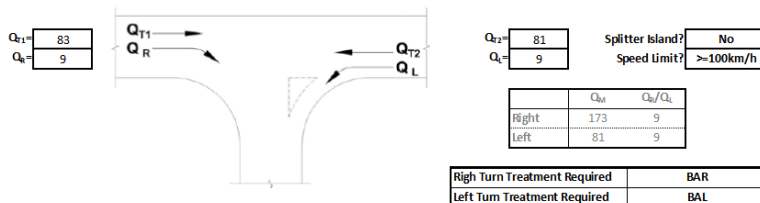
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

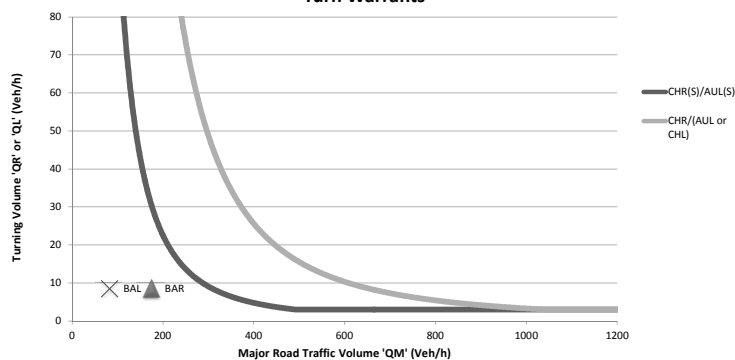
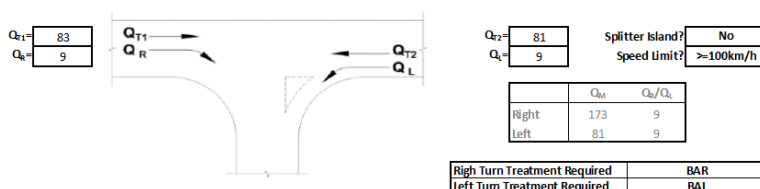
Windeyer Road traffic volumes come from Taroom Shire Council AADT (Wandoan Traffic Counter Register 160408.xls).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

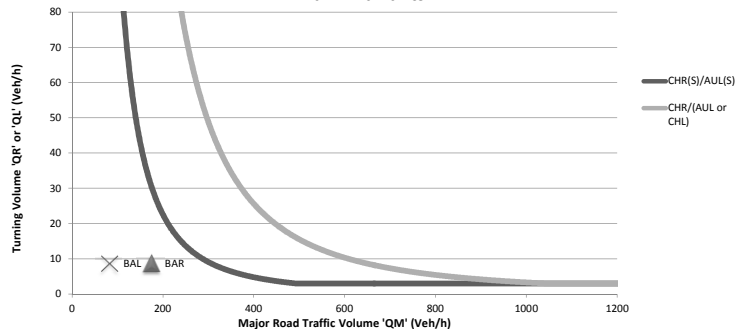
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx).

Windeyer Road/Leichhardt Highway
 2012 Background + GLNG (AM Peak)


Turn Warrants

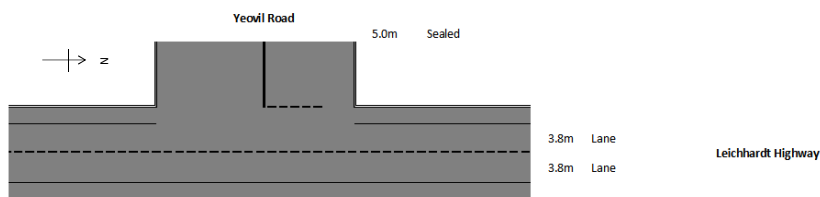

Windeyer Road/Leichhardt Highway
 2012 Background + GLNG (PM Peak)


Turn Warrants



Yeovil Road/Leichhardt Highway Intersection

Formation



Intersection Description

The Yeovil Road/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Leichhardt Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Yeovil Road	110	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1080	10%	108	10%	108
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			15		15
$Q_{T2} =$	1080	-	123	-	123
$Q_{T2} BG =$	1008	10%	101	10%	101
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			15		15
$Q_{T3} =$	1008	-	116	-	116
$Q_{T3} BG =$	28	10%	3	10%	3
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			1		1
$Q_{T4} =$	28	-	4	-	4
$Q_{T4} BG =$	28	10%	3	10%	3
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	28	-	3	-	3

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

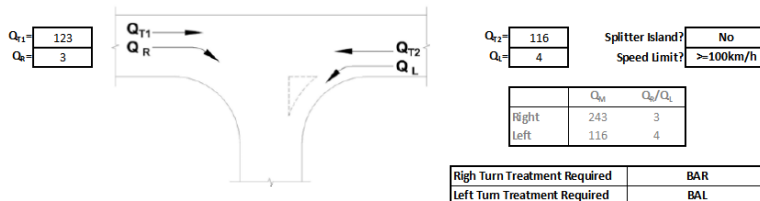
Traffic volume sources

Leichhardt Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 26B.pdf).

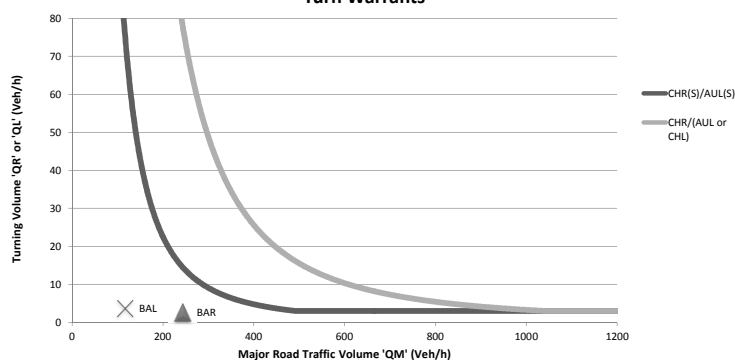
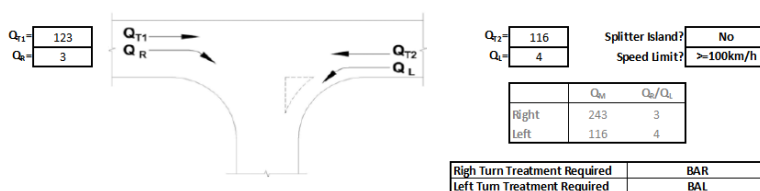
Yeovil Road traffic volume comes from 2000 Taroom Shire Council's AADT (Wandoan Traffic Counter Register 160408.xls)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

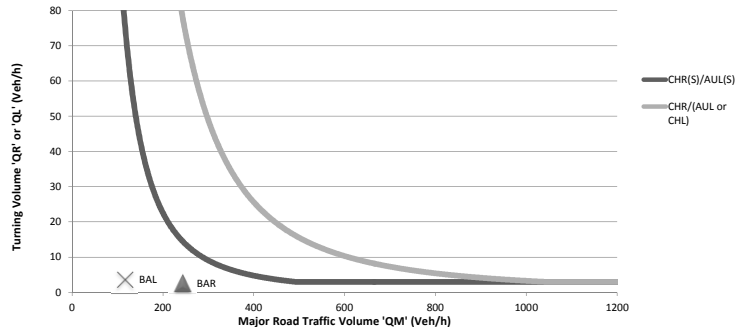
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

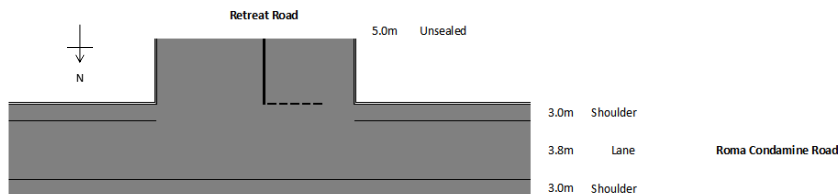
Yeovil Road/Leichhardt Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Yeovil Road/Leichhardt Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Retreat Road/Roma Condamine Road Intersection**Formation****Intersection Description**

The Retreat Road/Roma Condamine Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Roma Condamine Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Retreat Road	40	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	125	10%	12	10%	12
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			2		2
$Q_{T2} =$	125	-	14	-	14
$Q_{T2} BG =$	120	10%	12	10%	12
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			2		2
$Q_{T3} =$	120	-	14	-	14
$Q_L BG =$	10	10%	1	10%	1
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			0		0
$Q_R =$	10	-	1	-	1
$Q_R BG =$	10	10%	1	10%	1
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			2		2
$Q_{L+R} =$	10	-	3	-	3

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

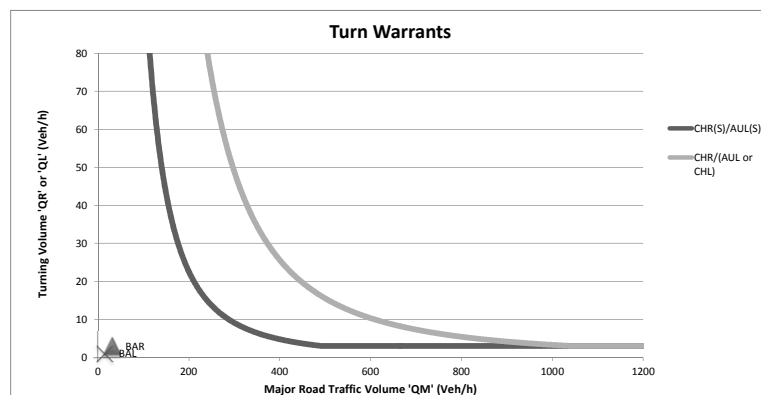
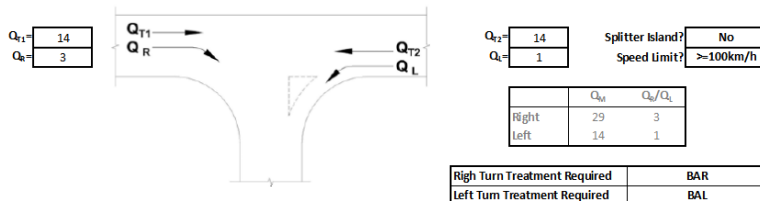
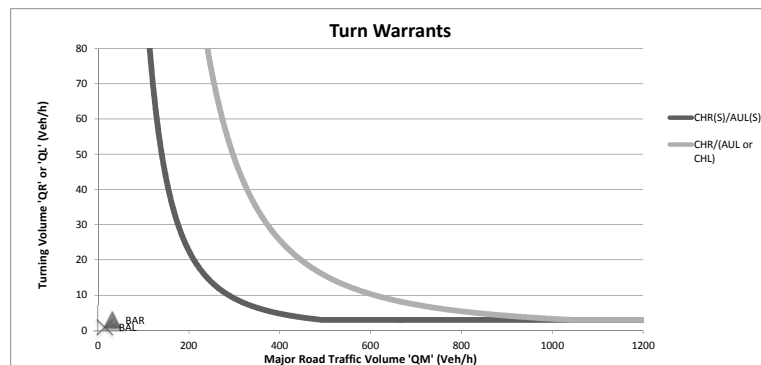
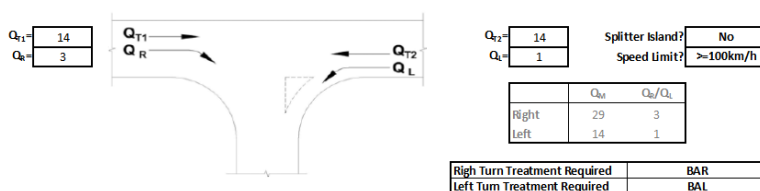
No upgrades are required.

Traffic volume sources

Roma Condamine Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 344.pdf).

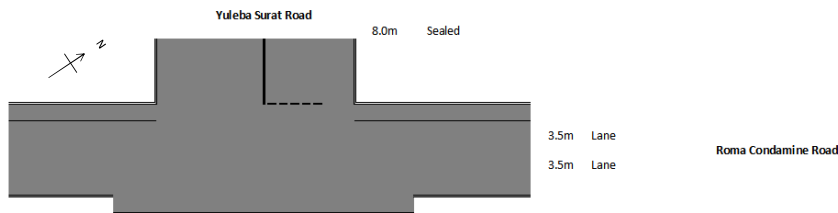
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Retreat Road/Roma Condamine Road
 2012 Background + GLNG (AM Peak)

Retreat Road/Roma Condamine Road
 2012 Background + GLNG (PM Peak)


Yuleba Surat Road/Roma Condamine Road Intersection

Formation



Intersection Description

The Yuleba Surat Road/Roma Condamine Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Roma Condamine Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Yuleba Surat Road	100	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	120	10%	12	10%	12
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			0		0
Q _{T2} BG=	120	-	12	-	12
Q _{T2} BG=	125	10%	12	10%	12
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			0		0
Q _L BG=	125	-	12	-	12
Q _L BG=	25	10%	3	10%	3
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _R BG=	25	-	6	-	6
Q _R BG=	25	10%	3	10%	3
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			0		0
Q _B BG=	25	-	3	-	3

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

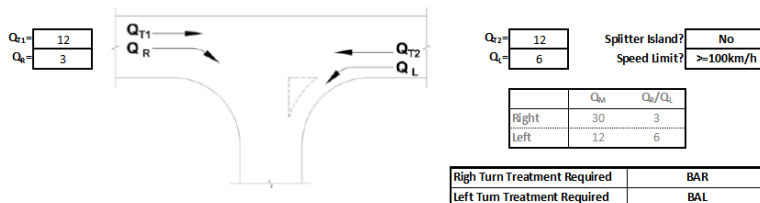
No upgrades are required.

Traffic volume sources

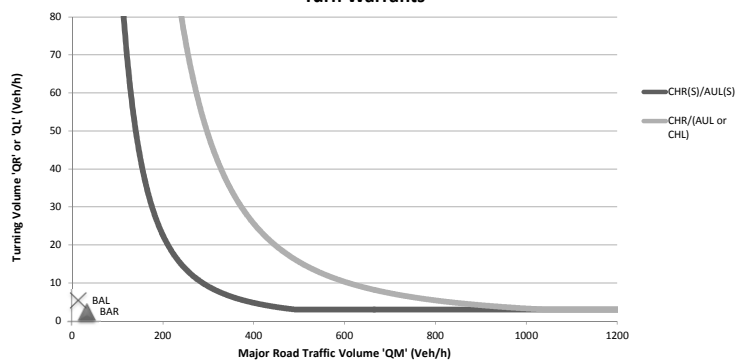
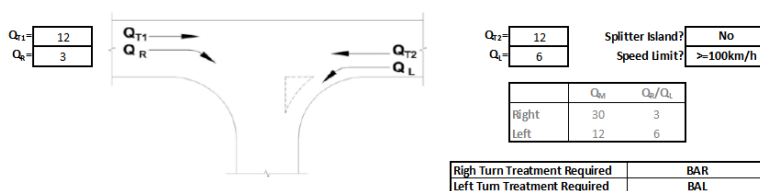
Roma Condamine Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 344.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

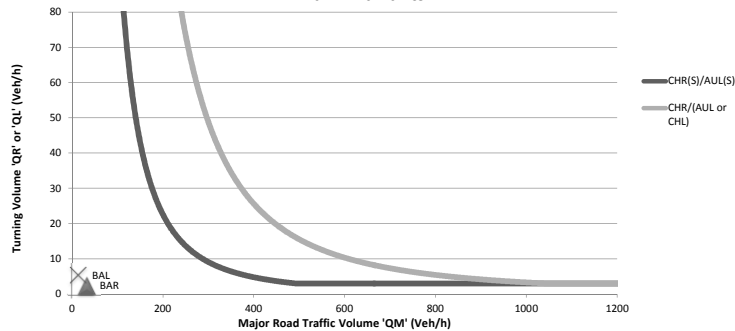
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

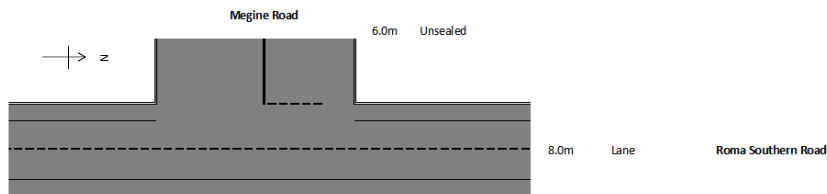
Yuleba Surat Road/Roma Condamine Road
2012 Background + GLNG (AM Peak)

Turn Warrants

Yuleba Surat Road/Roma Condamine Road
2012 Background + GLNG (PM Peak)

Turn Warrants



Megine Road/Roma Southern Road Intersection**Formation****Intersection Description**

The Megine Road/Roma South Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Roma Southern Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Megine Road	20	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	78	10%	8	10%	8
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			0		0
Q _{T2} BG=	78	-	8	-	8
Q _{T2} BG=	77	10%	8	10%	8
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			0		0
Q _L BG=	77	-	8	-	8
Q _L BG=	5	10%	1	10%	1
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _R BG=	5	-	1	-	1
Q _R BG=	5	10%	1	10%	1
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			5		5
Q _L BG=	5	-	6	-	6

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

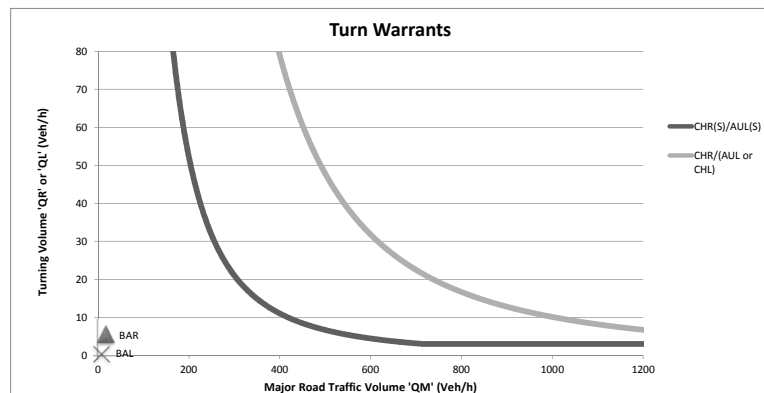
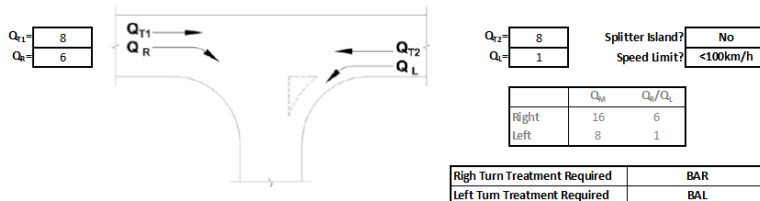
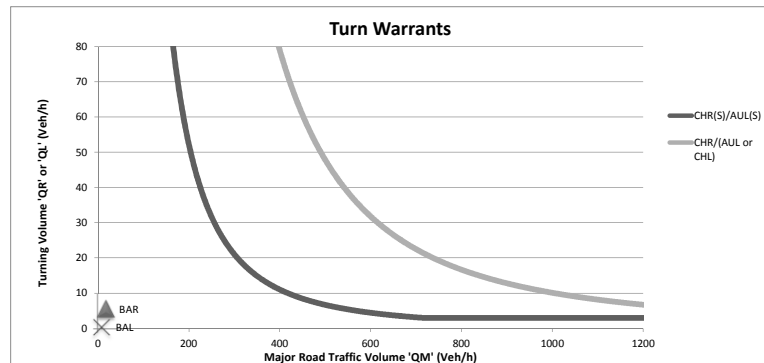
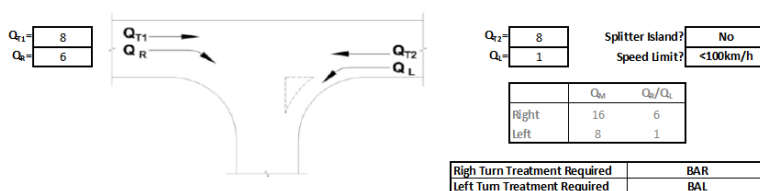
No upgrades are required.

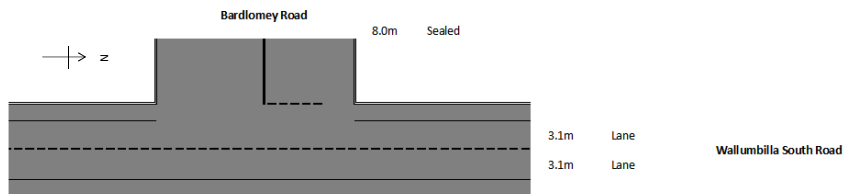
Traffic volume sources

Roma Southern Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3501.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Megine Road/Roma Southern Road
 2012 Background + GLNG (AM Peak)

Megine Road/Roma Southern Road
 2012 Background + GLNG (PM Peak)


Bardlomey Road/Wallumbilla South Road Intersection**Formation****Intersection Description**

The Lona Bardlomey Road/Wallumbilla South Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

	Daily	PF	AM	PF	PM
Q_{T1} BG=	110	10%	11	10%	11
Q_{T1} Cumulative=			0		0
Q_{T1} GLNG GFDP=			3		3
Q_{T1} =	110	-	14	-	14
Q_{T2} BG=	117	10%	12	10%	12
Q_{T2} Cumulative=			0		0
Q_{T2} GLNG GFDP=			3		3
Q_{T2} =	117	-	15	-	15
Q_L BG=			3		3
Q_L Cumulative=			0		0
Q_L GLNG GFDP=			0		0
Q_L =	0	-	3	-	3
Q_R BG=			8		8
Q_R Cumulative=			0		0
Q_R GLNG GFDP=			1		1
Q_R =	0	-	9	-	9

Assumptions

No background traffic or GLNG traffic use Lona Bardlomey Road. Assume 7vph for background traffic on Bardlomey Road with 5 going northbound and 2 going southbound.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

Traffic volume sources

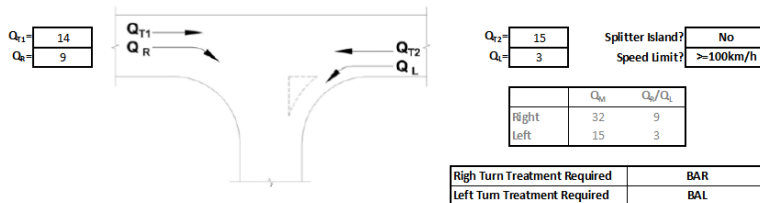
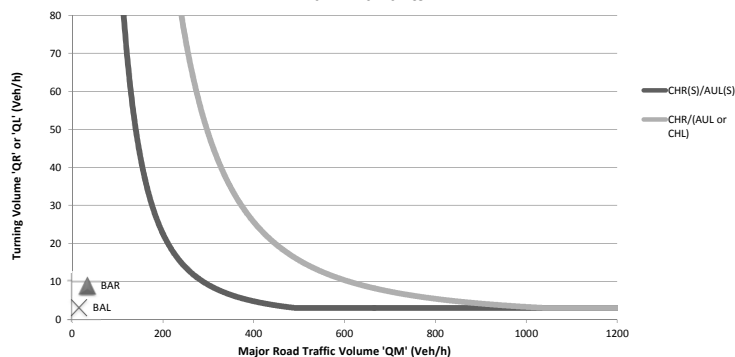
Wallumbilla South Road through traffic volumes come from DTMR AADT (Cardno_AADT segment with Heavy vehicles and Growth rates report.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

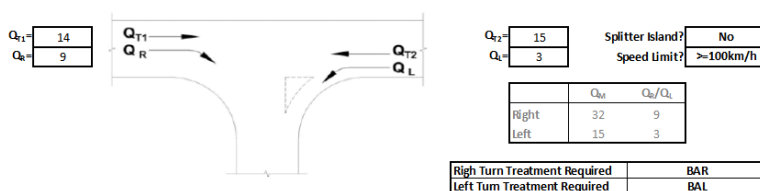
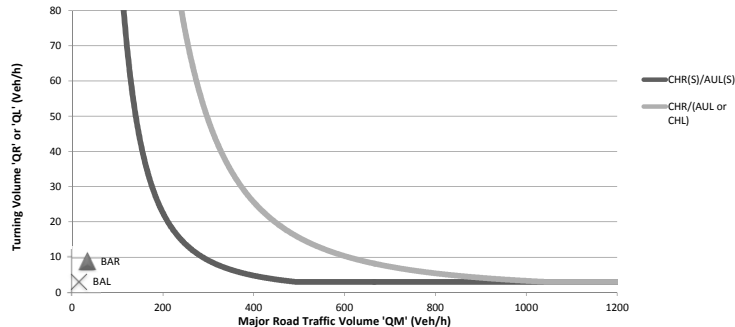
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Bardlomey Road/Wallumbilla South Road

2012 Background + GLNG (AM Peak)

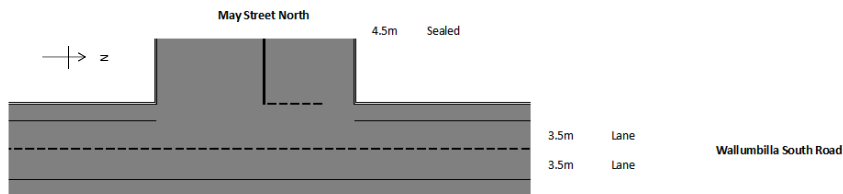
**Turn Warrants****Bardlomey Road/Wallumbilla South Road**

2012 Background + GLNG (PM Peak)

**Turn Warrants**

May Street North/Wallumbilla South Road Intersection

Formation



Intersection Description

The May Street North/Wallumbilla South Road intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
May Street North	30	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	102	10%	10	10%	10
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			7		7
Q _{T2} BG=	102	-	17	-	17
Q _{T2} BG=	94	10%	9	10%	9
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			7		7
Q _{T3} BG=	94	-	16	-	16
Q _{T3} BG=	8	10%	1	10%	1
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			0		0
Q _{T4} BG=	8	-	1	-	1
Q _{T4} BG=	8	10%	1	10%	1
Q _{T4} Cumulative=			0		0
Q _{T4} GLNG GFDP=			1		1
Q _{T5} BG=	8	-	2	-	2

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

Traffic volume sources

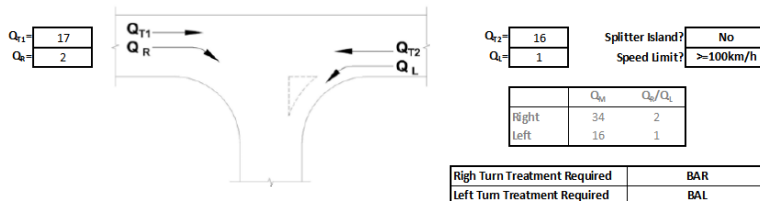
Wallumbilla South Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3441.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

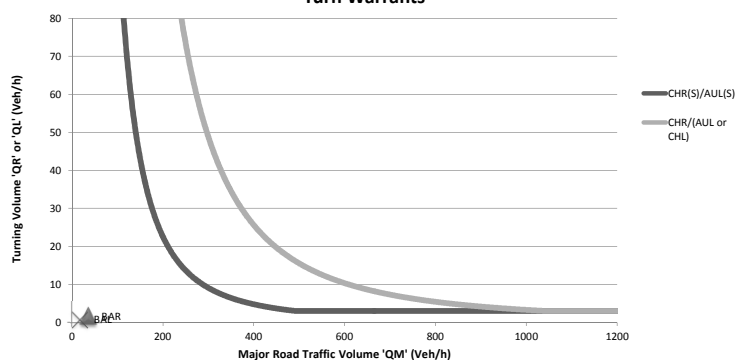
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

May Street North/Wallumbilla South Road

2012 Background + GLNG (AM Peak)

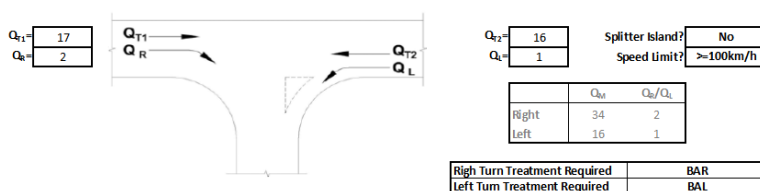


Turn Warrants

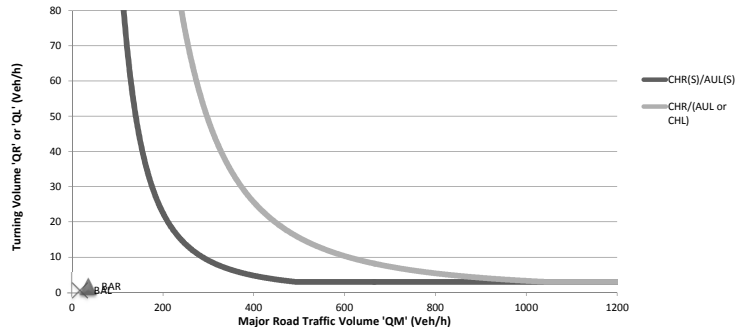


May Street North/Wallumbilla South Road

2012 Background + GLNG (PM Peak)

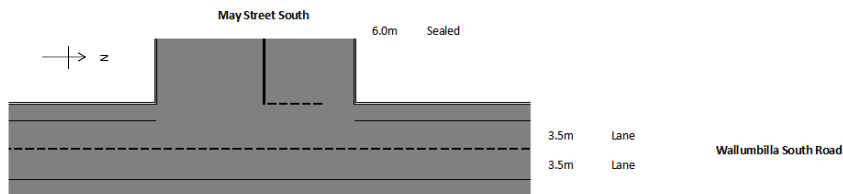


Turn Warrants



May Street South/Wallumbilla South Road Intersection

Formation



Intersection Description

The May Street South/Wallumbilla South Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

	Daily	PF	AM	PF	PM
Q_{T1} BG=	102	10%	10	10%	10
Q_{T1} Cumulative=			0		0
Q_{T1} GLNG GFDP=			7		7
Q_{T2} BG=	102	-	17	-	17
Q_{T2} BG=	94	10%	9	10%	9
Q_{T2} Cumulative=			0		0
Q_{T2} GLNG GFDP=			7		7
Q_{T3} BG=	94	-	16	-	16
Q_{T3} BG=			0		0
Q_{T3} Cumulative=			1		1
Q_{T3} GLNG GFDP=			1		1
Q_{T4} BG=	24	10%	2	10%	2
Q_{T4} Cumulative=			0		0
Q_{T4} GLNG GFDP=			0		0
Q_{T5} BG=	24	-	2	-	2

Assumptions

- 30vpd for background traffic from Trafford Park Road
 - 50% of the Trafford Park Road background traffic uses this intersection and 50% uses the northern intersection (south of railway).
 - No Trafford Park Road background traffic going to southbound.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

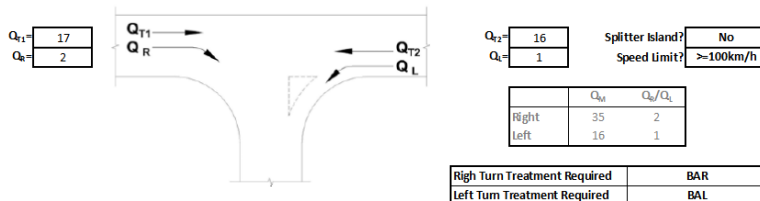
No upgrades are required.

Traffic volume sources

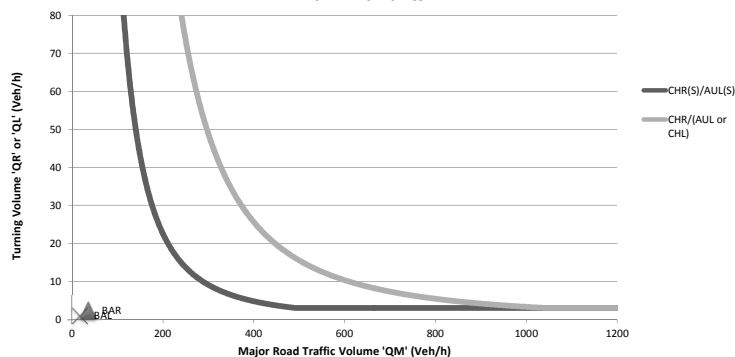
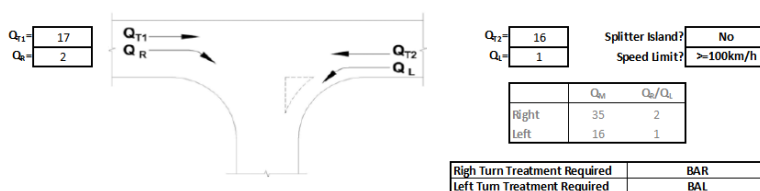
Wallumbilla South Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3441.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

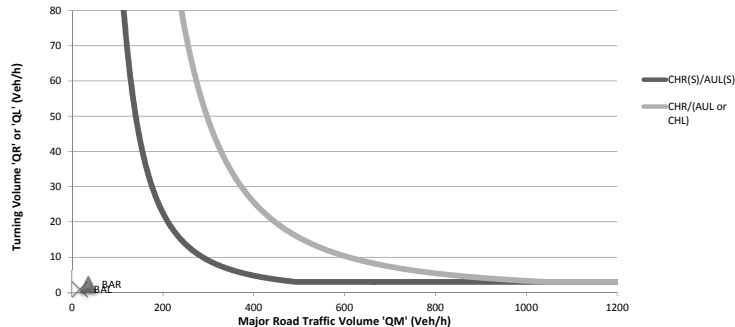
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

May Street South/Wallumbilla South Road
2012 Background + GLNG (AM Peak)

Turn Warrants

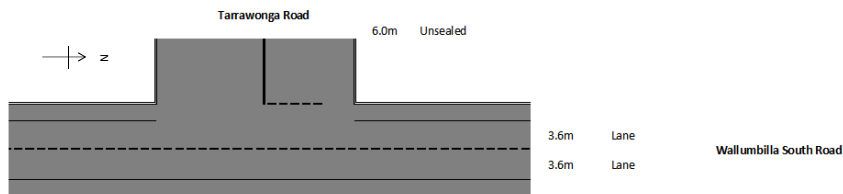
May Street South/Wallumbilla South Road
2012 Background + GLNG (PM Peak)

Turn Warrants



Tarrawonga Road/Wallumbilla South Road Intersection

Formation



Intersection Description

The Tarrawonga Road/Wallumbilla South Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Tarrawonga Road	20	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	24	10%	2	10%	2
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			0		0
Q _{T2} BG=	24	-	2	-	2
Q _{T2} BG=	27	10%	3	10%	3
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			0		0
Q _L BG=	27	-	3	-	3
Q _L BG=	5	10%	1	10%	1
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _R BG=	5	-	1	-	1
Q _R BG=	5	10%	1	10%	1
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			1		1
Q _L BG=	5	-	2	-	2

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

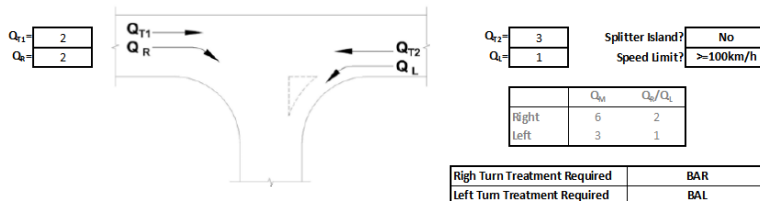
No upgrades are required.

Traffic volume sources

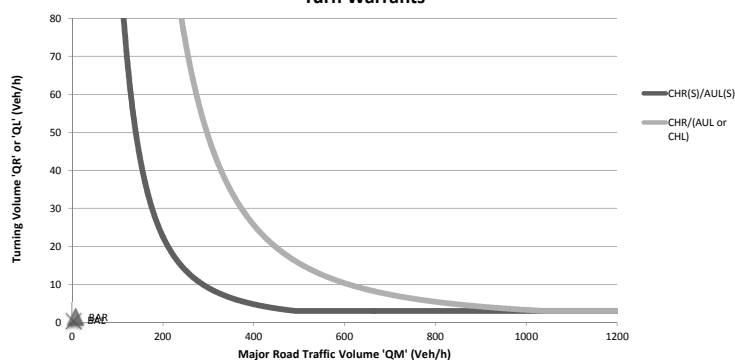
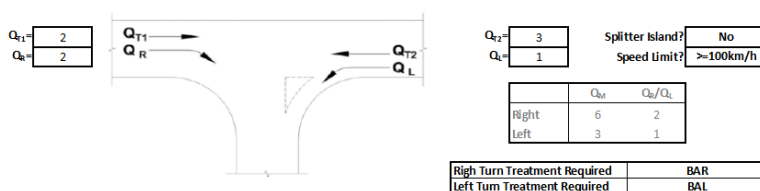
Wallumbilla South Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3441.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

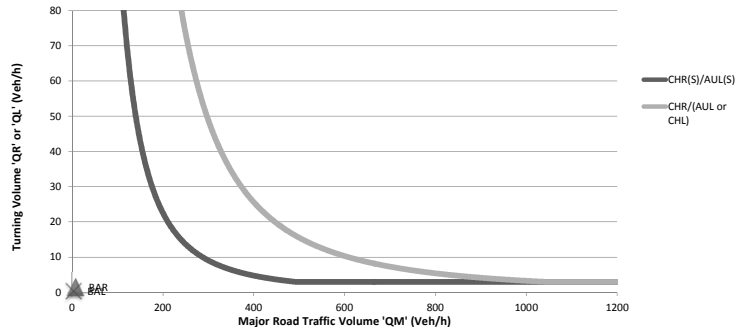
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Tarrawonga Road/Wallumbilla South Road
2012 Background + GLNG (AM Peak)

Turn Warrants

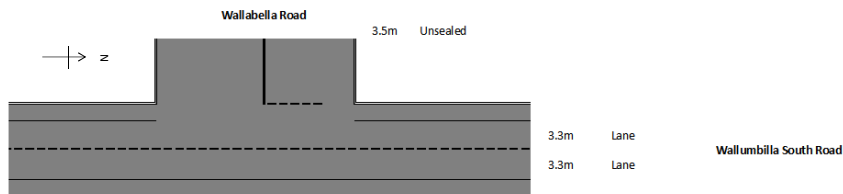
Tarrawonga Road/Wallumbilla South Road
2012 Background + GLNG (PM Peak)

Turn Warrants



Wallabella Road/Wallumbilla South Road Intersection

Formation



Intersection Description

The Wallabella Road/Wallumbilla South Road intersection is a three way priority controlled intersection with the main movement being the North-South movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Wallabella Road	20	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	27	10%	3	10%	3
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			3		3
Q _{T2} BG=	27	-	6	-	6
Q _{T2} BG=	24	10%	2	10%	2
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			3		3
Q _L BG=	24	-	5	-	5
Q _L BG=	5	10%	1	10%	1
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			2		2
Q _R BG=	5	-	3	-	3
Q _R BG=	5	10%	1	10%	1
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			0		0
Q _L BG=	5	-	1	-	1

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

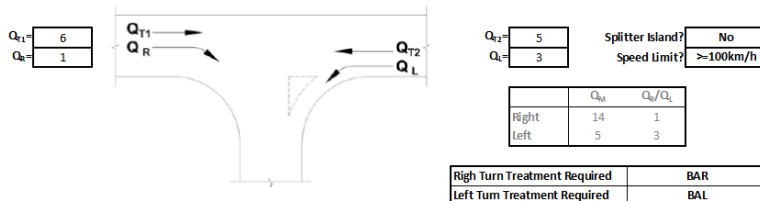
No upgrades are required.

Traffic volume sources

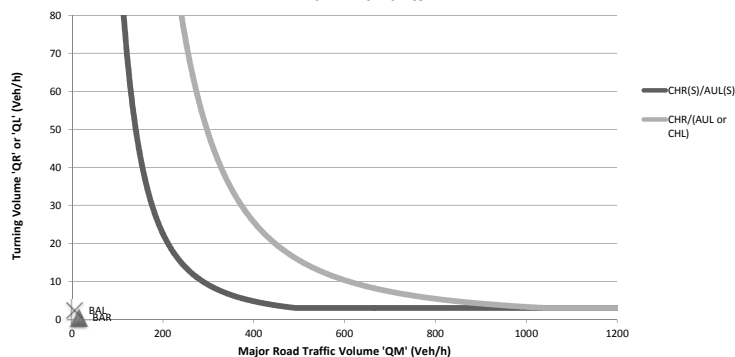
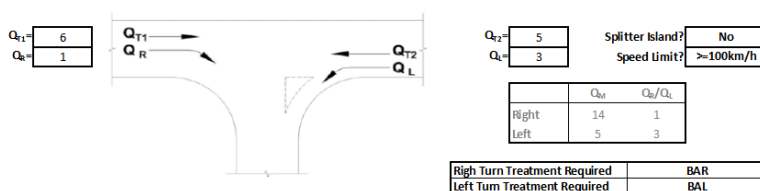
Wallumbilla South Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3441.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

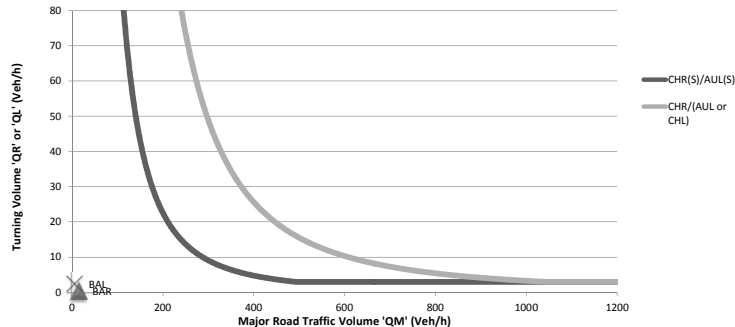
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Wallabella Road/Wallumbilla South Road
2012 Background + GLNG (AM Peak)

Turn Warrants

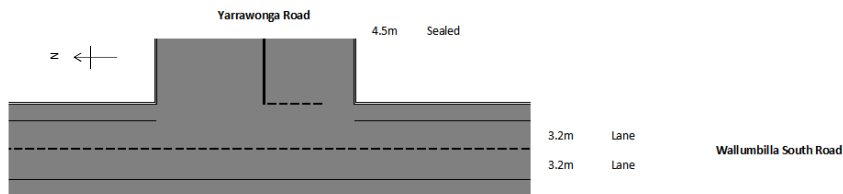
Wallabella Road/Wallumbilla South Road
2012 Background + GLNG (PM Peak)

Turn Warrants



Yarrawonga Road/Wallumbilla South Road Intersection

Formation



Intersection Description

The Yarrawonga Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the north-south movement along the Wallumbilla South Road. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Yarrawonga Road	30	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	94	10%	9	10%	9
Q _{T1} Cumulative=			0		0
Q _{T1} GLNG GFDP=			1		1
Q _{T2} BG=	94	-	10	-	10
Q _{T2} BG=	102	10%	10	10%	10
Q _{T2} Cumulative=			0		0
Q _{T2} GLNG GFDP=			1		1
Q _{T3} BG=	102	-	11	-	11
Q _{T3} BG=	8	10%	1	10%	1
Q _{T3} Cumulative=			0		0
Q _{T3} GLNG GFDP=			1		1
Q _{T4} BG=	8	-	2	-	2
Q _{T4} BG=	8	10%	1	10%	1
Q _{T4} Cumulative=			0		0
Q _{T4} GLNG GFDP=			7		7
Q _{T5} BG=	8	-	8	-	8

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

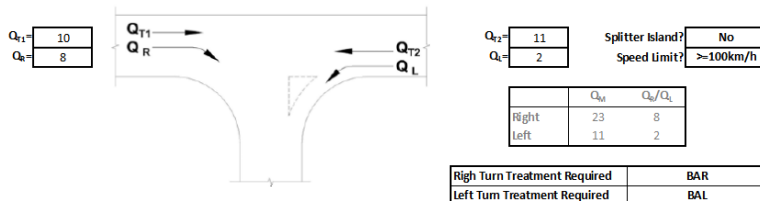
No upgrades are required.

Traffic volume sources

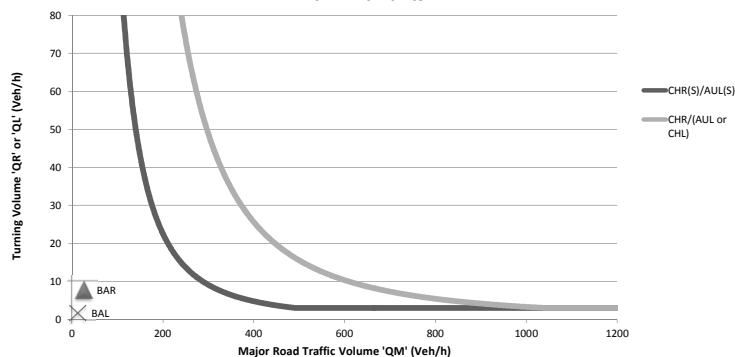
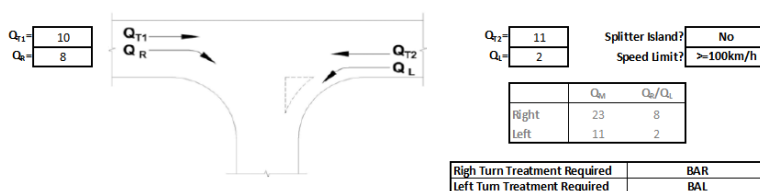
Wallumbilla South Road through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 3441.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

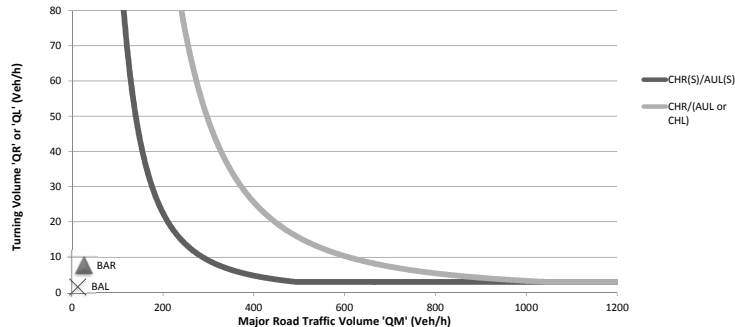
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Yarrawonga Road/Wallumbilla South Road
2012 Background + GLNG (AM Peak)

Turn Warrants

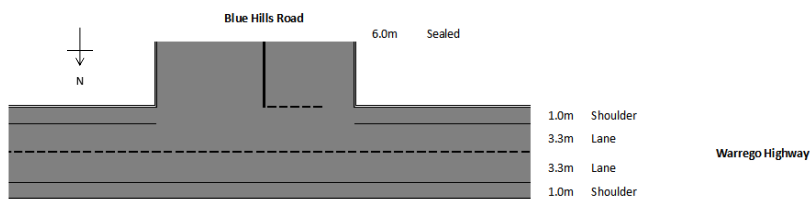
Yarrawonga Road/Wallumbilla South Road
2012 Background + GLNG (PM Peak)

Turn Warrants



Blue Hills Road/Warrego Highway Intersection

Formation



Intersection Description

The Blue Hills Road/Carnarvon Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Blue Hills Road	60	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
Q _{T1} BG=	1486	10%	149	10%	149
Q _{T1} Cumulative=			1		1
Q _{T1} GLNG GFDP=			33		33
Q _{T1} =	1486	-	182	-	182
Q _{T2} BG=	1383	10%	138	10%	138
Q _{T2} Cumulative=			1		1
Q _{T2} GLNG GFDP=			33		33
Q _{T2} =	1383	-	172	-	172
Q _L BG=	15	10%	2	10%	2
Q _L Cumulative=			0		0
Q _L GLNG GFDP=			0		0
Q _L =	15	-	2	-	2
Q _R BG=	15	10%	2	10%	2
Q _R Cumulative=			0		0
Q _R GLNG GFDP=			1		1
Q _R =	15	-	3	-	3

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

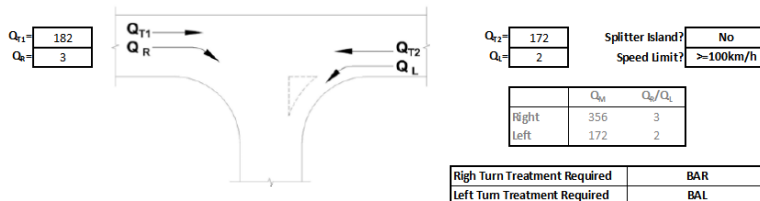
No upgrades are required.

Traffic volume sources

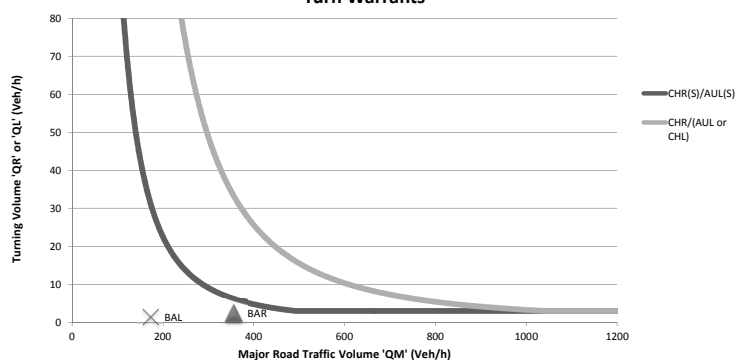
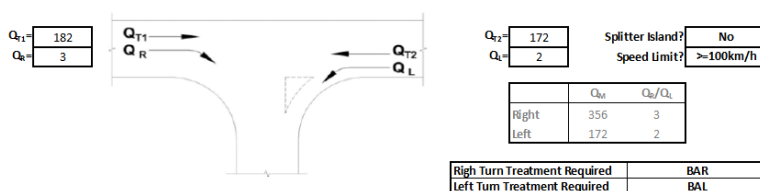
Warrego through traffic volumes come from DTMR AADT (Cardno_AADT segment with Heavy vehicles and Growth rates report.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

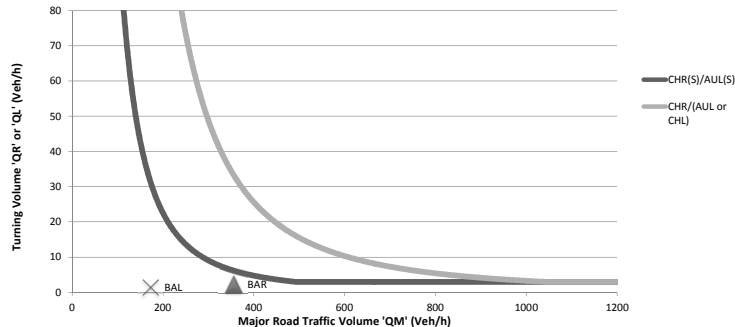
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Blue Hills Road/Warrego Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

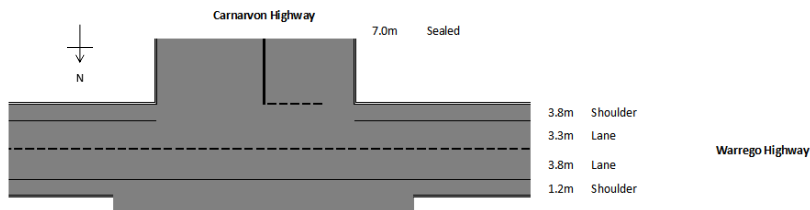
Blue Hills Road/Warrego Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Carnarvon Highway/Warrego Highway Intersection

Formation



Intersection Description

The Warrego Highway/Carnarvon highway intersection is a three way priority controlled intersection with the main movement being the east-west movement along the Warrego Highway. There is an auxiliary lane provided for through traffic to avoid right turners on the Carnarvon Highway.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			195		185
Q_{T1} Cumulative=			16		16
Q_{T1} GLNG GFDP=			14		14
Q_{T1} =	0	-	225	-	215
Q_{T2} BG=			127		176
Q_{T2} Cumulative=			1		1
Q_{T2} GLNG GFDP=			14		14
Q_{T2} =	0	-	142	-	191
Q_L BG=			5		5
Q_L Cumulative=			0		0
Q_L GLNG GFDP=			20		20
Q_L =	0	-	25	-	25
Q_R BG=			54		53
Q_R Cumulative=			0		0
Q_R GLNG GFDP=			18		18
Q_R =	0	-	72	-	71

Assumptions

Assumes equal split of project traffic comes from the east and west along the Warrego Highway.

Turn Warrant Requirement

A BAL and a CHR.

Conclusion

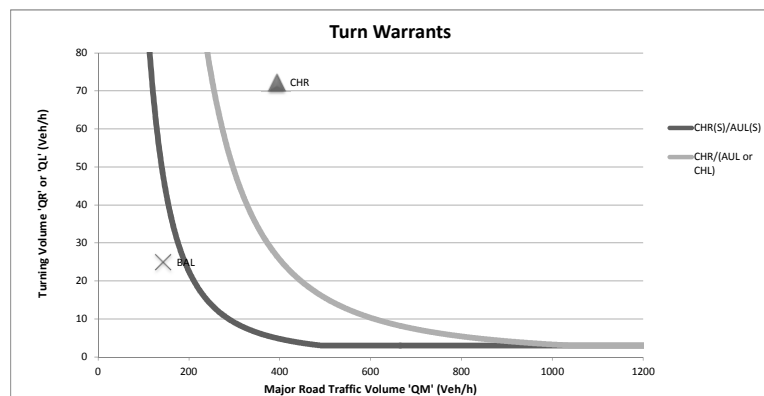
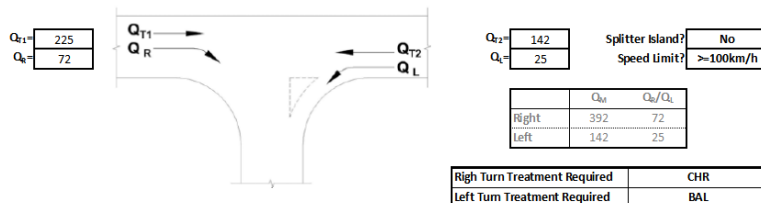
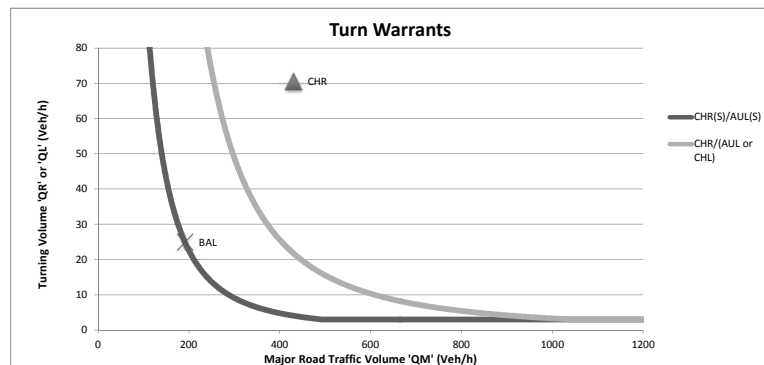
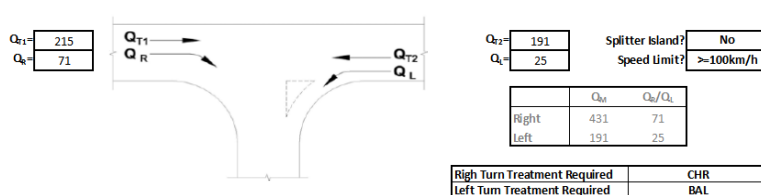
Upgrading intersection to accommodate a CHR required, although no provision is required by GLNG as no significant impact.

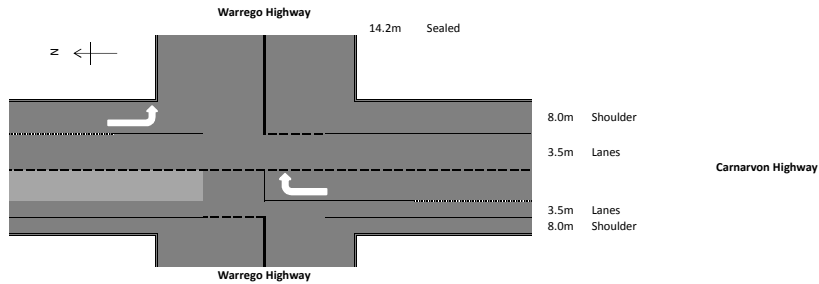
Traffic volume sources

Background Traffic volumes come from 2011 DTMR intersection counts. (Cardno_Intersection 33 report for 18D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx).

Carnarvon Highway/Warrego Highway
2012 Background + GLNG (AM Peak)Carnarvon Highway/Warrego Highway
2012 Background + GLNG (PM Peak)

Warrego Highway/Carnarvon Highway Intersection**Formation****Intersection Description**

The Warrego Highway/Carnarvon Highway intersection is a four way priority controlled intersection with the main movement being the North-South movement along the Carnarvon Highway. The road has right turn and left turn lanes into the eastern leg of the Warrego Highway. The western leg of the Warrego Highway is a left-in and left-out road.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			251		314
Q_{T1} Cumulative=			0		0
Q_{T1} GLNG GFDP=			3		3
Q_{T1} =	0	-	254	-	317
Q_{T2} BG=			293		245
Q_{T2} Cumulative=			0		0
Q_{T2} GLNG GFDP=			3		3
Q_{T2} =	0	-	296	-	248
Q_L BG=			283		237
Q_L Cumulative=			8		8
Q_L GLNG GFDP=			22		22
Q_L =	0	-	313	-	267
Q_R BG=			254		272
Q_R Cumulative=			8		8
Q_R GLNG GFDP=			12		12
Q_R =	0	-	274	-	292

Assumptions

Assumes worst case scenario when all project traffic travels to/from Roma

Turn Warrant Requirement

A CHL and CHR

Conclusion

No upgrades required for this intersection.

Traffic volume sources

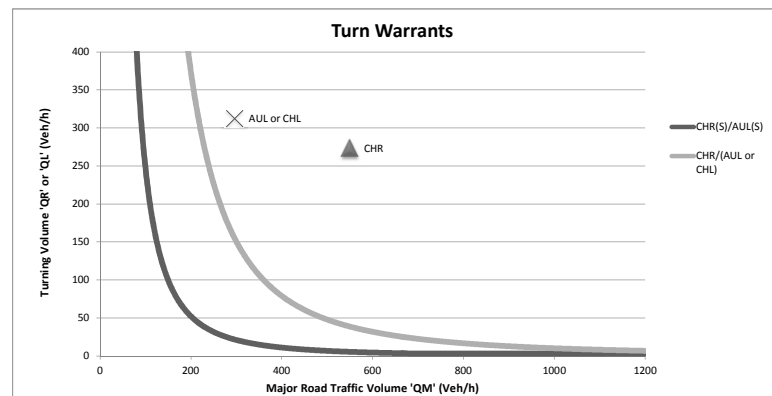
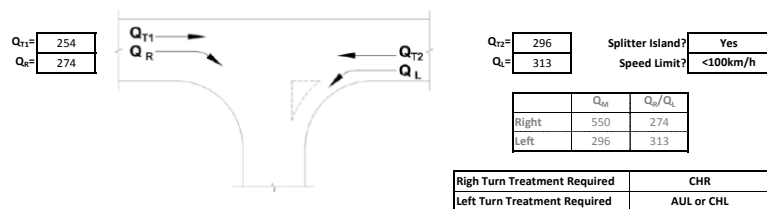
Background Traffic volumes come from DTMR intersection counts. (Road Section 18D Intersection 59.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

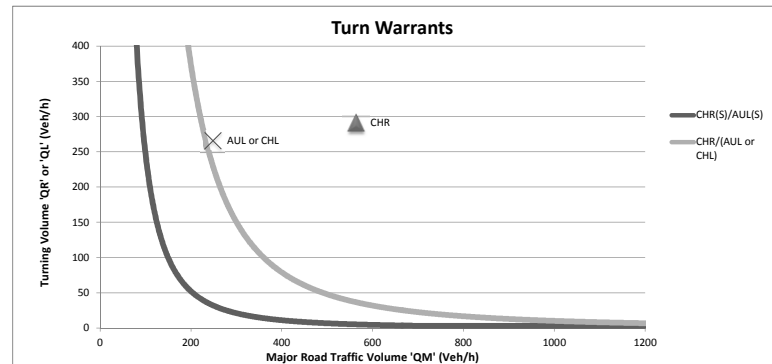
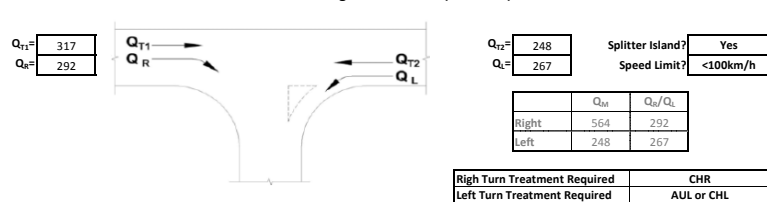
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx).

Warrego Highway/Carnarvon Highway

2012 Background + GLNG (AM Peak)

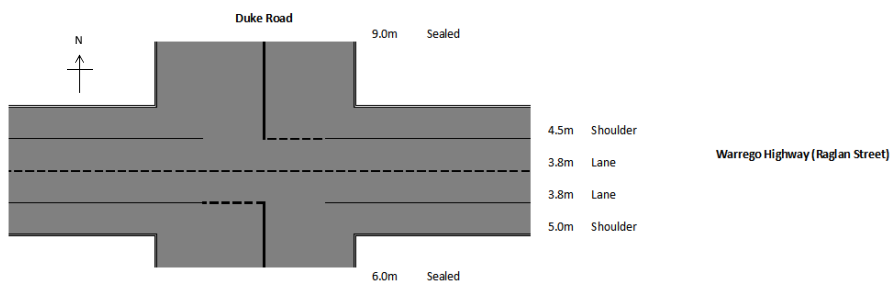
**Warrego Highway/Carnarvon Highway**

2012 Background + GLNG (PM Peak)



Duke Road/Warrego Highway (Raglan Street) Intersection

Formation



Intersection Description

The Warrego Highway /Duke Road intersection is a four way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes provided on Warrego Highway, however the wide shoulders can be used by vehicles to avoid turning vehicles at this intersection.

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$			346		376
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			5		5
$Q_{T1} =$	0	-	351	-	381
$Q_{T2} BG =$			389		389
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			5		5
$Q_{T2} =$	0	-	394	-	394
$Q_L BG =$			40		38
$Q_L Cumulative =$			0		0
$Q_L GLNG GFDP =$			5		5
$Q_L =$	0	-	45	-	43
$Q_R BG =$			109		101
$Q_R Cumulative =$			0		0
$Q_R GLNG GFDP =$			0		0
$Q_R =$	0	-	109	-	101

Assumptions

Turn Warrant Requirement

A AUL and a CHR.

Conclusion

AUL and CHR are required at this intersection for traffic turning into Duke Road from Warrego Highway.

Traffic volume sources

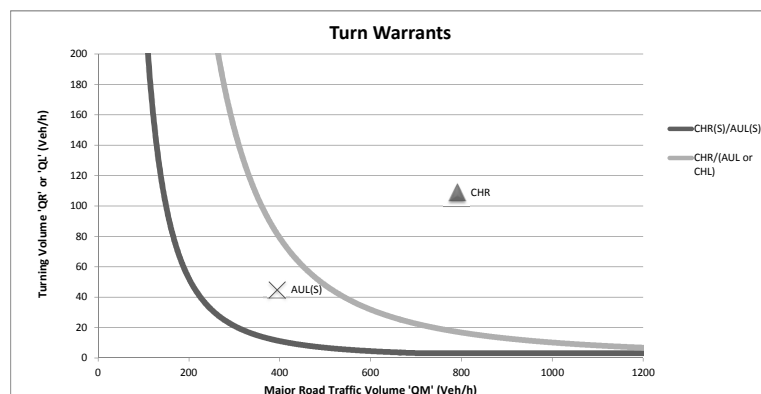
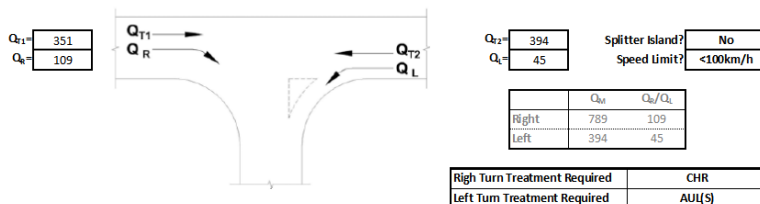
Background Traffic volumes come from 2012 DTMR intersection counts (Road Section 18E Intersection 70.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

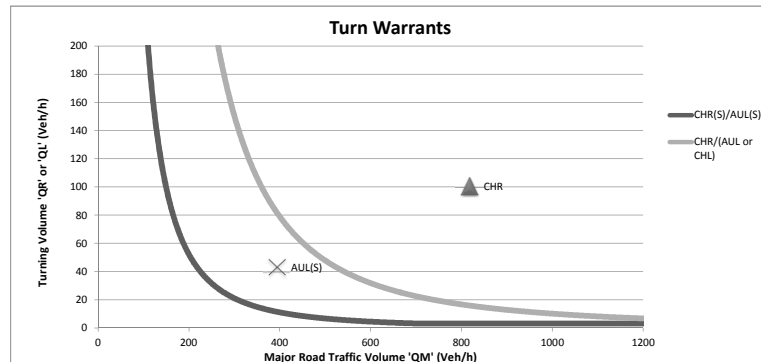
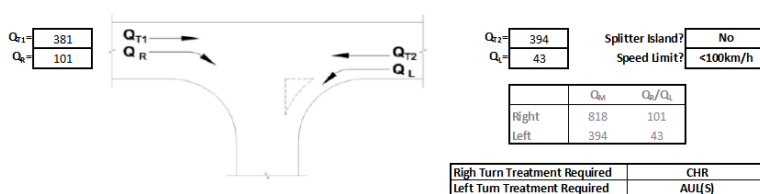
Duke Road/Warrego Highway (Raglan Street)

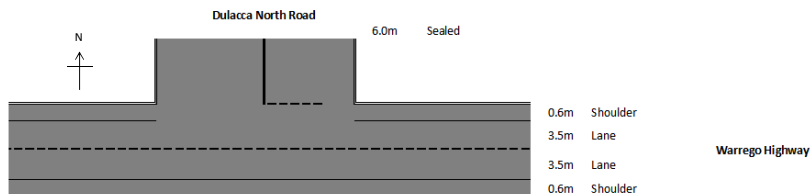
2012 Background + GLNG (AM Peak)



Duke Road/Warrego Highway (Raglan Street)

2012 Background + GLNG (PM Peak)



Dulacca North Road/Warrego Highway Intersection**Formation****Intersection Description**

The Warrego Highway/Dulacca North Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes provided on Warrego Highway.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Dulacca North Road	180	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1378	10%	138	10%	138
$Q_{T1} Cumulative =$			12		12
$Q_{T1} GLNG GFDP =$			13		13
$Q_{T2} =$	1378	-	163	-	163
$Q_{T2} BG =$	1400	10%	140	10%	140
$Q_{T2} Cumulative =$			8		8
$Q_{T2} GLNG GFDP =$			13		13
$Q_{T3} =$	1400	-	161	-	161
$Q_{T3} BG =$	45	10%	5	10%	5
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			2		2
$Q_{T4} =$	45	-	7	-	7
$Q_{T4} BG =$	45	10%	5	10%	5
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			1		1
$Q_{T5} =$	45	-	6	-	6

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

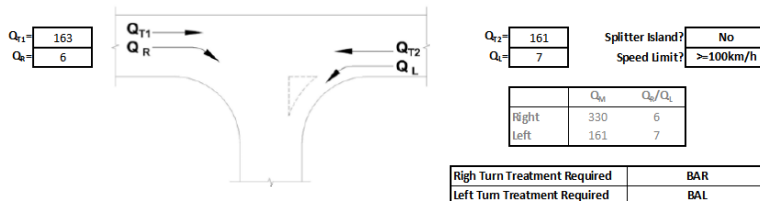
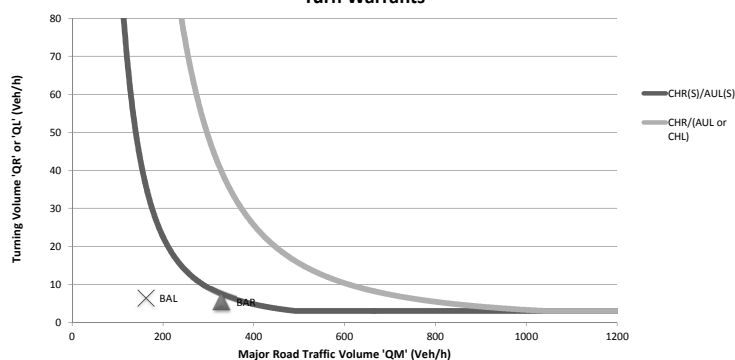
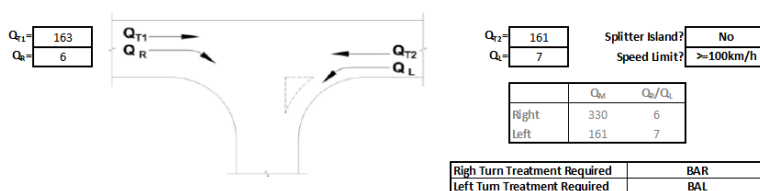
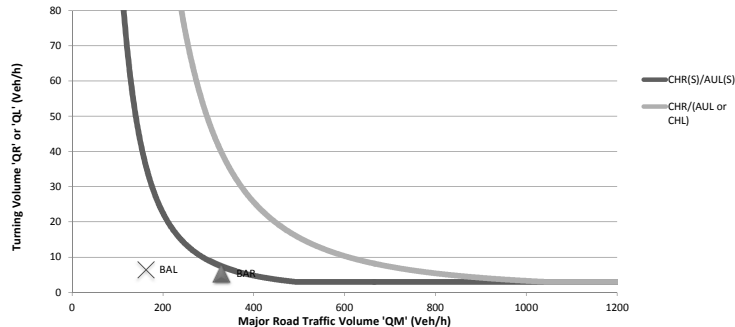
No upgrades are required.

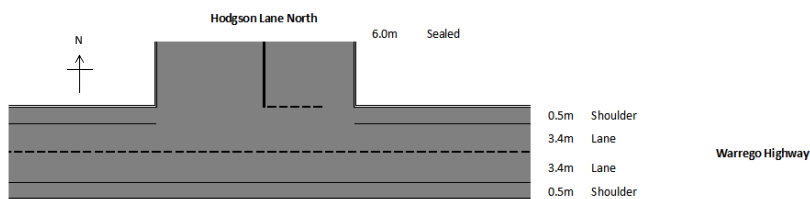
Traffic volume sources

Warrego Highway through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Dulacca North Road/Warrego Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Dulacca North Road/Warrego Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Hodgson Lane North/Warrego Highway Intersection**Formation****Intersection Description**

The Hodgson Lane North/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Hodgson Lane North	160	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	885	10%	88	10%	88
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			3		3
$Q_{T2} =$	885	-	91	-	91
$Q_{T2} BG =$	885	10%	88	10%	88
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			3		3
$Q_{T3} =$	885	-	91	-	91
$Q_{L1} BG =$	40	10%	4	10%	4
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			0		0
$Q_{L2} =$	40	-	4	-	4
$Q_{L2} BG =$	40	10%	4	10%	4
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			6		6
$Q_{L3} =$	40	-	10	-	10

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

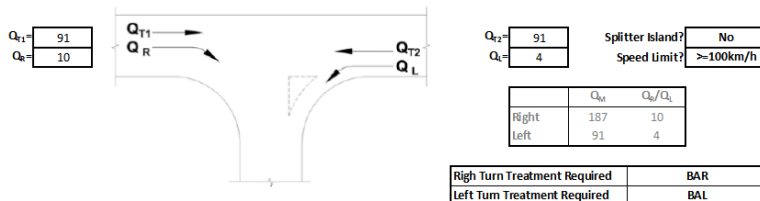
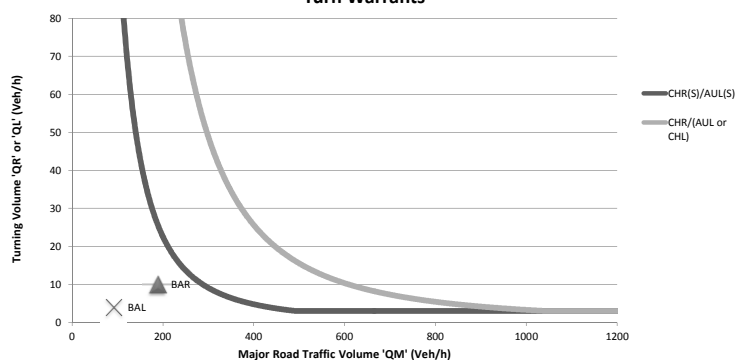
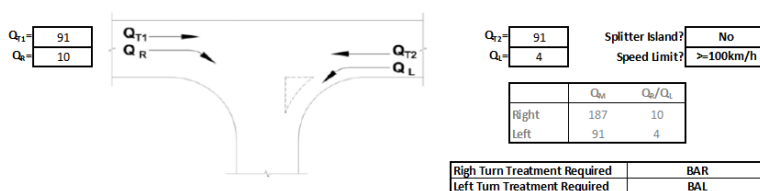
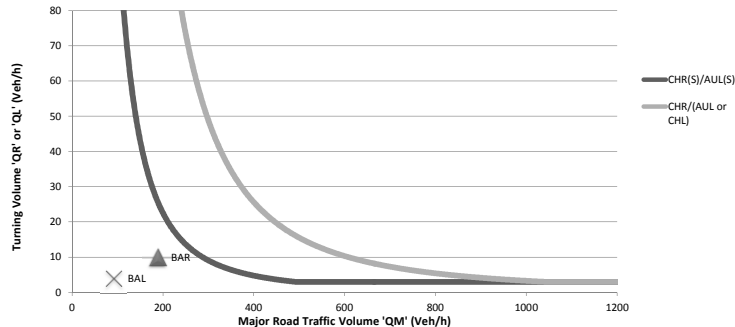
No upgrades are required.

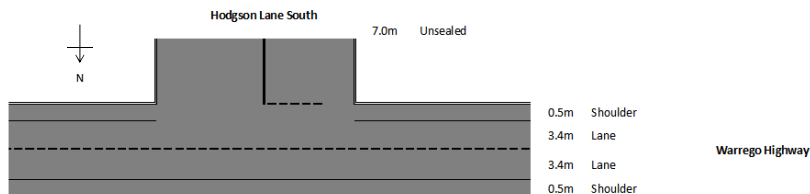
Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18E.pdf)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Hodgson Lane North/Warrego Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Hodgson Lane North/Warrego Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Hodgson Lane South/Warrego Highway Intersection**Formation****Intersection Description**

The Hodgson Lane South/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Hodgson Lane South	80	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	885	10%	88	10%	88
$Q_{T1} \text{ Cumulative} =$			0		0
$Q_{T1} GLNG GFDP =$			7		7
$Q_{T2} =$	885	-	95	-	95
$Q_{T2} BG =$	885	10%	88	10%	88
$Q_{T2} \text{ Cumulative} =$			0		0
$Q_{T2} GLNG GFDP =$			7		7
$Q_{L1} =$	885	-	95	-	95
$Q_{L1} BG =$	20	10%	2	10%	2
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			1		1
$Q_{L2} =$	20	-	3	-	3
$Q_{L2} BG =$	20	10%	2	10%	2
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			2		2
$Q_{L3} =$	20	-	4	-	4

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

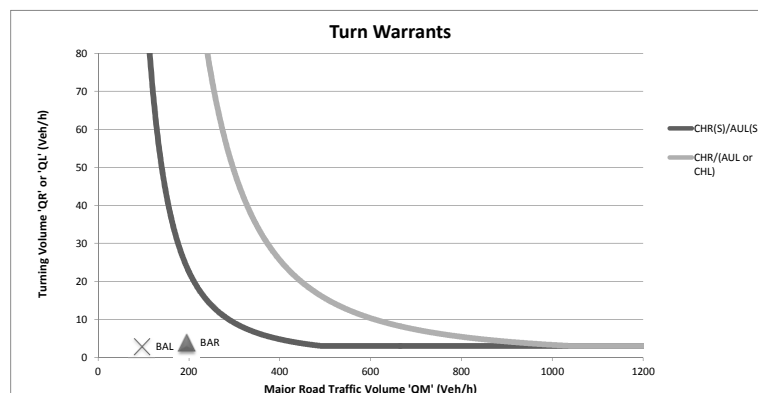
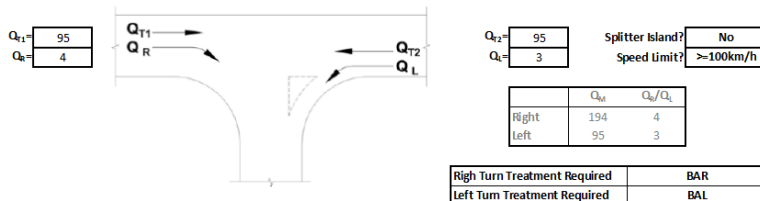
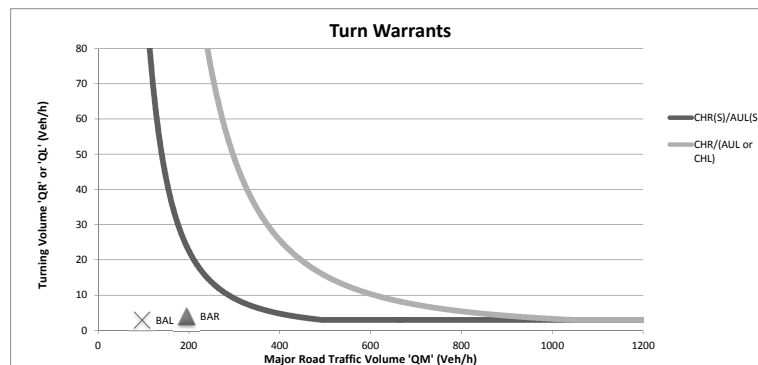
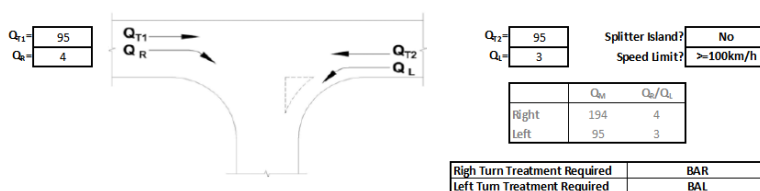
No upgrades are required.

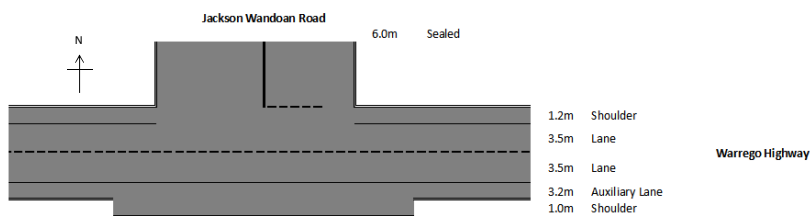
Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18E.pdf)

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Hodgson Lane South/Warrego Highway
 2012 Background + GLNG (AM Peak)

Hodgson Lane South/Warrego Highway
 2012 Background + GLNG (PM Peak)


Jackson Wandoan Road/Warrego Highway Intersection**Formation****Intersection Description**

The Warrego Highway/Jackson Wandoan Road intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There is AUR treatment provided for traffic turning into Jackson Wandoan Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Jackson Wandoan Road	222	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1378	10%	138	10%	138
$Q_{T1} Cumulative =$			8		8
$Q_{T1} GLNG GFDP =$			15		15
$Q_{T2} =$	1378	-	161	-	161
$Q_{T2} BG =$	1400	10%	140	10%	140
$Q_{T2} Cumulative =$			8		8
$Q_{T2} GLNG GFDP =$			15		15
$Q_{T3} =$	1400	-	163	-	163
$Q_{T3} BG =$	56	10%	6	10%	6
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			12		12
$Q_{T4} =$	56	-	18	-	18
$Q_{T4} BG =$	56	10%	6	10%	6
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			0		0
$Q_{T5} =$	56	-	6	-	6

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

No upgrades are required.

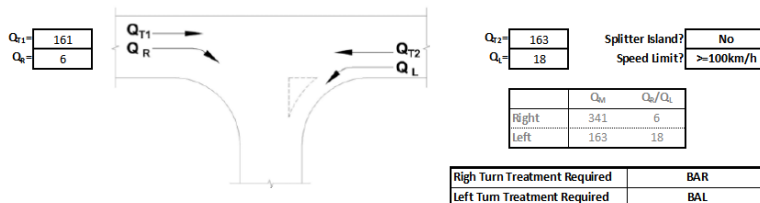
Traffic volume sources

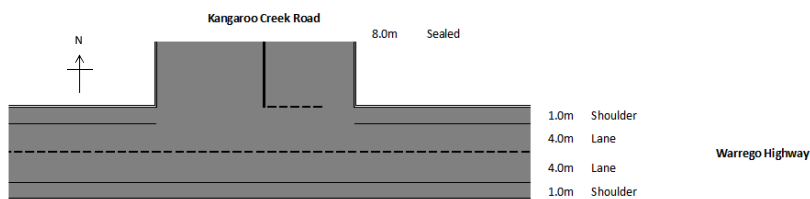
Roma Condamine Road traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18D.pdf).

Jackson Wandoan Road traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 4302.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Jackson Wandoan Road/Warrego Highway
 2012 Background + GLNG (AM Peak)


Kangaroo Creek Road/Warrego Highway Intersection**Formation****Intersection Description**

The Kangaroo Creek Road/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Kangaroo Creek Road	80	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$			162		173
$Q_{T1} \text{ Cumulative} =$			8		8
$Q_{T1} GLNG GFDP =$			20		20
$Q_{T2} =$	0	-	189	-	201
$Q_{T2} BG =$			187		166
$Q_{T2} \text{ Cumulative} =$			5		5
$Q_{T2} GLNG GFDP =$			20		20
$Q_{T3} =$	0	-	212	-	191
$Q_{T3} BG =$	20	10%	2	10%	2
$Q_{T3} \text{ Cumulative} =$			0		0
$Q_{T3} GLNG GFDP =$			1		1
$Q_{T4} =$	20	-	3	-	3
$Q_{T4} BG =$	20	10%	2	10%	2
$Q_{T4} \text{ Cumulative} =$			0		0
$Q_{T4} GLNG GFDP =$			5		5
$Q_{T5} =$	20	-	7	-	7

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

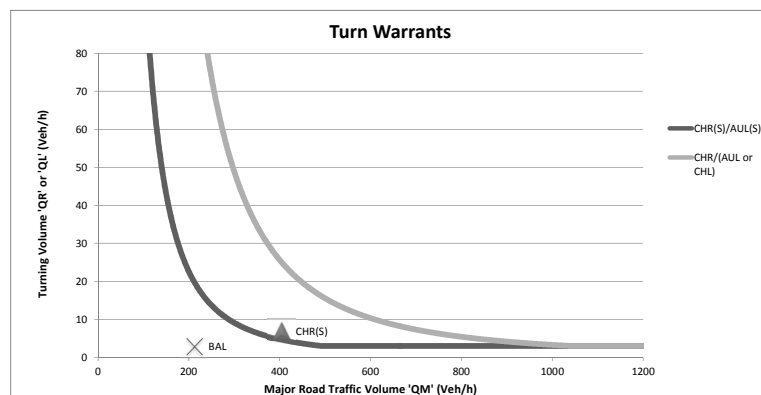
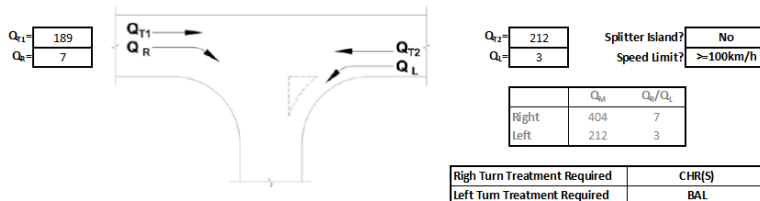
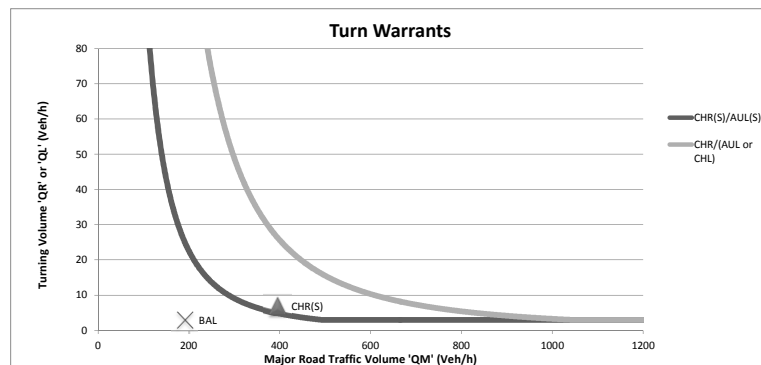
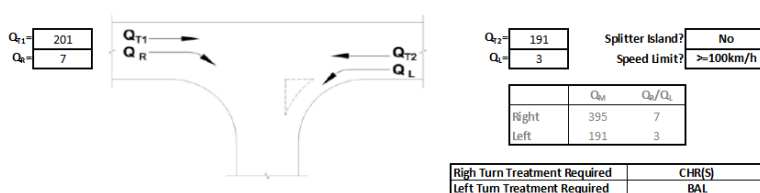
No upgrades are required.

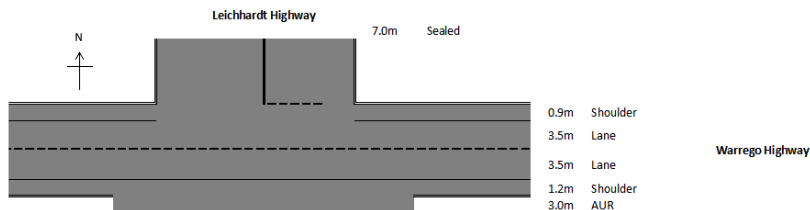
Traffic volume sources

Background Traffic volumes come from DTMR intersection counts. (Road Section 18D Intersection 69.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Kangaroo Creek Road/Warrego Highway
 2012 Background + GLNG (AM Peak)

Kangaroo Creek Road/Warrego Highway
 2012 Background + GLNG (PM Peak)


Leichhardt Highway/Warrego Highway Intersection**Formation****Intersection Description**

The Warrego Highway/Leichhardt Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There is AUR treatment provided for traffic turning into Leichhardt Highway.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			126		117
Q_{T1} Cumulative=			12		12
Q_{T1} GLNG GFDP=			7		7
Q_{T1} =	0	-	146	-	136
Q_{T2} BG=			159		166
Q_{T2} Cumulative=			12		12
Q_{T2} GLNG GFDP=			7		7
Q_{T2} =	0	-	178	-	185
Q_L BG=			0		2
Q_L Cumulative=			7		7
Q_L GLNG GFDP=			14		14
Q_L =	0	-	21	-	23
Q_R BG=			89		98
Q_R Cumulative=			7		7
Q_R GLNG GFDP=			0		0
Q_R =	0	-	96	-	105

Assumptions**Turn Warrant Requirement**

BAL and CHR

Conclusion

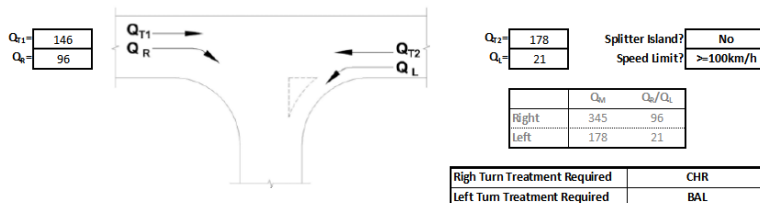
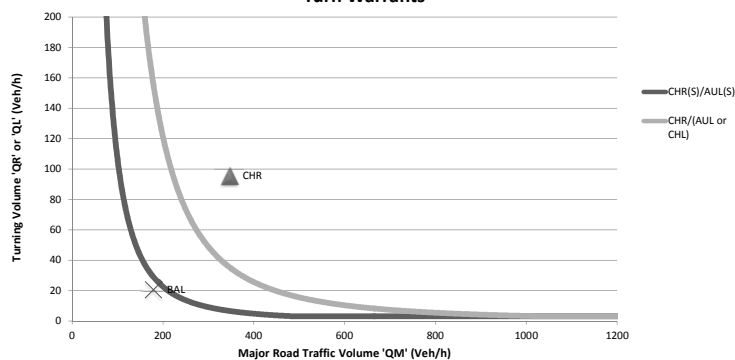
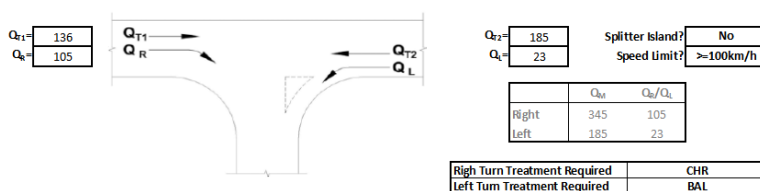
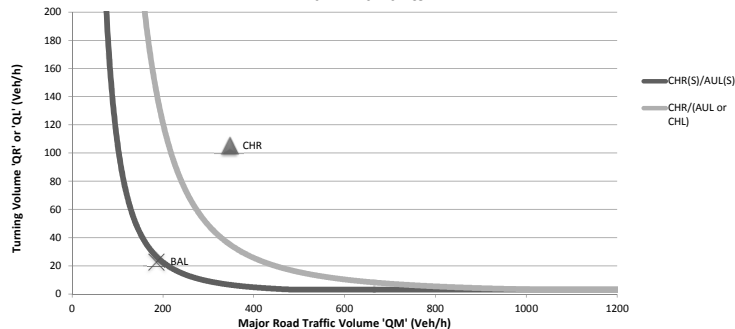
The current AUR needs to be upgraded into CHR.

Traffic volume sources

Background Traffic volumes come from 2009 DTMR intersection counts (120521 Future GLNG Data).

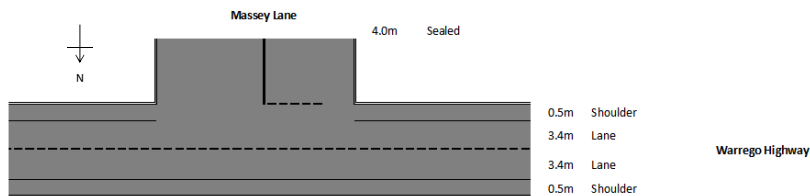
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Leichhardt Highway/Warrego Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Leichhardt Highway/Warrego Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

Massey Lane/Warrego Highway Intersection

Formation

**Intersection Description**

The Massey Lane/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Massey Lane	100	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	797	10%	80	10%	80
$Q_{T1} Cumulative =$			0		0
$Q_{T1} GLNG GFDP =$			0		0
$Q_{T2} =$	797	-	80	-	80
$Q_{T2} BG =$	819	10%	82	10%	82
$Q_{T2} Cumulative =$			0		0
$Q_{T2} GLNG GFDP =$			0		0
$Q_{L1} =$	819	-	82	-	82
$Q_{L1} BG =$	25	10%	3	10%	3
$Q_{L1} Cumulative =$			0		0
$Q_{L1} GLNG GFDP =$			4		4
$Q_{L2} =$	25	-	7	-	7
$Q_{L2} BG =$	25	10%	3	10%	3
$Q_{L2} Cumulative =$			0		0
$Q_{L2} GLNG GFDP =$			0		0
$Q_{L3} =$	25	-	3	-	3

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

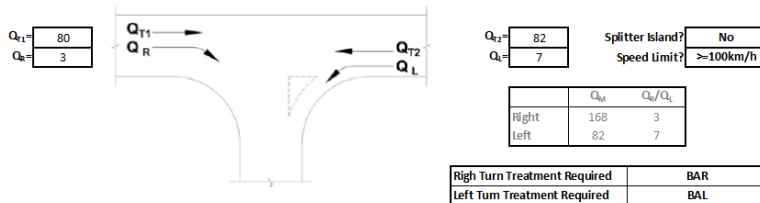
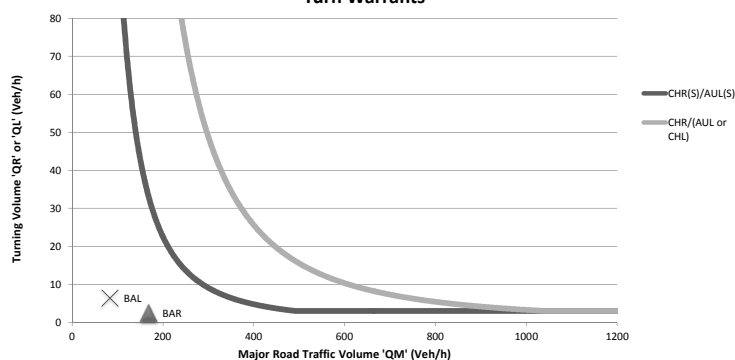
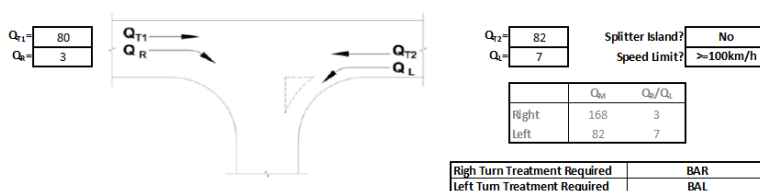
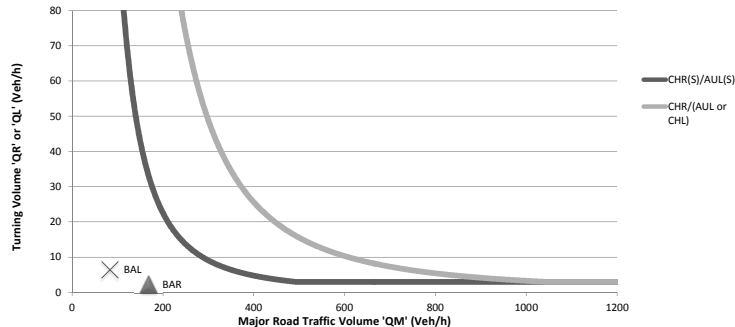
No upgrades are required.

Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18E.pdf)

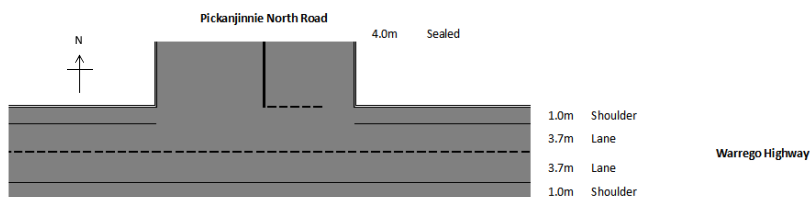
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Massey Lane/Warrego Highway
2012 Background + GLNG (AM Peak)**Turn Warrants****Massey Lane/Warrego Highway**
2012 Background + GLNG (PM Peak)**Turn Warrants**

Pickanjinie North Road/Warrego Highway Intersection

Formation



Intersection Description

The Pickanjinie North Road/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Pickanjinie North Road	155	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1383	10%	138	10%	138
$Q_{T1} \text{ Cumulative} =$			8		8
$Q_{T1} GLNG GFDP =$			33		33
$Q_{T2} =$	1383	-	180	-	180
$Q_{T2} BG =$	1486	10%	149	10%	149
$Q_{T2} \text{ Cumulative} =$			1		1
$Q_{T2} GLNG GFDP =$			33		33
$Q_{T3} =$	1486	-	182	-	182
$Q_{T3} BG =$	39	10%	4	10%	4
$Q_{T3} \text{ Cumulative} =$			0		0
$Q_{T3} GLNG GFDP =$			0		0
$Q_{T4} =$	39	-	4	-	4
$Q_{T4} BG =$	39	10%	4	10%	4
$Q_{T4} \text{ Cumulative} =$			0		0
$Q_{T4} GLNG GFDP =$			1		1
$Q_{T5} =$	39	-	5	-	5

Assumptions

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

No upgrades are required.

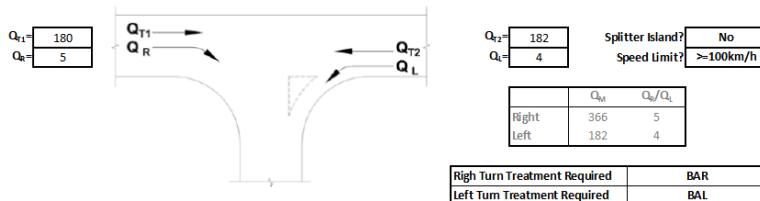
Traffic volume sources

Warrego through traffic volumes come from DTMR AADT (Cardno_AADT segment with Heavy vehicles and Growth rates report.pdf).

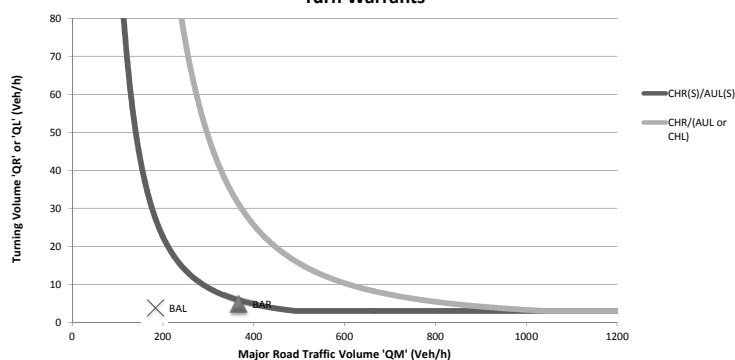
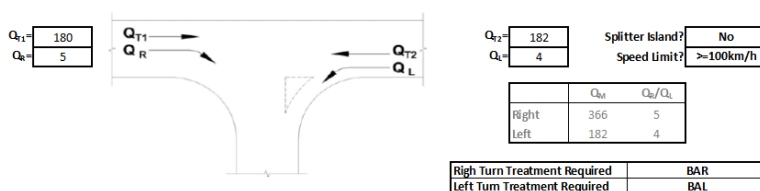
Pickanjinie Road traffic volumes come from Maranoa Region Traffic Counts (9148 Austraffic - Maranoa Region Traffic Counts.xlsx). It assumes the 12 hour survey data is 60% of daily traffic.

6% annual traffic growth has been applied to increase the background traffic for future traffic.

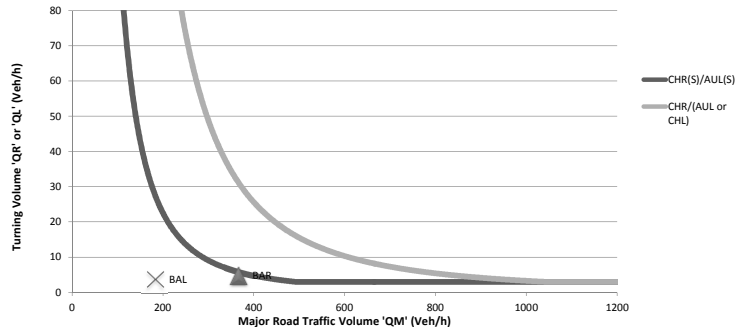
GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

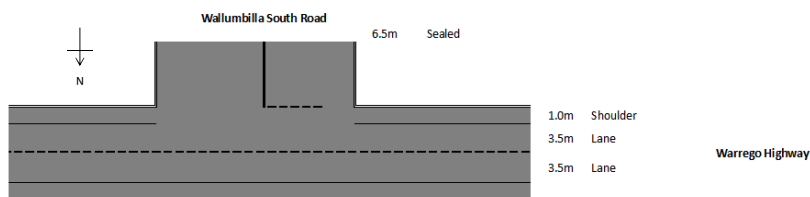
Pickanjinie North Road/Warrego Highway
2012 Background + GLNG (AM Peak)

Turn Warrants

Pickanjinie North Road/Warrego Highway
2012 Background + GLNG (PM Peak)

Turn Warrants



Wallumbilla South Road/Warrego Highway Intersection**Formation****Intersection Description**

The Wallumbilla South Road/Warrego Highway intersection is a four way priority controlled intersection with the main movement being the East-West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$			96		152
$Q_{T1} \text{ Cumulative} =$			8		8
$Q_{T1} GLNG GFDP =$			30		30
$Q_{T2} =$	0	-	134	-	190
$Q_{T2} BG =$			78		152
$Q_{T2} \text{ Cumulative} =$			5		5
$Q_{T2} GLNG GFDP =$			30		30
$Q_{L1} =$	0	-	113	-	187
$Q_{L1} BG =$			6		14
$Q_{L1} \text{ Cumulative} =$			0		0
$Q_{L1} GLNG GFDP =$			3		3
$Q_{L2} =$	0	-	9	-	17
$Q_{L2} BG =$			6		21
$Q_{L2} \text{ Cumulative} =$			0		0
$Q_{L2} GLNG GFDP =$			4		4
$Q_{R1} =$	0	-	10	-	25

Assumptions

Assumes Majority of project traffic comes from the west along Warrego Highway.

Turn Warrant Requirement

A BAL and a BAR.

Conclusion

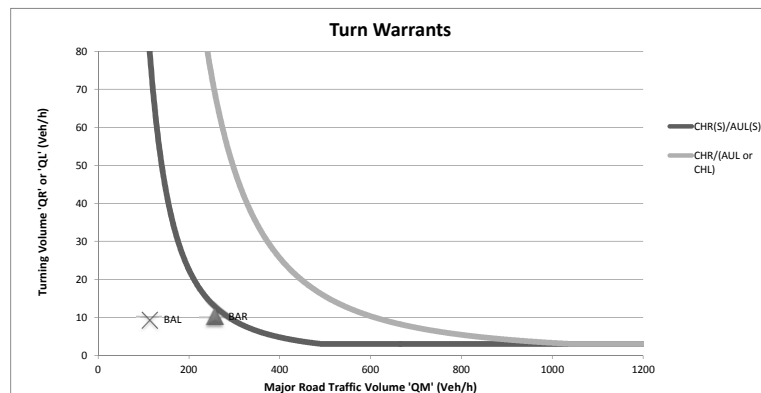
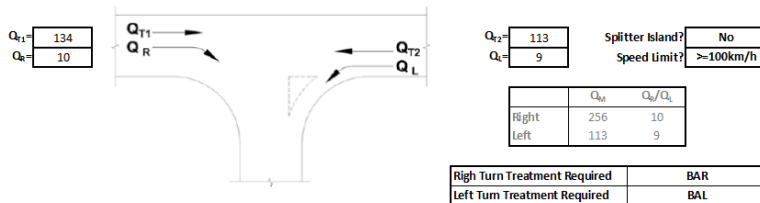
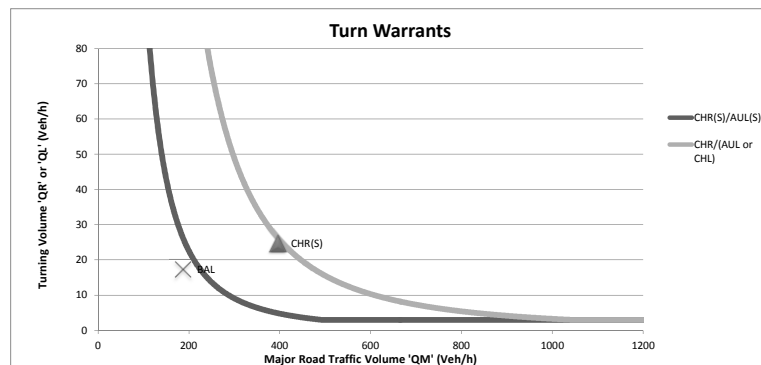
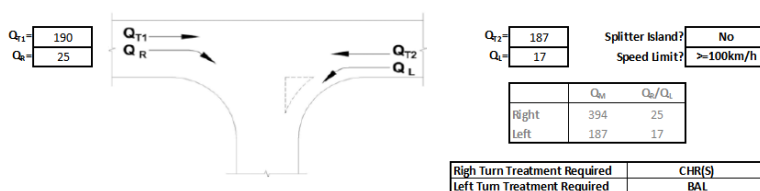
No upgrades required for this intersection.

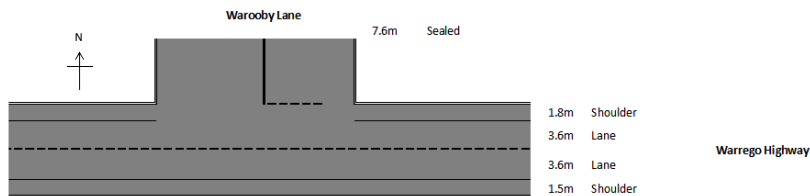
Traffic volume sources

Background Traffic volumes come from DTMR intersection counts. (Road Section 18D Intersection 69.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Wallumbilla South Road/Warrego Highway
 2012 Background + GLNG (AM Peak)

Wallumbilla South Road/Warrego Highway
 2012 Background + GLNG (PM Peak)


Warooby Lane/Warrego Highway Intersection**Formation****Intersection Description**

The Warooby Lane/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the east-west movement along the Warrego Highway. There are no turn facilities or auxiliary lanes provided Warrego Highway.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Warooby Lane	411	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1383	10%	138	10%	138
$Q_{T1} Cumulative =$			1		1
$Q_{T1} GLNG GFDP =$			33		33
$Q_{T2} =$	1383	-	172	-	172
$Q_{T2} BG =$	1486	10%	149	10%	149
$Q_{T2} Cumulative =$			1		1
$Q_{T2} GLNG GFDP =$			33		33
$Q_{T3} =$	1486	-	182	-	182
$Q_{T3} BG =$	103	10%	10	10%	10
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			4		4
$Q_{T4} =$	103	-	14	-	14
$Q_{T4} BG =$	103	10%	10	10%	10
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			1		1
$Q_{T5} =$	103	-	11	-	11

Assumptions**Turn Warrant Requirement**

A BAL and a CHR(S).

Conclusion

The right turn movement needs to be upgrade into CHR(S).

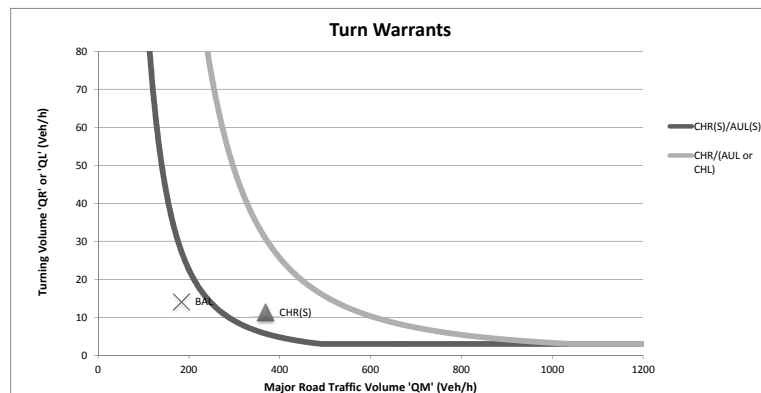
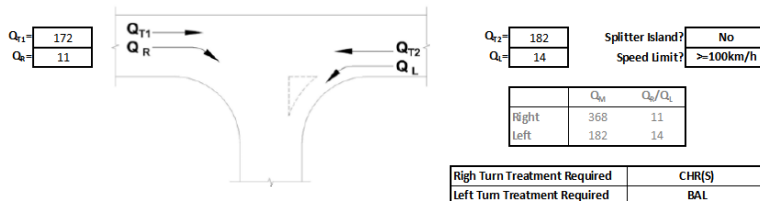
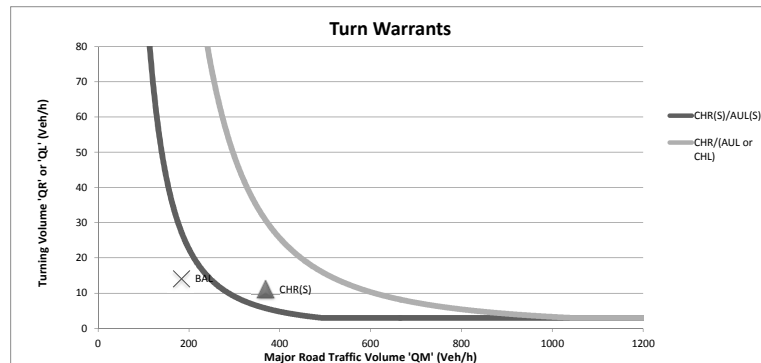
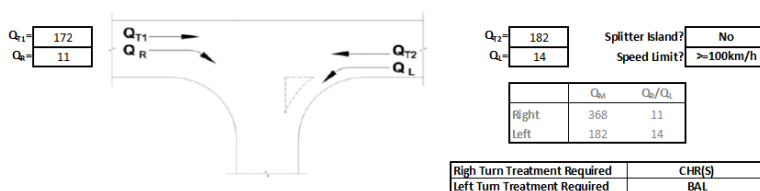
Traffic volume sources

Warrego through traffic volumes come from DTMR AADT (Cardno_AADT segment with Heavy vehicles and Growth rates report.pdf).

Warooby Lane traffic volumes come from Maranoa Region Traffic Counts(9148 Austraffic - Maranoa Region Traffic Counts.xlsx). It assumes the 12 hour survey data is 60% of daily traffic.

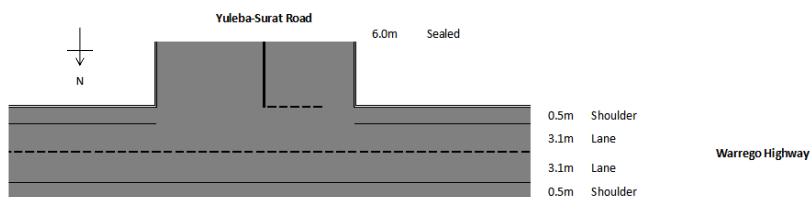
6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip

Warooby Lane/Warrego Highway
 2012 Background + GLNG (AM Peak)

Warooby Lane/Warrego Highway
 2012 Background + GLNG (PM Peak)


Yuleba-Surat Road/Warrego Highway Intersection

Formation



Intersection Description

The Yuleba-Surat/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East -West movement along the Warrego Highway. There are no turn facilities or auxiliary lanes.

	Daily	PF	AM	PF	PM
Q_{T1} BG=			134		128
Q_{T1} Cumulative=			8		8
Q_{T1} GLNG GFDP=			25		25
Q_{T2} BG=	0	-	167	-	161
Q_{T2} BG=			72		96
Q_{T2} Cumulative=			8		8
Q_{T2} GLNG GFDP=			25		25
Q_{L1} BG=	0	-	105	-	129
Q_{L1} BG=			0		0
Q_{L1} Cumulative=			0		0
Q_{L1} GLNG GFDP=			2		2
Q_{L2} BG=	0	-	2	-	2
Q_{L2} BG=			5		5
Q_{L2} Cumulative=			0		0
Q_{L2} GLNG GFDP=			7		7
Q_{L3} BG=	0	-	12	-	12

Assumptions

Turn Warrant Requirement

A BAL and a CHR(S).

Conclusion

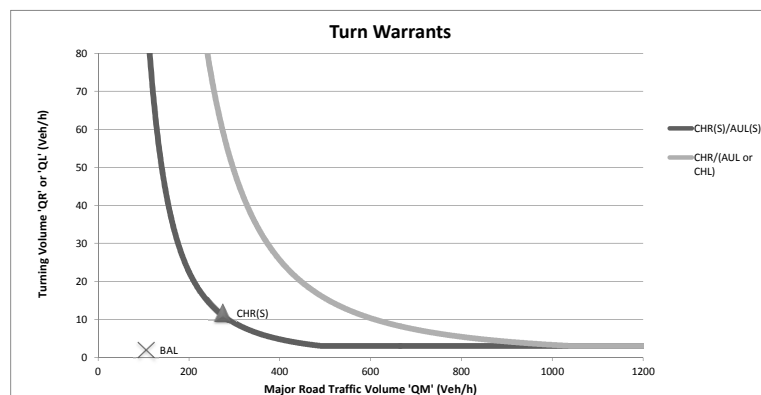
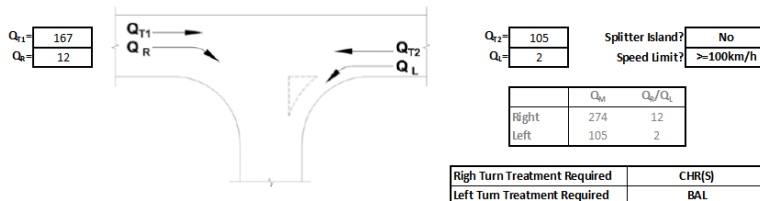
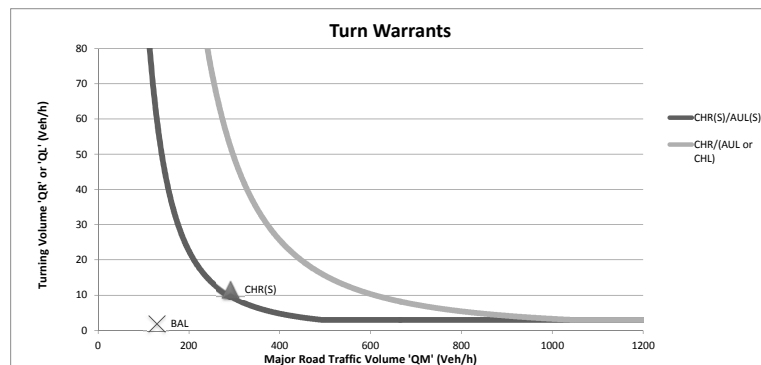
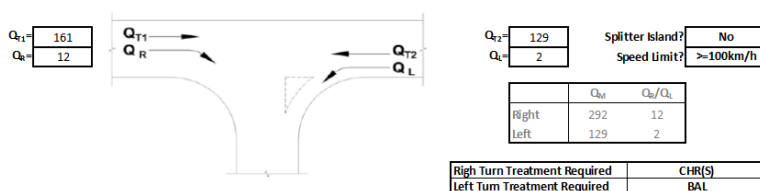
A CHR(S) is required for traffic turning into Yuleba-Surat Road from Warrego Highway.

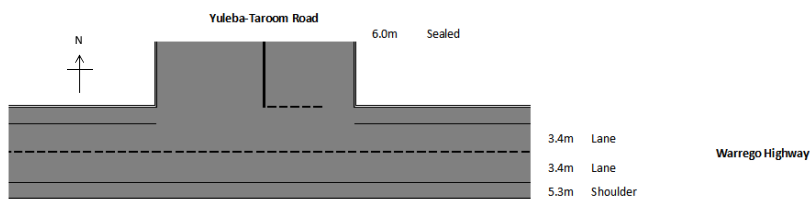
Traffic volume sources

Background Traffic volumes come from 2012 DTMR intersection counts (Road Section 18D Intersection 190.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Yuleba-Surat Road/Warrego Highway
2012 Background + GLNG (AM Peak)Yuleba-Surat Road/Warrego Highway
2012 Background + GLNG (PM Peak)

Yuleba-Taroom Road/Warrego Highway Intersection**Formation****Intersection Description**

The Yuleba-Taroom Road/Warrego Highway intersection is a three way priority controlled intersection with the main movement being the East - West movement along the Warrego Highway. There are CHR(S) turning facility provided for traffic going to Yuleba-Taroom Road.

Two-way Daily Volume (vpd)		Split Assumption			
		In	Out	Left In	Right In
Yuleba-Taroom Road	200	50%	50%	50%	50%

	Daily	PF	AM	PF	PM
$Q_{T1} BG =$	1397	10%	140	10%	140
$Q_{T1} Cumulative =$			8		8
$Q_{T1} GLNG GFDP =$			18		18
$Q_{T2} =$	1397	-	166	-	166
$Q_{T2} BG =$	1352	10%	135	10%	135
$Q_{T2} Cumulative =$			8		8
$Q_{T2} GLNG GFDP =$			18		18
$Q_{T3} =$	1352	-	161	-	161
$Q_{T3} BG =$	50	10%	5	10%	5
$Q_{T3} Cumulative =$			0		0
$Q_{T3} GLNG GFDP =$			3		3
$Q_{T4} =$	50	-	8	-	8
$Q_{T4} BG =$	50	10%	5	10%	5
$Q_{T4} Cumulative =$			0		0
$Q_{T4} GLNG GFDP =$			5		5

Assumptions**Turn Warrant Requirement**

A BAL and a BAR.

Conclusion

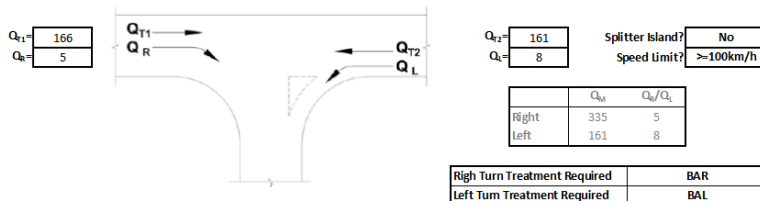
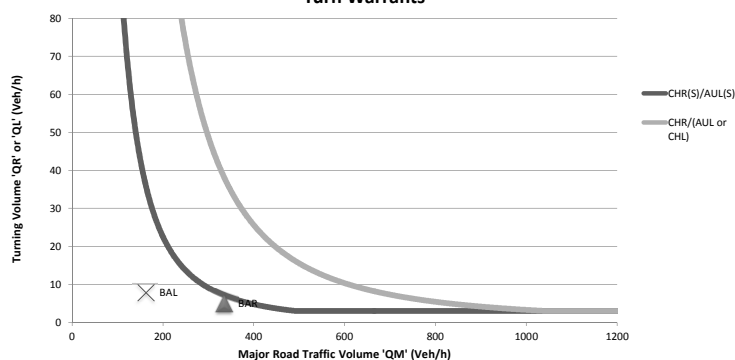
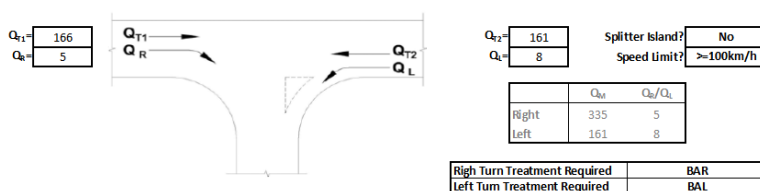
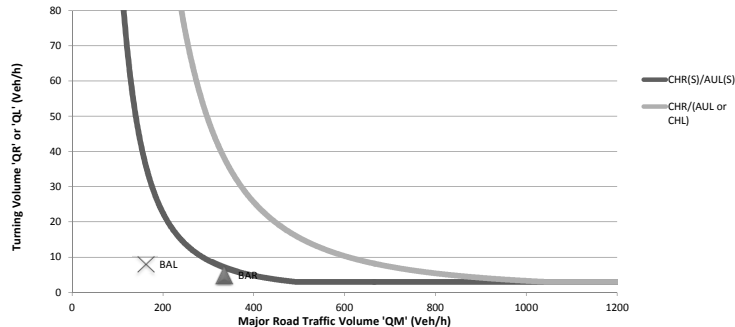
No upgrades are required.

Traffic volume sources

Warrego through traffic volumes come from 2012 DTMR AADT (Annual Volume Report Road Section 18D.pdf).

6% annual traffic growth has been applied to increase the background traffic for future traffic.

GLNG and GLNG GFDP traffic volumes come from intersection trip volumes sheet (IntersectionTripVolumes.xlsx)

Yuleba-Taroom Road/Warrego Highway
 2012 Background + GLNG (AM Peak)
**Turn Warrants**
Yuleba-Taroom Road/Warrego Highway
 2012 Background + GLNG (PM Peak)
**Turn Warrants**

APPENDIX E

PAVEMENT IMPACT ASSESSMENT

Background Parameters

P/A ID	Road	Section	Direction	Seal Width (m)	Link Width (m)	Width Difference (m)	Length (m)	Comm Year	Total Volume (yrd)	Classification					Total Heavy Vehicle Volume (yrd)	Annual HV Growth	Base Year	Growth Type	Total Base Year Heavy Vehicle Volume (yrd)	ESA Heavy Vehicle Ratio	Total Base Year ESA Load	Start Change	End Change	Roughness	Roughness Survey Year
										Light Vehicle %	Truck/Bus %	Articulated %	Road Type %												
1	Warrego Highway 18B	Toys Road to Oakey Biddston Road	Gazette	11.8	16.0	-4.2	16.24	2011	12345	85.95%	14%	1.734	3.00%	2011	Cumulative	1,734	3.20	2,025.312	10.6	26.8	89	2013			
2	Warrego Highway 18B	Toys Road to Oakey Biddston Road	Against-Gazette	11.8	16.0	-4.2	16.24	2011	12345	85.95%	14%	1.734	3.00%	2011	Cumulative	1,734	3.20	2,025.312	10.6	26.8	89	2013			
3	Warrego Highway 18B	Oakey Biddston Road to Dalby Cecil Plains Road	Gazette	10.6	9.0	-1.6	53.99	2011	5160	74.81%	25%	1.300	3.00%	2011	Cumulative	1,300	3.20	1,518.400	26.8	80.8	85	2013			
4	Warrego Highway 18B	Oakey Biddston Road to Dalby Cecil Plains Road	Against-Gazette	10.6	9.0	-1.6	53.99	2011	5160	74.81%	25%	1.300	3.00%	2011	Cumulative	1,300	3.20	1,518.400	26.8	80.8	85	2013			
5	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gazette	9.0	16.0	7.0	3.37	2011	9575	78.81%	18%	1.738	3.00%	2011	Cumulative	1,738	3.20	2,029.984	80.8	84.2	111	2013			
6	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazette	9.0	16.0	7.0	3.37	2011	9575	78.81%	18%	1.738	3.00%	2011	Cumulative	1,738	3.20	2,029.984	80.8	84.2	111	2013			
7	Warrego Highway 18C	Cunningham Street to Rail Line	Gazette	16.6	16.0	-0.6	1.09	2011	12068	83.39%	17%	2.004	3.00%	2011	Cumulative	2,004	3.20	2,240.672	0.0	1.1	82	2013			
8	Warrego Highway 18C	Cunningham Street to Rail Line	Against-Gazette	16.6	16.0	-0.6	1.09	2011	12068	83.39%	17%	2.004	3.00%	2011	Cumulative	2,004	3.20	2,240.672	0.0	1.1	82	2013			
9	Warrego Highway 18C	Rail Line to Macalister Bell Road	Gazette	10.8	9.0	-1.8	24.03	2011	3062	75.88%	24%	736	3.00%	2011	Cumulative	736	3.20	859.648	1.1	25.1	50	2013			
10	Warrego Highway 18C	Rail Line to Macalister Bell Road	Against-Gazette	10.8	9.0	-1.8	24.03	2011	3062	75.88%	24%	736	3.00%	2011	Cumulative	736	3.20	859.648	1.1	25.1	50	2013			
11	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Gazette	7.8	9.0	1.4	20.08	2011	2659	74.88%	25%	688	3.00%	2011	Cumulative	688	3.20	780.224	25.1	45.2	68	2013			
12	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Against-Gazette	7.8	9.0	1.4	20.08	2011	2659	74.88%	25%	688	3.00%	2011	Cumulative	688	3.20	780.224	25.1	45.2	68	2013			
13	Warrego Highway 18C	Warra Kogan Road to Glasson Street	Gazette	9.2	9.0	-0.2	34.98	2011	3625	79.53%	20%	742	3.00%	2011	Cumulative	742	3.20	866.656	45.2	80.2	98	2013			
14	Warrego Highway 18C	Warra Kogan Road to Glasson Street	Against-Gazette	9.2	9.0	-0.2	34.98	2011	3625	79.53%	20%	742	3.00%	2011	Cumulative	742	3.20	866.656	45.2	80.2	98	2013			
15	Warrego Highway 18C	Glasson Street to Auburn Road	Gazette	10.8	9.0	-1.8	2.98	2011	4233	77.37%	23%	968	3.00%	2011	Cumulative	968	3.20	1,118.944	80.2	83.2	107	2013			
16	Warrego Highway 18C	Glasson Street to Auburn Road	Against-Gazette	10.8	9.0	-1.8	2.98	2011	4233	77.37%	23%	968	3.00%	2011	Cumulative	968	3.20	1,118.944	80.2	83.2	107	2013			
17	Warrego Highway 18C	Auburn Road to Goombi	Gazette	10.2	9.0	-1.2	23.20	2011	2839	73.37%	27%	756	3.00%	2011	Cumulative	756	3.20	883.008	83.2	106.4	76	2013			
18	Warrego Highway 18C	Auburn Road to Goombi	Against-Gazette	10.2	9.0	-1.2	23.20	2011	2839	73.37%	27%	756	3.00%	2011	Cumulative	756	3.20	883.008	83.2	106.4	76	2013			
19	Warrego Highway 18C	Goombi to Leichhardt Highway	Gazette	9.0	9.0	0.0	20.39	2011	2178	80.89%	19%	423	3.00%	2011	Cumulative	423	3.20	494.064	106.4	126.8	69	2013			
20	Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gazette	9.0	9.0	0.0	20.39	2011	2178	80.89%	19%	423	3.00%	2011	Cumulative	423	3.20	494.064	106.4	126.8	69	2013			
21	Warrego Highway 18D	Miles to 18Dulacca North Intersection	Gazette	9.2	9.0	-0.2	43.00	2011	1855	70.09%	30%	555	3.00%	2011	Cumulative	555	3.20	648.240	0.0	43.0	68	2013			
22	Warrego Highway 18D	Miles to 18Dulacca North Intersection	Against-Gazette	9.2	9.0	-0.2	43.00	2011	1855	70.09%	30%	555	3.00%	2011	Cumulative	555	3.20	648.240	0.0	43.0	68	2013			
23	Warrego Highway 18D	18Dulacca North Intersection to Yuleba-Taroom Rd	Gazette	9.1	9.0	-0.1	37.00	2011	1448	68.98%	31%	455	3.00%	2011	Cumulative	455	3.20	531.440	43.0	80.0	76	2013			
24	Warrego Highway 18D	18Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazette	9.1	9.0	-0.1	37.00	2011	1448	68.98%	31%	455	3.00%	2011	Cumulative	455	3.20	531.440	43.0	80.0	76	2013			
25	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Sun Rd	Gazette	9.0	9.0	0.0	1.50	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	80.0	81.5	76	2013			
26	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Sun Rd	Against-Gazette	9.0	9.0	0.0	1.50	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	80.0	81.5	76	2013			
27	Warrego Highway 18D	Yuleba-Sun Rd to Kangaroo Cr Rd	Gazette	8.1	8.0	0.0	4.90	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	81.5	86.4	76	2013			
28	Warrego Highway 18D	Yuleba-Sun Rd to Kangaroo Cr Rd	Against-Gazette	8.1	8.0	0.0	4.90	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	81.5	86.4	76	2013			
29	Warrego Highway 18D	Kangaroo Cr Rd to 18Dulacca North Intersection	Gazette	8.4	8.0	-0.4	4.90	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	81.5	86.4	76	2013			
30	Warrego Highway 18D	Kangaroo Cr Rd to 18Dulacca North Intersection	Against-Gazette	8.4	8.0	-0.4	4.90	2011	1519	67.81%	32%	492	3.00%	2011	Cumulative	492	3.20	574.656	81.5	86.4	76	2013			
31	Warrego Highway 18D	18Dulacca North Intersection to Pickinjin Rd	Gazette	8.5	8.0	-0.5	4.00	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	101.0	105.0	47	2013			
32	Warrego Highway 18D	18Dulacca North Intersection to Pickinjin Rd	Against-Gazette	8.5	8.0	-0.5	4.00	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	101.0	105.0	47	2013			
33	Warrego Highway 18D	Pickinjin Rd to Letternore Lane	Gazette	8.7	9.0	0.7	13.00	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	108.0	121.0	56	2013			
34	Warrego Highway 18D	Pickinjin Rd to Letternore Lane	Against-Gazette	8.7	9.0	0.7	13.00	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	108.0	121.0	56	2013			
35	Warrego Highway 18D	Letternore Lane to Woorooly Lane	Gazette	9.5	9.0	-0.5	8.60	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	121.0	129.6	80	2013			
36	Warrego Highway 18D	Letternore Lane to Woorooly Lane	Against-Gazette	9.5	9.0	-0.5	8.60	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	121.0	129.6	80	2013			
37	Warrego Highway 18D	Woorooly Ln to KM135.5	Gazette	9.6	9.0	-0.6	5.40	2011	1601	74.98%	25%	407	3.00%	2011	Cumulative	407	3.20	475.376	129.6	135.0	49	2013			
38	Warrego Highway 18D	Woorooly Ln to KM135.5	Against-Gazette	9.6	9.0	-0.6	5.40	2011	1601	74.98%	25%	407	3.00%	2011											

DTMR Specified Inputs

Other Input Data		
ESA's/HV	2.9	Bruce Highway
	3.2	All Other Roads
Roughness Increase	3	counts/year
Terminal Roughness	110	Bruce Highway
	120	All Other Roads
Inflation Rate	7.0%	
Discount Rate	6.0%	
HV Growth Rate	6%	All road sections

Source: Data provided by DMR 28/03/08

Values updated on 3/4/13

ESA Load by Vehicle Class

Unloaded ESA's calculated from first principles

Loaded ESA's as defined in the Department of Main Roads Road Planning and Design Manual, Chapter 5, Table 5.16(a)

Loaded ESA NOT based on Gross Combination Mass allowed under the Mass Limits Review concession for vehicles fitted with Road Friendly Suspension

Variables**Unloaded Axle Loads**

4.5	single axle single wheels
4.5	single axle dual wheels
5	tandem axle dual wheels
6.5	tri-axle dual wheels

Loaded Axle Loads

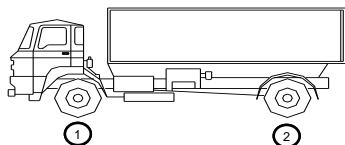
6	single axle single wheels
9	single axle dual wheels
16.5	tandem axle dual wheels
20	tri-axle dual wheels

Equivalent Axle Loads

5.4	single axle single wheels
8.2	single axle dual wheels
13.8	tandem axle dual wheels
18.5	tri-axle dual wheels

Two Axle Truck (class 3)

(General Access Vehicles, Rigid Trucks)

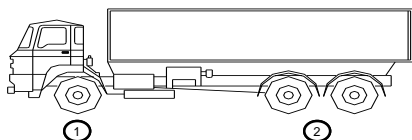


Scenario	Component	Single Axle Single Wheels 1	Single Axle Single Wheels 2	TOTAL
Unloaded	Axle Load (t)	4.5	4.5	9
	Equiv Load (t)	5.4	5.4	
	ESA	0.482	0.482	0.965
Loaded	ESA	-	-	3.000

AVG. ESA
1.98 (half the time empty)

Three Axle Truck (class 4)

(Three Axle Truck)

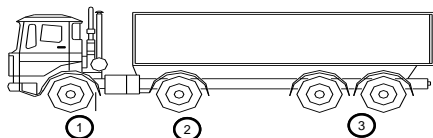


Scenario	Component	Single Axle Single Wheels 1	Tandem Axle Dual Wheels 2	TOTAL
Unloaded	Axle Load (t)	4.5	5	9.5
	Equiv Load (t)	5.4	13.8	
	ESA	0.482	0.017	0.499
Loaded	ESA	-	-	3.700

AVG. ESA
2.10 (half the time empty)

Four Axle Truck (class 5)

(Four Axle Truck)



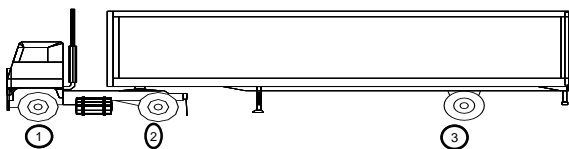
Scenario	Component	Single Axle Single Wheels 1	Single Axle Single Wheels 2	Tandem Axle Dual Wheels 3	TOTAL
Unloaded	Axle Load (t)	4.5	4.5	5	14
	Equiv Load (t)	5.4	5.4	13.8	
	ESA	0.482	0.482	0.017	0.982
Loaded	ESA	-	-	-	4.400

AVG. ESA
2.69 (half the time empty)

ESA Load by Vehicle Class

Three Axle Semi-trailer (class 6)

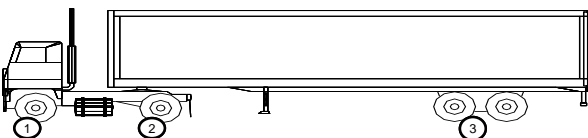
(Three Axle Articulated Vehicle)



Scenario	Component	Single Axle Single Wheels ①	Single Axle Dual Wheels ②	Single Axle Dual Wheels ③	TOTAL
Unloaded	Axle Load (t)	4.5	4.5	4.5	13.5
	Equiv Load (t)	5.4	8.2	8.2	
	ESA	0.482	0.091	0.091	0.664
Loaded	ESA	-	-	-	4.400

 AVG. ESA
2.53 (half the time empty)
Four Axle Semi-trailer (class 7)

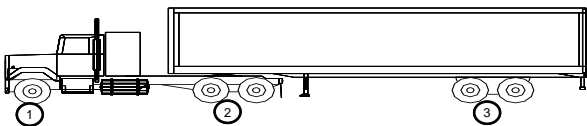
(Four Axle Articulated Vehicle)



Scenario	Component	Single Axle Single Wheels ①	Single Axle Dual Wheels ②	Tandem Axle Dual Wheels ③	TOTAL
Unloaded	Axle Load (t)	4.5	4.5	5	9.5
	Equiv Load (t)	5.4	8.2	13.8	
	ESA	0.482	0.091	0.017	0.590
Loaded	ESA	-	-	-	5.100

 AVG. ESA
2.85 (half the time empty)
Five Axle Semi-trailer (class 8)

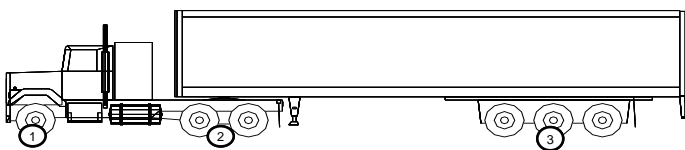
(Five Axle Articulated Vehicle)



Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tandem Axle Dual Wheels ③	TOTAL
Unloaded	Axle Load (t)	4.5	5	5	14.5
	Equiv Load (t)	5.4	13.8	13.8	
	ESA	0.482	0.017	0.017	0.517
Loaded	ESA	-	-	-	5.900

 AVG. ESA
3.21 (half the time empty)
Six Axle Semi Trailer (class 9)

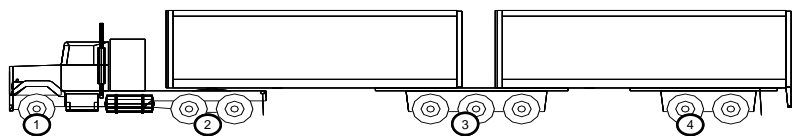
(Prime Mover Semi Trailer)



Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tri-axle Dual Wheels ③	TOTAL
Unloaded	Axle Load (t)	4.5	5	6.5	16
	Equiv Load (t)	5.4	13.8	18.5	
	ESA	0.482	0.017	0.015	0.515
Loaded	ESA	-	-	-	5.100

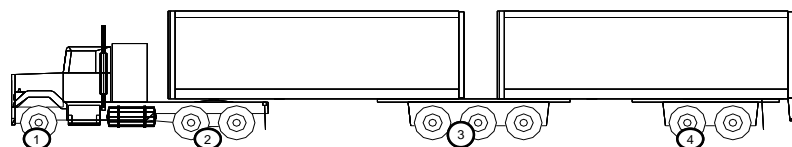
 AVG. ESA
0.51 (empty)
5.10 (full)

ESA Load by Vehicle Class

8 Axle B Double (class 10)
(19m B-double)

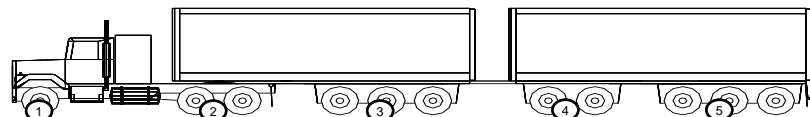
Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tri-axle Dual Wheels ③	Tandem Axle Dual Wheels ④	TOTAL
Unloaded	Axle Load (t)	4.5	5	6.5	5	21
	Equip Load (t)	5.4	13.8	18.5	13.8	
	ESA	0.482	0.017	0.015	0.017	0.532
Loaded	ESA	-	-	-	-	7.200

AVG. ESA
3.87 (half the time empty)

9 Axle B Double (class 10)
(25m B-double)

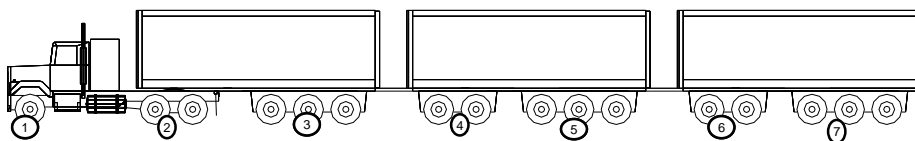
Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tri-axle Dual Wheels ③	Tri-Axle Dual Wheels ④	TOTAL
Unloaded	Axle Load (t)	4.5	5	6.5	6.5	22.5
	Equip Load (t)	5.4	13.8	18.5	18.5	
	ESA	0.482	0.017	0.015	0.015	0.530
Loaded	ESA	-	-	-	-	6.400

+ 1 wheel
AVG. ESA
3.46 (half the time empty)

11 Axle Double Road Train (class 11)
(conventional type I road train)

Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tri-axle Dual Wheels ③	Tandem Axle Dual Wheels ④	Tri-axle Dual Wheels ⑤	TOTAL
Unloaded	Axle Load (t)	4.5	5	6.5	5	6.5	27.5
	Equip Load (t)	5.4	13.8	18.5	13.8	18.5	
	ESA	0.482	0.017	0.015	0.017	0.015	0.547
Loaded	ESA	-	-	-	-	-	8.600

AVG. ESA
4.57 (half the time empty)

16 Axle Triple Road Train (class 12)
(conventional type II road train)

Scenario	Component	Single Axle Single Wheels ①	Tandem Axle Dual Wheels ②	Tri-axle Dual Wheels ③	Tandem Axle Dual Wheels ④	Tri-axle Dual Wheels ⑤	Tandem Axle Dual Wheels ⑥	Tri-axle Dual Wheels ⑦	TOTAL
Unloaded	Axle Load (t)	4.5	5	6.5	5	6.5	5	6.5	39
	Equip Load (t)	5.4	13.8	18.5	13.8	18.5	13.8	18.5	
	ESA	0.482	0.017	0.015	0.017	0.015	0.017	0.015	0.580
Loaded	ESA	-	-	-	-	-	-	-	12.140

AVG. ESA
6.36

Total Background + Cumulative Values

Line	Section	Direction	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	
1	Warrego Highway 18B	Troy Road to Oakley Biddison Road	Gas	991	1072	1065	1101	1137	1174	1212	1238	1274	1312	1351	1391	1426	1462	1501	1545	1591	1638	1686	1736	1787	1840	1895	1951	2008	2068	2129	2193	2258	2325	2394	2465	2538	2613	2691	2768	2828	2911	3000	3083	3178	3278		
2	Warrego Highway 18B	Warrego Road to Oakley Biddison Road	Against-Gas	991	1072	1065	1101	1137	1174	1212	1238	1274	1312	1351	1391	1426	1462	1501	1545	1591	1638	1686	1736	1787	1840	1895	1951	2008	2068	2129	2193	2258	2325	2394	2465	2538	2613	2691	2768	2828	2911	3000	3083	3178	3278		
3	Warrego Highway 18B	Oakley Biddison Road to Dalby Cecil Plains Road	Gas	781	836	821	852	880	909	936	965	995	1024	1054	1083	1113	1143	1173	1203	1233	1263	1293	1323	1353	1383	1413	1443	1473	1503	1533	1563	1593	1623	1653	1683	1713	1743	1773	1803	1833	1863	1893	1923	1953	1983	2013	
4	Warrego Highway 18B	Oakley Biddison Road to Dalby Cecil Plains Road	Against-Gas	781	836	821	852	880	909	936	965	995	1024	1054	1083	1113	1143	1173	1203	1233	1263	1293	1323	1353	1383	1413	1443	1473	1503	1533	1563	1593	1623	1653	1683	1713	1743	1773	1803	1833	1863	1893	1923	1953	1983	2013	
5	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gas	907	1075	1069	1109	1148	1185	1224	1262	1301	1339	1377	1415	1453	1491	1529	1567	1605	1643	1681	1719	1757	1795	1833	1871	1909	1947	1985	2023	2061	2100	2138	2176	2214	2252	2290	2328	2366	2404	2442	2480	2518	2556	2594	2632
6	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gas	907	1075	1069	1109	1148	1185	1224	1262	1301	1339	1377	1415	1453	1491	1529	1567	1605	1643	1681	1719	1757	1795	1833	1871	1909	1947	1985	2023	2061	2100	2138	2176	2214	2252	2290	2328	2366	2404	2442	2480	2518	2556	2594	2632
7	Warrego Highway 18B	Cunningham Street to Rail Line	Gas	1181	1197	1219	1264	1307	1351	1397	1431	1474	1519	1565	1613	1662	1713	1765	1818	1873	1929	1986	2044	2102	2161	2221	2282	2343	2404	2465	2526	2587	2648	2709	2770	2831	2892	2953	3014	3075	3136	3197	3258	3319	3380	3441	3502
8	Warrego Highway 18C	Rail Line to Macalister Belt Road	Against-Gas	1181	1197	1219	1264	1307	1351	1397	1431	1474	1519	1565	1613	1662	1713	1765	1818	1873	1929	1986	2044	2102	2161	2221	2282	2343	2404	2465	2526	2587	2648	2709	2770	2831	2892	2953	3014	3075	3136	3197	3258	3319	3380	3441	3502
9	Warrego Highway 18C	Rail Line to Macalister Belt Road	Gas	567	731	637	661	684	707	730	753	776	799	822	845	868	891	914	937	960	983	1006	1029	1052	1075	1098	1121	1144	1167	1190	1213	1236	1259	1282	1305	1328	1351	1374	1397	1420	1443	1466	1489	1512	1535	1558	
10	Warrego Highway 18C	Macalister Belt Road to Wana Koon Road	Against-Gas	567	731	637	661	684	707	730	753	776	799	822	845	868	891	914	937	960	983	1006	1029	1052	1075	1098	1121	1144	1167	1190	1213	1236	1259	1282	1305	1328	1351	1374	1397	1420	1443	1466	1489	1512	1535	1558	
11	Warrego Highway 18C	Macalister Belt Road to Wana Koon Road	Gas	448	443	471	494	516	537	560	582	603	624	645	666	687	708	729	750	771	792	813	834	855	876	897	918	939	960	981	1002	1023	1044	1065	1086	1107	1128	1149	1170	1191	1212	1233	1254	1275	1296		
12	Warrego Highway 18C	Macalister Belt Road to Wana Koon Road	Against-Gas	448	443	471	494	516	537	560	582	603	624	645	666	687	708	729	750	771	792	813	834	855	876	897	918	939	960	981	1002	1023	1044	1065	1086	1107	1128	1149	1170	1191	1212	1233	1254	1275	1296		
13	Warrego Highway 18C	Wana Koon Road to Glasien Street	Gas	289	303	316	329	343	357	371	385	399	413	427	441	455	469	483	497	511	525	539	553	567	581	595	609	623	637	651	665	679	693	707	721	735	749	763	777	791	805	819	833	847	861		
14	Warrego Highway 18C	Wana Koon Road to Glasien Street	Against-Gas	289	303	316	329	343	357	371	385	399	413	427	441	455	469	483	497	511	525	539	553	567	581	595	609	623	637	651	665	679	693	707	721	735	749	763	777	791	805	819	833	847			
15	Warrego Highway 18C	Glasien Street to Auburn Road	Gas	487	550	513	537	558	581	603	624	645	666	687	708	729	750	771	792	813	834	855	876	897	918	939	960	981	1002	1023	1044	1065	1086	1107	1128	1149	1170	1191	1212	1233	1254	1275	1296	1317	1338		
16	Warrego Highway 18C	Glasien Street to Auburn Road	Against-Gas	487	550	513	537	558	581	603	624	645	666	687	708	729	750	771	792	813	834	855	876	897	918	939	960	981	1002	1023	1044	1065	1086	1107	1128	1149	1170	1191	1212	1233	1254	1275	1296	1317	1338		
17	Warrego Highway 18C	Glasien Street to Auburn Road	Gas	602	705	672	699	725	751	774	797	820	843	866	889	912	935	958	981	1004	1027	1050	1073	1096	1119	1142	1165	1188	1211	1234	1257	1280	1303	1326	1349	1372	1395	1418	1441	1464	1487	1510	1533	1556			
18	Warrego Highway 18C	Glasien Street to Auburn Road	Against-Gas	602	705	672	699	725	751	774	797	820	843	866	889	912	935	958	981	1004	1027	1050	1073	1096	1119	1142	1165	1188	1211	1234	1257	1280	1303	1326	1349	1372	1395	1418	1441	1464	1487	1510	1533	1556			
19	Warrego Highway 18C	Auburn Road to Goombi	Gas	500	563	521	549	575	602	629	654	680	706	732	758	784	810	836	862	888	914	940	966	992	1018	1044	1070	1096	1122	1148	1174	1200	1226	1252	1278	1304	1330	1356	1382	1408	1434	1460	1486	1512			
20	Warrego Highway 18C	Auburn Road to Goombi	Against-Gas	500	563	521	549	575	602	629	654	680	706	732	758	784	810	836	862	888	914	940	966	992	1018	1044	1070	1096	1122	1148	1174	1200	1226	1252	1278	1304	1330	1356	1382	1408	1434	1460	1486	1512			
21	Warrego Highway 18C	Goombi to Leichhardt Highway	Gas	248	344	356	373	388	404	419	435	450	465	480	495	510	525	540	555	570	585	600	615	630	645	660	675	690	705	720	735	750	765	780	795	810	825	840	855	870	885	900	915	930			
22	Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gas	248	344	356	373	388	404	419	435	450	465	480	495	510	525	540	555	570	585	600	615	630	645	660	675	690	705	720	735	750	765	780	795	810	825	840	855	870	885	900	915	930			
23	Warrego Highway 18D	Mines to Leichhardt North Intersection	Gas	396	358	362	378	395	413	430	448	464	480	497	514	530	547	563	580	597	614	631	648	664	681	698	715	732	749	766	783	799	816	833	850	867	884	901	918	935	952	969	986	1003			
24	Warrego Highway 18D	Mines to Leichhardt North Intersection	Against-Gas	396	358	362	378	395	413	430	448	464	480	497	514	530	547	563	580	597	614	631	648	664	681	698	715	732	749	766	783	799	816	833	850	867	884	901	918	935	952	969	986	1003			
25	Warrego Highway 18D	Leichhardt North Intersection to Yuba-Taroom Rd	Gas	263	289	303	316	329	343	357	371	385	399	413	427	441	455	469	483	497	511	525	539	553	567	581	595	609	623	637	651	665	679	693	707	721	735	749	763	777	791	805	819	833			
26	Warrego Highway 18D	Leichhardt North Intersection to Yuba-Taroom Rd	Against-Gas	263	289	303	316	329	343	357	371	385	399	413	427	441	455	469	483	497	511	525	539	553	567	581	595	609	623	637	651	665	679	693	707	721	735	749	763	777	791	805	819	833			
27	Warrego Highway 18D	Yuba-Taroom Rd to Yuba-Surat Rd	Gas	283	327	330	343	356	370	384	397	410	423	436	449	462	475	488	501	514	527	540	553	566	579	592	605	618	631	644	657	670	683	696	709	722	735	748	761	774	787	800	813	826			
28	Warrego Highway 18D	Yuba-Taroom Rd to Yuba-Surat Rd	Against-Gas	283	327	330	343	356	370	384	397	410	423	436	449	462	475	488	501	514	527	540	553	566	579	592	605	618	631	644	657	670	683	696	709	722	735	748	761	774	787	800	813	826			
29	Warrego Highway 18D	Yuba-Surat Rd to Kangaroo Cr Rd	Gas	323	327	330	343	356	370	384	397	410	423	436	449	462	475	488	501	514	527	540	553	566	579	592	605	618	631	644	657	670	683	696	709	722	735	748	761	774	787	800	813	826			
30	Warrego Highway 18D	Yuba-Surat Rd to Kangaroo Cr Rd	Against-Gas	323	327	330	343	356	370	384	397	410	423	436	449	462	475	488	501	514	527	540	553	566	579	592	605	618	631	644	657	670	683	696	709	722											

Background Traffic Volumes			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056					
1	Warrego Highway 188	Troy Road to Oakley Biddisdon Road	General	820	847	876	1005	1026	1068	1088	1131	1165	1200	1236	1273	1311	1351	1391	1433	1476	1520	1566	1613	1661	1711	1762	1815	1870	1926	1984	2043	2104	2168	2233	2300	2369	2440	2513	2588	2666	2746	2828	2913	3000	3090	3183	3279				
2	Warrego Highway 188	Troy Road to Oakley Biddisdon Road	Against-Gazetted	820	847	876	1005	1026	1068	1088	1131	1165	1200	1236	1273	1311	1351	1391	1433	1476	1520	1566	1613	1661	1711	1762	1815	1870	1926	1984	2043	2104	2168	2233	2300	2369	2440	2513	2588	2666	2746	2828	2913	3000	3090	3183	3279				
3	Warrego Highway 188	Oakley Biddisdon Road to Dalby Creek Plains Road	General	690	710	732	776	799	828	846	874	900	927	955	983	1013	1043	1072	1107	1140	1174	1209	1245	1283	1321	1361	1402	1444	1487	1532	1578	1626	1674	1724	1776	1829	1884	1940	1999	2059	2120	2184	2249	2317	2386	2456					
4	Warrego Highway 188	Oakley Biddisdon Road to Dalby Creek Plains Road	Against-Gazetted	690	710	732	776	799	828	846	874	900	927	955	983	1013	1043	1072	1107	1140	1174	1209	1245	1283	1321	1361	1402	1444	1487	1532	1578	1626	1674	1724	1776	1829	1884	1940	1999	2059	2120	2184	2249	2317	2386	2456					
5	Warrego Highway 188	Dalby Creek Plains Road to Cunningham Street	General	922	950	978	1027	1058	1089	1111	1134	1160	1200	1236	1273	1311	1351	1391	1433	1476	1520	1566	1613	1661	1711	1762	1815	1870	1926	1984	2043	2104	2168	2233	2300	2369	2440	2513	2588	2666	2746	2828	2913	3000	3090	3183	3279				
6	Warrego Highway 188	Dalby Creek Plains Road to Cunningham Street	Against-Gazetted	922	950	978	1027	1058	1089	1111	1134	1160	1200	1236	1273	1311	1351	1391	1433	1476	1520	1566	1613	1661	1711	1762	1815	1870	1926	1984	2043	2104	2168	2233	2300	2369	2440	2513	2588	2666	2746	2828	2913	3000	3090	3183	3279				
7	Warrego Highway 188	Cunningham Street to Rail Line	General	1063	1095	1128	1162	1196	1232	1269	1307	1347	1387	1429	1471	1516	1561	1608	1656	1708	1757	1801	1844	1892	1940	1988	2037	2084	2131	2178	2226	2273	2320	2367	2414	2461	2508	2556	2604	2652	2701	2749	2798	2847	2897	2946	2995				
8	Warrego Highway 188	Cunningham Street to Rail Line	Against-Gazetted	1063	1095	1128	1162	1196	1232	1269	1307	1347	1387	1429	1471	1516	1561	1608	1656	1708	1757	1801	1844	1892	1940	1988	2037	2084	2131	2178	2226	2273	2320	2367	2414	2461	2508	2556	2604	2652	2701	2749	2798	2847	2897	2946	2995				
9	Warrego Highway 18C	Rail Line to Macalister Belt Road	General	360	402	414	427	439	453	466	480	495	509	525	540	557	573	591	608	626	645	665	685	705	726	748	771	794	817	842	867	893	920	948	976	1005	1036	1067	1099	1132	1165	1200	1236	1274	1312	1351	1392				
10	Warrego Highway 18C	Rail Line to Macalister Belt Road	Against-Gazetted	360	402	414	427	439	453	466	480	495	509	525	540	557	573	591	608	626	645	665	685	705	726	748	771	794	817	842	867	893	920	948	976	1005	1036	1067	1099	1132	1165	1200	1236	1274	1312	1351	1392				
11	Warrego Highway 18C	Macalister Belt Road to Warra Koan Road	General	354	365	376	387	399	411	423	436	449	462	476	490	505	520	536	552	569	586	603	621	640	659	679	699	720	742	764	787	811	835	860	886	912	940	968	997	1027	1058	1090	1122	1156	1191	1226	1263				
12	Warrego Highway 18C	Macalister Belt Road to Warra Koan Road	Against-Gazetted	354	365	376	387	399	411	423	436	449	462	476	490	505	520	536	552	569	586	603	621	640	659	679	699	720	742	764	787	811	835	860	886	912	940	968	997	1027	1058	1090	1122	1156	1191	1226	1263				
13	Warrego Highway 18C	Warra Koan Road to Glasdon Street	General	384	405	418	430	443	456	470	484	498	514	529	545	561	578	595	613	632	651	670	690	711	732	754	777	800	824	848	874	901	928	955	984	1014	1044	1075	1108	1141	1175	1210	1247	1284	1322	1362	1403				
14	Warrego Highway 18C	Warra Koan Road to Glasdon Street	Against-Gazetted	384	405	418	430	443	456	470	484	498	514	529	545	561	578	595	613	632	651	670	690	711	732	754	777	800	824	848	874	901	928	955	984	1014	1044	1075	1108	1141	1175	1210	1247	1284	1322	1362	1403				
15	Warrego Highway 18C	Glasdon Street to Auburn Road	General	508	523	538	555	572	589	607	625	643	662	681	700	720	740	760	781	802	823	844	865	887	910	933	956	979	1002	1025	1048	1071	1094	1117	1140	1163	1186	1209	1232	1255	1278	1301	1324	1347	1370	1393	1416				
16	Warrego Highway 18C	Glasdon Street to Auburn Road	Against-Gazetted	508	523	538	555	572	589	607	625	643	662	681	700	720	740	760	781	802	823	844	865	887	910	933	956	979	1002	1025	1048	1071	1094	1117	1140	1163	1186	1209	1232	1255	1278	1301	1324	1347	1370	1393	1416				
17	Warrego Highway 18C	Auburn Road to Goombi	General	401	413	425	438	451	465	479	493	508	523	538	555	572	589	607	625	643	662	681	700	720	740	760	781	802	823	844	865	887	910	933	956	979	1002	1025	1048	1071	1094	1117	1140	1163	1186	1209	1232	1255			
18	Warrego Highway 18C	Auburn Road to Goombi	Against-Gazetted	401	413	425	438	451	465	479	493	508	523	538	555	572	589	607	625	643	662	681	700	720	740	760	781	802	823	844	865	887	910	933	956	979	1002	1025	1048	1071	1094	1117	1140	1163	1186	1209	1232	1255			
19	Warrego Highway 18C	Goombi to Leichhardt Highway	General	224	231	238	245	253	260	268	276	284	293	302	311	320	330	339	350	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903
20	Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gazetted	224	231	238	245	253	260	268	276	284	293	302	311	320	330	339	350	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903
21	Warrego Highway 18C	Miles to 180/Dalucca North Intersection	General	294	303	312	322	331	341	352	362	373	384	396	408	420	432	445	459	472	487	501	516	532	548	564	581	598	616	635	654	674	694	715	736	758	781	804	828	853	879	905	932	960	989	1019	1049				
22	Warrego Highway 18C	Miles to 180/Dalucca North Intersection	Against-Gazetted	294	303	312	322	331	341	352	362	373	384	396	408	420	432	445	459	472	487	501	516	532	548	564	581	598	616	635	654	674	694	715	736	758	781	804	828	853	879	905	932	960	989	1019	1049				
23	Warrego Highway 18C	180/Dalucca North Intersection to Yuba-Taroom Rd	General	241	249	256	264	272	280	288	297	306	315	324	334	344	354	364	374	384	394	404	414	424	434	444	454	464	474	484	494	504	514	524	534	544	554	564	574	584	594	604	614	624	634	644	654				
24	Warrego Highway 18C	180/Dalucca North Intersection to Yuba-Taroom Rd	Against-Gazetted	241	249	256	264	272	280	288	297	306	315	324	334	344	354	364	374	384	394	404	414	424	434	444	454	464	474	484	494	504	514	524	534	544	554	564	574	584	594	604	614	624	634	644	654				
25	Warrego Highway 18D	Yuba-Taroom Rd to Yuba-Surt Rd	General	261	269	277	285	294	303	312	321	331	341	351	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903					
26	Warrego Highway 18D	Yuba-Taroom Rd to Yuba-Surt Rd	Against-Gazetted	261	269	277	285	294	303	312	321	331	341	351	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903					
27	Warrego Highway 18D	Yuba-Surt Rd to Kangaroo Ck Rd	General	261	269	277	285	294	303	312	321	331	341	351	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903					
28	Warrego Highway 18D	Yuba-Surt Rd to Kangaroo Ck Rd	Against-Gazetted	261	269	277	285	294	303	312	321	331	341	351	361	372	383	395	407	419	431	444	458	471	486	500	515	531	546	563	580	597	615	633	652	672	692	713	734	756	779	802	827	851	877	903					
29	Warrego Highway 18D	180/Dalucca North Intersection to Pickenanin Rd	General	216	222	229	236	243	250	258	266	273	282	290	299	308	317	327	336	346	357	368	379	390	402	414	426	439	452	466	480	494																			

[illegible]

ES&S Load (Background)	Direction	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	4
------------------------	-----------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---

Annual ESA Load (Background)

Line	Location	Direction	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012	3013	3014	3015	3016	3017	3018	3019	3020	3021	3022	3023	3024	3025	3026	3027	3028	3029	3030	3031	3032	3033	3034	3035	3036	3037	3038	3039	3040	3041	3042	3043	3044	3045	3046	3047	3048	3049	3050	3051	3052	3053	3054	3055	3056	3057	3058	3059	3060	3061	3062	3063	3064	3065	3066	3067	3068	3069	3070	3071	3072	3073	3074	3075	3076	3077	3078	3079	3080	3081	3082	3083	3084	3085	3086	3087	3088	3089	3090	3091	3092	3093	3094	3095	3096	3097	3098	3099	3100	3101	3102	3103	3104	3105	3106	3107	3108	3109	3110	3111	3112	3113	3114	3115	3116	3117	3118	3119	3120	3121	3122	3123	3124	3125	3126	3127	3128	3129	3130	3131	3132	3133	3134	3135	3136	3137	3138	3139	3140	3141	3142	3143	3144	3145	3146	3147	3148	3149	3150	3151	3152	3153	3154	3155	3156	3157	3158	3159	3160	3161	3162	3163	3164	3165	3166	3167	3168	3169	3170	3171	3172	3173	3174	3175	3176	3177	3178	3179	3180	3181	3182	3183	3184	3185	3186	3187	3188	3189	3190	3191	3192	3193	3194	3195	3196	3197	3198	3199	3200	3201	3202	3203	3204	3205	3206	3207	3208	3209	3210	3211	3212	3213	3214	3215	3216	3217	3218	3219	3220	3221	3222	3223	3224	3225	3226	3227	3228	3229	3230	3231	3232	3233	3234	3235	3236	3237	3238	3239	3240	3241	3242	3243	3244	3245	3246	3247	3248	3249	3250	3251	3252	3253	3254	3255	3256	3257	3258	3259	3260	3261	3262	3263	3264	3265	3266	3267	3268	3269	3270	3271	3272	3273	3274	3275	3276	3277	3278	3279	3280	3281	3282	3283	3284	3285	3286	3287	3288	3289	3290	3291	3292	3293	3294	3295	3296	3297	3298	3299	3300	3301	3302	3303	3304	3305	3306	3307	3308	3309	3310	3311	3312	3313	3314	3315	3316	3317	3318	3319	3320	3321	3322	3323	3324	3325	3326	3327	3328	3329	3330	3331	3332	3333	3334	3335	3336	3337	3338	3339	3340	3341	3342	3343	3344	3345	3346	3347	3348	3349	3350	3351	3352	3353	3354	3355	3356	3357	3358	3359	3360	3361	3362	3363	3364	3365	3366	3367	3368	3369	3370	3371	3372	3373	3374	3375	3376	3377	
------	----------	-----------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--

Cumulative ESA Load (Background)

Section	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
1 Wargo Highway 18B	1,157,839	2,430,395	3,664,101	4,940,408	6,268,091	7,639,170	9,054,844	10,500,522	11,989,110	13,521,795	15,009,804	16,724,387	18,390,450	20,002,007	21,682,865	23,368,533	25,121,712	26,866,610	28,784,760	30,817,816	32,867,932	34,965,136	37,104,367	39,283,344	41,514,619	43,824,021
2 Wargo Highway 18B	1,157,839	2,430,395	3,664,101	4,940,408	6,268,091	7,639,170	9,054,844	10,500,522	11,989,110	13,521,795	15,009,804	16,724,387	18,390,450	20,002,007	21,682,865	23,368,533	25,121,712	26,866,610	28,784,760	30,817,816	32,867,932	34,965,136	37,104,367	39,283,344	41,514,619	43,824,021
3 Wargo Highway 18B	889,847	1,865,587	2,825,086	3,819,788	4,847,533	5,930,115	7,005,347	8,122,472	9,272,658	10,456,126	11,675,282	12,921,746	14,214,413	15,544,198	16,922,863	17,881,077	19,302,765	20,826,622	22,626,628	23,505,162	24,889,607	26,516,014	28,089,111	29,707,908	31,374,372	33,089,944
4 Wargo Highway 18B	889,847	1,865,587	2,825,086	3,819,788	4,847,533	5,930,115	7,005,347	8,122,472	9,272,658	10,456,126	11,675,282	12,921,746	14,214,413	15,544,198	16,922,863	17,881,077	19,302,765	20,826,622	22,626,628	23,505,162	24,889,607	26,516,014	28,089,111	29,707,908	31,374,372	33,089,944
5 Wargo Highway 18B	1,160,317	2,414,677	3,665,615	4,960,987	6,298,485	7,683,967	9,113,234	10,578,473	12,073,883	13,607,088	15,168,881	16,866,541	18,641,618	20,513,782	21,486,618	23,517,077	25,315,073	27,124,887	29,866,456	30,903,840	32,877,870	34,910,284	37,022,714	39,127,082	41,315,495	43,684,955
6 Wargo Highway 18B	1,160,317	2,414,677	3,665,615	4,960,987	6,298,485	7,683,967	9,113,234	10,578,473	12,073,883	13,607,088	15,168,881	16,866,541	18,641,618	20,513,782	21,486,618	23,517,077	25,315,073	27,124,887	29,866,456	30,903,840	32,877,870	34,910,284	37,022,714	39,127,082	41,315,495	43,684,955
7 Wargo Highway 18C	1,378,489	2,776,728	4,230,705	5,676,932	7,203,654	8,782,034	10,413,508	12,084,562	13,806,725	15,581,262	17,409,678	19,283,371	21,213,422	23,072,684	24,984,601	26,952,861	28,974,479	31,055,871	33,188,028	35,405,197	37,678,882	40,015,841	42,424,093	44,903,717	47,468,654	50,085,708
8 Wargo Highway 18C	1,378,489	2,776,728	4,230,705	5,676,932	7,203,654	8,782,034	10,413,508	12,084,562	13,806,725	15,581,262	17,409,678	19,283,371	21,213,422	23,072,684	24,984,601	26,952,861	28,974,479	31,055,871	33,188,028	35,405,197	37,678,882	40,015,841	42,424,093	44,903,717	47,468,654	50,085,708
9 Wargo Highway 18C	685,512	1,598,231	2,293,232	3,055,933	3,853,989	4,679,527	5,532,490	6,428,933	7,355,242	8,321,685	9,327,290	10,354,261	11,412,104	12,498,814	13,612,461	14,762,054	15,955,254	17,184,427	18,451,262	19,855,954	21,392,487	23,068,947	24,881,848	26,840,070	28,945,600	31,192,640
10 Wargo Highway 18C	685,512	1,598,231	2,293,232	3,055,933	3,853,989	4,679,527	5,532,490	6,428,933	7,355,242	8,321,685	9,327,290	10,354,261	11,412,104	12,498,814	13,612,461	14,762,054	15,955,254	17,184,427	18,451,262	19,855,954	21,392,487	23,068,947	24,881,848	26,840,070	28,945,600	31,192,640
11 Wargo Highway 18C	523,078	1,067,234	1,598,619	2,173,781	2,770,061	3,397,858	4,057,153	4,742,904	5,459,527	6,196,000	6,972,246	7,788,185	8,633,961	9,518,271	10,432,104	11,385,461	12,368,354	13,380,287	14,422,262	15,493,287	16,593,461	17,721,685	18,888,948	20,093,301	21,335,644	22,617,976
12 Wargo Highway 18C	523,078	1,067,234	1,598,619	2,173,781	2,770,061	3,397,858	4,057,153	4,742,904	5,459,527	6,196,000	6,972,246	7,788,185	8,633,961	9,518,271	10,432,104	11,385,461	12,368,354	13,380,287	14,422,262	15,493,287	16,593,461	17,721,685	18,888,948	20,093,301	21,335,644	22,617,976
13 Wargo Highway 18C	596,926	1,201,977	1,815,296	2,405,336	3,089,883	3,767,935	4,447,815	5,122,049	5,802,627	6,484,500	7,168,663	7,855,121	8,546,276	9,242,121	9,938,266	10,634,901	11,332,626	12,031,451	12,731,276	13,432,101	14,133,926	14,835,751	15,537,576	16,239,401	16,941,226	17,643,051
14 Wargo Highway 18C	596,926	1,201,977	1,815,296	2,405,336	3,089,883	3,767,935	4,447,815	5,122,049	5,802,627	6,484,500	7,168,663	7,855,121	8,546,276	9,242,121	9,938,266	10,634,901	11,332,626	12,031,451	12,731,276	13,432,101	14,133,926	14,835,751	15,537,576	16,239,401	16,941,226	17,643,051
15 Wargo Highway 18C	709,336	1,527,028	2,312,413	3,129,128	3,975,679	4,852,648	5,760,637	6,641,866	7,561,166	8,485,632	9,454,711	11,498,884	12,408,534	13,343,320	14,304,460	15,288,460	16,301,034	17,343,038	18,413,367	19,518,999	20,654,002	21,823,429	23,028,375	24,264,464	25,538,748	26,849,128
16 Wargo Highway 18C	709,336	1,527,028	2,312,413	3,129,128	3,975,679	4,852,648	5,760,637	6,641,866	7,561,166	8,485,632	9,454,711	11,498,884	12,408,534	13,343,320	14,304,460	15,288,460	16,301,034	17,343,038	18,413,367	19,518,999	20,654,002	21,823,429	23,028,375	24,264,464	25,538,748	26,849,128
17 Wargo Highway 18C	584,024	1,240,077	1,850,828	2,491,862	3,163,953	3,866,393	4,600,765	5,352,601	6,132,796	6,941,870	7,780,357	8,648,807	9,468,948	10,195,806	10,940,499	11,706,455	12,489,612	13,295,328	14,124,270	14,977,133	15,854,436	16,757,519	17,686,542	18,642,489	19,626,129	20,638,412
18 Wargo Highway 18C	584,024	1,240,077	1,850,828	2,491,862	3,163,953	3,866,393	4,600,765	5,352,601	6,132,796	6,941,870	7,780,357	8,648,807	9,468,948	10,195,806	10,940,499	11,706,455	12,489,612	13,295,328	14,124,270	14,977,133	15,854,436	16,757,519	17,686,542	18,642,489	19,626,129	20,638,412
19 Wargo Highway 18C	290,108	691,797	1,107,244	1,542,780	1,996,054	2,460,054	2,967,385	3,470,804	3,975,954	4,474,749	4,950,282	5,412,904	5,838,923	6,271,545	6,728,099	7,168,151	7,598,655	8,016,121	8,420,055	8,812,965	9,169,255	9,440,000	9,699,320	9,937,840	10,172,351	10,392,616
20 Wargo Highway 18D	482,995	881,410	1,304,025	1,748,122	2,207,997	2,687,010	3,192,528	3,715,677	4,257,845	4,818,541	5,396,627	5,988,416	6,512,044	7,118,789	7,639,906	8,175,627	8,727,420	9,296,768	9,881,183	10,484,122	11,105,169	11,744,880	12,402,717	13,082,362	13,779,347	14,501,311
21 Wargo Highway 18D	482,995	881,410	1,304,025	1,748,122	2,207,997	2,687,010	3,192,528	3,715,677	4,257,845	4,818,541	5,396,627	5,988,416	6,512,044	7,118,789	7,639,906	8,175,627	8,727,420	9,296,768	9,881,183	10,484,122	11,105,169	11,744,880	12,402,717	13,082,362	13,779,347	14,501,311
22 Wargo Highway 18D	307,598	645,262	998,644	1,367,422	1,751,866	2,152,262	2,568,865	3,002,002	3,464,300	3,926,070	4,417,636	4,909,326	5,427,028	5,841,011	6,287,413	6,706,008	7,158,979	7,634,900	8,104,880	8,599,158	9,108,356	9,632,726	10,172,880	10,729,239	11,302,288	11,892,529
23 Wargo Highway 18D	307,598	645,262	998,644	1,367,422	1,751,866	2,152,262	2,568,865	3,002,002	3,464,300	3,926,070	4,417,636	4,909,326	5,427,028	5,841,011	6,287,413	6,706,008	7,158,979	7,634,900	8,104,880	8,599,158	9,108,356	9,632,726	10,172,880	10,729,239	11,302,288	11,892,529
24 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
25 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
26 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
27 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
28 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
29 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
30 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645	10,971,724	11,573,325	12,192,974	12,831,212
31 Wargo Highway 18D	330,522	712,237	1,098,116	1,499,068	1,915,368	2,347,370	2,795,328	3,264,783	3,742,783	4,245,262	4,767,421	5,309,680	5,839,945	6,387,593	6,748,670	7,223,579	7,712,736	8,215,567	8,735,513	9,270,028	9,820,578	10,387,645				

Cumulative ESA Load (Background)

Row	Section	Direction	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	
1	Wangero Highway 18B	Troys Road to Oakey Belderson Road	Agaisnt-Gazette	45,770.104	46,188.694	50,672.878	53,233.798	55,870.671	58,586.774	61,381.654	64,260.129	67,224.288	70,276.498	73,419.934	76,658.502	79,999.825	83,332.246	86,636.741	90,046.370	94,164.268	97,993.744	101,598.083
2	Wangero Highway 18B	Troys Road to Oakey Belderson Road	Agaisnt-Gazette	45,770.104	46,188.694	50,672.878	53,233.798	55,870.671	58,586.774	61,381.654	64,260.129	67,224.288	70,276.498	73,419.934	76,658.502	79,999.825	83,332.246	86,636.741	90,046.370	94,164.268	97,993.744	101,598.083
3	Wangero Highway 18B	Oakey Belderson Road to Dabily Cecil Plains Road	Agaisnt-Gazette	34,856.189	36,474.494	38,546.471	40,473.732	42,637.403	45,008.788	47,645.061	50,549.625	53,699.188	57,099.242	60,824.692	64,869.274	69,239.213	73,949.849	78,999.849	84,399.849	90,149.849	96,249.849	102,699.849
4	Wangero Highway 18B	Oakey Belderson Road to Dabily Cecil Plains Road	Agaisnt-Gazette	34,856.189	36,474.494	38,546.471	40,473.732	42,637.403	45,008.788	47,645.061	50,549.625	53,699.188	57,099.242	60,824.692	64,869.274	69,239.213	73,949.849	78,999.849	84,399.849	90,149.849	96,249.849	102,699.849
5	Wangero Highway 18B	Oakey Belderson Road to Dabily Cecil Plains Road	Agaisnt-Gazette	46,019.423	48,431.519	50,924.371	53,481.132	56,124.011	58,955.320	61,972.382	65,169.629	68,552.629	72,224.811	75,999.242	79,999.242	84,249.242	88,849.242	93,749.242	98,949.242	104,449.242	110,249.242	116,449.242
6	Wangero Highway 18B	Dabily Cecil Plains Road to Cunningham Street	Agaisnt-Gazette	46,019.423	48,431.519	50,924.371	53,481.132	56,124.011	58,955.320	61,972.382	65,169.629	68,552.629	72,224.811	75,999.242	79,999.242	84,249.242	88,849.242	93,749.242	98,949.242	104,449.242	110,249.242	116,449.242
7	Wangero Highway 18C	Cunningham Street to Rail Line	Agaisnt-Gazette	52,792.552	55,579.726	58,449.638	61,404.772	64,544.784	67,961.000	71,678.199	75,700.799	79,999.242	84,524.242	89,249.242	94,149.242	99,249.242	104,549.242	110,049.242	115,749.242	121,649.242	127,749.242	134,049.242
8	Wangero Highway 18C	Cunningham Street to Rail Line	Agaisnt-Gazette	52,792.552	55,579.726	58,449.638	61,404.772	64,544.784	67,961.000	71,678.199	75,700.799	79,999.242	84,524.242	89,249.242	94,149.242	99,249.242	104,549.242	110,049.242	115,749.242	121,649.242	127,749.242	134,049.242
9	Wangero Highway 18C	Rail Line to Maclester Bell Road	Agaisnt-Gazette	22,711.552	23,788.116	24,892.732	26,028.647	27,196.799	28,398.156	29,634.500	30,912.116	32,224.811	33,569.116	34,949.242	36,369.242	37,824.242	39,319.242	40,849.242	42,419.242	44,029.242	45,679.242	47,369.242
10	Wangero Highway 18C	Rail Line to Maclester Bell Road	Agaisnt-Gazette	22,711.552	23,788.116	24,892.732	26,028.647	27,196.799	28,398.156	29,634.500	30,912.116	32,224.811	33,569.116	34,949.242	36,369.242	37,824.242	39,319.242	40,849.242	42,419.242	44,029.242	45,679.242	47,369.242
11	Wangero Highway 18C	Maclester Bell Road to Wangero Kogan Road	Agaisnt-Gazette	18,900.460	19,836.721	20,798.226	21,788.136	22,807.307	23,856.615	24,934.268	26,042.884	27,189.371	28,374.711	29,597.821	30,853.316	32,142.811	33,469.613	34,834.613	36,239.613	37,679.613	39,154.613	40,669.613
12	Wangero Highway 18C	Maclester Bell Road to Wangero Kogan Road	Agaisnt-Gazette	18,900.460	19,836.721	20,798.226	21,788.136	22,807.307	23,856.615	24,934.268	26,042.884	27,189.371	28,374.711	29,597.821	30,853.316	32,142.811	33,469.613	34,834.613	36,239.613	37,679.613	39,154.613	40,669.613
13	Wangero Highway 18C	Wangero Kogan Road to Gasson Street	Agaisnt-Gazette	21,764.960	22,849.787	23,962.000	25,100.460	26,264.799	27,456.414	28,682.799	29,944.300	31,241.811	32,574.811	33,944.811	35,354.811	36,804.811	38,294.811	39,824.811	41,399.811	42,919.811	44,484.811	46,089.811
14	Wangero Highway 18C	Wangero Kogan Road to Gasson Street	Agaisnt-Gazette	21,764.960	22,849.787	23,962.000	25,100.460	26,264.799	27,456.414	28,682.799	29,944.300	31,241.811	32,574.811	33,944.811	35,354.811	36,804.811	38,294.811	39,824.811	41,399.811	42,919.811	44,484.811	46,089.811
15	Wangero Highway 18C	Gasson Street to Auburn Road	Agaisnt-Gazette	26,850.316	28,090.284	29,367.401	30,681.536	32,032.881	33,424.881	34,854.881	36,324.881	37,834.881	39,384.881	40,974.881	42,604.881	44,274.881	45,984.881	47,734.881	49,524.881	51,354.881	53,224.881	55,134.881
16	Wangero Highway 18C	Gasson Street to Auburn Road	Agaisnt-Gazette	26,850.316	28,090.284	29,367.401	30,681.536	32,032.881	33,424.881	34,854.881	36,324.881	37,834.881	39,384.881	40,974.881	42,604.881	44,274.881	45,984.881	47,734.881	49,524.881	51,354.881	53,224.881	55,134.881
17	Wangero Highway 18C	Auburn Road to Goombi	Agaisnt-Gazette	21,680.078	22,752.047	23,852.893	24,985.888	26,151.998	27,352.214	28,587.561	29,859.093	31,167.884	32,515.084	33,901.813	35,324.881	36,789.242	38,294.881	39,844.881	41,434.881	43,064.881	44,734.881	46,444.881
18	Wangero Highway 18C	Auburn Road to Goombi	Agaisnt-Gazette	21,680.078	22,752.047	23,852.893	24,985.888	26,151.998	27,352.214	28,587.561	29,859.093	31,167.884	32,515.084	33,901.813	35,324.881	36,789.242	38,294.881	39,844.881	41,434.881	43,064.881	44,734.881	46,444.881
19	Wangero Highway 18C	Goombi to Leichhardt Highway	Agaisnt-Gazette	12,949.344	13,565.027	14,191.838	14,838.638	15,503.966	16,188.738	16,892.446	17,616.790	18,361.927	19,128.574	19,917.244	20,699.701	21,505.528	22,334.910	23,190.434	24,079.883	24,977.949	25,912.126	26,874.326
20	Wangero Highway 18D	Goombi to Leichhardt Highway	Agaisnt-Gazette	12,949.344	13,565.027	14,191.838	14,838.638	15,503.966	16,188.738	16,892.446	17,616.790	18,361.927	19,128.574	19,917.244	20,699.701	21,505.528	22,334.910	23,190.434	24,079.883	24,977.949	25,912.126	26,874.326
21	Wangero Highway 18D	Miles to 180 Dulacca North Intersection	Agaisnt-Gazette	15,242.874	16,008.684	16,793.408	17,603.734	18,438.370	19,298.045	20,185.510	21,095.639	22,024.929	22,992.501	23,999.244	25,025.927	26,082.288	27,171.889	28,283.580	29,419.111	30,583.922	31,784.583	33,017.054
22	Wangero Highway 18D	Miles to 180 Dulacca North Intersection	Agaisnt-Gazette	15,242.874	16,008.684	16,793.408	17,603.734	18,438.370	19,298.045	20,185.510	21,095.639	22,024.929	22,992.501	23,999.244	25,025.927	26,082.288	27,171.889	28,283.580	29,419.111	30,583.922	31,784.583	33,017.054
23	Wangero Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Agaisnt-Gazette	12,500.477	13,126.664	13,771.838	14,443.957	15,120.208	15,824.987	16,550.909	17,298.608	18,068.738	18,861.973	19,679.005	20,505.547	21,357.386	22,226.128	23,119.704	24,048.888	25,022.446	26,027.222	27,062.288
24	Wangero Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Agaisnt-Gazette	12,500.477	13,126.664	13,771.838	14,443.957	15,120.208	15,824.987	16,550.909	17,298.608	18,068.738	18,861.973	19,679.005	20,505.547	21,357.386	22,226.128	23,119.704	24,048.888	25,022.446	26,027.222	27,062.288
25	Wangero Highway 18D	Yuleba-Taroom Rd to Yuleba-Sunard Rd	Agaisnt-Gazette	13,488.598	14,165.705	14,863.126	15,581.469	16,321.362	17,083.452	17,868.405	18,676.907	19,509.663	20,367.402	21,250.874	22,160.849	23,098.124	24,063.517	25,057.872	26,082.057	27,138.968	28,223.527	29,346.882
26	Wangero Highway 18D	Yuleba-Taroom Rd to Yuleba-Sunard Rd	Agaisnt-Gazette	13,488.598	14,165.705	14,863.126	15,581.469	16,321.362	17,083.452	17,868.405	18,676.907	19,509.663	20,367.402	21,250.874	22,160.849	23,098.124	24,063.517	25,057.872	26,082.057	27,138.968	28,223.527	29,346.882
27	Wangero Highway 18D	Yuleba-Taroom Rd to Yuleba-Sunard Rd	Agaisnt-Gazette	12,863.718	13,540.825	14,238.246	14,956.889	15,696.462	16,468.572	17,243.525	18,022.027	18,804.763	19,574.522	20,352.964	21,135.699	21,924.244	22,716.637	23,524.392	24,347.962	25,177.719	26,026.647	26,891.702
28	Wangero Highway 18D	Kangaroo Cr Rd 180/344 Intersection	Agaisnt-Gazette	12,863.718	13,540.825	14,238.246	14,956.889	15,696.462	16,468.572	17,243.525	18,022.027	18,804.763	19,574.522	20,352.964	21,135.699	21,924.244	22,716.637	23,524.392	24,347.962	25,177.719	26,026.647	26,891.702
29	Wangero Highway 18D	Kangaroo Cr Rd 180/344 Intersection	Agaisnt-Gazette	12,863.718	13,540.825	14,238.246	14,956.889	15,696.462	16,468.572	17,243.525	18,022.027	18,804.763	19,574.522	20,352.964	21,135.699	21,924.244	22,716.637	23,524.392	24,347.962	25,177.719	26,026.647	26,891.702
30	Wangero Highway 18D	180/344 Intersection to Pickincknee Rd	Agaisnt-Gazette	11,539.175	12,106.311	12,690.250	13,291.487	13,910.571	14,548.008	15,204.367	15,873.178	16,562.004	17,271.617	18,002.456	18,752.200	19,530.567	20,326.175	21,151.741	21,998.884	22,871.644	23,784.889	24,726.881
31	Wangero Highway 18D	Pickincknee Rd to Latimeres Lane	Agaisnt-Gazette	10,544.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,944.689	20,666.689	21,408.689
32	Wangero Highway 18D	Pickincknee Rd to Latimeres Lane	Agaisnt-Gazette	10,544.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,944.689	20,666.689	21,408.689
33	Wangero Highway 18D	Latimeres Lane to Wardsley Lane	Agaisnt-Gazette	10,454.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,944.689	20,666.689	21,408.689
34	Wangero Highway 18D	Latimeres Lane to Wardsley Lane	Agaisnt-Gazette	10,454.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,944.689	20,666.689	21,408.689
35	Wangero Highway 18D	Wardsley Lane to KM135.5	Agaisnt-Gazette	10,454.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,944.689	20,666.689	21,408.689
36	Wangero Highway 18D	Wardsley Lane to KM135.5	Agaisnt-Gazette	10,454.687	11,021.823	11,509.762	12,007.209	12,526.013	13,063.520	13,619.119	14,189.689	14,768.689	15,357.716	15,957.689	16,578.128	17,218.689	17,879.689	18,550.689	19,242.689	19,9		

Annual Development Generated ESA Load

Record	Section	Direction	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	
1	Wanageo Highway 18B	Toys Road to Oakey Belderson Road	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
2	Wanageo Highway 18B	Toys Road to Oakey Belderson Road	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
3	Wanageo Highway 18B	Oakey Belderson Road to Dalby Cecil Plains Road	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
4	Wanageo Highway 18B	Oakey Belderson Road to Dalby Cecil Plains Road	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
5	Wanageo Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
6	Wanageo Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
7	Wanageo Highway 18C	Cunningham Street to Rail Line	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
8	Wanageo Highway 18C	Warrington to Hest to Belderson Street	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
9	Wanageo Highway 18C	Rail Line to Macalister Bell Road	Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
10	Wanageo Highway 18C	Rail Line to Macalister Bell Road	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
11	Wanageo Highway 18C	Macalister Bell Road to Warrington Road	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
12	Wanageo Highway 18C	Macalister Bell Road to Warrington Road	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
13	Wanageo Highway 18C	Warrington Road to Gleason Street	Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
14	Wanageo Highway 18C	Warrington Road to Gleason Street	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
15	Wanageo Highway 18C	Gleason Street to Auburn Road	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
16	Wanageo Highway 18C	Gleason Street to Auburn Road	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
17	Wanageo Highway 18C	Auburn Road to Goombi	Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
18	Wanageo Highway 18C	Auburn Road to Goombi	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
19	Wanageo Highway 18C	Goombi to Leichhardt Highway	Against-Gazette	9,263	26,514	18,689	10,141	10,141	10,141	121,866	266,731	603,262	699,991	614,005	650,590	590,980	388,859	385,486	344,651	304,867	309,756	304,783	221,741	199,944	198,513	198,513	158,800	91,691	84,693
20	Wanageo Highway 18D	Goombi to Leichhardt Highway	Against-Gazette	943	2,777	1,898	1,032	1,032	1,032	12,530	27,415	62,262	72,051	63,107	66,847	60,776	39,954	36,975	35,525	31,374	31,876	31,375	22,922	20,703	20,557	20,557	16,445	9,495	8,770
21	Wanageo Highway 18D	Miles to 180 Dulacca North Intersection	Gazette	0	0	0	0	0	0	69,947	224,006	367,425	417,415	384,422	365,129	311,097	118,942	99,805	118,515	99,896	101,729	92,553	8,698	0	0	0	0	0	0
22	Wanageo Highway 18D	Miles to 180 Dulacca North Intersection	Against-Gazette	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Wanageo Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
24	Wanageo Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
25	Wanageo Highway 24C	Yuleba-Taroom Rd to Yuleba-Surat Rd	Against-Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
26	Wanageo Highway 24C	Yuleba-Taroom Rd to Yuleba-Surat Rd	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
27	Wanageo Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
28	Wanageo Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
29	Wanageo Highway 18D	Kangaroo Cr Rd to 180/344 Intersection	Against-Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
30	Wanageo Highway 18D	Kangaroo Cr Rd to 180/344 Intersection	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
31	Wanageo Highway 18D	180/344 Intersection to Pickinckrie Rd	Against-Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
32	Wanageo Highway 18D	180/344 Intersection to Pickinckrie Rd	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
33	Wanageo Highway 18D	Pickinckrie Rd to Latemores Lane	Against-Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
34	Wanageo Highway 18D	Pickinckrie Rd to Latemores Lane	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602	36,127	36,638
35	Wanageo Highway 18D	Latemores Lane to Wardsley Lane	Against-Gazette	2,884	4,946	5,014	4,186	4,186	4,186	74,224	230,573	403,885	484,200	402,591	375,053	326,335	128,510	108,732	97,446	92,671	94,045	86,272	18,814	4,860	4,517	4,533	4,762	4,895	4,962
36	Wanageo Highway 18D	Latemores Lane to Wardsley Lane	Against-Gazette	26,996	43,306	42,769	36,778	36,801	36,805	433,735	1,007,867	2,465,449	327,345	317,439	333,729	321,130	301,566	298,749	149,622	147,418	148,722	138,979	77,492	46,459	34,426	32,593	34,602		

Annual Development Generated ESA Load

Annual Development Generated ESA Load	Section	Direction	2038	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057
1	Warrego Highway 18B	Truys Road to Oakey Biddston Road	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Warrego Highway 18B	Truys Road to Oakey Biddston Road	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	Warrego Highway 18B	Oakey Biddston Road to Dalby Cecil Plains Road	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Warrego Highway 18B	Oakey Biddston Road to Dalby Cecil Plains Road	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Warrego Highway 18C	Cunningham Street to Rail Line	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Warrego Highway 18C	Cunningham Street to Rail Line	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Warrego Highway 18C	Rail Line to Macalister Bell Road	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Warrego Highway 18C	Rail Line to Macalister Bell Road	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Warrego Highway 18C	Warra Kogan Road to Glasson Street	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Warrego Highway 18C	Warra Kogan Road to Glasson Street	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Warrego Highway 18C	Glasson Street to Auburn Road	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Warrego Highway 18C	Glasson Street to Auburn Road	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Warrego Highway 18C	Auburn Road to Goombi	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Warrego Highway 18C	Auburn Road to Goombi	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Warrego Highway 18C	Goombi to Leichhardt Highway	84,693	84,693	8,958	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Warrego Highway 18C	Goombi to Leichhardt Highway	8,770	8,770	928	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Warrego Highway 18D	Miles to 180 Dulacca North Intersection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Warrego Highway 18D	Miles to 180 Dulacca North Intersection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Warrego Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	4,949	4,937	5,000	4,869	4,106	2,519	1,846	1,629	1,471	492	0	0	0	0	0	0	0	0	0
24	Warrego Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	36,786	36,748	37,227	36,244	30,494	18,652	13,766	13,835	10,942	3,651	0	0	0	0	0	0	0	0	0
25	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	4,949	4,937	5,000	4,869	4,106	2,519	1,846	1,629	1,471	492	0	0	0	0	0	0	0	0	0
26	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	36,786	36,748	37,227	36,244	30,494	18,652	13,766	13,835	10,942	3,651	0	0	0	0	0	0	0	0	0
27	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	7,506	7,460	7,394	7,203	6,433	4,838	4,157	4,128	2,880	492	0	0	0	0	0	0	0	0	0
28	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	56,765	56,145	55,655	54,162	48,377	36,480	31,540	31,308	21,789	3,651	0	0	0	0	0	0	0	0	0
29	Warrego Highway 18D	Kangaroo Ck Rd 180/3441 Intersection	7,506	7,460	7,394	7,203	6,433	4,838	4,157	4,128	2,880	492	0	0	0	0	0	0	0	0	0
30	Warrego Highway 18D	Kangaroo Ck Rd 180/3441 Intersection	56,765	56,145	55,655	54,162	48,377	36,480	31,540	31,308	21,789	3,651	0	0	0	0	0	0	0	0	0
31	Warrego Highway 18D	780/3441 Intersection to Pickajinnie Rd	7,754	7,653	7,503	7,203	6,433	4,838	4,157	4,128	2,880	492	0	0	0	0	0	0	0	0	0
32	Warrego Highway 18D	780/3441 Intersection to Pickajinnie Rd	56,884	56,219	55,703	55,139	49,304	37,376	32,404	32,120	22,244	3,651	0	0	0	0	0	0	0	0	0
33	Warrego Highway 18D	Pickajinnie Rd to Latemores Lane	7,695	7,626	7,530	7,308	6,534	4,934	4,249	4,210	2,930	492	0	0	0	0	0	0	0	0	0
34	Warrego Highway 18D	Pickajinnie Rd to Latemores Lane	57,389	57,022	56,358	55,139	49,304	37,376	32,404	32,120	22,244	3,651	0	0	0	0	0	0	0	0	0
35	Warrego Highway 18D	Latemores Lane to Wardsley Lane	7,768	7,698	7,565	7,308	6,534	4,934	4,249	4,210	2,930	492	0	0	0	0	0	0	0	0	0
36	Warrego Highway 18D	Latemores Lane to Wardsley Lane	55,181	54,641	53,201	55,139	49,304	37,376	32,404	32,120	22,244	3,651	0	0	0	0	0	0	0	0	0
37	Warrego Highway 18D	Wardsley Ln to KM135.5	4,249	4,208	4,170	4,084	3,437	2,583	2,049	1,984	1,352	492	0	0	0	0	0	0	0	0	0
38	Warrego Highway 18D	Wardsley Ln to KM135.5	60,344	59,416	57,149	55,139	49,304	37,376	32,404	32,120	22,244	3,651	0	0	0	0	0	0	0	0	0
39	Warrego Highway 18D	KM135.5 to Roma	84,953	83,992	28,839	12,524	12,178	10,678	9,912	9,629	8,211	4,935	4,353	4,211	3,730	2,656	1,767	1,707	1,646	983	0
40	Warrego Highway 18D	KM135.5 to Roma	84,953	83,992	28,839	12,524	12,178	10,678	9,912	9,629	8,211	4,935	4,353	4,211	3,730	2,656	1,767	1,707	1,646	983	0
41	Warrego Highway 18E	Roma to Roma Southern Road	18,259	18,190	11,528	0	0	0	0	325	2,868	2,814	2,814	2,814	2,814	2,814	2,814	2,814	2,814	2,814	0
42	Warrego Highway 18E	Roma to Roma Southern Road	2,459	2,440	1,550	0	0	0	0	45	402	394	394	394	394	394	394	394	394	394	0
43	Warrego Highway 18E	Roma Southern Road to CH 5.5	13,800	13,250	8,978	0	0	0	0	305	2,868	2,814	2,814	2,814	2,814	2,814	2,814	2,814	2,814	2,814	0
44	Warrego Highway 18E	Roma Southern Road to CH 5.5	1,796	1,788	1,132	0	0	0	0	45	402	394	394	394	394	394	394	394	394	394	0
45	Warrego Highway 18E	CH 5.5 to Massary Lane	8,216	8,203	5,207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Warrego Highway 18E	CH 5.5 to Massary Lane	1,120	1,117	708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	Camaron Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	Camaron Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Camaron Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	Camaron Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	Camaron Highway 24C	Roma-Condamine Road to CH 5.4	1,650	1,641	1,044	1,603	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	0
52	Camaron Highway 24C	Roma-Condamine Road to CH 5.4	12,196	12,135	12,305	12,010	11,949	11,887	11,826	11,719	7,163	0	0	0	0	0	0	0	0	0	0
53	Camaron Highway 24C	CH 5.4 to Kimber Road	1,789	1,756	1,776	1,730	1,717	1,704	1,691	1,671	1,619	0	0	0	0	0	0	0	0	0	0
54	Camaron Highway 24C	CH 5.4 to Kimber Road	13,154	12,847	13,154	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	12,847	0
55	Camaron Highway 24C	Kimber Road to Warrego Highway	100,383	99,447	28,335	15,618	11,685	11,058	10,891	8,628	5,008	4,353	4,211	3,730	2,656	1,767	1,707	1,646	983	0	
56	Camaron Highway 24C	Kimber Road to Warrego Highway	21,075	20,949	13,383	11,673	11,488	11,235	11,158	11,109	7,657	590	477	458	402	286	191	183	174	163	0
57	Camaron Highway 24C	CH 0.00 (Roma) to Midwood Street	118,706	118,713	68,605	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	26,372	0
58	Camaron Highway 24C	CH 0.00 (Roma) to Midwood Street	14,811	14,762	6,557	4,085	4,066	4,047	4,028	4,014	3,856	3,447	3,407	3,387	3,332	2,827	1,963	1,954	1,946	1,193	0
59	Camaron Highway 24C	Midwood Street to KM3.0	118,316	117,862	65,438	26,209	26,072	25,936	25,799	25,716	26,121	25,423	25,281	25,139	24,657	20,804	14,422	14,361	14,301	8,770	0
60	Camaron Highway 24C	CH 3.00 to CH 18 Roma - Taroom Road	118,316	117,862	65,438	26,209	26,072	25,936	25,799	25,716	26,121	25,423	25,281	25,139	24,657	20,804	14,422	14,361	14,301	8,770	0
61	Camaron Highway 24C	CH 3.00 to CH 18 Roma - Taroom Road	118,316	117,862	65,438	26,209	26,072	25,936	25,799	25,716	26,121	25,423	25,281	25,139	24,657	20,804	14,422	14,361	14,301	8,770	0
62	Camaron Highway 24C	CH 3.00 to CH 18 Roma - Taroom Road	118,316	117,862	65,438	26,209	26,072	25,936	25,799	25,716	26,121	25,423	25,281	25,139	24,657	20,804	14,422	14,361	14,301	8,770	0
63	Camaron Highway 24C	CH 3.00 to CH 18 Roma - Taroom Road	118,316	117,862	65,438	26,209	26,072	25,936	25,799	25,716	26,121	25,423	25,281	25,139	24,657	20,804	14,422	14,361	14,301	8,770	0
64	Camaron Highway 24C	Roma - Taroom Road to West Mill Road	13,943	13,866	5,940	3,528	3,509	3,490	3,471	3,457	3,514	3,427									

Cumulative Development Generated ESA Load

Row	Section	Direction	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	
1	Wargo Highway 18B	Toys Road to Oakley Bideston Road	Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
2	Wargo Highway 18B	Toys Road to Oakley Bideston Road	Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
3	Wargo Highway 18B	Oakley Bideston Road to Daily Cecil Plains Road	Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
4	Wargo Highway 18B	Oakley Bideston Road to Daily Cecil Plains Road	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
5	Wargo Highway 18B	Daily Cecil Plains Road to Cunningham Street	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
6	Wargo Highway 18B	Daily Cecil Plains Road to Cunningham Street	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
7	Wargo Highway 18C	Cunningham Street to Rail Line	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
8	Wargo Highway 18C	Vunnamah to Hot to Road	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
9	Wargo Highway 18C	Rail Line to Macalister Bell Road	Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
10	Wargo Highway 18C	Rail Line to Macalister Bell Road	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
11	Wargo Highway 18C	Macalister Bell Road to Wargo Kogan Road	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
12	Wargo Highway 18C	Macalister Bell Road to Wargo Kogan Road	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
13	Wargo Highway 18C	Wargo Kogan Road to Gleason Street	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
14	Wargo Highway 18C	Wargo Kogan Road to Gleason Street	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
15	Wargo Highway 18C	Gleason Street to Auburn Road	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
16	Wargo Highway 18C	Gleason Street to Auburn Road	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
17	Wargo Highway 18C	Auburn Road to Goombi	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
18	Wargo Highway 18C	Auburn Road to Goombi	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
19	Wargo Highway 18C	Goombi to Leichhardt Highway	Against-Gazette	9,263	35,777	54,466	64,607	74,748	84,889	206,765	473,486	1,076,768	1,776,759	2,390,764	3,041,353	3,632,333	4,021,193	4,406,679	4,751,330	5,056,217	5,365,974	5,670,757	5,892,498	6,096,442	6,290,955	6,489,468	6,648,268	6,793,959	6,824,652
20	Wargo Highway 18D	Goombi to Leichhardt Highway	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
21	Wargo Highway 18D	Miles to 18Dulacca North Intersection	Gazette	0	0	0	0	0	0	69,947	293,953	610,747	1,147,940	1,542,346	1,907,475	2,218,573	2,537,514	2,837,323	3,105,888	3,354,264	3,587,483	3,800,241	4,002,415	4,194,712	4,369,884	4,528,914	4,676,744	4,814,714	4,942,714
22	Wargo Highway 18D	Miles to 18Dulacca North Intersection	Against-Gazette	943	3,720	5,618	6,650	7,683	8,715	21,245	48,660	110,921	162,972	246,079	312,926	373,702	413,655	453,330	488,865	520,229	552,105	583,480	606,402	627,105	647,683	668,220	684,665	694,160	702,891
23	Wargo Highway 18D	18Dulacca North Intersection to Yuleba-Taroom Rd	Gazette	2,884	7,830	12,844	17,029	21,219	25,411	29,603	330,208	724,093	1,218,293	1,682,883	2,156,572	2,631,252	3,106,927	3,582,602	4,059,277	4,535,952	5,012,627	5,489,302	5,965,977	6,442,652	6,919,327	7,396,002	7,872,677	8,349,352	8,826,027
24	Wargo Highway 18D	18Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	916,326	1,233,874	1,551,427	1,868,980	2,186,532	2,499,084	2,811,636	3,124,188	3,436,740	3,749,292	4,061,844	4,374,396	4,686,948	5,000,000	5,312,552	5,625,104	5,937,656
25	Wargo Highway 18D	Yuleba-Taroom Rd to Kangaroo Cr Rd	Gazette	2,884	7,830	12,844	17,029	21,219	25,411	29,603	330,208	724,093	1,218,293	1,682,883	2,156,572	2,631,252	3,106,927	3,582,602	4,059,277	4,535,952	5,012,627	5,489,302	5,965,977	6,442,652	6,919,327	7,396,002	7,872,677	8,349,352	8,826,027
26	Wargo Highway 18D	Yuleba-Taroom Rd to Kangaroo Cr Rd	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	916,326	1,233,874	1,551,427	1,868,980	2,186,532	2,499,084	2,811,636	3,124,188	3,436,740	3,749,292	4,061,844	4,374,396	4,686,948	5,000,000	5,312,552	5,625,104	5,937,656
27	Wargo Highway 18D	Kangaroo Cr Rd 18Dulacca Intersection	Gazette	2,884	7,830	12,844	17,029	21,219	25,411	29,603	330,208	724,093	1,218,293	1,682,883	2,156,572	2,631,252	3,106,927	3,582,602	4,059,277	4,535,952	5,012,627	5,489,302	5,965,977	6,442,652	6,919,327	7,396,002	7,872,677	8,349,352	8,826,027
28	Wargo Highway 18D	Kangaroo Cr Rd 18Dulacca Intersection	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	916,326	1,233,874	1,551,427	1,868,980	2,186,532	2,499,084	2,811,636	3,124,188	3,436,740	3,749,292	4,061,844	4,374,396	4,686,948	5,000,000	5,312,552	5,625,104	5,937,656
29	Wargo Highway 18D	18Dulacca Intersection to Pickincknee Rd	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	916,326	1,233,874	1,551,427	1,868,980	2,186,532	2,499,084	2,811,636	3,124,188	3,436,740	3,749,292	4,061,844	4,374,396	4,686,948	5,000,000	5,312,552	5,625,104	5,937,656
30	Wargo Highway 18D	Pickincknee Rd to Latemores Lane	Gazette	2,884	7,830	12,844	17,029	21,219	25,411	29,603	330,208	724,093	1,218,293	1,682,883	2,156,572	2,631,252	3,106,927	3,582,602	4,059,277	4,535,952	5,012,627	5,489,302	5,965,977	6,442,652	6,919,327	7,396,002	7,872,677	8,349,352	8,826,027
31	Wargo Highway 18D	Pickincknee Rd to Latemores Lane	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	916,326	1,233,874	1,551,427	1,868,980	2,186,532	2,499,084	2,811,636	3,124,188	3,436,740	3,749,292	4,061,844	4,374,396	4,686,948	5,000,000	5,312,552	5,625,104	5,937,656
32	Wargo Highway 18D	Latemores Lane to Wardsley Lane	Gazette	2,884	7,830	12,844	17,029	21,219	25,411	29,603	330,208	724,093	1,218,293	1,682,883	2,156,572	2,631,252	3,106,927	3,582,602	4,059,277	4,535,952	5,012,627	5,489,302	5,965,977	6,442,652	6,919,327	7,396,002	7,872,677	8,349,352	8,826,027
33	Wargo Highway 18D	Latemores Lane to Wardsley Lane	Against-Gazette	25,966	69,272	112,041	147,819	183,620	219,445	260,135	343,761	589,210	91																

Cumulative ESA Load (Background + Development)

Route	Direction	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057
1 Warrago Highway 18B	Troys Road to Oakley Bideston Road	52,679,498	56,179,731	57,675,871	60,236,792	62,873,665	65,588,768	68,384,449	71,263,124	74,227,263	77,279,490	80,422,388	83,659,497	86,982,819	90,398,241	93,909,736	97,519,305	101,229,848	105,046,739	108,970,078
2 Warrago Highway 18B	Troys Road to Oakley Bideston Road	52,679,498	56,179,731	57,675,871	60,236,792	62,873,665	65,588,768	68,384,449	71,263,124	74,227,263	77,279,490	80,422,388	83,659,497	86,982,819	90,398,241	93,909,736	97,519,305	101,229,848	105,046,739	108,970,078
3 Warrago Highway 18B	Oakley Bideston Road to Daily Cecil Plains Road	46,753,533	49,660,546	52,675,616	55,792,639	58,920,712	62,050,845	65,182,928	68,315,011	71,447,094	74,579,177	77,711,260	80,843,343	83,975,426	87,107,509	90,239,592	93,371,675	96,503,758	99,635,841	102,767,924
4 Warrago Highway 18B	Oakley Bideston Road to Daily Cecil Plains Road	35,657,890	37,384,965	39,267,870	41,198,131	43,179,334	45,210,787	47,295,450	49,434,334	51,625,461	53,867,844	56,160,477	58,513,860	60,918,093	63,374,176	65,881,209	68,439,192	71,048,125	73,708,008	76,418,841
5 Warrago Highway 18B	Daily Cecil Plains Road to Cunningham Street	52,019,768	55,455,550	57,947,365	60,494,127	63,091,878	65,740,679	68,434,530	71,168,431	73,942,372	76,759,403	79,612,516	82,505,619	85,430,712	88,390,795	91,384,868	94,413,931	97,478,984	100,579,027	103,714,060
6 Warrago Highway 18B	Daily Cecil Plains Road to Cunningham Street	46,753,533	49,660,546	52,675,616	55,792,639	58,920,712	62,050,845	65,182,928	68,315,011	71,447,094	74,579,177	77,711,260	80,843,343	83,975,426	87,107,509	90,239,592	93,371,675	96,503,758	99,635,841	102,767,924
7 Warrago Highway 18C	Cunningham Street to Rail Line	58,701,286	62,573,762	66,452,633	70,341,507	74,240,379	78,149,251	82,058,123	85,967,000	89,875,872	93,784,744	97,693,616	101,602,488	105,511,360	109,420,232	113,329,104	117,237,976	121,146,848	125,055,720	128,964,592
8 Warrago Highway 18C	Cunningham Street to Rail Line	52,679,498	56,179,731	57,675,871	60,236,792	62,873,665	65,588,768	68,384,449	71,263,124	74,227,263	77,279,490	80,422,388	83,659,497	86,982,819	90,398,241	93,909,736	97,519,305	101,229,848	105,046,739	108,970,078
9 Warrago Highway 18C	Rail Line to Maclester Bell Road	20,699,686	20,762,153	21,856,727	23,031,641	24,297,744	25,654,049	27,100,554	28,637,269	29,266,984	30,991,700	32,806,916	34,713,632	36,711,948	38,803,064	40,986,980	43,263,796	45,635,512	48,100,128	50,657,644
10 Warrago Highway 18C	Rail Line to Maclester Bell Road	23,423,253	24,508,588	25,614,131	26,750,046	27,916,758	29,115,350	30,354,924	31,635,587	32,958,341	34,323,185	35,730,119	37,178,143	38,667,258	40,196,462	41,765,756	43,375,140	45,024,514	46,713,478	48,442,532
11 Warrago Highway 18C	Maclester Bell Road to Warrago Kogan Road	25,893,758	26,830,758	27,811,253	28,831,900	29,894,810	30,999,610	32,147,030	33,336,580	34,568,910	35,842,540	37,158,070	38,513,990	39,909,910	41,347,430	42,826,050	44,346,770	45,908,090	47,509,410	49,150,330
12 Warrago Highway 18C	Maclester Bell Road to Warrago Kogan Road	19,612,161	20,557,192	21,518,624	22,500,536	23,524,700	24,581,116	25,670,686	26,793,416	27,947,300	29,142,436	30,379,720	31,658,244	32,978,008	34,338,112	35,738,556	37,178,440	38,660,832	40,194,112	41,765,592
13 Warrago Highway 18C	Warrago Kogan Road to Galeson Street	29,674,301	30,845,500	32,058,300	33,313,578	34,610,338	35,948,588	37,328,338	38,748,588	40,210,338	41,722,588	43,276,338	44,871,588	46,508,338	48,185,588	49,903,338	51,661,588	53,460,338	55,299,588	57,178,338
14 Warrago Highway 18C	Warrago Kogan Road to Galeson Street	25,893,758	26,830,758	27,811,253	28,831,900	29,894,810	30,999,610	32,147,030	33,336,580	34,568,910	35,842,540	37,158,070	38,513,990	39,909,910	41,347,430	42,826,050	44,346,770	45,908,090	47,509,410	49,150,330
15 Warrago Highway 18C	Galeson Street to Auburn Road	33,759,660	36,184,321	38,699,465	41,308,839	43,918,213	46,527,587	49,136,961	51,746,335	54,355,709	56,965,083	59,574,457	62,183,831	64,793,205	67,402,579	70,011,953	72,621,327	75,230,701	77,840,075	80,449,449
16 Warrago Highway 18C	Galeson Street to Auburn Road	27,562,017	28,733,216	29,904,415	31,075,614	32,246,813	33,418,012	34,589,211	35,760,410	36,931,609	38,102,808	39,274,007	40,445,206	41,616,405	42,787,604	43,958,803	45,129,999	46,301,198	47,472,397	48,643,596
17 Warrago Highway 18C	Auburn Road to Gooma	28,589,422	30,048,784	31,509,146	32,969,508	34,429,870	35,890,232	37,350,594	38,810,956	40,271,318	41,731,680	43,192,042	44,652,404	46,112,766	47,573,128	49,033,490	50,493,852	51,954,214	53,414,576	54,874,938
18 Warrago Highway 18C	Auburn Road to Gooma	28,589,422	30,048,784	31,509,146	32,969,508	34,429,870	35,890,232	37,350,594	38,810,956	40,271,318	41,731,680	43,192,042	44,652,404	46,112,766	47,573,128	49,033,490	50,493,852	51,954,214	53,414,576	54,874,938
19 Warrago Highway 18C	Auburn Road to Gooma	28,589,422	30,048,784	31,509,146	32,969,508	34,429,870	35,890,232	37,350,594	38,810,956	40,271,318	41,731,680	43,192,042	44,652,404	46,112,766	47,573,128	49,033,490	50,493,852	51,954,214	53,414,576	54,874,938
20 Warrago Highway 18C	Gooma to Leichhardt Highway	28,589,422	30,048,784	31,509,146	32,969,508	34,429,870	35,890,232	37,350,594	38,810,956	40,271,318	41,731,680	43,192,042	44,652,404	46,112,766	47,573,128	49,033,490	50,493,852	51,954,214	53,414,576	54,874,938
21 Warrago Highway 18D	Gooma to Leichhardt Highway	13,661,045	14,268,498	14,913,327	15,599,037	16,225,365	16,890,777	17,593,189	18,338,159	19,034,363	19,781,973	20,580,483	21,430,993	22,334,103	23,291,813	24,305,723	25,377,433	26,508,543	27,699,653	28,950,763
22 Warrago Highway 18D	Gooma to Leichhardt Highway	10,828,068	11,466,386	12,143,122	12,860,448	13,617,774	14,415,100	15,252,426	16,130,752	17,050,078	18,011,404	19,055,730	20,194,056	21,427,382	22,754,708	24,177,034	25,690,360	27,293,686	28,987,012	30,769,338
23 Warrago Highway 18D	Gooma to Leichhardt Highway	15,586,068	16,286,068	17,026,068	17,806,068	18,626,068	19,486,068	20,386,068	21,326,068	22,306,068	23,326,068	24,386,068	25,486,068	26,626,068	27,806,068	29,026,068	30,286,068	31,586,068	32,926,068	34,306,068
24 Warrago Highway 18D	180/Dualla North Intersection to Yuleba-Taroom Rd	15,475,157	16,106,280	16,776,253	17,486,126	18,236,099	19,026,072	19,856,045	20,726,018	21,636,000	22,586,000	23,576,000	24,606,000	25,676,000	26,786,000	27,936,000	29,126,000	30,356,000	31,626,000	32,936,000
25 Warrago Highway 18D	180/Dualla North Intersection to Yuleba-Taroom Rd	15,475,157	16,106,280	16,776,253	17,486,126	18,236,099	19,026,072	19,856,045	20,726,018	21,636,000	22,586,000	23,576,000	24,606,000	25,676,000	26,786,000	27,936,000	29,126,000	30,356,000	31,626,000	32,936,000
26 Warrago Highway 18D	180/Dualla North Intersection to Yuleba-Taroom Rd	15,475,157	16,106,280	16,776,253	17,486,126	18,236,099	19,026,072	19,856,045	20,726,018	21,636,000	22,586,000	23,576,000	24,606,000	25,676,000	26,786,000	27,936,000	29,126,000	30,356,000	31,626,000	32,936,000
27 Warrago Highway 18D	Yuleba-Taroom Rd to Kangaroo Cr Rd	17,178,803	17,802,658	18,462,305	19,157,852	19,888,400	20,654,948	21,457,496	22,297,044	23,173,592	24,084,140	25,028,688	26,007,236	27,029,784	28,096,332	29,206,880	30,361,428	31,561,976	32,807,524	34,098,072
28 Warrago Highway 18D	Yuleba-Taroom Rd to Kangaroo Cr Rd	16,250,816	16,935,365	17,660,200	18,425,335	19,229,470	20,072,605	20,954,740	21,876,875	22,839,010	23,841,145	24,883,280	25,965,415	27,087,550	28,249,685	29,451,820	30,693,955	31,976,090	33,298,225	34,660,360
29 Warrago Highway 18D	Kangaroo Cr Rd 180/344 Intersection	15,566,242	16,200,809	16,885,624	17,611,700	18,377,487	19,143,274	19,909,061	20,674,848	21,440,635	22,206,422	22,972,209	23,737,996	24,503,783	25,269,570	26,035,357	26,801,144	27,566,931	28,332,718	29,100,505
30 Warrago Highway 18D	Kangaroo Cr Rd 180/344 Intersection	17,751,740	18,485,298	19,259,856	20,074,414	20,928,972	21,823,530	22,758,088	23,732,646	24,747,204	25,791,762	26,876,320	27,990,878	29,145,436	30,339,994	31,574,552	32,849,110	34,163,668	35,518,226	36,912,784
31 Warrago Highway 18D	180/344 Intersection to Pajankine Rd	13,661,045	14,268,498	14,913,327	15,599,037	16,225,365	16,890,777	17,593,189	18,338,159	19,034,363	19,781,973	20,580,483	21,430,993	22,334,103	23,291,813	24,305,723	25,377,433	26,508,543	27,699,653	28,950,763
32 Warrago Highway 18D	Pajankine Rd to Latemores Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
33 Warrago Highway 18D	Pajankine Rd to Latemores Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
34 Warrago Highway 18D	Latemores Lane to Warragool Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
35 Warrago Highway 18D	Latemores Lane to Warragool Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
36 Warrago Highway 18D	Warragool Lane to Warragool Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
37 Warrago Highway 18D	Warragool Lane to Warragool Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415,344	20,027,914	20,641,484	21,256,054	21,871,624	22,488,194	23,104,764	23,722,334
38 Warrago Highway 18D	Warragool Lane to Warragool Lane	12,807,863	13,388,744	13,974,214	14,566,784	15,160,354	15,764,924	16,370,494	16,977,064	17,584,634	18,193,204	18,803,774	19,415							

Development ESA Load as a Percentage of the Background ESA Load

Road	Section	Direction	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038		
1	Warrego Highway 18B	Toys Road to Oakey Bidsdon Road	Gazetted	0%	0%	0%	0%	0%	8%	16%	20%	31%	26%	29%	26%	18%	19%	17%	17%	15%	15%	14%	10%	6%	0%	0%	0%	0%		
2	Warrego Highway 18C	Toys Road to Oakey Bidsdon Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
3	Warrego Highway 18B	Oakey Bidsdon Road to Dalby Cecil Plains Road	Gazetted	0%	0%	0%	0%	0%	10%	19%	34%	37%	34%	34%	31%	24%	24%	21%	19%	19%	18%	14%	13%	12%	12%	11%	9%	5%	0%	
4	Warrego Highway 18B	Oakey Bidsdon Road to Dalby Cecil Plains Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
5	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gazetted	0%	0%	0%	0%	0%	13%	10%	20%	21%	28%	28%	20%	19%	19%	17%	17%	15%	15%	14%	10%	6%	0%	0%	0%	0%	0%	
6	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
7	Warrego Highway 18C	Cunningham Street to Rail Line	Gazetted	0%	0%	0%	0%	0%	7%	14%	26%	28%	25%	26%	24%	17%	17%	17%	15%	13%	13%	12%	9%	8%	8%	8%	8%	8%		
8	Warrego Highway 18C	Cunningham Street to Rail Line	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
9	Warrego Highway 18C	Rail Line to Macalister Bell Road	Gazetted	0%	0%	0%	0%	0%	13%	26%	44%	47%	43%	43%	41%	34%	34%	31%	28%	27%	27%	22%	20%	18%	18%	17%	14%	8%	8%	
10	Warrego Highway 18C	Rail Line to Macalister Bell Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
11	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Gazetted	0%	0%	0%	0%	0%	16%	29%	47%	50%	46%	47%	40%	38%	37%	34%	31%	31%	30%	29%	21%	20%	20%	18%	10%	8%	8%	
12	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
13	Warrego Highway 18C	Warra Kogan Road to Gleason Street	Gazetted	0%	0%	0%	0%	0%	15%	26%	44%	47%	43%	44%	40%	34%	34%	31%	28%	27%	27%	22%	20%	18%	18%	17%	14%	8%	8%	
14	Warrego Highway 18C	Warra Kogan Road to Gleason Street	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
15	Warrego Highway 18C	Gleason Street to Auburn Road	Gazetted	0%	0%	0%	0%	0%	12%	23%	40%	43%	39%	39%	36%	30%	29%	26%	24%	23%	23%	23%	17%	15%	15%	15%	12%	7%	6%	
16	Warrego Highway 18C	Gleason Street to Auburn Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
17	Warrego Highway 18C	Auburn Road to Goombi	Gazetted	0%	0%	0%	0%	0%	14%	26%	44%	46%	42%	43%	42%	35%	34%	31%	28%	28%	27%	21%	19%	18%	18%	14%	9%	8%	8%	
18	Warrego Highway 18C	Auburn Road to Goombi	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
19	Warrego Highway 18C	Goombi to Leichhardt Highway	Gazetted	0%	0%	0%	0%	0%	16%	29%	47%	50%	46%	47%	40%	38%	37%	34%	31%	31%	30%	29%	21%	20%	20%	18%	10%	8%	8%	
20	Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
21	Warrego Highway 18D	Miles to 180 Dulacca North Intersection	Gazetted	0%	0%	0%	0%	0%	12%	30%	41%	45%	40%	38%	34%	19%	18%	18%	15%	15%	14%	0%	0%	0%	0%	0%	0%	0%	0%	
22	Warrego Highway 18D	Miles to 180 Dulacca North Intersection	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
23	Warrego Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Gazetted	0%	0%	0%	0%	0%	15%	35%	47%	51%	45%	42%	39%	24%	20%	18%	17%	17%	15%	0%	0%	0%	0%	0%	0%	0%	0%	
24	Warrego Highway 18D	180 Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazetted	8%	11%	11%	9%	9%	8%	9%	16%	36%	41%	39%	39%	39%	42%	41%	30%	25%	24%	22%	14%	7%	6%	6%	6%	6%	6%	
25	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Gazetted	0%	0%	0%	0%	0%	16%	29%	47%	50%	46%	47%	40%	38%	37%	34%	31%	31%	30%	29%	21%	20%	20%	18%	10%	8%	8%	
26	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Against-Gazetted	7%	10%	10%	8%	8%	16%	28%	42%	40%	38%	38%	36%	40%	38%	39%	29%	23%	23%	21%	13%	6%	0%	0%	0%	0%	0%	
27	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Gazetted	0%	0%	0%	0%	0%	14%	32%	49%	46%	41%	39%	36%	20%	17%	15%	14%	14%	12%	0%	0%	0%	0%	0%	0%	0%	0%	
28	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
29	Warrego Highway 18D	Kangaroo Cr Rd 1803441 Intersection	Gazetted	0%	0%	0%	0%	0%	14%	32%	49%	50%	46%	44%	41%	20%	17%	15%	14%	14%	12%	0%	0%	0%	0%	0%	0%	0%	0%	
30	Warrego Highway 18D	Kangaroo Cr Rd 1803441 Intersection	Against-Gazetted	7%	11%	10%	9%	8%	16%	30%	46%	53%	53%	53%	50%	46%	45%	46%	45%	46%	45%	32%	31%	29%	16%	8%	8%	8%	8%	
31	Warrego Highway 18D	1803441 Intersection to Pickinjinne Rd	Gazetted	0%	0%	0%	0%	0%	13%	30%	42%	47%	43%	43%	40%	34%	34%	31%	28%	27%	27%	22%	20%	21%	20%	18%	10%	8%	8%	
32	Warrego Highway 18D	1803441 Intersection to Pickinjinne Rd	Against-Gazetted	8%	11%	11%	9%	9%	24%	40%	50%	58%	55%	55%	52%	53%	51%	43%	39%	38%	36%	19%	10%	10%	10%	10%	10%	10%	10%	
33	Warrego Highway 18D	Pickinjinne Rd to Latemores Lane	Gazetted	0%	0%	0%	0%	0%	15%	37%	52%	53%	48%	46%	40%	34%	34%	31%	28%	27%	27%	22%	20%	21%	20%	18%	10%	8%	8%	8%
34	Warrego Highway 18D	Pickinjinne Rd to Latemores Lane	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
35	Warrego Highway 18D	Latemores Lane to Wardsley Lane	Gazetted	0%	0%	0%	0%	0%	15%	37%	52%	53%	48%	46%	40%	34%	34%	31%	28%	27%	27%	22%	20%	21%	20%	18%	10%	8%	8%	8%
36	Warrego Highway 18D	Latemores Lane to Wardsley Lane	Against-Gazetted	9%	14%	13%	11%	11%	29%	47%	57%	65%	63%	63%	58%	53%	51%	43%	39%	38%	36%	19%	11%	10%	10%	10%	10%	10%	10%	
37	Warrego Highway 18D	Wardsley Ln to KM135.5	Gazetted	0%	0%	0%	0%	0%	14%	32%	49%	50%	46%	47%	40%	38%	37%	34%	31%	31%	30%	29%	21%	20%	20%	18%	10%	8%	8%	
38	Warrego Highway 18D	KM135.5 to Roma	Against-Gazetted	0%	0%	0%	0%	0%	13%	28%	47%	45%	41%	41%	38%	19%	15%	15%	15%	15%	15%	15%	14%	14%	14%	13%	11%	7%	7%	
39	Warrego Highway 18D	KM135.5 to Roma	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
40	Warrego Highway 18E	Roma to Roma Southern Road	Gazetted	0%	0%	0%	0%	0%	18%	18%	20%	17%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
41	Warrego Highway 18E	Roma to Roma Southern Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
42	Warrego Highway 18E	Roma to Roma Southern Road	Gazetted	0%	0%	0%	0%	0%	18%	18%	20%	17%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
43	Warrego Highway 18E	Roma Southern Road to CH 5.5	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
44	Warrego Highway 18E	Roma Southern Road to CH 5.5	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
45	Warrego Highway 18E	CH 5.5 to Massey Lane	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
46	Warrego Highway 18E	CH 5.5 to Massey Lane	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
47	Cameroon Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
48	Cameroon Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
49	Cameroon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
50	Cameroon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
51	Cameroon Highway 24C	Roma-Condamine Road to CH 5.4	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
52	Cameroon Highway 24C	Roma-Condamine Road to CH 5.4	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
53	Cameroon Highway 24C	CH 5.4 to Kimber Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
54	Cameroon Highway 24C	CH 5.4 to Kimber Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
55	Cameroon Highway 24C	Kimber Road to Warrego Highway	Gazetted	19%	20%	19%	19%	18%	18%	17%	77%	80%	88%	87%	87%	85%	76%	76%	70%	68%	68%	66%	54%	47%	46%	46%	42%	32%	30%	
56	Cameroon Highway 24C	Kimber Road to Warrego Highway	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
57	Cameroon Highway 24C	CH 0.00 (Roma) to Midwood Street	Gazetted	0%	0%	0%	0%	0%	15%	27%	41%	51%	52%	51%	46%	38%	36%	32%	30%	30%	2									

Development ESA Load as a Percentage of the Background ESA Load

Road	Section	Direction	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057
1	Warrego Highway 18B	Toys Road to Oakley Biddston Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	Warrego Highway 18B	Toys Road to Oakley Biddston Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	Warrego Highway 18B	Oakley Biddston Road to Dalby Cecil Plains Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	Warrego Highway 18B	Oakley Biddston Road to Dalby Cecil Plains Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
5	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7	Warrego Highway 18C	Cunningham Street to Rail Line	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8	Warrego Highway 18C	Cunningham Street to Rail Line	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	Warrego Highway 18C	Rail Line to Macalister Bell Road	Gazetted	7%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
10	Warrego Highway 18C	Rail Line to Macalister Bell Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Gazetted	8%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
12	Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
13	Warrego Highway 18C	Warra Kogan Road to Glessen Street	Gazetted	7%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
14	Warrego Highway 18C	Warra Kogan Road to Glessen Street	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	Warrego Highway 18C	Glessen Street to Auburn Road	Gazetted	6%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16	Warrego Highway 18C	Glessen Street to Auburn Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17	Warrego Highway 18C	Auburn Road to Goombi	Gazetted	8%	7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	Warrego Highway 18C	Auburn Road to Goombi	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	Warrego Highway 18C	Goombi to Leichhardt Highway	Gazetted	12%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	Warrego Highway 18D	Miles to 180Dulacca North Intersection	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	Warrego Highway 18D	Miles to 180Dulacca North Intersection	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
23	Warrego Highway 18D	180Dulacca North Intersection to Yuleba-Taroom Rd	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24	Warrego Highway 18D	180Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazetted	6%	6%	5%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
25	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Gazetted	5%	5%	5%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
26	Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Against-Gazetted	5%	5%	5%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
27	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28	Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Cr Rd	Against-Gazetted	10%	8%	7%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
29	Warrego Highway 18D	Kangaroo Cr Rd 18D3441 Intersection	Against-Gazetted	8%	8%	7%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
30	Warrego Highway 18D	Kangaroo Cr Rd 18D3441 Intersection	Gazetted	8%	8%	7%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
31	Warrego Highway 18D	18D3441 Intersection to Pickeringine Rd	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
32	Warrego Highway 18D	18D3441 Intersection to Pickeringine Rd	Against-Gazetted	10%	9%	9%	8%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
33	Warrego Highway 18D	Pickeringine Rd to Latemores Lane	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
34	Warrego Highway 18D	Pickeringine Rd to Latemores Lane	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
35	Warrego Highway 18D	Latemores Lane to Warosby Lane	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
36	Warrego Highway 18D	Latemores Lane to Warosby Lane	Against-Gazetted	10%	9%	8%	8%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
37	Warrego Highway 18D	Warosby Ln to KM135.5	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
38	Warrego Highway 18D	Warosby Ln to KM135.5	Against-Gazetted	10%	9%	8%	8%	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
39	Warrego Highway 18D	KM135.5 to Roma	Gazetted	7%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
40	Warrego Highway 18D	KM135.5 to Roma	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
41	Warrego Highway 18E	Roma to Roma Southern Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
42	Warrego Highway 18E	Roma to Roma Southern Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
43	Warrego Highway 18E	Roma Southern Road to CH 5.5	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
44	Warrego Highway 18E	Roma Southern Road to CH 5.5	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
45	Warrego Highway 18E	CH 5.5 to Massary Lane	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
46	Warrego Highway 18E	CH 5.5 to Massary Lane	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
47	Canarvon Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
48	Canarvon Highway 24C	CH 0.00 (Surat) to Yuleba-Surat Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
49	Canarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
50	Canarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
51	Canarvon Highway 24C	Roma-Condamine Road to CH 5.4	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
52	Canarvon Highway 24C	Roma-Condamine Road to CH 5.4	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
53	Canarvon Highway 24C	CH 5.4 to Kimber Road	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
54	Canarvon Highway 24C	CH 5.4 to Kimber Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
55	Canarvon Highway 24C	Kimber Road to Warrego Highway	Gazetted	29%	28%	10%	6%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
56	Canarvon Highway 24C	Kimber Road to Warrego Highway	Against-Gazetted	8%	8%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
57	Canarvon Highway 24D	CH 0.00 (Roma) to Midowall Street	Gazetted	10%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
58	Canarvon Highway 24D	CH 0.00 (Roma) to Midowall Street	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
59	Canarvon Highway 24D	Midowall Street to KM 3.0	Gazetted	10%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
60	Canarvon Highway 24D	Midowall Street to KM 3.0	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
61	Canarvon Highway 24D	CH 3m to CH 18 Roma - Taroom Road	Gazetted	13%	13%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
62	Canarvon Highway 24D	CH 3m to CH 18 Roma - Taroom Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
63	Canarvon Highway 24D	Roma - Taroom Road to West Myall Road	Gazetted	20%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
64	Canarvon Highway 24D	Roma - Taroom Road to West Myall Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
65	Canarvon Highway 24D	West Myall Road to Gunnewin East Road	Gazetted	19%	18%	7%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
66	Canarvon Highway 24D	West Myall Road to Gunnewin East Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
67	Canarvon Highway 24D	Gunnewin East Road to Kinnora East Road	Gazetted	19%	18%	7%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
68	Canarvon Highway 24D	Gunnewin East Road to Kinnora East Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
69	Canarvon Highway 24D	Kinnora East Road to Injune	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
70	Canarvon Highway 24D	Kinnora East Road to Injune	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
71	Canarvon Highway 24E	CH 0.00 (Injune) to Fairview Field Access CH25.00	Gazetted	30%	29%	12%	9%	8%	8%	8%	8%	8%	8%	7%	7%	6%	0%	0%	0%	0%	0%
72	Canarvon Highway 24E	CH 0.00 (Injune) to Fairview Field Access CH25.00	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
73	Canarvon Highway 24E	Fairview Field Access to Arcadia Valley Access Road	Gazetted	30%	29%	12%	9%	8%	8%	8%	8%	8%	8%	7%	7%	6%	0%	0%	0%	0%	0%
74	Canarvon Highway 24E	Fairview Field Access to Arcadia Valley Access Road	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
75	Canarvon Highway 24E	Arcadia Valley Access Road to CH 69 Boundary with Emerald	Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
76	Canarvon Highway 24E	Arcadia Valley Access Road to CH 69 Boundary with Emerald	Against-Gazetted	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
77	Canarvon Highway 24E	CH 69 to CH 86 Access to Camp 1	Gazetted	26%	26%	11%	8%	7%	7%	7%	7%	7%	6%	6%	6%	5%	0%</				

Detailed Pavement Impact Assessment

Road	Section	Direction	Roughness Count*	Survey Year	Roughness Count Deficiency	Roughness Deterioration Rate	Background				With Development				Bring Forward Time Period (Years)
							Rehabilitation Year	ESA Load at Rehabilitation Year (rounded)	EAS Load 1 Year After Rehabilitation Year	ESA Load at Breakpoint	Rehabilitation Year (rounded)	ESA Load at Rehabilitation Year (rounded)	EAS Load 1 Year After Rehabilitation Year	Rehabilitation Year	
1 Warrego Highway 18B	Troys Road to Oakay Biddeston Road	Gazettal	68.7	2013	120.0	3.0	2030.1	26,926.610	28,784.780	27,112.427	2027	26,067.573	28,119.863	2027.5	2.6
2 Warrego Highway 18B	Troys Road to Oakay Biddeston Road	Against-Gazettal	68.7	2013	120.0	3.0	2030.1	26,926.610	28,784.780	27,112.427	2029	25,641.941	27,478.716	2029.8	0.3
3 Warrego Highway 18B	Oakey Biddeston Road to Dalby Cecil Plains Road	Gazettal	85.0	2013	120.0	3.0	2024.7	12,929.726	14,221.473	13,833.949	2022	12,233.284	14,066.026	2022.9	1.8
4 Warrego Highway 18B	Oakey Biddeston Road to Dalby Cecil Plains Road	Against-Gazettal	85.0	2013	120.0	3.0	2024.7	12,929.726	14,221.473	13,833.949	2024	13,242.652	14,595.175	2024.4	0.3
5 Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Gazettal	111.4	2013	120.0	3.0	2015.9	3,665.615	4,960.587	4,831.090	2015	3,720.081	5,025.194	2015.9	0.0
6 Warrego Highway 18B	Dalby Cecil Plains Road to Cunningham Street	Against-Gazettal	111.4	2013	120.0	3.0	2015.9	3,665.615	4,960.587	4,831.090	2015	3,671.233	4,967.237	2015.9	0.0
7 Warrego Highway 18C	Cunningham Street to Rail Line	Gazettal	82.3	2013	120.0	3.0	2025.6	21,213.422	23,072.684	22,328.979	2023	19,800.441	22,334.724	2024.0	1.6
8 Warrego Highway 18C	Cunningham Street to Rail Line	Against-Gazettal	82.3	2013	120.0	3.0	2025.6	21,213.422	23,072.684	22,328.979	2025	21,587.124	23,486.339	2025.4	0.2
9 Warrego Highway 18C	Rail Line to Macalister Bell Road	Gazettal	49.8	2013	120.0	3.0	2036.4	19,655.460	20,646.070	20,051.704	2030	19,618.006	20,762.756	2030.4	6.0
10 Warrego Highway 18C	Rail Line to Macalister Bell Road	Against-Gazettal	49.8	2013	120.0	3.0	2036.4	19,655.460	20,646.070	20,051.704	2035	19,360.068	20,340.125	2035.7	0.7
11 Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Gazettal	68.0	2013	120.0	3.0	2030.3	11,590.076	12,311.597	11,806.532	2024	10,578.250	11,894.114	2024.9	5.4
12 Warrego Highway 18C	Macalister Bell Road to Warra Kogan Road	Against-Gazettal	68.0	2013	120.0	3.0	2030.3	11,590.076	12,311.597	11,806.532	2029	11,409.305	12,142.181	2029.5	0.8
13 Warrego Highway 18C	Warra Kogan Road to Glasson Street	Gazettal	98.2	2013	120.0	3.0	2020.3	5,220.574	5,992.467	5,452.142	2019	4,678.570	5,694.060	2019.8	0.5
14 Warrego Highway 18C	Warra Kogan Road to Glasson Street	Against-Gazettal	98.2	2013	120.0	3.0	2020.3	5,220.574	5,992.467	5,452.142	2020	5,269.233	6,103.389	2020.2	0.1
15 Warrego Highway 18C	Glasson Street to Auburn Road	Gazettal	107.4	2013	120.0	3.0	2017.2	3,975.679	4,852.648	4,151.072	2017	4,050.426	4,937.536	2017.1	0.1
16 Warrego Highway 18C	Glasson Street to Auburn Road	Against-Gazettal	107.4	2013	120.0	3.0	2017.2	3,975.679	4,852.648	4,151.072	2017	3,983.361	4,861.363	2017.2	0.0
17 Warrego Highway 18C	Auburn Road to Goombi	Gazettal	76.3	2013	120.0	3.0	2027.6	10,940.499	11,706.445	11,400.067	2023	10,171.121	11,690.160	2023.8	3.8
18 Warrego Highway 18C	Auburn Road to Goombi	Against-Gazettal	76.3	2013	120.0	3.0	2027.6	10,940.499	11,706.445	11,400.067	2027	11,393.829	12,195.301	2027.0	0.6
19 Warrego Highway 18C	Goombi to Leichhardt Highway	Gazettal	65.7	2013	120.0	3.0	2031.1	8,610.562	9,101.651	8,659.671	2024	8,474.215	9,547.378	2024.2	6.9
20 Warrego Highway 18C	Goombi to Leichhardt Highway	Against-Gazettal	65.7	2013	120.0	3.0	2031.1	8,610.562	9,101.651	8,659.671	2029	8,188.380	8,684.964	2029.9	1.2
21 Warrego Highway 18D	Miles to 18D/Dulacca North Intersection	Gazettal	68.4	2013	120.0	3.0	2030.2	9,295.766	9,881.163	9,412.846	2025	8,833.393	9,457.303	2025.9	4.3
22 Warrego Highway 18D	Miles to 18D/Dulacca North Intersection	Against-Gazettal	68.4	2013	120.0	3.0	2030.2	9,295.766	9,881.163	9,412.846	2029	8,999.834	9,578.538	2029.7	0.5
23 Warrego Highway 18D	18D/Dulacca North Intersection to Yuleba-Taroom Rd	Gazettal	75.6	2013	120.0	3.0	2027.8	6,267.413	6,706.608	6,618.769	2023	6,038.519	6,925.263	2023.7	4.1
24 Warrego Highway 18D	18D/Dulacca North Intersection to Yuleba-Taroom Rd	Against-Gazettal	75.6	2013	120.0	3.0	2027.8	6,267.413	6,706.608	6,618.769	2024	6,497.029	7,315.870	2024.1	3.7
25 Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Gazettal	76.4	2013	120.0	3.0	2027.5	6,748.670	7,223.579	6,986.124	2023	6,387.776	7,304.976	2023.7	3.8
26 Warrego Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	Against-Gazettal	76.4	2013	120.0	3.0	2027.5	6,748.670	7,223.579	6,986.124	2023	6,255.507	7,131.436	2023.8	3.7
27 Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	Gazettal	76.0	2013	120.0	3.0	2027.7	6,748.670	7,223.579	7,081.106	2023	6,297.454	7,179.855	2023.9	3.8
28 Warrego Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	Against-Gazettal	76.0	2013	120.0	3.0	2027.7	6,748.670	7,223.579	7,081.106	2023	6,857.703	7,895.745	2023.2	4.5
29 Warrego Highway 18D	Kangaroo Ck Rd 18D/3441 Intersection\	Gazettal	59.9	2013	120.0	3.0	2033.0	9,195.698	9,762.765	9,195.698	2028	9,000.780	9,568.649	2028.3	4.7
30 Warrego Highway 18D	Kangaroo Ck Rd 18D/3441 Intersection\	Against-Gazettal	59.9	2013	120.0	3.0	2033.0	9,195.698	9,762.765	9,195.698	2026	8,754.643	9,599.991	2026.5	6.5
31 Warrego Highway 18D	18D/3441 Intersection to Pickenjinnie Rd	Gazettal	46.6	2013	120.0	3.0	2037.5	10,453.373	10,988.354	10,720.864	2032	10,361.225	10,830.991	2032.8	4.7
32 Warrego Highway 18D	18D/3441 Intersection to Pickenjinnie Rd	Against-Gazettal	46.6	2013	120.0	3.0	2037.5	10,453.373	10,988.354	10,720.864	2028	10,694.935	11,369.410	2028.0	9.5
33 Warrego Highway 18D	Pickenjinnie Rd to Latemores Lane	Gazettal	55.8	2013	120.0	3.0	2034.4	7,854.428	8,344.607	8,050.500	2029	7,782.061	8,263.070	2029.6	4.8
34 Warrego Highway 18D	Pickenjinnie Rd to Latemores Lane	Against-Gazettal	55.8	2013	120.0	3.0	2034.4	7,854.428	8,344.607	8,050.500	2026	8,041.011	8,838.444	2026.0	8.4
35 Warrego Highway 18D	Latemores Lane to Warooby Lane	Gazettal	80.2	2013	120.0	3.0	2026.3	4,406.654	4,795.082	4,523.182	2022	3,957.440	4,624.563	2022.8	3.5
36 Warrego Highway 18D	Latemores Lane to Warooby Lane	Against-Gazettal	80.2	2013	120.0	3.0	2026.3	4,406.654	4,795.082	4,523.182	2021	3,690.632	4,651.322	2021.9	4.4
37 Warrego Highway 18D	Warooby Ln to KM135.5	Gazettal	49.3	2013	120.0	3.0	2036.6	8,849.281	9,368.885	9,161.043	2031	9,070.199	9,534.866	2031.2	5.4
38 Warrego Highway 18D	Warooby Ln to KM135.5	Against-Gazettal	49.3	2013	120.0	3.0	2036.6	8,849.281	9,368.885	9,161.043	2026	8,472.545	9,270.312	2026.9	9.7
39 Warrego Highway 18D	KM135.5 to Roma	Gazettal	64.7	2013	120.0	3.0	2031.4	17,736.948	18,830.368	18,174.316	2026	17,238.398	18,355.543	2026.8	4.6
40 Warrego Highway 18D	KM135.5 to Roma	Against-Gazettal	64.7	2013	120.0	3.0	2031.4	17,736.948	18,830.368	18,174.316	2030	17,872.339	19,009.585	2030.3	1.1
41 Warrego Highway 18E	Roma to Roma Southern Road	Gazettal	99.4	2013	120.0	3.0	2019.9	5,013.252	5,817.911	5,737.445	2019	5,013.252	5,820.696	2019.9	0.0
42 Warrego Highway 18E	Roma to Roma Southern Road	Against-Gazettal	99.4	2013	120.0	3.0	2019.9	5,013.252	5,817.911	5,737.445	2019	5,013.252	5,818.214	2019.9	0.0
43 Warrego Highway 18E	Roma Southern Road to CH. 5.5	Gazettal	87.0	2013	120.0	3.0	2024.0	2,963.205	3,260.895	2,963.205	2022	2,666.644	3,087.288	2022.7	1.3
44 Warrego Highway 18E	Roma Southern Road to CH. 5.5	Against-Gazettal	87.0	2013	120.0	3.0	2024.0	2,963.205	3,260.895	2,963.205	2023	2,719.852	3,022.737	2023.8	0.2
45 Warrego Highway 18E	CH 5.5 to Massey Lane	Gazettal	68.7	2013	120.0	3.0	2030.1	3,829.790	4,108.249	3,857.635	2028	3,686.794	3,956.719	2028.6	1.5
46 Warrego Highway 18E	CH 5.5 to Massey Lane	Against-Gazettal	68.7	2013	120.0	3.0	2030.1	3,829.790	4,108.249	3,857.635	2029	3,604.789	3,876.200	2029.9	0.2
47 Camarvon Highway 24C	CH. 0.00 (Surat) to Yuleba-Surat Road	Gazettal	91.8	2012	120.0	3.0	2021.4	977.745	1,103.320	1,027.975	2021	977.745	1,103.320	2021.4	0.0
48 Camarvon Highway 24C	CH. 0.00 (Surat) to Yuleba-Surat Road	Against-Gazettal	91.8	2012	120.0	3.0	2021.4	977.745	1,103.320	1,027.975	2021	977.745	1,103.320	2021.4	0.0
49 Camarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Gazettal	88.2	2012	120.0	3.0	2022.6	1,103.320	1,232.663	1,180.926	2022	1,103.320	1,232.663	2022.6	0.0
50 Camarvon Highway 24C	Yuleba-Surat Road to Roma-Condamine Road	Against-Gazettal	88.2	2012	120.0	3.0	2022.6	1,103.320	1,232.663	1,180.926	2022	1,103.320	1,232.663	2022.6	0.0
51 Camarvon Highway 24C	Roma-Condamine Road to CH. 54	Gazettal	93.8	2012	120.0	3.0	2020.7	1,005.597	1,148.850	1,105.874	2020	1,005.597	1,148.958	2020.7	0.0
52 Camarvon Highway 24C	Roma-Condamine Road to CH. 54	Against-Gazettal	93.8	2012	120.0	3.0	2020.7	1,005.597	1,148.850	1,105.874	2020	1,005.597	1,149.743	2020.7	0.0
53 Camarvon Highway 24C	CH. 54 to Kimbler Road	Gazettal	60.3	2012	120.0	3.0	2031.9	2,840.360	3,038.657	3,018.827	2031	3,007.158	3,208.460	2031.1	0.8
54 Camarvon Highway 24C	CH. 54 to Kimbler Road	Against-Gazettal	60.3	2012	120.0	3.0	2031.9	2,840.360	3,038.657	3,018.827	2027	3,011.661	3,335.717	2027.0	4.9
55 Camarvon Highway 24C	Kimbler Road to Warrego Highway	Gazettal	48.7	2012	120.0	3.0	2035.8	3,669.959	3,893.144	3,848.507	2021	2,883.229	4,075.132	2021.8	14.0
56 Camarvon Highway 24C	Kimbler Road to Warrego Highway	Against-Gazettal	48.7	2012	120.0	3.0	2035.8	3,669.959	3,893.144	3,848.507	2029	3,629.430	3,896.363	2029.8	6.0
57 Camarvon Highway 24D	CH. 0.00 (Roma) to Mcdowall Street	Gazettal	139.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	562.713	2012.0	0.0
58 Camarvon Highway 24D	CH. 0.00 (Roma) to Mcdowall Street	Against-Gazettal	139.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	562.713	2012.0	0.0
59 Camarvon Highway 24D	Mcdowall Street to KM 3.0	Gazettal	112.9	2012	120.0	3.0	2014.4	1,132.000	1,641.126	1,335.651	2014	1,132.000	1,641.126	2014.4	0.0
60 Camarvon Highway 24D	Mcdowall Street to KM 3.0	Against-Gazettal	112.9	2012	120.0	3.0	2014.4	1,132.000	1,641.126	1,335.651	2014	1,132.000	1,641.126	2014.4	0.0
61 Camarvon Highway 24D	CH. 3m to CH. 18 Roma - Taroom Road	Gazettal	85.5	2012	120.0	3.0	2023.5	4,723.140	5,215.083	4,969.112	2021	4,929.483	5,599.086	2021.0	2.5
62 Camarvon Highway 24D	CH. 3m to CH. 18 Roma - Taroom Road	Against-Gazettal	85.5	2012	120.0	3.0	2023.5	4,723.140	5,215.083	4,969.112	2023	4,967.453	5,519.997	2023.0	0.5
63 Camarvon Highway 24D	Roma - Taroom Road to West Myall Road	Gazettal	96.1	2012	120.0	3.0	2020.0	2,009.308	2,285.148	2,009.308	2019	1,830.119	2,344.675	2019.3	0.7
64 Camarvon Highway 24D	Roma - Taroom Road to West Myall Road	Against-Gazettal	96.1</												

158	Dawson Highway 46C	46C/85B Intersection to Prospect Creek Culvert	Against-Gazettal	64.1	2012	120.0	3.0	2030.6	1,634,941	1,753,731	1,706,215	2028	1,615,234	1,746,986	2028.7	1.9
159	Dawson Highway 46C	Prospect Creek Culvert to AT155	Gazettal	65.4	2010	120.0	3.0	2028.2	1,407,641	1,519,612	1,430,035	2023	1,325,783	1,632,675	2023.3	4.9
160	Dawson Highway 46C	Prospect Creek Culvert to AT155	Against-Gazettal	65.4	2010	120.0	3.0	2028.2	1,407,641	1,519,612	1,430,035	2026	1,357,784	1,485,827	2026.6	1.6
161	Dawson Highway 46C	AT155 to Duaringa/Bauhinia Intersection	Gazettal	59.3	2012	120.0	3.0	2032.2	1,874,916	2,000,940	1,900,121	2024	1,631,507	1,939,367	2024.9	7.3
162	Dawson Highway 46C	AT155 to Duaringa/Bauhinia Intersection	Against-Gazettal	59.3	2012	120.0	3.0	2032.2	1,874,916	2,000,940	1,900,121	2030	1,881,310	2,020,720	2030.1	2.1
163	Dawson Highway 46C	Duaringa/Bauhinia Intersection to KM 137.5	Gazettal	81.9	2012	120.0	3.0	2024.7	990,268	1,089,752	1,059,907	2021	845,590	1,079,558	2021.9	2.8
164	Dawson Highway 46C	Duaringa/Bauhinia Intersection to KM 137.5	Against-Gazettal	81.9	2012	120.0	3.0	2024.7	990,268	1,089,752	1,059,907	2023	1,001,658	1,151,122	2023.4	1.3
165	Dawson Highway 46C	KM 137.5 to Rolleston	Gazettal	94.0	2012	120.0	3.0	2020.7	657,917	751,641	723,524	2020	664,259	796,361	2020.4	0.3
166	Dawson Highway 46C	KM 137.5 to Rolleston	Against-Gazettal	94.0	2012	120.0	3.0	2020.7	657,917	751,641	723,524	2020	715,015	838,309	2020.1	0.6
167	Fitzroy Development Road 85A	Leichhardt Highway to Glenhaughton Road	Gazettal	98.3	2012	120.0	3.0	2019.2	218,380	253,432	225,391	2019	218,380	253,432	2019.2	0.0
168	Fitzroy Development Road 85A	Leichhardt Highway to Glenhaughton Road	Against-Gazettal	98.3	2012	120.0	3.0	2019.2	218,380	253,432	225,391	2019	218,380	253,432	2019.2	0.0
169	Fitzroy Development Road 85A	Glenhaughton Road to CH. 94.14	Gazettal	80.7	2012	120.0	3.0	2025.1	87,086	95,275	87,905	2025	87,086	95,275	2025.1	0.0
170	Fitzroy Development Road 85A	Glenhaughton Road to CH. 94.14	Against-Gazettal	80.7	2012	120.0	3.0	2025.1	87,086	95,275	87,905	2025	87,086	95,275	2025.1	0.0
171	Fitzroy Development Road 85A	CH. 94.14 to Dawson Highway	Gazettal	0.0	0	120.0	3.0	O/R by 13	0	0	0	2040	0	0	0.0	0.0
172	Fitzroy Development Road 85A	CH. 94.14 to Dawson Highway	Against-Gazettal	0.0	0	120.0	3.0	O/R by 13	0	0	0	2040	0	0	0.0	0.0
173	Roma Condamine Road 344	Canrarvon Highway to Wallumbilla South Road	Gazettal	101.2	2013	120.0	3.0	2019.3	94,948	110,188	99,520	2019	94,948	110,188	2019.3	0.0
174	Roma Condamine Road 344	Canrarvon Highway to Wallumbilla South Road	Against-Gazettal	101.2	2013	120.0	3.0	2019.3	94,948	110,188	99,520	2019	94,948	110,188	2019.3	0.0
175	Roma Condamine Road 344	Wallumbilla South road to Yuleba-Surat Road	Gazettal	133.9	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
176	Roma Condamine Road 344	Wallumbilla South road to Yuleba-Surat Road	Against-Gazettal	133.9	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
177	Roma Condamine Road 344	Yuleba-Surat Road to Yuleba-Surat Road	Gazettal	132.5	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
178	Roma Condamine Road 344	Yuleba-Surat Road to Yuleba-Surat Road	Against-Gazettal	132.5	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
179	Roma Condamine Road 344	Yuleba-Surat Road to Yuleba-Surat Road to CH. 45	Gazettal	104.4	2013	120.0	3.0	2018.2	128,243	151,917	132,978	2018	128,243	151,917	2018.2	0.0
180	Roma Condamine Road 344	Yuleba-Surat Road to Yuleba-Surat Road to CH. 45	Against-Gazettal	104.4	2013	120.0	3.0	2018.2	128,243	151,917	132,978	2018	128,243	151,917	2018.2	0.0
181	Roma Condamine Road 344	CH. 45 to CH. 85	Gazettal	128.9	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
182	Roma Condamine Road 344	CH. 45 to CH. 85	Against-Gazettal	128.9	2013	120.0	3.0	O/R by 13	0	0	0	2012	0	19,826	2012.0	0.0
183	Roma Condamine Road 344	CH. 85 Leichhardt Hwy	Gazettal	108.5	2013	120.0	3.0	2016.8	155,522	197,361	188,994	2016	155,522	197,361	2016.8	0.0
184	Roma Condamine Road 344	CH. 85 Leichhardt Hwy	Against-Gazettal	108.5	2013	120.0	3.0	2016.8	155,522	197,361	188,994	2016	155,522	197,361	2016.8	0.0
185	Blackwater Rolleston Road 46S	CH. 49 to Penrose Road	Gazettal	81.3	2012	120.0	3.0	2024.9	580,331	638,632	632,802	2024	580,331	638,632	2024.9	0.0
186	Blackwater Rolleston Road 46S	CH. 49 to Penrose Road	Against-Gazettal	81.3	2012	120.0	3.0	2024.9	580,331	638,632	632,802	2024	580,331	638,632	2024.9	0.0
187	Blackwater Rolleston Road 46S	Penrose Road to Humboldt Road	Gazettal	68.7	2012	120.0	3.0	2029.1	889,860	957,447	896,619	2028	894,558	969,127	2028.0	1.1
188	Blackwater Rolleston Road 46S	Penrose Road to Humboldt Road	Against-Gazettal	68.7	2012	120.0	3.0	2029.1	889,860	957,447	896,619	2024	887,066	1,037,773	2024.1	5.0
189	Blackwater Rolleston Road 46S	Humboldt Road to Sunlight Road	Gazettal	77.6	2012	120.0	3.0	2026.1	698,683	760,534	704,868	2025	681,577	751,111	2025.3	0.8
190	Blackwater Rolleston Road 46S	Humboldt Road to Sunlight Road	Against-Gazettal	77.6	2012	120.0	3.0	2026.1	698,683	760,534	704,868	2022	608,613	737,433	2022.7	3.4
191	Blackwater Rolleston Road 46S	Sunlight Road to CH. 107	Gazettal	145.9	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	19,207	2012.0	0.0
192	Blackwater Rolleston Road 46S	Sunlight Road to CH. 107	Against-Gazettal	145.9	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	19,207	2012.0	0.0
193	Blackwater Rolleston Road 46S	CH. 107 to Dawson Highway	Gazettal	116.0	2012	120.0	3.0	2013.3	19,207	38,989	25,141	2013	19,207	38,989	2013.3	0.0
194	Blackwater Rolleston Road 46S	CH. 107 to Dawson Highway	Against-Gazettal	116.0	2012	120.0	3.0	2013.3	19,207	38,989	25,141	2013	19,207	38,989	2013.3	0.0
195	Wallumbilla South Road 3441	Warrego Highway to Trafford Park Rd	Gazettal	92.0	2012	120.0	3.0	2021.3	428,008	482,979	444,499	2019	357,009	491,534	2019.7	1.6
196	Wallumbilla South Road 3441	Warrego Highway to Trafford Park Rd	Against-Gazettal	92.0	2012	120.0	3.0	2021.3	428,008	482,979	444,499	2019	359,758	500,907	2019.6	1.7
197	Wallumbilla South Road 3441	Trafford Park Road to CH0.6	Gazettal	129.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
198	Wallumbilla South Road 3441	Trafford Park Road to CH0.6	Against-Gazettal	129.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
199	Wallumbilla South Road 3441	CH0.6 to CH1.7	Gazettal	86.4	2012	120.0	3.0	2023.2	539,598	597,917	551,262	2020	473,531	598,796	2020.6	2.6
200	Wallumbilla South Road 3441	CH0.6 to CH1.7	Against-Gazettal	86.4	2012	120.0	3.0	2023.2	539,598	597,917	551,262	2020	527,424	689,089	2020.1	3.1
201	Wallumbilla South Road 3441	CH1.7 to CH4	Gazettal	122.8	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
202	Wallumbilla South Road 3441	CH1.7 to CH4	Against-Gazettal	122.8	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
203	Wallumbilla South Road 3441	CH4 to Luckona Road	Gazettal	143.7	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
204	Wallumbilla South Road 3441	CH4 to Luckona Road	Against-Gazettal	143.7	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
205	Wallumbilla South Road 3441	Luckona Road to Iona Bardlomey Road	Gazettal	122.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	22,924	2012.0	0.0
206	Wallumbilla South Road 3441	Luckona Road to Iona Bardlomey Road	Against-Gazettal	122.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	22,924	2012.0	0.0
207	Wallumbilla South Road 3441	Iona Bardlomey Road to Roma Condamine Road	Gazettal	98.8	2012	120.0	3.0	2019.1	33,232	38,566	33,765	2019	33,232	38,566	2019.1	0.0
208	Wallumbilla South Road 3441	Iona Bardlomey Road to Roma Condamine Road	Against-Gazettal	98.8	2012	120.0	3.0	2019.1	33,232	38,566	33,765	2019	33,232	38,566	2019.1	0.0
209	Roma Southern Road 3501	Warrego Highway to Comyindale Road	Gazettal	159.1	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	49,565	2012.0	0.0
210	Roma Southern Road 3501	Warrego Highway to Comyindale Road	Against-Gazettal	159.1	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	49,565	2012.0	0.0
211	Roma Southern Road 3501	Comyindale Road to Mount Abundance Road	Gazettal	144.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
212	Roma Southern Road 3501	Comyindale Road to Mount Abundance Road	Against-Gazettal	144.0	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	42,130	2012.0	0.0
213	Roma Southern Road 3501	Mount Abundance Road to Meegine Road	Gazettal	134.3	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	22,924	2012.0	0.0
214	Roma Southern Road 3501	Mount Abundance Road to Meegine Road	Against-Gazettal	134.3	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	22,924	2012.0	0.0
215	Jackson-Wandoan Road 4302	Warrego Highway Intersection to Grid	Gazettal	92.9	2012	120.0	3.0	2021.0	576,279	635,292	576,279	2020	555,240	635,863	2020.3	0.7
216	Jackson-Wandoan Road 4302	Grid to 18D/Dulacca North Intersection	Against-Gazettal	92.9	2012	120.0	3.0	2021.0	576,279	635,292	576,279	2017	540,543	628,800	2017.4	3.6
217	Jackson-Wandoan Road 4302	Grid to Leichardt Highway	Gazettal	125.5	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	119,289	2012.0	0.0
218	Jackson-Wandoan Road 4302	Leichardt Highway to Grid	Against-Gazettal	125.5	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	142,371	2012.0	0.0
219	Roma Taroom Road 4397	Canrarvon Highway to CH 1.3	Gazettal	87.1	2012	120.0	3.0	2023.0	1,804,246	1,993,355	1,804,246	2021	1,727,804	2,025,070	2021.3	1.7
220	Roma Taroom Road 4397	Canrarvon Highway to CH 1.3	Against-Gazettal	87.1	2012	120.0	3.0	2023.0	1,804,246	1,993,355	1,804,246	2022	1,663,596	1,860,073	2022.7	0.3
221	Roma Taroom Road 4397	Culvert at CH 1.3	Gazettal	0.0	0	120.0	3.0	O/R by 13	0	0	0	2012	0	139,325	2012.0	0.0
222	Roma Taroom Road 4397	Culvert at CH 1.3	Against-Gazettal	0.0	0	120.0	3.0	O/R by 13	0	0	0	2012	0	139,926	2012.0	0.0
223	Roma Taroom Road 4397	CH 1.3 to CH10	Gazettal	117.4	2011	120.0	3.0	O/R by 13	0	0	0	2012	0	138,723	2012.0	0.0
224	Roma Taroom Road 4397	CH 1.3 to CH10	Against-Gazettal	117.4	2011	120.0	3.0	O/R by 13	0	0	0	2012	0	138,723	2012.0	0.0
225	Roma Taroom Road 4397	CH10 to CH10.1	Gazettal	125.5	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	138,723	2012.0	0.0
226	Roma Taroom Road 4397	CH10 to CH10.1	Against-Gazettal	125.5	2012	120.0	3.0	O/R by 13	0	0	0	2012	0	138,723	2012.0	0.0
227	Roma Taroom Road 4397	CH10.1 to CH24.6	Gazettal	77.3	2012	120.0	3.0	2026.2	1,535,017	1,665,439	1,561,101	2026	1,535,017	1,665,439	2026.2	0.0
228	Roma Taroom Road 4397	CH10.1 to CH24.6	Against-Gazettal	77.3	2012	120.0	3.0	2026.2	1,535,017	1,665,439	1,					

Report	Maintenance Contribution (where development ESA load is greater than 5% of background ESA load)		Agains-Gazetteal	2013	2014	2015	2016	2017	2018	2019	2020	2021
--------	---	--	------------------	------	------	------	------	------	------	------	------	------

Gas Field Development Project – Environmental Impact Statement

APPENDIX F MID-BLOCK ASSESSMENT

Backward AADT

ID	Road	Section	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056		
1	Warrago Highway 18B	Toys Road to Oakley Biddisdon Road	11,636	11,085	12,609	12,816	13,240	13,740	14,072	14,504	14,944	15,398	15,865	16,320	16,809	17,313	17,831	18,364	18,903	19,291	19,868	20,462	21,067	21,697	22,346	23,015	23,704	24,414	25,145	25,898	26,673	27,472	28,294	29,142	30,015	30,913	31,830	32,773	33,775	34,787	35,829	36,903	38,008	39,097	40,270	41,478	42,722	44,004	45,324	46,684		
3	Warrago Highway 18B	Oakey Biddisdon Road to Dalby Cecil Plains Road	4,884	5,010	5,256	5,516	5,817	6,170	6,580	7,048	7,586	8,195	8,885	9,667	10,543	11,517	12,594	13,777	15,068	16,470	18,000	19,668	21,487	23,469	25,625	27,968	30,508	33,250	36,204	39,382	42,805	46,488	50,441	54,685	59,238	64,111	69,234	74,627	80,311	86,315	92,660	99,378	106,492	113,933	121,730	129,915	138,519	147,582	157,045	166,945	185,153	
5	Warrago Highway 18B	Dalby Cecil Plains Road to Cunningham Street	17,344	17,298	10,039	10,063	10,301	10,715	10,960	11,303	11,650	12,008	12,379	12,760	13,114	13,509	13,915	14,334	14,729	15,129	15,524	15,924	16,351	16,840	17,344	17,867	18,397	18,929	19,461	20,000	20,552	21,115	21,697	22,294	22,914	23,561	24,235	24,936	25,665	26,424	27,214	28,039	28,899	29,794	30,724	31,691	32,694	33,734	34,804	35,904	37,036	38,199
7	Warrago Highway 18C	Cunningham Street to Rail Line	11,375	11,717	12,763	13,290	13,038	13,391	13,765	14,195	14,631	15,080	15,542	15,993	16,474	16,970	17,480	18,005	18,510	18,883	19,424	20,005	20,595	21,211	21,846	22,501	23,174	23,867	24,582	25,318	26,076	26,857	27,661	28,491	29,342	30,211	31,126	32,058	33,019	34,008	35,026	36,076	37,156	38,260	39,366	40,547	41,764	43,017	44,307	45,638		
9	Warrago Highway 18C	Rail Line to Macalister Bell Road	2,877	2,793	3,898	3,590	3,621	3,993	3,881	4,007	4,133	4,260	4,394	4,530	4,677	4,753	4,742	4,885	4,933	4,877	5,015	5,161	5,305	5,457	5,617	5,787	5,967	6,132	6,313	6,499	6,691	6,888	7,092	7,301	7,513	7,726	7,946	8,206	8,443	8,693	8,951	9,216	9,489	9,666	9,956	10,254	10,562	10,879	11,205	11,541		
11	Warrago Highway 18C	Macalister Bell Road to Warrago Highway	4,591	4,892	3,303	3,035	3,008	3,061	3,183	3,296	3,409	3,524	3,642	3,712	3,809	3,849	3,972	4,108	4,253	4,184	4,304	4,432	4,566	4,692	4,831	4,976	5,124	5,277	5,434	5,596	5,763	5,935	6,113	6,295	6,479	6,672	6,873	7,078	7,289	7,506	7,732	7,969	8,206	8,461	8,694	8,908	9,147	9,396				
13	Warrago Highway 18C	Warrago Highway to Glasson Street	3,417	3,519	4,269	4,030	4,033	4,250	4,272	4,415	4,559	4,707	4,858	5,044	5,196	5,353	5,514	5,680	5,850	5,769	5,934	6,109	6,280	6,445	6,656	6,856	7,053	7,253	7,458	7,669	7,827	8,161	8,403	8,652	8,904	9,168	9,494	9,720	10,005	10,305	10,611	10,926	11,251	11,480	11,825	12,180	12,545	12,921	13,309	13,708		
15	Warrago Highway 18C	Glasson Street to Auburn Road	3,990	4,110	4,878	4,586	4,679	4,989	5,031	5,195	5,360	5,529	5,703	5,782	5,958	6,140	6,326	6,518	6,743	6,662	6,855	7,059	7,260	7,477	7,699	7,929	8,165	8,408	8,659	8,917	9,183	9,457	9,739	10,029	10,325	10,633	10,950	11,277	11,614	11,961	12,318	12,686	13,066	13,408	13,808	14,222	14,649	15,090	15,541	16,007		
17	Warrago Highway 18C	Auburn Road to Goomi	2,676	2,766	3,444	3,222	3,210	3,403	3,387	3,512	3,637	3,765	3,896	4,005	4,135	4,269	4,406	4,546	4,555	4,480	4,616	4,754	4,887	5,032	5,182	5,335	5,494	5,657	5,825	5,998	6,177	6,360	6,549	6,744	6,941	7,148	7,361	7,580	7,806	8,039	8,278	8,526	8,779	8,991	9,261	9,538	9,825	10,120	10,423	10,736		
19	Warrago Highway 18C	Goomi to Leichhardt Highway	2,053	2,115	2,453	2,391	2,369	2,406	2,487	2,580	2,687	2,790	2,896	3,002	3,107	3,217	3,308	3,393	3,480	3,480	3,567	3,657	3,742	3,831	3,908	4,006	4,227	4,362	4,481	4,614	4,751	4,892	5,037	5,187	5,337	5,492	5,659	5,827	6,000	6,179	6,362	6,547	6,696	7,105	7,318	7,537	7,764	8,006	8,264			
21	Warrago Highway 18D	Miles to 18D/Dulacca North Intersection	1,749	1,801	2,180	2,306	2,172	2,137	2,187	2,284	2,343	2,424	2,507	2,592	2,675	2,760	2,847	2,936	3,022	2,890	3,072	3,168	3,263	3,360	3,458	3,557	3,654	3,771	3,888	4,000	4,120	4,244	4,371	4,503	4,638	4,777	4,920	5,068	5,220	5,376	5,538	5,704	5,875	6,051	6,238	6,420	6,612	6,811	7,015			
23	Warrago Highway 18D	18D/Dulacca North Intersection to Yuleba-Taroom Rd	1,365	1,406	1,473	1,557	1,580	1,653	1,723	1,783	1,844	1,907	1,971	2,037	2,109	2,182	2,258	2,334	2,354	2,256	2,324	2,393	2,465	2,539	2,615	2,694	2,775	2,858	2,943	3,032	3,123	3,216	3,313	3,412	3,515	3,620	3,729	3,841	3,956	4,074	4,197	4,323	4,452	4,586	4,723	4,865	5,011	5,161	5,316	5,476		
25	Warrago Highway 18D	Yuleba-Taroom Rd to Yuleba-Surat Rd	1,432	1,475	1,554	1,631	1,686	1,771	1,817	1,877	1,939	2,003	2,068	2,135	2,208	2,282	2,358	2,437	2,462	2,387	2,438	2,511	2,585	2,659	2,734	2,825	2,925	2,998	3,088	3,180	3,276	3,374	3,475	3,580	3,687	3,798	3,912	4,029	4,150	4,274	4,402	4,535	4,671	4,811	4,955	5,104	5,257	5,415	5,577			
27	Warrago Highway 18D	Yuleba-Surat Rd to Kangaroo Ck Rd	1,432	1,475	1,554	1,631	1,686	1,771	1,817	1,877	1,939	2,003	2,068	2,135	2,208	2,282	2,358	2,437	2,462	2,387	2,438	2,511	2,585	2,659	2,734	2,825	2,925	2,998	3,088	3,180	3,276	3,374	3,475	3,580	3,687	3,798	3,912	4,029	4,150	4,274	4,402	4,535	4,671	4,811	4,955	5,104	5,257	5,415	5,577			
29	Warrago Highway 18D	Kangaroo Ck Rd to 18D/Alkali Intersection	1,432	1,475	1,519	1,610	1,656	1,709	1,795	1,846	1,899	1,954	2,010	2,068	2,121	2,184	2,248	2,298	2,367	2,438	2,511	2,586	2,664	2,743	2,826	2,911	2,998	3,088	3,180	3,276	3,374	3,475	3,580	3,687	3,798	3,912	4,029	4,142	4,264	4,402	4,535	4,671	4,811	4,955	5,104	5,257	5,415	5,577				
31	Warrago Highway 18D	18D/Alkali Intersection to Pokrajine Rd	1,509	1,554	1,638	1,727	1,795	1,877	1,921	1,984	2,049	2,116	2,185	2,255	2,331	2,409	2,489	2,571	2,598	2,567	2,681	2,758	2,839	2,914	2,990	3,069	3,172	3,267	3,364	3,465	3,568	3,675	3,785	3,898	4,015	4,135	4,258	4,386	4,505	4,640	4,779	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054			
33	Warrago Highway 18D	Pokrajine Rd to Latemore Lane	1,509	1,554	1,613	1,661	1,711	1,761	1,814	1,868	1,924	1,981	2,040	2,101	2,164	2,228	2,295	2,363	2,434	2,506	2,581	2,658	2,738	2,819	2,904	2,990	3,080	3,172	3,267	3,364	3,465	3,568	3,675	3,785	3,898	4,015	4,135	4,258	4,386	4,505	4,640	4,779	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054		
35	Warrago Highway 18D	Latemore Lane to Warraby Lane	1,509	1,554	1,613	1,661	1,711	1,761	1,814	1,868	1,924	1,981	2,040	2,101	2,164	2,228	2,295	2,363	2,434	2,506	2,581	2,658	2,738	2,819	2,904	2,990	3,080	3,172	3,267	3,364	3,465	3,568	3,675	3,785	3,898	4,015	4,135	4,258	4,386	4,505	4,640	4,779	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054		
37	Warrago Highway 18D	Warraby Ln to KM135 to	1,509	1,554	1,613	1,661	1,711	1,761	1,814	1,868	1,924	1,981	2,040	2,101	2,164	2,228	2,295	2,363	2,434	2,506	2,581	2,658	2,738	2,819	2,904	2,990	3,080	3,172	3,267	3,364	3,465	3,568	3,675	3,785	3,898	4,015	4,135	4,258	4,386	4,505	4,640	4,779	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054		
39	Warrago Highway 18D	KM135 to Roma	4,055	4,177	4,339	4,691	4,877	4,880	5,043	5,208	5,377	5,550	5,728	5,911	6,099	6,291	6,495	6,881	6,714	6,915	7,123	7,336	7,559	7,782	8,015	8,255	8,502	8,757	9,019	9,290	9,568	9,855	10,150	10,454	10,767	11,090	11,422	11,765	12,105	12,448	12,842	13,228	13,625	14,033	14,451	14,888	15,799	16,268				
41	Warrago Highway 18E	Roma to Roma Southern Road	4,985	5,135	5,289	5,448	5,611	5,779	5,953	6,131	6,315	6,505	6,700	6,901	7,108	7,321	7,541	7,767	8,000	8,240	8,487	8,742	9,004	9,274	9,553	9,839	10,134	10,438	10,751	11,071	11,406	11,748	12,101	12,464	12,838	13,223	13,620	14,028	14,449	14,883	15,329	15,789	16,263	16,750	17,253	17,771	18,304	18,853	19,410	20,001		
43	Warrago Highway 18E	Roma Southern Road to CH 5.5	1,246	1,283	1,322	1,362	1,403	1,445	1,488	1,533	1,579	1,626	1,675	1,725	1,777	1,830	1,881	1,941	2,000	2,060	2,121	2,185	2,251	2,318	2,386	2,459	2,533	2,609	2,687	2,768	2,851	2,937	3,025	3,115	3,209	3,305	3,402	3,508	3,612	3,720	3,832	3,946	4,065	4,187	4,312	4,442	4,572	4,712	4,854	4,999		
45	Warrago Highway 18E	CH 5.5 to Massieu Lane	846	871	897	924	962	990	1,010	1,040	1,071	1,103	1,136	1,170	1,205	1,242	1,279	1,317	1,357	1,397	1,439	1,483	1,527	1,57																												

G:\CEB06417 - SANTOS GLNG Gas Field Development EIS\6417 Analysis\MIA\6417 MIA ARS 2013 08 26.xlsx MIA

Background - Development AADT

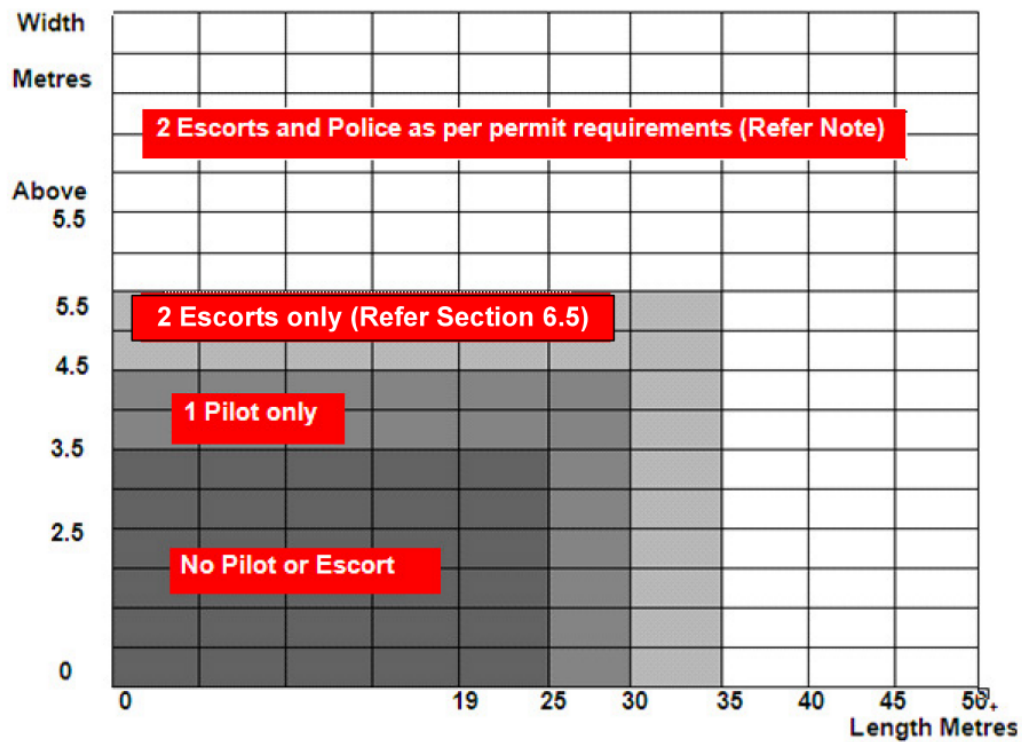
ID	0.05	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056						
1	Warrago Highway 18B	11,886	11,111	12,249	12,916	13,582	14,248	14,914	15,580	16,246	16,912	17,578	18,244	18,910	19,576	20,242	20,908	21,574	22,240	22,906	23,572	24,238	24,904	25,570	26,236	26,902	27,568	28,234	28,900	29,566	30,232	30,898	31,564	32,230	32,896	33,562	34,228	34,894	35,560	36,226	36,892	37,558	38,224	38,890	39,556	40,222	40,888	41,554	42,220	42,886	43,552	44,218	44,884	45,550	46,216
3	Warrago Highway 18B	4,864	5,010	5,204	5,416	5,627	5,839	6,050	6,261	6,472	6,683	6,894	7,105	7,316	7,527	7,738	7,949	8,160	8,371	8,582	8,793	9,004	9,215	9,426	9,637	9,848	10,059	10,270	10,481	10,692	10,903	11,114	11,325	11,536	11,747	11,958	12,169	12,380	12,591	12,802	13,013	13,224	13,435	13,646	13,857	14,068	14,279	14,490	14,701	14,912	15,123	15,334	15,545	15,756	
5	Warrago Highway 18B	8,025	9,296	10,309	10,063	10,311	10,474	10,880	11,314	11,661	12,019	12,509	13,021	13,576	14,274	14,776	14,856	15,044	15,374	15,404	15,845	16,262	16,684	17,179	17,677	18,106	18,617	19,166	19,733	20,273	20,800	21,412	22,050	22,727	23,301	23,988	24,705	25,446	26,208	26,993	27,801	28,634	29,491	30,324	31,234	32,171	33,136	34,130	35,154	36,209	37,287				
7	Warrago Highway 18C	11,375	11,717	12,763	12,763	13,048	13,420	13,784	14,206	14,682	15,091	15,625	16,284	17,136	17,735	18,150	18,596	19,074	19,586	20,146	20,646	21,186	21,760	22,360	22,990	23,640	24,306	24,986	25,686	26,416	27,176	27,966	28,786	29,626	30,516	31,426	32,356	33,306	34,286	35,296	36,336	37,406	38,506	39,636	40,796	41,986	43,206	44,456	45,736	47,046	48,386				
9	Warrago Highway 18C	2,877	2,963	3,088	3,090	3,441	4,002	3,901	4,018	4,144	4,273	4,498	5,099	5,339	5,383	5,638	5,679	5,301	5,436	5,539	5,638	5,738	5,838	5,938	6,038	6,138	6,238	6,338	6,438	6,538	6,638	6,738	6,838	6,938	7,038	7,138	7,238	7,338	7,438	7,538	7,638	7,738	7,838	7,938	8,038	8,138	8,238	8,338	8,438	8,538					
11	Warrago Highway 18C	2,506	2,582	3,303	3,035	3,018	3,091	3,203	3,307	3,420	3,535	3,775	4,004	4,491	4,715	4,742	4,908	4,899	4,609	4,726	4,810	4,889	5,030	5,165	5,251	5,340	5,429	5,518	5,607	5,696	5,785	5,874	5,963	6,052	6,141	6,230	6,319	6,408	6,497	6,586	6,675	6,764	6,853	6,942	7,031	7,120	7,209	7,298	7,387	7,476	7,565				
13	Warrago Highway 18C	3,417	3,519	4,269	4,003	4,043	4,279	4,292	4,426	4,718	4,981	5,335	5,888	6,119	6,185	6,390	6,466	6,194	6,356	6,486	6,614	6,742	6,870	6,998	7,126	7,254	7,382	7,510	7,638	7,766	7,894	8,022	8,150	8,278	8,406	8,534	8,662	8,790	8,918	9,046	9,174	9,302	9,430	9,558	9,686	9,814	9,942	10,070	10,198	10,326					
15	Warrago Highway 18C	3,990	4,110	4,878	4,686	4,689	5,019	5,151	5,206	5,371	5,543	5,837	6,620	6,905	6,967	7,228	7,386	7,086	7,276	7,436	7,596	7,756	7,916	8,076	8,236	8,396	8,556	8,716	8,876	9,036	9,196	9,356	9,516	9,676	9,836	9,996	10,156	10,316	10,476	10,636	10,796	10,956	11,116	11,276	11,436	11,596	11,756	11,916	12,076	12,236					
17	Warrago Highway 18C	2,071	2,166	2,766	3,444	3,222	3,220	3,432	3,407	3,523	3,648	3,776	4,029	4,297	4,787	5,266	5,201	4,914	5,039	5,164	5,289	5,414	5,539	5,664	5,789	5,914	6,039	6,164	6,289	6,414	6,539	6,664	6,789	6,914	7,039	7,164	7,289	7,414	7,539	7,664	7,789	7,914	8,039	8,164	8,289	8,414	8,539	8,664	8,789	8,914					
19	Warrago Highway 18C	2,053	2,115	2,424	2,391	2,369	2,635	2,707	2,791	2,883	2,977	3,195	3,352	3,589	3,622	4,059	4,213	4,268	4,319	4,370	4,421	4,472	4,523	4,574	4,625	4,676	4,727	4,778	4,829	4,880	4,931	4,982	5,033	5,084	5,135	5,186	5,237	5,288	5,339	5,390	5,441	5,492	5,543	5,594	5,645	5,696	5,747	5,798	5,849	5,900	5,951				
21	Warrago Highway 18D	1,749	1,801	2,180	2,306	2,172	2,137	2,127	2,264	2,343	2,424	2,583	2,827	3,177	3,333	3,341	3,379	3,409	3,085	3,195	3,266	3,363	3,461	3,559	3,657	3,755	3,853	3,951	4,049	4,147	4,245	4,343	4,441	4,539	4,637	4,735	4,833	4,931	5,029	5,127	5,225	5,323	5,421	5,519	5,617	5,715	5,813	5,911	6,009	6,107	6,205				
23	Warrago Highway 18D	1,365	1,406	1,471	1,557	1,646	1,728	1,803	1,874	1,938	1,999	2,141	2,402	2,658	3,147	3,163	3,234	3,186	2,878	2,917	2,878	3,004	3,043	3,084	3,125	3,166	3,207	3,248	3,289	3,330	3,371	3,412	3,453	3,494	3,535	3,576	3,617	3,658	3,699	3,740	3,781	3,822	3,863	3,904	3,945	3,986	4,027	4,068	4,109	4,150	4,191	4,232			
25	Warrago Highway 18D	1,432	1,475	1,544	1,631	1,689	1,842	1,897	1,969	2,031	2,095	2,282	2,609	3,068	3,227	3,268	3,341	3,297	2,993	3,036	3,000	2,998	3,077	3,137	3,080	3,104	3,186	3,279	3,380	3,477	3,575	3,672	3,769	3,861	3,951	4,042	4,134	4,221	4,314	4,401	4,488	4,575	4,661	4,748	4,835	4,922	5,009	5,096	5,183	5,270	5,357	5,444			
27	Warrago Highway 18D	1,432	1,475	1,544	1,631	1,689	1,842	1,897	1,969	2,031	2,095	2,219	2,745	3,212	3,425	3,471	3,572	3,480	3,144	3,187	3,151	3,150	3,232	3,284	3,317	3,196	3,278	3,374	3,476	3,571	3,673	3,773	3,877	3,983	4,087	4,172	4,223	4,309	4,433	4,522	4,565	4,671	4,811	4,955	5,104	5,257	5,415	5,577	5,744	5,910	6,077	6,244			
29	Warrago Highway 18D	1,432	1,475	1,519	1,610	1,689	1,775	1,875	1,958	1,991	2,046	2,215	2,528	2,966	3,272	3,303	3,373	3,307	3,155	3,178	3,142	3,141	3,223	3,275	3,168	3,198	3,268	3,365	3,470	3,570	3,673	3,773	3,877	3,983	4,087	4,172	4,223	4,309	4,433	4,522	4,565	4,671	4,811	4,955	5,104	5,257	5,415	5,577	5,744	5,910	6,077	6,244			
31	Warrago Highway 18D	1,509	1,554	1,638	1,689	1,778	1,943	2,002	2,076	2,141	2,208	2,439	2,812	3,289	3,641	3,684	3,758	3,683	3,346	3,315	3,318	3,404	3,459	3,440	3,341	3,448	3,555	3,666	3,771	3,878	3,980	4,088	4,198	4,307	4,398	4,456	4,548	4,586	4,701	4,810	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054	6,230	6,406					
33	Warrago Highway 18D	1,509	1,554	1,613	1,661	1,744	1,827	1,895	1,960	2,016	2,073	2,289	2,645	3,089	3,439	3,430	3,524	3,480	3,297	3,343	3,311	3,314	3,400	3,455	3,338	3,357	3,444	3,552	3,663	3,768	3,876	3,979	4,087	4,194	4,307	4,398	4,456	4,548	4,586	4,701	4,810	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054	6,230	6,406				
35	Warrago Highway 18D	1,509	1,554	1,613	1,661	1,744	1,827	1,895	1,960	2,016	2,073	2,294	2,655	3,099	3,439	3,472	3,569	3,512	3,303	3,346	3,314	3,317	3,403	3,458	3,339	3,360	3,447	3,555	3,666	3,772	3,879	3,982	4,089	4,199	4,307	4,398	4,456	4,548	4,586	4,701	4,810	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054	6,230	6,406				
37	Warrago Highway 18D	1,509	1,554	1,613	1,661	1,744	1,827	1,895	1,960	2,016	2,073	2,345	2,782	3,228	3,592	3,694	3,534	3,311	3,354	3,322	3,325	3,467	3,348	3,369	3,456	3,568	3,676	3,782	3,889	3,990	4,094	4,200	4,307	4,398	4,456	4,548	4,586	4,701	4,810	4,923	5,070	5,223	5,379	5,541	5,707	5,878	6,054	6,230	6,406						
39	Warrago Highway 18D	4,055	4,177	4,339	4,491	4,677	4,908	5,086	5,282	5,431	5,605	5,951	6,404	7,247	7,517	7,694	7,958	8,102	7,312	7,456	7,708	7,850	8,117	8,341	8,576	8,814	9,064	9,324	9,587	9,872	10,032	10,316	10,608	10,822	11,104	11,403	11,676	11,985	12,325	12,631	12,888	13,244	13,640	14,047	14,464	14,894	15,341	15,801	16,272	16,755	17,250				
41	Warrago Highway 18E	1,485	1,515	1,589	1,648	1,611	1,779	1,953	2,131	2,315	2,505	2,609	2,809	3,131	3,345	3,535	3,702	3,856	3,832	3,856	3,810	3,780	3,793	3,844	3,921	4,027	4,103	4,168	4,228	4,283	4,333	4,378	4,423	4,468	4,513	4,558	4,603	4,648	4,693	4,738	4,783	4,828	4,873	4,918	4,963	5,008	5,053	5,098	5,143	5,188					
43	Warrago Highway 18E	1,246	1,263	1,322	1,362	1,403	1,445	1,488	1,533	1,579	1,626	1,675	1,734	1,787	1,842	1,902	1,968	2,038	2,108	2,144	2,257	2,317	2,383	2,447	2,511	2,575	2,639	2,703	2,767	2,831	2,895	2,959	3,023	3,087	3,151	3,215	3,279	3,343	3,407	3,471	3,535	3,599	3,663	3,727	3,791	3,855	3,919	3,983	4,047	4,111	4,175	4,239	4,303		
45	Warrago Highway 18E	846	871	897																																																			

AADT		Section		2000	2010	2011	2012	2013	2014	2015	2016	2017
------	--	---------	--	------	------	------	------	------	------	------	------	------

APPENDIX G

OVERSIZE VEHICLE ESCORT WARRANTS

DTMR Oversize Vehicle Escort Thresholds



Note: Sub section 13.3 indicates a recommended position or maximum distance a pilot or escort or police escort vehicle should travel when accompanying an oversize vehicle or combination.

Source: Table 6 - Guideline for Excess Dimension - Vehicles Carrying Indivisible Articles, Special Purpose Vehicles, Vehicles that require a Pilot or Escort, 2013

Gas Field Development Project – Environmental Impact Statement

APPENDIX H

CRASH DATA

DCA DIAGRAM

DCA (Definition for Coding Accidents) is a system of classifying crashes, using ‘collision diagrams’, based on the traffic movements leading up to the crash. Participant intent, as well as actual movement, can be used in determining the DCA crash type however the relative fault of the participants is not relevant (for example the car was stationary waiting to turn right, when it was hit from behind).

The DCA crash types were defined in the *Australian Road Research Board Report ARR227 ‘Costs for accident-types and casualty classes’* (July 1992).

	0	1	2	3	4	5	6	7	8	9
	PEDESTRIAN on foot in toy/pram	INTERSECTION vehicles from adjacent approaches	VEHICLES FROM OPPOSING DIRECTIONS	VEHICLES FROM ONE DIRECTION	MANOEUVRING	OVERTAKING	ON PATH	NON-COLLISION, ON STRAIGHT	NON-COLLISION, ON CURVE	MISCELLANEOUS
	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER	OTHER
	000	100	200	300	400	500	600	700	800	900
1	 NEAR SIDE 001	 THRU-THRU 101	 HEAD ON 201	 REAR-END 301	 LEAVING PARKING 401	 HEAD ON 501	 PARKED 601	 OFF CARRIAGEWAY TO LEFT 701	 OFF CARRIAGEWAY RIGHT BEND 801	 FELL IN/FROM VEHICLE 901
2	 EMERGING 002	 RIGHT-THRU 102	 THRU-RIGHT 202	 LEFT-REAR 302	 PARKING 402	 OUT OF CONTROL 502	 DOUBLE PARKED 602	 OFF CARRIAGEWAY TO RIGHT 702	 OFF CARRIAGEWAY LEFT BEND 802	
3	 FAR SIDE 003	 LEFT-THRU 103	 RIGHT-LEFT 203	 RIGHT-REAR 303	 PARKING VEHICLES ONLY 403	 PULLING OUT 503		 LEFT OFF CARRIAGEWAY INTO OBJECT 703	 OFF RIGHT BEND INTO OBJECT 803	 HIT TRAIN 903
4	 PLAYING, WORKING, LYING, STANDING ON CARRIAGEWAY 004	 THRU-RIGHT 104	 RIGHT-RIGHT 204	 U-TURN 304	 REVERSING IN TRAFFIC 404	 CUTTING IN 504	 CAR DOOR 604	 RIGHT OFF CARRIAGEWAY INTO OBJECT 704	 OFF LEFT BEND INTO OBJECT 804	 HIT RAILWAY XING FURNITURE 904
5	 WALKING WITH TRAFFIC 005	 RIGHT-RIGHT 105	 THRU-LEFT 205	 VEHICLES IN PARALLEL LANES LANE SIDE SWIPE 305	 REVERSING INTO FIXED OBJECT 405	 PULLING OUT REAR END 505	 HIT PERMANENT OBSTRUCTION 605	 OUT OF CONTROL ON CARRIAGEWAY 705	 OUT OF CONTROL ON CARRIAGEWAY 805	 HIT ANIMAL, OFF CARRIAGEWAY 905
6	 FACING TRAFFIC 006	 LEFT-RIGHT 106	 LEFT-LEFT 206	 LANE CHANGE - RIGHT 306	 LEAVING DRIVEWAY 406	 OVERTAKING - RIGHT TURN 506	 HIT ROADWORKS 606	 LEFT TURN 706	 LOSE CONTROL TURNING LEFT ON BEND 806	 PARKED VEHICLE RAN AWAY 906
7	 DRIVEWAY 007	 THRU-LEFT 107	 U-TURN 207	 LANE CHANGE - LEFT 307			 HIT TEMPORARY OBJECT ON CARRIAGEWAY 607	 RIGHT TURN 707	 LOSE CONTROL TURNING RIGHT ON BEND 807	 VEHICLE MOVEMENTS NOT KNOWN 907
8	 ON FOOTWAY 008	 RIGHT-LEFT 108		 RIGHT TURN S/S 308	 FROM FOOTWAY OR VERGE 408		 ACCIDENT OR BROKEN DOWN 608	 TRAFFIC ISLAND 708		
9	 STRUCK WHILE BOARDING OR ALIGHTING 009	 LEFT-LEFT 109		 LEFT TURN S/S 309			 HIT ANIMAL 609			
10							 LOAD HITS VEHICLE 610			© D. ANDREASSEN

G:\CIB06190 - GLNG Section11 - CIB06190 Maininfo\Tables\Road Safety\CRW\All Crashes 2006-2010 - IFA.csv All Crashes 2006-2010 - IFA

G:\CEB06190 - GLNG Santoni\11_CEB06190 Mapinfo\Tables\Road Safety\CRWV\AllCrashes 2006-2010_P1A.csv AllCrashes 2006-2010_P1A.csv

[illegible]

Gas Field Development Project – Environmental Impact Statement

APPENDIX I ALCAM ASSESSMENT

Proposal Type: alternative

Proposed Wallumbilla Road South Upgrade

Characteristics

	Condition	Points	Score	% of total
CONTROL DETAILS				
11 Effectiveness of equipment inspection and maintenance	good	0	0	0.0%
12 Longest approach warning time	short	0	0	0.0%
ROAD GEOMETRY				
21 Proximity to intersection/control point	<50-20m	3	12	9.7%
22 Proximity to siding/shunting yard	200-100m	1	7	5.7%
23 Proximity to station	>200m	0	0	0.0%
24 Possibility of short stacking	low	0	0	0.0%
26 Number of lanes (highest number of lanes in any one app	one	0	0	0.0%
27 Vulnerability to road user fatigue	low	0	0	0.0%
ROAD TRAFFIC CONTROL				
31 Presence of adjacent distractions	low	0	0	0.0%
32 Condition of traffic control at Crossing	good	0	0	0.0%
33 Visibility of Traffic Control at Crossing	good	0	0	0.0%
34 Distance from advance warning to crossing	good	0	0	0.0%
35 Conformance with standard AS 1742.7	yes	0	0	0.0%
ROAD VEHICLES				
41 Heavy vehicle proportion	low medium	3	28	23.3%
42 Level of Service (Vehicle Congestion)	Lvl B - Stable Flo	1	2	1.5%
43 Queuing from adjacent intersections	none	0	0	0.0%
44 Road traffic speed (approach speed 85%ile)	<60km/h	0	0	0.0%
RAIL VEHICLES				
51 Train volume - two way (high is bad)	low	0	0	0.0%
52 Train volume - two way (low is bad)	medium - high	4	29	24.1%
53 Seasonal/infrequent train patterns	regular use	0	0	0.0%
54 Slowest train speed at crossing (typical)	60-79km/h	1	3	2.5%
55 Longest train length (typical)	>300-1000m	3	11	9.0%
56 High Train Speed	61 to 80 km/hr	1	8	6.5%
CROSSING GEOMETRY				
61 Number of operational rail tracks	one	0	0	0.0%
62 Road surface on approach/departure (not Xing panel)	good	0	0	0.0%
63 Is the crossing on a hump, dip or rough surface?	no	0	0	0.0%
VISIBILITY				
71 S1 - advance visibility of crossing from road	>100%	0	0	0.0%
72 S2 - approach visibility to train (vehicle approaching cross	<50%	5	8	6.4%
73 S3 - visibility to train (vehicle stopped at crossing)	>100%	0	0	0.0%
74 Possible sun glare sighting crossing on road approach	No sunglare	0	0	0.0%
75 Possible sun glare sighting train	Sunglare	5	12	9.8%
76 Temporary visual impediments - sighting of crossing	1 day/year	1	0	0.4%
77 Temporary visual impediments - sighting of train	1 day/year	1	1	1.1%
			120	100.0%

Controls

(Estimated AADT)

ADDITIONAL / IMPROVED CO	R6-25 signage (confederate flag)
	RX-9 Railway Crossing Width Marker Assembly
ADVANCE WARNING	SINGLE standard advanced warning (W7-4 or W7-7)
CONTROLS AT CROSSING	Passive control - stop signs
CROSSING ENVIRONMENT	Maintenance program for vegetation etc (Road).
	Street lighting at crossing
HUMAN FACTORS	Public response phone number
TRAIN RELATED	Whistle board / location board for train

Crossing Volumes

Road

Rail: 5

Consequences

e. School bus route

Consequence Value: 3

Outputs	ALCAM Likelihood Factor: 120	ALCAM Risk Score:
----------------	-------------------------------------	-------------------

Proposal Type: alternative

Proposed Wallumbilla Road South Upgrade

Flags:

Non-Compliance to Standard

Sighting

Mechanisms:

Unaware

distracted	5
could not see control	2
could not see train from road approach (S2) (if stop or active then all values are zero)	0
could not see train from at crossing (S3) (if active then all values are zero)	14
vandalism	0
failure (wrong side) of active protection	0
Failure (right side) of active protection	0
assumes train will stop (if no shunting or station then all values are zero)	12
does not expect second train (of only one line then all values are zero)	0
finds crossing protection is ambiguous	10
is fatigued (if not fatigue zone all values zero)	0
Road standard / road driver expectation (ie. high quality road / low quality crossing)	6

Unable to Avoid

unable to stop in time	0
stuck on tracks (if no hump all values zero)	22
stopped on tracks	2

Unwilling to Recognise

queued on tracks (if no queuing then all values zero)	0
overhangs on tracks (if no short stacking possible all values zero)	0
racing train or misjudged train speed	19
driving through passive warning without looking (if not passive control all values are z	29
driving through flashing lights (if not flashing lights all values are zero)	0
driving around boom gates (if no boom gates all values are zero)	0

120

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	860
Suburb or Town:	KOWGURAN
Road Name:	LEICHHARDT HWY
Kilometrage	17.54
Rail Line Name:	WANDOAN BRANCH
Road Jurisdiction	MRD
Rail Line Prefix	WD
Line Section Code	564

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			41	26%
frequency of equipment inspection	no inspection program exists	5	35	22.6%
longest approach warning time	20 to 28sec	3	5	3.5%
ROAD GEOMETRY			0	0%
proximity to intersection/control point	More than 200m	0	0	0.0%
proximity to station/siding/shunting yard	More than 200m	0	0	0.0%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			11	7%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	11	6.8%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0	0	0.0%
conformance with MUTCD	Protection conforms with MUTCD	0	0	0.0%
ROAD VEHICLES			11	7%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	10	6.7%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	More than 80km/h	5	1	0.6%
RAIL VEHICLES			26	16%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	3	1.8%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	2	1.4%
slowest train speed at crossing (typical)	80 to 60km/h	1	2	1.0%
longest train length (typical)	More than 500m	5	19	12.2%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			1	1%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed/good condition	0	0	0.0%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	70 to 30 degrees	3	1	0.5%
VISIBILITY			67	43%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	9	5.8%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	7	4.6%
road-rail alignment re. sun glare	Road runs E-W, sun obscures crossing or protection equipment	5	50	32.4%
TOTAL WEIGHTED RISK SCORE			156	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	536
T = daily train traffic (two way)	6

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	yes
passive protection - stop signs	-
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	yes
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 860

Suburb or Town: KOWGURAN

Road Name: LEICHHARDT HWY

Kilometrage 17.54

Rail Line Name: WANDOOAN BRANCH

Road Jurisdiction MRD

Rail Line Prefix WD

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	5	0	
longest approach warning time	20 to 28sec	3		
ROAD GEOMETRY				
proximity to intersection/control point	More than 200m	0		
proximity to station/siding/shunting yard	More than 200m	0		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0		
conformance with MUTCD	Protection conforms with MUTCD	0		
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	More than 80km/h	5		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	80 to 60km/h	1		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	0		
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	70 to 30 degrees	3		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5		
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5		
road-rail alignment re. sun glare	Road runs E-W, sun obscures crossing or protection equipment	5		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	536		
T = daily train traffic (two way)	6		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no	enter COST
PROTECTION AT CROSSING	existing	
grade separation	-	
active protection - full boom, flashing lights	-	
active protection - half boom, flashing lights	-	
active protection - flashing lights only	yes	
passive protection - stop signs	-	
passive protection - give way signs	-	
passive protection - position markers only	-	
gates at crossing	-	
ADVANCE WARNING		
train activated advance warning (eg. flashing lights)	-	
vehicle activated advance warning (eg. strobe lights)	-	
passive advance warning (eg. signs only)	yes	
passive tactile advance warning (eg. rumble strips)	-	
HUMAN FACTORS		
police enforcement	-	
public education strategies	-	
public response phone number	-	
TRAIN RELATED		
reschedule train to avoid conflict	-	
whistle board for train	yes	
flashing light on train	-	
hand signallers (flagmen)	-	
ROAD SIGNAGE		
"Do Not Queue" signs	-	
train speed advisory sign to road user	-	
target boards	-	yes
hump advisory sign to road user	-	
pavement marking of crossing	-	
improve sign design/reflectors (eg. Conrail, Buckeye)	-	
add overhead mounted (mast arm) traffic control	-	
CROSSING ENVIRONMENT		
street lighting at crossing	-	
maintenance program for vegetation etc.	yes	
ROAD WORKS		
create extra lanes over crossing	-	
central barrier posts/median on road approach	-	
vehicle escape zones	-	
close crossing	-	
SIGNALLING/DETECTION SYSTEMS		
coordinate with adjacent traffic signals	-	
sign (active) for downstream queue warning	-	
sign (active) for second oncoming train warning	-	
detectors in crossing conflict zone	-	
road traffic signals (active)	-	
variable message sign (active)	-	
sub total COST		\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 860

Suburb or Town: KOWGURAN

Road Name: LEICHHARDT HWY

Kilometrage: 17.54

Rail Line Name: WANDOAN BRANCH

Road Jurisdiction: MRD

Rail Line Prefix: WD

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	2	1.6%	very low
A.2 could not see traffic control	5	3.2%	very low
A.3 distracted by sun	50	32.4%	medium
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	0	0.0%	very low
A.6 vandalism	8	4.8%	medium
A.7 failure (wrong side) of active protection	26	17.0%	high
A.8 shunting	11	6.9%	low
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	8	5.2%	low
A.11 fatigue	0	0.0%	very low
sub total	111	71%	low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
0	0.0%	very low	100%
2	2.6%	very low	56%
25	29.8%	low	50%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	100%
8	8.9%	low	71%
11	12.8%	low	0%
0	0.0%	very low	0%
0	0.0%	very low	100%
0	0.0%	very low	0%
46	54%	very low	59%

group B

B.1	unable to stop in time	0	0.0%	very low
B.2	vehicle stuck on tracks	3	1.9%	low
sub total		3	2%	very low

0	0.0%	very low	0%
3	3.5%	low	0%
3	4%	very low	0%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	6	3.7%	low
C.4	driving through passive warning without looking	0	0.0%	very low
C.5	driving through flashing lights	36	23.1%	medium
C.6	driving around boom gates	0	0.0%	very low
sub total		42	27%	very low

0	0.0%	very low	0%
0	0.0%	very low	0%
6	6.9%	low	0%
0	0.0%	very low	0%
30	35.5%	medium	17%
0	0.0%	very low	0%
36	42%	very low	14%

TOTAL RISK SCORE	156	100%	very low
------------------	-----	------	----------

85	100%	very low	46%
----	------	----------	-----

V = daily road traffic (two way)	536	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	6		
EXPOSURE RATING (VT product)	3.22E+03		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	5.00E+05	no	

536	intervention limit 400.00	installation limit 200.00
6		
3.22E+03		
	is proposed treatment adequate?	
2.72E+05	yes	

existing risk score	156	proposed risk score	85	reduced by	(indicative only)
existing risk exposure score	5.00E+05	proposed risk exposure score	2.72E+05	46%	COST OF TREATMENT = \$10,600
				46%	BENEFIT/COST RATIO = 21520
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	990
Suburb or Town:	ROMA
Road Name:	QUINTIN STREET
Kilometrage	350.96
Rail Line Name:	WESTERN LINE
Road Jurisdiction	MRD
Rail Line Prefix	WL
Line Section Code	567

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			5	5%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	20 to 28sec	3	5	5.3%
ROAD GEOMETRY			3	3%
proximity to intersection/control point	200 to 50m	1	3	2.8%
proximity to station/siding/shunting yard	More than 200m	0	0	0.0%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			4	4%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Complete and in good condition	0	0	0.0%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0	0	0.0%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	4	4.0%
ROAD VEHICLES			14	14%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	10	10.2%
road traffic volume - two way	3,000 to 5,000vpd	2	4	3.9%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			29	28%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	3	2.7%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	2	2.1%
slowest train speed at crossing (typical)	40 to 20km/h	3	5	4.7%
longest train length (typical)	More than 500m	5	19	18.6%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			0	0%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed/good condition	0	0	0.0%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			46	46%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	9	8.8%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	7	7.1%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	30	29.7%
TOTAL WEIGHTED RISK SCORE			102	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	3,342
T = daily train traffic (two way)	9

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	yes
passive protection - stop signs	-
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	yes
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 990

Suburb or Town: ROMA

Road Name: QUINTIN STREET

Kilometrage 350.96

Rail Line Name: WESTERN LINE

Road Jurisdiction MRD

Rail Line Prefix WL

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	20 to 28sec	3		
ROAD GEOMETRY				
proximity to intersection/control point	200 to 50m	1		
proximity to station/siding/shunting yard	More than 200m	0		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	0		
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0		
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	3,000 to 5,000vpd	2		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	3		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	0		
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5		
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5		
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	3,342		
T = daily train traffic (two way)	9		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	yes		
passive protection - stop signs	-		
passive protection - give way signs	-		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	yes		
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 990

Suburb or Town: ROMA

Road Name: QUINTIN STREET

Kilometrage 350.96

Rail Line Name: WESTERN LINE

Road Jurisdiction MRD

Rail Line Prefix WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	2	2.4%	very low
A.2 could not see traffic control	1	1.4%	very low
A.3 distracted by sun	30	29.7%	medium
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	0	0.0%	very low
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	8	7.4%	low
A.8 shunting	11	10.6%	low
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	6	6.0%	very low
A.11 fatigue	0	0.0%	very low
sub total	59	57%	very low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
2	2.5%	very low	0%
1	1.4%	very low	0%
30	30.9%	medium	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
8	7.7%	low	0%
11	11.0%	low	0%
0	0.0%	very low	0%
2	2.1%	very low	67%
0	0.0%	very low	0%
54	56%	very low	7%

group B

B.1	unable to stop in time	0	0.0%	very low
B.2	vehicle stuck on tracks	3	2.9%	low
sub total		3	3%	very low

0	0.0%	very low	0%
3	3.1%	low	0%
3	3%	very low	0%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	6	5.5%	low
C.4	driving through passive warning without looking	0	0.0%	very low
C.5	driving through flashing lights	35	34.1%	medium
C.6	driving around boom gates	0	0.0%	very low
sub total		40	40%	very low

0	0.0%	very low	0%
0	0.0%	very low	0%
6	5.7%	low	0%
0	0.0%	very low	0%
35	35.6%	medium	0%
0	0.0%	very low	0%
40	41%	very low	0%

TOTAL RISK SCORE	102	100%	very low
------------------	-----	------	----------

98	100%	very low	4%
----	------	----------	----

V = daily road traffic (two way)	3,342	intervention limit 380.00	installation limit 195.00
T = daily train traffic (two way)	9		
EXPOSURE RATING (VT product)	3.01E+04		
		is treatment required? no	
TOTAL RISK EXPOSURE SCORE	3.07E+06		

3,342	intervention	installation
9	limit	limit
3.01E+04	380.00	195.00
	is proposed treatment adequate?	
2.94E+06	yes	

existing risk score	102	proposed risk score	98	reduced by	(indicative only)
existing risk exposure score	3.07E+06	proposed risk exposure score	2.94E+06	4%	COST OF TREATMENT = \$20,700
				4%	BENEFIT/COST RATIO = 5885
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1075
Suburb or Town:	0
Road Name:	LEICHARDT HIGHWAY
Kilometrage	64.98
Rail Line Name:	WANDOAN BRANCH
Road Jurisdiction	MRD
Rail Line Prefix	WD
Line Section Code	564

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			0	0%
proximity to intersection/control point	More than 200m	0	0	0.0%
proximity to station/siding/shunting yard	More than 200m	0	0	0.0%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			42	32%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	11	8.2%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	27	20.9%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	4	3.1%
ROAD VEHICLES			11	9%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	10	8.1%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	More than 80km/h	5	1	0.8%
RAIL VEHICLES			29	22%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	3	2.2%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	2	1.7%
slowest train speed at crossing (typical)	40 to 20km/h	3	5	3.7%
longest train length (typical)	More than 500m	5	19	14.7%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			31	24%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed but breaking up/unsealed but firm	3	16	12.7%
grade on road approach	5 to 8%	3	14	10.8%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	70 to 30 degrees	3	1	0.7%
VISIBILITY			16	13%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	9	7.0%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	7	5.6%
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0	0	0.0%
TOTAL WEIGHTED RISK SCORE			129	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	536
T = daily train traffic (two way)	4

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	yes
passive protection - stop signs	-
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	yes
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1075	
Suburb or Town:	0	
Road Name:	LEICHARDT HIGHWAY	
Kilometrage	64.98	
Rail Line Name:	WANDOAN BRANCH	
Road Jurisdiction	MRD	0 0
Rail Line Prefix	WD	0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	More than 200m	0		
proximity to station/siding/shunting yard	More than 200m	0		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Some wear and tear, but the message is understandable	3		
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5		
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3		
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	More than 80km/h	5		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	3		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed but breaking up/unsealed but firm	3		
grade on road approach	5 to 8%	3		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	70 to 30 degrees	3		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5		
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5		
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	536		
T = daily train traffic (two way)	4		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	yes		
passive protection - stop signs	-		
passive protection - give way signs	-		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	yes		
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1075

Suburb or Town: 0

Road Name: LEICHARDT HIGHWAY

Kilometrage 64.98

Rail Line Name: WANDOAN BRANCH

Road Jurisdiction MRD

Rail Line Prefix WD

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	5	3.8%	very low
A.2 could not see traffic control	2	1.7%	very low
A.3 distracted by sun	0	0.0%	very low
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	0	0.0%	very low
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	8	5.9%	low
A.8 shunting	11	8.4%	low
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	12	9.4%	low
A.11 fatigue	0	0.0%	very low
sub total	38	29%	very low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
5	3.8%	very low	0%
2	1.7%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
8	5.9%	low	0%
11	8.4%	low	0%
0	0.0%	very low	0%
12	9.4%	low	0%
0	0.0%	very low	0%
38	29%	very low	0%

group B

B.1	unable to stop in time	51	39.7%	low
B.2	vehicle stuck on tracks	7	5.1%	medium
sub total		58	45%	low

51	39.7%	low	0%
7	5.1%	medium	0%
58	45%	low	0%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	7	5.1%	low
C.4	driving through passive warning without looking	0	0.0%	very low
C.5	driving through flashing lights	27	20.9%	medium
C.6	driving around boom gates	0	0.0%	very low
sub total		34	26%	very low

0	0.0%	very low	0%
0	0.0%	very low	0%
7	5.1%	low	0%
0	0.0%	very low	0%
27	20.9%	medium	0%
0	0.0%	very low	0%
34	26%	very low	0%

TOTAL RISK SCORE	129	100%	very low
------------------	-----	------	----------

129	100%	very low	0%
-----	------	----------	----

V = daily road traffic (two way)	536	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	4		
EXPOSURE RATING (VT product)	2.14E+03		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	2.77E+05	no	

536	intervention limit 400.00	installation limit 200.00
4		
2.14E+03		
	is proposed treatment adequate?	
2.77E+05	yes	

existing risk score	129	proposed risk score	129	reduced by	(indicative only)
existing risk exposure score	2.77E+05	proposed risk exposure score	2.77E+05	0%	COST OF TREATMENT = \$0
				0%	BENEFIT/COST RATIO = 0
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1802
Suburb or Town:	GURULMUNDI
Road Name:	LEICHHARDT HIGHWAY
Kilometrage	28.09
Rail Line Name:	WANDOAN BRANCH
Road Jurisdiction	MRD
Rail Line Prefix	WD
Line Section Code	564

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			11	4%
proximity to intersection/control point	More than 200m	0	0	0.0%
proximity to station/siding/shunting yard	More than 200m	0	0	0.0%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	possible fatigue zone - uninterrupted for 100 - 200km	3	11	4.1%
ROAD TRAFFIC CONTROL			0	0%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Complete and in good condition	0	0	0.0%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0	0	0.0%
conformance with MUTCD	Protection conforms with MUTCD	0	0	0.0%
ROAD VEHICLES			32	11%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	17	6.2%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	More than 80km/h	5	15	5.2%
RAIL VEHICLES			100	36%
train volume - two way (high is bad)	Less than 2 trains per day	0	0	0.0%
train volume - two way (low is bad)	Less than 2 trains per day	5	88	31.4%
slowest train speed at crossing (typical)	Less than 20km/h	5	4	1.4%
longest train length (typical)	More than 500m	5	8	2.9%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			23	8%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed/good condition	0	0	0.0%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	70 to 30 degrees	3	23	8.1%
VISIBILITY			114	41%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	114	40.8%
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	0	0	0.0%
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0	0	0.0%
TOTAL WEIGHTED RISK SCORE			279	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	540
T = daily train traffic (two way)	1

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	-
passive protection - give way signs	yes
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	yes
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1802

Suburb or Town: GURULMUNDI

Road Name: LEICHHARDT HIGHWAY

Kilometrage 28.09

Rail Line Name: WANDOAN BRANCH

Road Jurisdiction MRD

Rail Line Prefix WD

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	More than 200m	0		
proximity to station/siding/shunting yard	More than 200m	0		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	possible fatigue zone - uninterrupted for 100 - 200km	3		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	0		
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	0		
conformance with MUTCD	Protection conforms with MUTCD	0		
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	More than 80km/h	5		
RAIL VEHICLES				
train volume - two way (high is bad)	Less than 2 trains per day	0		
train volume - two way (low is bad)	Less than 2 trains per day	5		
slowest train speed at crossing (typical)	Less than 20km/h	5		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	0		
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	70 to 30 degrees	3		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	5	0	
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	0		
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	540		
T = daily train traffic (two way)	1		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	-		
passive protection - give way signs	yes		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	yes		
passive tactile advance warning (eg. rumble strips)	-	yes	
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1802
 Suburb or Town: GURULMUNDI
 Road Name: LEICHHARDT HIGHWAY
 Kilometrage: 28.09
 Rail Line Name: WANDOAN BRANCH
 Road Jurisdiction: MRD
 Rail Line Prefix: WD
 Line Section Code

0 0
 0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

- with PROPOSED characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	0	0.0%	very low
A.2 could not see traffic control	3	1.0%	very low
A.3 distracted by sun	0	0.0%	very low
A.4 could not see train from road approach	130	46.5%	high
A.5 could not see train from at crossing	0	0.0%	very low
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	6	2.1%	very low
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	0	0.0%	very low
A.11 fatigue	11	4.1%	medium
sub total	150	54%	low

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK
0	0.0%	very low
1	0.9%	very low
0	0.0%	very low
22	14.0%	low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
2	1.5%	very low
25	16%	very low

PERCENTAGE RISK SCORE REDUCTION
0%
50%
0%
83%
0%
0%
0%
100%
0%
0%
80%
83%

group B			
B.1 unable to stop in time	0	0.0%	very low
B.2 vehicle stuck on tracks	3	1.1%	low
sub total	3	1%	very low

0	0.0%	very low
3	1.9%	low
3	2%	very low

0%
0%
0%

group C			
C.1 traffic queued on tracks	0	0.0%	very low
C.2 long vehicle overhangs on tracks	0	0.0%	very low
C.3 racing train or misjudged train speed	14	5.0%	high
C.4 driving through passive warning without looking	113	40.3%	high
C.5 driving through flashing lights	0	0.0%	very low
C.6 driving around boom gates	0	0.0%	very low
sub total	127	45%	low

0	0.0%	very low
0	0.0%	very low
14	9.0%	high
113	72.7%	high
0	0.0%	very low
0	0.0%	very low
127	82%	low

0%
0%
0%
0%
0%
0%
0%

TOTAL RISK SCORE	279	100%	low
------------------	-----	------	-----

155	100%	very low
-----	------	----------

45%

V = daily road traffic (two way)	540	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	1		
EXPOSURE RATING (VT product)	5.40E+02		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	1.51E+05	no	

540	intervention limit 400.00	installation limit 200.00
1		
5.40E+02		
	is proposed treatment adequate?	
8.36E+04	yes	

existing risk score	279	proposed risk score	155	reduced by	(indicative only)
existing risk exposure score	1.51E+05	proposed risk exposure score	8.36E+04	45%	COST OF TREATMENT = \$0
				45%	BENEFIT/COST RATIO = 0
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1987
Suburb or Town:	ROMA
Road Name:	CURREY STREET
Kilometrage	352.41
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL
Line Section Code	567

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			113	26%
proximity to intersection/control point	Less than 20m	5	65	15.2%
proximity to station/siding/shunting yard	Less than 50m	5	48	11.1%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			60	14%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	22	5.0%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	30	7.0%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	8	1.9%
ROAD VEHICLES			112	26%
heavy vehicle proportion	Medium proportion of heavy vehicles (5 to10%)	3	32	7.5%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	Occasional queues back to the crossing	3	79	18.5%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			91	21%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	1	0.2%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	80	18.5%
slowest train speed at crossing (typical)	40 to 20km/h	3	2	0.6%
longest train length (typical)	More than 500m	5	8	1.9%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			21	5%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed but breaking up/unsealed but firm	3	21	4.8%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			34	8%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0	0	0.0%
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	0	0	0.0%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	34	7.8%
TOTAL WEIGHTED RISK SCORE			429	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	480
T = daily train traffic (two way)	9

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	yes
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1987
Suburb or Town:	ROMA
Road Name:	CURREY STREET
Kilometrage	352.41
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL

0	0
0	0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	Less than 20m	5		
proximity to station/siding/shunting yard	Less than 50m	5		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	Medium proportion of heavy vehicles (5 to 10%)	3		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	3	0	
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	3		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	3	0	
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0		
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	0		
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	480		
T = daily train traffic (two way)	9		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	yes		
passive protection - give way signs	-		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	YES	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-	YES	
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-	YES	
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1987

Suburb or Town: ROMA

Road Name: CURREY STREET

Kilometrage 352.41

Rail Line Name: WESTERN LINE

Road Jurisdiction LGA

Rail Line Prefix WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	29	6.7%	low
A.2 could not see traffic control	2	0.3%	very low
A.3 distracted by sun	34	7.8%	medium
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	0	0.0%	very low
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	35	8.1%	medium
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	45	10.4%	medium
A.11 fatigue	0	0.0%	very low
sub total	143	33%	low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
15	7.5%	low	49%
1	0.5%	very low	30%
30	15.7%	medium	10%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
35	17.9%	medium	0%
0	0.0%	very low	0%
18	9.4%	low	59%
0	0.0%	very low	0%
99	51%	very low	31%

group B

B.1	unable to stop in time	44	10.1%	low
B.2	vehicle stuck on tracks	4	0.8%	low
sub total		47	11%	low

0	0.0%	very low	100%
2	0.9%	low	50%
2	1%	very low	96%

group C

C.1	traffic queued on tracks	67	15.7%	medium
C.2	long vehicle overhangs on tracks	79	18.5%	high
C.3	racing train or misjudged train speed	15	3.5%	high
C.4	driving through passive warning without looking	78	18.1%	medium
C.5	driving through flashing lights	0	0.0%	very low
C.6	driving around boom gates	0	0.0%	very low
sub total		239	56%	medium

0	0.0%	very low	100%
0	0.0%	very low	100%
15	7.9%	high	0%
78	40.1%	medium	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
93	48%	low	61%

TOTAL RISK SCORE	429	100%	low
------------------	-----	------	-----

193	100%	low	55%
-----	------	-----	-----

V = daily road traffic (two way)	480	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	9		
EXPOSURE RATING (VT product)	4.32E+03		
		is treatment required? YES	
TOTAL RISK EXPOSURE SCORE	1.85E+06		

480	intervention limit 400.00	installation limit 200.00
9		
4.32E+03		
	is proposed treatment adequate?	
8.34E+05	yes	

existing risk score	429	proposed risk score	193	reduced by	55%	COST OF TREATMENT =	\$0	(indicative only)
existing risk exposure score	1.85E+06	proposed risk exposure score	8.34E+05		55%	BENEFIT/COST RATIO =	0	
								risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1993
Suburb or Town:	ROMA
Road Name:	TIFFIN STREET
Kilometrage	349.8
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL
Line Section Code	565

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			55	14%
proximity to intersection/control point	50 to 20m	3	16	4.1%
proximity to station/siding/shunting yard	Less than 50m	5	39	9.7%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			53	13%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	21	5.1%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	24	6.0%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	8	2.0%
ROAD VEHICLES			18	4%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	18	4.4%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			80	20%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	1	0.2%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	70	17.5%
slowest train speed at crossing (typical)	60 to 40km/h	2	2	0.4%
longest train length (typical)	More than 500m	5	8	2.0%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			17	4%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed/good condition	0	0	0.0%
grade on road approach	5 to 8%	3	17	4.3%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			177	44%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	5	1.2%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	139	34.7%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	34	8.4%
TOTAL WEIGHTED RISK SCORE			400	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	620
T = daily train traffic (two way)	12

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	yes
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	yes
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1993
Suburb or Town:	ROMA
Road Name:	TIFFIN STREET
Kilometrage	349.8
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL

0	0
0	0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	50 to 20m	3		
proximity to station/siding/shunting yard	Less than 50m	5		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	Less than 20km/h	2	5	
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	0		
grade on road approach	5 to 8%	3		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	5	0	
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	5	0	
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	620		
T = daily train traffic (two way)	12		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	yes		
passive protection - give way signs	-		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	YES	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	yes		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1993

Suburb or Town: ROMA

Road Name: TIFFIN STREET

Kilometrage 349.8

Rail Line Name: WESTERN LINE

Road Jurisdiction LGA

Rail Line Prefix WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

- with PROPOSED characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	16	4.0%	low
A.2 could not see traffic control	2	0.5%	very low
A.3 distracted by sun	38	9.6%	medium
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	130	32.4%	high
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	41	10.4%	medium
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	36	9.1%	medium
A.11 fatigue	0	0.0%	very low
sub total	264	66%	low

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK
10	5.2%	low
1	0.7%	very low
35	17.4%	medium
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
28	13.9%	low
0	0.0%	very low
11	5.5%	low
0	0.0%	very low
85	43%	very low

PERCENTAGE RISK SCORE REDUCTION
35%
30%
10%
0%
100%
0%
0%
33%
0%
70%
0%
68%

group B			
B.1 unable to stop in time	35	8.7%	low
B.2 vehicle stuck on tracks	5	1.2%	low
sub total	40	10%	low

10	4.9%	very low
5	2.4%	low
15	7%	very low

72%
0%
63%

group C			
C.1 traffic queued on tracks	0	0.0%	very low
C.2 long vehicle overhangs on tracks	0	0.0%	very low
C.3 racing train or misjudged train speed	14	3.6%	high
C.4 driving through passive warning without looking	83	20.6%	high
C.5 driving through flashing lights	0	0.0%	very low
C.6 driving around boom gates	0	0.0%	very low
sub total	97	24%	low

0	0.0%	very low
0	0.0%	very low
17	8.5%	high
83	41.5%	high
0	0.0%	very low
0	0.0%	very low
99	50%	low

0%
0%
-17%
0%
0%
0%
-2%

TOTAL RISK SCORE	400	100%	low
------------------	-----	------	-----

199	100%	low
-----	------	-----

50%

V = daily road traffic (two way)	620	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	12		
EXPOSURE RATING (VT product)	7.44E+03		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	2.98E+06	YES	

620	intervention	installation
12	limit	limit
7.44E+03	400.00	200.00
	is proposed treatment adequate?	
1.48E+06	yes	

existing risk score	400	proposed risk score	199	reduced by	(indicative only)
existing risk exposure score	2.98E+06	proposed risk exposure score	1.48E+06	50%	COST OF TREATMENT = \$0
				50%	BENEFIT/COST RATIO = 0
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	1997
Suburb or Town:	BLYTHDALE
Road Name:	BLUE HILLS ROAD
Kilometrage	334.43
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL
Line Section Code	565

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			113	21%
proximity to intersection/control point	200 to 50m	1	6	1.1%
proximity to station/siding/shunting yard	Less than 50m	5	108	19.9%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			60	11%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	22	4.0%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	30	5.5%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	8	1.5%
ROAD VEHICLES			11	2%
heavy vehicle proportion	Medium proportion of heavy vehicles (5 to10%)	3	11	2.0%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			108	20%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	13	2.4%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	70	12.9%
slowest train speed at crossing (typical)	40 to 20km/h	3	2	0.4%
longest train length (typical)	More than 500m	5	23	4.3%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			74	14%
number of operational rail tracks	Two	3	30	5.6%
road surface type	Sealed but breaking up/unsealed but firm	3	21	3.8%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	70 to 30 degrees	3	23	4.3%
VISIBILITY			175	32%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0	0	0.0%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineeri	5	141	26.1%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	34	6.2%
TOTAL WEIGHTED RISK SCORE			541	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	30
T = daily train traffic (two way)	10

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	-
passive protection - give way signs	-
passive protection - position markers only	yes
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1997
 Suburb or Town: BLYTHDALE
 Road Name: BLUE HILLS ROAD
 Kilometrage 334.43
 Rail Line Name: WESTERN LINE
 Road Jurisdiction LGA
 Rail Line Prefix WL

0 0
 0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	200 to 50m	1		
proximity to station/siding/shunting yard	Less than 50m	5		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	Medium proportion of heavy vehicles (5 to 10%)	3		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	3		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	Two	3		
road surface type	Sealed/good condition	3	0	
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	70 to 30 degrees	3		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0		
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5		
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	30		
T = daily train traffic (two way)	10		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	-		
passive protection - give way signs	-	YES	
passive protection - position markers only	yes	NO	
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	YES	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 1997

Suburb or Town: BLYTHDALE

Road Name: BLUE HILLS ROAD

Kilometrage: 334.43

Rail Line Name: WESTERN LINE

Road Jurisdiction: LGA

Rail Line Prefix: WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	22	4.0%	low
A.2 could not see traffic control	3	0.6%	very low
A.3 distracted by sun	34	6.2%	medium
A.4 could not see train from road approach	22	4.0%	low
A.5 could not see train from at crossing	130	24.0%	high
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	50	9.2%	medium
A.9 simultaneous trains from both directions	114	21.1%	high
A.10 crossing protection is ambiguous	28	5.2%	medium
A.11 fatigue	0	0.0%	very low
sub total	401	74%	medium

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
10	2.1%	very low	55%
2	0.5%	very low	30%
30	6.6%	medium	10%
22	4.7%	low	0%
130	28.5%	high	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
50	10.9%	medium	0%
114	25.1%	high	0%
4	0.8%	very low	87%
0	0.0%	very low	0%
360	79%	low	10%

group B

B.1	unable to stop in time	44	8.0%	low
B.2	vehicle stuck on tracks	4	0.7%	low
sub total		47	9%	low

0	0.0%	very low	100%
2	0.4%	low	50%
2	0%	very low	96%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	15	2.8%	high
C.4	driving through passive warning without looking	78	14.3%	medium
C.5	driving through flashing lights	0	0.0%	very low
C.6	driving around boom gates	0	0.0%	very low
sub total		93	17%	low

0	0.0%	very low	0%
0	0.0%	very low	0%
15	3.3%	high	0%
78	17.0%	medium	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
93	20%	low	0%

TOTAL RISK SCORE	541	100%	low
------------------	-----	------	-----

455	100%	low	16%
-----	------	-----	-----

V = daily road traffic (two way)	30	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	10		
EXPOSURE RATING (VT product)	3.00E+02		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	1.62E+05	YES	

30	intervention limit 400.00	installation limit 200.00
10		
3.00E+02		
	is proposed treatment adequate?	
1.36E+05	NO	

existing risk score	541	proposed risk score	455	reduced by	(indicative only)
existing risk exposure score	1.62E+05	proposed risk exposure score	1.36E+05	16%	COST OF TREATMENT = \$0
				16%	BENEFIT/COST RATIO = 0
					risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	2008
Suburb or Town:	0
Road Name:	ROAD
Kilometrage	288.105
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL
Line Section Code	565

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			13	2%
frequency of equipment inspection	no inspection program exists	5	13	2.1%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			13	2%
proximity to intersection/control point	200 to 50m	1	6	1.0%
proximity to station/siding/shunting yard	More than 200m	0	0	0.0%
frequency of crossings along the road	3 or more within 6km	3	8	1.3%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			65	11%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	22	3.6%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	30	5.1%
conformance with MUTCD	Protection does not conform with MUTCD or is not understandable	5	14	2.3%
ROAD VEHICLES			18	3%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	18	3.0%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			80	13%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	1	0.1%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	70	11.8%
slowest train speed at crossing (typical)	80 to 60km/h	1	1	0.1%
longest train length (typical)	More than 500m	5	8	1.3%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			41	7%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed but breaking up/unsealed but firm	3	21	3.5%
grade on road approach	5 to 8%	3	20	3.4%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			363	61%
advance visibility of crossing from road	Less than the road user stopping distance (see S1 in Traffic Engineering	5	75	12.7%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	114	19.2%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	141	23.8%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	34	5.7%
TOTAL WEIGHTED RISK SCORE			593	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	5
T = daily train traffic (two way)	10

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	-
passive protection - give way signs	-
passive protection - position markers only	yes
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 2008

Suburb or Town: 0

Road Name: ROAD

Kilometrage 288.105

Rail Line Name: WESTERN LINE

Road Jurisdiction LGA

Rail Line Prefix WL

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	5	0	
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	200 to 50m	1		
proximity to station/siding/shunting yard	More than 200m	0		
frequency of crossings along the road	3 or more within 6km	3		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	5	0	
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	1	3	
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed but breaking up/unsealed but firm	3		
grade on road approach	Less than 5%	3	0	
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	5	0	
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5		
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	5	0	
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	5		
T = daily train traffic (two way)	10		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	-	yes	
passive protection - give way signs	-		
passive protection - position markers only	yes	no	
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	yes	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 2008

Suburb or Town: 0

Road Name: ROAD

Kilometrage 288.105

Rail Line Name: WESTERN LINE

Road Jurisdiction LGA

Rail Line Prefix WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	13	2.1%	low
A.2 could not see traffic control	8	1.3%	very low
A.3 distracted by sun	38	6.5%	medium
A.4 could not see train from road approach	108	18.2%	medium
A.5 could not see train from at crossing	130	21.9%	high
A.6 vandalism	8	1.3%	medium
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	17	2.9%	low
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	34	5.7%	medium
A.11 fatigue	0	0.0%	very low
sub total	355	60%	low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
6	3.9%	very low	49%
2	1.1%	very low	77%
30	18.2%	medium	21%
0	0.0%	very low	100%
0	0.0%	very low	100%
0	0.0%	very low	100%
0	0.0%	very low	0%
6	3.5%	very low	67%
0	0.0%	very low	0%
4	2.2%	very low	89%
0	0.0%	very low	0%
48	29%	very low	87%

group B

B.1	unable to stop in time	132	22.3%	high
B.2	vehicle stuck on tracks	7	1.1%	medium
sub total		139	23%	high

12	7.3%	very low	91%
5	2.9%	low	27%
17	10%	low	88%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	10	1.6%	medium
C.4	driving through passive warning without looking	90	15.2%	high
C.5	driving through flashing lights	0	0.0%	very low
C.6	driving around boom gates	0	0.0%	very low
sub total		100	17%	low

0	0.0%	very low	0%
0	0.0%	very low	0%
11	6.7%	medium	-17%
90	54.2%	high	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
101	61%	low	-2%

TOTAL RISK SCORE	593	100%	medium
------------------	-----	------	--------

166	100%	low	72%
-----	------	-----	-----

V = daily road traffic (two way)	5	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	10		
EXPOSURE RATING (VT product)	5.00E+01		
		is treatment required? YES	
TOTAL RISK EXPOSURE SCORE	2.96E+04		

5	intervention limit 400.00	installation limit 200.00
10		
5.00E+01		
	is proposed treatment adequate?	
8.30E+03	yes	

existing risk score	593	proposed risk score	166	reduced by	72%	COST OF TREATMENT =	\$10,200
existing risk exposure score	2.96E+04	proposed risk exposure score	8.30E+03		72%	BENEFIT/COST RATIO =	2092
				risk exposure points per \$000			

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	3367
Suburb or Town:	0
Road Name:	WINDEYER ROAD
Kilometrage	68.005
Rail Line Name:	WANDOAN BRANCH
Road Jurisdiction	LGA
Rail Line Prefix	WD
Line Section Code	564

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			125	25%
proximity to intersection/control point	50 to 20m	3	18	3.4%
proximity to station/siding/shunting yard	Less than 50m	5	108	21.1%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			60	12%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	22	4.2%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	30	5.9%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	8	1.6%
ROAD VEHICLES			18	4%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	18	3.5%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			108	21%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	13	2.5%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	70	13.8%
slowest train speed at crossing (typical)	40 to 20km/h	3	2	0.5%
longest train length (typical)	More than 500m	5	23	4.5%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			51	10%
number of operational rail tracks	Two	3	30	6.0%
road surface type	Sealed but breaking up/unsealed but firm	3	21	4.1%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			147	29%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5	6	1.1%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineerin	5	141	27.7%
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0	0	0.0%
TOTAL WEIGHTED RISK SCORE			509	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	130
T = daily train traffic (two way)	4

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	yes
passive protection - give way signs	-
passive protection - position markers only	-
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 3367

Suburb or Town: 0

Road Name: WINDEYER ROAD

Kilometrage 68.005

Rail Line Name: WANDAN BRANCH

Road Jurisdiction LGA

Rail Line Prefix WD

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	50 to 20m	3		
proximity to station/siding/shunting yard	More than 200m	5	0	
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	40 to 20km/h	3		
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	Two	3		
road surface type	Sealed but breaking up/unsealed but firm	3		
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance less than calculated distance (see Traffic Engineerin	5		
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	5	0	
road-rail alignment re. sun glare	Road/rail do not run E-W, sun glare does not become a problem	0		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	130		
T = daily train traffic (two way)	4		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	yes		
passive protection - give way signs	-		
passive protection - position markers only	-		
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	yes	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 3367

Suburb or Town: 0

Road Name: WINDEYER ROAD

Kilometrage 68.005

Rail Line Name: WANDOAN BRANCH

Road Jurisdiction LGA

Rail Line Prefix WD

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	25	5.0%	low
A.2 could not see traffic control	3	0.5%	very low
A.3 distracted by sun	0	0.0%	very low
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	130	25.5%	high
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	55	10.9%	high
A.9 simultaneous trains from both directions	114	22.4%	high
A.10 crossing protection is ambiguous	36	7.2%	medium
A.11 fatigue	0	0.0%	very low
sub total	363	71%	low

- with PROPOSED characteristics and controls

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK	PERCENTAGE RISK SCORE REDUCTION
10	5.0%	very low	61%
2	0.9%	very low	30%
0	0.0%	very low	0%
0	0.0%	very low	0%
0	0.0%	very low	100%
0	0.0%	very low	0%
0	0.0%	very low	0%
9	4.7%	low	83%
54	27.5%	low	53%
11	5.6%	low	70%
0	0.0%	very low	0%
86	44%	very low	76%

group B

B.1	unable to stop in time	44	8.5%	low
B.2	vehicle stuck on tracks	5	0.9%	low
sub total		48	9%	low

12	6.2%	very low	72%
5	2.4%	low	0%
17	9%	low	65%

group C

C.1	traffic queued on tracks	0	0.0%	very low
C.2	long vehicle overhangs on tracks	0	0.0%	very low
C.3	racing train or misjudged train speed	15	3.0%	high
C.4	driving through passive warning without looking	83	16.2%	high
C.5	driving through flashing lights	0	0.0%	very low
C.6	driving around boom gates	0	0.0%	very low
sub total		98	19%	low

0	0.0%	very low	0%
0	0.0%	very low	0%
11	5.7%	medium	26%
83	42.0%	high	0%
0	0.0%	very low	0%
0	0.0%	very low	0%
94	48%	low	4%

TOTAL RISK SCORE	509	100%	low
------------------	-----	------	-----

196	100%	low	61%
-----	------	-----	-----

V = daily road traffic (two way)	130	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	4		
EXPOSURE RATING (VT product)	5.20E+02		
		is treatment required?	
TOTAL RISK EXPOSURE SCORE	2.65E+05	YES	

130	intervention	installation
4	limit	limit
5.20E+02	400.00	200.00
	is proposed treatment adequate?	
1.02E+05	yes	

existing risk score	509	proposed risk score	196	reduced by	61%	COST OF TREATMENT =	\$6,600
existing risk exposure score	2.65E+05	proposed risk exposure score	1.02E+05		61%	BENEFIT/COST RATIO =	24643
							risk exposure points per \$000

DATA INPUT (EXISTING) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number:	5664
Suburb or Town:	HODGSON
Road Name:	DONNYBROOK ROAD
Kilometrage	368.136
Rail Line Name:	WESTERN LINE
Road Jurisdiction	LGA
Rail Line Prefix	WL
Line Section Code	567

CROSSING CHARACTERISTICS - existing

Crossing characteristic	Description	Risk Point	Existing Risk Score	
				% of total
PROTECTION DETAILS			0	0%
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0	0	0.0%
longest approach warning time	Less than 20sec - (or no active protection)	0	0	0.0%
ROAD GEOMETRY			57	14%
proximity to intersection/control point	50 to 20m	3	16	4.0%
proximity to station/siding/shunting yard	Less than 50m	5	41	10.0%
frequency of crossings along the road	less than 3 within 6km	0	0	0.0%
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0	0	0.0%
ROAD TRAFFIC CONTROL			57	14%
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0	0	0.0%
conspicuity of traffic control	Some wear and tear, but the message is understandable	3	20	4.9%
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0	0	0.0%
distance from advance warning to crossing	Less than safe stopping distance (see Table 1) - (or do not exist)	5	30	7.4%
conformance with MUTCD	Protection does not conform with MUTCD but is understandable	3	7	1.8%
ROAD VEHICLES			18	4%
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5	18	4.4%
road traffic volume - two way	Less than 1,000vpd	0	0	0.0%
queuing from adjacent intersections	No queues back to the crossing	0	0	0.0%
road traffic speed	Less than or equal to 60km/h	0	0	0.0%
RAIL VEHICLES			80	20%
train volume - two way (high is bad)	Between 2 and 20 trains per day	2	1	0.2%
train volume - two way (low is bad)	Between 20 and 2 trains per day	4	70	17.3%
slowest train speed at crossing (typical)	80 to 60km/h	1	1	0.2%
longest train length (typical)	More than 500m	5	8	2.0%
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0	0	0.0%
CROSSING GEOMETRY			21	5%
number of operational rail tracks	One	0	0	0.0%
road surface type	Sealed but breaking up/unsealed but firm	3	21	5.1%
grade on road approach	Less than 5%	0	0	0.0%
is the crossing on a hump?	No hump (crossing is level)	0	0	0.0%
angle from road approach to rail	90 to 70 degrees	0	0	0.0%
VISIBILITY			172	43%
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering I	0	0	0.0%
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0	0	0.0%
crossing visibility (vehicle stopped) to train (S3)	measured distance less than calculated distance (see Traffic Engineeri	5	139	34.3%
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3	34	8.3%
TOTAL WEIGHTED RISK SCORE			405	100%

CROSSING VOLUMES - existing

EXPOSURE	
V = daily road traffic (two way)	30
T = daily train traffic (two way)	9

CROSSING CONTROL MEASURES - existing

Crossing control measure	existing
PROTECTION AT CROSSING	
grade separation	-
active protection - full boom, flashing lights	-
active protection - half boom, flashing lights	-
active protection - flashing lights only	-
passive protection - stop signs	-
passive protection - give way signs	yes
passive protection - position markers only	yes
gates at crossing	-
ADVANCE WARNING	
train activated advance warning (eg. flashing lights)	-
vehicle activated advance warning (eg. strobe lights)	-
passive advance warning (eg. signs only)	-
passive tactile advance warning (eg. rumble strips)	-
HUMAN FACTORS	
police enforcement	-
public education strategies	-
public response phone number	-
TRAIN RELATED	
reschedule train to avoid conflict	-
whistle board for train	yes
flashing light on train	-
hand signallers (flagmen)	-
ROAD SIGNAGE	
"Do Not Queue" signs	-
train speed advisory sign to road user	-
target boards	-
hump advisory sign to road user	-
pavement marking of crossing	-
improve sign design/reflectors (eg. Conrail, Buckeye)	-
add overhead mounted (mast arm) traffic control	-
CROSSING ENVIRONMENT	
street lighting at crossing	-
maintenance program for vegetation etc.	yes
ROAD WORKS	
create extra lanes over crossing	-
central barrier posts/median on road approach	-
vehicle escape zones	-
close crossing	-
SIGNALLING/DETECTION SYSTEMS	
coordinate with adjacent traffic signals	-
sign (active) for downstream queue warning	-
sign (active) for second oncoming train warning	-
detectors in crossing conflict zone	-
road traffic signals (active)	-
variable message sign (active)	-

DATA INPUT (PROPOSED) for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 5664

Suburb or Town: HODGSON

Road Name: DONNYBROOK ROAD

Kilometrage 368.136

Rail Line Name: WESTERN LINE

Road Jurisdiction LGA

Rail Line Prefix WL

0 0

0 0

CROSSING CHARACTERISTICS - proposed

Crossing characteristic	Description	Risk Point enter if changed		enter COST
PROTECTION DETAILS		existing	proposed	
frequency of equipment inspection	adequate evidence that a frequent inspection program is in place	0		
longest approach warning time	Less than 20sec - (or no active protection)	0		
ROAD GEOMETRY				
proximity to intersection/control point	50 to 20m	3		
proximity to station/siding/shunting yard	Less than 50m	5		
frequency of crossings along the road	less than 3 within 6km	0		
vulnerability to road user fatigue	non fatigue zone - frequent curves and driver interactions	0		
ROAD TRAFFIC CONTROL				
presence of adjacent distractions	Few or no distractions and warning signs/crossing stands out	0		
conspicuity of traffic control	Complete and in good condition	3	0	
visibility of traffic control at crossing	Easily observed from a safe stopping distance (see Table 1)	0		
distance from advance warning to crossing	More than, or equal to, the required MUTCD distance	5	0	
conformance with MUTCD	Protection conforms with MUTCD	3	0	
ROAD VEHICLES				
heavy vehicle proportion	High proportion of heavy vehicles (more than 10%)	5		
road traffic volume - two way	Less than 1,000vpd	0		
queuing from adjacent intersections	No queues back to the crossing	0		
road traffic speed	Less than or equal to 60km/h	0		
RAIL VEHICLES				
train volume - two way (high is bad)	Between 2 and 20 trains per day	2		
train volume - two way (low is bad)	Between 20 and 2 trains per day	4		
slowest train speed at crossing (typical)	60 to 40km/h	1	2	
longest train length (typical)	More than 500m	5		
conspicuity of train	Standard colour scheme and reflectors - easily visible to road user	0		
CROSSING GEOMETRY				
number of operational rail tracks	One	0		
road surface type	Sealed/good condition	3	0	
grade on road approach	Less than 5%	0		
is the crossing on a hump?	No hump (crossing is level)	0		
angle from road approach to rail	90 to 70 degrees	0		
VISIBILITY				
advance visibility of crossing from road	At least the road user stopping distance (see S1 in Traffic Engineering N	0		
approach visibility (vehicle moving) to train (S2)	measured distance more than calculated distance (see Traffic Engineer	0		
crossing visibility (vehicle stopped) to train (S3)	measured distance more than calculated distance (see Traffic Engineer	5	0	
road-rail alignment re. sun glare	Rail track runs E-W, sun often obscures train from crossing	3		
sub total COST				\$0

CROSSING VOLUMES - existing

EXPOSURE	existing	proposed	COST
V = daily road traffic (two way)	30		
T = daily train traffic (two way)	9		
sub total COST			\$0

CROSSING CONTROL MEASURES - proposed

Crossing control measure	if proposed = yes if removed = no		enter COST
PROTECTION AT CROSSING	existing		
grade separation	-		
active protection - full boom, flashing lights	-		
active protection - half boom, flashing lights	-		
active protection - flashing lights only	-		
passive protection - stop signs	-		
passive protection - give way signs	yes		
passive protection - position markers only	yes	no	
gates at crossing	-		
ADVANCE WARNING			
train activated advance warning (eg. flashing lights)	-		
vehicle activated advance warning (eg. strobe lights)	-		
passive advance warning (eg. signs only)	-	yes	
passive tactile advance warning (eg. rumble strips)	-		
HUMAN FACTORS			
police enforcement	-		
public education strategies	-		
public response phone number	-		
TRAIN RELATED			
reschedule train to avoid conflict	-		
whistle board for train	yes		
flashing light on train	-		
hand signallers (flagmen)	-		
ROAD SIGNAGE			
"Do Not Queue" signs	-		
train speed advisory sign to road user	-		
target boards	-		
hump advisory sign to road user	-		
pavement marking of crossing	-		
improve sign design/reflectors (eg. Conrail, Buckeye)	-		
add overhead mounted (mast arm) traffic control	-		
CROSSING ENVIRONMENT			
street lighting at crossing	-		
maintenance program for vegetation etc.	yes		
ROAD WORKS			
create extra lanes over crossing	-		
central barrier posts/median on road approach	-		
vehicle escape zones	-		
close crossing	-		
SIGNALLING/DETECTION SYSTEMS			
coordinate with adjacent traffic signals	-		
sign (active) for downstream queue warning	-		
sign (active) for second oncoming train warning	-		
detectors in crossing conflict zone	-		
road traffic signals (active)	-		
variable message sign (active)	-		
sub total COST			\$0

DATA OUTPUT for VEHICLE/RAIL CROSSINGS

Crossing Identification Number: 5664

Suburb or Town: HODGSON

Road Name: DONNYBROOK ROAD

Kilometrage: 368.136

Rail Line Name: WESTERN LINE

Road Jurisdiction: LGA

Rail Line Prefix: WL

Line Section Code

0 0

0 0

CROSSING RISK SCORE

- with EXISTING characteristics and controls

- with PROPOSED characteristics and controls

Accident mechanism	EXISTING RISK SCORE	percentage of total	RELATIVE RISK
group A			
A.1 competing stimuli	25	6.2%	low
A.2 could not see traffic control	3	0.6%	very low
A.3 distracted by sun	34	8.3%	medium
A.4 could not see train from road approach	0	0.0%	very low
A.5 could not see train from at crossing	130	32.0%	high
A.6 vandalism	0	0.0%	very low
A.7 failure (wrong side) of active protection	0	0.0%	very low
A.8 shunting	37	9.1%	medium
A.9 simultaneous trains from both directions	0	0.0%	very low
A.10 crossing protection is ambiguous	33	8.1%	medium
A.11 fatigue	0	0.0%	very low
sub total	261	64%	low

PROPOSED RISK SCORE	percentage of total	RELATIVE RISK
13	6.8%	low
2	0.9%	very low
30	15.9%	medium
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
0	0.0%	very low
35	18.2%	medium
0	0.0%	very low
11	5.7%	low
0	0.0%	very low
90	48%	very low

PERCENTAGE RISK SCORE REDUCTION
49%
30%
10%
0%
100%
0%
0%
6%
0%
67%
0%
65%

group B			
B.1 unable to stop in time	44	10.7%	low
B.2 vehicle stuck on tracks	5	1.2%	low
sub total	48	12%	low

0	0.0%	very low
3	1.6%	low
3	2%	very low

100%
38%
94%

group C			
C.1 traffic queued on tracks	0	0.0%	very low
C.2 long vehicle overhangs on tracks	0	0.0%	very low
C.3 racing train or misjudged train speed	14	3.4%	high
C.4 driving through passive warning without looking	83	20.4%	high
C.5 driving through flashing lights	0	0.0%	very low
C.6 driving around boom gates	0	0.0%	very low
sub total	96	24%	low

0	0.0%	very low
0	0.0%	very low
14	7.6%	high
83	43.3%	high
0	0.0%	very low
0	0.0%	very low
97	51%	low

0%
0%
-6%
0%
0%
0%
-1%

TOTAL RISK SCORE	405	100%	low
------------------	-----	------	-----

190	100%	low
-----	------	-----

53%

V = daily road traffic (two way)	30	intervention limit 400.00	installation limit 200.00
T = daily train traffic (two way)	9		
EXPOSURE RATING (VT product)	2.70E+02		
TOTAL RISK EXPOSURE SCORE	1.09E+05	is treatment required? YES	

30	intervention limit 400.00	installation limit 200.00
9		
2.70E+02		
is proposed treatment adequate?		
5.14E+04	yes	

existing risk score	405	proposed risk score	190	reduced by	(indicative only)
existing risk exposure score	1.09E+05	proposed risk exposure score	5.14E+04	53%	COST OF TREATMENT = \$6,100
				53%	BENEFIT/COST RATIO = 9500
					risk exposure points per \$000