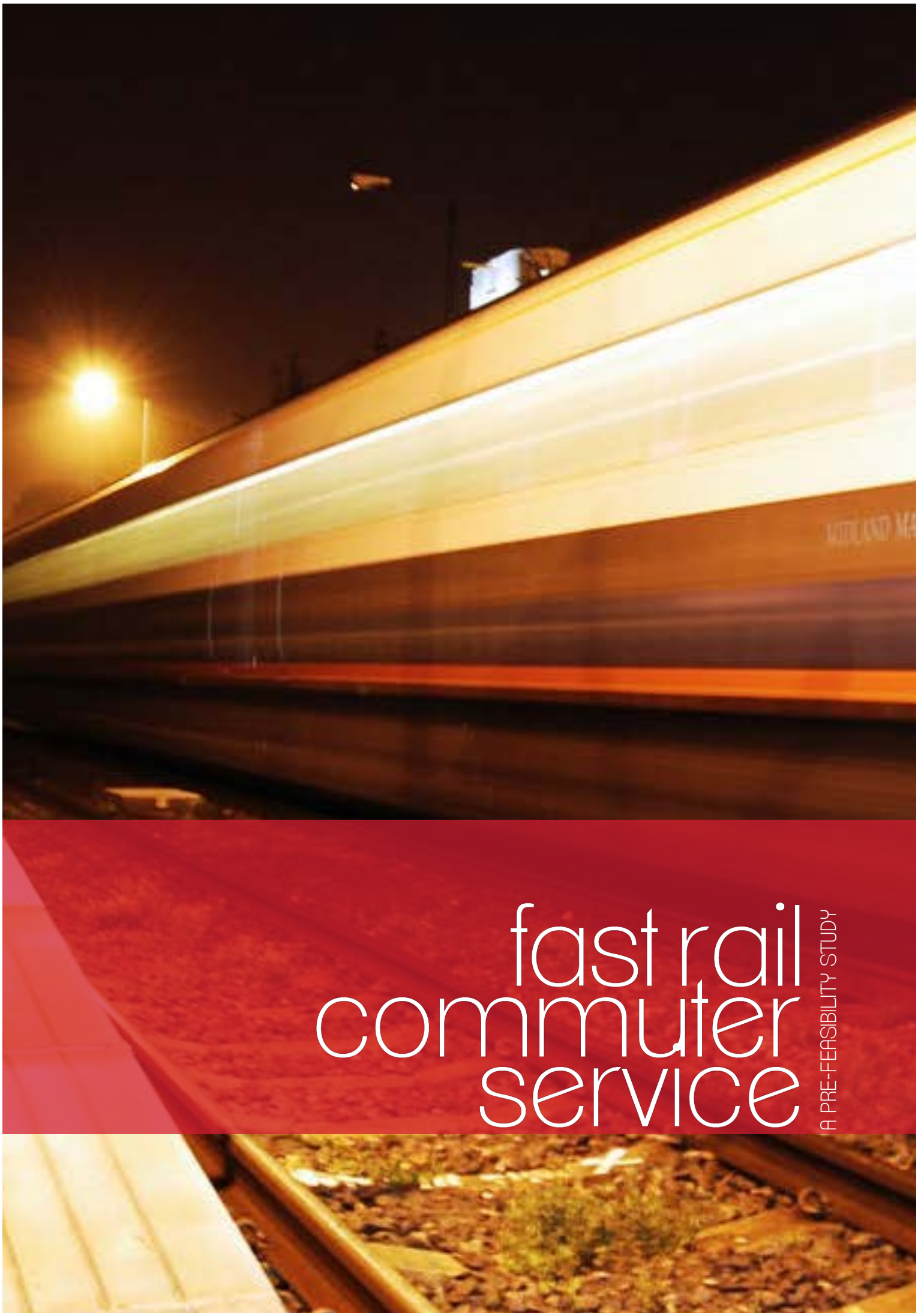

fast rail commuter service

A PRE-FEASIBILITY STUDY

2012

July

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EXECUTIVE SUMMARY

The Central Queensland area finds itself at the leading edge of an economic boom, driven by the separate products both related to the increased global need for energy sources. The current boom in coal began several years ago, with many more mines yet to come on-stream or to reach potential output. More recently, improved technologies have led to the commercialisation of coal seam gas. An investment commitment totalling more than $60 billion is associated with the development. The Port of Gladstone is pivotal to the export of these natural resources and products to worldwide customers. While Gladstone is benefiting from the investment there is an unintended consequence that is putting substantial pressure on the Gladstone community. Gladstone is a relatively small city with limited housing and social infrastructure. In contrast, the cities of Bundaberg and Rockhampton offer a wide range of commercial, health and social services. The capacity to benefit all three areas through the provision of a Fast Rail Commuter Service is evident.

A pre-feasibility study for a Fast Rail Commuter Service between Rockhampton, Gladstone and Bundaberg was announced by Capricorn Enterprise on 21 February 2012. The study has been conducted for the proponents, Capricorn Enterprise and Queensland Rail to assess the value of implementing a Fast Rail Commuter Service. Uniquely, the below rail infrastructure for a Fast Rail Commuter Service is already in place across the study region, and therefore this major capital cost is not required. Primarily, the focus of the study is on demand and scheduling to indicate viability. The findings are presented within the context of the five key areas outlined in the ToR.

Viability based on demand is complex to quantify as only inferential data is available on the number of commuters currently travelling between the study regions. The literature, statistical data and key stakeholder consultation undertaken in this study evidence a demand based on the known population growth in the Gladstone region.

There is demand based on population growth in the short term. In the scope of this study it is not possible to ascertain the adoption rate of commuters. Based on economic modelling utilised in this study, the cost benefit analysis indicated **viability in the short term**. Literature and case studies reviewed supported the need for a long term view to be taken on rail transit services as this results in increased accessibility and community living.

As a result of the population growth **opportunities and sectors that may benefit** from the service will be widespread. Stakeholders indicated opportunities in tourism, schools, health and local transport. In particular, the tourism sector has identified the benefits of linking the three regions. A Fast Rail Commuter Service provides an opportunity for regional business to expand into new markets. The literature evidences urban renewal and revitalisation often occurs as a result of transit projects.

Proposed scheduling to meet demand is possible. A concept schedule based on scenario modelling indicates that a Fast Rail Commuter Service can operate to provide multiple commuter options. No information has been provided that indicate technical impediments exist on the availability of paths or trains that could potentially be used for this service.

The **cost benefit analysis** indicated the Fast Rail Commuter Service is a viable proposition. Using a reasonable estimate of a commercial fare, if a subsidy equal to below rail costs and return on investment in rolling stock (new train) is used then an averaged of 67 passengers per trip are required for the Rockhampton to Gladstone route and 59 passengers per trip are required for the Bundaberg to Gladstone route. The number of required passengers reduces if current tilt-train fares are applied. Conversely, the number of passengers required would increase if fares equivalent to metropolitan pricing structure is applied.

Potential for private sector support for the service is significant. A private sector investor has confirmed an interest in contributing to a Fast Rail Commuter Service. However, a full business case would need to be presented before any formal commitment can be considered by the private sector.

RECOMMENDATIONS AND FURTHER RESEARCH

- Explore alteration to the current tilt path
- Consider a shift in the current schedule of the weekday southbound electric tilt to earlier and the weekday northbound tilt to later
- Investigate what existing rollingstock could be used for the service
- Investigate possibility of “pilot” service using existing rollingstock
- Further detailed and comprehensive demand data gathered and analysed to inform modelling for best fit scheduling
- Review and negotiate suitable regular path access based on chosen concept
- Undertake a feasibility study, if warranted, a business case and policy development
- Develop intra-regional passenger rail plan
- Undertake community analyses to understand consumers and the drivers for commuting
- Prepare a behaviour change plan and introduce a marketing incentive scheme to promote Fast Rail Commuter Service, targeting consumer market
- Investigation additional economic benefits and markets arising as a flow on effect of the introduction of the Fast Rail Commuter Service

While each of the three locations already have designated transit facilities for passengers who are alighting and disembarking, increased use of these facilities will require an urban planning review at each of the transit sites to inform potential for Master Planning the Development of the Transit areas.

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
LNG	Liquefied Natural Gas
TOR	Terms of Reference
FIFO	Fly In Fly Out
DIDO	Drive In Drive Out
BIBO	Bus In Bus Out
RIRO	Rail In Rail Out
SIA	Social Impact Assessment
SIMP	Social Impact Management Plan
TODs	Transit-oriented developments
TTF	Tourism and Transport Forum
VTRI	Victoria Transport Policy Institute
GADPL	Gladstone Area Promotion Development Limited
SISP	Social Infrastructure Strategic Plan
VFR	Visiting Friends and Relatives
RDA	Regional Development Australia
ABS	Australian Bureau of Statistics
DTMR	Department of Transport and Main Roads
DIDOW	Drive-In-Drive-Out-Workforce
TQ	Tourism Queensland
CSG	Coal Seam Gas
PETRONAS	Petroliam Nasional Berhad
EIS	Environmental Impact Statement
Mtpa	Million tonnes per annum
WICET	Wiggins Island Coal Export Terminal Pty Ltd
GNP	Gladstone Nickel Project
GPNL	Gladstone Pacific Nickel Limited
GSDA	Gladstone State Development Area
MCCI	MCC International Incorporation Ltd
WISDRI	Wuhan Iron & Steel Design and Research Institute
XCQ	Xstrata Coal Queensland
LGA	Local Government Area
OESR	Office of Economic and Statistical Research
GRP	Gross Regional Product
Fitzroy SD	Fitzroy Statistical Division
GFC	Global Financial Crisis
RTA	Residential Tenancies Authority
CBD	Central Business District
OWA	Operational Works Approval
REIQ	Real Estate Institute of Queensland
AADT	Annual Average Daily Traffic
ARRA	American Recovery and Reinvestment Act
EMU	Electric Multiple Unit
CIPL	Capricorn Investment Partners Limited

GST	Goods and Services Tax
DITRDLG	Department of Infrastructure, Transport, Regional Development and Local Government
HPAL	High pressure acid leach
OECD	Organisation for Economic Co-operation
CPI	Consumer Price Index
AUD	Australian Dollars
MTP	Master Train Plan
NRMA	National Roads and Motorists' Association
Abbreviations	Defintion
GLT	Gladstone
ROK	Rockhampton
BDB	Bundaberg
NSW	New South Wales
QLD	Queensland
Kms	Kilometres
Sqm	Square metre
Nth	North
Sth	South
Ck	Creek
Hwy	Highway
Bdg	Building

BACKGROUND

Gladstone is at the centre of a zone of economic and population growth fuelled by the natural resources industries of coal, minerals and gas. This growth has associated impacts, positive and negative that may be addressed through the provision of a Fast Rail Commuter Service that delivers passengers from Rockhampton and Bundaberg into the centre of Gladstone on suitably timed frequencies to work in multiple industries and services.

Federal, State and Local governments acknowledge the impact of growth in Gladstone and the opportunity to strengthen our economic output in the region. Importantly, the Regional Development Australia Roadmap – Fitzroy and Central West; report that a fast rail train service has been identified by Rockhampton LGA and Gladstone LGA as a strategic priority project (Regional Development Australia, 2012)

Capricorn Enterprise and Queensland Rail have a mutual interest in better understanding if a Fast Rail Commuter Service from Rockhampton and Bundaberg into Gladstone could be an option worth considering in detail.

This report is undertaken to investigate at a pre-feasibility study level, to determine the potential for viability and scheduling to meet demand in the short term and long term. Full details of the project are defined in the Terms of Reference (ToR) attached in Appendix F.

The study area rail corridor is already available, below rail infrastructure is already constructed, reducing the cost of this project enormously. In the short term suitable rollingstock may also be available from Queensland Rail assets, however, this information was not made available to the study team. If this is the case further cost reductions can be anticipated. Without this information, or indeed details on what rollingstock is available for forecasting and evaluation of this initiative, the study team have reviewed State, National and International models and have based the study on their assessment of the most likely set.

PROJECT SCOPE AND APPROACH

PROJECT SCOPE

Capricorn Enterprise and Queensland Rail, have identified that significant opportunities are evolving as a result of the current growth across the Central Queensland region and in particular the Gladstone area. This level of growth requires large workforces to construct and operate the planned major projects and is applying pressure to the region in multiple areas such as housing, environment and social infrastructure.

The neighbouring cities of Rockhampton and Bundaberg may provide a viable option for the provision of workforce and services - if a reliable, cost effective, and time relevant alternative to vehicle/bus transport is available. The proponents have determined that an investigation into the development of a fast train commuter service between the larger centres of Rockhampton, Gladstone and Bundaberg merits a pre-feasibility study to better understand this potential business opportunity.

Tanner Consulting, working with a team of highly qualified professionals has been engaged, within certain constraints, to accurately assess and analyse the demand and future viability of a fast train rail commuter service to Gladstone from Rockhampton and Bundaberg. The specific areas under investigation are determined by the ToR (Appendix F), and focus on providing the proponents with evidence in the following areas:

- Viability of the project based on evidenced demand across the study area
- Projected long-term and short-term viability of the project
- Other opportunities and sectors that may benefit from the Fast Rail Commuter Service
- Proposed scheduling of services to meet demand
- Cost benefit analysis
- Potential of private sector support for the service

DEFINITION

Fast Commuter Rail is defined in this study as; a passenger rail transport service that primarily operates between city centres, in regional areas beyond 50 km, that act as commuter towns that draw commuters—people who travel on a daily basis. Trains operate following a schedule, at speeds varying from 50 to 200 km/h.

Compared to rapid transit, commuter rail has lower frequency, following a schedule rather than fixed intervals, and fewer stations spaced further apart. Typically, Fast Commuter Rail primarily serves lower density suburban areas (non inner-city) and often shares right-of-way with intercity or freight trains. Some services operate only during peak hours. Average speeds are high, and better serve the longer distances involved. Some services include express services, which skip some stations in order to run faster, and separate longer distance riders from short-distance ones. This study has not considered the potential for station stops, however, potential for stops at Miriam Vale and Mount Larcom were a recurrent suggestion throughout the consultation period with many stakeholders.

STUDY APPROACH

The author has conducted the pre-feasibility study using a methodology that is aimed at providing insightful and technically useful analysis by addressing the following in a systematic approach based on the agreed scope of works.

In addressing these areas, data was gathered from reliable sources to provide a data set for analysis.

- Publically available literature, reports and documents.
- Private data sources
- Key stakeholders

The study team followed a quantitative and qualitative methodology which was designed and triangulated to provide robust data. The approach consisted of the following tasks:

- a comprehensive Baseline Study to understand the current study areas and locations,
- a review of the literature on the domains of Fast Rail Commuter Services nationally and internationally,
- a review of publically available plans, reports and documents and data

- preparation of a detailed analysis based on valid and current data and measured against the qualitative data provided from the key stakeholder consultation conducted in Rockhampton, Gladstone and Bundaberg, with a primary focus on Gladstone Industry representatives.
- economic data collection and analysis
- key stakeholder consultation and analysis of data collected

A mixed interview consultation method was applied using both set format and open ended question and answer approach. Thematic analysis was applied to the consultation minutes. Interrater reliability was used to cross check results. A total of 17 interviews were held and a total of 44 respondents to the project as outlined in this report.

STUDY REGION

The study focussed on Gladstone, Rockhampton and Bundaberg cities only with the majority of all stakeholder consultation being conducted in Gladstone with nominated key stakeholders from Industry, Business and Local Government.

Gladstone

The Gladstone LGA covers 10,489 square km. It comprises five main communities, Gladstone, Tannum Sands, Boyne Island, Calliope and Agnes Water (Rose, Rolfe, & Kinnear, 2012). With the exception of Agnes Water, all communities are closely aligned geographically, and can be considered as one unit for the purposes of understanding population density and potential labour force access to development in the Gladstone Region. The resident population of the Gladstone LGA in 2010 was 60,300 persons. Population projections to 2031 estimate an increase to 111,690 persons (medium series).

Rockhampton

The Rockhampton Region is located in Central Queensland, on the Tropic of Capricorn, between 570 and 800 km's north of Brisbane. The Rockhampton Region is bounded by the Isaac Region in the north, the South Pacific Ocean in the east, the Gladstone Region and Banana Shire in the south, and the Central Highlands Region in the west. The resident population of the Rockhampton LGA in 2010 was 115,310 persons. Population projections to 2031 estimate an increase to 162,873 persons (medium series).

Bundaberg

The Bundaberg Region is also located on the outer rim of Central Queensland and forms the Wide Bay Burnett area; it is between 385 km's north of Brisbane. The Bundaberg Region is bounded by the Gladstone Region in the north, the South Pacific Ocean in the east, the Frazer Coast Region in the south, and the North Burnett Region in the west. The resident population of the Bundaberg LGA in 2010 was 96,755 persons. Population projections to 2031 estimate an increase to 139,350 persons (medium series).

Population growth across the LGA's in the study footprint from 2010 to 2031 is projected to produce a population in excess of 413,913 persons (medium series). Figure 1 shows the LGA areas.

Figure 1: Map of Central Queensland

Source: Tourism Queensland

The changes brought about by the unprecedented growth in the Gladstone communities of interest, and across the study footprint, is a significant impact. An understanding of these impacts is reviewed to provide facts on the potential for a Fast Rail Commuter Service to contribute to a viable regional solution.

Section 1 - Social Impact

SECTION 1 – SOCIAL IMPACT

This section introduces several variables that fit within the domain of a social impact assessment. A full social impact assessment has not been conducted because of the limited scope of this pre-feasibility study. The importance of changes to communities of interest, across the study footprint, is significant. Therefore a rudimentary investigation of the changes to the communities of interest is required to give a better understanding of the potential of this project.

INTRODUCTION

To provide a framework in which the data can be analysed it is essential to view the information in the context of the available literature. The literature has been sourced from referred journals, publicly available government planning and report documents and private sources in conjunction with the author's knowledge in the discipline.

LITERATURE REVIEW

As a component of the baseline an understanding of a commute is required and considered within the context of this study. Globally accepted parameters of commuting are recognised in several studies.

Sandow (2011) cited several international studies across the period 1993 to 2001, as showing that most people have a threshold of around 45 minutes concerning what constitutes an acceptable daily commuting time, one-way. This commuting time needs to be understood in a cultural context. As the majority of research was based on European data consideration needs to be given to the tyranny of distance experienced in the Australian context that supports a generalised proclivity to accept longer distance travel. For example, in NSW the commute from Sydney Central to Woy Woy is 75 minutes and further still the commute from Sydney Central to Newcastle is approximately 2 hours 36 minutes.

The use of accepted commute time research, adjusted to consider the Australian context has been used in this study based on the accepted commuter schedules of Sydney to Gosford, Perth to Mandurah and Brisbane Central to Caboolture commute times. The geographical areas being considered in this study contains two different travel times Rockhampton to Gladstone (70 minutes) and Bundaberg to Gladstone (100 minutes), both of which are considered long commutes. However, several examples exist of commuters in Australia accepting longer commuter periods. Evidence of fatigue and commuting has been reviewed and applied to inform a reasonable suggested commuting time. Travel time also needs to be considered in relation to the shiftwork schedules. A number of studies identify a correlation between shiftwork and driver drowsiness. Di Milia (2007) reports that 12 hour shifts with an additional long daily commute, would raise fatigue issues and therefore safety concerns for employers and employees.

Sandow and Westin (2010), in their transportation research paper on long-distance commuting found that economic incentives, such as higher income, are positively correlated for continuing long-distance commuting over a period of more than a few years. This supports a view that the Fast Train Rail Commuter Service may provide not only a short-term option but if employment in Gladstone is

secured by higher wage earners, commuting by rail may be a long-term household strategy of choice.

Strong workforce demand has been demonstrated across the literature. Reports from Gladstone Economic Development organisations report significant construction and operational workforces will be required to deliver major projects in the Gladstone area (GEIDB, 2012). Moreover, Rolfe (2012) highlights a rapid population prediction of up to 25,000 persons in Gladstone to 2018.

This demand will have a cumulative impact on a number of social variables. Brown and Werner (2010) discuss the benefits of rail stops for residents and conclude that developments around rail transit stops can be planned to provide a design that is intended to foster walking and rail transit use, especially within a half-mile of the rail stop, thus supporting healthy green communities. Research shows that transit-oriented developments (TODs) support multiple societal benefits. These benefits include housing development and neighbourhood revitalisation, infrastructure efficiencies, decreased sprawl and decreased automobile dependence and oil consumption as well as oil vulnerability.

Dodson and Sipe (2008) in their report on oil, mortgage and inflation vulnerability argue that the outer suburban and regional areas are most exposed to vulnerability. While expenditure and planned public transport infrastructure is focused on inner city areas of most Australian cities, including, Brisbane, Melbourne and Sydney, it fails those most in need. This has the effect of 'forced car ownership' because of the dependency on private vehicles ownership, often requiring more than one vehicle to travel to multiple workplaces. This is particularly relevant in dual working parent families, who are living in outer areas, which offer higher affordability.

Exceeding patronage expectations, the Western Australian government completed a suburban rail line from Perth to Mandurah (2008). An unintended result of the project was a significant reduction in oil vulnerability for Perth's outer areas residents. Additionally, the Tourism and Transport Forum (2010) acknowledge the benefits of rail services for urban areas, asserting that Rail transit has the potential to stimulate associated investment activity. Urban renewal projects and residential and commercial development often occurs in areas that were previously of little value or unviable. The longevity, durability and branding appeal of commuter rail infrastructure sends a positive message to planners and developers. The TTF reports the social benefits of improved public transport as encouraging interaction between communities and individuals and attracts skilled workers. Rail commuting improves liveability and amenity by attracting investment along rail routes. A recent international study of resident attitudes and travel behaviour found that light rail commuters have more healthy walking habits, lower car use, lower prevalence of obesity, higher place attachment and neighbourhood satisfaction, and are more positive about transit-oriented development (TTF, 2010).

The literature forms a foundation to consider the major issues to be understood in this rail study. The introduction of a rail commuting service has historically been discussed in the public and community domain across the region. All three tiers of Government recognise the associated impacts on Gladstone from project growth. The Brisbane – Cairns Corridor Strategy 2007, acknowledges the following as Transport Issues in Regional Centres:

- Growth in industry links between Rockhampton and Gladstone is increasing both freight and passenger traffic between the centres leading to emerging capacity needs, as the current highway has narrow pavement with unsealed shoulders and limited overtaking opportunities.
- Emerging safety issues related to movement of heavy vehicles and dangerous goods within Gladstone
- Rapid residential growth impacting on efficiency of freight corridors
- Increasing traffic conflict between industrial and commuter traffic between Gladstone and Rockhampton

In March 2010 Gladstone Area Development Promotion Limited (GADPL) released Prosperity 2030: Gladstone Region Economic Development Strategy. In this document the following issues for the Gladstone Region were identified.

> *Action 2.7 'Prepare for a Whole-of –Gladstone Region Retail Diversification and Revitalisation Program'. Two significant issues are raised in this Action – One is the critical issues concerning the sustainable development of a vibrant retail hub in the Gladstone Central Activity Area due to its proximity to Bundaberg and to the Rockhampton Regional Centre, which offers a greater diversity of retail choice including more higher order retail facilities as well as Rockhampton's Sunday Trading. Many residents are travelling to Rockhampton or Bundaberg to purchase higher order retail goods and services*.
>
> *Action 2.1 The timely provision, augmentation and maintenance of efficient and effective strategic infrastructure underpins economic activity and investment and is therefore fundamental to the Gladstone Region's economic prosperity. Strategic infrastructure includes 'physical' assets (like roads, rail, ports and airports, information technology and telecommunications, power and water) and 'social' assets (like recreation and leisure facilities, cultural services and facilities and community services and facilities including aged care, childcare, etc.). In acknowledgement that the Gladstone Region competes nationally and internationally as an investment destination, for the region to maximise economic development potential, world class excellence in strategic infrastructure provision, both 'physical' and 'social' is required. The following project was considered to warrant priority action along with three others.*

The Queensland Infrastructure Plan 2011 - Central Queensland; identifies long-term strategic priorities of supporting economic and urban growth in key regional centres with additional planning underway for improved passenger transport for the growing communities of Rockhampton and Gladstone.

Queensland Transport and Roads Investment Program 2010-11 to 2013-14 (p. 147) reports in its Regional profile section that a major challenge is to ensure safe and efficient travel conditions for transport and road users - especially targeting fatigue due to long-distance work commuting by mine staff and tradespeople, and high levels of heavy vehicle growth from increasing freight movements.

A study conducted by DEEDI (2011), reported feedback from residents of the Gladstone region. Feedback included a need for improved public transport especially on weekends and better connectivity between different centres across the region', health services especially specialist medical practitioners; and additional educational services across the region.

The Social Infrastructure Strategic Plan (SISP), (2012) for the Gladstone region reports that feedback from residents of the Gladstone region included the need for improved public transport especially on weekends and better connectivity between different centres across the region.

Transport remained an issue in the Gladstone SISP and while it was not identified as an option, access to improved public transport is identified as a need. Many of the areas of need and priority for the community that are raised in the SISP regarding public transport needs, could be at least partially addressed by a Fast Rail Commuter Service. For example, such a service would offer an option to address the lack of public transport to access medical services in Rockhampton. A daily hospital shuttle has been funded through the Gladstone Foundation for this purpose, however, uptake is reported to be slow, and a rail commuter service could provide a safer, and more frequent commute option.

URS (2012) discuss the issue of rail transit in their concept design report on a transit corridor in Canberra and notes that within Australia examples exist of successful implementation of light rail and commuter rail systems. However, very little data is available regarding the urban development and regeneration that has occurred from these transport corridors as a result of improved transit services. The URS report evidences the Gold Coast Rail Transit, which is currently being implemented and is predicted to stimulate the current medium scenario population and employment projections of Queensland Treasury Planning and Information by 20%. This report also cites the urban growth and change at six precincts along the Eastern Busway that can be attributed to improved connectivity provided through the provision of new public transport.

Collins and Chambers (2005) reported that transport choice for commuting is among the most environmentally significant decisions faced by individuals. Personal car use contributes to environmental pollution, decreased air quality, greenhouse gas emissions, and fossil fuel consumption. Collins and Chamber (2005) conclude that public transport is the most viable alternative to commuter-car travel for most people. Given the importance of this issue and in the context of oil vulnerability factors, and carbon economies, future urban and regional planning needs to consider public transport as a higher priority if it is to successfully consider alternatives to increasing personal car use and its impacts on the environment.

While the introduction of a fast rail service presents clear benefits for commuters there is a flow on effect to other sectors. The recent Tourism Queensland branding strategy links the three study areas of the Capricorn region, the Gladstone region and the Bundaberg North Burnett region into the 'Southern Great Barrier Reef' destination. This strategy is based on sound research that supports a focus on the study area as a single tourism destination. This is a signifier of the benefits that can be derived by connecting the three LGA's for tourism and economic growth through a one destination marketing and branding campaign. A proposed Fast Rail Commuter Service will enhance this tourism offering and further strengthen this one area strategy. For example, Tourism Queensland (2011) report that in excess of 120,000 international visitors travelled to the region. Representing a larger international visitor patronage than regional Queensland cities, Townsville and Mackay.

Consultation with Regional Development Australia senior key staff across the study area evidenced interest in the project and a desire to remain engaged and briefed regarding the pre-feasibility study. The Fitzroy and Central West RDA indicated the issue of FIFO workforces as a sensitive one

across the area. The introduction of a RIRO option may be of interest to LGA's over a FIFO model to generate more stabilised communities.

As identified earlier it is acknowledged in the Prosperity 2030: Gladstone Economic Development Strategy of GADPL, that Gladstone lacks the full range of experiences expected of a large regional centre. A critical issue is the lack of retail experiences equal to those on offer in Rockhampton and Bundaberg, but it also extends to matters such as entertainment and health.

Data on the number of professional services and businesses that may benefit from a fast rail service is not generally available. However, it is acknowledged that professionals in both Rockhampton and Bundaberg may derive benefits from delivering services from operating in Gladstone. Consulting services, accounting and financial planning services, community services, health professionals and allied health professionals are just a few of the potential businesses that may consider the business case for expanding services through commuting, given the demand in Gladstone and the issues that currently preclude this for most business operations. Data collected through consultation supports this view, however a comprehensive survey of businesses across the footprint would be required to accurate understand this opportunity.

The cost benefit of rail transit over road is outside the scope of this study, however, the Victoria Transport Policy Institute (2012) reports that a long term view needs to be taken to evaluating the benefits and costs of Public Transport. Rail transit and transit oriented development need to be considered over the long term rather than the short term as the full benefits may take many years to be achieved. Rail transport can provide diverse benefits and these benefits are extremely durable once implemented. Providing a legacy of increased accessibility and community liveability for the future. A short-term perspective only will therefore undervalue these strategies.

The Victoria Transport Policy Institute (Litman, 2012) also report that travel time unit costs (cents per minute or dollars per hour, as reflected by opportunity costs and consumers willingness to pay for travel time savings) are generally lower for high quality public transit than for driving, since transit travellers can work or relax. As a result, even if transit travel takes more minutes per trip, travel time costs may be lower.

STAKEHOLDER ANALYSIS

A project brief was forwarded to all key stakeholders for review and discussion at the consultation meeting. The brief provided a general overview of the project including the study areas and project scope. Five key factors were addressed;

- Viability of the project across the study region
- Projected long and short term viability of the project
- Other opportunities and sectors that may benefit
- Proposed scheduling to meet demand
- Cost benefit analysis and the potential for private sector support.

Additionally the study team presented to 102 Industry and Business leaders at the Bundaberg Riding the Wave Resource Sector Opportunity Forum on 18 April, to provide an overview of the study and seek input regarding demand, current commuting levels and support for the initiative.

- One on one meetings were undertaken with over 17 Stakeholders.
- 12 expressions of interest in the project were received
- 15 phone enquiries for information regarding the project
- 6 email enquires for information regarding the project

Community engagement with Industry and community members totalled 157 individuals

ABC radio interviews, Television interviews were conducted across the study footprint to seek community and industry feedback regarding demand for the project. Of the 157 individuals recorded as responding to consultation, a 100% positive feedback was received, with no record of a negative response recorded.

VIABILITY OF THE PROJECT ACROSS THE STUDY REGION

As evidenced in Figure 2, a strong response was reported during stakeholder consultation indicating a high degree of viability of a Fast Rail Commuter Service based on committed and likely projects. Almost a quarter of those surveyed voiced a concern in regards to the viability of the commuter train in regards to scheduling and times, citing the need for the rail times to work within the scope required for major projects in order for it to be viable. Significant concern was raised on whether the rail system currently held the capacity to successfully undertake the project, whether unions or regulatory factors would be a concern and whether the costs of travel would make the service unviable. One company noted that they did trial the use of buses for transporting their workers, however, there was no uptake of this service. Positive viability was noted for locals, stating that rail travel would become the transport mode of choice for the local community.

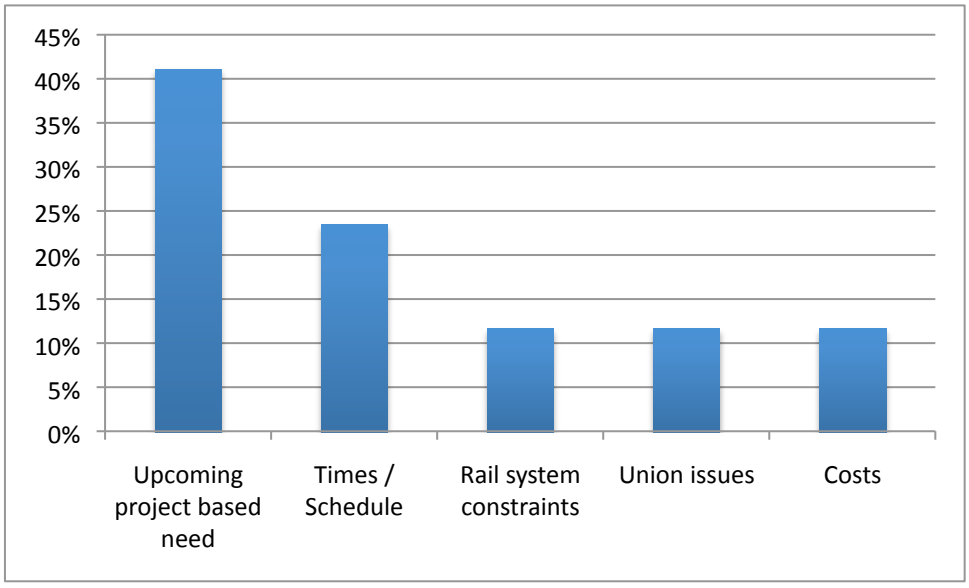

Figure 2 Viability for the Fast Rail Commuter Project

Industry stakeholders identified Retail/Lifestyle and Work life Balance as the key factor driving the demand for the fast rail commuter service. This may be attributed to the high cost of living for ancillary staff in the region. For example, the cost of living for teachers, cleaners and retail staff is untenable, requiring an increasing number of these workers to live outside of the region or pay extremely high rental/housing costs. This is reflected in the education stakeholder consultation "the introduction of a Fast Rail Commuter Service will provide a good affordable service for teachers who

are currently experiencing long commutes as they can't afford to live in the area". It should be noted that while demand for the rail system was not recorded as due to population growth, both economic and anecdotal data suggests this is a key factor. It could be assumed that the factor is so obvious that the stakeholders did not feel the need to verbalise in the consultation process - rather they felt the focus needed to be put on the flow on effects of significant growth in the region.

PROJECTED LONG TERM AND SHORT TERM VIABILITY OF THE PROJECT

Retail opportunities were raised in consultation with Stakeholders as a potential benefit that could be offered to Gladstone residents in the short term.

Key stakeholders all indicated that Gladstone was under significant strain due to exponential growth. In particular, it was noted that the approval of all three NLG projects was unexpected and unplanned for. The rail commuter service may not alleviate short term pain, unless a quick startup can be implemented. While acknowledging there are long term benefits that may come out of a Fast Rail Commuter Service, stakeholder's could not identify clear benefits other than pointing to examples in other areas. For example, the Gold Coast Robina rail service and the Gosford to Sydney rail service were highlighted as examples of services which positively changed the face of those regional cities.

OTHER OPPORTUNITIES AND SECTIONS THAT MAY BENEFIT

When asked about the flow on opportunities and benefits for the introduction of the Fast Rail Commuter Services stakeholders indicated that benefits based on Health Services would be high. The service was seen as mutually beneficial for all three areas, in accessing better health services. For example, 3000 residents in Gladstone currently access medical services in Rockhampton and provision of a rail service would provide patients with a safe and comfortable alternative to road travel.

Implementation of a Fast Rail Commuter Service in the short term, support planning initiatives to building long term viability for rail transit in the three regions. In particular, the NRL will produce regular large scale events and the rail service will provide a means for regional Queensland audiences to access these popular events.

It was also noted the rail system would mitigate against the high costs of living in Gladstone and allow organisations traction in the employment sector; specifically auxiliary workers could afford to work in Gladstone as the barriers to living outside the region would be alleviated. Positivity was voiced on the promotion of rail based on the useability and benefits of rail travel as opposed to a self-drive option. Specifically, that you could carry all your gear, work on the train or choose to read or rest. Further opportunities were identified in regards to road safety. Stakeholders noting a reduction of traffic on the existing high traffic, heavy machinery laden highway would be greatly appreciated.

PROPOSED SCHEDULING TO MEET DEMANDS

Proposed scheduling was raised as an important factor, which would require detailed consultation across industries to ensure needs were met relevant to demand. It should be noted that the demand numbers provided in datasets, from all sources, are limited by the issue that that they do not indicate the additional ancillary resource impact. Feedback indicated that due to higher wage incentives of the major projects, there is a workforce shift, resulting in gaps in essential services. For example, refuse collection.

Moreover demand anomalies exist based on the roster system. As was evidenced in the consultation there are a multitude of rosters with no standardised roster system. The roster system would have to consider roster cycles and a multiple discipline workforce. There are roster cycles that preclude a daily commute, but synchronise with a weekly commute. For example, a five day roster for a person living in Bundaberg would need to consider a commute start to Gladstone on Monday and returning on Friday.

Additionally, it is noted the demand numbers are incomplete, based on the data a number of significant projects are unable to provide constructional and operational resource projects; indicating To Be Advised (TBA) in a number cases.

COST BENEFIT ANALYSIS AND THE POTENTIAL FOR PRIVATE SECTOR SUPPORT

Key stakeholders identified economic organisational factors, workforce recruitment and retention as the major costs benefits they could identify as flowing off the introduction of the fast rail service. Project led demand is projected to increase exponentially in the next 5 to 10 years. Key stakeholders acknowledge projects such as three individual LNG projects, Wiggins Island, True Energy, Boulder Steel, in conjunction with increased construction will place significant demand on the region. Further economic benefits are also foreseen with the rail service mitigating the currently high turnover rate in the Gladstone region, with some organisations citing churn rates of 30%. Already high rental prices are projected to continue to increase in Gladstone with sharp increases to begin in the Bundaberg area.

In addition, key stakeholders identified that a rail service would keep the wages and flow on's in regional Queensland across the three cities. Whereas, a FIFO model workforce means the economic benefit is spent elsewhere. Table 1 highlights some of the key themes.

RIRO may offer a highly viable mitigation strategy for individuals, industry and the community over the DIDO and BIBO options for workforce, professionals and community to address the growth impacts in Gladstone. By efficiently delivering passengers to work destinations or park and ride facilities, being a cost effective transit mode, offset options against high rents and housing costs - offering alternatives to high rents, reducing fatigue time, adding productive time to commuting, reduced mileage and vehicles dependence, reducing vehicle costs for households, access to services under stress or unavailable in Gladstone.

Table 1 Cost Benefits of Fast Rail Commuter Service

Organisational - Economic Benefits	Community - Economic Benefits
Reduce turnover Decrease FIFO costs Decrease accommodation costs Increased retention rate	Health Younger cohort (reverse aging population) Reduction in workers camps and temporary accommodation

Consultation with key stakeholders across the study locations did not produce a commitment to financial support for this project, however, the majority did confirm interest in the project and it's potential as an option to address workforce issues. Stakeholders inferred that the benefits of

supporting a Fast Rail Commuter Service would need to be evidenced prior to any commitment of funds.

Fully subsidised bus services have been arranged in the past by construction company Bechtel, however was cancelled within a very short timeframe due to low numbers using the service. Bus services do not currently provide a commuter service other than Greyhound which offers a service that may provide an option for workers undertaking standard business hours.

Interest was expressed in the potential for a Fast Rail transit to offer recreational activities and events packages to employees (in excess of 6,000 on Curtis Island alone), living away from home and residing in temporary accommodation units with interim rostered time off during the standard 28 day roster cycle present an opportunity for Bundaberg and Rockhampton to develop packaged recreation offerings.

In addition to this, a private investor, based in Rockhampton has expressed an interest in funding this project independently, or in a joint venture arrangement. Consultation confirmed that continued interest in the initiative and a request to access the final pre-feasibility study report to continue to inform position.

Overall the project was of interest to industry in the private sector as an option in the short-term for Gladstone residents, both permanent and temporary, to address impacts from the current growth pressures in the area. It is also of interest to local governments across the study area as a key project for economic sustainability.

SUMMARY

Consultation, the literature review and data analysis collectively support a substantial workforce demand in the short-term for a construction workforce for major projects. However, it is not possible to determine definitive figures given the complexities in quantifying many of the issues. A large number of projects in approval or planning stages not able to provide workforce estimates. Additionally workforce transition across projects is unknown but will alter the demand figures considerably. Commitments to temporary accommodation campsites for construction workers have been made for the LNG projects to address the unintended social impacts on Gladstone and as a requirement of the SIMP. In addition, strategies within the SIMP contribute to reducing commuting fatigue and also has the effect of reducing the demand figures by a minimum of 6000 workers, however, as previously mentioned in private sector support even workers in temporary accommodation may have a real demand for use of the Fast Rail Commuter Service for accessing recreation opportunities on time off between rostered days off.

While out of the scope of this project, consultation also identified a demand for a workforce to support the outcomes for the construction of major projects; e.g., supermarkets, community centres, housing and also the workforce required to back fill the resource leakage from general services and business across to the major projects; e.g., hospitality, retail, or forced impacts from housing affordability. For example, education, professionals and community services. The anticipated workforce required to support this growth will be sourced from Gladstone residents and alternatives FIFO, BIBO, DIDO.

CATCHMENT PROFILES

The LGA under review in this study have unique features that represent an opportunity for Gladstone and a potential to generate economic benefits for the area. The following profiles articulate the specific attributes of each area.

INFRASTRUCTURE

ROADS

The Gladstone region has an extensive road network to service its major industry and to allow for the transportation of heavy goods without impacting on its dense population areas. The road network into Gladstone provides three access points to the Bruce and Dawson Highway and the resource rich areas of Central Queensland.

AIR

Gladstone has a modern regional airport with connections to Brisbane, Rockhampton, Mackay, Townsville and Cairns. Some 88 services per week operate to and from Brisbane with an annual passenger movement of almost 200,000 and growing rapidly. The Gladstone Airport is located 8 km from the city heart and services mainly transit passengers and small amounts of freight. QantasLink and Virgin operate flights to and from Brisbane seven days a week from the Gladstone Airport (Gladstone Regional Council, 2012).

RAIL

As a significant coal exporting centre, Gladstone is a major operations hub for Queensland Rail. Electrified rail links Gladstone to Brisbane, Rockhampton and the coal mines in the Bowen Basin, with trains more than 1.5 kilometres long carrying in excess of 6,500 tonnes of coal to Gladstone's coal terminals. Non-electrified rail extends the network to encompass agriculture and other mineral resources. In addition to the central distribution system within Gladstone, Queensland Rail has established a dangerous cargo spur line and direct access to the Port of Gladstone and the Port's container facility. There is a regular 'Tilt Train' passenger service from Brisbane to Rockhampton through Gladstone and return. The journey from Brisbane to Gladstone takes just over 6 hours and is offered daily, except Saturday. (Gladstone Regional Council, 2012).

TRANSPORT

A Department of Main Roads study in 2007 suggested at that time that the Annual Average Daily vehicle traffic (AADT) between Rockhampton and Mt Larcom turnoff to Gladstone was between 4,600 and 6,000 vehicles per day, with over 1,000 of these vehicle movements being heavy vehicles (Gladstone Area Water Board, 2012).

Capacity constraints exist along those parts of the Bruce Highway where overtaking opportunities are limited. In particular, the section between Benaraby and Rockhampton has inadequate overtaking opportunities to safely cater for higher future traffic volumes (Auslink, 2012). The Queensland Government's Bruce Highway Upgrade Strategy also reveals an existing fatal and serious injury crash rate of two accidents per km's in the period between October 2004 and September 2009 on the Rockhampton to Benaraby stretch of the Bruce Highway (Department of Transport and Main

Roads 2011). With an increase in traffic volumes on that stretch of the Bruce Highway, in the absence of major capital works, that rate cannot be expected to decrease.

The Queensland Government has identified significant improvements are required on the Rockhampton to Bernaraby sections of the Bruce Highway. The strategy proposes a number of actions.

- Calliope Crossroads Upgrade to address what has become a significant problem with higher volume of traffic using the Dawson Highway intersection with the Bruce Highway. Construct six new overtaking lanes between Benaraby and Rockhampton. Proposed for completion between 2012 and 2015.
- Upgrade 3 km section south of Rockhampton round about. Proposed for completion between 2016 and 2021.
- Create 75 km section of dual carriageway from Rockhampton to Mt Larcom. Proposed for completion between 2021 and 2031.

While laudatory, these initiatives are not currently planned to be completed in time to assist the Bruce Highway to safely cope with, in the absence of an alternative, the increased traffic volumes of passenger vehicles and buses resulting from some thousands of extra daily workers travelling to and from Gladstone (Department of Transport & Main Roads, 2011).

ECONOMIC DEVELOPMENT GLADSTONE REGION

DEVELOPMENTS IN GLADSTONE UNDERWAY OR PROPOSED

The vast mineral coal and gas deposits of Central Queensland, resident extraction and processing facilities and an historically high percentage of industrial jobs in the local economy has positioned Gladstone to be the natural location to support the additional significant projects already approved and underway and the other projects planned for development (Rose, Rolfe, & Kinnear, 2012). These developments will have profound implications for the economic, social and physical infrastructure of the Gladstone LGA in particular, and the greater Central Queensland region generally. It should be noted that these developments will be in addition to the significant energy, industrial and extraction and processing facilities already operating within the Gladstone LGA.

There are a number of direct major energy, mineral and pipeline projects approved and under construction or proposed for development in the Gladstone LGA. Total capital expenditure proposed for these projects is just under AUD $60 billion. Three of these projects, all under construction, account for AUD $46.3 billion in expenditure. A fourth proposed major LNG project accounts for AUD $10.3 billion of the remaining AUD $13.7 billion. Detail of the three LNG related projects outlined in Table 2 confirm that the scale of the projects and that the major focus of economic activity will be within the Gladstone LGA.

Australia Pacific LNG, Curtis Island (Origin/Conoco Phillips)

This will be an integrated liquefied natural gas (LNG) project. The Project consists of three key parts:

- Further development of Australia Pacific LNG's gas fields in the Surat and Bowen Basins in south-west and central Queensland.

- Construction of a 520km gas transmission pipeline from the gas fields to an LNG facility on Curtis Island off the coast of Gladstone.
- An LNG facility on Curtis Island off the coast of Gladstone, with the first two gas production trains processing up to 9 million tonnes per annum. (Australia Pacific LNG, 2012)

Gladstone LNG, Curtis Island (Santos/Petronas)

Santos Limited and Petroliam Nasional Berhad (PETRONAS) propose to develop a liquefied natural gas (LNG) export facility at Gladstone to commercialise their Queensland coal seam gas (CSG) resources in the Comet Ridge and Roma region. The designated proponent for the project is Santos Ltd. The project involves:

- extraction of coal seam gas from fields around Roma, Emerald, Injune and Taroom
- a 435 kilometres gas transmission pipeline from the gas fields to Gladstone
- an LNG facility of approximately 10 million tonnes per annum on Curtis Island near Gladstone
- associated infrastructure including marine facilities, port dredging and a potential access road and bridge at Gladstone.

The Santos Ltd LNG facility is proposed to be developed in three stages, the first of which will have a capacity of approximately 3-4 million tonnes per annum. The LNG will be exported to overseas markets. (Gladstone Regional Council, 2012)

Queensland Curtis LNG, Curtis Island (BG Group)

The Queensland Curtis LNG project proposes to develop an integrated liquefied natural gas project in Queensland comprising the following aspects.

- The expansion of coal seam gas operations in the Surat Basin to provide gas for two liquefied natural gas plants or trains and gas for domestic markets.
- The development of a gas and water pipeline network of approximately 800 kilometres including a 220 km network of gas and water pipelines connecting the primary gas fields. 200 kilometres lateral to other nearby gas resources and 380 kilometres of pipeline to the liquefied natural gas plant at Gladstone
- The development of the liquefied natural gas processing and export facility on Curtis Island, near Gladstone, comprising up to three liquefied natural gas trains of total capacity approximately 12 million tonnes per annum (a first train to be followed by a second within a year and with the potential development of the third train) , three storage tanks of up 200,000 cubic metres each (one for each liquefied natural gas train) and a marine jetty containing specialised liquefied natural gas loading facilities and berths.

OTHER SIGNIFICANT PROJECTS

Other direct significant projects are a mix of energy and mineral related developments. Each project is at various stages in its development and is briefly outlined below.

Arrow LNG Plant Project

The Arrow LNG Plant Project, has submitted its EIS and is awaiting approval. This project involves:

- construction of a gas pipeline from near the Bruce Highway to Curtis Island

- construction of a liquefaction facility where coal seam gas will be converted to LNG and stored for shipment in LNG carriers to growing LNG markets
- construction of marine facilities such as jetties on the mainland
- construction of jetties, offloading facilities and LNG Carrier Terminal on Curtis Island in the vicinity of North China Bay, Hamilton Point and behind Boatshed Point
- localised dredging at marine facilities.

The Arrow LNG project is also supported by a dredging program off Port Curtis being managed by the Gladstone Ports Corporation to extend shipping lanes to develop swings basins for LNG carriers to load and manoeuvre. The Western Basin Dredging Project by the Port is subject to a separate EIS approval.

The liquefaction facility will produce up to 18 million tonnes per annum (Mtpa) of LNG, and includes the phased construction of up to four trains or processing plants on its Curtis Island site. Stage 1 includes the construction of two trains of around 4mtpa of LNG each on the Arrow site behind Boatshed Point.

Wiggins Island (WICET)

Another significant development is the Stage One of the Wiggins Island Coal Export Terminal Pty Ltd (WICET), which is owned and being developed by existing and potential coal exporters located in Queensland to provide increased long term export coal capacity. This AUD $2.5 billion project is currently under construction at Golding Point, to the west of the existing RG Tanna and Barney Point Terminals. Once fully commissioned, the multi-billion dollar industry-owned and privately funded Terminal will provide over $80 million tonnes per annum (Mtpa) in additional export coal capacity through the Port of Gladstone (Gladstone Regional Council 2012).

Gladstone Nickel Project (GNP)

There are two other multi-billion dollar projects proposed for the Gladstone LGA that have recently re-stated their intention to proceed but are at the EIS or pre-final commitment stage in the developmental process. The Gladstone Pacific Nickel Limited (GPNL) is an Australian mining development company, which intends to establish an AUD $3.75 billion long-life, nickel and cobalt refinery at the Gladstone State Development Area (GSDA), located west of Gladstone.

The Gladstone Nickel Project (GNP) will comprise a high pressure acid leach (HPAL) plant and metal refinery in the Yarwun Precinct of the GSDA; nickel mines and load out/shipping facilities in New Caledonia and potentially other south-west Pacific islands; ore importation facilities at the Port of Gladstone; a modern nickel mine at Marlborough with ore railed to the refinery at Gladstone; and a long-term residue storage facility located in the Aldoga precinct of the GSDA (Gladstone Pacific Nickel Limited, 2012).

Gladstone Steel Plant Project

The second large project in the pre-final commitment stage is the Gladstone Steel Plant Project, a proposed steel plant by Boulder Steel Limited for the Aldoga precinct of the Gladstone State Development Area (GSDA). Boulder Steel Limited is an Australian company, which is currently working with MCC International Incorporation Ltd (MCCI) and MCC-WISDRI of China to jointly progress the AUD $4 billion project. The Gladstone Steel Plant will use blast furnace/basic oxygen

furnace technology to produce high quality steel slabs and billets for exports to Asian markets (Boulder Steel Limited, 2012).

Summary of Other Projects in Gladstone

The capital expenditure within the Gladstone LGA between 2012 and 2021 may comprise an additional AUD $10 billion to the AUD $60 billion outlined in the initial direct projects commented upon.

DEVELOPMENTS OUTSIDE GLADSTONE

A number of other significant projects outside the immediate Gladstone LGA will have an impact on the infrastructure and economic activity within the area. This will be through proximity, downstream flow of outputs through Gladstone Port or demand on human resources and businesses within the Gladstone LGA.

Xstrata Coal Queensland Pty Ltd (XCQ) is proposing to construct and operate a coal export facility at Balaclava Island, 40 kilometres north of Gladstone within the Rockhampton Regional LGA. It will involve the development of rail unloading facilities via a rail spur line off the main North Coast Line located north of the township of Raglan, construction of a conveyor system across wetlands to Balaclava Island and the development of a coal terminal with the appropriate ship loading facilities. It is proposed that the terminal will have a capacity of up to 35 million tonnes per annum, with development costs expected to be approximately $1-1.5 billion. This EIS for this project is currently nearing completion. As with other projects close to, but outside the Gladstone LGA, this project will draw on workers and resources from Gladstone (Xstrata Coal, 2011).

There are seventeen mineral coal related projects proposed for the Central Highlands Regional LGA with a combined required capital expenditure of AUD $7.5 billion (Rose, Rolfe, & Kinnear, 2012). These projects are scheduled for completion between 2012 and 2017, a timeline in parallel to the main construction period for the major projects within the Gladstone LGA. These projects will provide competition for resources, both human and physical and it can be expected that a number of the people working on these new projects will be DIDO from the Gladstone LGA. This will further increase demand on the available labour force within the Gladstone LGA.

IMPLICATIONS OF ECONOMIC DEVELOPMENT IN GLADSTONE REGION

The scale of the proposed and confirmed developments will require significant human, financial and physical resources over a number of years during the construction phase and ongoing human resource allocation once all projects are commissioned. The probable number of employed human resources and/or contractors required to undertake construction and operation of these projects within the Gladstone LGA is estimated in table 2. The breakdown includes a timeline of human resource engagement. This has been developed from a range of publicly available resources which include project timelines, consultation and company estimates of required human resources. It also includes estimates for project ramp up and post completion run down on resources. While an informed estimate only, it confirms the scale of the growth in the number of human resources that will be required to develop and operate the projects, both definite and proposed, in the Gladstone LGA over the next six years.

Table 2 Estimated Human Resource requirements from Projects, Gladstone Regional, March 2012

		Number of Persons						
		2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Definite Projects								
Projects - Potential Human Resources Requirements - **Construction Phase**	Australia Pacific LNG	1500	4000	6000	4000	500		
	Gladstone LNG	1500	3000	5000	2000	500		
	Queensland Curtis LNG	4000	4000	2000				
	Wiggins Island Coal Export Terminal Pty Ltd - Stage 1	400	800	200				
	Other Definite Projects	1000	1000	1000	1000	1000	400	
Projects - Potential Human Resources Requirements - **Operational Phase**	Australia Pacific LNG				500	500	500	500
	Gladstone LNG				500	1000	1000	1000
	Queensland Curtis LNG				1000	1000	1000	1000
	Wiggins Island Coal Export Terminal Pty Ltd - Stage 1			100	100	100	100	100
	Other Definite Projects				300	300	300	300
	Subtotal	8400	12800	14300	9400	4900	3300	2900
Possible Projects								
Projects - Potential Human Resources Requirements - **Construction Phase**	Arrow LNG Plant Project			2000	3000	3000	500	
	Gladstone Nickel Project (GNP)			1500	2000	2000		
	Gladstone Steel Plant Project		1000	2000				
	Balaclava Island Coal Terminal		600	800	300			
	Other Possible Projects I.e. (Aldoga Power Station, etc.)			1500	1500	1000	500	
Projects - Potential Human Resources Requirements - **Operational Phase**	Arrow LNG Plant Project						250	250
	Gladstone Nickel Project (GNP)						500	500
	Gladstone Steel Plant Project			1000	1000	1000	1800	1800
	Balaclava Island Coal Terminal				100	100	100	100
	Other Possible Projects I.e. (Aldoga Power Station, etc.)					300	300	300
	Subtotal	0	1600	8800	7900	7400	3950	2950
	Total of Definite and Possible Extra Human Resources (persons)	**8400**	**14400**	**23100**	**17300**	**12300**	**7250**	**5850**

Table 3 Estimated Demand for workers by timeline per year, Gladstone Region

	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Definite Required Extra Employees	8400	12800	14300	9400	4900	3300	2900
Possible Required Extra Employees	0	1600	8800	7900	7400	3950	2950
Total of Definite and Possible Extra Employees	8400	14400	23100	17300	12300	7250	5850
Total of Definite and Possible Extra Employees as a % of Sept 2011 Labour Force	25%	43%	69%	52%	37%	22%	17%
Total of Definite and Possible Extra Employees % of 2010 Resident Gladstone LGA Population	14%	24%	38%	29%	20%	12%	10%

ALTERNATIVE SOURCES OF SUPPLY

An analysis of the Demand Factors and Supply Factors highlight a significant mismatch between the size of the current labour force in the Gladstone LGA and the extra human resources identified as required within the next seven years to undertake the construction phases on the definite and likely development projects. With a unemployment rate of 5.5% there is little capacity available within the existing labour force, even allowing for the possibility of under utilisation of existing labour force. Increasing the rate of participation rate of that part of the resident population not currently in the labour force is another possibility, but due to the requirement for specific skills may be of limited benefit.

As at September 2011 the existing labour force was 33,455 persons. The resident population as at 2010 was 60,300. Table 3 (p.20) sets out the relevant percent against each of these statistics of the definite and possible extra human resources that will be required in the next few years in the Gladstone LGA.

This ratio's disclosed are all significant and would not be sustainable for a labour force supplied from, and situated solely within, the Gladstone LGA. Even the projected labour force in the Gladstone LGA of 47,500 persons by 2021 would be insufficient by approximately 8,000 people and seven years too late to cope with the anticipated possible demand for workers at the anticipated peak of the development in 2014/2015.

The existing economic capacity, social infrastructure, property market and physical infrastructure of Gladstone Region are simply insufficient to supply what would be an unprecedented and rapid growth in population in a relatively short period of time. It is also doubtful that the economic capacity, physical and social infrastructure could also be developed on the ground solely within the Gladstone Regional Local Government in the same short period of time. As displayed in the following Figure 3 the investment to be unleashed is already underway.

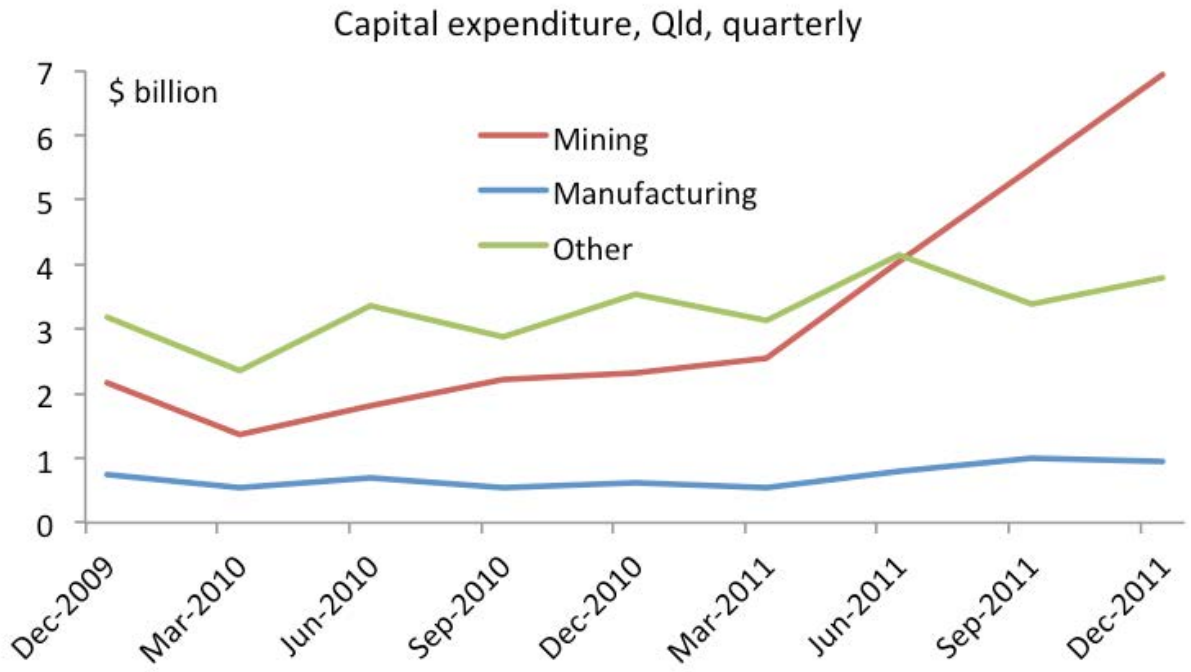

Figure 3 Capital Expenditure, QLD per Quarter

GROWTH AND SUPPLY FACTORS

GLADSTONE LGA

LABOUR FORCE AND EMPLOYMENT STATISTICS

The Gladstone LGA covers 10,489 square km. It comprises five main communities, Gladstone, Tannum Sands, Boyne Island, Calliope and Agnes Water (Rose, Rolfe, & Kinnear, 2012). With the exception of Agnes Water, all communities are closely aligned geographically, and can be considered as one unit for the purposes of understanding population density and potential labour force access to development in the Gladstone Region.

The resident population of the Gladstone LGA in 2010 was 60,300 persons. In the ten years to 2010 the population grew 30% from 46,400 people. This increase of 30% was well in excess of the 24.2% increase for Queensland as a whole during the same ten year time period (OESR, 2011a).

Projections based on low, medium and high growth rates suggest potential resident population projections for the Gladstone Regional LGA of 62,982, 74,459, 85,655, 95,174 persons by 2026. Using the mid-level growth rate a projected population of 111,690 persons can be expected to be reached by 2031 (See figure 4 below) (OESR, 2011a). These projections were developed on assumptions of growth that factor in definite and likely development projects in the Gladstone LGA, but are required to be reviewed against the human resource demand as identified in section III of this paper and the available labour force.

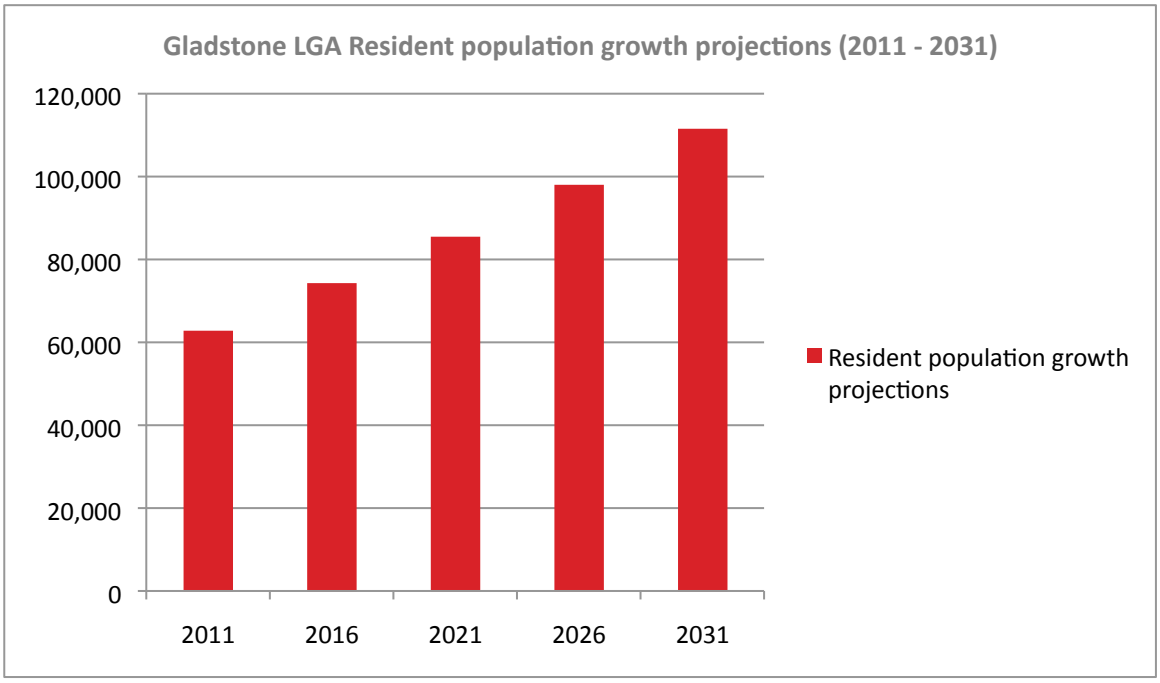

Figure 4 Gladstone LGA resident population growth projects (2011 - 2031)

Source: OESR,2011

As shown in Table 4, in the Gladstone LGA as at 30 June 2010, 23.0% of persons were aged 0 to 14 years, 68.0% were aged 15 to 64 years and 9.0% were aged 65 years and over. This aligns closely to the age profile for the whole of Queensland. Other than absolute number, this means that

Gladstone should not confront any additional issues with available labour force to that of the remainder of Queensland.

As compared to Queensland as a whole the higher percentage of younger persons in the total population reinforces an assumption that the labour force as a percentage of the total population of the Gladstone LGA will remain at least constant through to 2018. Based on the projected growth in total population the available labour force in the Gladstone LGA is expected to reach 47,500 persons by 2021.

Table 4 Estimated resident population by age, by LGA, Gladstone Regional, 30 June 2010

	Population by age									
LGA	0–14		15–24		25–44		45–64		65+	
	number	%	number	%	number	%	number	%	number	%
Gladstone	13,892	23.0	7,982	13.2	17,652	29.3	15,373	25.5	5,417	9.0
Queensland	901,542	20.0	644,985	14.3	1,278,876	28.3	1,121,066	24.8	567,381	12.6
Region as % of Qld	1.5	. .	1.2	. .	1.4	. .	1.4	. .	1.0	. .

The number of unemployed persons aged 15 years and over, in Gladstone LGA in the September quarter 2011 was 1,766 persons. This represented an unemployment rate of 5.3%, compared with Queensland which had a smoothed unemployment rate of 5.5%, based on an available labour force of 33,455. Between the December quarter 2009 and the September quarter 2011, the unemployment rate in Gladstone LGA ranged between 5.2% (March quarter 2011) and 5.7% (June quarter 2010) (OESR, 2011a).

ECONOMIC CAPACITY

To understand the economic importance of the Gladstone LGA an examination of the size of the local economy is required. One measure of the size of the economy of an area is Gross Regional Product (GRP). The region referred to in the economic measure Gross Regional Product is made up of a number of LGAs. The Gladstone LGA is within the Fitzroy SD, the smallest available subset of measured economic activity made available publicly by the Queensland Treasury.

In 2009/2010, Queensland's Gross State Product (GSP) was estimated to be $243.8 billion (OESR 2011a). For that same financial year GRP for the Fitzroy SD was $15.7 billion (Rose, Rolfe, & Kinnear, 2012). The Fitzroy SD, including the Gladstone LGA, therefore accounted for 6.4% of the Queensland's GSP in that financial year. The Fitzroy SD, as a proportion of Queensland's population, accounts for only 5% of the state population (OESR 2011a).

As the GRP of $15.7 billion is for the entire Fitzroy SD, but the projected capital expenditure of between $60 and $70 billion is focused mainly within the Gladstone LGA, the relative impact on the Gladstone LGA economy will be momentous. Highlighting the magnitude of the work based on the fact that GRC despite only making up a small part of the SD, is the lion share of the GRP.

Additionally, at a micro level, the economic capacity of the Gladstone LGA to support the development can be appreciated in the context of the composition of business activity. In 2008–09, the construction industry had the largest number of businesses for Gladstone LGA. As shown in Table 5, as at 2011, Gladstone LGA 860 businesses or 22.3 % of the region's total number of businesses were in the construction industry. Other industries with relatively large numbers of business counts included Agriculture, Forestry and Fishing (591 businesses or 15.3%) and Rental, Hiring and Real Estate Services (387 businesses or 10.0 %). The contrast of 22.3% against the Queensland average of 18.8% highlights Gladstone as being more economically focused than Queensland as a whole, towards Construction and manufacturing to support the proposed projects, but demand may overwhelm supply given the existing number of businesses and scale of the projects anticipated. A full copy of industry breakdown in the Gladstone Region can be found in Appendix A.

Table 5 Top Five industries in Gladstone Region, 2011

Industry	Gladstone Regional		Queensland	
	number	%	number	%
Agriculture, Forestry and Fishing	591	15.3	46,624	11.1
Construction	860	22.3	78,768	18.8
Transport, Postal and Warehousing	258	6.7	27,180	6.5
Rental, Hiring and Real Estate Services	387	10.0	46,636	11.1
Professional, Scientific and Technical Services	310	8.0	41,509	9.9
Total (d)	3,865	100.0	419,410	100.0

Source: Adapted from OESR, 2011

SOCIAL INFRASTRUCTURE

As at 30 June 2010, in Gladstone LGA there were eight police stations, six ambulance stations, four fire station and 32 schools (OESR 2011a). There are two hospitals, with the Gladstone Hospital having 69 beds, and the smaller Mater Hospital 30 beds. Gladstone Hospital also has two fully-functional operating theatres, provided 25,781 emergency services in 2010, had 24 839 outpatient attendances, admitted 6,309 patients and had 485 babies born in 2010 (Queensland Health, 2012a).

There are no capital works currently underway, but in early 2012 Queensland Heath completed the Gladstone Hospital Health Services Review. This review projected that Gladstone Hospital will require approximately 111 overnight and same day beds and 27 emergency treatment spaces by 2021–22. The distribution of these beds will be across surgical and medical services, cancer care, maternity, rehabilitation, endoscopy, paediatrics and palliative care services (Queensland Health, 2012b). Even with these potentially increased facilities, Rockhampton Base Hospital will continue to act as a regional specialist emergency department supporting staff at Gladstone Hospital's emergency department, It is unknown when the necessary development for Gladstone will commence and peak construction is ramping up from now to 2018.

There is already a heavy dependence on the provision of beds and higher level clinical services for the people of the Gladstone Region in Rockhampton. However, Rockhampton Hospital is a main referral hospital, and is located 110 km's away (Queensland Health, 2012a).

As at 30 November 2009 there were seven preschools / kindergartens catering to 3 to 5 year olds, in the Gladstone LGA, five in Gladstone, one in Calliope and one in Tannum Sands. The total maximum capacity of these centres is 174 places. The analysis of centres indicated a slight current under provision of centres, and the size of the centres in Gladstone was also found to be below the State average. It is also highly possible that high rates of demand for kindergarten places are experienced in the Gladstone LGA as a result of the special characteristics of the workforce and high labour force participation rates. Anecdotal evidence suggests that there is a lack of kindergarten vacancies in Gladstone and long waiting periods.

As at 30 June 2009 in Gladstone LGA, there were seven aged-care service providers, with a total of 256 places in operation. During 2008–09, the aged-care service providers in Gladstone Regional LGA received $8.8 million in Australian government recurrent funding, 0.7 % of total funding received in Queensland ($1,259.9 million) (OESR 2011a).

In terms of resident professional servicing the Gladstone Region the number of medical specialists in all fields Gladstone appears to be about half the national average; however there are a number of visiting specialists from Bundaberg, and higher level specialist services are provided in Rockhampton (Gladstone Regional Council, 2009).

PROPERTY MARKET

Table 6 summarises the level of new lots coming onto the property market in the Gladstone LGA over 2009/2010. In effect, this is the stock of land available for construction of new residential accommodation. Dwelling approvals can only proceed if the stock of land is available.

Table 6 Land Lot Registration Gladstone Region, 2010

Gladstone LGA - Lot Registration by type Year (to Dec)	2009	2010
Standard lots (140- 2,500sqm)	382	264
Building format & community management (incl. multi-storey units and townhouses)	165	74
Total urban lots	547	338
Low density (2,500sqm – 5ha)	71	37
Total lot registrations	618	375

Source: RTA 2011

House prices for the Gladstone region (which includes its satellite towns and dormitory suburbs) have continued strong trend growth following a flattening over the period of the GFC. Sales volumes initially dipped, but have returned strongly to levels below the boom period pre-GFC, but well above those prevailing in the late 1990's. Figure 5 represents house prices trends in Gladstone.

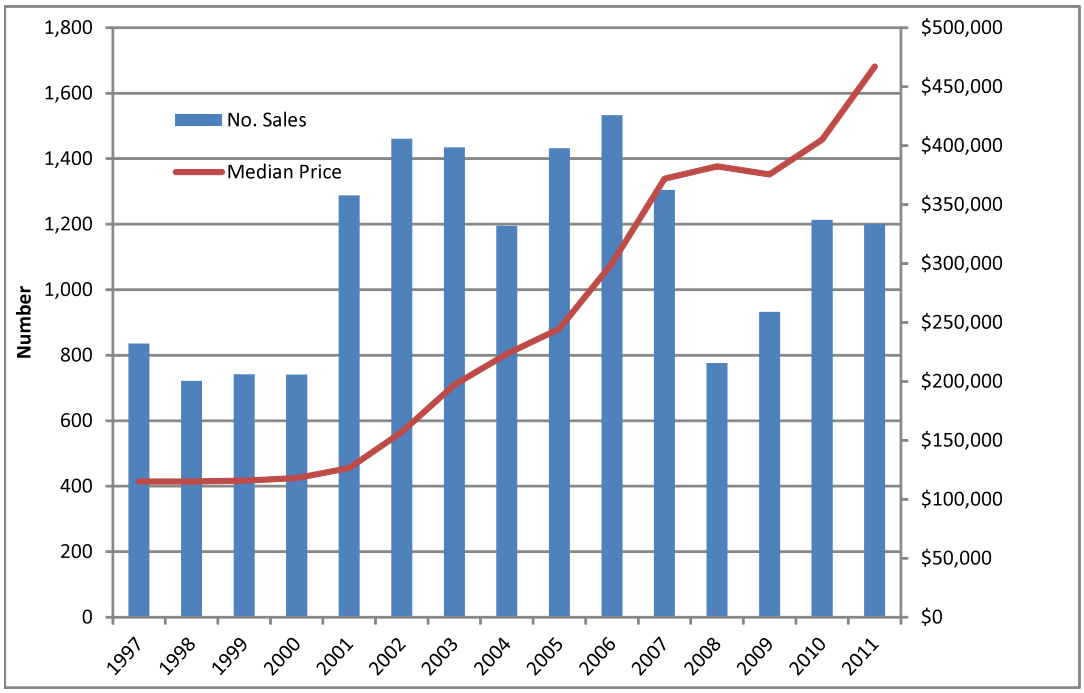

Figure 5: House Prices - Gladstone

Source: Pricefinder (4680 postcode)

In 2010, sales of new residential lots increased by two-thirds on the previous year (508 sales of vacant land in 2010 compared with 303 in 2009). With the number of lots sold exceeding the number of lots being registered, 508 to 338, the available stock of unsold land decreased in 2010. The number of house and land packages also increased. In 2010 the median sale price of vacant residential lots rose to $184,300 from $179,950 in 2009 (up $4350 or 2%) (OESR, 2011b).

Over the year to 30th March 2011, there were 611 dwellings approved in Gladstone LGA, up substantially on the 299 dwellings approved in the previous year (OESR, 2011b). This indicates that more residential properties were available for increasing numbers of resident workers and families; however the level is very low relative to the anticipated required number of workers for all confirmed and potential developments.

Rents increased 71% for three bedroom houses and 86 % for four bedroom houses from March 2010 to March 2011 in the Gladstone LGA (see Table 7). Even as rental supply increased with the number of properties rented in the Gladstone Postcode area increasing from 4588 in December 2010 to 4926 in December 2011, these significant increases in rents were well above the Queensland average increase in 2010/2011 of 5.9 percent for four bedroom homes (RTA, 2012).

Table 7 Median rentals Gladstone Region, 2012

Local Government Authority	Type of housing	Median weekly rent Mar 2010 (A$)	Median weekly rent Mar 2011 (A$)	Median weekly rent Mar 2012 (A$)	$ Change	% Change 2010-2012
Gladstone	4 bedroom house	350	450	650	300	85.7
	3 bedroom house	280	360	480	200	71.4
	3 bedroom unit	300	350	400	100	33.3
	2 bedroom unit	230	275	360	130	56.5
	1 bedroom unit	180	200	250	60	33.3

Source: RTA, 2012

Despite the average rent for a four bedroom property at $650 per week (RTA, 2012), demand is currently outstripping supply, even before the further higher levels of workers required arrive. This is expressed currently in the consultation feedback, with several sources reported large numbers of persons (1,000) sleeping in their cars. Greater pressure on the rental market is expected with the increased level of workers entering the region. Therefore, the limited capacity to further increase supply, even with the intention of some companies to provide supported or on-site accommodation may well continue to increase these rental costs further. Vacancy rates are well below 1% (RTA, 2012). Figure 6 below summarises this data.

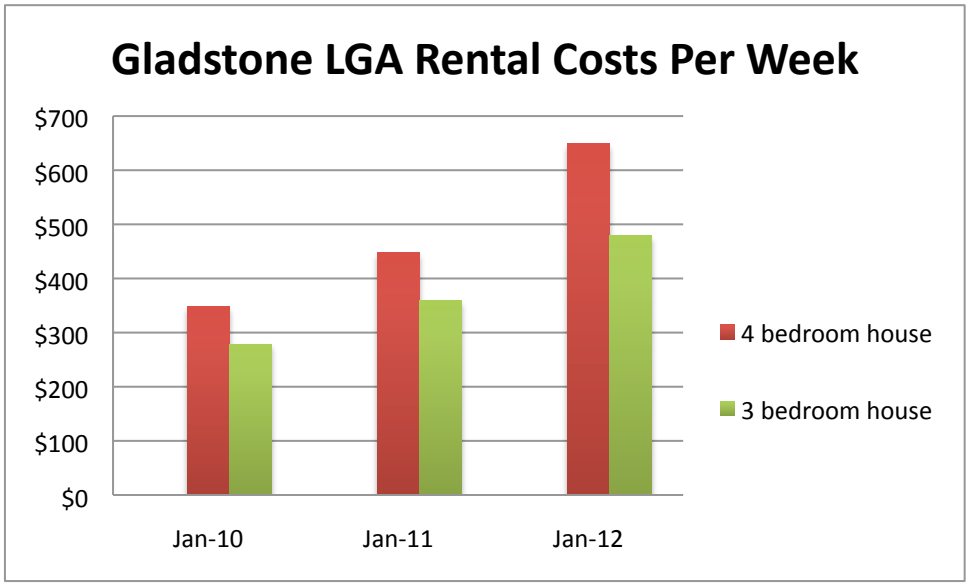

Figure 6 Gladstone Rentals

ROCKHAMPTON LGA

The number of people already commuting daily from the Rockhampton LGA to the Gladstone LGA is estimated at under 1,000 based on employer feedback. For sourcing the human resources required for the Gladstone Regional projects, Rockhampton presents a viable option to be considered as an alternative workforce supply source.

Given the limited accommodation in the Gladstone LGA, and irrespective of the amount of new accommodation to be built, the Rockhampton Regional LGA may also present a residential option for the many more workers that will relocate from Gladstone and other parts of Australia, rather than fly in and out. The relatively close proximity of Rockhampton to Gladstone, its well-developed social and economic infrastructure, and relative to Gladstone, large property market, indicates ample resources exist to support an increased resident population.

LABOUR FORCE AND EMPLOYMENT STATISTICS

The resident population of the Rockhampton Regional LGA in 2010 was 115,526 persons. In the five years to 2010 the population grew 9.9 %, up from 105,000 people in 2005. This increase of 9.9% was below the 12.8% increase for Queensland as a whole during the same five year time period (OESR, 2011a). Over a much longer ten year period Gladstone had outperformed the Queensland state average, in comparison to Rockhampton region which has underperformed.

In the Rockhampton Regional LGA as at 30 June 2010, 20.9% of persons were aged 0 to 14 years, 65.7% were aged 15 to 64 years and 13.4% were aged 65 years and over. As compared to Gladstone (68%), Rockhampton has a slightly lower percentage (2.3%) of persons aged less than 65 years, but still maintains a strong labour market of 61,849 persons. With a high rate of unemployment of 6.9% in September 2011, the Rockhampton labour market has potential capacity to supply workers to Gladstone (OESR, 2011a). Between the December quarter 2009 and the September quarter 2011, the unemployment rate in Rockhampton Regional LGA ranged between 6.4% (December quarter 2010) and 7.1% (December quarter 2009).

However, the 'fit' of those workers to the required roles given a period of unemployment consistently above the Queensland average is influenced by the skill and qualifications of those potential workers. At the time of the 2006 census the average education level of workers in the Rockhampton Regional LGA was below that for Queensland as a whole. While only 8% of Queensland workers had an educational level of year 8 or below this was 11% for Rockhampton Region. Year 9 completion for Rockhampton workers was 37%, but 33% for the whole of Queensland. Similarly, for Years 11 and 12, Rockhampton was well below the Queensland result of 50 percent with only 40% of Rockhampton Regional workers completing either Year 11 or 12. This is consistent with Gladstone whose percentage of workers finishing in Years 11 or 12 was 43% (OESR, 2011a).

At the time of the 2006 Census, in Rockhampton Regional LGA, there were 36,200 persons aged 15 years and over with a qualification, 45.6% of the population in this age group. This percentage was less than the Queensland rate of 50.4% (OESR, 2011a). In the Rockhampton Region there were 7,666 persons with a bachelor degree or higher, 3,619 persons with an advanced diploma or diploma

and 13,724 persons with a certificate. Of persons aged 15 years and over with a qualification, 21.2% had bachelor degree or higher (26.0% in Queensland), 10.0% had an advanced diploma or diploma (13.1% in Queensland), and 37.9% had a certificate (35.5% in Queensland).

ECONOMIC CAPACITY

In addition to the labour market and property market/vacant land infrastructure issues already outlined, Rockhampton has other aspects to its economic infrastructure that position it to attract and support a percentage of the required Gladstone workforce. The Rockhampton airport, an international airport servicing large defence exercises and domestic passengers, is owned by the Council and reports more than 740,000 passengers every year. It is one of the largest regional airports in Australia.

At the time of the 2006 Census, Retail Trade was the largest industry of employment for Rockhampton Regional usual residents, with 11.7% of the region's employed labour force. In 2008–09, there were 7,516 businesses in Rockhampton LGA, 1.8% of all Queensland businesses. These businesses were diverse, signalling a strong economic base to support a growing population with the goods and services required for a population to expand. A copy of the count of registered businesses is provided in Appendix B.

The number of workers in each industry is also an indicator of the economic diversity of Rockhampton Region. In the Rockhampton region only three industries employed greater than 10% of the workforce, while there was a strength of diversity across the other industries. A full table of the place of work by industry of employment for Rockhampton region can be found in Appendix C. While last updated from the 2006 census, it adds to the confirmation that the Rockhampton Region has a ratio of people employed in businesses similar to the rest of Queensland, and can provide the services necessary to support a percentage of the increasing workers required for the Gladstone projects commenced, approved and in other stages of their development processes.

Development is already underway in Rockhampton on projects aimed at the Gladstone DIDO worker market. Work on a $20 million, high-rise serviced apartment complex on the banks of the Fitzroy River has commenced and is being developed by Queensland Property Developers. It is designed to attract professionals running the Gladstone projects to drive in and out from Rockhampton and is expected to be completed by 2014.

SOCIAL INFRASTRUCTURE

As at 30 June 2010, in Rockhampton LGA there were 10 police stations, seven ambulance stations, six fire stations, 58 schools and seven hospitals. As at 30 June 2009 in Rockhampton Regional LGA, there were 30 aged-care service providers, with a total of 1,319 places in operation (OESR, 2011a). At 31 August 2011, the Rockhampton Regional LGA had a total of 57 early childhood education and care services, 2.1% of Queensland's total early childhood education and care services.

The largest of the hospitals is Rockhampton Hospital which is a 232 bed facility and which in 2010 provided 44,111 emergency services, admitted 25,826 patients and had 1,356 babies born. Significant capital works are underway at this hospital and are in two stages.

The first stage of major redevelopment of Rockhampton Hospital includes the completion of; a new Phlebotomy, Medical Library, Medical Records (Part 1), Geriatric and Rehabilitation Service and Learning and Development, MRI, Patient Transit Lounge, Emergency Department, Renal Dialysis,

Paediatric, together with the consolidation of a number of outlying services into the main Hospital complex. Stage One redevelopment is due to be completed in early 2012; however still to be completed are; Medical Records (Part 2), Orthopaedic Clinic, Mortuary, Acute Assessment/ED Observation Ward and Maternity.

Already commenced, Stage Two is the construction of a new eight-level building that will house cancer services, medical officers facilities, two wards, provision for a future ICU and plant space. Completion of the new building is on program for mid-2013 (Queensland Health, 2012a).

With a population nearly twice that of the Gladstone LGA, nearly twice as many schools and three times as many hospitals and a main hospital soon to four times the size of Gladstone Hospital, Rockhampton LGA has a much stronger level of existing infrastructure to attract and support a significant portion of the workers required for the identified demand in Gladstone.

PROPERTY MARKET

House prices in the Rockhampton region (LGA area) have remained stable following the impact of the GFC, but sales volumes have fallen by 60 % from their peak. The combination of stable prices and falling sales volumes suggests significant hoarding of housing stock, as weak demand at the prevailing price level sees sellers withdraw stock from sale. Figure 7 demonstrates this.

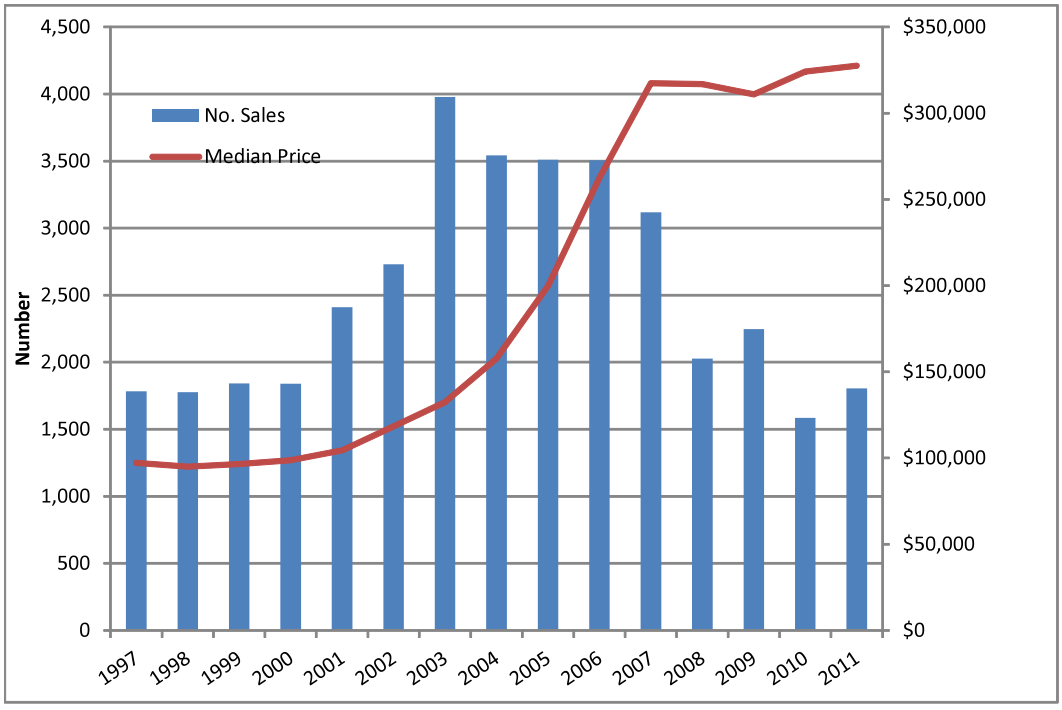

Figure 7: House Prices - Rockhampton

Source: Pricefinder (all postcodes aggregating to LGA)

In the Rockhampton LGA rents increased 14 percent for three bedroom houses and four bedroom houses from March 2010 to March 2012 (see Table 8). The increases in the Rockhampton area may be reflective of the demand pressures driven by the Bowen Basin growth (RTA, 2012). The capacity of the Rockhampton Region to absorb some of the 14,000 to 23,000 extra Gladstone workers needs to be confirmed.

Table 8: Weekly Rental Costs in Rockhampton LGA

Local Government Authority	Type of housing	Median weekly rent Mar 2010 (A$)	Median weekly rent Mar 2011 (A$)	Median weekly rent Mar 2012 (A$)	% Change	
					$ change 2010-2012	2010-2012
Rockhampton	4 bedroom house	350	370	400	50	14.3
	3 bedroom house	290	300	330	40	13.8
	3 bedroom unit	295	300	330	35	11.9
	2 bedroom unit	225	235	250	25	11.1
	1 bedroom unit	140	160	140	0	0.0

Source: RTA, 2012

Occupied rental property numbers in the Rockhampton Regional LGA increased from 9840 in December 2010 to 10,946 in December 2011 and vacancy rates fell to below 1% in December 2011 (RTA, 2012). To increase both the stock of both rental properties and new house for sale it is useful to review land available currently and potentially available, subject to Council approvals. Rockhampton Regional LGA contains 2,360 hectares of broad hectare land suitable for residential development. This equates to 11,000 developed residential lots. For land being developed already in the year to September 2011, Rockhampton Regional Council approved 318 residential lots. This was a decrease of 58% compared with the same period in the previous year when 761 lots were approved. In terms of lot registrations 418 lots were registered in the year to September 2011 and 607 new lots were sold in Rockhampton Regional Council of which 587 were vacant. In the four years from September 2007 to September 2011 there were 3,570 lots registered and 3,758 lots sold (OESR, 2011a). This confirms that there is not currently an excess of registered lots for sale, but potential is evident to develop significant numbers of lots, subject to council approvals and demand.

BUNDABERG LGA

Historically, the number of people willing to commute the 185km distance from Bundaberg to Gladstone has been very low. However, in recent times the high demand for extra human resources and the limited availability for affordable accommodation in the Gladstone region has lead to an increasing number of miners and families beginning to live in the Bundaberg area and commute to Gladstone (PRD Nationwide, 2012).

Despite a high level of construction in Gladstone, the demands for accommodation due to population growth in the area are placing significant stress on some members of the local community. The Bundaberg region provides an alternative accommodation solution to support Gladstone's increasing population.

LABOUR FORCE AND EMPLOYMENT STATISTICS

As of the 30 June 201, the estimated resident population of the Bundaberg LGA was 97,762 persons. The Bundaberg region is experiencing a low and declining growth with the annual growth rate.

Between 2006 to 2010 annual growth was 2.2%, while growth between 2010 and 2011 was estimated at only 1%. With a growth rate of 8.9% over a five year period, Bundaberg represents a lower than average growth than Queensland (12.8%), and Gladstone (11.6%) and Rockhampton, (9.9%) (OESR, 2011c).

The age structure in Bundaberg indicates an older population with 45.5% of the population aged 45 years and over. Compared to Gladstone (91%), Bundaberg has a lower percentage (81.9%) of persons aged less than 65 years, and maintains a labour market of 42,628 persons. As a December 2011 the unemployment rate in the Bundaberg region was 8.1% and higher than Rockhampton 6.9%, presenting a potentially strong worker supply capacity. It should however be noted that the higher than average unemployment rate compared to Queensland average of 5.5% may represent a gap in the skills and qualifications in the area.

The 2006 census indicated that the average education level for workers in the Bundaberg LGA was significantly below the Queensland average. Compared to a Queensland average of 8%, 13% of individuals in the Bundaberg Region indicated they had an education level of Year 8 or below. Similarly, completion of Year 10 (31.8%) and Year 12 (26.8%) was lower than Queensland averages (26.8% and 41.0%). In order to support an increased population, the economic infrastructure of a proposed location must be capable of meeting expected demands. Owned and operated by Bundaberg Regional Council the Bundaberg airport is located 6km southwest of the CBD and offers approximately 27 regular Qantaslink services in and out of Bundaberg a week.

As at the 2006 Census, 15.0% of Bundaberg Regional Councils usual residents workforce were employed in the retail trade, while 12.8% were employed in Health and Social Services sector (ABS, 2006a). A full copy of the place of work by industry can be found in Appendix D.

SOCIAL INFRASTRUCTURE

As of August 2011 there were 70 state and non-state schools in the Bundaberg LGA (Qld Education, 2012) and 38 aged care service providers. The largest of the hospitals is Bundaberg Hospital which is an acute care facility with approximately 200 beds. In 2010, the hospital provided approximately 39,238 emergency services, admitted 28,935 patients and 1,140 babies were born (Qld Health, 2012a).

While the proximity of Bundaberg to Gladstone is at the outer limits, social and economic factors make Bundaberg a viable options to address the population growth in Gladstone.

Although outside the scope of the current study region parameters a possible alternative location is Miriam Vale. Miriam Vale is located approximately 67km's from Gladstone and 118km from Bundaberg.

PROPERTY MARKET

House prices in Bundaberg (including Bargara) show roughly the same pattern as for those in Rockhampton, but peak sales volumes prevailed for a much shorter period than seen in either Gladstone or Rockhampton. Figure 8 below demonstrates housing prices as discussed.

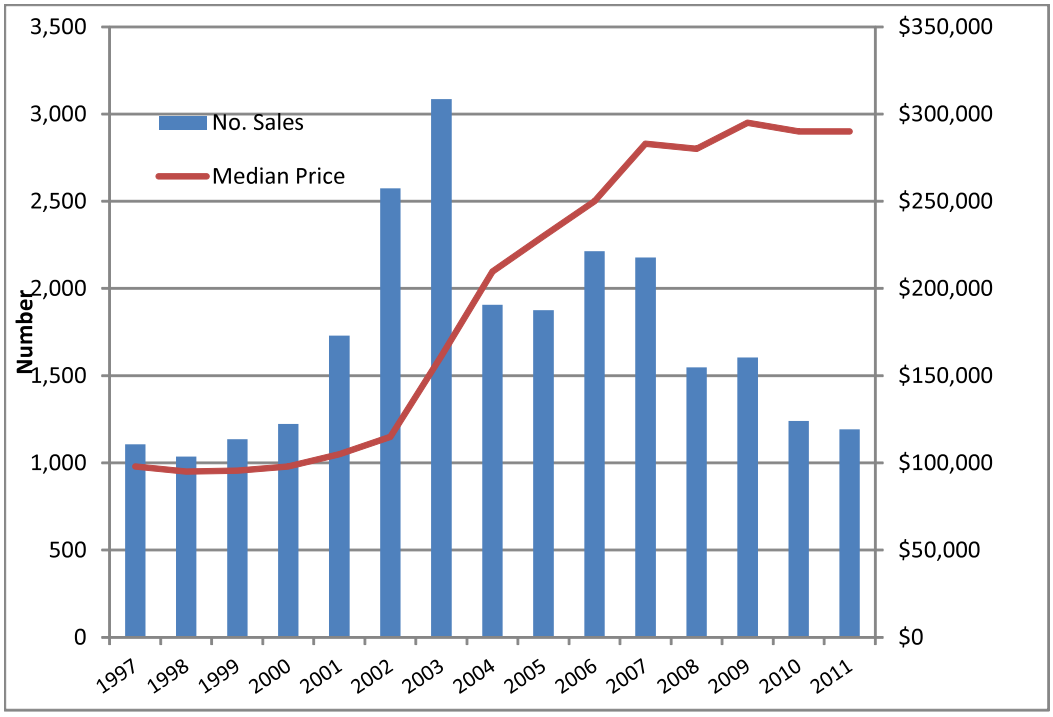

Figure 8: House Prices - Bundaberg

Source: Pricefinder (4670 postcode)

As of March quarter 2012, the weekly rent for a four bedroom house in Bundaberg was $320, compared to $650 in Gladstone. Similarly, while Gladstone has reported rental increases of 33 to 86% over a two year period, the largest rental increase was reported in the three bedroom unit market with a 5.6% increase over the same period.

The Residential Tenancies Authority (2012) report vacancy rates in Bundaberg to be 3.3%, thus indicating a sound and open rental accommodation market (see Table 9). In contrast, Rockhampton and Gladstone are currently experiencing high demand with vacancy rates at 1.1% and 1.4% respectively.

Table 9 Weekly Rental Costs in Bundaberg LGA

Local Government Authority	Type of housing	Median weekly rent Mar 2010 (A$)	Median weekly rent Mar 2011 (A$)	Median weekly rent Mar 2012 (A$)	$ Change 2010-2012	% Change 2010-2012
Bundaberg	4 bedroom house	315	310	320	$5	1.6
	3 bedroom house	260	260	270	$10	3.8
	3 bedroom unit	270	275	285	$15	5.6
	2 bedroom unit	200	200	210	$10	5.0
	1 bedroom unit	170	155	140	-$30	-17.6

Source: RTA, 2012

Although, some other regional centres such as Rockhampton provide a closer alternative for the identified increased population demands of Gladstone, the capacity for the Rockhampton LGA to

provide housing is limited. The capacity to increase rental property availability and new houses is high in Bundaberg however. In September 2011, there were approximately 2,380 hectares of broad hectare land suitable for residential development in Bundaberg Regional Council (OESR, 2011d). Based on current government planning this supply is projected to yield 6,500 dwellings.

Up until September 2011, approval for land development 98 lots was given, following the downward trend since 2008 and representing a 69% decrease in residential building lot approvals over the same period last year. There were 111 urban lot registrations for the September quarter. Although, this represents an increase over the previous quarter (eight urban lots) total lot registrations were down 31% compared to the previous year. Of the 296 residential lot registrations recorded, until September 2011, 278 were vacant land. In the year ending September quarter 2011, the median sale price of vacant land in Bundaberg Regional Council was $140,000. This represents only a slightly increased change in median value compared with the 2010 ($138,000)

SUMMARY OF CATCHMENT PROFILE

Living in close proximity to work is a common transport solution were possible, or affordable. The popularity of this solution is evidenced through differentials in the price of properties for purchase or rental, that are close to centres of work, or even efficient transport routes. The following sections summarise the household income, comparative house prices and rentals across the study area.

INCOME LEVELS

Income is one determinant of price, and in general demand will rise as income levels rise. Table 10 shows the income levels for each of the LGA areas that are the subject of this analysis. Note that the Rockhampton LGA covers several postcode areas, and as such we have created a weighted average for the four most populous postcodes – 4700, 4702, 4703 and 4704.

Table 10 Relative income levels for the study area ($) Median Family income (Weekly)

Rockhampton	1,094
Gladstone	1,429
Bundaberg	898
Australia	1,171

Source: ABS, 2006.

Higher incomes for Gladstone are the result of salaries offered to participants in mining and associated industries (partly due to the outright demand for labour and partly due because of shiftwork and other available allowances).

The effect of these income differentials can clearly be seen in the housing price data shown above. Based on this data we can conclude that workers based in Gladstone would be better off residing in Rockhampton or Bundaberg region, where they would pay less for housing, and because of the higher salaries, would be better able to afford the rail fares than the average Australian.

HOUSING PRICES

Living in Rockhampton or Bundaberg (or satellites) and commuting to work is an alternative to living and working in Gladstone. The data in table 11 provides a comparison of the median prices for houses in the Rockhampton, Gladstone and Bundaberg Regions.

Table 11 Comparison of median house prices

	Rockhampton	Gladstone	Bundaberg
2009	$310,922	$375,500	$295,000
2010	$324,095	$405,000	$290,000
2011	$327,602	$467,000	$290,000
Average	$320,873	$415,833	$291,667

Based on data averaged over the past three years, median house prices for the Gladstone region were 30% higher than for the Rockhampton region and 43% higher than for the Bundaberg region.

The supply of land on which to build residences is largely determined by the rate at which it passes through various aspects of the approval process. Figure 9 shows the supply of uncompleted residential lots for the Rockhampton, Gladstone and Bundaberg LGAs. This represents the store of residential land which have approval for reconfiguring a lot, but which have not proceeded to survey plan certification – in effect the pipeline of available land.

Comparing income levels to Australia as a whole, Rockhampton is 6.6% lower, Bundaberg 23.4% lower, and Gladstone 22%.

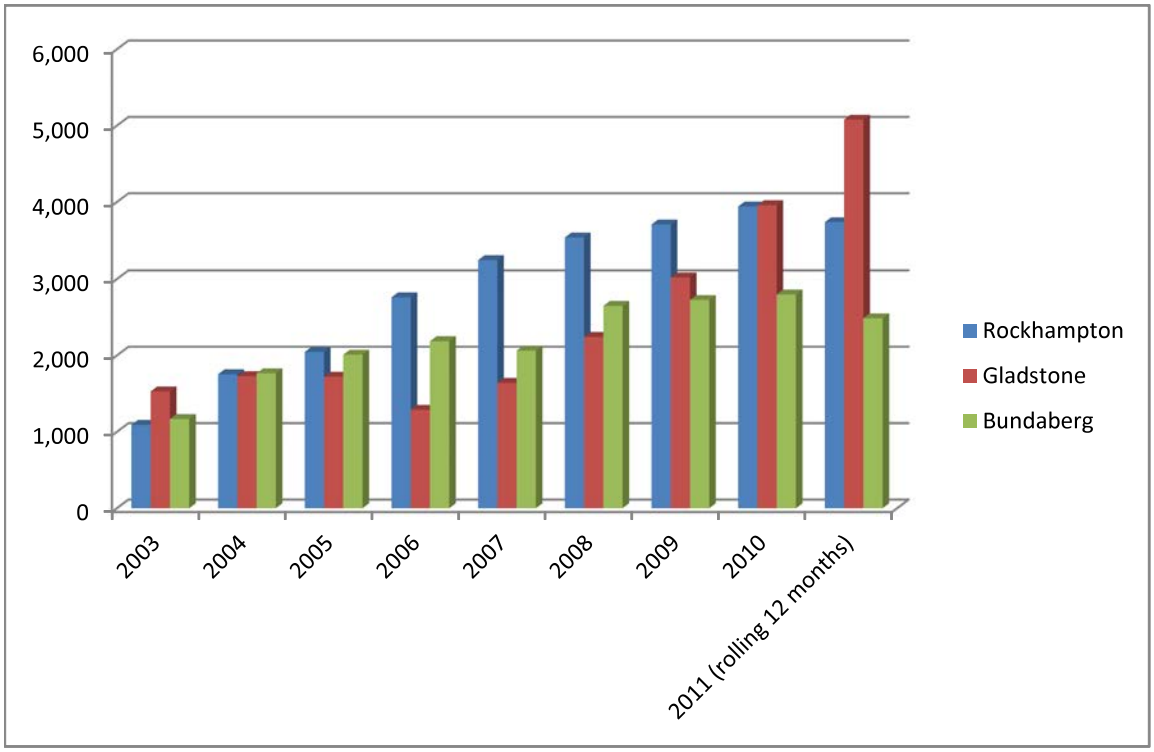

Figure 9: Uncompleted residential lots

Figure 10 shows the supply of lots with operational works approval (OWA) for each of the three centres. Between December 2010 and September 2011 OWA lots for Rockhampton and Gladstone increased by 9% and 6% respectively, while those available in Bundaberg fell by about 8%.

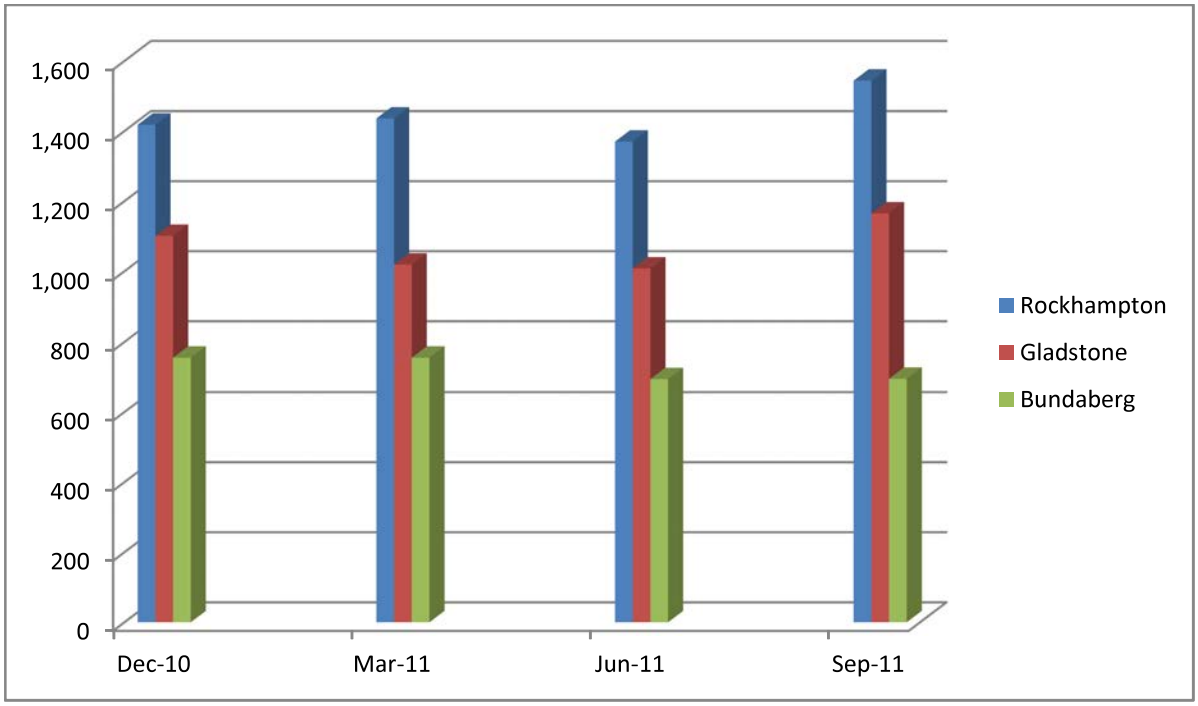

Figure 10: Approved lots

Land is typically slow to bring to market, and the number of lots immediately available does not seem sufficient to cope with the requirements of workers as the construction phase for Gladstone gas projects ramps up.

RENTALS

Analysis of data recorded by the Queensland RTA reported a significant disparity in rental properties across the study region. As shown in Table 12 significantly higher rental costs were found across all property types in the Gladstone LGA. In the March Quarter 2012 rental prices in Gladstone region ranged from a low of $250 per week for a one bedroom unit through to $650 per week for a four bedroom house. This is much higher than regional neighbours with Rockhampton recording significantly lower rental costs $140 per week to $400 per week and up to 50% lower rental costs in Bundaberg with one bedroom units renting for $ 140 per week and a four bedroom house for $320 per week.

Table 12 Weekly Median Rental Rates for the Rockhampton, Gladstone and Bundaberg's LGA's

Local Government Authority	Type of housing	Median weekly rent Mar 2010 (A$)	Median weekly rent Mar 2011 (A$)	Median weekly rent Mar 2012 (A$)	% Change	
					$ change 2010-2012	2010-2012
Rockhampton	4 bedroom house	350	370	400	50	14.3
	3 bedroom house	290	300	330	40	13.8
	3 bedroom unit	295	300	330	35	11.9
	2 bedroom unit	225	235	250	25	11.1
	1 bedroom unit	140	160	140	0	0.0

Gladstone	4 bedroom house	350	450	650	300	85.7
	3 bedroom house	280	360	480	200	71.4
	3 bedroom unit	300	350	400	100	33.3
	2 bedroom unit	230	275	360	130	56.5
	1 bedroom unit	180	200	250	60	33.3
Bundaberg	4 bedroom house	315	310	320	$5	1.6
	3 bedroom house	260	260	270	$10	3.8
	3 bedroom unit	270	275	285	$15	5.6
	2 bedroom unit	200	200	210	$10	5.0
	1 bedroom unit	170	155	140	-$30	-17.6

Source: Queensland Rental Tenancy Authority, 2012

In comparing the rental prices increases across the study region, as expected Bundaberg has recorded the most consistent rental prices. Rental increases ranged from highs of 5.6% in the three bedroom unit market through to a decreasing rental rate of -17.6% in one bedroom unit properties. (see Table 13).

Table 13 Comparative Rental Increase across Regions over a Three Year Period

Property Type	ROK	BDB	GLT
4 bedroom house	14.30%	1.60%	85.70%
3 bedroom house	13.80%	3.80%	71.40%
3 bedroom unit	11.90%	5.60%	33.30%
2 bedroom unit	11.00%	5.00%	56.50%
1 bedroom unit	0%	-17.60%	33.30%

Source: Queensland Rental Tenancy Authority, 2012

Although significantly higher than Rockhampton and Bundaberg rental prices were found in the Gladstone LGA across all property types, the greatest differences can be found in the four bedroom home market. As shown in Figure 11 while in March 2010 a sharp increase in Gladstone was recorded in 2011 with the trend continuing to record a 85.7% increase over a three year period. The increase in rental prices across the two years can be mapped across the development and commencement of projects in the Gladstone region.

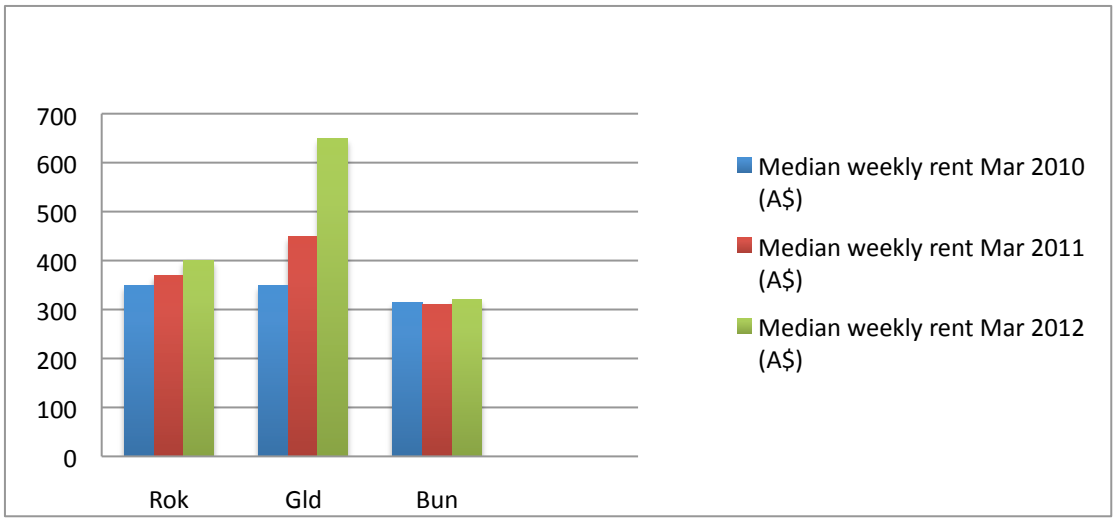

Figure 11: Comparative Median Rental

Source: Queensland Rental Tenancy Authority, 2012

Vacancy rates of 3% are generally considered the average equilibrium point of supply and demand. As indicated in Table 14, Rockhampton and Gladstone have recorded increasingly tightening rental markets with 1% and 1.4% rental vacancies in the March Quarter. Vacancy rates in Bundaberg remain steady with a moderate vacancy rates recorded against the previous two quarters.

Table 14 Comparative Residential Vacancy Rates

Location	Mar Qtr 2011	Dec Qtr 2011	Mar Qtr 2011
Brisbane SD	2.3%	2.5%	2.2%
Rockhampton LGA	1.8%	.9%	1.0%
Gladstone LGA	1.4%	1.5%	1.4%
Bundaberg LGA	2.5%	3.7%	3.3%

Source: REIQ, March Quarter, 2012

Section two examines scheduling possibilities on the existing rail network and the associated challenges. The current rail infrastructure and regional passenger rail services are outlined. The section finishes with an examination of the limitations in concept scheduling for the project and proposes a range of possible scenarios.

Section 2 - Scheduling

SECTION TWO - SCHEDULING

Section two examines scheduling possibilities on the existing rail network and the associated challenges. The current rail infrastructure and regional passenger rail services are outlined. The section finishes with an examination of the limitations in concept scheduling for the project and proposes a range of possible scenarios.

The concept schedules provided are based on several assumptions due to the lack of data provided to the author from Queensland Rail and QR National.

CURRENT RAIL INFRASTRUCTURE

Approximately 290km of narrow gauge rail line lies between Rockhampton and Bundaberg. Gladstone sits approximately 110km south of Rockhampton and 185km north of Bundaberg on this line. It is the line between Rockhampton and Bundaberg that is in scope for this study.

ELECTRIFICATION

The passenger rail network in the South East Queensland and north to Rockhampton is electrified by a 25 kV overhead power supply. This includes the section of track between Rockhampton and Bundaberg.

DUPLICATION

With respect to rail infrastructure, duplication refers to line sections of rail network that consist of two tracks rather than one. Figure 12 illustrates both a single line section and a duplicated section of track.

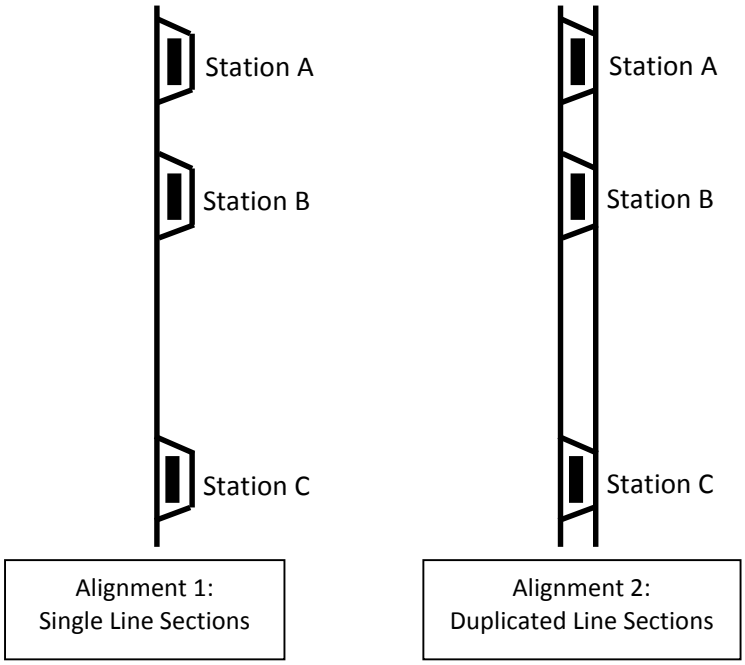

Figure 12: Single and Duplicated line sections

With the exception of a line section just south of Rockhampton and another just north of Gladstone, (both extending approximately 5 kilometres), all track between Rockhampton and Gladstone is duplicated. Between Gladstone and Bundaberg, however, there is only single line track with the exception of short duplicated sections at the following locations: Parana, Benaraby, Iveragh, Bororen Miriam Vale, Netley, Irkanda, Baffle, Berajondo, Flinders, Littabellaa, Avondale and Meadowvale.

The viability of these locations as holding or passing loops for various types of rollingstock has not been investigated as part of this study.

PASSENGER STATIONS

Rockhampton, Gladstone and Bundaberg all have passenger stations. Mount Larcom and Miriam Vale also have boarding and disembarking facilities. No other locations on the inscope line are currently used as passenger stops by existing rail services. Figure 13 below shows the section as a simplified line diagram.

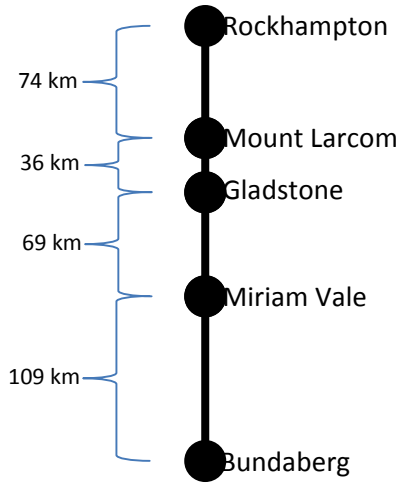

Figure 13: Passenger Stations between Rockhampton and Bundaberg with relative distances

DIFFERENT SPEED RESTRICTIONS FOR TILT/NON-TILTING

The designated speed restriction on a section of rail network is a function of many variables including gradient, curves, signal sighting and also rollingstock dynamics and performance. Where there are significant differences in the performance of train vehicles types that use a particular section of a rail network, it can be useful to designate two separate sets of speed restrictions.

In 1997 passenger trains with tilting technology were introduced to the Queensland Rail network. The tilting trains are able to safely run at greater speed than other trains over the same sections, therefore reducing travel time. In order to facilitate the realisation of this travel time saving there are two sets of speed restrictions on the rail network where tilting trains run including the line between Rockhampton and Bundaberg.

CURRENT PASSENGER RAIL SCHEDULE

CURRENT REGIONAL RAIL SERVICES

All passenger rail services operating between Rockhampton and Gladstone also run through Brisbane. Currently there is no dedicated regular inter-city passenger rail service facilitating a daily working commute between any of the combinations of Rockhampton, Gladstone and Bundaberg.

Rockhampton Tilt

The Rockhampton Tilt service, operating since 1998, is a 6-car electric tilting train. The tilting technology allows the train to safely travel at higher speeds than other train classes. The line sections over which tilt trains are scheduled has two sets of speed restrictions, one for regular train traffic and the other for tilt trains. Currently there are sections of the rail network between Rockhampton and Bundaberg allowing tilt train speeds in excess of 120 kph.

Cairns Tilt

The Cairns Tilt service uses the same tilting technology as the Rockhampton Tilt. The differences being that the Cairns Tilt consist is longer and is diesel powered. The Cairns Tilt is a diesel powered train because the rail network in Queensland is electrified north only to Rockhampton and the Cairns Tilt service operates between Brisbane and Cairns.

Figure 14: Cairns Tilt

Source: Queensland Rail

The Sunlander also operates between Brisbane and Cairns. It currently operates as a traditional set of individually coupled carriages hauled by diesel locomotives. Because the consist employs no tilting technology the Sunlander observes slower speeds and has longer travel times than the tilting trains.

Figure 15: Sunlander

Source: Queensland Rail

The Spirit of the Outback has a tradition consist similar to the Sunlander and observes the same slower travel times. It operates between Brisbane and Longreach via Rockhampton.

Figure 16: Spirit of the Outback

Source: Queensland Rail

As shown in Table 15, of the services running south from Rockhampton, only the Rockhampton tilt runs every weekday. With an arrival time of 8:28am in Gladstone it may already be suitable for some commuters that within a standard business day for example, 9am to 5pm.

Table 15 Southbound Timetable

Service	Cairns Tilt	Sunlander	Rocky Tilt	Spirit of the Outback
Days Commencing	Mon & Thu	Wed, Fri & Sun	Daily	Mon & Thurs
Departing				
Rockhampton	1:15 AM	5:10 AM	7:15 AM	8:45 PM
Mount Larcom		6:07 AM	8:00 AM	9:58 PM
Gladstone	2:30 AM	6:45 AM	8:28 AM	10:40 PM
Miriam Vale		7:40 AM	9:05 AM	11:33 PM
Bundaberg	4:20 AM	9:10 AM	10:15 AM	1:05 AM

The Northbound Timetable from Rockhampton is illustrated in Table 16. The only service running north every day on the rail network is the Rockhampton Tilt. Departing Gladstone at 5:15pm it is likely to be too early for commuters completing a standard business day of 9am to 5pm.

Table 16 Northbound Timetable

Service	Spirit of the Outback	Rocky Tilt	Cairns Tilt	Rocky Tilt	Sunlander	Spirit of the Outback	Sunlander
Days Commencing	Wed	Sun & Fri	Mon & Fri	Sun to Fri	Sun	Sat	Tue & Thu
Departing							
Bundaberg	12:15 AM	9:40 PM	11:13 PM	3:35 PM	4:00 PM	7:05 PM	7:30 PM
Miriam Vale	1:40 AM	10:40 PM		4:35 PM	5:30 PM	8:30 PM	9:00 PM
Gladstone	2:45 AM	11:20 PM	12:58 AM	5:15 PM	6:30 PM	9:30 PM	10:00 PM
Mount Larcom	3:16 AM	11:45 PM		5:40 PM	7:05 PM	10:06 PM	10:35 PM
Rockhampton	4:15 AM	12:30 AM	2:15 AM	6:25 PM	8:30 PM	11:05 PM	11:55 PM

TRAIN GRAPH – CURRENT SERVICES

The train graph illustrated in Figure 17 does not contain the exact times of each service. It is produced here in the interest of examining the times of the existing passenger services in relation to each other. It should be remembered that not every service in the graph runs every day.

The southbound daily tilt is shown in purple and the northbound Sunday to Friday tilt is light green. These are the only services that currently run every weekday. They have the ability to deliver a Rockhampton resident to Gladstone each workday for eight hours and forty-seven minutes. It is likely that this is too short a bracket of time to complete a workday and travel to and from the station. Minor alterations to provide a better fit with standard business hours may interest passengers wishing to commute in the professional and/or retail sectors as indicated by consultation feedback.

These weekday services do not provide for anyone living in Bundaberg with a daily working destination of Gladstone.

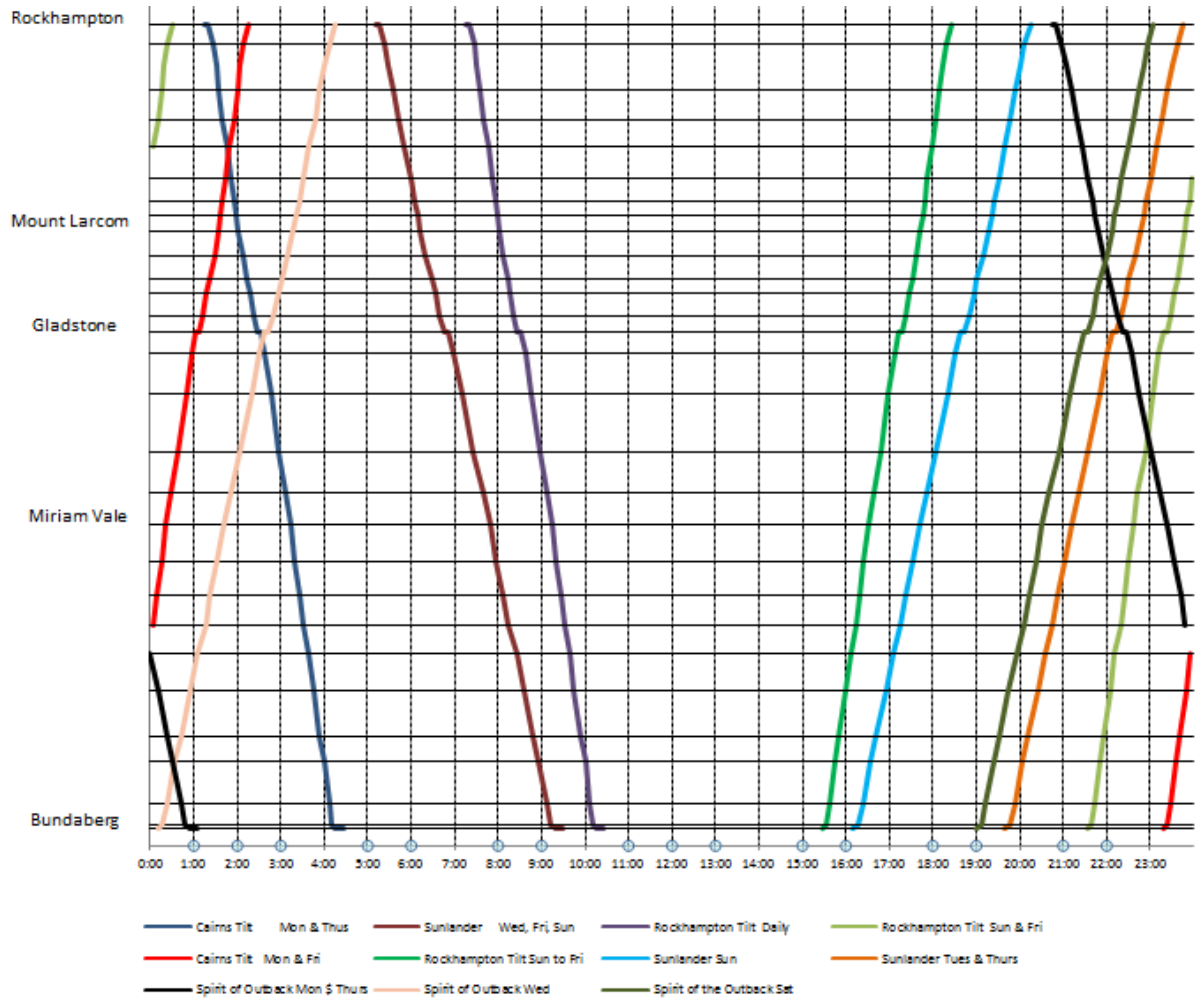

Figure 17: Train Graph

CONCEPT SCHEDULES

WHAT IS A CONCEPT SCHEDULE?

For the purpose of this report a concept schedule can be understood as a schedule generated for the purpose of discussion and examination of its suitability for a particular transport demand or policy scenario. It is built with available information regarding existing infrastructure and rollingstock capabilities.

The study team have not been provided with freight path information within the corridors of interest. Therefore, the concept schedules in this report have not been assessed for possible impacts on the contracted paths of rail operators and have also not been constrained by any work place agreements currently in place for train crew.

While these schedules are indicative of what could be achieved, they have not been developed with either the tools or analytical rigour required to produce an operational service plan.

A broad range of workplace rosters has been identified. Based on the cost benefit analysis and economic modelling (refer section 3), three concept rail schedule scenarios are put forward for

consideration in this section. A single and multiple daily service from Rockhampton to Gladstone and a multiple service from Bundaberg to Gladstone. Given demand will be based on rosters and workplace specific requirements a variety of concept schedules has been developed and can be found in Appendix E.

CONCEPT SCHEDULE ASSUMPTIONS

The concept timetables in this report are built on the following assumptions.

SURROUNDING RAIL TRAFFIC

No assessment has been made regarding the impact of any of the concept schedules on existing allocated train paths.

RUNTIMES

Runtimes have been based on both the existing passenger service runtimes and some information regarding a portion of the line sections between Rockhampton and Bundaberg supplied by Queensland Rail. Where information was not available interpolation between known network nodes based in metrics available from publically available rail maps was applied for the purpose of train graph visualisation.

The runtimes used in the tabular timetables are shown in Table 17. The times are taken from the current published timetable for the Rockhampton Tilt Train.

Table 17 Runtimes

Southbound	
Rockhampton to Gladstone	73 minutes
Gladstone to Bundaberg	107 minutes
Northbound	
Bundaberg to Gladstone	100 minutes
Gladstone to Rockhampton	70 minutes

It should be noted that shorter runtimes as likely to be achievable for these track sections. The inter-regional services explored here in concept have significantly shorter start to terminus journeys than the current Tilt and do not run to Brisbane. A component of the reliability runtime allowance in the current TravelTrain schedule may be due to the requirement to interact with traffic over a relatively long run on highly constrained and congested infrastructure including the Brisbane Suburban Area. As late as 2008 Queensland Rail scheduled runtimes of less than 70 minutes for the Tilt Train between Rockhampton and Gladstone and less than 100 minutes between Gladstone and Bundaberg in both directions

LINE HEADWAYS

For the purpose of this investigation a minimum separation of 20 minutes has been applied between all services travelling in the same direction.

CROSSING AND CLEARING TIMES

Where services are scheduled to cross at a passing loop or station an additional 5 minutes or more has been scheduled for the waiting train.

TURNBACK TIMES

A minimum of 15 minutes has been included for services scheduled to turnback at a terminus. This is an arbitrary figure applied without consideration to recovery time, provisioning time or to train crew workplace agreements.

STABLING

Where trains are scheduled off main line running, it is assumed there are facilities available to stable.

MAINTENANCE FACILITIES

No provision has been made in any of these concept timetables for a maintenance plan or assumptions made about the location of maintenance facilities.

SINGLE TRIP – ROCKHAMPTON TO GLADSTONE

Concept 1 – Rockhampton to Gladstone – Single daily service

The first concept explored is the most simple. It is important to examine and initially explore the possibilities for rail services between Rockhampton and Gladstone without imposing the significant infrastructure imposed constraints of running south to Bundaberg. Using a single train to run from Rockhampton to Gladstone in the morning and from Gladstone in the evening. Two versions of this concept are presented (see table 18 and Figure 18). One facilitates an 8 hour working day in Gladstone within the period 7:30 AM and 4:00PM and allowing for travel to and from Gladstone station. The other is based on a 10 hour working day within the times 6:30AM and 5:00PM.

As with all concept timetables the intent here is illustrative rather than operational. Times arriving in and departing from Gladstone are not dependant on each other and can be altered. This plan has a minimal requirement of rollingstock and track capacity and delivers a commuter service to Gladstone not currently available. Each of these concepts allow only one rail option to and from Gladstone each day and commits the passenger to a set time period away from Rockhampton.

A low impact schedule such as this might be a candidate for a pilot or trial service.

Table 18 Concept Timetable (8 hour day)

Southbound	
Rockhampton	5:32 AM
Gladstone	6:45 AM

Northbound	
Gladstone	4:30 PM
Rockhampton	5:40 PM

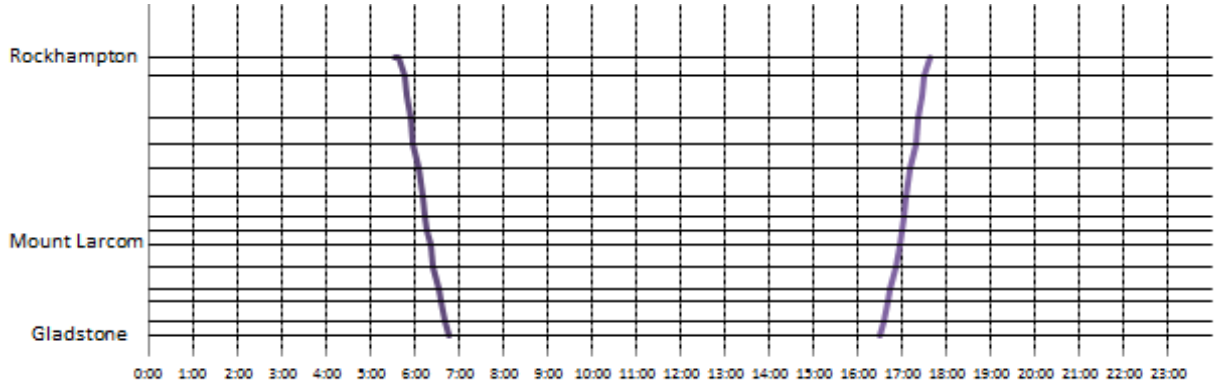

Figure 18: Concept Map; Train Graph (8 hour day) Rockhampton to Gladstone

A second concept map for a single trip model has been provided based on a 10 hour working day within the times 6:30am and 5:00pm and is illustrated in Table 19 and Figure 19.

Table 19: Concept Timetable (10 hour working day)

Southbound	
Rockhampton	4:32 AM
Gladstone	5:45 AM

Northbound	
Gladstone	5:30 PM
Rockhampton	6:40 PM

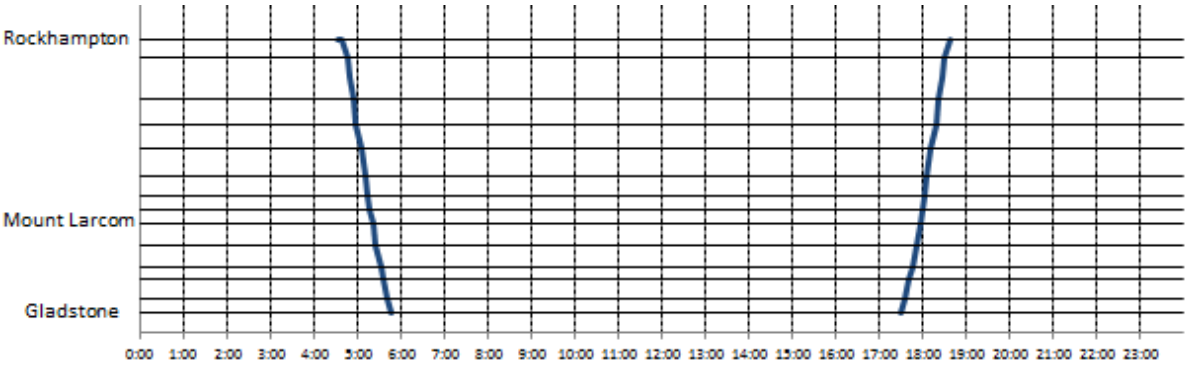

Figure 19: Concept Map, Train Graph (10 hour working day)

SINGLE TRIP – GLADSTONE TO BUNDABERG

Concept 2 – Gladstone to Bundaberg – Single train shuttle, Gladstone to Bundaberg only

This concept illustrates a timetable achievable with a single train running between Gladstone and Bundaberg. Due to the distance and runtimes, a neat clock-face timetable is not possible between Gladstone and Bundaberg. A timetable such as this one could be combined with any Rockhampton to Gladstone concepts if additional platform capacity were built at Gladstone station.

This timetable would not keep regular passenger connections for people requiring a journey past Gladstone in either direction. It would however, isolate the infrastructure constraints of the Gladstone to Bundaberg section to that component of the timetable.

Concept 2 Timetable

Table 20 Concept Timetable Gladstone to Bundaberg

Southbound				
Gladstone	6:05 AM	10:35 AM	2:45 PM	7:15 PM
Bundaberg	7:52 AM	12:22 PM	4:32 PM	9:02 PM
Northbound				
Bundaberg	4:00 AM	8:25 AM	12:40 PM	5:00 PM
Gladstone	5:40 AM	10:05 AM	2:20 PM	6:40 PM

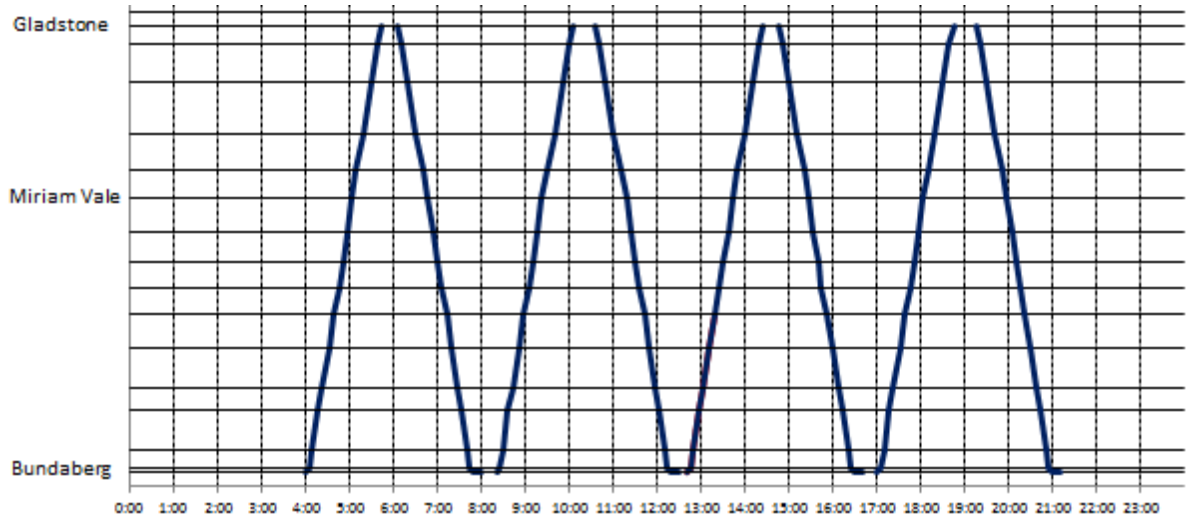

Figure 20: Concept Map: Gladstone to Bundaberg

MULTIPLE TRIP – ROCKHAMPTON TO GLADSTONE

Concept 3– Rockhampton to Gladstone – Multiple services from a single train

This concept provides an example of using a single train for several services throughout the day. It is based on schedule containing maximum regular frequency achievable between Rockhampton and Gladstone by a single train vehicle that has been scaled back to four journeys each way per day.

A schedule such as this one could be incrementally increased as demand or policy required. Provided the rollingstock employs tilting technology a single train could provide a service every three hours between Rockhampton and Gladstone.

A timetable such as this could accommodate the requirements of various shift work start times as well as passengers accessing the service, retail or recreational opportunities of each city.

Table 21: Concept Timetable Rockhampton to Gladstone (Multiple Trip)

Southbound				
Rockhampton	5:32 AM	11:32 AM	5:32 PM	8:32 PM
Gladstone	6:45 AM	12:45 PM	6:45 PM	9:45 PM

Northbound				
Gladstone	4:05 AM	7:05 AM	4:05 PM	7:05 PM
Rockhampton	5:15 AM	8:15 AM	5:15 PM	8:15 PM

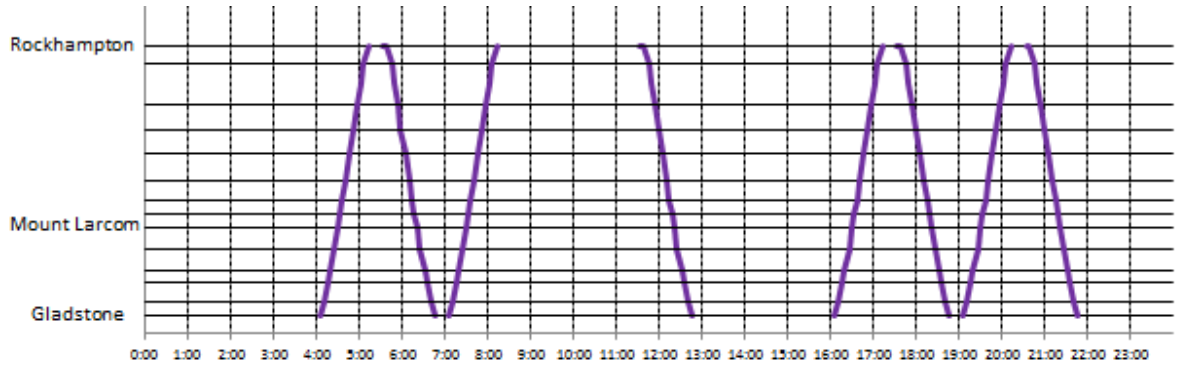

Figure 21: Concept Graph, Train Graph Rockhampton To Gladstone (Multiple Trip)

SCHEDULING SUMMARY

The study concluded that minor adjustments to current tilt services between Rockhampton and Gladstone could potentially deliver a commuter service between standard business hours. There are a variety of schedules possible for both the Rockhampton to Gladstone and Gladstone to Bundaberg line and are shown in Appendix E. The schedules provided are concepts only and will require further analysis and detailed input from Queensland Rail and QR National.

The concept schedules in this report have not been assessed for possible impacts on the contracted paths of rail operators. Additionally, they have also not been constrained by any work place agreements currently in place for train crew.

Run times are shown for the southbound journey at 73 minutes (Rockhampton to Gladstone) and 107 minutes (Gladstone to Bundaberg) and 100 minutes (Rockhampton to Gladstone) and 70 minutes (Gladstone to Bundaberg) for the northbound journey. The possibility of shorter runtimes should be investigated as part of the operationalisation of any concept timetable.

Section three of the report presents the economic and cost factors pertaining to the project. This includes a literature review of studies examining the economic background of Fast Rail Commuter Services, a cost analysis including infrastructure, demand pricing and comparable fare analysis. This is followed by value of life, traffic movements, and a road cost recovery review. A summary of the cost benefit analysis is provided.

Section 3 – Economic Cost Analysis

SECTION THREE - ECONOMIC COST ANALYSIS

Section three of the report presents the economic and cost factors pertaining to the project. This includes a literature review of studies examining the economic background of Fast Rail Commuter Services, a cost analysis including infrastructure, demand pricing and comparable fare analysis. This is followed by value of life, traffic movements, and a road cost recovery review. A summary of the cost benefit analysis is provided.

ECONOMIC BACKGROUND

In informing the study a review of similar national and international fast rail projects was undertaken with a particular focus on economic factors. Three relevant papers were identified including studies conducted in Eastern Europe, Africa and other third world countries. (Amos & Bullock, 2007).

One particular, close comparative study included a branch line train with four carriages, operating up to four to five times a day (Amos & Bullock, 2007) argued;

> *"Passenger railways can perform a valuable economic and social role in dense inter-city corridors, for suburban transport in major cities, and in some rural regions where population density permits. In many cases these roles could only be transferred to road transport at a higher cost in road infrastructure, traffic congestion, vehicle emissions and traffic accidents." (p5)."*

Amos and Bullock (2007) reviewed ten rail systems in Eastern Europe and developing countries and identified that 40% were able or nearly able to cover above-rail working expenses and 30% just about covered operating expenses plus capital costs (the amortised costs of the rolling stock), however none was able to provide a return on capital invested to shareholders.

The study drew a number of significant conclusions

> *"If they are reasonably well patronised and operated efficiently, mainline train services should be able to cover both their avoidable train working expenses and the cost of renewing rolling stock as it falls due."*
>
> *"Branch line trains can sometimes provide a valuable role in feeding traffic to mainline services, but will only rarely be able to cover even their above-rail working expenses, let alone make any contribution to rolling stock asset renewal, or infrastructure costs. Bus feeder services can often (perhaps usually) be contracted to provide better services at lower fares." (p8).*

It should be noted that the study was related to Eastern Europe and third world countries rail systems where generally low incomes may affect the ability for passengers to pay fares that reflect the capital equipment employed on such services. In particular, Amos and Bullock (2007) state *"The capital costs of rolling stock and infrastructure is reasonably consistent across all railways"* (p.17). Capital equipment is often sourced from the same manufacturers as are used in the west, such as Siemens (Germany), Bombardier (Canada), General Electric (USA) and Hitachi (Japan). Thereby indicating that with similar capital costs, the higher incomes and the consequently higher ability to

pay (leading to higher fares) is more likely to lead to a more positive outcome in western countries than in the countries.

A further high speed rail study conducted by Amos, Bullock and Sondhi (2010) confirmed the cost efficiency of fast rail services stating *"high speed rail is … a tried and tested technology that delivers real transport benefits and can dominate market share against road and airline transport over the medium distances that many inter-city travellers confront. They also noted that the situations where high speed rail could be successful, in particular the need for transport corridors of the requisite length, the availability of train paths, sufficient potential demand and people with adequate purchasing power, were quite limited"* (p2).

Although the train service that is the subject of this study is not high speed it is worth noting that at least some of the conditions that do support new investment in high-speed rail are found in Central Queensland. In 2009, the American Recovery and Reinvestment Act (ARRA) was signed into law. As part of this legislation, $8 billion was provided for inter-city and high speed rail projects. Demand from US states vastly outstripped the $8 billion allocated, and the Administration proposed an authorisation of $53 billion to be spent between 2012 and 2017. The program was awarded with "high priority status". The document highlights the pervasive investment benefits in new and upgraded infrastructure, and the fact that Government sought to support it.

Two further studies were identified that investigated the impact of the economic impact of high speed rail on the economy in general. In a study examining the Economic Effects of High speed rail investment (OECD, 2007) applies a cost/benefit argument to the issue of High Speed Rail investment and looks to determine an investment conclusion based on several factors. These factors include the net expected social benefit, which is required to be higher than the next best alternative available. The case for investment in High Speed Rail programs presented by this research are strongly dependent on the volume of traffic where the new lines/services are to be built, the expected time savings and the average willingness of potential users to pay a premium for this service. Often another benefit which arises from an investment in high speed rail is the release of capacity in congested roads, airports or conventional rail lines.

The OECD (2007) further argues that investment in high-speed rail can lead to lower total travel time, higher comfort and reliability, reduction in the probability of accident, and in some specific instances it can lead to the release of extra capacity which has flow on effects in terms of alleviating congestion in other modes of transportation. Furthermore, the environmental benefits of high speed rail are identified as lowering the net environmental impact of transport and boost regional development in areas which would have lagged had they not been serviced with a high speed rail connection. Thereby suggesting that high speed rail could reduce road congestion and airport delays which arise and by reducing these two problems could help to lower the generalised cost of travel. The argument is that high speed rail is reliable and punctual and relies on operations and infrastructure which is vertically integrated in practice. This competes with road transport which has thousands of motorists entering simultaneously into a limited capacity infrastructure without any planned scheme; this is where problems can occur.

Similar findings are reported in the airport industry, due to a variety of issues including delays which occur due to bad weather, maintenance issues with aircraft, problems departing or arriving from the origin or destination airport or indeed delays experienced by in flight issues. With high speed rail in

place these types of extra costs/time delays are limited and do not rely upon several airline companies or motorists, it depends on the sole operator of the high speed rail.

The final study on the economics of high speed rail in China concluded that the high speed rail system will increase the mobility of the population affecting some 700 million people (OECD,2007). It is the solution for China's growth sustainability by having a more mobile work force and more accessible markets will narrow the country's vast geographic and economic disparities this will provide long term economic impacts. Whether the investment is profitable and sustainable depends on the uptake in the number of passengers as the purchase price of a ticket will be substantial when compared to relative income levels in China. However the added economic benefits flowing to the Chinese local and state governments are anticipated to close the present funding gap. High speed rail is expected to provide the backbone to China's modern logistics system as well as providing the impetus to achieve more energy efficient consumption and preserve natural resources as well as providing passengers with reasonable speed and comfort.

Overall the research addressed the issue of high speed rail investment and what exactly it will mean to China's burgeoning industries which range from transport, tourism, mining to property and consumer staples/discretionary industries. This provides an important backdrop for the case of investment in high speed rail within Australia as the potential benefits are highlighted across a similar geographic scale and dispersed population (only on a much smaller scale in terms of numbers).

COST ANALYSIS

Rail costs are commonly broken down into two components; above rail costs and below rail costs. Above rail costs are those related to the actual operation of a vehicle on the track, while below rail cost are those related to the infrastructure on which the train travels. For example, overhead electric infrastructure is a below rail cost, because it is part of the underlying infrastructure on which a train runs. Indeed in some countries this infrastructure is provided by way of a "third rail".

After considering a number of alternatives and taking into account that the project is a pre-feasibility study, the project team formed the view that cost analysis should be undertaken on a "per-train basis". This type of analysis essentially poses the question – What is the approximate overall cost of running a single train between Rockhampton and Gladstone, and Gladstone and Bundaberg?

Firstly, there are limitations to achieving an accurate cost analysis. There are several reasons for this. Government rail operators are subject to significant public pressure in regards to transparency and the disparity in public and private sector policy, procedures and economic imperatives. Secondly, Queensland Rail was unable to supply full cost details with the required time frame, therefore an independent analysis based on data obtained from other sources.

AVAILABILITY OF TRAIN PATHS

A train path represents the track capacity dedicated to running one train. The availability of train paths affects the number of train that can be run over a period, and therefore critically affects many unit-cost calculations. However, it should be noted that industry reported a general belief that there are no train paths available between Rockhampton and Gladstone, due to the constant use of the infrastructure by coal trains.

The availability of train paths is predominantly determined by the speed of the train. The speed of the train is determined by many factors including:

- the technical specifications of the train,
- reliability,
- the state of the track and other infrastructure such as signalling,
- the speed of other trains using the infrastructure,
- whether the track is duplicated or not. A duplicated track means train scheduling does not have to consider the movements of trains running in the opposite direction.
- The manner in which the network is run (the more organised the network is, the more paths that can be made available).

For the purposes of this study, it is assumed that the hypothetical train can achieve travel times equal to that of the tilt train (an average of 88km/h between Rockhampton and Gladstone). Globally, the tilt train would not be classified as fast, and there are many sets available that employ tilting technology.

The track between Rockhampton, Gladstone and Bundaberg is of a high standard. The entire section is currently maintained such that it can cope with the track stresses of the higher speed tilt-train, and is groomed to maintain passenger comfort. Moreover, the Rockhampton to Gladstone section is built to cope with coal trains of more than 1.6km long, driven by up to six locomotives. The weight of these trains and their impact on the track is vastly in excess of that indicated by any of the passenger trains currently used. As a consequence it is probably reasonable to assume that a commuter train does not require incidental below rail capital expenditure.

The track between Rockhampton and Gladstone is duplicated for all but a short distance at each end (specifically Aldoga to Rocklands is duplicated- 2009 Coal Rail Infrastructure Plan) (QR Network Pty Ltd, p29), while the track between Gladstone and Bundaberg is not duplicated. That section of the track does however have several passing lanes (see Section 2).

A number of issues were identified along the Rockhampton to Gladstone track. QRN data pertaining to the Blackwater line (of which Rocklands to Aldoga is a segment) suggests that less than 30% of trains ran to schedule (QR National, 2012) during the period October to December 2011. Comparatively to similar systems, this is a very low performance rate for the type of industry where scheduling and asset optimisation is considered a core competence.

A significant delay in scheduling was also identified. For example, less than 30% ran according to schedule, while 24.1% of delays and 10.0% of cancellations to schedule were due to identified factors almost 60% of failures to maintain schedule times were unexplained. This may be attributed to a variety of factors ranging from the absence of a penalty based system for schedule defaults, the need to maintain the reputation as a flexible fright transport provider, and poor record keeping/process reporting.

Therefore based on the data available it would appear that with improved management of the Rockhampton Gladstone rail track sufficient capacity is available and there are no technical considerations that would preclude access to additional passenger trains on the Rockhampton Gladstone track. Evidence within Queensland Rail data confirms the viability and capacity to introduce new rail services. For example, QR Network Pty Ltd note “Train paths are available every

15 minutes on the North Coast Line…Every second path in the loaded direction is allocated to coal trains" (p29) and "Blackwater System Track Utilisation is reported as 60%" (p122)

ABOVE RAIL COSTS

Above rail costs are further broken into capital costs, associated with providing the rolling stock, and ongoing costs including labour, maintenance and fuel. Table 22 shows the above rail costs used in the study and the measures used to derive unit costs that can then be applied to calculating the running cost of a single train.

Table 22: Measures of unit cost

Rolling stock	$ per set
Crew	$ per train hour
Maintenance	Vehicle km's
Fuel	Kw/h per seat km

Source: CIPL, 2012

ROLLING STOCK

We have assumed the use of a three car electric multiple unit (EMU). An EMU (see figure 22 to 24) is a self-contained set where the motor is embodied in one of the cars that also carries passengers. In a three car EMU, the sets at each end generally carry passengers and house the motor, and the middle car is a trailer. A three car vehicle has been selected based on the following factors.

- There is no locomotive unit, which if used to power three carriages, would be overkill, and as a consequence would represent a very large amount of unused capacity acquired at a high price.
- Providing servicing is available and the track is equipped with overhead lines, electric units have lower fuel, maintenance and acquisition costs than equivalent diesel units. The Queensland Rail tilt train Service Centre at Gracemere can accommodate other types of electric trains, and indeed has done in the past when precursor to the Tilt Train, the ICE, ran between Brisbane and Rockhampton.
- Electric units have been operating on the route since 1988, and comprise the most capacity on the route.
- Queensland Rail has extensive experience in operating urban and interurban electric services. If the project was to run as a trial, Queensland Rail could presumably relocate suitable equipment.
- Electric units are cleaner and quieter than equivalent diesel units.

Figure 22: Three-car EMU (not necessarily the type proposed)

Source – Queensland Rail

Based on the specifications there is no reason a diesel unit could not be used on the service. Diesel services are used by Cityrail's Hunter services, based in Newcastle NSW, and by Victoria's V-Line servicing many centres including the Melbourne to Geelong commuter service.

Figure 23: Two-car Endeavour set (used in the Hunter Region of NSW)

Source - Cityrail

Figure 24: Interior of a V-Line Sprinter (used on the Melbourne to Geelong service)

Source – V-line

Almost all train combinations are available with an infinite choice of operating and cosmetic variations. The provision of vehicles sourced from National or International parties which work on a different gauge system does not restrict purchase. The equipment can be ordered with narrow gauge bogies (wheel, suspension and axel assemblies). It is noted that State Government owned enterprises in Australia commonly specify what are essentially tailored sets at significant increasing acquisition cost.

In the course of this study we discovered that it is not necessary to purchase new rolling stock. Existing EMU's are available from Japan at significantly less cost than new rolling stock.

For the purposes of this study, capital costs were obtained from the following sources:

- Email correspondence with Richard Bullock, an internationally renowned expert in railway cost models
- Email correspondence with Kevin Chaloner, State Manager, NSW Interfleet Technology Pty Ltd, a specialist railway consultancy with extensive experience across rail operations throughout Australia.
- Publication – Queensland Rail Rolling Stock Costs 2009/10

Based on this analysis it is determined the costs per EMU is $7 million for new vehicles and $3 million existing vehicles.

COST PER TRIP

Unless otherwise specified, a one trip model is assumed throughout this report. Table 23 shows the calculation of capital cost per trip for new and second-hand equipment. The data shows that the capital cost is very sensitive to the number of trips made in a year. Therefore, in order to estimate the capital cost of running one trip, it is necessary to estimate how many trips per day are possible.

It is arbitrarily assumed that the life of a set before significant refurbishment is 20 years. This is considered to be conservative given the age of many sets in current use.

Table 23 Calculation of capital cost per trip

	New			Existing		
Trips/day	1	2	4	1	2	4
Days in year	365	365	365	365	365	365
Trips/year	365	730	1,460	365	730	1,460
Train life (years)	20	20	20	12	12	12
Train life (trips)	7,300	14,600	29,200	4,380	8,760	17,520
Capital cost/trip ($)	959	479	240	685	342	171
Return on capital ($)	931	466	233	503	251	126
Total	1,890	945	473	1,188	594	297

Source: CIPL, 2012

Table 24 shows the calculation of train-hours used for one trip between each of the centres. At tilt-train speeds, the travel time between Rockhampton and Gladstone is 73 minutes, equating to an average speed of 88km/h.

Table 24 Calculation of train hours

	Rockhampton	**Gladstone**	**Bundaberg**
Timetable (departure/arrival)	7.15	8.28	10.15
Travel time (minutes)	n/a	73	107
Relocation/idling (minutes)	n/a	40	40
Minutes	**n/a**	**113**	**147**
Train hours			
Travel	n/a	1.22	1.78
Relocation/idling	n/a	0.67	.67
Total (hours)7.15	**n/a**	**1.88**	**2.45**

Source: CIPL, 2012

Based on this analysis the sum of the sector times is 4.33 hours, equating to up to 5.5 evenly spaced trips per day. To allow for maintenance we have assumed a maximum of 4 trips per day is possible (allowing in excess of 6.5 hours per day for maintenance).

RETURN ON INVESTMENT

The use of capital requires not only an allowance for repayment for that capital. This is of particular importance if the asset is a depreciating asset, and any final recovery value is uncertain, but also an allowance for the rate of return required on the investment in the asset. To calculate the required rate of return, the Reserve Bank Cash Rate (3.75% at the time of writing), was added to an equity risk premium of 6% (Officer, Brown, Ball, 1976).

The result of these calculations (9.75%) was applied to the capital value remaining after repayment of an equal amount of principal for each year of the assumed useful life of the asset. The sum of the annual allowances for the required return on capital was then averaged across the useful like of the asset.

To demonstrate the effect of increased utilisation of capital costs cost a variety of cycles have been provided and are shown in Table 23 (above p59).

CREW

Calculations are made on the assumption of a two crew members for operation of a single trip, with a $90 per train-hour for a driver (equating to an annual cost of $177,840 per annum) and $50 per train-hour for crew (equating to $98,800 per annum). It should be noted that calculations are based o the assumption that personal can be relocated to other tasks when they are not actually operating the service, such as operating other trains of working in ticketing.

Crew costs for a single train journey are shown in Table 25.

Table 25 Calculation of crew cost per trip

	Driver	Crew	ROK-GLT	GLT-BDB
$/Train-hour	90	50	264	343
Annualised	177,840	98,800	n/a	n/a

Source: Bullock 2012, CIPL, 2012

MAINTENANCE

Table 26 reports the derivation of maintenance costs and reports that the total cost of maintenance for the Rockhampton to Gladstone commute would be $113, and the Gladstone to Bundaberg commute is $168. The calculations are based on an indicative maintenance cost of 35 cents per vehicle kilometre. Vehicle kilometres are calculated as the number of units in a set multiplied by the number of kilometres in each sector.

Table 26 Calculation of maintenance costs per trip

	ROK-GLT	GLT-BDB
Vehicle/km	324	480
Cost/vehicle/km ($)	0.35	0.35
Total cost ($)	113	168

Source: Bullock 2012, CIPL, 2012

FUEL

Seat kilometres are derived as the multiplication of an assumed average of 61 seats per rail car, by the number of cars (three) by the distance of each sector. External consultants provided an estimate of 0.0325 kilowatt-hours (kw/h) per seat kilometre. An energy price of 12.5 cents per kilowatt hour was obtained through informal discussions with a senior staff member of Ergon Energy.

As reported in Table 27, total electricity consumption calculations indicated a total electricity cost of $126.59 for Rockhampton to Gladstone and $181.80 for Gladstone to Bundaberg.

Table 27 Electricity consumption

	ROK-GLT	GLT-BDB
Seat/km (one way)	20,130	32,574
Electricity consumption (kw/h per seat-km)	0.0325	0.0325
Electricity consumption (kw/h)	654.2	1058.7
Energy price (cents per kw/h)	0.125	0.125
Electricity consumption – travel ($)	81.78	132.33
Electricity consumption – relocation/idling (4)	44.81	49.47
Total electricity consumption ($ per trip)	126.59	181.80

Source: CIPL, 2012

BELOW RAIL COSTS

Track for the route under consideration is operated and maintained by two distinct entities. QR National is operator of the section between Rockhampton and Gladstone, and the State Government owned, Queensland Rail, operates the section between Gladstone and Bundaberg. Costings from Queensland Rail and QR National were sought to inform pricing.

QR National provided costings by way of a tariff schedule and some associated direction. Queensland Rail provided a price of a round trip (email correspondence). The price structure quoted from Queensland Rail was significantly higher (100%) than QR National published tariffs. Queensland Rail provided a number not referenced to anything, except to say it was the price of a round trip (email correspondence). The price was more than double estimates based on QR National's published tariffs.

Given the extreme difference, clarification was sought regarding the method of calculation used by Queensland Rail. The response offered was that the price was referenced to the opportunity cost of providing a freight train path on the entire North Coast line.

- This assumes that the use of 180km of track precludes the use of the whole North Coast route (telephone conversation 17 May). Additionally it assumes that the track is fully utilised.
- The study concludes that this is flawed on the following basis. Appropriate scheduling would enable relatively short sections of track to be used for the commuter service, without impacting on existing freight services (already demonstrated with reference to coal services).
- The track is not fully utilised and because the track is in place, the marginal cost of using it is very low. Consequently selling any additional capacity at greater than marginal cost confers an economic benefit.

In essence the opportunity cost argument fails because:

a) Basing the opportunity cost of a 180km service on a train path spanning nearly 2,000km suggests an uncommercial lack of scheduling flexibility.
b) The track is not operating at full utilisation (telephone conversation 17th May) and therefore the value of the opportunity missed (opportunity cost) through running the commuter service is zero.

Time constraints restricted further robust interrogation of the cost structure and therefore for consistency the below rail costs are calculated on the basis of QRN's regulated network charges. These charges are detailed in a formal reference tariffs schedule produced by QR National, and because QR National is a publically listed company, could be expected to cover off on generally all commercial pricing considerations. The QR National tariff calculations have therefore been applied to both the Rockhampton to Gladstone and the Gladstone to Bundaberg sectors.

Table 28 shows that the tariffs are calculated with reference to a number of flag fall and marginal measures.

Table 28 Calculation of network charges - QR National

	Price component	Nature	Unit	Charge/unit ($)
AT_1	Maintenance charge	Variable	$/'000gtk	0.82
AT_2	Capital charge	Fixed	$/rpt	1,922.06
AT_3	Component 1	Variable	$/'000ntk	4.64
AT_4	Component 2	Variable	$/nt	1.57
AT_5	Electric traction	Variable	$/'000gtk	5.13
AT_6	Electric energy	Variable	$/'000gtk	0.80

Source: CIPL, 2012

AT1 is a charge for maintenance of track, calculated with respect to the weight of the train and the distance it travels.
AT2 is a flag fall charge set at a fixed value for each train journey.
AT3 is a usage based charge calculated with respect to the weight of the train's cargo and the number of kilometres travelled.
AT4 is essentially a loading charge, based on the weight of the train's cargo. A customer has to pay this amount per tonne before the train goes anywhere.
AT5 is a charge for the infrastructure related to electric traction (gantry's etc.)
AT6 is a charge for the infrastructure related to the provision of electric energy – power related infrastructure.

The data presented in Table 28 shows that the important components for the completion of the table are the number of trains, the weight of the train and its cargo, and the length of each trip.

NUMBER OF TRAINS

As discussed above, analysis of the number of trains is based on the fully-allocated incremental cost of the operation of one train between each of Rockhampton and Gladstone, and between Gladstone and Bundaberg.

TRAIN WEIGHT

Based on a review of a large number of different motor and carriage cars, an average weight of 45 tonnes per car is assumed. The choice of a three car set was based on iterative analysis, whereby the analytical process revealed that a train consist of less than three cars could not hold enough people to cover costs, even at current fares.

Table 29 shows the calculation of the assumed weight of the train is 135 tonnes.

Table 29 Calculation of train weight

	Cars	Weight/car (tonnes)	Total (tonnes)
Train	3	45	135

Source: CIPL, 2012

WEIGHT OF CARGO

The cargo carried by a passenger train is the people. It is anticipated that the weight of cargo would be 15 Tonnes. The calculations is based on the weight of people on the train and is shown in Table 30.

Table 30 Calculation of payload

		Average weight (kg)			
		Men	Women	Men/Women (%)	Total (tonnes/trail)
Passengers/car	61	85	69	75	15

Source: CIPL, 2012

LENGTH OF JOURNEY

The length of each sector was sourced from Queensland Rail documents and is reported in Table 31.

Table 31 Length of sector

ROK-GLT	GLT_BDB
110	178

Source: CIPL, 2012

CALCULATION OF GROSS-TONNE KILOMETRES

Multiplying the cost inputs discussed above provides the estimate of gross tonne-kilometres per sector. A full calculation is shown in Table 32.

Table 32 Calculation of gross tonne-kilometres (per train)

	Gladstone to:	
	Rockhampton	Bundaberg
Trains (weight)	135	135
Passengers (weight)	15	15
Kilometres	110	178
Gross tonne-kilometres	16,481	26,668

Source: CIPL, 2012

CALCULATION OF NET-TONNE KILOMETRES

Net tonne-kilometres are calculates as shown in Table 33.

Table 33 Calculation of net tonne-kilometres (per train)

	Gladstone to:	
	Rockhampton	Bundaberg
Passengers (weight)	1	15
Kilometres	110	178
Gross tonne-kilometres	1,631	2,638

Source: CIPL, 2012

CALCULATION OF FIXED ASSET CHARGES

Based on the above data inputs, Table 34 shows the calculation of fixed asset charges, as per Queensland Rail methodology. The data suggests that the fixed asset charges for a journey using a 3 car electric train between Rockhampton and Gladstone is $2,064, and between Gladstone and Bundaberg $2,138. The relatively short sector lengths and the relatively light weight of people (compared to the weight of coal in a coal wagon for example) results in the AT2 Capital charge being by far the largest single component of below rail costs. The AT2 charge does not vary with respect to sector length.

Table 34 Calculation of Queensland Rail fixed asset charges (per train)

					Gladstone to:	Gladstone to
	Price component	**Nature**	**Unit**	**Charge/unit ($)**	**ROK**	**BDB**
AT_1	Maintenance charge	Variable	$/'000gtk	0.82	14	22
AT_2	Capital charge	Fixed	$/rpt	1,922.06	1,922	1,922
AT_3	Component 1	Variable	$/'000ntk	4.64	8	12
AT_4	Component 2	Variable	$/nt	1.57	23	23
AT_5	Electric traction	Variable	$/'000gtk	5.13	85	137
AT_6	Electric energy	Variable	$/'000gtk	0.80	13	21
					2,064	**2,138**

Source: CIPL, 2012

TOTAL COSTS

Table 35 consolidates the results derived above to give a fully allocated cost running one train on each of the sectors that are the subject of this study. The calculations suggest that:

- Below rail costs comprise more than 50 % of total costs.
- The cost of obtaining the train path is about 90% of total below-rail costs. The capital cost of a new train is about 80% of total above-rail costs, and about half of that is due to the required return on investment.
- Due to the long useful asset lives of rolling stock, the capital cost associated with using a new train compared to a existing one is quite low, but the return on investment required to justify expenditure on the new train is significantly higher than that for a existing train (see table 23, page 57).

Further, it should be noted that capital costs fall rapidly as additional trips are made by the same train (see table 23, page 57).

Table 35 Calculation of fully allocated cost ($ per train)

	Gladstone to:	
	ROK	BDB
Above rail		
New	2,396	2,602
Second-hand	1,694	1,900
Below rail		
Total	2,064	2,138
Total Costs (trip)		
New	4,460	4,740
Existing	3,758	4,037

Source: CIPL, 2012

DEMAND

The financial parameters concerning the supply of the commuter rail project are generally discussed in the costs section above. Demand parameters are dealt with in this section.

PRICING

The demand for any product or service is based on the availability of the product or service and the demand for it. The interaction of these factors gives rise to a price at which buyers and sellers are satisfied. For a given level of supply (one three car train for example), price will generally be higher if demand is greater. The two factors influencing demand are the availability of substitute goods or services, and prevailing income levels. For the purpose of this analysis electing to live close to work is considered to be a substitute to commuting by rail.

SUBSTITUTE GOODS AND SERVICES

There are several ways to travel between Rockhampton and Gladstone and between Gladstone and Bundaberg:

PRIVATE CAR

Private vehicles offer a point to point transport alternative and have the advantage of providing a travel option that is at the driver's discretion. Private vehicles are however, the subject of numerous road accidents and are frequently held up by ubiquitous road works.

The road distance between Rockhampton and Gladstone is 108.2 kilometres, and travel time is 1 hour and 20 minutes. The distance between Gladstone and Bundaberg as 187.5 kilometres, corresponding to a travel time of 2 hours 21 minutes.

Based on data obtained from the NRMA, the fully allocated cost of running a car between Rockhampton and Gladstone is approximately $35 and between Gladstone and Bundaberg $57 (for car and train comparisons we have used approximations using data provided by NSW's suburban operator, Cityrail, some of which was sourced from the NRMA).

COMMERCIAL AIR TRAVEL

Qantaslink provides two air services per day between Rockhampton and Gladstone, and one each day in the opposite direction. One service commences in Cairns, travelling through Townsville, Mackay, Rockhampton and Gladstone, before terminating in Brisbane. There are currently no direct air services between Gladstone and Bundaberg, nor between Rockhampton and Bundaberg. However, historically such services were run.

The journey time by air from Rockhampton Gladstone is 25 minutes, and allowing for 30 minutes for check-in, total travel time is 55 minutes. As at the time of writing May 8, 2012 the lowest available fare between Rockhampton and Gladstone with one day's notice was $136 each way.

In all cases the only alternative for air travel between each of these centres is to transit via Brisbane. This extends the journey time by several hours and increases costs beyond viable limits.

RAIL

Gladstone, Rockhampton and Bundaberg are well serviced by passenger trains. While providing a viable option the service is based on a long distance model, rather than as a commuter service. Tables 36 and 37 show the existing services, and their timetables:

Table 36 Timetables - Long distance passenger and tourism (24hr clock)

	Sunlander			Spirit of the Outback		Diesel Tilt	
	Wed	**Fri**	**Sun**	**Mon**	**Thur**	**Mon**	**Thur**
Rockhampton	5.10	5.10	5.10	20.45	20.45	1.15	1.15
Gladstone	6.45	6.45	6.45	22.40	22.40	2.30	2.30
Bundaberg	9.10	9.10	9.10	01.05+1	01.05+1	4.20	4.20
	Sun	**Tue**	**Thur**	**Wed**	**Sat**	**Mon**	**Fri**
Bundaberg	16.00	19.30	19.30	0.15	19.05	23.13	23.13
Gladstone	18.30	22.00	22.00	2.45	21.30	0.58+1	0.58+1
Rockhampton	20.30	23.55	23.55	4.15	23.05	2.15+1	2.15+1

Source: Queensland Rail, 2012

Only the electric tilt service offers scheduling that may be general interest to commuters.

Table 37 Timetables - Electric Tilt Train (24hr clock)

	Electric Tilt							
	Mon	**Tue**	**Wed**	**Thur**	**Fri**		**Sun**	
Rockhampton	7.15	7.15	7.15	7.15	7.15			
Gladstone	8.28	8.28	8.28	8.28	8.28			
Bundaberg	10.15	10.15	10.15	10.15	10.15			
Bundaberg	15.30	15.30	15.30	15.30	15.30	21.40	15.30	21.40
Gladstone	17.15	17.15	17.15	17.15	17.15	23.20	17.15	23.20
Rockhampton	18.25	18.25	18.25	18.25	18.25	00.30+1	18.25	00.30+1

Source: Queensland Rail, 2012

Table 38 shows sample journey time for all services. From a commuter's point of view, only the tilt services offer acceptable journey times.

Table 38 Journey Time - all services

	Sunlander	Spirit of the Outback	Diesel Tilt	Electric tilt
ROK-GLT	1hr 35min	1hr 55min	1hr 15min	1hr 13min
GLT-BDB	2hr 25min	2hr 20min	1hr 50min	1hr 47min

Source: Queensland Rail, 2012

LONG DISTANCE ROAD COACH

Greyhound Australia is the only road coach operator that service the route between Rockhampton and Gladstone, and is the only operator that services each of Rockhampton, Gladstone and Bundaberg. The one way fare is $40.90 between Rockhampton and Gladstone, with two daily services each way. Departure times on southern sectors are at each end of a standard work day, with the north bound services both leaving in the evening or late evening.

There are two direct daily Greyhound services between Gladstone and Bundaberg, one leaving about 8am and one at about 8.30pm. The cost is about $51.00. In the return direction there are two services departing in the afternoon and early evening.

In each case travel time is significantly longer than offered by the Tilt Train.

HIRE CAR

The cost of hiring a car between Rockhampton and Gladstone for a one-way trip is $254.01 including one-way surcharge. This price does not include fuel. The cost of hiring a mid-sized car for a return trip to Gladstone is $107.13 for a trip between Gladstone and Bundaberg, the price of a mid-sized hire car including one-way surcharge and no fuel is $329.96. The daily rate, assuming a return trip is $111.46 (Hertz, 2012).

COMPARABLE FARE ANALYSIS

With the exception of services originating in Newcastle (NSW), to our knowledge, there are no commuter rail services in Australia that run on a regular basis solely between regional points. Those that do operate from Newcastle generally operate over much shorter distances. Newcastle to Scone and Dungog are longer trips but they include many stops. Therefore trips were selected for comparative analysis were of a comparable distance and exhibited generally significant distances between stops (to enable the train to reach a reasonable operating speed). Table 39 shows a selection of routes, and applicable fares. This includes a comparison of the current tilt-train fare with generally available single fares on other routes.

Table 39 Comparison of fares

Depart	Rockhampton	Robina	Woy-woy	Geelong
Arrive	Gladstone	Central (Brisbane)	Central (Sydney)	Melbourne
Travel time (minutes)	73	75	73	61
Fare	$34	$10.83	$7.45	$9.36
Type	Single no discount	Go-card	Single no discount	Peak single, no discount

Source: CIPL, 2012

The major finding is the disparity between the tilt train fare and fares for other services with similar travel times. There are several possible reasons for this:

- The tilt train is a long distance and not a commuter service. As such it carries conductors and other staff, which the commuter services do not.
- All of the other services operate as part of extensive metropolitan networks. These networks are heavily subsidised by Government. Regarding the privately run Melbourne metropolitan network (not the Melbourne-Geelong route which is operated by Government owned country operator V-Line), the extent of the subsidy is an explicit factor in negotiations regarding the tender for operation of services. The extent of the average subsidy for V-Line operations was $18.68 per passenger in 2010 (Steele et al, 2010).
- Fares on services that are part of a metropolitan system are also generally based on zones. In this concentric bands are placed at pre-determined distanced from the main hub (Central in Sydney for example). Such pricing leads to unusual outcomes. For example the fare from Central to Woy-Woy (75 minutes) is the same as from Central to Newcastle (2hr and 36 minutes on an express).

There are few commercial commuter rail passenger services in Australia that operate without Government subsidies. Two major services are the airport rail services in Brisbane and Sydney. Travel time and fares for these are shown in Table 40. The most striking feature of this data is the ratio of the fare to distance. In each case the fares are significantly higher than for any of the routes shown in Table 40 which are all much longer.

Table 40 Commercial fares

Depart	Brisbane Domestic	Mascot Domestic
Arrive	Central (Brisbane)	Central (Sydney)
Travel time (minutes)	23	12
Fare (ex GST)	14.09	14.00
Type	Single no discount	Single no discount

Source: CIPL, 2012

This is attributable to commercial reasons. The airport services were set up as a commercial venture, aiming to recover costs and to provide a return to investors. However, both went into liquidation or have had to undergo significant financial restructuring, despite what could be thought of a captive customer base, and expensive commuter alternatives such as Taxis. It is understood that these services are operating well now, but it has taken many years for passenger numbers to

reach the levels required for the services to recover operating costs let alone to repay capital and make a return on investment.

Analysis of the airport services, in particular the Sydney service, provides the ability to compare commercial and non-commercial trips of similar lengths. The fare for the commercial service from Mascot Domestic to Central is $14.00 (ex GST) for a distance of 6.74 km. By way of comparison the fare from Wollstonecraft to Central is $3.09 ex GST for a similar distance of 7.18 km. The difference is explained by the addition of a station access charge for the Domestic airport station. The charge is $10.91 ex GST, and it is the mechanism by which the operator of the Sydney airport rail-link converts standard metropolitan fares to fares that are expected to generate a commercial return. The addition of the station access charge to the standard fare for a similar distance gives $14.00, which is exactly the same as the full single airport fare for a trip from the domestic airport to Central.

Using this analysis, it is possible to derive an approximation of a commercial fare and subsidised fares for the journeys between Rockhampton and Gladstone and between Gladstone and Bundaberg. Calculations are based on a flag fall of $10.91 (based on the station access charge for Sydney Domestic Airport Station – which could be expected to include a return on capital invested), and the normal commuter fare for a trip of a similar length. The fare for the Central-Robina service was selected as it is service that is operated by Queensland Rail.

Table 41 Reasonable estimate of equivalent commercial fare ($)

Station access charge	10.91
Central-Robina (75 minutes)	10.83
Rockhampton-Gladstone equivalent	21.74

Source: CIPL, 2012

The estimation of an equivalent commercial fare can be used as a partial guide as to the extent of subsidy that may or may not be needed on the route.

Table 42 provides a summary of the fares we have used in this analysis.

Table 42 Fares used in the analysis

	Current tilt train		**Reasonable estimate**		**Metro commuter**	
	GLT	**BDB**	**GLT**	**BDB**	**GLT**	**BDB**
Cost per fare (current ex gst)	34.00	46.00	21.74	28.43	10.83	17.52
Commuter discount (%)	30.00	30.00	30.00	30.00	30.00	30.00
Net Fare	23.80	32.20	15.22	19.90	7.58	12.26

Source: CIPL, 2012

The reasonable estimate is the fare calculated in Table 41, with for the Bundaberg leg, pro-rata adjustment based on the additional distance between Gladstone and Bundaberg, compared with Rockhampton and Gladstone. The adjustment is not applied to the Station Access Charge. The

Metro commuter fare is based on the Brisbane to Robina fare, using for Bundaberg, the previously described adjustment.

For comparative purposes the effect of a 30% discount for regular commuters was included. This discount is not applied in this analysis, however a commuter discount is one way in which services may recognise and attract patrons.

BREAK-EVEN PASSENGERS

Using the fare and cost data derived above, the number of passengers required to break even under a number of policy scenarios has been calculated. These passenger numbers are shown in Table 43.

Table 43 Passengers required to break even

	Current tilt train		Reasonable estimate		Metro commuter	
	GLT	**BDB**	**GLT**	**BDB**	**GLT**	**BDB**
Fare	**$34.00**	**$46.00**	**$21.74**	**$28.43**	**$10.43**	**$17.52**
Fully allocated costs						
New	131	103	205	167	412	271
Exiting	111	88	173	142	347	230
Operating costs						
New	70	57	110	92	221	149
Existing	50	41	78	67	156	108
Operating costs less return on investment						
New	43	36	67	59	135	95
Existing	22	21	35	34	70	55

Source: CIPL, 2012

Fully Allocated Costs shows the number of passengers required to fully recover all costs and provide a return on capital, as per the detailed cost analysis provided above, given a particular fare basis. Operating Costs shows the number of passengers required to cover operating costs only (implying a subsidy for the below rail costs), given a particular fare basis. Operating costs less return on investment assume recovery of all operating costs but without an allowance for a return on capital invested.

Ignoring certain cost categories (as occurs in the "Operating Costs" and "Operating costs less return on investment" panels of Table 43), necessarily implies a subsidy to the extent of those costs. Table 44 calculates the extent of that subsidy, based on each train, and on a per-passenger basis.

Table 44 Implied subsidies

	Current tilt train		Reasonable estimate		Metro commuter	
	GLT	**BDB**	**GLT**	**BDB**	**GLT**	**BDB**
Fare	**34.00**	**46.00**	**21.74**	**28.43**	**10.83**	**17.52**
Basis – Below rail costs						
Per train						
New	2,064	2,138	2,064	2,138	2,064	2,138
Existing	2,064	2,138	2,064	2,138	2,064	2,138
Per Passenger						
New	29.29	37.79	18.73	23.36	9.33	14.39
Existing	41.44	51.76	26.49	31.99	13.20	19.72
Basis – Below rail costs and return on investment						
Per train						
New	2,995	3,069	2,995	3,069	2,995	3,096
Existing	1,133	1,206	1,133	1,206	1,133	1,206
Per Passenger						
New	69.54	84.50	44.45	52.23	22.14	32.19
Existing	50.53	57.31	32.30	35.42	16.09	21.83

Source: CIPL, 2012

The focus of the analysis has been on the assumption of the costs and revenues associated with running one discrete train. Table 45 relaxes that assumption to estimate the effect of running a single train set on more than one trip per day. Extending beyond this straightforward analysis is beyond the scope of this paper.

Table 45 Capital effect of additional services operated by same train

	Current tilt train		Reasonable estimate		Metro commuter	
	2 trains	4 trains	2 trains	4 trains	2 trains	4 trains
Fully allocated costs						
New						
Per train	945	1,418	945	1,418	945	1,418
Per passenger	7.20	13.76	4.61	8.50	2.29	5.24
Existing						
Per train	594	891	594	891	594	891
Per passenger	5.37	10.15	3.44	6.27	1.71	3.87
Operating Costs						
New						
Per train	945	1,418	945	1,418	945	1,418
Per passenger	13.41	25.06	8.57	15.49	4.27	9.55
Existing						
Per train	594	891	594	891	594	891
Per passenger	11.92	21.57	7.62	13.33	3.80	8.22
Operating Costs less return on investment						
New						
Per train	945	1,418	945	1,418	945	1,418
Per passenger	21.94	39.04	14.03	24.13	6.99	14.87
Existing						
Per train	594	891	594	891	594	891
Per passenger	26.49	42.33	16.94	26.16	8.44	16.12

Source: CIPL, 2012

Table 45 shows that additional services operated by the same train result in a significant reduction in fully allocated operating cost (because the capital cost and the required return on investment are halved on a per service basis each time the service frequency from the one train is doubled). It should be noted that the analysis must be considered in the context of whether enough passengers use the service to justify that number of trips.

VALUE OF LIFE

The implementation of the proposed train services may have significant benefits external to those conferred to train travellers and to those enjoying the employment opportunities relating to the service. A significant and oft reported benefit is the potential for a reduction in the number of accidents on the highway between Bundaberg and Rockhampton.

The value of life is an often emotive concept, but it is a fact that part of being human is the sense of loss that accompanies the loss of a loved one. If that sense of loss is real, then perhaps it can be quantified. Actual examples of a sum being put on the value of life include:

- Extraordinary sums of money are spent on drugs that aim to extend life, or the quality of life
- The money spent on roads to prevent accidents or at least to prevent the risk of the operator of the road being sued for death or injury of a road user
- Money being spent on fitness and other activities that are linked to longer and healthier life
- People will insure themselves for significant amounts, the cost of which increases with the amount insured

Looking at various studies originating in the USA relating to the value of a life; Applebaum (2011) investigates the cost and uses these as the basis for his argument:

- Environmental Protection Authority (EPA) uses a figure of about $US6 million
- The Food and Drug administration - $US7.9 million
- Us Department of Transportation - $6 million

Further a recent article in The Australian Financial Review Magazine (Connors, 2012) reported that "most medicines that make it onto the (Pharmaceutical Benefits Scheme) subsidy list have a cost per quality adjusted life year of between $35,000 and $45,000 (equating to about $3 million for the life-span of an average person).

It is interesting to note that not only is death expensive, ongoing morbidity is even more expensive, Someone who has been rendered totally and permanently incapacitated in a car accident for example, loses both the capacity to earn income and perform normally in society, but society chooses to maintain their viability.

Such observations are critical in this type of analysis. Based on the US data, one life saved can almost cover the whole capital cost of one train set. Using the Australian data the ratio is two lives to one train set, still a compelling number and a strong point in the context of the number of lives lost on the Bruce Highway investigations.

Another Australian source estimated the economic cost of a fatal crash at $2.67 million in 2006. The cost of a hospitalised injury crash was approximately $266,000 and the cost of a non-hospitalised injury crash was about $14,700. The average cost of a property-only crash was approximately $9,950 according to the Department of Infrastructure, Transport, Regional Development and Local Government (DITRDLG, 2011). Since this data is the best sourced, and is categorised in a manner reasonably consistent with the road crash data described below (Table 46), it was selected as a basis for the study's death and trauma calculations.

The study team was provided with road crash data for the study area by The Department of Transport and Main Roads for the period 1 January 2005 to 31 December 2009.

Table 46 Estimate of the value of Road crashes in study area 2005 to 2009 ($ million)

	Gin Gin to Benaraby	Benaraby to Rockhampton	Total
Fatal	9	9	18
Hospitalisation	81	80	161
Medical Treatment	51	66	117
Minor Injury	44	44	88
Property damage only	108	157	265
	293	365	649

Source: Department of Transport and Main Roads – special data request

The data shows a total of 649 crashes in the five year period equating to 2.5 per week Applying the Department of Infrastructure, Transport, Regional Development and Local Government (DITRDLG) morbidity and property damage costs to the number of road crashes gives the results shown in Table 47. To bring the data (DITRDLG, 2006) to current dollars, a CPI factor of 16.3% was applied, representing inflation across the five years.

Table 47 Estimate of the value of road crashes in study area ($)

	Total	Assigned cost (2006)	Cost (2012)
Fatal	18	2,760,000	55,909,073
Hospitalisation	161	266,000	49,820,266
Medical Treatment	117	14,700	2,000,791
Minor Injury	88	14,700	1,504,868
Property damage only	265	9,950	3,067,379
	649	n/a	112,302,378

Source: Department of Main Roads, DITRDLG, ABS

Using these estimates gives a total cost of morbidity and property damage of in excess of $112 million for the five year period, or almost $22.5 million per annum. Without research that is beyond the scope of this pre-feasibility study, it is impossible to accurately assess the likely reduction in the incidence of accidents. Therefore a costing showing the economic benefit resulting from various possible rates of avoiding an accident, as a result of a choice to travel by train has been created and is shown in Table 48.

Table 48 Estimate of economic benefit through avoidance of road crashes

	Years									
Chance of avoiding accident (%)	1	2	3	4	5	6	7	8	9	10
10	2,246,048	4,492,095	6,738,143	8,984,190	11,230,238	13,476,285	15,722,333	17,968,380	20,214,418	22,460,476
20	4,492,095	4,984,190	13,476,285	17,968,380	22,460,476	26,952,571	31,444,666	35,936,761	40,428,856	44,920,951
30	6,738,143	13,476,285	20,214,428	26,952,571	33,690,713	40,428,856	47,166,999	53,905,141	60,643,284	67,381,427
40	8,984,190	17,968,380	26,952,571	35,936,761	44,920,951	53,904,141	62,889,331	71,873,522	80,857,712	89,841,902
50	11,230,238	22,460,476	33,690,713	44,920,954	56,151,189	67,381,147	78,611,664	89,841,902	101,072,140	112,302,378

Source: CIPL, 2012

The data in table shows that even a 10% probability of avoiding a vehicle accident generates an expected benefit of almost $22.5 million over 10 years (in 2012 dollars), more than covering the cost of any investment in rolling stock.

TRAFFIC MOVEMENTS

Table 49 reports traffic movements for segments of the Bruce Highway between Gin Gin and Rockhampton. A section of approximately 54 km between Gin Gin and Bundaberg, has been

excluded on account of maintaining consistency in the data set as Bundaberg is not strictly speaking on the main Bruce Highway.

Table 49: Traffic movements Gin Gin to Rockhampton

Local description	Formal description	Average daily traffic		
		North	South	Both
Rural				
Just north of Gin Gin	1.920 km Sth of Roadtek Depot Gin Gin	2,175	2,660	4,835
Mt Perry Turnoff	9.634 km North of Jensens Road	1,881	1,881	3,762
Kalpower/Manypeaks turnoff	38.450 km North of Kalpower Turnoff	1,835	1,744	3,579
Colosseum	83.136 km Bruce Hwy at Colosseum	1,843	1,788	3,631
Nr Turkey Beach Turnoff	Bruce Hwy 100m North Rodds Creek	2,916	2,966	5,882
Tannum Sands Turnoff	Bruce Hwy Southern About Machine Creek	3,725	3,714	7,439
Calliope	Bruce Hwy 500m S Dawson Hwy (Calliope)	2,824	2,761	5,585
Calliope River	Bruce Calliope 25m S Calliope River Bdg	2,393	2,380	4,773
Ambrose	Bruce Hwy 1km Sth Hut Ck (Nth Ambrose)	2,953	2,935	5,888
Bobs Creek	Bruce Hwy Mikros WiM site (Bobs Ck)	3,030	3,103	6,133
Gavial Creek	Bruce Hwy 100m Nth Gavial Ck	3,065	5,998	6,063
Scrubby Creek	Bruce Hwy 1km Nth Scrubby Ck	5,164	4,829	9,993
Rural Average		**2,817**	**2,813**	**5,630**
City				
Rockhampton	Bruce Hwy 100m N Oswald St (Lower Dawson Rd)	12,889	12,417	25,306
Rockhampton	Bruce Hwy (Gladstone Rd) at Derby St	12,068	12,490	24,558

Source: Queensland Department of Transport and Main Roads – special data request

The data in table 49 shows a daily average of about 2,800 vehicles using the road between Gin Gin and Rockhampton, in each direction. The daily average transiting between Gin Gin and the Tannum Sands Turnoff is approximately 800 vehicles less than for the remainder of the route. The Rockhampton data includes city traffic, and is included only for completeness.

Table 50 Changes in traffic movements between road segment

Local description	Formal description	Change in Vehicle movements			
		North	South	Both	Reasons
Just north of Gin Gin	1.920 km Sth of Roadtek Depot Gin Gin				N/A
Mt Perry Turnoff	9.634 km North of Jensens Road	-294	-779	-1073	Turning off to Mt Perry
Kalpower/Manypeaks turnoff	38.450 km North of Kalpower Turnoff	-46	-137	-183	Turning off to Kalpower/Manypeaks
Colosseum	83.136 km Bruce Hwy at Colosseum	8	44	52	Local traffic added between Kalpower and Collosseum
Nr Turkey Beach Turnoff	Bruce Hwy 100m North Rodds Creek	1073	1178	2251	Added from Miriam Vale and Bororen
Tannum Sands Turnoff	Bruce Hwy Southern About Machine Creek	809	748	1557	Added from Tannum Sands/Benaraby
Calliope	Bruce Hwy 500m S Dawson Hwy (Calliope)	-901	-953	-1854	Turned off to Gladstone/Boyne Island
Calliope River	Bruce Calliope 25m S Calliope River Bdg	-431	-381	-812	Turned off to Calliope
Ambrose	Bruce Hwy 1km Sth Hut Ck (Nth Ambrose)	560	555	1115	Added from Gladstone
Bobs Creek	Bruce Hwy Mikros WiM site (Bobs Ck)	77	168	245	Added from Bajool, Marmor, etc
Gavial Creek	Bruce Hwy 100m Nth Gavial Ck	35	-105	-70	Added from Bobs Creek area
Scrubby Creek	Bruce Hwy 1km Nth Scrubby Ck	2099	1831	3930	Added from Gracemere
Rockhampton	Bruce Hwy 100m N Oswald St (Lower Dawson Rd)	7725	7588	15313	Includes inner Rockhampton traffic
Rockhampton	Bruce Hwy (Gladstone Rd) at Derby Street	-821	73	-748	Local traffic influence

Source: CIPL, 2012

Table 50 shows the changes in traffic movements for the Road segments shown in Table 49. The data makes for a number of interesting observations:

- Traffic volumes increase in a Northerly Direction.
- The impact of traffic from Gladstone (a total of 1,115 vehicles across both directions) accounts for a 20% of the average daily traffic across the entire route.
- Traffic associated with Miriam Vale and Bororen accounts for about 40% of average traffic flows across the entire route
- Traffic added from Tannum Sands is more than offset by traffic leaving the highway to go to Gladstone.
- Other data shows that heavy vehicles make up about a quarter of all vehicle movements.

Based on data collected by the NSW Government the average Occupancy of a motor vehicle is 1.45 passengers (Transport Data Centre, 2009). Table 51 uses this information to provide an indication of the reduction in the number of cars on the road, if a regular passenger rail service was established.

A three car train running at a load factor of 70% (an arbitrary number) could take 177 cars off the road daily, equating to a reduction in light traffic of 3.14% per train. Running four return trips per day under the same conditions could reduce light traffic volumes by more than 12%.

Table 51 Derivation of potential reduction in light vehicle numbers

Total vehicles (average)	5,630
Heavy vehicles	1,442
Cars (average)	4,188
Train sets (return trip)	366
Load factor(%)	70
Passengers per train (number)	256
Passengers per car (number)	1.45
Cars removed from road (number)	177
Cars removed from road (%)	3.14

Source: CIPL, 2012

ROAD COST RECOVERY

The study team considered whether running a commuter rail service over the proposed route would assist in reducing costs associated with providing and operating road infrastructure. It was concluded that such an effect would be negligible. This is because the costs incurred in building, maintaining and widening and repairing roads are due to the use of heavy vehicles (South Australian Department of Transport/Travers Morgan Pty Ltd, 1985). For example, if only light vehicles were to use the road, then it could be built to a much lower standard, would need less maintenance and would not need to be as wide or need as many passing lanes.

According to data supplied by the Queensland Department of Transport and Main Roads, around a quarter of the traffic travelling between Rockhampton and Gladstone and between Gladstone and Bundaberg comprises heavy vehicles. If the taxes and other charges levied on trucks do not accurately reflect the costs of providing the road infrastructure, then other road users and the public are subsidising operators of heavy vehicles, and moving that freight to rail may confer an economic advantage. That is not however the subject of this study.

SUMMARY OF COST BENEFIT ANALYSIS

In summary, the complete cost benefit analysis preliminary findings indicate the following:

- Demand levels remain uncertain, but there is grounds to believe that sufficient demand for the service does exist
- Using estimates of commercial commuter fares, an average of 205 passengers per trip are required to cover fully allocated costs if a new train is used for the Rockhampton to Gladstone Route and 167 passengers for the Bundaberg to Gladstone route. The number of required passengers is lower if existing tilt-train fares are used, and higher if metropolitan equivalents are used.

- Table 52 shows the subsidy required based on running four services per day, with the subsidy equal to foregone return on capital investment and below rail costs, and using a reasonable estimate of commuter fares.

Table 52 Estimated annual subsidy

	GLT	BDB	Total
Maximum subsidy (per train)	2,995	3,069	6,064
Capital effect of 4 trains	1,418	1,418	2,835
Net daily subsidy	1,578	1,651	3,229
Net annual subsidy	575,896	602,704	1,178,600

Source: CIPL, 2012

Costing is based on a single trip and with no subsidy.

- If a subsidy equal to below rail costs and return on investment in rolling stock (new train) is provided then using estimates of commercial commuter fares, an average of 67 passengers per trip are required used for the Rockhampton to Gladstone Route and 59 passengers for the Bundaberg to Gladstone route. The number of required passengers is lower if existing tilt-train fares are used, and higher if metropolitan equivalents are used.
- The subsidy is offset if through the operation of the commuter rail service, the aggregate of motor vehicle accidents (across all accident categories) is reduced by 5.3% per annum.
- Other economic benefits such as the increase in land values and other economic externalities that would normally be expected as a result of the operation of such a service have not been considered.

LIMITATIONS OF THIS REPORT

The conclusions presented in this pre-feasibility study report are based upon observations and information collated from desktop studies and preliminary consultation and available data. The author has relied heavily on the accuracy and completeness of this information, as it existed at the time of writing.

In preparing this study, Tanner Consulting (the Consultant) has relied upon, and presumed accurate, information provided by Queensland Rail and Capricorn Enterprise (the client – shown as Proponent throughout the document) and/or from other sources as deemed reliable. Except as otherwise stated, Tanner Consulting has not attempted to verify the absolute completeness, or accuracy of any such information. If the information is subsequently determined to be incomplete, outdated, false or inaccurate then it is possible that the observations and conclusions as expressed in this report may change at the time of subsequent reports.

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Fast Rail Commuter Service

pre-feasibility study

appendices

APPENDIX A
INDUSTRY BREAKDOWN GLADSTONE REGION

Industry	Gladstone Regional		Queensland	
	number	%	number	%
Agriculture, Forestry and Fishing	591	15.3	46,624	11.1
Mining	18	0.5	1,913	0.5
Manufacturing	201	5.2	18,193	4.3
Electricity, Gas, Water and Waste Services	3	0.1	1,039	0.2
Construction	860	22.3	78,768	18.8
Wholesale Trade	54	1.4	13,442	3.2
Retail Trade	246	6.4	27,747	6.6
Accommodation and Food Services	172	4.5	14,950	3.6
Transport, Postal and Warehousing	258	6.7	27,180	6.5
Information Media and Telecommunications	9	0.2	2,772	0.7
Financial and Insurance Services	177	4.6	25,827	6.2
Rental, Hiring and Real Estate Services	387	10.0	46,636	11.1
Professional, Scientific and Technical Services	310	8.0	41,509	9.9
Administrative and Support Services	117	3.0	15,724	3.7
Public Administration and Safety	12	0.3	1,460	0.3
Education and Training	42	1.1	4,559	1.1
Health Care and Social Assistance	100	2.6	17,630	4.2
Arts and Recreation Services	42	1.1	5,313	1.3
Other Services	210	5.4	18,591	4.4
Not Classified	56	1.4	9,533	2.3
Total (d)	**3,865**	**100.0**	**419,410**	**100.0**

Source: OESR, 2012

APPENDIX B
COUNT OF REGISTERED BUSINESSES BY INDUSTRY FOR ROCKHAMPTON REGIONAL COUNCIL 2008/2009

Industry	Rockhampton Regional		Queensland		Specialisation ratio (c)
	number	%	number	%	number
Agriculture, Forestry and Fishing	1,059	14.1	46,624	11.1	1.27
Mining	67	0.9	1,913	0.5	1.95
Manufacturing	261	3.5	18,193	4.3	0.80
Electricity, Gas, Water and Waste Services	18	0.2	1,039	0.2	0.97
Construction	1,582	21.0	78,768	18.8	1.12
Wholesale Trade	174	2.3	13,442	3.2	0.72
Retail Trade	593	7.9	27,747	6.6	1.19
Accommodation and Food Services	320	4.3	14,950	3.6	1.19
Transport, Postal and Warehousing	531	7.1	27,180	6.5	1.09
Information Media and Telecommunications	33	0.4	2,772	0.7	0.66
Financial and Insurance Services	396	5.3	25,827	6.2	0.86
Rental, Hiring and Real Estate Services	659	8.8	46,636	11.1	0.79
Professional, Scientific and Technical Services	532	7.1	41,509	9.9	0.72
Administrative and Support Services	207	2.8	15,724	3.7	0.73
Public Administration and Safety	27	0.4	1,460	0.3	1.03
Education and Training	85	1.1	4,559	1.1	1.04
Health Care and Social Assistance	293	3.9	17,630	4.2	0.93
Arts and Recreation Services	98	1.3	5,313	1.3	1.03
Other Services	438	5.8	18,591	4.4	1.31
Not Classified	143	1.9	9,533	2.3	0.84
Total (d)	**7,516**	**100.0**	**419,410**	**100.0**	**1.00**

Source: OESR, 2012

APPENDIX C
PLACE OF WORK BY INDUSTRY, ROCKHAMPTON LGA

Industry	Rockhampton Regional		Queensland		Specialisation ratio (d)
	number	%	number	%	number
Agriculture, Forestry and Fishing	1,065	2.7	59,504	3.4	0.80
Mining	274	0.7	29,007	1.7	0.42
Manufacturing	3,471	9.0	172,770	9.9	0.90
Electricity, Gas, Water and Waste Services	1,081	2.8	18,119	1.0	2.68
Construction	2,524	6.5	154,898	8.9	0.73
Wholesale Trade	1,409	3.6	69,819	4.0	0.91
Retail Trade	4,949	12.8	205,183	11.8	1.08
Accommodation and Food Services	3,061	7.9	121,886	7.0	1.13
Transport, Postal and Warehousing	2,276	5.9	87,936	5.1	1.16
Information Media and Telecommunications	445	1.1	25,796	1.5	0.77
Financial and Insurance Services	883	2.3	51,201	2.9	0.77
Rental, Hiring and Real Estate Services	721	1.9	37,416	2.2	0.86
Professional, Scientific and Technical Services	1,371	3.5	100,826	5.8	0.61
Administrative and Support Services	824	2.1	53,083	3.1	0.70
Public Administration and Safety	2,837	7.3	118,693	6.8	1.07
Education and Training	4,320	11.1	136,054	7.8	1.42
Health Care and Social Assistance	4,838	12.5	181,029	10.4	1.20
Arts and Recreation Services	330	0.9	23,867	1.4	0.62
Other Services	1,691	4.4	66,645	3.8	1.14
Total (e)	**38,749**	**100.0**	**1,737,618**	**100.0**	**1.00**

Source: OESR, 2012

APPENDIX D
PLACE OF WORK BY INDUSTRY, BUNDABERG REGIONAL COUNCIL

Industry	#	%
Accommodation and Food Services	1,243	7.3
Administrative and Support Services	484	2.8
Agriculture, Forestry and Fishing	994	5.8
Arts and Recreation Services	135	0.8
Construction	1,392	8.1
Education and Training	1,355	7.9
Electricity, Gas, Water and Waste Services	172	1.0
Financial and Insurance Services	335	2.0
Health Care and Social Assistance	2,192	12.8
Information Media and Telecommunications	201	1.2
Manufacturing	1,694	9.9
Mining	116	0.7
Other Services	731	4.3
Professional, Scientific and Technical Services	545	3.2
Public Administration and Safety	902	5.3
Rental, Hiring and Real Estate Services	279	1.6
Retail Trade	2,566	15.0
Transport, Postal and Warehousing	604	3.5
Wholesale Trade	660	3.9
Inadequately described	207	1.2
Not stated	279	1.6
Total	**17,086**	**100%**

APPENDIX E
INSTRUCTION MANUAL – TRAIN SCHEDULING

SCHEDULING CHALLENGES

The rail network infrastructure as described in the study body presents several significant challenges regarding the development of viable schedules for regular regional commuter services between Rockhampton and Bundaberg.

Central to the understanding of these issues is familiarisation with a train graph as a means of reading schedules.

TRAIN SCHEDULES DISPLAYED IN A TRAIN GRAPH

A tabular timetable (table 1) is a common way of publishing a passenger rail timetable. The same schedule can be represented diagrammatically. An example of a timetable represented diagrammatically is presented in Figure 1. It can be understood as a time/distance plot of train services. The vertical axis marks stations scaled to their relative distance. The horizontal axis captures the timescale. Each line on the graph represents a train service moving through distance (vertical axis) and time (horizontal axis).

Table 1: Sample Rail Schedule.

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Station A	5:00 AM	8:00 AM	11:00 AM	2:00 PM
Station B	6:00 AM	9:00 AM	12:00 AM	3:00 PM
Station C	8:00 AM	11:00 AM	2:00 PM	5:00 PM

Station C	5:30 AM	8:30 AM	11:30 AM	2:30 PM
Station B	7:30 AM	10:30 AM	1:30 PM	3:30 PM
Station A	8:30 AM	11:30 AM	2:30 PM	5:30 PM

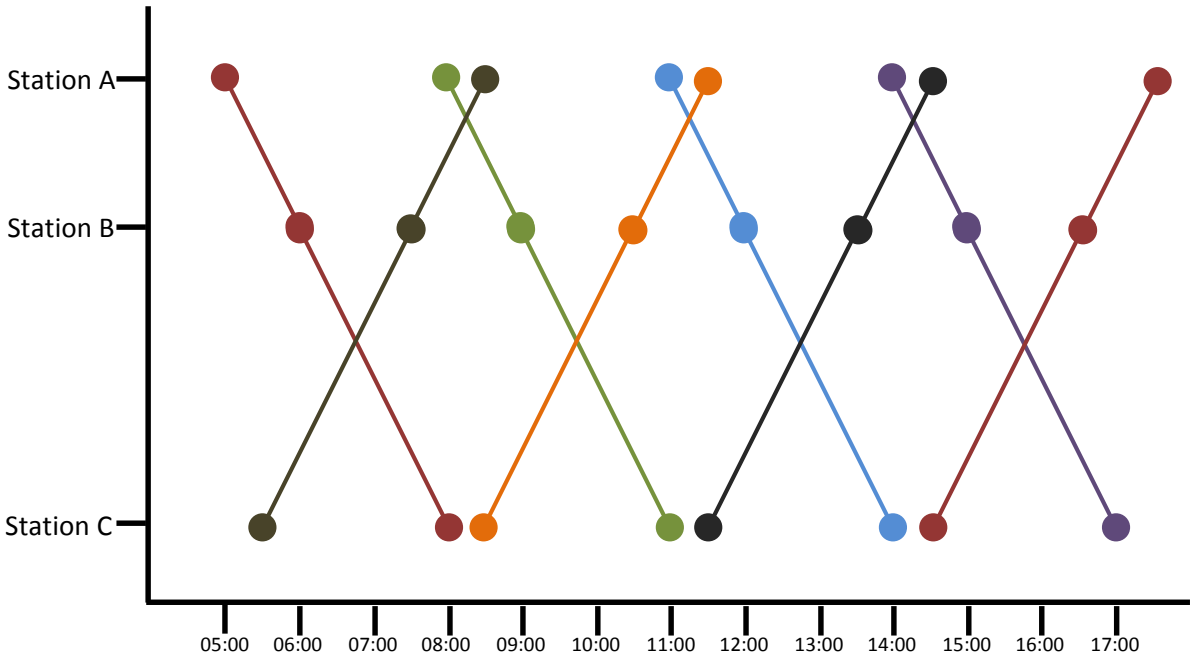

Figure 1: Diagrammatic representation of the sample rail schedule

A train graph is a good way of understanding what a particular schedule might deliver as a complete plan. Visualising a timetable in this manner also allows rapid assessment of:

- Frequency
- Service regularity
- Service gaps
- Services can in relation to each other
- Location of services at any time
- The times and locations that services pass or overtake
- Service levels at individual stations

SINGLE LINE SECTIONS

As mentioned in the body of the study, almost all of the rail line between Gladstone and Bundaberg comprises of single line sections. It is important to understand the limitations this places on possible schedules. Figures 2 presents an example of the routing of trains on two fictitious rail lines.

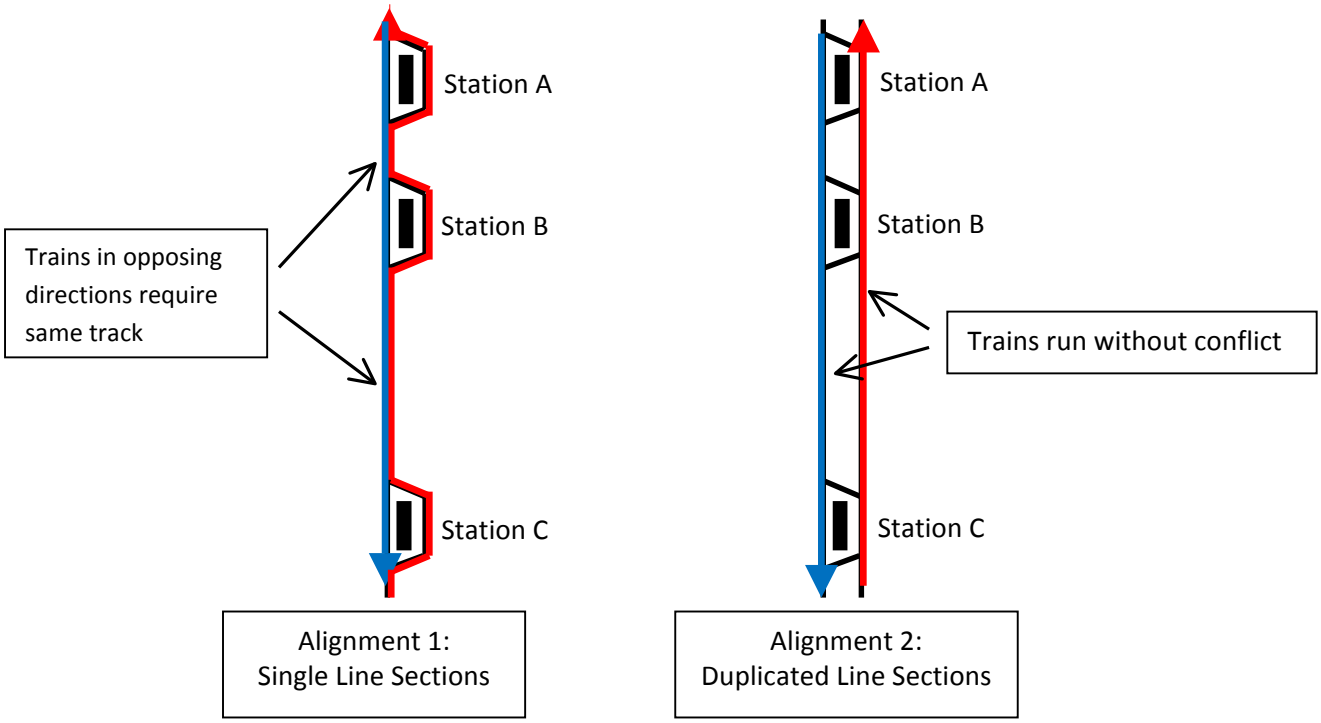

Figure 2: Train routing on single and duplicated track

Supposing that the line runs south from Station A to Station B it can be seen in figure 2 that the south bound blue train must use the same track as the north bound red train on the non-duplicated alignment. The consequence of this from a scheduling perspective is illustrated in the train graph below.

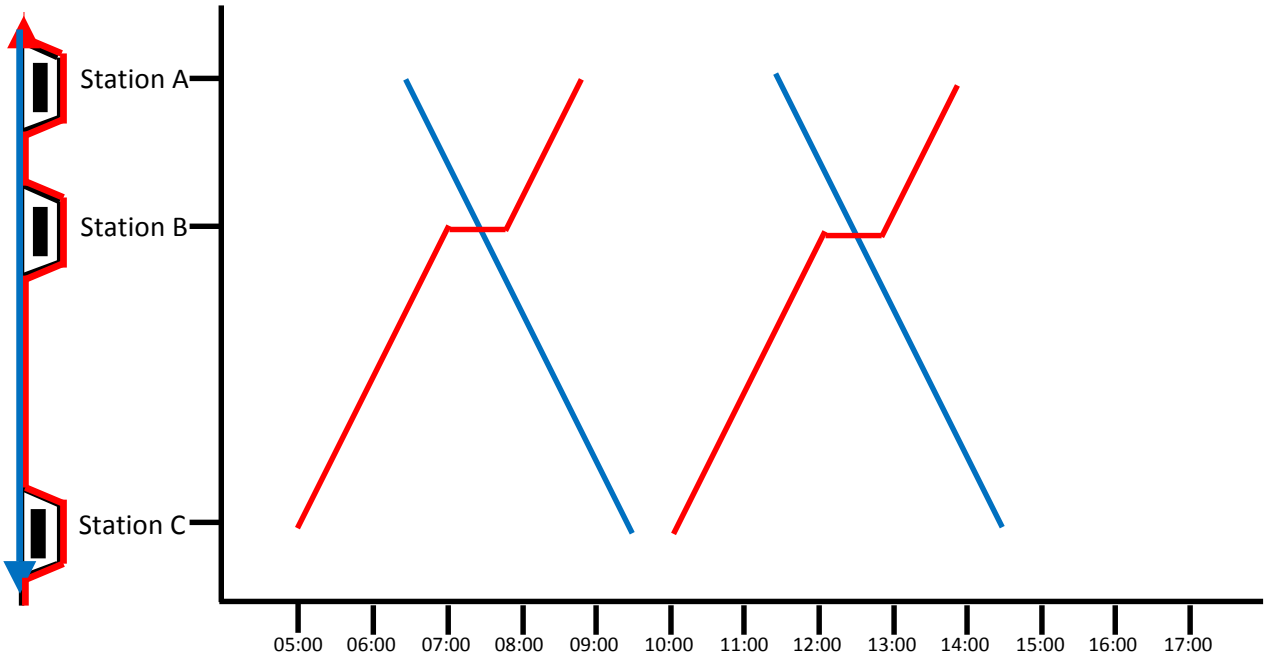

Figure 5: Example schedule on single line sections

The only opportunity for trains to pass each other is at stations. This limitation introduces significant constrains on the frequencies and travel times achievable in a schedule. On a train graph, lines representing trains can only cross each other at stations. Figure 3 is an example of one of many

schedules possible. It shows that the first northbound red train must wait at Station B until the first southbound blue train passes through. Until the blue train reaches Station C, the second southbound red train cannot leave. None of these limitations apply to the example schedule shown in figure 4. Because the line sections are duplicated, trains can pass each at any point. This allows a much great frequency and consistency of service.

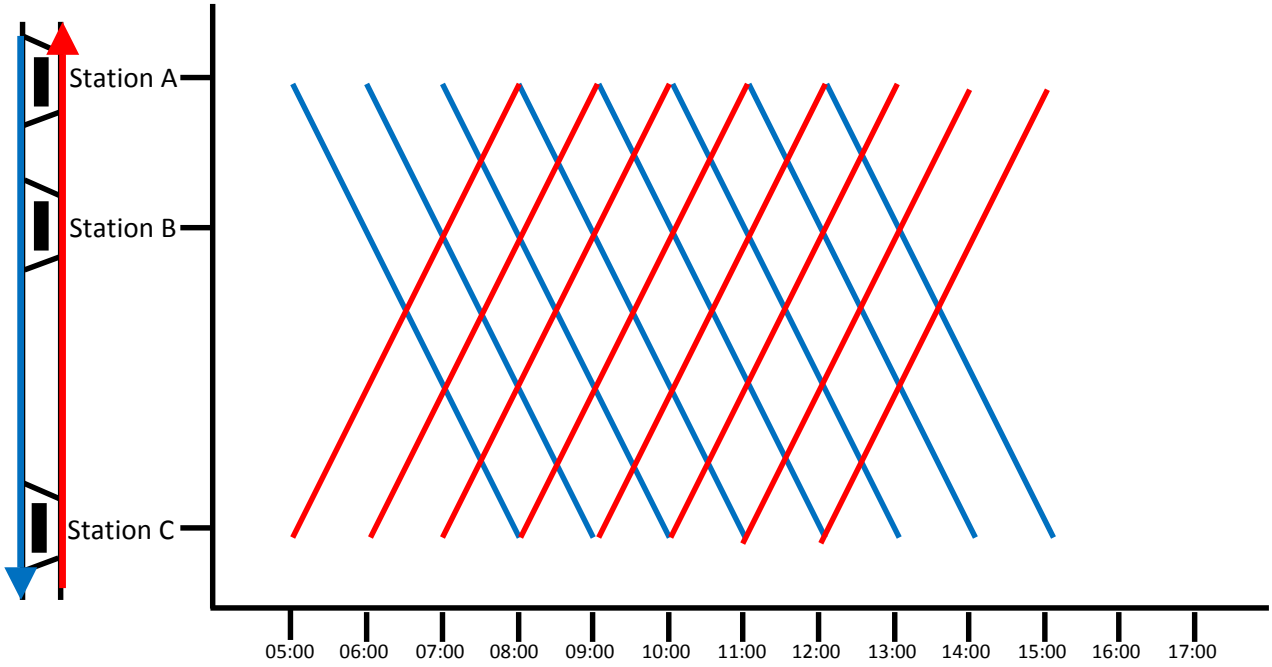

Figure 6: Example schedule on duplicated track section

As outlined above, the line section between Rockhampton and Gladstone is almost entirely duplicated. Between Gladstone and Bundaberg however are single line sections between passing locations.

Disregarding the freight task, the infrastructure between Rockhampton and Gladstone could support a high frequency regular passenger train service. Between Gladstone and Bundaberg however, the infrastructure constrains any potential schedule in much the same way as the example illustrated in Figure 2.

MIXED USE TRAFFIC AND OPERATORS, DIFFERENT TIMETABLE EACH DAY

The current passenger rail schedule between Rockhampton and Bundaberg is detailed later in this report. This section of the rail network also carries freight and coal trains run by different rail operators.

The current Master Train Plan (MTP) showing all scheduled services has not been released to the authors of this report and no impact assessment on non-passenger freight paths has been completed for any of the concept passenger timetables investigated.

In the absence of the detailed schedule, there are still important points that should be highlighted with regard to existing non-passenger rail traffic currently scheduled on the network between Rockhampton and Bundaberg.

The scheduled rail traffic runs to a different timetable each day of the week. It is unlikely any train paths conducive to commuter rail services would be available every day of the working week. It is

almost inevitable that any additional intra-regional rail passenger service would require the alteration of the current Master Train Plan.

Altering the Master Train Plan would require negotiation and agreement with stakeholders holding current access agreement contracts. This may then impact on other areas in Queensland outside the scope of this study.

MIXED TRAFFIC OBEYING DIFFERENT SPEED RESTRICTIONS

Higher speed passenger trains such as the tilting trains have a higher capacity impact when scheduled on a mixed traffic network. This dynamic is illustrated in the train graph below.

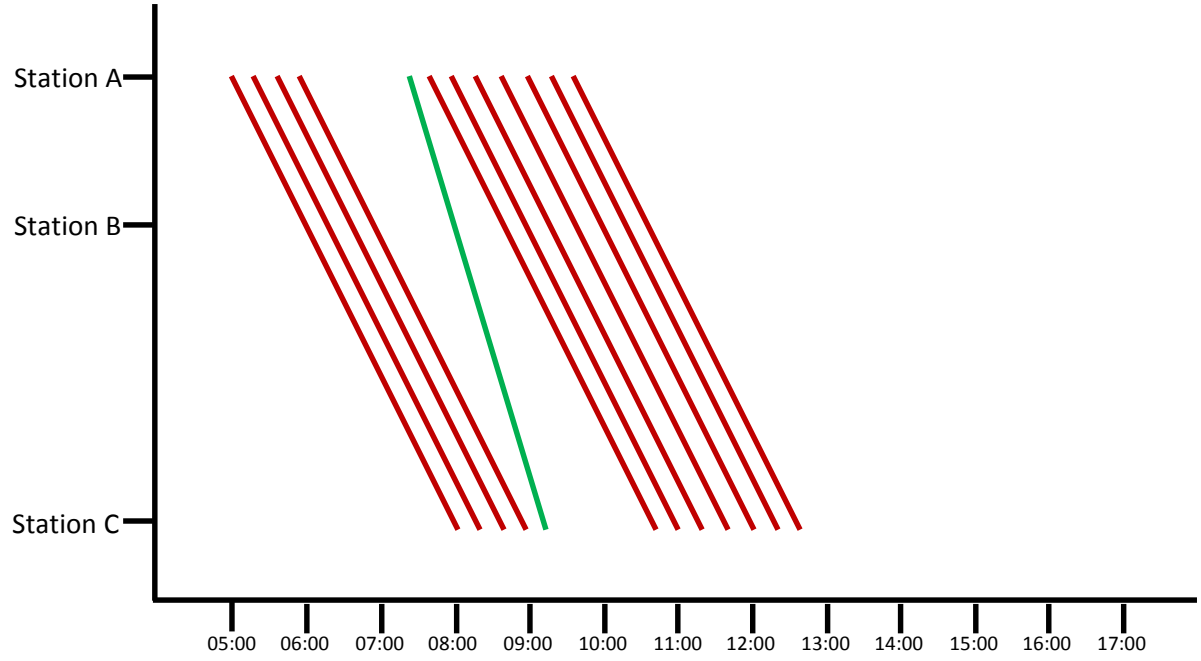

Figure 5: High speed train scheduled amongst regular trains

The speeds and separations used in Figure 5 are only for the sake of the example. Assume that the minimum safe scheduled separation for trains is 20 minutes. This would mean that every hour three trains could be scheduled in the same direction. This is illustrated in the graph by the red trains 20 minutes apart. When including a fast train such as the one in green, 20 minutes separation would still need to be maintained at both Station A and Station C between the surrounding trains. It can be seen from the graph that decreased travel time for one train can be at the opportunity cost of path availability for other trains when scheduled in a mixed speed traffic environment.

APPENDIX F

CAPRICORN ENTERPRISE
TERMS OF REFERENCE

FAST RAIL COMMUTER NORTH-SOUTH RAIL SERVICE BETWEEN ROCKHAMPTON – GLADSTONE – BUNDABERG

Terms of Reference

Pre-feasibility Study

February 2012

TABLE OF CONTENTS

Terms of Reference – Feasibility Study for North – South Fast Rail Service to Gladstone:

1. INTRODUCTION:

The Central Queensland Region is at the cusp of significant growth and opportunity. In particular the current growth in the Gladstone region and the projected sustained growth indicate opportunities for service provision, workforce provision and flow on effects from the key service areas of Rockhampton and Bundaberg which offer unique lifestyle destinations for employees during construction and operational periods of new and planned project developments. Conversely, these areas also offer opportunities for Gladstone businesses and residents to access the infrastructure and services that are established in Rockhampton and Bundaberg, including but not limited to retail, education, health and tourism offerings.

To demonstrate current and projected labour/employment demand for projects current and planned in Gladstone the following analysis is provided.

Table 1.0: Projects currently under construction in the Gladstone region:

Project	Employment Estimation	Timing
Queensland Curtis LNG (QGC – a BG Group business)	Construction – 5,000 (peak) Operational – up to 1,000	First cargoes expected early 2014.
Rio Tinto Alcan – Yarwun Alumina Refinery	Construction – 1,350 (peak) Operational – 250	Work commenced in third quarter 2007. First shipments targeted mid 2012.
Boyne Smelters Ltd.	Construction – 450 (peak)	Work commenced June 2008 and is expected to continue over a 3 year period. Reduction lines to be completed Dec 2011 and CBF4 in March 2012.
	225 – (peak dredging period) Construction (reclamation area) – 30-40	Stage 1A and 1B – Late 2010/2011.
Queensland Energy Resources Limited	Construction – 140 (approx.) Operational – 50 (approx.)	Commissioning in progress.
GLNG (Santos, Petronas, Total and Kogas)	Construction – 5,000 (peak) Operational – 1,000	Commence plant construction 2011. First cargoes expected 2015.
Australian Pacific LNG (Origin and ConocoPhillips)	Construction – 3,300 (peak) Operations – 175 (approx.)	First exports expected first half 2015.
Wiggins Island Coal Export Terminal Pty Ltd	Construction – 800 (on site) and 1200 (other) Operational – 120 (approx.)	IAS and significant project status announced October 2005. EIS completed and approved. Stage 1 construction commenced for commissioning in 2014.

Table 2.0: Projects with completed EIS in the Gladstone region

Project	Employment Estimation	Timing
Arrow Energy Ltd and AGL Ltd (Joint Venture)	Construction – 300-350 (peak) Operational – 8-10	In 2007 AGL and Arrow jointly acquired Enertrade's merchant gas business from the Queensland Government. Pipeline License has been granted: PPL 121.
Gladstone Pacific Nickel Limited	Construction – 1,000-2,300 Operational – 530	IAS and significant project status announced October 2005. Construction is expected to take 2-3 years.
Gladstone Area Water Board	Construction – 400 (peak)	EIS Completed Nov 2008, and Supplementary EIS June 2009. Construction period may take 2 years.
Surat Basin Rail (SBR) ATEC DVR, Xstrata Coal, Anglo Coal and QR National	Construction – 1,000 (approx.) Operational – 44 train drives plus support and maintenance	Commencement of operations targeted for 2012; completion 2014/15.

The impacts from the scale of development planned have the potential to change the communities of interest significantly. These impacts are considered to be in the domains of economic development, housing, employment, health, environment, social wellbeing, education and training plus transport. To maximise the positive opportunities and reduce the negative impacts, connectivity to surrounding regional areas may offer multiple benefits for the entire Central Queensland region. In particular connectivity through rail services that already have the infrastructure in place to deliver commuter services between the service centres.

Capricorn Enterprise has identified the potential for commuter services to operate and connect the three major service hubs by high-speed train service. This potential has been discussed and supported by key stakeholders in the region. To progress this concept it is felt that developing a suitably scheduled commuter rail service connecting Rockhampton, Gladstone and Bundaberg is both an opportunity to ease the current pressure on housing and accommodation, support the supply of skilled labour to continue the progress of developments and enhance the lifestyles of all communities through access to established services and infrastructure that reduces the burden on any one region. To better understand the viability and full scale of opportunities that this high-speed commuter rails service offers, a ***feasibility study*** is required to provide a detailed report to the key stakeholders and proponents of this concept.

2. ROAD CORRIDOR – BRUCE HIGHWAY:

The State Government has released its Bruce Highway Upgrade Strategy [December 2011] which includes significant upgrading of the Highway to provide a minimum 11 metre wide sealed traffic way between Gin Gin and Rockhampton.

This upgrading work, however, is projected to take between 11 and 20 years! Highway upgrading [as detailed in the strategy] includes:

> "Over the next 20 years, the Bruce Highway will be progressively upgraded to provide minimum 11-metre wide sealed highway (on two-lane sections) and overtaking opportunities approximately every 10 kilometres. To accommodate rapid growth in the mining sector, improved safety, reduced congestion and reliable journey times will be achieved by upgrades to Yeppen Lagoon and improved flood immunity will be achieved by upgrading the highway crossing the Yeppen floodplain to mitigate impacts of major flooding from the Fitzroy River.
>
> The highway will also be upgraded to dual carriageway on the southern approach to Gladstone, and between Mt Larcom and Parkhurst (north of Rockhampton). Major advances will be made on removing highway traffic out of the urban area of Rockhampton."

The State Government has not released costing of the Highway upgrades, however, the following three projects can be used as examples for costing analysis:

- Completion of the $205 million widening works between Ulhmann Road and Caboolture, the final stage in providing six lanes from the Gateway Motorway to Caboolture;
- Completion of the $71 million duplication of two lanes to four lanes on the Gympie urban section (Kidgell Street to Pine Street); and
- Completion of construction of a two-lane motorway standard of Townsville Ring Road stages two and three, from Upper Ross River Road to Shaw Road, at a total cost of $119 million.

At present, the current traffic flow between the Rockhampton and Gin Gin area is dominated by smaller vehicles (refer to Figure 1). Majority of the bulk freight is transported by road trains; more than 5,000 TEUs are transported through Rockhampton each day (refer to Figure 2).

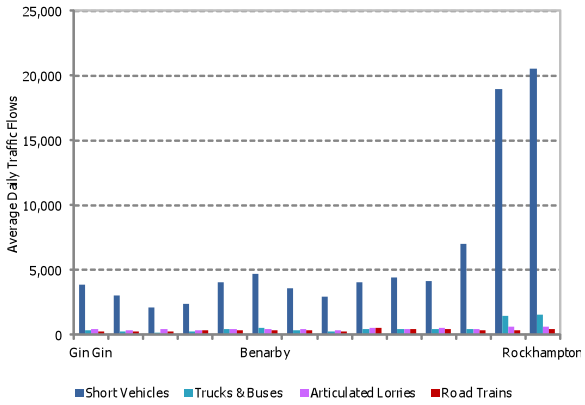

Figure 1.0: Average daily traffic flows from Gin Gin to Rockhampton

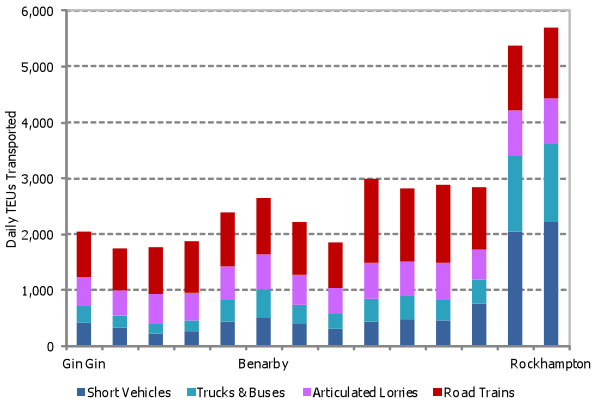

Figure 2.0: Daily TEUs transported from Gin Gin to Rockhampton

2.1. ROAD CORRIDOR - BRUCE HIGHWAY - Driver Fatigue, Accidents and Downtime:

With increased traffic movements highway related accidents are inevitable. With limitations on the highway (lack of dual lane and overtaking facilities) accidents are being observed as a regular occurrence – resulting in hospitalisation of victims as well as fatalities. Accidents necessitate downtime – with delays of between 2 – 3 hours being common.

An alternate mode of commuter transport will not only lessen traffic congestion on the Highway – it will provide a safe, efficient and economical facility for all commuters utilising the service.

3. DETAIL PROJECT REPORT – SALIENT'S AND PREMISES:

A Detailed Feasibility Study (DFS) for the North - South Commuter Rail Service is to be based on the following premises:

- The Commuter rail service will be operated with infrastructure that is owned and operated by Queensland Rail and QR National; this infrastructure currently operates as the passenger service from Brisbane to Cairns on the North - South rail line; and
- The Commuter rail service under investigation in this study is between the destinations of Rockhampton, Gladstone and Bundaberg only.

The DFS must also include and address the following:

1) Identify train services to the various areas within the study footprint including the number of services, times of operation of the service and numbers of potential commuters,
2) Purpose in which the service commuters are most likely to be using the service for,
3) The length of time the service is projected to be viable,
4) The interest from the private sector in subsidising or financial contribution to the project,
5) The social impacts that may result from the project,
6) The economic case for the service to be beneficial to the Central Queensland region as a whole, and independently the Gladstone, Rockhampton and Bundaberg regions.

4. OBJECTIVES OF THE STUDY:

The study aims to accurately inform the client and key stakeholders of the viability and the predicted longevity of viability of scheduling and provisioning of a Fast Rail Commuter Service from Rockhampton to Gladstone and return; and Bundaberg to Gladstone and return to service workforce, the retail sector and other tourism, social and health sectors to be identified in the study. The following objectives are to be further explored through the study:

- Viability of the project based on evidenced demand across the study area;
- Projected long term and short term viability of the project;
- Other opportunities and or sectors that may benefit from the Fast Rail Commuter Service;
- Proposed scheduling of services to meet demand;
- Cost benefit analysis;
- Potential for private sector support for the service - financial and/or subsidised and/or other.

The results of the study are expected to inform the client if this concept is a viable one and if the concept is then worth progressing to a more detailed study and/or a business plan stage.

5. NETWORK MAP:

Routes for consideration:

1. Rockhampton – Gladstone,
2. Gladstone – Bundaberg.


Map BR
South Queensland
Continued Map RC
Curragh
Longreach
Barcaldine
Alpha
Willows
Emerald
Blackwater
Duaringa
Ilfracombe
Jericho
Bogantungan
Anakie
Comet
Bluff
Dingo
Springsure
Kinrola
Laleham
Mount Larcom
Rockhampton
Yeppoon
Rosslyn Bay
Great Keppell Island
Cairns Tilt Train
The Sunlander
The Spirit of the Outback
Heron Island
Western Queensland
Kooemba
Koorngoo
Earlsfield
Graham
Callemondah
Gladstone
Boundary Hill
Biloela
Callide Coalfield
Miriam Vale
Burnett
Barcoo
Dawson
Rockhampton Tilt Train
Moura
Bundaberg
Monto
Howard
Goolara
Maryborough West
Maryborough
Mundubbera
Mungar
Byee
Murgon
Theebine
Taroom
Kingaroy
Gympie North
Channel Country
Proposed Dawson Valley Railway
Dagun
Gympie
Amamoor
Kandanga
Traveston
Cooran
Mary Valley Railway
Imbil
Pomona
Cooroy
Eumundi
Yandina
Sunshine Coast
QUEENSLAND
Wandoan
Nambour
Woombye
Palmwoods
Guluguba
Eudlo
CityTrain Sunshine Coast line
Mooloolah
Landsborough
Beerwah
Glasshouse Mountains
Beerburrum
Elimbah
Caboolture
Rosewood Railway
Kunkala
Cabanda
Perry's Knob
Brisbane
Toowoomba
Helidon
Gatton
Laidley
Rosewood
Dunwich
Ormeau
Darling Downs
Cecil Plains
Glenmorgan
Cunnamulla
Quilpie
Charleville
Morven
Roma
Yuleba
Mitchell
Wallumbilla
Miles
Chinchilla
Dalby
Oakey
Jandowae
Bell
The Westlander
Legend
Journey time - hours from Brisbane (or journey start)
Frequency Guide: Services per day:
Or - Days per week:
(Shaded = seasonal)
June 2007
Continued Map SB

6. SCOPE OF THE STUDY & EXPECTED OUTPUTS:

The feasibility study shall provide a high level feasibility assessment to indicate demand analysis and future viability of the "service" and entail the following specific tasks:

1. Evidence the demand for a Fast Rail Commuter Service in the study area,
2. Provide a detailed financial analysis based on the demand,
3. Provide a detailed analysis of the cost of the service,
4. Undertake scheduling planning and modelling at a level that examines what service provision can be offered by the service to meet the identified demand and at the appropriate times, and what impacts this will have on current services,
5. Report on the social impacts,
6. Report on the tourism, and retail sector opportunities the service may provide,
7. Consult with industry, agencies and the private sector to gauge interest in supporting the service through financial, subsidised or other provisions.

The main project deliverable will be a final report encapsulating all the research, analysis, findings, observations and recommendations.

It is envisioned that the final report would include:

- Executive summary including observations and recommendations;
- Background research including;
    - Demand assessment including potential commuter numbers – north and south,
    - Financial analysis including fare structure and subsidisation,
    - Infrastructure capacity and capability, timetable(s), recommended service analysis and practicable service commencement date.
- Comprehensive economic assessment of the potential viability and sustainability of the project,
- Preliminary risk assessment.
- Analysis of potential social and other impacts from the project,
- Identification of private sector support and participation for the project,
- An overall detailed report that clearly articulates any additional benefits impacts (positive or negative) and need for further technical inputs.

7. PROJECT MANAGEMENT & ADMINISTRATION:

The project is being undertaken by ***Capricorn Enterprise (proponents)*** and ***QRTravel*** as a joint undertaking - under the administration of Capricorn Enterprise who will act as the primary contact for service providers.

Contact details for Capricorn Enterprise and QR Rail Travel:

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Economic Development Manager
Capricorn Enterprise
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Max Kruse
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T: 07 3235 3647 M: 0405 287 549 F: 07 3235 1365
Max.Kruse@qr.com.au

8. MILESTONES & TIMING:

Due to the urgency in having the Study completed by April 30th 2012 – the following timelines have been established:

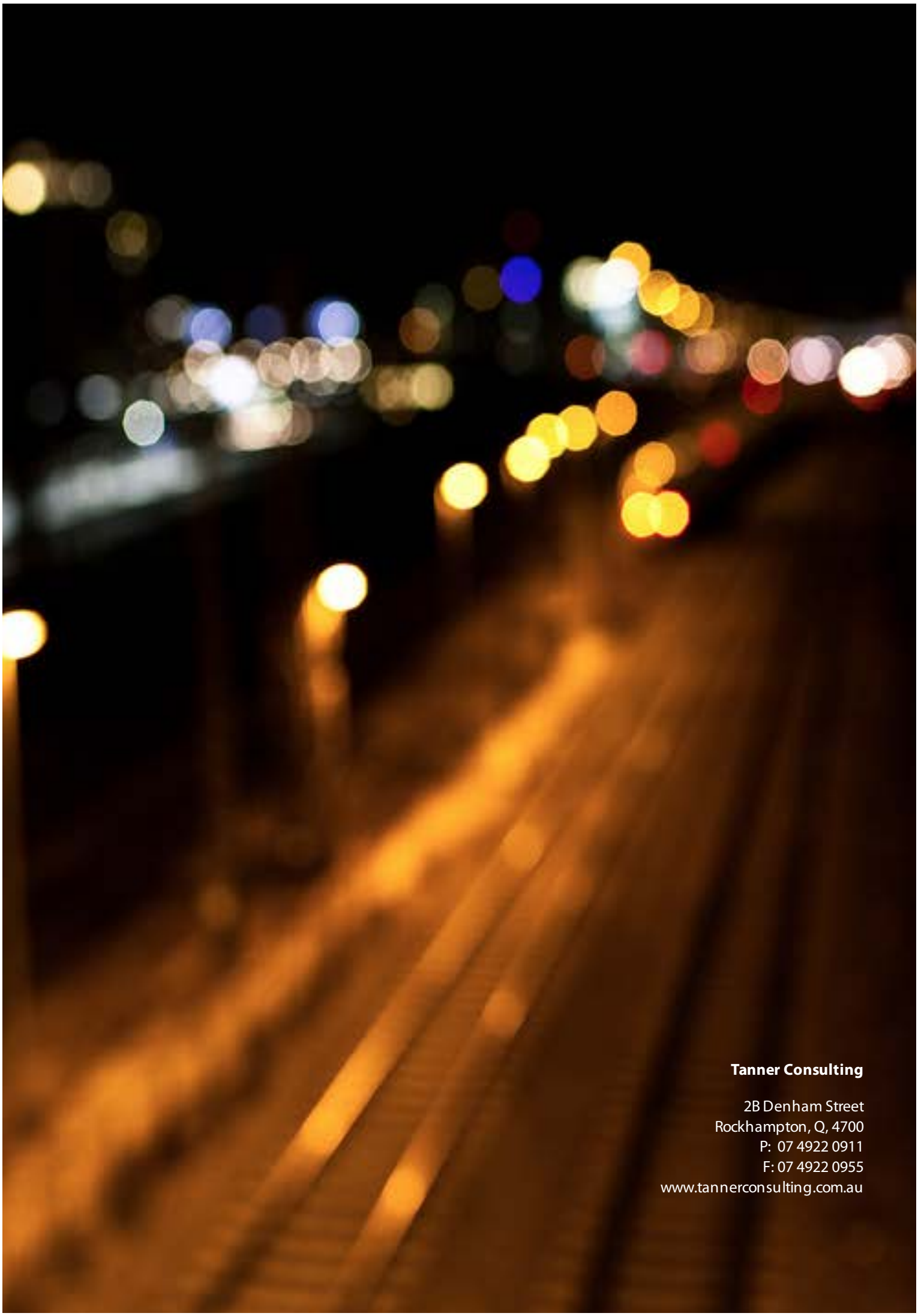
Quotations – suitably endorsed, will be received by the proponents by no later than Monday February 20th at 4pm and should include, as a minimum, the following:

- ✓ Proposed methodology.
- ✓ Key project staff included in the project team.
- ✓ Timeline for the study.
- ✓ Proposed fixed fee inclusive of all travel and other incidental costs.
- ✓ Contact details.
- ✓ Insurance cover including professional indemnity, public liability and workers cover.

Start-Up Meeting: It is proposed that a start up meeting will be held in Rockhampton on Thursday February 23rd.

Whilst there is no requirement to undertake significant community or associated industry consultation, it is expected that the successful Consultancy will meet with key business and industry groups to complete the demand assessment.

E & O E.



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