TOR section	Title	Requirement	Section in Report
		• impact of driver fatigue for workers travelling to and from regional centres and key destinations • impacts on any existing public transport networks (assets and services).	
3.9.3.2	Rail impacts	The assessment of rail impacts should consider: • project impacts on the amenity and health of adjacent land users as a result of dust, noise and vibration • impacts on transport and services, should the Project generate large public transport trip movements.	The use of the rail network to transport project freight is currently being considered. At this stage the assessment has been based on rail not being used. A discussion of the existing rail network is found in 2.4 Rail network and potential rail usage and impacts in 4.3 Rail network
3.9.4	Proposed infrastructure alterations	The EIS should detail proposed alterations to road and rail infrastructure occasioned by the Project. This includes road realignments; grade separated crossings, level crossings, road alterations and resurfacing, bridges, access roads, and associated civil works. Special reference should be made to any relationship between road works undertaken as part of the Project and works proposed in DTMR's *Roads Implementation Program* where details of such works are provided by the DIP to the proponent or otherwise published. Any proposed new infrastructure provision or requirements to mitigate impacts of development on State-controlled roads should be in accordance with DTMR's *Road Planning and Design Manual.* The EIS should also discuss the results of consultation with the relevant district and regional officers of DTMR and local government regarding the potential impacts of the Project on the road network and proposed infrastructure alterations. This consultation should also discuss developing an integrated approach with this and other existing or planned projects (whether publicly published or advised by DIP) known to the proponent.	Road and rail impacts are addressed under 4.2 Road transport 4.3 Rail network Their relationship to current network planning is addressed under 2.2 Policy and network planning framework

TOR section	Title	Requirement	Section in Report
3.9.5	Road management planning	A traffic analysis should be presented to indicate the impacts or improvements to traffic flows and capacity both during construction and after completion. Particular attention should be paid to: • requirements for access to road/rail corridors during construction, including emergency access • methods to be adopted to ensure safety and avoid obstruction to other road/rail users during construction • proposed traffic management arrangements and plans • capacity and safety improvements as a result of road infrastructure alterations. This section should also address how transport elements and impacts of the Project, taking into account publicly published or DIP advised future demand growth, (including the potential impact of other major infrastructure and industrial projects in the nearby area) relate to DTMR's existing transport strategies for the Central Queensland area and the future infrastructure needs of this area as presented in State Government documents, including: Statements of Intent for Road Link Development; Gladstone Integrated Regional Transport Plan 2001 – 2030; and Capricornia Integrated Regional Transport Plan 2004 – 2030. It is also necessary to make reference to publicly published or DIP advised planning schemes of the relevant local governments. This section should outline: • procedures for assessing and agreeing on the scope of required infrastructure alterations with road/rail corridor managers, including any associated works, such as sourcing water and gravel • strategies to minimise the effects of project transport on existing and future public road or rail corridors	Overall road impacts and mitigation are addressed under the 2 Existing transport network assessment and sub sections 2.1 Transport legislation 2.2 Policy and network planning framework and a range of potential project impacts on the road network are addressed under 4.2 Road transport Preliminary information on the Traffic Management Plan are provided in 4.2.13 Traffic Management Plan This plan will be progressively developed as the Project develops

TOR section	Title	Requirement	Section in Report
		• steps to be taken to prevent access from public roads/rail corridors to the Project sites • strategies to maintain safe access to public road/rail reserves to allow road/rail/pipeline maintenance activities • process for decommissioning of any temporary access to road/rail reserves, e.g., stockpile sites. Findings of studies and transport infrastructure impact assessments should be an input into preparing a draft road-use management plan. Conditions of approval for transport management impacts should also be detailed in the EMP (see section 7.0).	
3.9.6	Shipping	The Regional Harbour Master Gladstone should be consulted regarding maritime issues relating to the movement and loading of LNG tankers and any barge operations. The EIS should discuss the results of the consultation. Describe current vessels utilising the port and in the Commonwealth Marine area, their size, shipping movements, anchorages, access to/from the port and navigational arrangements. In relation to shipping of LNG, details of the number of ships utilising Gladstone Ports Corporation (GPC) port facilities and their size and frequency should be documented. In particular, changes to any of the following are to be described: • berthing/departure requirements including weather constraints • security zones around the vessels both in berth and in transit, together with impacts on other maritime operations • interaction with other vessels • scheduling of vessel movement	Shipping is addressed in a number of locations throughout the report 1.5.1 Mainland Facilities and Embarkation Point Flags the concerns previously raised over the use of Auckland Point and the response to this 2.1 Transport legislation 2.2 Policy and network planning framework Provide the legislative and policy context 2.5 Shipping provides details on the existing shipping network and operations 3.6 Transport – shipping provides details on proposed shipping operations 4.4 Shipping provides details on the Projects

TOR section	Title	Requirement	Section in Report
		• channel configuration, including swing basins • towage requirements, including provision of escort tugs (if necessary) and having the use of LNG vessel dedicated escort tugs • pilot requirements • parameters of vessels to be used • arrival and departure conditions of the vessels • anchorage arrangements • access to and from the port, shipping routes to be used by vessels beyond the port in Commonwealth marine waters. These should be indicated in relationship to the GBRMP and to the main shipping channels • any other navigational arrangements • any additional servicing of vessels In regard to increased shipping volumes, the following should be specifically addressed: • potential for introduction of exotic organisms from increased shipping rates • ballast water management arrangements - including Australian Quarantine and Inspection Service (AQIS) mandatory arrangements and agency contingency planning • management of ship waste, in particular quarantine waste, domestic garbage, oil and sewage • potential risk of spills and their management • potential foreshore damaged caused by LNG tanker and tug activities	potential impact on shipping and the proposed mitigation measures

TOR section	Title	Requirement	Section in Report
		• potential for increased vessel strike to marine species • potential impacts on existing shipping activity from both LNG ship movements and if the Project should generate a significant degree of public or private ferry or barge movements in the port • routes of ships in transit through port waters and the aligned infrastructure such as navigational aids Additional marine transport issues that should be considered include the potential of the proposal to impact on recreational craft. Potential impacts arising from the gas pipeline crossing of waterways which are able to support vessel activity should also be considered.	
3.9.7	Air Services	The air services and their current capacity serving the gas field region and the Gladstone region should be described. Projections should be made of the requirements of the Project for air transport to and from these regions, and the services required to supply these projections An assessment is required of the infrastructure needed to support the Projected level of air services	Legislation and policy pertaining to air services are addressed in; 2.1 Transport legislation 2.2 Policy and network planning framework Existing conditions are addressed in 2.7 Air network, impacts and mitigation in 4.5 Air services

4.1.2 Sustainability and Risk

Australia Pacific LNG recognises that the construction and operation of the Project could create environmental and community impacts and that successful management of these impacts will be crucial throughout the life of the Project. To this end, the assessment of this project across all disciplines has incorporated recognised sustainability principles.

The sustainability principles applied to the traffic and transport component of the EIS are:

- Adhering to an overriding duty to safety, ensuring operations are carried out in a safe manner and empowering employees and contractors to place safety considerations above all other priorities
- Minimising adverse environmental impacts and enhancing environmental benefits associated with Australia Pacific LNG's activities, products or services. Conserving, protecting, and enhancing where the opportunity exists, the biodiversity values and water resources in Australia Pacific LNG's operational areas
- Reducing the greenhouse gas intensity of Australia Pacific LNG's operations through the development of an energy source less carbon intensive than the world average for the majority of fuel providers for power generation; and implementing a greenhouse gas mitigation strategy that commits Australia Pacific LNG to continuously seek opportunities to further reduce greenhouse gas emissions
- Engaging regularly, openly and transparently with people and communities affected by Australia Pacific LNG's activities, considering their views in Australia Pacific LNG's decision-making and striving for positive social outcomes
- Working cooperatively with communities, governments and other stakeholders to achieve positive social and environmental outcomes, seeking partnership approaches where appropriate
- Identifying, assessing, managing, monitoring and reviewing risks to Australia Pacific LNG's workforce, Australia Pacific LNG's property, the environment and the communities affected by Australia Pacific LNG's activities.

A risk assessment has been undertaken to identify potential risks, causes and consequences from traffic and transport. Mitigation measures to reduce the risks have been nominated and the residual risk has been calculated. Further details of the Project risk assessment methodology are provided in Volume 1 Chapter 4 of this EIS.

4.1.3 Consultation

A primary objective of this EIS is to provide a comprehensive and robust assessment that meets the needs of the stakeholders and regulatory agencies. Australia Pacific LNG personnel and the WorleyParsons assessment team have embarked on a comprehensive and ongoing consultation process.

Issues that were raised by stakeholders and regulatory agencies in relation to other LNG proponents' EIS' were highlighted in Section 1.

The following matters were addressed through discussions with stakeholders;

- Presenting the assessment methodology to the regulatory agencies for endorsement early in the Project assessment

- Undertaking several rounds of consultation with the DTMR, local Government, QR, Gladstone Ports Corporation and Gladstone Airport staff
- Responding to matters discussed at the relevant meetings

4.2 Road transport

4.2.1 Methodology - roads

Road components

When determining the impact of the Project, four components of the road infrastructure network were analysed as follows:

- Road link capacity
- Intersection capacity
- Pavement capacity
- Bridge capacity

The first three components listed above were assessed using a spreadsheet based sketch traffic model developed that combined background traffic and growth rates with project generated traffic.

The impact of the Project on bridges was assessed qualitatively as only limited bridge condition data was made available for this assessment.

For each of these components, the methodology used to determine the Project's impacts are presented.

Assessment timeframe

The year 2010 has been selected as the starting point for assessment purposes.

The timeframe for the assessment of any works continues until 2032 for the reasons described below:

- The former Department of Main Road's publication Guidelines for Assessment of Road Impacts of Development (GARID) indicates that for staged developments the planning horizon should be 10 years after the opening of the final stage.
- The fourth and final train of the LNG plant will be fully operational by the year 2022, therefore to remain in line with GARID the planning horizon has been adopted as 10 years after 2022, i.e. year 2032.

Whilst the Project continues to 2045 and possibly beyond, development between 2032 and 2045 is generally limited to drilling activities and background traffic growth dominates during this period.

Traffic analysis scenarios

In general, the traffic scenarios modelled in the assessment were as follows;

- Background - this assessment was undertaken with the background traffic within the assessment timeframe and factored by the appropriate growth rates.
- Background plus Project - this assessment was undertaken with background traffic plus the addition of the traffic generated from the proposed Project within the assessment timeframe.

- Background plus Project and regionally significant projects - this assessment was undertaken with background traffic plus the addition of the traffic generated from the proposed Project plus the traffic generated from other regionally significant projects within the assessment timeframe.

The assessment of intersection performance was undertaken for the following:

- Year 2010 – as detailed above, this is the first year of the Project's assessment period
- Year 2013 – this year is the first peak traffic generation year of the Project that is associated with the construction of LNG trains one and two. This coincides with the construction of the gas pipeline
- Year 2019 – this year represents the second peak traffic generation year of the Project that is associated with the construction of LNG trains three and four. This coincides with the operation of trains one and two. While an earlier peak occurs in 2013, 2019 will be more critical as it will be combined with a higher background traffic component
- Year 2032 – as detailed above, this is the final year of the Project's assessment period.

Assessment triggers

GARID states that a project's road impacts are considered to be insignificant if the Project generates an increase on State controlled roads of no more than five percent against existing levels. Therefore, if the Project generates an increase of more than five percent then the impact is deemed to be potentially significant and the impact needs to be assessed.

Growth rates

During the analysis period, there is expected to be a background increase in traffic volumes due to growth in the region independent of this Project. The growth rates are based on:

- Years 2008 – 2020 - application of the historic 10 year average growth rate based upon the assumption that this growth rate continues to 2020
- Years 2020 – 2032 - application of a decaying growth rate based upon the assumption that this 10 year growth rate is not realistically expected to continue and a more modest growth rate would occur. This was calculated by reducing the 2010 growth rates by 20% in 2032 and interpolating for the years in between. This reflects general background traffic growth and generally excludes this and other known regionally significant projects currently planned for the study area.
- There were two other limitations exercised in the growth rate parameters as follows:
- Where the 10 year historical growth rate was less than 1%, including roads with negative growth, a growth rate of 1% p.a. was adopted
- Where the 10 year historical growth rate was greater than 5%, a rate of 5% was adopted for the first 10 years. The growth rate then decays as detailed above.

A summary of the growth rates adopted for the assessment is given in Appendix G.

Sketch planning model

A sketch planning model is a type of transport model that aims to simplify/streamline the forecasting of traffic volumes. The Australia Pacific LNG model has been developed in a series of spreadsheets, with additional coding of traffic distribution and routes in GIS.

The model is primarily focused on forecasting traffic volumes on the State controlled road network. While the local roads are identified in the GIS coding of the proposed traffic routes and are included in the calculations of Project traffic, the lack of information about pavement condition, AADT and growth rate on the local road network prohibited meaningful analysis in the sketch model. A complete listing of the roads included in the model can be found in Appendix E.

The primary goal of the model was to determine future traffic volumes for the three traffic analysis scenarios as described previously. The model was used to identify link capacity constraints, to provide the necessary input data for the pavement capacity analysis and to provide input to the SIDRA intersection software package to enable the analysis of intersections.

The model was been developed in two parts. Firstly a mid-block capacity model was been developed that forecasts daily two-way volumes on the whole road network to analyse the roadway link capacities and provide data for the pavement capacity analysis. Secondly, a subsidiary model was developed that forecasts turning movements at key intersections, utilising data from the mid-block model, for further analysis in the SIDRA Intersection software package.

Mid-block model development

The intention of the mid-block model is to forecast daily two-way traffic volumes for the three traffic analysis scenarios. These forecasts are then utilised to identify segments of road that may encounter capacity constraints in the future either without the Project, after development of the Project, or as a result of the cumulative impact of all developments.

The DTMR provided 2008 mid-block traffic count data and historical growth rates for all State controlled roads as detailed in Appendix E. The data has been utilised in developing the base case models.

Intersection assessment model development

The intersection assessment model focuses primarily on forecasting turning movement flows at key intersections within the study area. The traffic flows for each intersection are forecast through the assessment period as per the mid-block assessment model.

Traffic counts for the morning and afternoon peak periods were supplied by DTMR. Counts were undertaken in 2005, 2006, 2007 and 2008. These counts form the basis of the background flows that are projected in to the future.

It has been assumed that all turning movements at the intersections in the model encounter the same growth rates as the mid-block model.

Vehicle types

Based upon the breakdown of vehicle types provided in the traffic count data, the following vehicle classes were used in the sketch planning model:

- Light vehicles
- Trucks and buses
- Articulated trucks
- Road trains.

For the purposes of incorporating the background traffic, it was assumed that the relative proportion of vehicle classes remains constant into the future.

Table 4.2 shows how these four vehicle classes relate to the 12 Austroads vehicle classes.

Table 4.2 Vehicle types

Austroads class	APLNG model (DTMR) class
Short	Light Vehicles
Short – towing	Light Vehicles
Two Axle Truck or Bus	Truck or bus
Three Axle Truck or Bus	Truck or bus
Four Axle Truck	Truck or bus
Three Axle Articulated	Articulated truck
Four Axle Articulated	Articulated truck
Five Axle Articulated	Articulated truck
Six Axle Articulated	Articulated truck
B Double	Articulated truck
Double Road Train	Road train
Triple Road Train	Road train

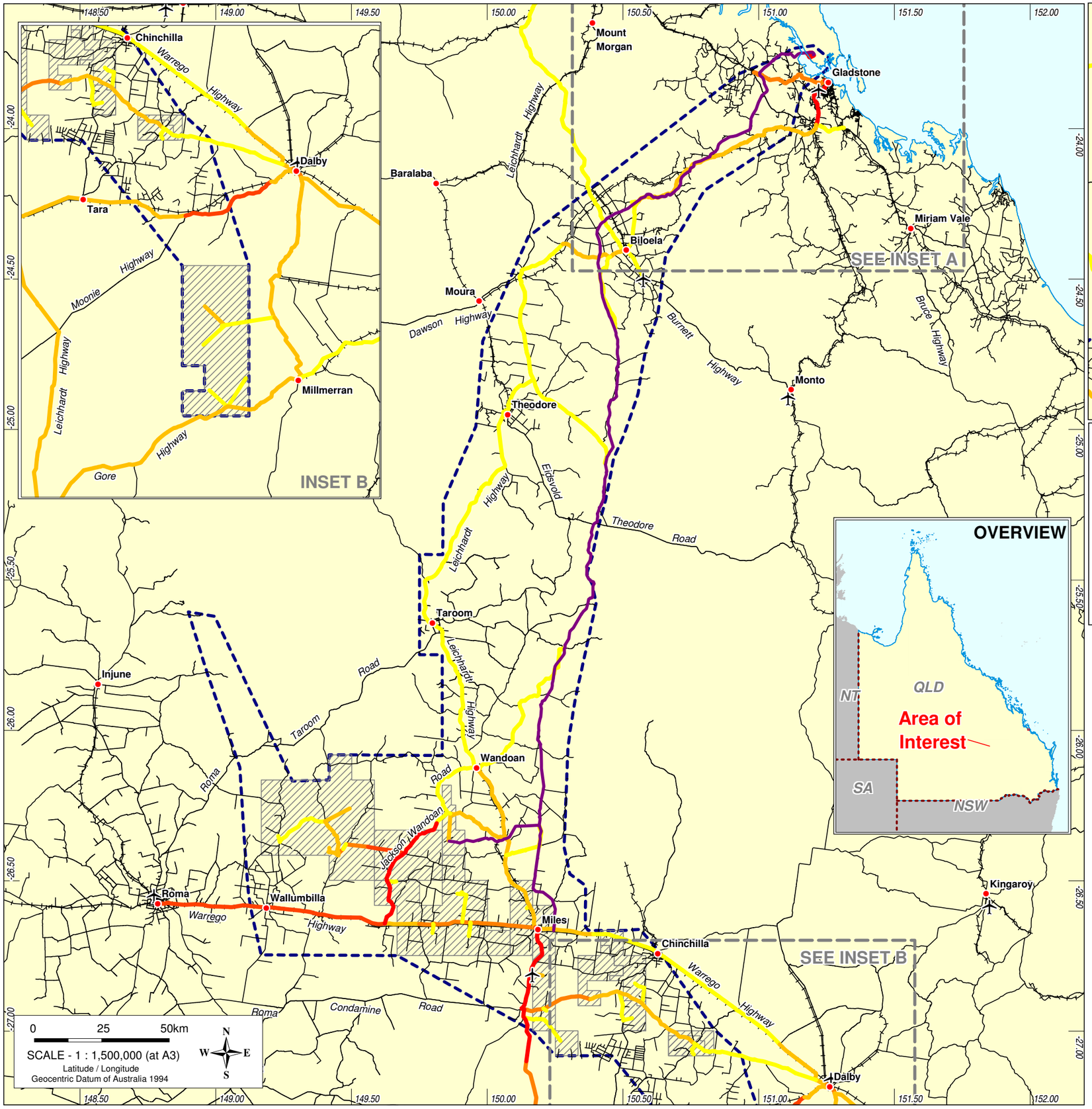
Project traffic distribution

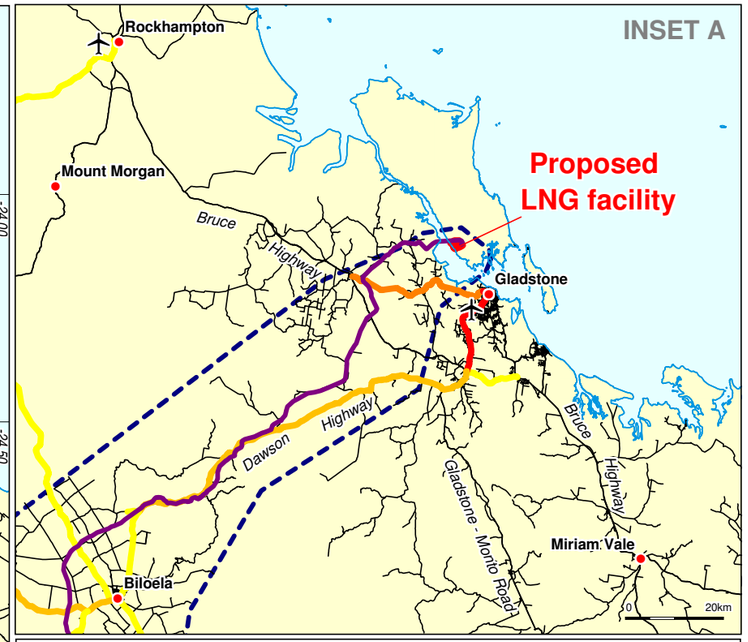
The distribution of Project traffic refers to the traffic generated by the Project, and where the traffic is coming from and/or going to. The approach taken in the model was as follows:

- Calculate the traffic movements (trips) for each component of the Project (refer Section 3)
- Code the traffic movements in the GIS
- Interrogate the GIS for each movement and identify the affected road links
- Calculate (sum) the total traffic on each road link and input this into the sketch model
- Add the Project traffic to the background traffic and analyse the model

4.2.2 Roads impacted

The average daily project traffic on the road network is shown on Figure 4.1.





LEGEND

- Town
- Aircraft facility
- Railway
- Road
- Preferred pipeline alignment
- Walloons gas fields development areas
- Study area

Average Daily Traffic

- Less than 50
- 51 - 100
- 101 - 150
- 151 - 200
- More than 200

0 25 50km

SCALE - 1 : 1,500,000 (at A3)

Latitude / Longitude

Geocentric Datum of Australia 1994

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	27/01/2010	Issued for use	NA	KM		

WorleyParsons
resources & energy

AUSTRALIA PACIFIC LNG

AUSTRALIA PACIFIC LNG PTY LIMITED

AUSTRALIA PACIFIC LNG PROJECT

Figure 4.1 Average Daily Traffic

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0384	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

K:\ORIGIN\301001-00448\GIS\Maps\00448-00-EN-DAL-0384Rev0(Transport_AverageDay).wor

A summary of all of the State controlled roads within the study area is given in Table 4.3, Table 4.4 and Table 4.5. The table provides the peak increase in traffic volume on each link resulting from the Project.

Table 4.3 Impact of Project, Fitzroy Region

Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
181 - Gladstone-Mt Larcom Rd	Ch 0 to 1.345	Dawson Highway to Port Access Road	8,395	25	0.3%
		Port Access Road to Hilderbrand Street	8,395	12	0.1%
	Ch 1.345 to 3.258	Hilderbrand Street to Blain Drive	6,653	12	0.2%
	Ch 3.258 to 4.625	Blain Drive to Red Rover Road	9,445	425	4.5%
	Ch 4.625 to 12.292	Red Rover Road to Reid Road	6,469	425	6.6%
	Ch 12.292 to 32.14	Reid Road to Bruce Highway	3,070	116	3.8%
183 - Gladstone Port Access Rd	Ch 0 to 0.858	Auckland Point to Gladstone Mt Larcom Road	2,135	67	3.1%
26A - Leichhardt Hwy	Ch 0 to 25.68	Banana Regional Council boundary to Burnett Highway	933	4	0.4%
	Ch 104.66 to 105.22	Dawson Highway to Dawson Highway, Banana	2,197	30	1.4%
	Ch 105.22 to 162.34	Dawson Highway to Eidsvold - Theodore Rd	858	41	4.8%
	Ch 162.34 to 170.29	Eidsvold - Theodore Rd to Glenmoral Roundstone Road	747	23	3.1%
	Ch 170.29 to 192.23	Glenmoral Roundstone Road to 6.4km north Isla Gorge Road	519	23	4.5%
	Ch 192.23 to 238.956	6.4km north Isla Gorge Road to Joynsons Road	431	23	5.4%
	Ch 238.956 to 256.508	Joynsons Road to Roma - Taroom Rd	513	23	4.5%
41D - Burnett Hwy	Ch 41.47 to 85.531	34km south east of Russian Club Road – Hintons Lane	696	5	0.7%

	Ch 85.531 to 92.811	Hintons Lane – Wahroonga Street	1,849	5	0.3%
	Ch 92.811 to 93.811	Wahroonga Street – Dawson Highway	2,415	5	0.2%
41E - Burnett Hwy	Ch 0 to 35.511	Dawson Highway – 12.5km north of Bongers Lane	1,166	4	0.3%
	Ch 35.511 to 71.84	12.5km north of Bongers Lane – Leichhardt Highway	860	4	0.5%
46A - Dawson Hwy	Ch 0 to 1.5	Gladstone Mr Larcom Road to Breslin Street	13,140	58	0.4%
	Ch 1.5 to 2.24	Breslin Street to Blaine Drive	20,462	134	0.7%
	Ch 2.24 to 3.13	Blain Drive to Phillip St	24,981	676	2.7%
	Ch 3.13 to 4.39	Philip Street to Penda Avenue	28,095	575	2.0%
	Ch 4.39 to 5.18	Penda Avenue to Chapman Drive	24,403	525	2.2%
	Ch 5.18 to 10.3	Chapman Drive to Harvey Road/Beecher Street	6,483	107	1.7%
	Ch 10.3 to 19.05	Harvey Road/Beecher Street to Bruce Highway	5,152	107	2.1%
	Ch 19.05 to 21.75	Bruce Highway to Taragoola Road	6,169	107	1.7%
	Ch 21.75 to 25.69	Taragoola Road to Gladstone Monto Road	1,279	58	4.5%
	Ch 25.69 to 101.15	Gladstone Monto Road to Argoon Kilburnie Road	1,030	58	5.6%
	Ch 101.15 to 113.87	Argoon Kilburnie Road – Shepherdson Road	900	38	4.3%
	Ch 113.87 to 116.97	Shepherdson Road – Tognolini Baldwin Road	1,227	38	3.1%
	Ch 116.97 to 119.9	Tognolini Baldwin Road – Burnett Highway	6,200	38	0.6%
46B - Dawson Hwy	Ch 0 to 1.37	Burnett Highway – Meissners Road	5,304	38	0.7%
	Ch 1.37 to 26.8	Meissners Road – Beldeen Defence Road	1,572	61	3.9%

	Ch 26.8 to 45.69	Beldeen Defence Road – Charles Street	1,196	32	2.7%

Table 4.4 Impact of Project, Darling Downs Region

Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
18C - Warrego Hwy	Ch 0 to 1.09	450m south of Moonie Highway to 640m north of Moonie Highway, Dalby	7,551	123	1.6%
	Ch 1.09 to 25.115	640m north of Moonie Highway to 20km south of Warra Kogan Road	2,673	52	1.9%
	Ch 25.115 to 45.195	20km south of Warra Kogan Road to Warra Kogan Road	2,375	45	1.9%
	Ch 45.195 to 80.175	Warra Kogan Road to Chinchilla Tara Road	2,195	45	2.0%
	Ch 80.175 to 83.155	Chinchilla Tara Road to Auburn Road	2,751	45	1.6%
	Ch 83.155 to 106.355	Auburn Road to 1.8km west Davies Road	2,248	45	2.0%
	Ch 106.355 to 126.745	1.8km west Davies Road to Leichhardt Highway	2,066	75	3.6%
18D - Warrego Hwy	Ch 0 to 1.135	Leichhardt Highway to Leichhardt Highway, Miles	2,911	197	6.8%
	Ch 1.135 to 44.099	Leichhardt Highway to Dulacca South Road	1,497	138	9.2%
	Ch 44.099 to 56.831	Dulacca South Road to Jackson Wondoan Road	1,283	69	5.4%
	Ch 56.831 to 101.157	Jackson Wondoan Road to Chadford Street	1,255	158	12.6%
	Ch 101.157 to 135.247	Chadford Street to Roma Surat Road	1,621	158	9.7%
	Ch 135.247 to 141.267	Roma Surat Road to Carnarvon Highway	3,217	158	4.9%
26B - Leichhardt Hwy	Ch 0 to 60.47	Bridge Street, Taroom to Jackson Wondoan Road	677	25	3.7%
	Ch 60.47 to 127.61	Jackson Wondoan Road to Warrego Highway	643	98	15.3%

Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
26C - Leichhardt Hwy	Ch 0 to 32.02	Warrego Highway to Roma Condamine Road	489	278	56.8%
	Ch 32.02 to 53.04	Roma Condamine Road to 16.6km south of Elerslea Ln	322	204	63.4%
	Ch 53.04 to 81.4	16.6km south of Elerslea Ln to Surat Developmental Road	296	139	47.0%
	Ch 81.4 to 127.42	Surat Developmental Road to Moonie Highway	327	60	18.2%
	Ch 127.42 to 176.37	Moonie Highway to 29km north of Gore Highway	466	60	12.8%
	Ch 176.37 to 205.21	29km north of Gore Highway to Gore Highway	570	60	10.5%
28A - Gore Hwy	Ch 0 to 1.05	Warrego Highway to bend	19,936	21	0.1%
	Ch 1.05 to 1.95	Bend to 900m south	15,083	18	0.1%
	Ch 1.95 to 3.52	900m south of bend to 1.57km south of bend	15,244	21	0.1%
	Ch 3.52 to 5.59	1.57km south of bend to 3.64km south of bend	10,865	21	0.2%
	Ch 5.59 to 35.57	3.64km south of bend – Rail line	3,828	21	0.5%
	Ch 35.57 to 79.54	Railway Crossing Milmerran – Cecil Plains Road	2,271	21	0.9%
28B - Gore Hwy	Ch 0 to 49.92	Milmerran - Cecil Plains Road – 7.5km west of bend	1,515	67	4.5%
	Ch 49.92 to 121.55	7.5km west of bend – Leichhardt Highway	1,241	60	4.8%
325 - Dalby - Cecil Plains Rd	Ch 0 to 39.08	Warrego Highway to Milmerran Cecil Plains Road	475	85	18.0%
3251 - Milmerran - Cecil Plains Rd	Ch 0 to 45.61	Dalby- Cecil Plains Road to Gore Highway	128	95	74.3%
340 - Dalby-Kogan Rd	Ch 0 to 19.292	Warrego Highway – 6.2km east of Kumbarilla Lane	650	12	1.9%

Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
	Ch 19.292 to 47.682	6.2km east of Kumbarilla Lane – Tara-Kogan Road	397	12	3.1%
3402 - Tara-Kogan Rd	Ch 34.8 to 43.03	Kerrs Road to Dalby Kogan Road	158	28	17.6%
341 - Chinchilla-Tara Rd	Ch 22.51 to 43.49	Kogan Condamine Road to Dougalls Road	436	39	9.0%
342 - Kogan-Condamine Rd	Ch 0 to 45.82	Tara-Kogan Road to 9.6km west Noel Robinson Road	202	83	41.1%
	Ch 45.82 to 71.41	9.6km west Noel Robinson Road to Leichhardt Highway	484	122	25.1%
35A - Moonie Hwy	Ch 0 to 2.5	Warrego Highway to 2.5km south	6,870	85	1.2%
	Ch 2.5 to 11	2.5km south Warrego Highway to Railway Crossing	1,800	85	4.7%
	Ch 11 to 50.37	Railway crossing to Surat Developmental Road	1,466	171	11.6%
4302 - Jackson-Wandoan Rd	Ch 47.94 to 68.93	Roma Council boundary to Bundi Road	71	11	15.4%
	Ch 68.93 to 81.1	Bundi Road to Leichhardt Highway	155	11	7.0%
86A - Surat Developmental Rd	Ch 119.3 to 142.67	Leichhardt Highway to 23km east	292	85	29.3%
	Ch 142.67 to 146.95	23km east of Leichhardt Highway to 540m west of Chinchilla Tara Road	678	85	12.6%
	Ch 146.95 to 147.51	540m west of Chinchilla Tara Road to Chinchilla Tara Road	1,668	85	5.1%
	Ch 147.51 to 147.86	Chinchilla Tara Road to 250m east of Chinchilla Tara Road	2,543	85	3.4%
86B - Surat Developmental Rd	Ch 0 to 0.05	250m east of Chinchilla Tara Road - 300m east of Chinchilla Tara Road	2,097	85	4.0%
	Ch 0.05 to 0.6	300m east of Chinchilla Tara Road to 850m east of Chinchilla Tara	1,023	85	8.4%

Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
		Road			
	Ch 0.6 to 40.39	850m east of Chinchilla Tara Road to Moonie Highway	629	85	13.6%

Table 4.5 Impact of Project, South West Region

Road name	Chainage	Extents	2009 AADT	Peak Daily Project traffic	Max increase
4302 - Jackson-Wandoan Road	Ch 0 to 47.94	Warrego Highway to Roma Council boundary	71	211	295.0%

4.2.3 Road link capacity analysis

4.2.4 Methodology

The methodology adopted to assess the road links within the study area was as follows:

- Identify the road links within the study area that could be utilised by project traffic
- Identify planned road alterations within the study area
- Gather all available data on existing traffic volumes on the road links within the study area
- Input traffic data into the sketch model
- Analyse the network over the analysis period of 2010 to 2032, by factoring the average annual daily traffic by the appropriate growth rates to determine background traffic to road links
- Identify and report deficiencies in the existing network (i.e. where road capacity is exceeded)
- Add project traffic to existing background traffic to calculate increased traffic due to the Project
- Identify the road links where the Project traffic has a significant impact (i.e. where project traffic exceeds five percent of existing traffic)
- For the road links deemed to have been significantly impacted by the Project, determine alteration requirements to maintain road link safety and capacity
- Determine whether alteration needs to be brought forward due to project traffic, and by how many years
- Repeat assessment for traffic generated by regionally-significant projects.

Analysis parameters

The capacity of the road links has been generally based on the approach outlined in Austroads Guide to Traffic Engineering Practice – Part 2. The capacities are based on a level of service (LOS) E.

Table 4.6 provides a summary of the adopted capacities for various road links within the study area.

Table 4.6 Roadway link capacities

Roadway type	Capacity (vehicles per day)
Rural, two lanes	16,000
Rural, four lanes with median	40,000
Urban, two lane	18,000
Urban, four lane no median, no access control	30,000
Urban, four lane with median, no access control	36,000

Notes:

[1]Adopted from Table 3.9 of Austroads assuming rolling terrain and k=0.10 but adjusted for 3.3m standard lanes, 1m shoulders and 10% truck traffic

[2] Adopted from Section 4 of Austroads assuming rolling terrain, 80km/hr travel speed, 3.3m standard lanes, 1m shoulders and 10% truck traffic

[3] Adopted from Section 7 of Austroads Table 7.1

[4] Adopted from Section 7 of Austroads Table 7.1

For the rural road links, the road link capacity should consider the operating level of service (LOS).

For rural road links, extended operation at LOS D and E is considered intolerable.

Table 4.7 summarises the maximum AADTs for various levels of service as per the Austroads guidelines for rural roads.

Table 4.7 Adopted maximum AADTs for various levels of service

Road link Type	AADT for level of service				
	A	B	C	D	E
Rural, two lane[1]	1200	3000	5500	8400	16000
Rural, four lane[2]	13200	18000	24000	30400	40000

Notes:

[1] Adopted from Table 3.9 of Austroads assuming rolling terrain and k=0.10 but adjusted for 3.3m standard lanes, 1m shoulders and 10% truck traffic

[2] Adopted from Section 4 of Austroads assuming rolling terrain, 80km/hr travel speed, 3.3m standard lanes, 1m shoulders and 10% truck traffic

Significantly impacted links

Links that are impacted by more than five percent are given in Table 4.8. It is noted that Gladstone-Mt Larcom Road from the Bruce Highway to the Blain Drive and the Dawson Highway from the Bruce Highway to Breslin Street have been considered as potentially being significantly impacted by the Project even though the Project traffic is less than five percent of the background traffic.

Table 4.8 Significantly impacted roads

DTMR Region	Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
Darling Downs	18D - Warrego Hwy	Ch 0 to 1.135	Leichhardt Highway to Leichhardt Highway, Miles	2,911	197	6.8%
		Ch 1.135 to 44.099	Leichhardt Highway to Dulacca South Road	1,497	138	9.2%
		Ch 44.099 to 56.831	Dulacca South Road to Jackson Wondoan Road	1,283	69	5.4%
		Ch 56.831 to 101.157	Jackson Wondoan Road to Chadford Street	1,255	158	12.6%
		Ch 101.157 to 135.247	Chadford Street to Roma Surat Road	1,621	158	9.7%
	26B - Leichhardt Hwy	Ch 60.47 to 127.61	Jackson Wondoan Road to Warrego Highway	643	98	15.3%
	26C - Leichhardt Hwy	Ch 0 to 32.02	Warrego Highway to Roma Condamine Road	489	278	56.8%
		Ch 32.02 to 53.04	Roma Condamine Road to 16.6km south of Elerslea Ln	322	204	63.4%
		Ch 53.04 to 81.4	16.6km south of Elerslea Ln to Surat Developmental Road	296	139	47.0%
		Ch 81.4 to 127.42	Surat Developmental Road to Moonie Highway	327	60	18.2%
		Ch 127.42 to 176.37	Moonie Highway to 29km north of Gore Highway	466	60	12.8%

DTMR Region	Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
		Ch 176.37 to 205.21	29km north of Gore Highway to Gore Highway	570	60	10.5%
	325 - Dalby - Cecil Plains Rd	Ch 0 to 39.08	Warrego Highway to Milmerran Cecil Plains Road	475	85	18.0%
	3251 - Milmerran - Cecil Plains Rd	Ch 0 to 45.61	Dalby- Cecil Plains Road to Gore Highway	128	95	74.3%
	3402 - Tara-Kogan Rd	Ch 34.8 to 43.03	Kerrs Road to Dalby Kogan Road	158	28	17.6%
	341 - Chinchilla-Tara Rd	Ch 22.51 to 43.49	Kogan Condamine Road to Dougalls Road	436	39	9.0%
	342 - Kogan-Condamine Rd	Ch 0 to 45.82	Tara-Kogan Road to 9.6km west Noel Robinson Road	202	83	41.1%
		Ch 45.82 to 71.41	9.6km west Noel Robinson Road to Leichhardt Highway	484	122	25.1%
	35A - Moonie Hwy	Ch 11 to 50.37	Railway crossing to Surat Developmental Road	1,466	171	11.6%
	4302 - Jackson-Wandoan Rd	Ch 47.94 to 68.93	Roma Council boundary to Bundi Road	71	11	15.4%
		Ch 68.93 to 81.1	Bundi Road to Leichhardt Highway	155	11	7.0%
	86A - Surat Developmental Rd	Ch 119.3 to 142.67	Leichhardt Highway to 23km east	292	85	29.3%
		Ch 142.67 to 146.95	23km east of Leichhardt Highway to 540m west of Chinchilla Tara Road	678	85	12.6%

DTMR Region	Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
		Ch 146.95 to 147.51	540m west of Chinchilla Tara Road to Chinchilla Tara Road	1,668	85	5.1%
	86B - Surat Developmental Rd	Ch 0.05 to 0.6	Moonie Highway to 600m west	1,023	85	8.4%
		Ch 0.6 to 40.39	600m west of Moonie Highway to Tara	629	85	13.6%
Fitzroy	181 - Gladstone-Mt Larcom Rd	Ch 3.258 to 4.625	Blain Drive to Red Rover Road	9,445	425	4.5%
		Ch 4.625 to 12.292	Red Rover Road to Reid Road	6,469	425	6.6%
		Ch 12.292 to 32.14	Reid Road to Bruce Highway	3,070	116	3.7%
	26A - Leichhardt Hwy	Ch 192.23 to 238.956	6.4km north Isla Gorge Road to Joynsons Road	431	23	5.4%
	46A - Dawson Hwy	Ch 1.5 to 2.24	Breslin Street to Blain Drive	20,462	134	0.7%
		Ch 2.24 to 3.13	Blain Drive to Phillip St	24,981	676	2.7%
		Ch 3.13 to 4.39	Philip Street to Penda Avenue	28,095	575	2.0%
		Ch 4.39 to 5.18	Penda Avenue to Chapman Drive	24,403	525	2.2%
		Ch 5.18 to 10.3	Chapman Drive to Harvey Road/Beecher Street	6,483	107	1.7%
		Ch 10.3 to 19.05	Harvey Road/Beecher Street to Bruce Highway	5,152	107	2.1%
		Ch 19.05 to 21.75	Bruce Highway to Taragoola Road	6,169	107	1.7%
		Ch 21.75 to 25.69	Taragoola Road to Gladstone Monto Road	1,279	58	4.5%

DTMR Region	Road Name	Chainage	Extents	2009 AADT	Peak Daily Project Traffic	Max increase
		Ch 25.69 to 101.15	Gladstone Monto Road to Argoon Kilburnie Road	1,030	58	5.6%
South West	4302 - Jackson-Wandoan Rd	Ch 0 to 47.94	Warrego Highway to Roma Council boundary	71	211	295.5%

Impact assessment - State controlled roads

An assessment of all State controlled links which have been identified as being significantly impacted by the Project (refer to Table 4.8) has been undertaken to determine if capacity is reached within the planning horizon. Additionally an assessment has been made to determine if the Project has “brought forward” the need for an alteration and therefore if the developer of the Project is required to contribute to the cost of alteration.

Table 4.9 and Table 4.10 provide details of road segments significantly impacted by the Project , the year the segment reaches capacity with background traffic, background traffic plus Project and background traffic plus traffic form all regionally significant developments, and the number of years the Project brings forward the need for the alteration.

For completeness road segments that reach capacity within the planning horizon that are not significantly impacted by the Project (less than five percent of background) are included in the table.

Table 4.9 Bring forward – with Project

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Project	Failure Year With Project	Bring Forward from Project
Darling Downs	18C - Warrego Hwy	Ch 0 to 1.09	450m south of Moonie Highway to 640m north of Moonie Highway, Dalby	16000	1.6%	7,551	2025	2025	0.1
	18D - Warrego Hwy	Ch 0 to 1.135	Leichhardt Highway to Leichhardt Highway, Miles	16000	6.8%	2,911	Beyond 2032	Beyond 2032	-
		Ch 1.135 to 44.099	Leichhardt Highway to Dulacca South Road	16000	9.2%	1,497	Beyond 2032	Beyond 2032	-
		Ch 44.099 to 56.831	Dulacca South Road to Jackson Wondoan Road	16000	5.4%	1,283	Beyond 2032	Beyond 2032	-
		Ch 56.831 to 101.157	Jackson Wondoan Road to Chadford Street	16000	12.6%	1,255	Beyond 2032	Beyond 2032	-
		Ch 101.157 to 135.247	Chadford Street to Roma Surat Road	16000	9.7%	1,621	Beyond 2032	Beyond 2032	-
	26B - Leichhardt Hwy	Ch 60.47 to 127.61	Jackson Wondoan Road to Warrego Highway	16000	15.3%	643	Beyond 2032	Beyond 2032	-
	26C - Leichhardt Hwy	Ch 0 to 32.02	Warrego Highway to Roma Condamine Road	16000	56.8%	489	Beyond 2032	Beyond 2032	-
		Ch 32.02 to 53.04	Roma Condamine Road to 16.6km south of Elerslea Ln	16000	63.4%	322	Beyond 2032	Beyond 2032	-

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Project	Failure Year With Project	Bring Forward from Project
		Ch 53.04 to 81.4	16.6km south of Elerslea Ln to Surat Developmental Road	16000	47.0%	296	Beyond 2032	Beyond 2032	-
		Ch 81.4 to 127.42	Surat Developmental Road to Moonie Highway	16000	18.2%	327	Beyond 2032	Beyond 2032	-
		Ch 127.42 to 176.37	Moonie Highway to 29km north of Gore Highway	16000	12.8%	466	Beyond 2032	Beyond 2032	-
		Ch 176.37 to 205.21	29km north of Gore Highway to Gore Highway	16000	10.5%	570	Beyond 2032	Beyond 2032	-
	28A - Gore Hwy	Ch 0 to 1.05	Warrego Highway to bend	16000	0.1%	19,936	Already Fail	Already Fail	Already Fail
		Ch 1.05 to 1.95	Bend to 900m south	16000	0.1%	15,083	2012	2012	-
		Ch 1.95 to 3.52	900m south of bend to 1.57km south of bend	16000	0.1%	15,244	2010	2010	-
		Ch 3.52 to 5.59	1.57km south of bend to 3.64km south of bend	16000	0.2%	10,865	2017	2017	-
	324 - Toowoomba - Cecil Plains Road	Ch 0 to 2.67		16000	0.0%	13,352	2013	2013	-
	325 - Dalby - Cecil Plains Rd	Ch 0 to 39.08	Warrego Highway to Milmerran Cecil Plains Road	16000	18.0%	475	Beyond 2032	Beyond 2032	-

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Project	Failure Year With Project	Bring Forward from Project
	3251 - Milmerran - Cecil Plains Rd	Ch 0 to 45.61	Dalby- Cecil Plains Road to Gore Highway	16000	74.3%	128	Beyond 2032	Beyond 2032	-
	3402 - Tara-Kogan Rd	Ch 34.8 to 43.03	Kerrs Road to Dalby Kogan Road	16000	17.6%	158	Beyond 2032	Beyond 2032	-
	341 - Chinchilla-Tara Rd	Ch 22.51 to 43.49	Kogan Condamine Road to Dougalls Road	16000	9.0%	436	Beyond 2032	Beyond 2032	-
	342 - Kogan-Condamine Rd	Ch 0 to 45.82	Tara-Kogan Road to 9.6km west Noel Robinson Road	16000	41.1%	202	Beyond 2032	Beyond 2032	-
		Ch 45.82 to 71.41	9.6km west Noel Robinson Road to Leichhardt Highway	16000	25.1%	484	Beyond 2032	Beyond 2032	-
	35A - Moonie Hwy	Ch 0 to 2.5	Warrego Highway to 2.5km south	16000	1.2%	6,870	2027	2027	0.2
		Ch 11 to 50.37	Railway crossing to Surat Developmental Road	16000	11.6%	1,466	Beyond 2032	Beyond 2032	-
	4302 - Jackson-Wandoan Rd	Ch 47.94 to 68.93	Roma Council boundary to Bundi Road	16000	15.4%	71	Beyond 2032	Beyond 2032	-
		Ch 68.93 to 81.1	Bundi Road to Leichhardt Highway	16000	7.0%	155	Beyond 2032	Beyond 2032	-
	86A - Surat Developmental Rd	Ch 119.3 to 142.67	Leichhardt Highway to 23km east	16000	29.3%	292	Beyond 2032	Beyond 2032	-
		Ch 142.67 to 146.95	23km east of Leichhardt Highway to 540m west of Chinchilla Tara Road	16000	12.6%	678	Beyond 2032	Beyond 2032	-

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Project	Failure Year With Project	Bring Forward from Project
		Ch 146.95 to 147.51	540m west of Chinchilla Tara Road to Chinchilla Tara Road	16000	5.1%	1,668	Beyond 2032	Beyond 2032	-
	86B - Surat Developmental Rd	Ch 0.05 to 0.6	Moonie Highway to 600m west	16000	8.4%	1,023	Beyond 2032	Beyond 2032	-
		Ch 0.6 to 40.39	600m west of Moonie Highway to Tara	16000	13.6%	629	Beyond 2032	Beyond 2032	-
Fitzroy	181 - Gladstone-Mt Larcom Rd	Ch 3.258 to 4.625	Blain Drive to Red Rover Road	16000	4.5%	9,445	2020	2020	0.4
		Ch 4.625 to 12.292	Red Rover Road to Reid Road	16000	6.6%	6,469	2029	2028	0.7
		Ch 12.292 to 32.14	Reid Road to Bruce Highway	16000	3.8%	3,070	Beyond 2032	Beyond 2032	-
	26A - Leichhardt Hwy	Ch 192.23 to 238.956	6.4km north Isla Gorge Road to Joynsons Road	16000	5.4%	431	Beyond 2032	Beyond 2032	-
	46A - Dawson Hwy	Ch 1.5 to 2.24	Breslin Street to Blain Drive	36000	0.7%	20,462	Beyond 2032	Beyond 2032	-
		Ch 2.24 to 3.13	Blain Drive to Phillip St	36000	2.7%	24,981	2028	2027	0.7
		Ch 3.13 to 4.39	Philip Street to Penda Avenue	36000	2.0%	28,095	2016	2016	0.2
		Ch 4.39 to 5.18	Penda Avenue to Chapman Drive	36000	2.2%	24,403	2023	2023	0.5
		Ch 5.18 to 10.3	Chapman Drive to Harvey Road/Beecher Street	16000	1.7%	6,483	2028	2028	-
		Ch 10.3 to 19.05	Harvey Road/Beecher Street to	16000	2.1%	5,152	Beyond	Beyond	-

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Project	Failure Year With Project	Bring Forward from Project
			Bruce Highway				2032	2032	
		Ch 19.05 to 21.75	Bruce Highway to Taragoola Road	16000	1.7%	6,169	2030	2030	0.1
		Ch 21.75 to 25.69	Taragoola Road to Gladstone Monto Road	16000	4.5%	1,279	Beyond 2032	Beyond 2032	-
		Ch 25.69 to 101.15	Gladstone Monto Road to Argoon Kilburnie Road	16000	5.6%	1,030	Beyond 2032	Beyond 2032	-
South West	4302 - Jackson-Wandoan Rd	Ch 0 to 47.94	Warrego Highway to Roma Council boundary	16000	295.5%	71	Beyond 2032	Beyond 2032	-

Table 4.10 Bring forward – all developments

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
Darling Downs	18C - Warrego Hwy	Ch 0 to 1.09	450m south of Moonie Highway to 640m north of Moonie Highway, Dalby	16000	1.6%	7,551	2025	2025	0.1
	18D - Warrego Hwy	Ch 0 to 1.135	Leichhardt Highway to Leichhardt Highway, Miles	16000	6.8%	2,911	Beyond 2032	Beyond 2032	0
		Ch 1.135 to 44.099	Leichhardt Highway to Dulacca South Road	16000	9.2%	1,497	Beyond 2032	Beyond 2032	0

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
		Ch 44.099 to 56.831	Dulacca South Road to Jackson Wondoan Road	16000	5.4%	1,283	Beyond 2032	Beyond 2032	0
		Ch 56.831 to 101.157	Jackson Wondoan Road to Chadford Street	16000	12.6%	1,255	Beyond 2032	Beyond 2032	0
		Ch 101.157 to 135.247	Chadford Street to Roma Surat Road	16000	9.7%	1,621	Beyond 2032	Beyond 2032	0
	26B - Leichhardt Hwy	Ch 60.47 to 127.61	Jackson Wondoan Road to Warrego Highway	16000	15.3%	643	Beyond 2032	Beyond 2032	0
	26C - Leichhardt Hwy	Ch 0 to 32.02	Warrego Highway to Roma Condamine Road	16000	56.8%	489	Beyond 2032	Beyond 2032	0
		Ch 32.02 to 53.04	Roma Condamine Road to 16.6km south of Elerslea Ln	16000	63.4%	322	Beyond 2032	Beyond 2032	0
		Ch 53.04 to 81.4	16.6km south of Elerslea Ln to Surat Developmental Road	16000	47.0%	296	Beyond 2032	Beyond 2032	0
		Ch 81.4 to 127.42	Surat Developmental Road to Moonie Highway	16000	18.2%	327	Beyond 2032	Beyond 2032	0
		Ch 127.42 to 176.37	Moonie Highway to 29km north of Gore Highway	16000	12.8%	466	Beyond 2032	Beyond 2032	0
		Ch 176.37 to	29km north of Gore Highway	16000	10.5%	570	Beyond 2032	Beyond	0

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
		205.21	to Gore Highway					2032	
	28A - Gore Hwy	Ch 0 to 1.05	Warrego Highway to bend	16000	0.1%	19,936	Already Fail	Already Fail	Already Fail
		Ch 1.05 to 1.95	Bend to 900m south	16000	0.1%	15,083	2012	2012	0
		Ch 1.95 to 3.52	900m south of bend to 1.57km south of bend	16000	0.1%	15,244	2010	2010	0
		Ch 3.52 to 5.59	1.57km south of bend to 3.64km south of bend	16000	0.2%	10,865	2017	2017	0
	325 - Dalby - Cecil Plains Rd	Ch 0 to 39.08	Warrego Highway to Milmerran Cecil Plains Road	16000	18.0%	475	Beyond 2032	Beyond 2032	0
	3251 - Milmerran - Cecil Plains Rd	Ch 0 to 45.61	Dalby- Cecil Plains Road to Gore Highway	16000	74.3%	128	Beyond 2032	Beyond 2032	0
	3402 - Tara-Kogan Rd	Ch 34.8 to 43.03	Kerrs Road to Dalby Kogan Road	16000	17.6%	158	Beyond 2032	Beyond 2032	0
	341 - Chinchilla-Tara Rd	Ch 22.51 to 43.49	Kogan Condamine Road to Dougalls Road	16000	9.0%	436	Beyond 2032	Beyond 2032	0
	342 - Kogan-Condamine Rd	Ch 0 to 45.82	Tara-Kogan Road to 9.6km west Noel Robinson Road	16000	41.1%	202	Beyond 2032	Beyond 2032	0
		Ch 45.82 to 71.41	9.6km west Noel Robinson	16000	25.1%	484	Beyond 2032	Beyond	0

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
			Road to Leichhardt Highway					2032	
	35A - Moonie Hwy	Ch 0 to 2.5	Warrego Highway to 2.5km south	16000	1.2%	6,870	2027	2027	0.2
		Ch 11 to 50.37	Railway crossing to Surat Developmental Road	16000	11.6%	1,466	Beyond 2032	Beyond 2032	0
	4302 - Jackson-Wandoan Rd	Ch 47.94 to 68.93	Roma Council boundary to Bundi Road	16000	15.4%	71	Beyond 2032	Beyond 2032	0
		Ch 68.93 to 81.1	Bundi Road to Leichhardt Highway	16000	7.0%	155	Beyond 2032	Beyond 2032	0
	86A - Surat Developmental Rd	Ch 119.3 to 142.67	Leichhardt Highway to 23km east	16000	29.3%	292	Beyond 2032	Beyond 2032	0
		Ch 142.67 to 146.95	23km east of Leichhardt Highway to 540m west of Chinchilla Tara Road	16000	12.6%	678	Beyond 2032	Beyond 2032	0
		Ch 146.95 to 147.51	540m west of Chinchilla Tara Road to Chinchilla Tara Road	16000	5.1%	1,668	Beyond 2032	Beyond 2032	0
	86B - Surat Developmental Rd	Ch 0.05 to 0.6	Moonie Highway to 600m west	16000	8.4%	1,023	Beyond 2032	Beyond 2032	0
		Ch 0.6 to 40.39	600m west of Moonie Highway to Tara	16000	13.6%	629	Beyond 2032	Beyond 2032	0

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
Fitzroy	181 - Gladstone-Mt Larcom Rd	Ch 3.258 to 4.625	Blain Drive to Red Rover Road	16000	4.5%	9,445	2020	2018	2.2
		Ch 4.625 to 12.292	Red Rover Road to Reid Road	16000	6.6%	6,469	2029	2028	1.5
		Ch 12.292 to 32.14	Reid Road to Bruce Highway	16000	3.8%	3,070	Beyond 2032	Beyond 2032	0
	26A - Leichhardt Hwy	Ch 192.23 to 238.956	6.4km north Isla Gorge Road to Joynsons Road	16000	5.4%	431	Beyond 2032	Beyond 2032	0
	46A - Dawson Hwy	Ch 1.5 to 2.24	Breslin Street to Blain Drive	36000	0.7%	20,462	Beyond 2032	Beyond 2032	0
		Ch 2.24 to 3.13	Blain Drive to Phillip St	36000	2.7%	24,981	2028	2027	1.0
		Ch 3.13 to 4.39	Philip Street to Penda Avenue	36000	2.0%	28,095	2016	2016	0.5
		Ch 4.39 to 5.18	Penda Avenue to Chapman Drive	36000	2.2%	24,403	2023	2023	0.6
		Ch 5.18 to 10.3	Chapman Drive to Harvey Road/Beecher Street	16000	1.7%	6,483	2028	2028	0.1
		Ch 10.3 to 19.05	Harvey Road/Beecher Street to Bruce Highway	16000	2.1%	5,152	Beyond 2032	Beyond 2032	0.1
		Ch 19.05 to 21.75	Bruce Highway to Taragoola Road	16000	1.7%	6,169	2030	2030	0.1

DTMR Region	Road Name	Chainage	Extents	Capacity	Max increase	2009 AADT	Failure Year Without Development	Failure Year Cumulative	Bring Forward from Cumulative
		Ch 21.75 to 25.69	Taragoola Road to Gladstone Monto Road	16000	4.5%	1,279	Beyond 2032	Beyond 2032	0
		Ch 25.69 to 101.15	Gladstone Monto Road to Argoon Kilburnie Road	16000	5.6%	1,030	Beyond 2032	Beyond 2032	0
South West	4302 - Jackson-Wandoan Rd	Ch 0 to 47.94	Warrego Highway to Roma Council boundary	16000	295.5%	71	Beyond 2032	Beyond 2032	0

Mitigation

Table 4.11 and Table 4.12 identify alteration requirements for road segments that have reached capacity within the planning horizon.

Table 4.11 Darling Downs Region

Road name	Chainage	Extents	Works required
18C - Warrego Highway	Ch 0 to 1.09	450m south of Moonie Highway to 640m north of Moonie Highway, Dalby	Alter from two lane rural to four lane rural
28A - Gore Highway	Ch 0 to 5.59	Warrego Highway to 3.64km south of bend	Alter from two lane rural to four lane rural
35A - Moonie Highway	Ch 0 to 2.5	Warrego Highway to 2.5km south	Alter from two lane rural to four lane rural

Table 4.12 Fitzroy Region

Road name	Chainage	Extents	Works required
181 - Gladstone-Mt Larcom Road	Ch 3.258 to 12.292	Blain Drive to Reid Road	Alter from two lane rural to four lane urban
46A - Dawson Highway	Ch 2.24 to 4.87 (approx)	Blain Drive to Aerodrome Road	Alter from four lane urban to six lane urban
	Ch 5.18 to 10.3	Chapman Drive to Harvey Road	Alter from two lane rural to four lane urban
	Ch 19.05 to 21.75	Bruce Highway to Taragoola Road	Alter from two lane rural to four lane urban

Developer contribution to link alterations

Review of Table 4.9 indicates that there are a number of road segments that reach capacity within the planning horizon however the Project does not bring forward the need for any alteration by more than one year and therefore in accordance with GARID a contribution to the alteration is not warranted.

Developer contribution to link alteration – cumulative impacts

Review of Table 4.10 indicates that there are a number of road segments that reach capacity within the planning horizon where the need for alteration is brought forward by more than one year from the cumulative impact of regionally significant developments. These are summarised in Table 4.13.

Table 4.13 Fitzroy Region

Road name	Chainage	Extents	Bring forward
181 - Gladstone-Mt Larcom Road	Ch 3.258 to 4.625	Blain Drive to Red Rover Road	2.2
	Ch 4.625 to 12.292	Red Rover Road to Reid Road	1.5
46A - Dawson Highway	Ch 2.24 to 3.13	Blain Drive to Philip Street	1.0

Level of service assessment

Due to the high amount of heavy vehicles generated by the Project an additional check was undertaken on the anticipated levels of service (LOS) on the rural roads significantly impacted by the Project. (i.e. >5% increase in traffic volume). This is given in Table 4.14.

The assessment has determined the level of service for the full planning horizon with background traffic and Project traffic.

It is noted that the level of service stated are the highest levels of service for the entire planning horizon.

It can be seen that for all significantly impacted rural roads the majority of rural roads links will operate with a level of service of C or better, which is considered satisfactory. The Dawson Highway from Harvey Road to Beecher Street will operate at LOS D towards the end of the planning horizon. With respect to this section of road it is noted that;

- The LOS D will be reached towards the end of the planning horizon with background traffic and will not be worsened by the Project traffic
- At the time of reaching LOS D the Project will be mainly in operational mode and Project heavy vehicle traffic will be minimal
- The road link warrants an alteration to four lanes towards the end of the planning period but this is not brought forward by the Project.

Table 4.14 Levels of service for significantly impacted rural roads

DTMR Region	Road name	Chainage	Extents	Highest LOS without Project	Highest LOS with Project	Highest LOS with all developments
Darling Downs	18D - Warrego Highway	Ch 0 to 1.135	Leichhardt Highway to Leichhardt Highway, Miles	C	C	C
		Ch 1.135 to 44.099	Leichhardt Highway to Dulacca South Road	B	B	B
		Ch 44.099 to 56.831	Dulacca South Road to Jackson Wandoan Road	B	B	B
		Ch 56.831 to 101.157	Jackson Wandoan Road to Chadford Street	A	A	A
		Ch 101.157 to 135.247	Chadford Street to Roma Surat Road	B	B	B
	26B - Leichhardt Highway	Ch 60.47 to 127.61	Jackson Wandoan Road to Warrego Highway	A	A	A
	26C - Leichhardt Highway	Ch 0 to 32.02	Warrego Highway to Roma Condamine Road	A	A	A
		Ch 32.02 to 53.04	Roma Condamine Road to 16.6km south of Elerslea Lane	A	A	A
		Ch 53.04 to 81.4	16.6km south of Elerslea Lane to Surat Developmental Road	A	A	A
		Ch 81.4 to 127.42	Surat Developmental Road to Moonie Highway	A	A	A
		Ch 127.42 to 176.37	Moonie Highway to 29km north of Gore Highway	A	A	A
		Ch 176.37 to 205.21	29km north of Gore Highway to Gore Highway	A	A	A
	325 - Dalby - Cecil	Ch 0 to 39.08	Warrego Highway to Millmerran Cecil Plains	A	A	A

DTMR Region	Road name	Chainage	Extents	Highest LOS without Project	Highest LOS with Project	Highest LOS with all developments
	Plains Road		Road			
	3251 - Millmerran - Cecil Plains Road	Ch 0 to 45.61	Dalby- Cecil Plains Road to Gore Highway	A	A	A
	3402 - Tara-Kogan Road	Ch 34.8 to 43.03	Kerrs Road to Dalby Kogan Road	A	A	A
	341 - Chinchilla-Tara Road	Ch 22.51 to 43.49	Kogan Condamine Road to Dougalls Road	A	A	A
	342 - Kogan-Condamine Road	Ch 0 to 45.82	Tara-Kogan Road to 9.6km west Noel Robinson Road	A	A	A
		Ch 45.82 to 71.41	9.6km west Noel Robinson Road to Leichhardt Highway	A	A	A
	35A - Moonie Highway	Ch 11 to 50.37	Railway crossing to Surat Developmental Road	A	B	B
	4302 - Jackson-Wandoan Road	Ch 47.94 to 68.93	Roma Council boundary to Bundi Road	A	A	A
		Ch 68.93 to 81.1	Bundi Road to Leichhardt Highway	A	A	A
	86A - Surat Developmental Road	Ch 119.3 to 142.67	Leichhardt Highway to 23km east	A	A	A
		Ch 142.67 to 146.95	23km east of Leichhardt Highway to 540m west of Chinchilla Tara Road	A	A	A
		Ch 146.95 to 147.51	540m west of Chinchilla Tara Road to Chinchilla Tara Road	B	B	B

DTMR Region	Road name	Chainage	Extents	Highest LOS without Project	Highest LOS with Project	Highest LOS with all developments
	86B - Surat Developmental Road	Ch 0.05 to 0.6	Moonie Highway to 600m west	A	A	A
		Ch 0.6 to 40.39	600m west of Moonie Highway to Tara	A	A	A
Fitzroy	26A - Leichhardt Highway	Ch 192.23 to 238.956	6.4km north Isla Gorge Road to Joynsons Road	A	A	A
	46A - Dawson Highway	Ch 10.3 to 19.05	Harvey Road/Beecher Street to Bruce Highway	D	D	D
		Ch 25.69 to 101.15	Gladstone Monto Road to Argoon Kilburnie Road	A	A	A
South West	4302 - Jackson-Wandoan Road	Ch 0 to 47.94	Warrego Highway to Roma Council boundary	A	A	A

Local roads

The development of the gas fields and gas pipeline will impact on the local road network within the study area, with the highest impact resulting from the construction of the relevant components. For each local road the average and peak daily Project traffic has been determined and used to assess impacts and mitigation strategies.

As detailed in Section 2 of this report the majority of the local roads will have very low volumes, and although traffic count data was not available, it has been determined that the traffic volumes would generally be in the order of less than 150 vehicles per day on most of the road links. The majority of the local roads are unsealed.

Table 4.15, Table 4.16, Table 4.17 and Table 4.18 detail the local road links that will be impacted by the Project traffic, the nature of the Project traffic, the peak daily and average daily Project traffic, and the proposed mitigation strategy.

The broad mitigation strategy developed for local roads is as follows;

- Type A - where the Project traffic is associated only with the construction of a pipeline or a single gas plant including access to camps and laydown areas, the Project traffic will be of a low level (less than 150 vehicles per day) and is expected to occur over a short duration (two to three months for the pipeline construction and up to twelve months for the gas field construction). Depending on traffic volume and load type, for local roads impacted it is proposed to alter the local road to a minimum unsealed six metre formation this will enable two heavy vehicles to pass safely. Where the peak daily Project traffic is above 150 vehicles per day the formation width may be increased to eight metres. The alteration may involve resheeting of the existing gravel pavement to provide a pavement of suitable strength to cater for the increased heavy vehicle traffic generated by the Project. During construction more regular maintenance of the road should be undertaken including regular grading and dust control in accordance with an approved traffic management plan and where required to maintain safety.
- Type B - where the Project is associated with the construction of a number of components including multiple gas plants, the Project traffic will be of a higher level and will be undertaken over a longer duration. For these local roads it is proposed to provide a higher standard of roadway in accordance with Austroads – Part 3 which is a minimum 9.2m formation with a 7m seal and 0.5m sealed shoulders. This standard of carriageway will cater for daily traffic in the order of 150 to 500 vehicles per day.

The mitigation strategy, which at this stage is only a proposed strategy that has not been discussed with the relevant local authorities, is based on the level, nature and duration of Project traffic. It is expected that detailed negotiation will be held with the relevant authority with respect to the appropriate mitigation strategies for the local road network.

It is noted that the impact analysis does not consider cumulative impacts from the other LNG projects as it is generally the case where the other LNG developments do not propose to use the same local road network as the Australia Pacific LNG project. For instances where the same network is used by more than one LNG proponent it is unlikely that construction traffic from each project will occur simultaneously on that local road link, therefore mitigation strategies detailed above will be equally valid for cumulative impacts.

Table 4.15 Banana Shire Council roads

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Mitigation proposed
Argoon-Kilburnie Road	6.3	Rural	Sealed	36	180	2012	This is the access road to laydown area 3 and camp 2. In the maximum case the roadway may be impacted by heavy and light traffic.	Type A (8m)
Aerodrome Road	5	Urban	Sealed	5	17	2012	This is a local access road to the Biloela airport. In the maximum case the roadway may be impacted by bus and light traffic during pipeline construction.	Type A (6m)
Crowsdale Camboon Road	5 – 6	Rural	Sealed and unsealed	10	112	2012	In the maximum case the roadway may be impacted by the Project during pipeline construction as it is a local access road to camp 3 and lies adjacent to the pipeline route.	Type A (8m)
Defence Road	5 – 7	Rural	Sealed and unsealed	22	170	2012	In the maximum case the roadway may be impacted by the Project for a short period during pipeline construction as it is the local access road to camp 4.	Type A (8m)
Des Burton Drive	5	Urban	Sealed	5	17	2012	This is a local access road to the Biloela airport. In the maximum case the roadway may be impacted by bus and light traffic during pipeline construction. Every month (28 days) the complete construction crew 600-800 will fly in / fly out utilising this airport as one of the major exit ports.	Type A (6m)

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Mitigation proposed
Ponty Pool Road	8	Rural	Unsealed	14	160	2013	In the maximum case the roadway may be impacted by the Project for a short period during pipeline construction as it is the local access road to camp 5.	Type A (8m) Note: formation width currently adequate
Winston Street	10	Urban	Sealed	5	17	2012	This is a local access road to the Biloela airport. In the maximum case the roadway may be impacted by bus and light traffic during pipeline construction.	Type A (6m) Note: formation width currently adequate

Table 4.16 Western Downs Regional Council roads impact

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
Avenue Road	4	Urban	Sealed	38	92	2012	In the maximum case the roadway may be impacted by the Project over a twelve month period during construction of GPF_OAN_04 which is due to be online in 2013.	Type A (6m)
Bells Road	7	Rural	Unsealed	40	91	2022	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of GPF_CAS_05 due to be online in 2022.	Type A (6m) Note: formation width currently adequate
Colsons Road	7	Rural	Unsealed	43	129	2019	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of	Type A (6m) Note: formation

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
							GPF_BYM_03, due to be online in 2020.	width currently adequate
Elerslea Lane East	6	Rural	Unsealed	29	120	2012	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of GPF_CNS_03, due to be online in 2012.	Type A (6m) Note: formation width currently adequate
Giligulgul Road	5 – 6	Rural	Sealed and Unsealed	57	179	2015	In the maximum case the roadway may be impacted by construction vehicles from 2014 to 2020 during the construction of GPF_WOL_01 and its associated water treatment facilities and brine pond.	Type B (9.2m)
Gunbarwood Road	5	Rural	Unsealed	38	92	2012	In the maximum case the roadway may be impacted by the Project over a twelve month period during construction of GPF_OAN_04, due to be online in 2013.	Type A (6m)
Homebush Road	7	Rural	Unsealed	38	91	2018	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of GPF_CAR_01a, due to be online in 2018.	Type A (6m) Note: formation width currently adequate
Kerr's Road	5	Rural	Unsealed	28	115	2015	In the maximum case the roadway may be impacted by the Project over a 12 month period during construction of GPF_KIA_01a, due to be online in 2015.	Type A (6m)
Mclennans Road	7	Rural	Unsealed	51	189	2013	In the maximum case the roadway may be impacted from 2012 to 2016 during the construction and upgrade of	Type B (9.2m)

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
							GPF_CON_02b and its water treatment facilities. The GPF is due to be online in 2013 and upgraded in 2014, and its associated WTF is due to be on line in 2012 and will be upgraded in stages through to 2016.	
Wallan Creek Road	5 – 6	Rural	Sealed	38	91	2018	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of GPF_CAR_01a, due to be online in 2018.	Type A (6m)
Bungaban Road	6	Rural	Sealed	14	160	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road from the Leichhardt Highway to camp 5.	Type A (6m) Note: formation width currently adequate
L Tree Creek Road	8	Rural	Unsealed	36	178	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road from the Leichhardt Highway to camp 6.	Type A (8m) Note: formation width currently adequate
Ponty Pool Road	5 – 8	Rural	Sealed and Unsealed	14	160	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road to camp 5.	Type A (6m)
Roche Creek Road	6	Rural	Sealed	14	160	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road to camp 5.	Type A (6m) Note: formation width currently adequate

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
Welsh's Road	7	Rural	Unsealed	36	178	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road from the Leichhardt Highway to camp 6. It is likely that the unsealed surface will require frequent grading to maintain surface condition.	Type A (6m) Note: formation width currently adequate
Windeyer Road	6	Rural	Sealed and unsealed	14	160	2013	In the maximum case the roadway may be impacted by the Project for a short period during construction of the main pipeline as it is a local access road from the Leichhardt Highway to camp 6. It is likely that the unsealed surface will require frequent grading to maintain surface condition.	Type A (6m) Note: formation width currently adequate

Table 4.17 Maranoa Regional Council roads impact

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
Bogandilla West Road	6	Rural	Unsealed	42	94	2019	In the maximum case the roadway may be impacted by the Project for twelve months during the construction of GPF_NGA_02, due to be online in 2019.	Type A (6m) Note: formation width currently adequate
Cattle Creek Road	4	Rural	Sealed	47	122	2013	In the maximum case the roadway may be impacted by the Project for two periods of approximately twelve months during the construction and upgrade of GPF_MUG_06,	Type A (6m)

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
							due to be online in 2014 and upgraded in 2016.	
Crossroads Road	6	Rural	Unsealed	179	510	2012	In the maximum case the roadway may be impacted by the Project, with a moderate impact over an extended period during the construction and upgrade of GPF_MUG_06, GPF_COM_03a, GPF_LUK_02a and GPF_RCK_04a with their associated upgrades and water treatment facilities. Construction is scheduled to begin in 2011 and continue to 2017. This road is the most highly impacted in the local road network.	Type B (9.2m)
Horse Creek Road	4 – 5	Rural	Sealed and Unsealed	132	456	2012	In the maximum case the roadway may be impacted by the Project, with a moderate impact over an extended period during the construction and upgrade of GPF_MUG_06, GPF_COM_03a and GPF_RCK_04a with their associated water treatment facilities. Construction on these GPFs is scheduled to begin in 2011 and continue to 2016.	Type B (9.2m)
Seaside Road	4 – 5	Rural	Unsealed	51	130	2012	In the maximum case the roadway may be impacted by the Project for two periods of approximately twelve months during the construction and upgrade GPF_RCK_04a, due to be online in 2013 and upgraded in 2015.	Type A (6m)
Wallumbilla North Road	4	Rural	Sealed	46	122	2013	In the maximum case the roadway may be by the Project for two periods of approximately twelve months during the construction and upgrade of GPF_MUG_06, due to be online in 2014 and upgraded in 2016.	Type A (6m)

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
Yuleba Taroom Road	4	Rural	Sealed	67	273	2011	In the maximum case the roadway may be impacted by the Project for an extended period during construction of GPF_MUG_06, GPF_COM_03a and GPF_RCK_04a. Construction of these GPFs is scheduled to begin in 2011 and continue to 2016.	Type B (9.2m)

Table 4.18 Gladstone Regional Council roads impact

Road name	Trafficable width (m)	Type	Surface	Peak AADT	Peak daily traffic	Peak daily traffic year	Nature of Project traffic	Minimum mitigation proposed
The Narrows Road	8	Rural	Unsealed	36	180	2012	This is the access road to camp 1 and lay down area 1. In the maximum case the roadway may be impacted by traffic during pipeline construction	Type A (8m)

4.2.5 Intersection impact assessment

Methodology

Intersections are assessed from Gladstone heading south to the gas fields around Miles.

The methodology adopted to undertake the intersection impact assessment was as follows;

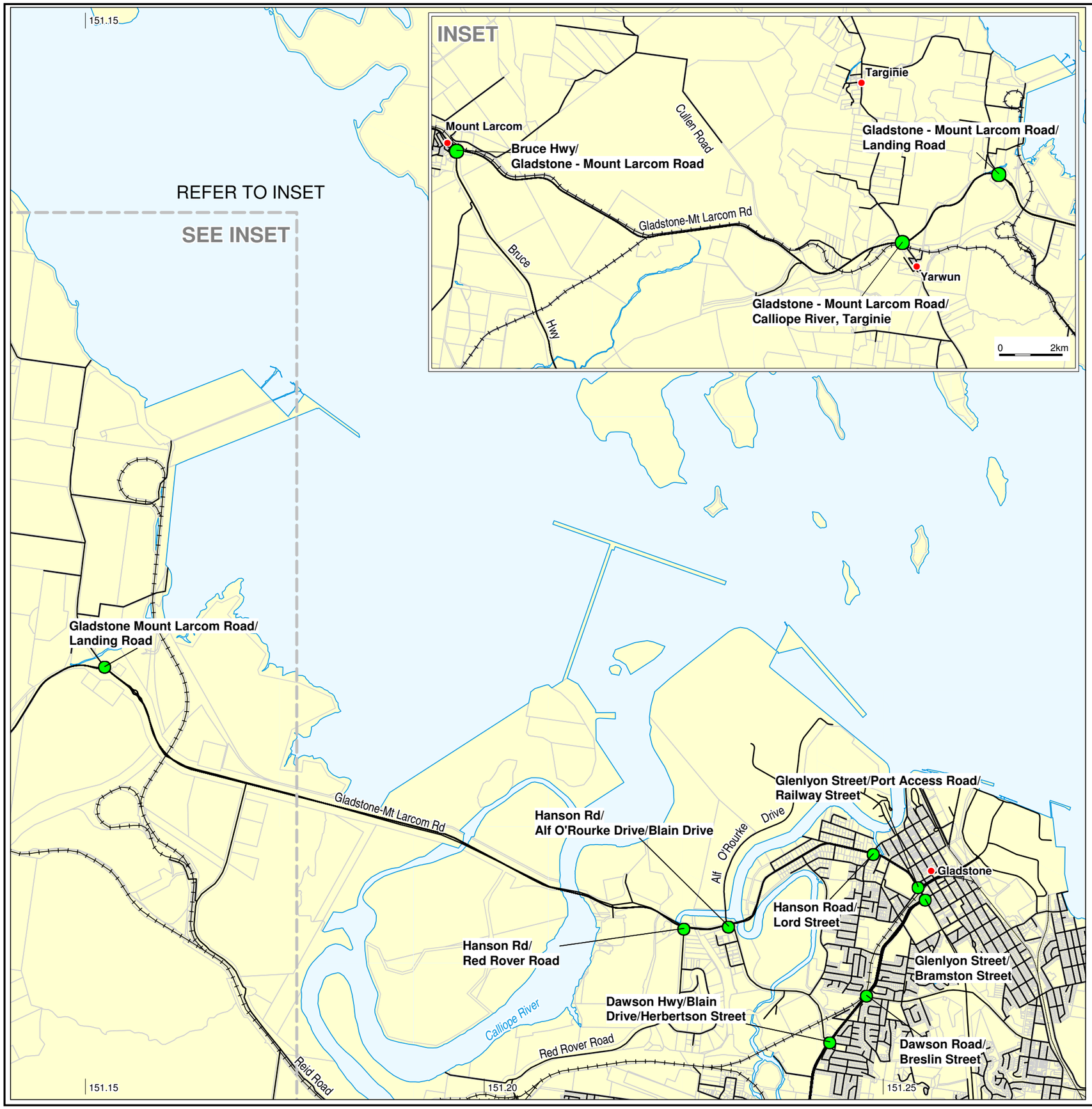
- Identify intersections within the study area that could be significantly impacted by project traffic. Intersections were initially identified as those on road links where project traffic could be more than five percent of existing background traffic
- Obtain background AM/PM peak hour traffic volumes for the intersections from the sketch model
- Analyse the existing intersection operation over the assessment timeframe
- Identify intersections that reach capacity within the assessment timeframe, and the year at which the capacity is reached
- Obtain background plus development AM/PM peak hour traffic volumes for intersections from the sketch model
- Analyse existing intersection operation over the assessment timeframe for background plus development traffic
- Identify intersections that reach capacity within the assessment timeframe and the year at which capacity is reached for background plus development traffic
- For intersections that reach capacity within the assessment timeframe, determine intersection alterations required to maintain intersection capacity throughout the assessment timeframe
- Repeat the assessment for traffic generated by regionally-significant projects to determine cumulative impacts.

The following intersections have been identified for analysis based on the potential for project to significantly impact on the operation;

- Dawson Highway/Dawson Road/Breslin Street
- Dawson Highway/Blain Drive/Herbertson Street
- Dawson Highway/Philip Street/Shopping Centre Access
- Dawson Highway/Penda Avenue
- Dawson Highway/Aerodrome Road
- Dawson Highway/Chapman Road/Harvey Road
- Dawson Highway/Don Young Drive
- Dawson Highway/Kirkwood Road
- Bruce Highway/Dawson Highway
- Hanson Road/Blain Drive/Alf Rourke Drive
- Hanson Road/Red Rover Road

- Gladstone Mt Larcom Road/Hanson Road/Landing Road
- Gladstone Mt Larcom Road/Calliope River Road/Targinie Road
- Bruce Highway/Gladstone Mt Larcom Road
- Dawson Highway/Kariboe Street
- Warrego Highway/Leichhardt Highway
- Warrego Highway/Dawson Street/Leichhardt Highway

The intersections locations are shown in Figure 4.2 to Figure 4.4.



LEGEND

- Town
- Intersection
- Airport
- Railway
- Road
- Cadastral parcel

0 1 2km

SCALE - 1:50,000 (at A3)
Latitude / Longitude
Geocentric Datum of Australia 1994

N
W E
S

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	13/01/2010	Issued for use	NA	KM		

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AUSTRALIA PACIFIC LNG PROJECT

Figure 4.2 Gladstone - Mount Larcom Road Intersections

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0371	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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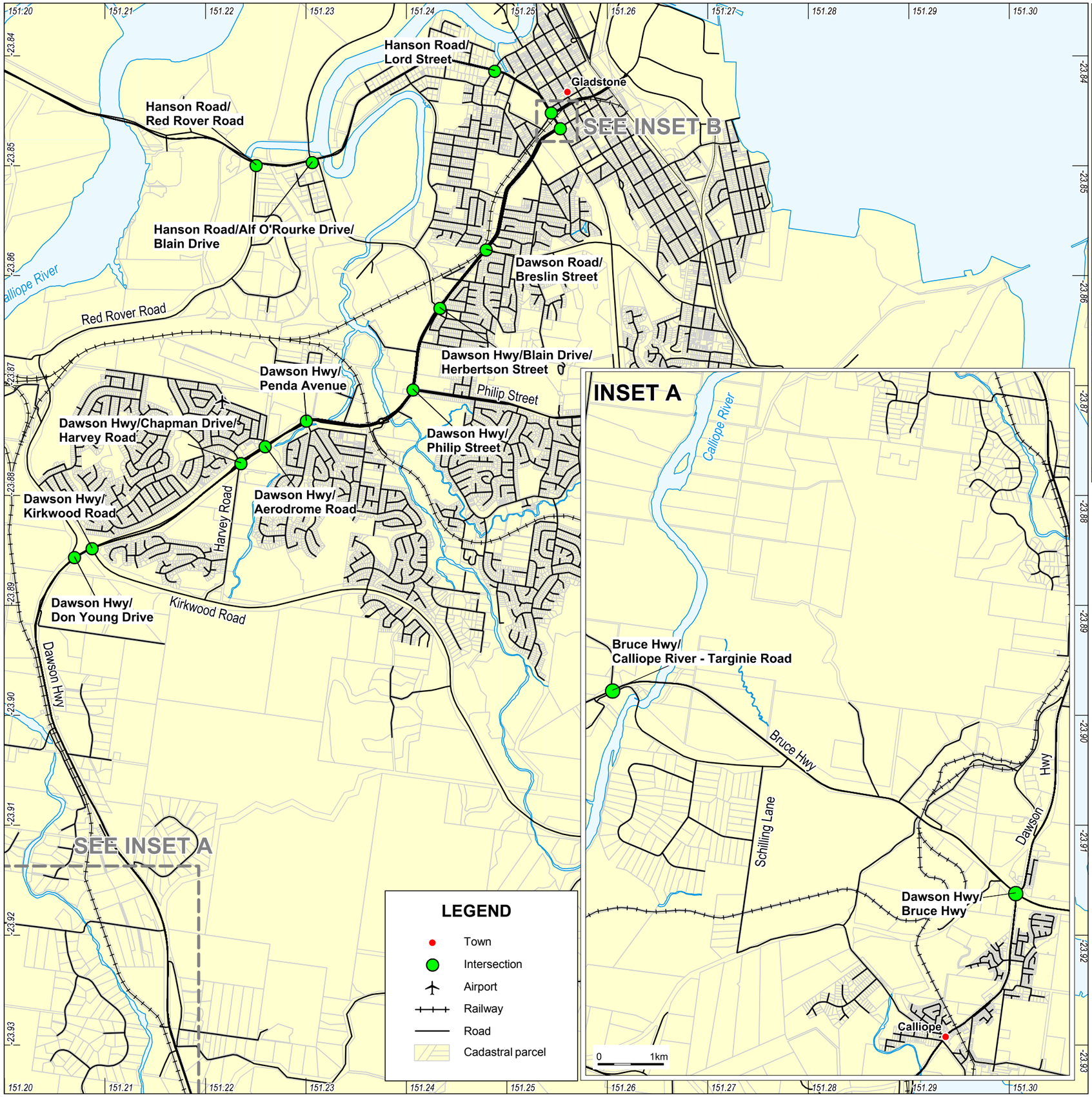

0 1 2km

SCALE - 1:40,000 (at A3)
Latitude / Longitude
Geocentric Datum of Australia 1994

N
W E
S

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
1	09/03/2010	Re-issued for use	GSB	MZ		RB
0	13/01/2010	Issued for use	NA	KM		

WorleyParsons resources & energy

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AUSTRALIA PACIFIC LNG PTY LIMITED

AUSTRALIA PACIFIC LNG PROJECT

Figure 4.3 Dawson Highway Intersections

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0372	Rev: 1

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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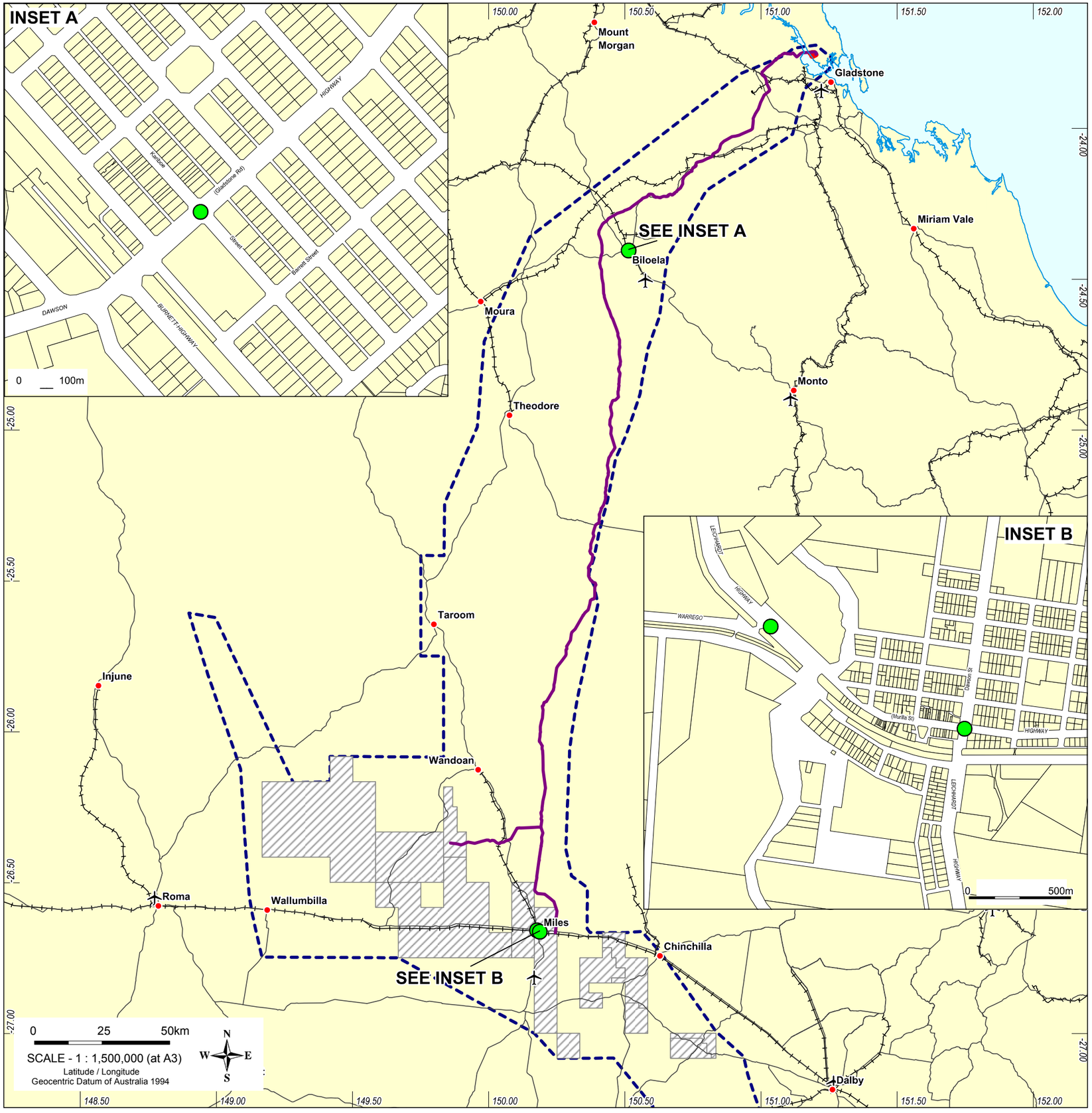

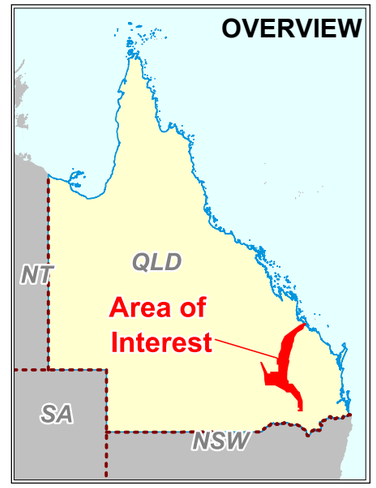

LEGEND

- Town
- Intersection
- Aircraft facility
- Railway
- Road
- Preferred pipeline alignment
- Walloons gas fields development areas
- Study area

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
1	09/03/2010	Re-issued for use	GSB	MZ		RB
0	27/01/2010	Issued for use	NA	KM		

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Figure 4.4 Rural Intersections

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0383	Rev: 1

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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Analysis parameters

The SIDRA ver3.2 intersection analysis program was used to analyse key intersections for each of the analysis scenarios. This program calculates the operation of intersections based on input parameters including geometry and traffic volumes. Output from the SIDRA intersection analyses provides values for the degree of saturation (DOS), 95% back of queues and average delays. The DOS is a volume to capacity ratio and is a common variable for assessing intersection performance. The adopted upper limits for an intersection performing satisfactorily were as follows:

- Unsignalised priority intersections: 0.80
- Roundabouts: 0.85
- Signalised intersections: 0.90

These DOS limits are based on the Guidelines for Assessment of Road Impact of Development (GARID). A DOS exceeding these values indicates that the intersection is nearing its practical capacity. Above these values, delays increase substantially for modest increase in volume.

Assessment scenarios

Intersection analysis was undertaken for the following years within the planning period;

- Year 2010 - as detailed above this is the first year of the Project assessment period.
- Year 2013 – this year presents the first peak traffic generation year of the Project that is associated with the construction of LNG trains one and two. This coincides with the construction of the gas pipeline.
- Year 2019 - this year represents the peak traffic generation year of the Project associated with the construction of trains three and four of the LNG plant (refer to Section 3 of the report for details).
- Year 2032 - as detailed above, this is the final year of the Project assessment period.
- Year that the intersection reached to the upper limit based on background growth (without any Project traffic).

Appendix D details vehicle turning movements of each intersection for the abovementioned assessment scenarios.

Intersection analysis

Dawson Highway/Dawson Road/Breslin Street

The existing intersection is a signalised T-Intersection as shown in Figure 4.5. The SIDRA analysis results for the existing intersection operation are shown in Table 4.19 below.

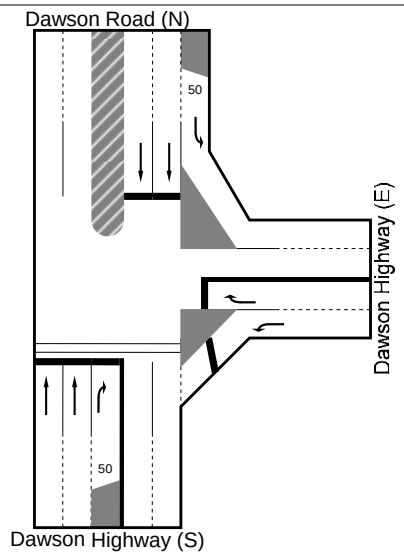


Figure 4.5 Existing Dawson Highway/Dawson Road/Breslin Street intersection

Table 4.19 Existing Dawson Highway/Dawson Road/Breslin Street intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.53	21	94	0.58	24	109	0.58	22	108
	PM	0.53	19	115	0.58	23	139	0.69	18	103
2013	AM	0.55	21	98	0.61	22	109	0.62	23	154
	PM	0.59	20	120	0.65	18	101	0.68	18	149
2019	AM	0.59	22	105	0.64	23	153	0.68	24	175
	PM	0.62	20	128	0.65	19	124	0.76	20	169
2032	AM	0.66	22	120	0.68	23	124	0.73	24	151
	PM	0.74	22	160	0.75	22	157	0.79	20	143

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Dawson Highway/Blain Drive/Herbertson Street

The existing intersection is a four way, two lane roundabout as shown in Figure 4.6. The SIDRA analysis results for the existing intersection operation are shown in Table 4.20 below.

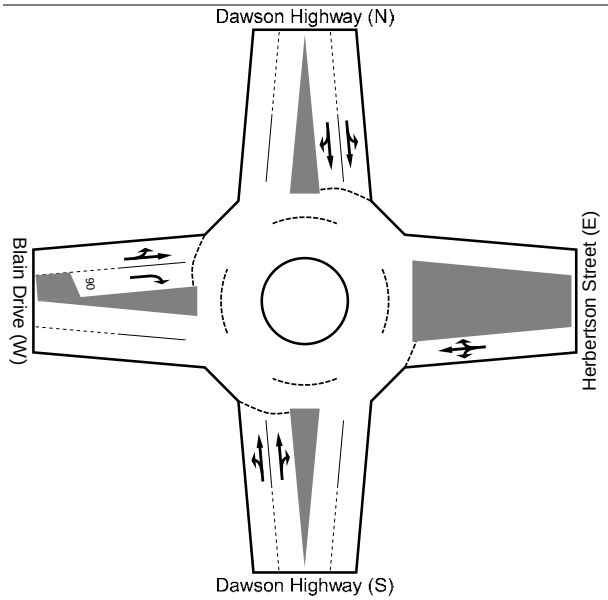


Figure 4.6 Existing Dawson Highway/Blain Drive/Herbertson Street intersection

Table 4.20 Existing Dawson Highway/Blain Drive/Herbertson Street intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.65	8	54	0.68	8	55
	PM	0.67	10	52	0.67	10	52
2013	AM	0.67	8	60	0.74	9	76
	PM	0.69	11	58	0.82	14	81
2019	AM	0.74	9	75	0.82	11	106
	PM	0.78	12	74	1.0	28	189
2032	AM	0.90	13	139	0.92	16	176
	PM	1.0	32	240	1.17	76	555

The existing intersection will operate within capacity to 2021 under background traffic only.

The Project traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013.

A proposed altered intersection is shown in Figure 4.7. The intersection alteration incorporates the following;

- Addition of a free left turn lane on the Dawson Highway (South) approach.
- Extension of the short right turn lane on the Blain Drive approach.
- Conversion of the left/through lane on the Blain Drive approach to a left/through/right lane.

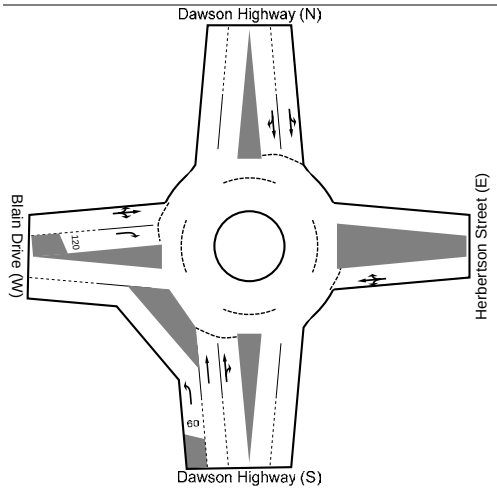


Figure 4.7 Altered Dawson Highway/Blain Drive/Herbertson Street intersection

The SIDRA analysis results for the altered intersection operation during the AM and PM peak hour periods are shown in Table 4.21 below.

Table 4.21 Altered Dawson Highway/Blain Drive/Herbertson Street intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.52	7	35	0.52	7	35	0.52	7	35
	PM	0.60	8	37	0.60	9	37	0.63	9	40
2013	AM	0.54	7	37	0.54	7	38	0.62	8	61
	PM	0.63	9	40	0.69	10	46	1.00	19	180
2019	AM	0.58	8	43	0..60	8	46	0.76	9	84
	PM	0.70	9	48	0.78	11	62	1.16	73	659
2032	AM	0.72	9	69	0.72	9	69	0.81	10	97
	PM	0.88	12	82	0.92	14	109	1.17	54	493

The works will be required by 2013.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

It is noted that DTMR have conditioned the Pacific Nickel development to contribute to the cost of signalisation of the roundabout. With signalisation in place, although analysis has not been undertaken, it is expected that the altered intersection would operate satisfactory within the full planning horizon.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner, provided that the roundabout is signalised.

Dawson Highway/Philip Street/Shopping Centre

The existing intersection is a four way, two lane roundabout as shown in Figure 4.8 The Dawson Highway (South) approach, shopping centre access and Philip Street approaches all operate under signals. The signals operate on the Philip Street approach during the AM peak whilst the other signals operate during the PM peak. The SIDRA results for the existing intersection are shown in Table 4.22 below assuming no signals are in operation.

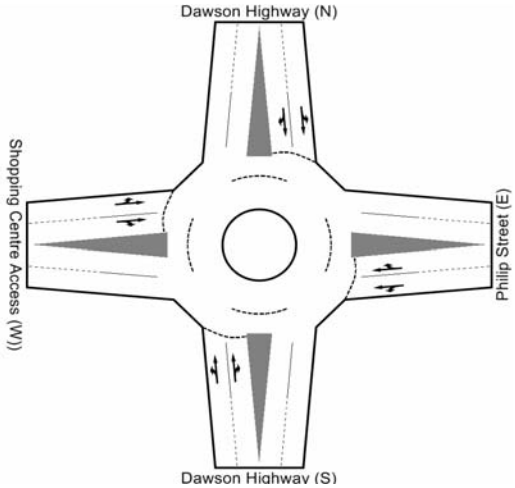


Figure 4.8 Existing Dawson Highway/Philip Street/Shopping Centre intersection

Table 4.22 Existing Dawson Highway/Philip Street/Shopping Centre intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.83	13	107	0.83	13	110
	PM	1.08	31	365	1.09	33	397
2013	AM	0.87	14	130	0.98	22	243
	PM	1.16	45	558	1.27	80	800
2019	AM	1.03	21	226	1.10	62	657
	PM	1.17	85	913	1.29	132	892
2032	AM	1.17	93	971	1.21	110	1152
	PM	1.35	184	1278	1.40	203	1458

The existing intersection currently fails during the PM peak hour. It is noted that the roundabout would be expected to operate at a higher level as three legs of the roundabout are metered during the peak hour periods.

The Project traffic will have a worsening effect on the intersection's performance, particularly during the peak construction years of 2013 and 2019.

The proposed intersection alteration is a signalised intersection as shown on Figure 4.9 below.

Alteration works recommended for the intersection include:

- Signalisation of the intersection.
- Provision of three stand-up lanes on each of the Dawson Road approaches consistent with the planned mid block alteration to a six-lane road.
- Left turn slip lane on all approaches.
- Right turn lanes on all approaches.

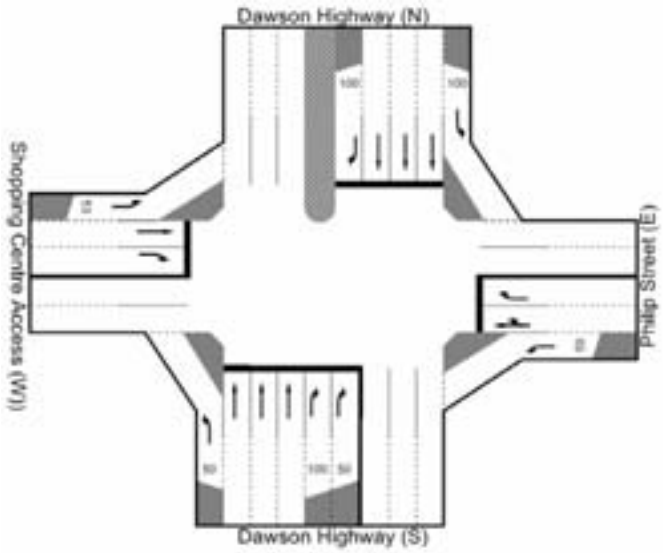


Figure 4.9 Altered Dawson Highway/Philip Street/Shopping Centre intersection

The SIDRA results for the altered intersection are provided in Table 4.23 below.

Table 4.23 Altered Dawson Highway/Philip Street/Shopping Centre intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.79	26	90	0.79	26	92	0.88	28	154
	PM	0.77	27	98	0.78	27	100	0.80	26	103
2013	AM	0.82	32	145	0.82	33	145	0.91	41	191
	PM	0.84	27	95	0.84	28	115	0.90	29	142
2019	AM	0.83	28	120	0.85	31	134	0.90	40	204
	PM	0.85	29	116	0.85	28	116	0.91	36	207
2032	AM	0.91	31	154	0.91	32	154	1.00	44	196
	PM	0.89	37	168	0.89	38	184	1.00	49	282

From the SIDRA results it can be seen that the altered intersection will generally operate within capacity for the planning horizon.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Dawson Highway/Penda Avenue

The existing intersection is a three leg roundabout intersection as illustrated below in Figure 4.10. The SIDRA analysis results for the existing intersection performance are shown in Table 4.24 below.

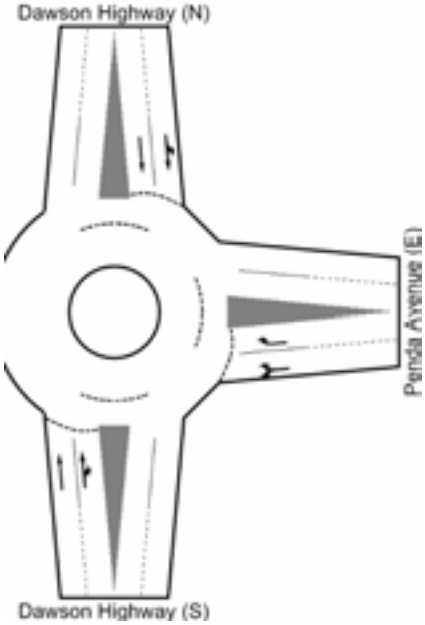


Figure 4.10 Existing Dawson Highway/Penda Avenue intersection

Table 4.24 Existing Dawson Highway/Penda Avenue intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.74	9	65	0.75	9	67
	PM	0.77	8	78	0.78	8	80
2013	AM	0.84	10	91	0.92	12	133
	PM	0.85	10	116	0.91	14	158
2019	AM	1.05	36	407	1.15	76	837
	PM	1.09	43	370	1.13	76	698
2032	AM	1.39	169	1734	1.42	184	1870
	PM	1.21	153	1453	1.23	166	1576

The Sidra results indicate that the existing intersection will operate within capacity to 2013 under background traffic only.

The Project traffic will have a minor impact on the operation of the existing intersection, but will result in bringing forward the need for the alteration to 2012.

The alteration works recommended for the intersection include:

- Signalisation of the intersection
- Provision of three stand-up lanes on each of the Dawson Highway approaches, consistent with the planned mid block alteration to six lanes.
- Dual right turn lanes into Penda Avenue.

A plan of the proposed intersection alteration is shown on Figure 4.11and the SIDRA results of the altered intersection performance are shown in Table 4.25.

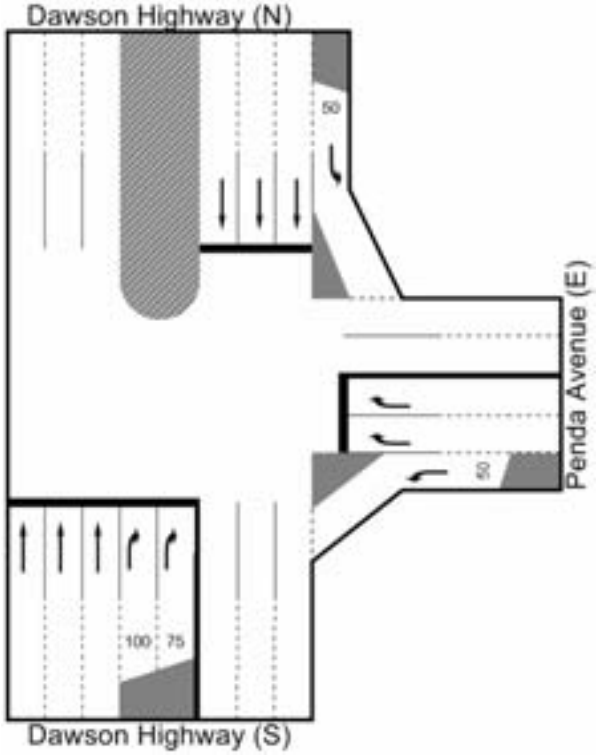


Figure 4.11 Altered Dawson Highway/Penda Avenue intersection

Table 4.25 Altered Dawson Highway/Penda Avenue intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.763	15.1	61	0.601	15.4	76	0.799	15.2	66
	PM	0.628	13.3	79	0.634	13.3	80	0.639	13.1	79
2013	AM	0.653	15.7	82	0.653	15.7	91	0.871	16.1	90
	PM	0.684	13.8	88	0.716	13.9	97	0.804	14.7	115
2019	AM	0.714	17.3	101	0.752	17.4	113	0.806	18.6	139

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2032	PM	0.742	14	101	0.742	14.3	115	0.803	16.1	151
	AM	0.834	21	136	0.84	21.7	144	0.865	23	159
	PM	0.827	16.7	132	0.827	17	139	0.827	18	151

The works will be required by 2012.

From the SIDRA results it can be seen that the altered intersection will operate within capacity for the planning horizon with the Project in place.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Dawson Highway/Aerodrome Road

The existing intersection is a four way signalised intersection as illustrated below in Figure 4.12. The SIDRA analysis results for the existing intersection performance are shown in Table 4.26 below.

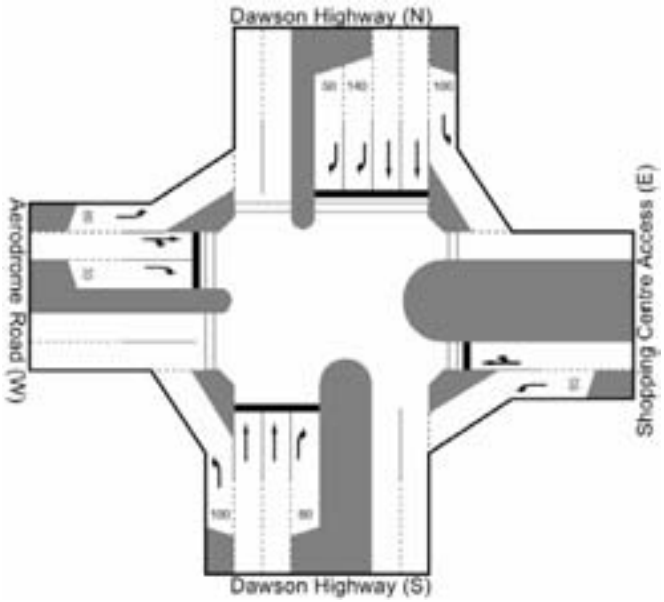


Figure 4.12 Existing Dawson Highway/Aerodrome Road/Shopping Centre intersection

Table 4.26 Existing Dawson Highway/Aerodrome Road/Shopping Centre intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.81	28	170	0.82	28	176
	PM	0.87	37	159	0.87	37	164
2013	AM	0.78	27	187	0.79	27	194
	PM	0.89	40	202	0.90	43	227
2019	AM	0.82	28	237	0.84	29	250
	PM	1.00	48	255	1.00	52	325
2032	AM	0.88	32	346	0.89	33	363
	PM	1.00	67	518	1.02	68	520

The existing intersection will operate within capacity to 2014 under background traffic only.

The Project traffic will have an impact on the operation of the existing intersection, resulting in the capacity being reached during the first peak construction year of 2013, which corresponds to the first peak year of the Project associated with the construction of trains one and two.

The intersection alteration incorporates additional stand up lanes on Dawson Highway north approach. This is consistent with the planned mid block alteration between Aerodrome Road and Philip Street to six lanes. A plan of the proposed intersection alteration is shown on Figure 4.13and the SIDRA results of the altered intersection performance are shown in Table 4.27.

Alteration works recommended for the intersection include:

- Additional stand-up lanes on both Dawson Highway approaches. This is consistent with the planned mid block alteration between Aerodrome Road and Philip Street to six-lanes.

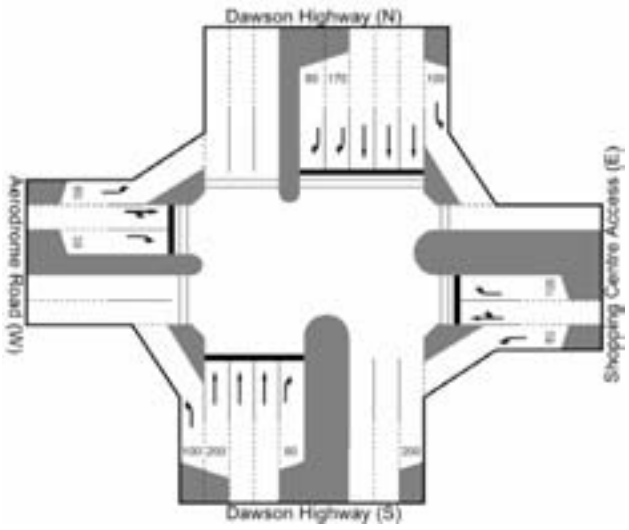


Figure 4.13 Altered Dawson Highway/Aerodrome Road/Shopping Centre intersection

Table 4.27 Altered Dawson Highway/Aerodrome Road/Shopping Centre intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.63	27	115	0.63	27	117	0.63	27	120
	PM	0.73	33	108	0.73	33	108	0.88	34	115
2013	AM	0.63	27	115	0.69	28	128	0.69	29	133
	PM	0.79	35	127	0.80	35	123	0.88	38	143
2019	AM	0.80	30	151	0.80	30	156	0.80	31	165
	PM	0.86	36	157	0.88	39	180	0.90	41	206
2032	AM	0.88	33	196	0.88	33	199	0.88	33	202
	PM	0.96	42	273	0.96	43	273	0.96	47	273

From the SIDRA results it can be seen that the altered intersection will generally operate within capacity for the planning horizon with the cumulative traffic from the three proposed LNG projects in place.

Works will be required by 2013.

The alteration works described opposite will ensure that the cumulative impacts of all LNG projects and other regionally- significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Dawson Highway/Chapman Road/Harvey Road

The existing intersection is a four leg roundabout intersection as illustrated below in Figure 4.14. The SIDRA analysis results for the existing intersection performance are shown in Table 4.28 below.

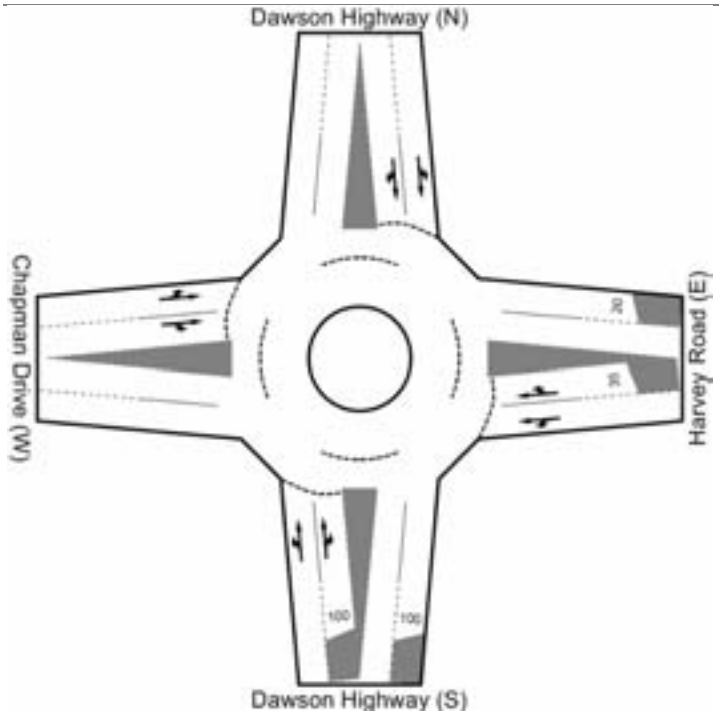


Figure 4.14 Existing Dawson Highway/Chapman Drive/Harvey Road intersection

Table 4.28 Existing Dawson Highway/Chapman Drive/Harvey Road intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.674	8	53	0.696	8.3	57
	PM	0.366	7.5	20	0.38	7.8	22
2013	AM	0.79	9	78	0.893	11.1	122
	PM	0.428	7.8	25	0.484	7.8	30
2019	AM	1.059	27.5	405	1.238	67.1	968
	PM	0.548	8.3	37	0.617	8.5	46
2032	AM	1.279	69.2	1034	1.398	95.7	1333
	PM	0.722	9.4	63	0.753	9.6	70

The existing intersection will operate within capacity to 2014 under background traffic only.

The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013.

Alteration works recommended for the intersection include:

- Signalisation of the intersection.
- Provision of two stand-up lanes on each of the Dawson Highway approaches consistent with

the planned mid block alteration to a four-lane road.

- Left turn slip lane all approaches.
- Dual right turn lanes on Dawson Highway into Chapmen Drive and a single right turn lane on Dawson Highway into Harvey Road.

A plan of the proposed intersection alteration is shown on Figure 4.15and the SIDRA results of the altered intersection performance are shown in Table 4.29.

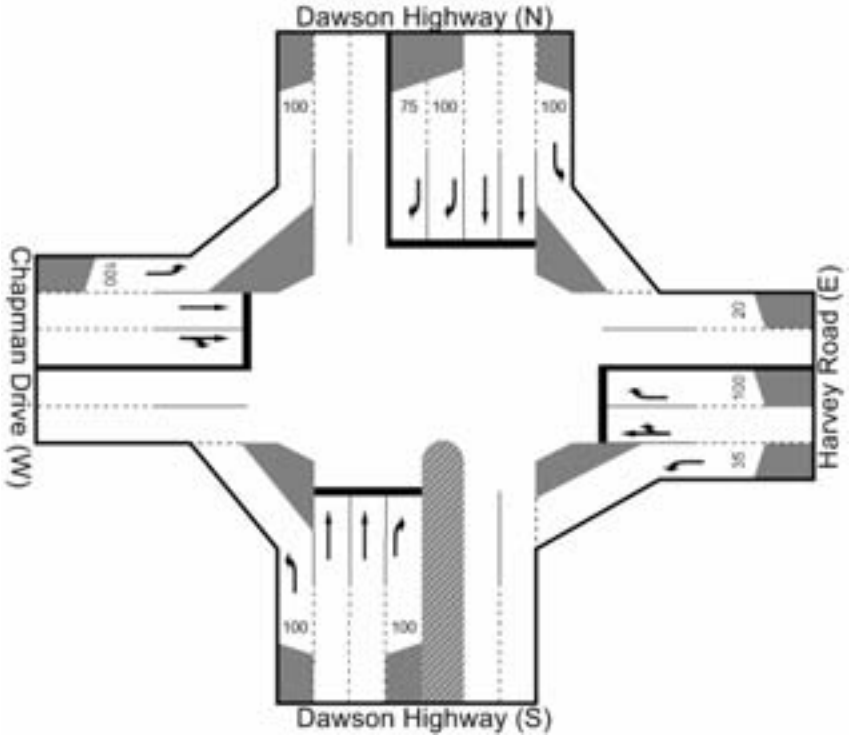


Figure 4.15 Altered Dawson Highway/Chapman Drive/Harvey Road intersection

Table 4.29 Altered Dawson Highway/Chapman Drive/Harvey Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.79	22	87	0.79	22	87	0.80	23	91
	PM	0.65	22	51	0.67	23	53	0.79	22	52
2013	AM	0.86	23	104	0.88	26	117	0.92	28	163
	PM	0.71	23	58	0.72	23	63	0.74	23	73
2019	AM	0.89	29	158	0.91	32	206	0.92	39	279
	PM	0.78	24	78	0.79	25	85	0.81	26	98
2032	AM	1.00	45	389	1.00	46	426	1.00	47	428
	PM	0.80	27	109	0.82	27	113	0.84	27	119

From the SIDRA results it can be seen that the altered intersection will operate at full saturation (DOS of 1.0) by the end of the planning horizon with and without the Project traffic in place.

Works will be required by 2013.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Dawson Highway/Don Young Drive

This priority controlled T- intersection as shown in Figure 4.16 is located immediately north of the Kirkwood Road intersection. The SIDRA analysis results for the existing intersection performance are tabulated in Table 4.30 below.

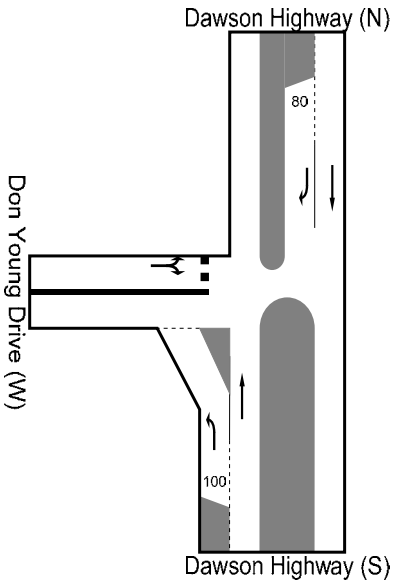


Figure 4.16 Existing Dawson Highway/Don Young Drive intersection

Table 4.30 Existing Dawson Highway/Don Young Drive intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.22	3	8	0.23	3	9
	PM	0.40	5	20	0.41	5	21
2013	AM	0.30	3	13	0.34	3	14
	PM	0.52	5	30	0.57	6	34
2019	AM	0.67	5	34	0.80	6	45
	PM	0.91	12	103	1.03	25	198
2032	AM	1.91	86	496	2.04	97	529
	PM	1.90	238	1222	1.97	254	1271

The existing intersection will operate within capacity to 2018 under background traffic only.

The Project traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2017.

The recommended alteration is signalisation of the existing intersection while maintaining existing footprint as shown in Figure 4.17and the SIDRA results of the altered intersection performance are shown in Table 4.31.

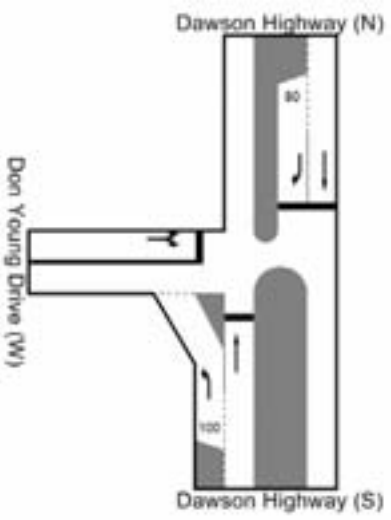


Figure 4.17 Altered Dawson Highway/Don Young Drive intersection

Table 4.31 Altered Dawson Highway/Don Young Drive intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.56	9	49	0.58	10	51	0.58	10	51
	PM	0.62	13	50	0.65	13	53	0.65	13	52
2013	AM	0.63	10	60	0.67	10	62	0.70	10	67
	PM	0.73	14	62	0.75	14	65	0.75	13	64
2019	AM	0.63	9	79	0.89	15	112	0.89	16	112
	PM	0.73	17	107	0.8	17	100	0.82	17	110
2032	AM	0.84	13	145	0.85	14	147	0.85	14	147
	PM	0.88	28	227	0.89	28	232	0.89	28	239

From the SIDRA results it can be seen that the altered intersection will operate within capacity within the planning horizon with and without the Project in place, and with the cumulative traffic from all three proposed LNG projects.

Works will be required by 2017.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Dawson Highway/Kirkwood Road

The existing intersection is a priority controlled T-intersection with priority for through traffic on the Dawson Highway as shown in Figure 4.18. The SIDRA results for the operation of the existing intersection are shown in Table 4.32 below.

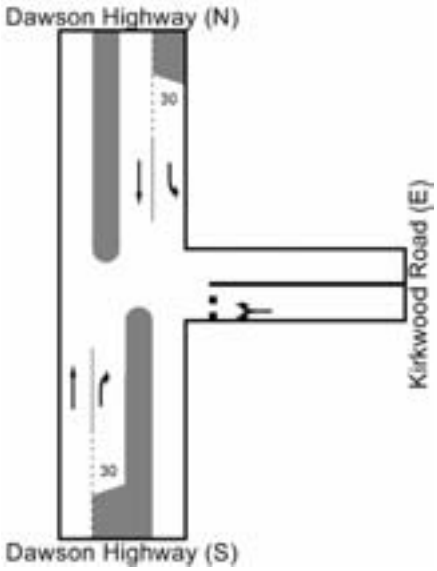


Figure 4.18 Existing Dawson Highway/Kirkwood Road intersection

Table 4.32 Existing Dawson Highway/Kirkwood Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.24	1.2	2	0.25	1.2	2	0.25	3	13
	PM	0.20	1.5	2	0.21	1.5	2	0.25	3	13
2013	AM	0.28	1.2	2	0.32	2	1.1	0.36	1	4
	PM	0.23	1.6	3	0.27	1.5	3	0.31	2	5
2019	AM	0.36	1.3	3	0.40	1.2	3	0.46	1	5
	PM	0.30	1.7	4	0.34	1.7	5	0.40	2	6
2032	AM	0.48	1.4	5	0.50	1.4	6	0.51	2	9
	PM	0.40	2.1	8	0.41	2.1	8	0.42	3	13

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Dawson Highway/Bruce Highway

The intersection is currently a four way priority controlled intersection as shown in Figure 4.19. The SIDRA analysis results for this intersection are shown in Table 4.33 below.

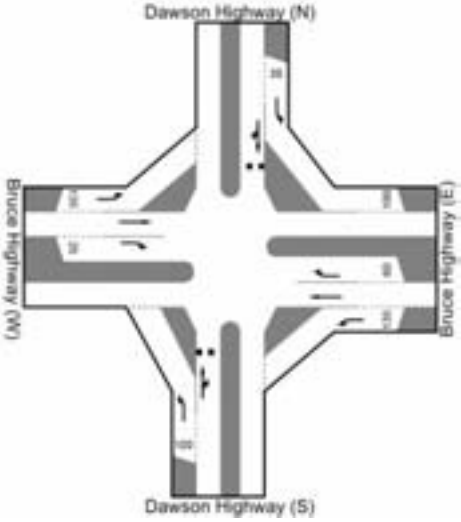


Figure 4.19 Existing Dawson Highway/Bruce Highway intersection

Table 4.33 Existing Dawson Highway/Bruce Highway intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.66	13	61	0.67	13	62
	PM	0.54	10	39	0.60	11	48
2013	AM	0.85	18	112	0.87	19	123
	PM	0.72	13	67	0.83	16	103
2019	AM	1.23	99	588	1.27	112	653
	PM	1.02	35	253	1.20	85	543
2032	AM	2.27	530	1979	2.27	542	2001
	PM	1.81	338	1460	1.89	368	1556

The existing intersection will operate within capacity to 2012 under background traffic only.

The Project traffic will have a minor impact upon the operation of the existing intersection and will not result in bringing forward the need for the alteration earlier than 2012. As noted in DTMR's Road Implementation Program (RIP) the intersection has been identified for an alteration and planning is currently being undertaken for the option of upgrading the intersection to a grade separated interchange due to safety concerns with the current arrangement. It is assumed grade priority is given to the Bruce Highway as shown in Figure 4.20 below. The performance of the interchange is shown in Table 4.34 below.

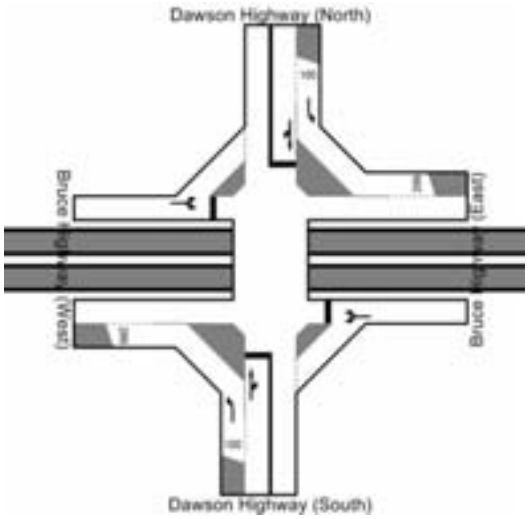


Figure 4.20 Altered Dawson Highway/Bruce Highway Interchange

Table 4.34 At grade Portion of Altered Interchange – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.41	9	42	0.41	9	42	0.42	9	42
	PM	0.38	8	37	0.39	8	39	0.44	9	43
2013	AM	0.48	9	49	0.49	9	50	0.50	9	51
	PM	0.45	9	44	0.51	9	52	0.61	9	64
2019	AM	0.62	9	66	0.71	10	82	0.72	10	84
	PM	0.57	9	58	0.65	10	70	0.77	11	95
2032	AM	0.76	11	107	0.76	11	108	0.77	11	110
	PM	0.71	11	87	0.73	11	92	0.78	13	107

The SIDRA results indicate that the planned intersection alteration will operate within capacity for the planning period with the Project traffic and the cumulative development traffic from all three LNG projects.

Works will be required by 2012.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Hanson Road/Blain Drive/Alf O'Rourke Drive

The existing intersection is a four way, single lane roundabout as shown in Figure 4.21. The SIDRA results of this intersection are shown in Table 4.35.

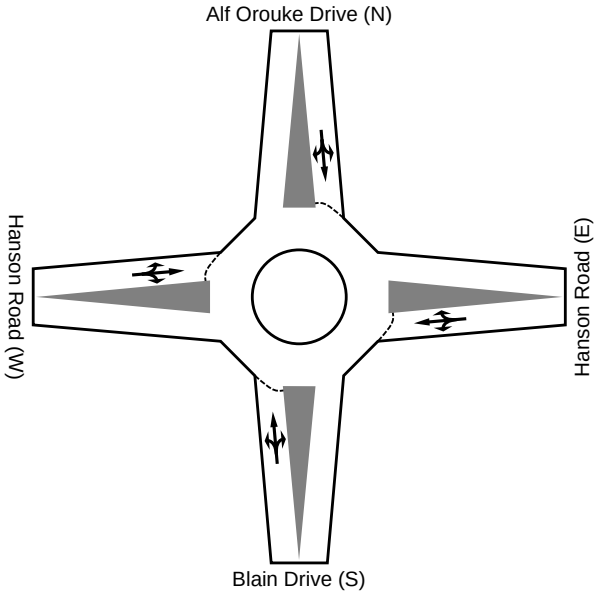


Figure 4.21 Existing Hanson Road/Blain Drive/Alf O'Rourke Drive intersection

Table 4.35 Existing Hanson Road/Blain Drive/Alf O'Rourke Drive intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.86	13	145	0.86	13	145
	PM	0.60	9	58	0.60	9	58
2013	AM	1.1	49.9	590	1.11	54	636
	PM	0.78	12.6	102	0.78	13	104
2019	AM	1.72	254	2378	1.83	297	2704
	PM	1.20	80	721	1.37	112	1033
2032	AM	2.38	548	4064	2.52	606	4467
	PM	3.55	627	3190	4.10	760	3382

The existing intersection currently fails during the AM peak hour under background traffic only.

The Project traffic will have a worsening effect on the intersection performance, particularly during the peak construction years of 2013 and 2019.

Alteration works recommended for the intersection, as shown on Figure 4.22 includes;

- Two circulating lanes
- Additional approach lane on Blain Drive
- Hanson Road (W) approach altered to four lanes consistent with mid block alteration planning

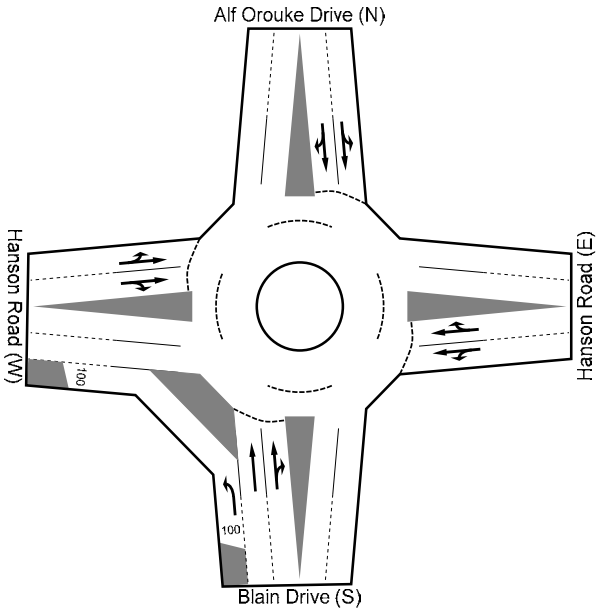


Figure 4.22 Altered Hanson Road/Blain Drive/Alf O'Rourke Drive intersection

The SIDRA results for the altered intersection are shown in Table 4.36 below.

Table 4.36 Altered Hanson Road/Blain Drive/Alf O'Rourke Drive intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.31	6	15	0.31	6	15	0.47	6	21
	PM	0.30	6	15	0.30	6	15	0.36	7	20
2013	AM	0.36	6	19	0.38	6	20	0.45	6	26
	PM	0.36	7	20	0.37	7	20	0.43	7	27
2019	AM	0.49	7	30	0.52	7	33	0.78	7	40
	PM	0.50	7	34	0.53	8	38	1.07	32	369
2032	AM	0.71	9	64	0.71	9	65	0.90	9	90
	PM	0.77	10	83	0.83	12	110	1.04	27	343

From the SIDRA results of the altered roundabout it can be seen that with the Project traffic the intersection will operate within capacity for the planning horizon, although capacity is reached towards the end of the planning horizon.. In order for the roundabout to operate within capacity for the full planning horizon full signalisation of the roundabout could be implemented.

The SIDRA results demonstrate that with all regionally significant projects including the three LNG projects, the Pacific Nickel project and the Wiggins Coal terminal expansion, the altered intersection would operate above capacity for the peak year 2016. Signalisation of the roundabout may result in satisfactory performance.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Hanson Road/Red Rover Road

The existing intersection is a single lane roundabout as shown in Figure 4.23 below.

The SIDRA analysis results for the existing intersection operation are shown in Table 4.37 below.

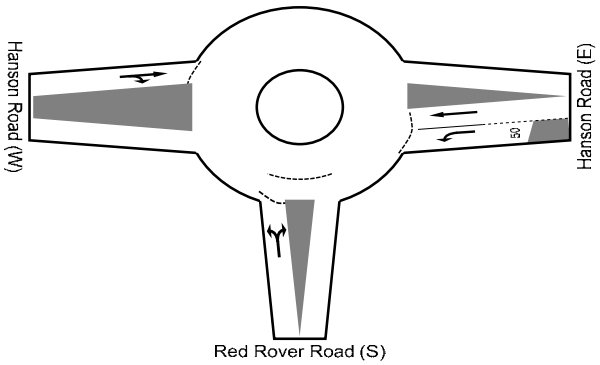


Figure 4.23 Existing Hanson Road/Red Rover Road intersection

Table 4.37 Existing Hanson Road/Red Rover Road intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.51	6	37	0.51	6	37
	PM	0.51	5	39	0.51	5	39
2013	AM	0.60	7	52	0.62	7	57
	PM	0.58	5	49	0.59	5	52
2019	AM	0.89	14	144	1.03	26	275
	PM	0.72	5	77	0.78	5	93
2032	AM	3.19	424	2278	4.21	595	2566

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
	PM	0.99	16	381	1.06	38	677

The existing intersection will operate within capacity to 2016 under background traffic only.

The Project's traffic will have a minor impact on the operation of the existing intersection but will not result in bringing forward the need for the alteration earlier than 2016.

The recommended alteration works include:

- Two circulating lanes, additional approach lanes consistent with the planned four-lane alteration of Hanson Road and an additional approach lane on Red Rover Road.
- An additional approach lane on Red Rover Road.

A proposed alteration of the roundabout is shown in Figure 4.24and the SIDRA results for the altered roundabout are shown in Table 4.38.

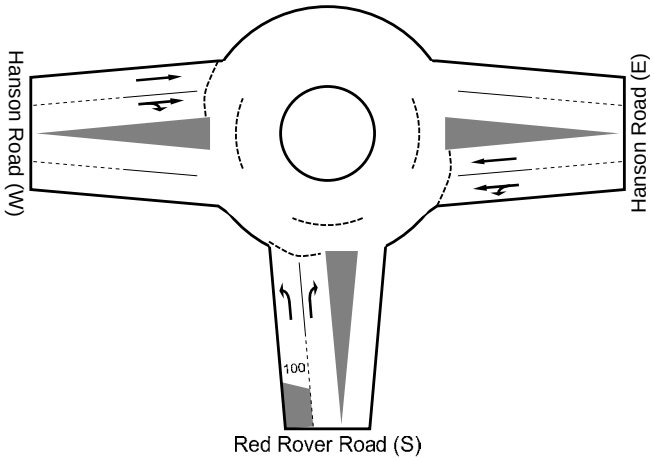


Figure 4.24 Altered Hanson Road/ Red Rover Road intersection

Table 4.38 Altered Hanson Road/Red Rover Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.33	5	19	0.34	6	19	0.50	6	33
	PM	0.27	5	14	0.27	6	14	0.45	6	28
2013	AM	0.39	5	23	0.40	6	24	0.62	6	50
	PM	0.31	5	16	0.32	6	17	0.43	6	26
2019	AM	0.49	5	33	0.52	6	37	0.78	7	87
	PM	0.38	5	22	0.42	6	26	0.70	6	62
2032	AM	0.64	6	56	0.68	7	64	1.62	63	738
	PM	0.52	6	36	0.54	6	41	0.83	8	106

From the SIDRA results of the altered roundabout it can be seen that with the Project traffic the intersection will operate within capacity for the planning period.

Works will be required by 2016.

The SIDRA results demonstrate that with all regionally-significant projects including the three LNG projects, the Pacific Nickel and the Wiggins Coal Terminal Expansion, the altered intersection would operate above capacity towards the end of the planning horizon. The signalisation of the roundabout may result in the intersection operating below capacity.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Gladstone-Mt Larcom Road/Landing Road

This existing intersection is a priority controlled T intersection with priority given to through traffic on Gladstone-Mt Larcom Road as shown in Figure 4.25. The SIDRA analysis results for the existing intersection performance are shown in

Table 4.39.

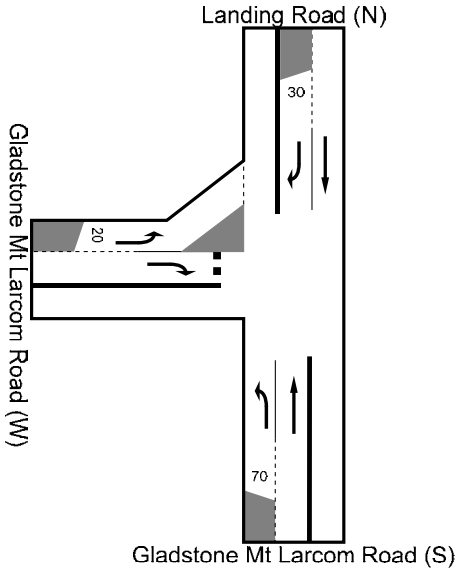


Figure 4.25 Existing Gladstone-Mt Larcom Road/Landing Road intersection

Table 4.39 Existing Gladstone-Mt Larcom Road/Landing Road intersection – SIDRA results

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.67	11	34	0.47	11	34
	PM	0.33	10	17	0.33	10	17
2013	AM	0.56	12	48	0.65	13	62
	PM	0.41	10	24	0.47	11	29
2019	AM	0.79	16	103	1.15	83	411
	PM	0.59	12	43	0.83	16	75
2032	AM	1.31	156	714	1.58	251	1.22

Year	Period	Background			With Project		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
	PM	1.12	50	275	1.36	124	589

The existing intersection will operate within capacity to 2020 under background traffic only.

The Project traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2015.

The recommended alteration to the intersection is to convert to a single lane roundabout as shown in Figure 4.26. The SIDRA results for the operation of the altered intersection are shown in

Table 4.40 below.

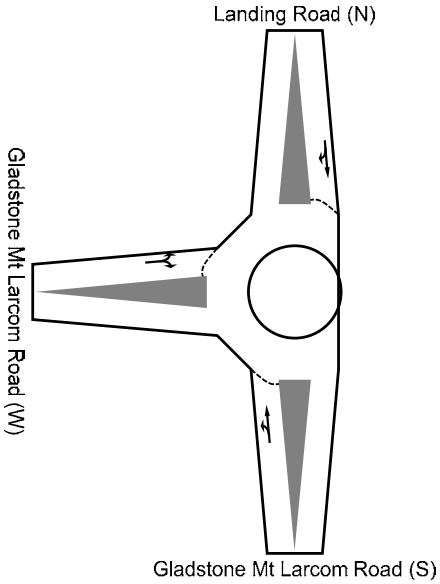


Figure 4.26 Altered Gladstone-Mt Larcom Road/Landing Road intersection

Table 4.40 Altered Gladstone-Mt Larcom Road/Landing Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.21	9	14	0.21	9	14	0.47	13	37
	PM	0.24	8	19	0.24	8	19	0.41	8	35
2013	AM	0.25	9	17	0.28	10	20	0.36	11	28
	PM	0.28	8	23	0.32	8	28	0.35	8	31
2019	AM	0.31	10	23	0.41	10	32	0.56	11	47
	PM	0.34	8	31	0.41	8	39	0.51	8	53

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2032	AM	0.44	10	36	0.44	11	38	0.55	11	50
	PM	0.48	8	52	0.48	9	53	0.55	8	66

The alteration works will be required by 2015.

The alteration works will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner.

Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands on the intersection.

Gladstone-Mt Larcom Road/Calliope River Targinie Road

The existing intersection is a four way priority controlled intersection with priority for through traffic on the Gladstone-Mt Larcom Road as shown in Figure 4.27. The SIDRA results for the operation of the existing intersection are shown in Table 4.41 below.

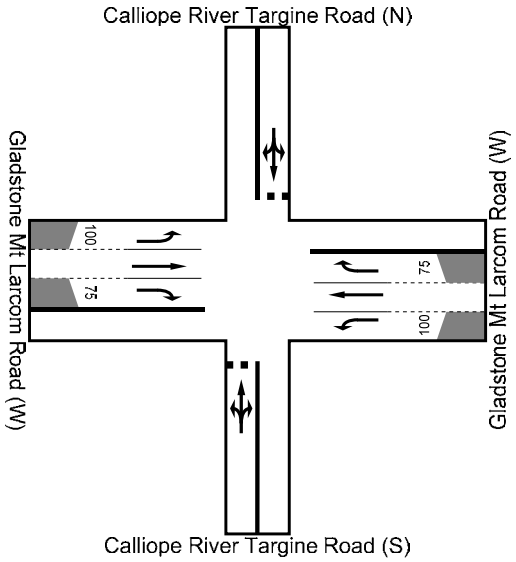


Figure 4.27 Existing Gladstone-Mt Larcom Road/Calliope River Targinie Road intersection

Table 4.41 Existing Gladstone-Mt Larcom Road/Calliope River Targinie Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.16	3	3	0.16	3	3	0.18	3	6
	PM	0.09	3	1	0.09	3	1	0.10	4	3

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2013	AM	0.18	3	3	0.19	2	4	0.23	3	8
	PM	0.10	3	1	0.12	3	1	0.15	3	2
2019	AM	0.22	3	4	0.24	3	4	0.38	4	16
	PM	0.12	3	2	0.14	3	2	0.17	4	4
2032	AM	0.29	3	7	0.29	3	7	0.42	5	18
	PM	0.16	3	2	0.17	3	2	0.19	4	3

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Bruce Highway/Gladstone-Mt Larcom Road

The existing intersection is a priority controlled T-Intersection with priority for through traffic on the Bruce Highway as shown in Figure 4.28. The SIDRA analysis results for the existing intersection operation are shown in Table 4.42 below.

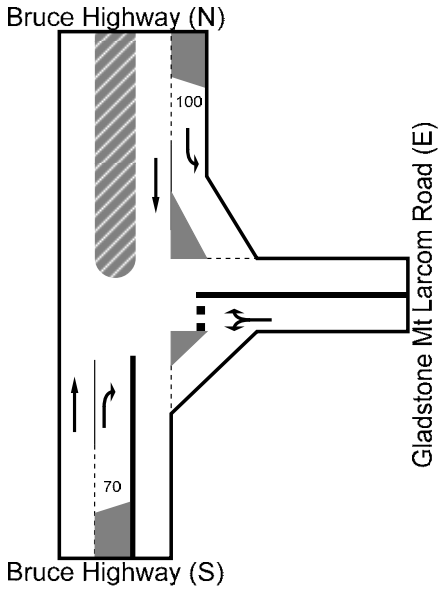


Figure 4.28 Existing Bruce Highway/Gladstone-Mt Larcom Road intersection

Table 4.42 Existing Bruce Highway/Gladstone-Mt Larcom Road intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.21	6	9	0.23	6	10	0.27	7	13
	PM	0.13	5	5	0.14	5	6	0.14	5	6
2013	AM	0.26	6	12	0.27	6	12	0.29	7	13
	PM	0.17	5	7	0.21	6	10	0.28	7	13
2019	AM	0.39	7	21	0.40	7	22	0.42	8	24
	PM	0.33	6	17	0.37	7	20	0.44	7	26
2032	AM	0.62	9	42	0.62	9	43	0.63	9	44
	PM	0.50	9	35	0.53	9	39	0.57	10	44

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Dawson Highway/Kariboe Street

The existing intersection, located in the town of Biloela, is a four way signalised intersection as shown in Figure 4.29. The SIDRA analysis results for the existing intersection operation are shown in Table 4.43 below.

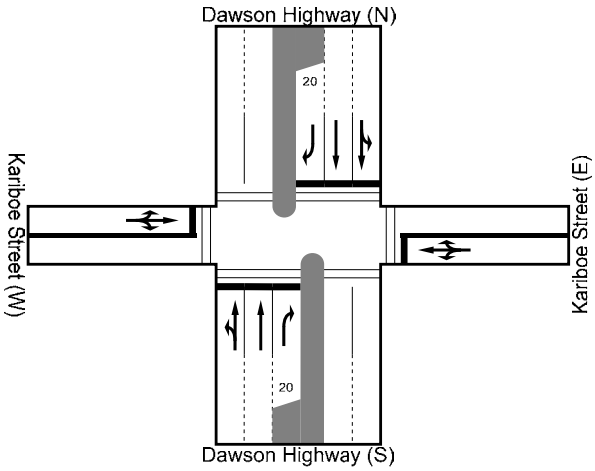


Figure 4.29 Existing Dawson Highway/Kariboe Street intersection

Table 4.43 Existing Dawson Highway/Kariboe Street intersection – SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.21	14	32	0.21	14	32	0.21	14	32
	PM	0.35	15	30	0.35	15	30	0.35	15	31
2019	AM	0.22	14	33	0.22	14	34	0.24	13	34
	PM	0.36	15	38	0.36	15	38	0.41	15	34
2032	AM	0.26	14	38	0.26	14	38	0.28	14	38
	PM	0.42	15	36	0.42	15	36	0.46	14	38

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Warrego Highway/Leichhardt Highway

This is a priority controlled T-intersection with priority to through traffic on the Warrego Highway as shown in Figure 4.30. This is shown in Table 4.44.

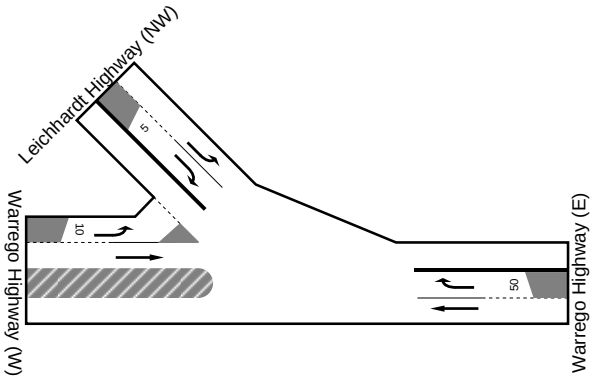


Figure 4.30 Existing Warrego Highway/Leichhardt Highway intersection

Table 4.44 Existing Warrego Highway/Leichhardt Highway intersection - SIDRA results

Year	Period	Background			With Project			Cumulative		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.08	4	3	0.08	4	3	0.08	4.1	3

		Background			With Project			Cumulative		
	PM	0.08	4	3	0.08	4	3	0.08	4	3
2019	AM	0.10	4	4	0.11	4	5	0.11	4	5
	PM	0.10	4	4	0.11	4	5	0.11	4	5
2032	AM	0.12	4	6	0.13	4	6	0.13	4	6
	PM	0.12	4	5	0.13	4	5	0.13	4	5

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Warrego Highway/Leichhardt Highway/Dawson Street

Located within Miles this is a four-way priority controlled intersection with priority for through traffic on the Warrego Highway as shown in Figure 4.31. The SIDRA analysis results for the existing intersection operation are shown in Table 4.45 below.

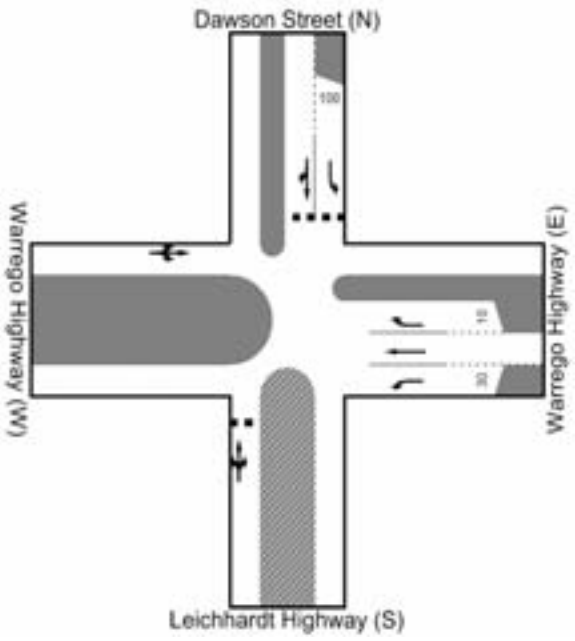


Figure 4.31 Existing Warrego Highway/Leichhardt Highway/Dawson Street intersection

Table 4.45 Existing Warrego Highway/Leichhardt Highway/Dawson Street intersection – SIDRA results

Year	Period	Background	With Project	Cumulative

		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
2010	AM	0.15	6	9	0.15	6	10	0.19	6	11
	PM	0.15	6	10	0.17	6	12	0.20	6	12
2019	AM	0.24	6	17	0.31	7	19	0.35	8	21
	PM	0.25	7	18	0.33	8	21	0.37	8	23
2032	AM	0.35	8	25	0.43	9	27	0.49	9	28
	PM	0.35	8	27	0.44	9	29	0.67	12	46

The existing intersection will operate within capacity for the full planning horizon under background traffic only.

The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

The cumulative traffic from the regionally- significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Intersections of rural State controlled roads with local council roads

A number of rural intersections of State controlled roads with local council roads will be utilised by Project traffic associated with the construction and operation of the gas fields and the gas pipeline. The intersections are identified in Section 2 of this report.

Whilst there will be no intersection capacity issues associated with these intersections, the intersections will need to be assessed during the detailed design stage to determine if other alterations are required as noted below;

- A review of all the intersections should be undertaken to ensure that adequate safe intersection sight distance is currently achieved. If the required safe intersection sight distance is not currently available the intersection should be altered to achieve the required sight distance
- The Department of Main Roads' "Road Planning and Design Manual" provides warrants for the intersection form of minor roads with State controlled roads. The warrants are based on the number of turning movements compared with the through movements on the State controlled roads. Based on the through movement volume on the State controlled roads at the intersections with the local roads and the anticipated Project turning volumes, it is expected that the intersection forms will be required to be a minimum basic right turn (BAR) and basic left turn (BAL) treatment. All intersections where the Project results in an increase in turning movements should be altered to achieve this minimum standard.
- The only exception to this will be the intersection of the Bruce Highway with the Narrows Road which will be utilised by the Project to access pipeline Camp 1 and Laydown Area 1. Due to the higher volume on the Bruce Highway it is expected that the intersection treatment at this intersection will be required to be a channelised right turn treatment with a short right turn slot (CHR (S)).

Intersections of construction camp access to State controlled roads

A number of construction camp access roads associated with the construction of the pipeline will access directly onto State controlled roads. The final locations of the intersections will be required to be selected to ensure that safe intersection sight distance is achieved for the speed environment on the State controlled road. It is expected, based on the turning volumes in/out of the camp, that the intersection forms will be a minimum basic right turn (BAR) and basic left turn (BAL) treatment.

Intersections of gas plant access roads and camp access roads with local roads

Where a gas plant access road or construction camp access road intersects with a local road, the access location should be selected to ensure that safe intersection sight distance is achieved for the local access road speed environment. It is expected that the intersection form would be a minimum basic right turn (BAR) and basic left turn (BAL) treatment.

Intersection mitigation summary

Table 4.46 Results of the intersection assessment

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Dawson Highway/Dawson Road/Breslin Street	Three-way signalised	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Blain Drive/Herbertson Street	Four-way, two-lane roundabout	The existing intersection will operate within capacity to 2021 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013. Alteration works recommended for the intersection include: • Addition of a free left turn lane on the Dawson Highway (South) approach. • Extension of the short right turn lane on the Blain Drive approach. • Conversion of the through/right lane on the Blain Drive approach to a left/through/right lane. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner, provided that the roundabout is signalised. Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands from regionally-significant projects. It is noted that DTMR has previously conditioned the Gladstone Pacific Nickel development to contribute to the cost of signalisation of the roundabout.
Dawson Highway/Philip	Four-way, two-	The existing intersection currently fails during the PM peak hour. It is noted that	The alteration works described opposite

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Street/Shopping Centre	lane roundabout	the roundabout would be expected to operate at a higher level as three legs of the roundabout are metered during the peak hour periods. The Project's traffic will have a worsening effect on the intersection's performance, particularly during the peak construction years of 2013 and 2019. Alteration works recommended for the intersection include: • Signalisation of the intersection. • Provision of three stand-up lanes on each of the Dawson Road approaches consistent with the planned mid block alteration to a six-lane road. • Free left turn lane on all approaches. • Right turn lanes on all approaches. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Dawson Highway/Penda Avenue	Two-lane roundabout	The existing intersection will operate within capacity to 2013 under background traffic only. The Project's traffic will have a minor impact on the operation of the existing intersection and will result in bringing forward the need for the alteration earlier to 2012. The alteration works recommended for the intersection include: • Signalisation of the intersection • Provision of three stand-up lanes on each of the Dawson Highway approaches, consistent with the planned mid block alteration to six	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		lanes. • Dual right turn lanes into Penda Avenue. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	
Dawson Highway/Aerodrome Road	Four- way signalised	The existing intersection will operate within capacity to 2014 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection, resulting in the capacity being reached during the first peak construction year of 2013, which corresponds to the first peak year of the development associated with the construction of trains one and two. Alteration works recommended for the intersection include: • Additional stand-up lanes on both Dawson Highway approaches. This is consistent with the planned mid block alteration between Aerodrome Road and Philip Street to six-lanes. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Dawson Highway/Chapman Road/Harvey Road	Two-lane roundabout	The existing intersection will operate within capacity to 2014 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		Alteration works recommended for the intersection include: • Signalisation of the intersection. • Provision of two stand-up lanes on each of the Dawson Highway approaches consistent with the planned mid block alteration to a four-lane road. • Free left turn lane all approaches. • Dual right turn lanes on Dawson Highway into Chapmen Drive and a single right turn lane on Dawson Highway into Harvey Road. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection..
Dawson Highway/Don Young Drive	Priority controlled T-intersection	The existing intersection will operate within capacity to 2018 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2017. The recommended alteration is signalisation of the existing intersection. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Dawson Highway/Kirkwood Road	Priority controlled T-intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Bruce Highway	Four way priority controlled	The existing intersection will operate within capacity to 2012 under background traffic only. The Project's traffic will have a minor impact upon the operation of the existing intersection and will not result in bringing forward the need for the alteration earlier than 2012. DTMR is planning an alteration to a grade separated interchange. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Hanson Road/Blain Drive/Alf O'Rourke Drive	Four-way, single-lane roundabout	The existing intersection currently fails during the AM peak hour under background traffic only. The Project's traffic will have a worsening effect on the intersection performance, particularly during the peak construction years of 2013 and 2019. The recommended alteration works include: • Two circulating lanes. • Additional approach lane on Blain Drive. • Hanson Road (W) approach alteration to four-lanes, consistent with mid block alteration planning. Australia Pacific LNG will work with the Federal, State, Local Government and	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		industry in regard to the potential alterations to meet the increased demands on the intersection.	
Hanson Road/Red Rover Road	Three-way single-lane roundabout	The existing intersection will operate within capacity to 2016 under background traffic only. The Project's traffic will have a minor impact on the operation of the existing intersection but will not result in bringing forward the need for the alteration earlier than 2016. The recommended alteration works include: • Two circulating lanes, additional approach lanes consistent with the planned four-lane alteration of Hanson Road and an additional approach lane on Red Rover Road. • An additional approach lane on Red Rover Road. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Gladstone-Mt Larcom Road/Landing Road	Priority controlled T-intersection	The existing intersection will operate within capacity to 2020 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2015. The recommended alteration to the intersection is to convert to a single lane roundabout. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		the intersection.	on the intersection.
Gladstone-Mt Larcom Road/Calliope River Targinie Road	Four-way priority controlled	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Bruce Highway/Gladstone-Mt Larcom Road	Priority controlled T-Intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Kariboe Street	Four way signalised intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Warrego Highway/Leichardt Highway	Priority controlled T intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Warrego Highway/Leichardt Highway/Dawson Street	Four way priority controlled intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

4.2.6 Road pavement

Methodology

The methodology adopted to undertake the impact assessment of the pavements on the State-controlled roads was as follows:

- Identify the road links within the study area that could be significantly impacted by project traffic (i.e. where project traffic exceeded five percent of existing background traffic)
- Obtain all available data about existing traffic volumes, vehicle classification, conditions and roughness on these road links
- Calculate current Equivalent Standard Axles (ESA) to the road links
- Identify the year that the existing pavement would reach terminal roughness based on background traffic and determine the corresponding ESA. This represents the remaining life of the road link pavement in ESAs and provides the year at which, under normal operating conditions, rehabilitation would be required
- Obtain the Project traffic ESAs from the sketch model and add these to the background ESAs to calculate the increases pavement loading due to the Project
- Determine the year at which the existing pavement will reach terminal roughness based on background plus project ESAs. This year represents the year when pavement rehabilitation would be required due to project traffic.

Analysis parameters

The pavement analysis comprises two components, namely the impact on the timing of the pavement rehabilitation and the increased maintenance required on the network due to Project traffic. The assessment was based on a comparison of the cumulative Equivalent Standard Axle (ESA) loads with and without the Project over the analysis period.

The distribution of traffic for the pavement impact assessment considers the origins and destinations of heavy vehicle movements only. The origin and destination of vehicles was coded in the GIS and impacted road links were extracted.

The cumulative number of ESAs loaded onto the roadway segment to the terminal year was calculated based on the ESA loading along the haulage routes. The background volumes were based on classified AADT volumes with a cumulative heavy vehicle growth rate equivalent to the normal background traffic growth. For this analysis a value of 2.9 ESAs for each heavy vehicle was applied for the Bruce Highway and 3.2 ESAs for each heavy vehicle was used for all other State-controlled roads.

Terminal roughness values for the various road links were broadly based on Figure 2.2 of the Pavement Rehabilitation Manual, Queensland Transport, 1992. Terminal roughness values for the various road links are given in Table 4.47 below. In general, main rural roads were assumed to be equivalent to secondary roads having a terminal roughness of 175. With the exception of the Bruce Highway, all other roads were assigned a terminal roughness of 120 which was consistent with assumptions presented in the Gladstone LNG (Santos/Petronas) and Queensland Curtis LNG Project (QGC/BG) environmental impact statements.

Pavement impacts on local roads could not be performed because of the lack of condition data and historic deterioration rates on these roads.

As pavement impact is a cumulative assessment, separate consideration of the other regionally-significant projects was not required. The impacts of these projects are to be assessed in isolation, to determine individual project contribution to pavement rehabilitation.

Table 4.47 Terminal roughness values

DTMR Region	Road number	Road name	Terminal roughness
Darling Downs	340	Dalby – Kogan Road	175
Darling Downs	341	Chinchilla – Tara Road	175
Darling Downs	342	Kogan – Condamine Road	175
Darling Downs	3402	Tara – Kogan Road	175
Darling Downs	3403	Warra – Kogan Road	175
Darling Downs	4302	Jackson – Wandoan Road	175
Darling Downs	18A	Warrego Highway	120
Darling Downs	18B	Warrego Highway	120
Darling Downs	18C	Warrego Highway	120
Darling Downs	18D	Warrego Highway	120
Darling Downs	26B	Leichhardt Highway	120
Darling Downs	26C	Leichhardt Highway	120
Darling Downs	35A	Moonie Highway	120
Darling Downs	86A	Surat Developmental Road	120
Darling Downs	86B	Surat Developmental Road	120
Fitzroy	181	Gladstone – Mt Larcom Road	120
Fitzroy	183	Gladstone Port Access Road	120
Fitzroy	454	Eidsvold - Theodore Road	175
Fitzroy	4397	Roma - Taroom Road	175
Fitzroy	10E	Bruce Highway	100
Fitzroy	26A	Leichhardt Highway	120
Fitzroy	41D	Burnett Highway	120
Fitzroy	41E	Burnett Highway	120
Fitzroy	41F	Burnett Highway	120
Fitzroy	46A	Dawson Highway	120

DTMR Region	Road number	Road name	Terminal roughness
Fitzroy	46B	Dawson Highway	120
Fitzroy	46C	Dawson Highway	120
South West	4302	Jackson – Wandoan Road	175
Darling Downs	325	Dalby - Cecil Plains Road	175
Darling Downs	3251	Millmerran - Cecil Plains R	175
South West	24D	Carnarvon Highway	120
Darling Downs	28A	Gore Highway	120
Darling Downs	28B	Gore Highway	120

Where available, historic roughness information was used to estimate background annual roughness degradation. The process used in calculating yearly roughness degradation rates was as follows:

- Historic data available for each road segment which could be effected by the Project was interrogated and the average yearly roughness values for the road links was calculated
- The data was corrected for errors and relative decreases in roughness, these being predominately due to changes in road chainages recorded, missing years, and physical improvements of the road such as rehabilitation or resurfacing.

The results of the analysis are given in Appendix F.

From the results of the analysis, the following degradation rates were adopted as shown in Table 4.48.

Table 4.48 Adopted deterioration rates

Road details	Annual deterioration rates
Roads that have recorded historic data	Calculated average for the whole road
Class 1 roads – no available historic data	3 counts/yr
Class 2 roads – no available historic data	3 counts/yr
Class 3 roads – no available historic data	4.4 counts/yr
Class 4 roads – no available historic data	1.9 counts/yr

Despite calculating the annual roughness degradation for each segment of the road, as shown in Table 4.48 the adopted rates use the calculated average deterioration rate for the entire road (i.e. average of all of the segments). This approach was adopted because of the limited data set available for the calculation of roughness deterioration, the significant differences in some deterioration rates between each segment, and the uncertainty associated with predictive deterioration modelling. Additionally, this approach was seen as conservative as growth rates have been assumed to decrease over the analysis period.

No data was available for the deterioration of class 1 and class 2 roads. A conservative figure of three counts per year was adopted as per other reports.

Some data exists for class 3 and 4 roads. The values adopted represent the average of recorded values for roads in the same class.

Based on this data and the existing roughness data, the year at which the various segments reach their terminal roughness was calculated.

Impact assessment

Contributions towards pavement rehabilitation and maintenance would only be made where the Project would bring forward the need for rehabilitation by more than one year within the analysis timeframe and where the Project traffic has an impact of greater than five percent of the existing traffic volume, in accordance with the GARID guidelines. Roads conforming to these conditions are shown in

Table 4.49. This excludes the pavements that have already reached the end of their lives because those pavements currently require rehabilitation and this requirement is not triggered by the Project.

Mitigation – pavement rehabilitation

To determine contribution amounts for the impact of the reduced pavement lives, it is proposed to use the bring forward methodology as detailed in the GARID. It is noted that bring forward cost percentages have only been applied on roads not identified in year one or year two of the RIP.

Australia Pacific LNG will work with Federal, State, Local Government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network.

Table 4.49 Pavement rehabilitation

DTMR Region	Road Name	Chainage	Rehab Year no Project	Rehab Year with Project	Bring Forward with Project
Darling Downs	18D - Warrego Hwy	Ch 0 to 1.135	2028	2026	1.9
		Ch 56.831 to 101.157	2020	2018	1.8
		Ch 101.157 to 135.247	2021	2020	1.1
	26B - Leichhardt Hwy	Ch 60.47 to 127.61	2020	2018	1.8
	26C - Leichhardt Hwy	Ch 0 to 32.02	2019	2010	8.6
		Ch 32.02 to 53.04	2012	2010	2.3
	3251 - Milmerran - Cecil Plains Rd	Ch 0 to 45.61	2036	2019	17.2
	3402 - Tara-Kogan Rd	Ch 34.8 to 43.03	2022	2018	4.1
	342 - Kogan-Condamine Rd	Ch 0 to 45.82	2033	2024	8.8
		Ch 45.82 to 71.41	2031	2026	5.1
	4302 - Jackson-Wandoan Rd	Ch 68.93 to 81.1	2033	2029	3.9

DTMR Region	Road Name	Chainage	Rehab Year no Project	Rehab Year with Project	Bring Forward with Project
	86A - Surat Developmental Rd	Ch 119.3 to 142.67	2010	2009	1.0
	86B - Surat Developmental Rd	Ch 0.6 to 40.39	2013	2012	1.0

Road maintenance

The GARID required proponents to identify roads that will be significantly impacted by the development in order to establish the roads which may require increased maintenance. These roads were provided in Table 4.8.

Australia Pacific LNG will work with Federal, State, Local Government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network.

4.2.7 Bridge capacity and constraints

Methodology

The methodology adopted to examine the capacity of the bridges was as follows:

- Identify the likely routes to be impacted by the Project
- Identify the bridges on the likely routes
- Identify any planned alteration works
- Identify any existing load limits or other restrictions that currently impede the functioning of the bridge
- Identify heavy load routes and check whether any of these exceed the capacity of the bridge on the route.

Analysis parameters

Qualitative analyses have been conducted to identify the potential impact of heavy vehicle movements from the Project. Information concerning the capacity of bridges along the proposed Australia Pacific LNG routes was obtained during site inspections and a desktop review of the data provided by the Department of Transport and Main Roads. Bridges with known limits and conditions were also identified, as well as bridges that were perceived to be 'at risk'.

Impact assessment

Section 2 provided information on bridges within the study area that were either load limited or were in a poor condition.

Table 4.50 Fitzroy Region bridge

ID	**17326**
Name	Sandy Ck Bridge
TDist	144.72

Road segment	4397 - Roma - Taroom Road
Road segment chainage	84.150 to 149.420
Restriction Type	Mass
Impact	No Project traffic is scheduled to use this bridge.
Mitigation	Nil

Table 4.51 Darling Downs Region bridges

ID	**13028**
Name	Dogwood Creek Bridge
TDist	T Dist: 0.705
Road segment	18D - Warrego Highway
Road segment chainage	0.000 to 1.135
Restriction Type	Mass. All platforms crossing this structure must have a minimum axle spacing of 1.8m centres, must not carry more than 10 tonne per axle and must travel at 10 km/h on the bridge centreline
Impact	This bridge will be heavily impacted on by the Project in the construction of both the pipeline and the gas field infrastructure as it is on the western route from Miles. The average daily traffic volume peaks at 200 VPD on this road. The restriction on this bridge is unlikely to affect the majority of Project traffic.
Mitigation	Heavy loads such as those that may be required for large items for the gas plants will need to travel at 10km/hr over the bridge and ensure that load and axel spacing complies with the restriction. There are no reasonable opportunities for alternative routes.
ID	**15566**
Name	Condamine River Bridge (Crawford Bridge)
TDist	32.31
Road segment	26C - Leichardt Highway
Road segment chainage	32.020 to 53.040
Restriction Type	Mass. Heavy Load Platforms crossing this bridge at Condamine are restricted to 13t per axle line, regardless of axle spacing
Impact	This bridge provides access from Miles/Condamine to the Condabri, Talinga/Orana and Kainama gas fields and is heavily trafficked by the Project with the average daily traffic peaking at 204 VPD. The load restriction on this bridge is unlikely to have any impact on the Project.
Mitigation	Nil
ID	**15592**
Name	Moraby Creek Bridge

TDist	80.1
Road segment	Roma-Condamine Road
Road segment chainage	63.07 to 105.123
Restriction Type	Mass
Impact	No Project traffic is scheduled to use this bridge.
Mitigation	Nil
ID	**15970**
Name	Wooleebe Creek Bridge
TDist	69.27
Road segment	Jackson-Wandoan Road
Road segment chainage	68.930 to 81.100
Restriction Type	Mass. Wooleebe Creek Bridge is closed to vehicles operating under excess mass guidelines or excess mass permits
Impact	This bridge provides access from Gladstone and Townsville to the Woleebee, Combabula/Ramyard gas fields. The restriction is not expected to impact the Project.
Mitigation	Nil
ID	**15978**
Name	One Arm Man Creek Bridge
TDist	70.20
Road segment	Jackson-Wandoan Road
Road segment chainage	68.930 to 81.100
Restriction Type	Mass. One Arm Man Creek Bridge is closed to vehicles with a Gross Vehicle Mass (GVM) greater than 30 tonnes.
Impact	This bridge provides access from Gladstone and Townsville to the Woleebee, Combabula/Ramyard gas fields.
Mitigation	An alternative route is available via the Leichhardt Highway and Giligulgul Road. This route will be taken for any vehicle with a GVM in excess of 30t.
ID	**250**
Name	Kogan Creek Bridge
TDist	47.46
Road segment	Dalby-Kogan Road
Road segment chainage	19.292 to 47.682
Restriction Type	Of concern (narrow wooden bridge)

Impact	This bridge provides access from Brisbane to the Talinga/Orana and Condabri gas fields. Additionally, it provides access to the Kainama field from Miles and the Miles airport.
Mitigation	As this bridge is narrow, large loads originating from Brisbane may need to use an alternative route to access the gas fields. The route would be via the Warrego Highway through Chinchilla, then south on the Leichhardt Highway at Miles then east on the Kogan-Condamine Road at Condamine.
ID	**253**
Name	Fourteen Mile Creek Bridge
TDist	15.92
Road segment	Kogan-Condamine Road
Road segment chainage	0.000 to 45.82
Restriction Type	Bridge removed and diversion in place, prone to flooding
Impact	This bridge provides access from Brisbane to the Talinga/Orana and Condabri gas fields. Additionally, it provides access to the Kainama field from Miles and the Miles airport.
Mitigation	As this bridge is prone to flooding, during flooding periods loads originating from Brisbane may need to use an alternative route to access the gas fields. The route would be via the Warrego Highway through Chinchilla, then south on the Leichhardt Highway at Miles then east on the Kogan-Condamine Road at Condamine. Personnel transport to/from Miles and the Kainama fields may also be affected by flooding of this bridge and it may be necessary to use the Warra-Kogan Road as a diversion during these times.
ID	**249**
Name	Braemer Creek Bridge
TDist	36.3
Road segment	Dalby-Kogan Road
Road segment chainage	19.292 – 47.682
Restriction Type	Of concern (narrow wooden bridge)
Impact	This bridge provides access from Brisbane to the Kainama, Talinga/Orana and Condabri gas fields.
Mitigation	Large loads bound for the Kianama gas fields would need to be diverted via the Warrego Highway and the Warra-Kogan Road. Large loads bound for the remaining fields would need to be diverted via the Warrego Highway through Chinchilla, then south on the Leichhardt Highway at Miles then east on the Kogan-Condamine Road at Condamine.
ID	**24700**
Name	Unidentified

TDist	25.08
Road segment	Dalby-Kogan Road
Road segment chainage	19.292 - 47.682
Restriction Type	Of concern. Bridge closed, diversion in place
Impact	This bridge provides access from Brisbane to the Kainama, Talinga/Orana and Condabri gas fields. It is expected that this crossing is affected by flooding.
Mitigation	During flooding periods, traffic to the Kianama gas fields would need to be diverted via the Warrego Highway and the Warra-Kogan Road. Traffic bound for the remaining fields would need to be diverted via the Warrego Highway through Chinchilla, then south on the Leichhardt Highway at Miles then east on the Kogan-Condamine Road at Condamine during flooding.
ID	**23,800**
Name	Ashall Creek Bridge
TDist	17.50
Road segment	Dalby - Cecil Plains Road
Road segment chainage	0.000 to 39.080
Restriction Type	Of concern. Bridge closed, diversion in place
Impact	This bridge provides access from Gladstone to the Gilbert Gully gas fields. It is expected that this crossing is affected by flooding.
Mitigation	During flooding periods, traffic from the Gilbert Gully gas fields would need to be diverted via south on the Dalby-Cecil Plains Road, west on the Gore Highway then north on the Leichhardt Highway to access Miles.

4.2.8 Public and active transport network

In Section 2 of this report the existing and proposed public and active transport network was reviewed.

Outside of Gladstone the public transport network is limited largely to the school bus route network. To minimise the safety risk as part of the transport management plan the movement of heavy project vehicles along designated school routes during their pick up and set down times will be aim to be avoided.

In terms of active transport the major impact of the proposal will be on pedestrian and cyclist safety and their interaction with the road network. It is recognised that the increase in vehicles, especially heavy vehicles, in communities along project routes may pose a safety risk. Risk assessment plays an important part of this assessment and a range of proposed mitigation measures have been identified.

For instance, a number or road widening and intersection improvements are recommended in this report. In the proposed alteration of this transport infrastructure it is recommended that DMR ensure that the existing pedestrian and cyclist facilities should be maintained or improved in accordance with current design standards. In addition the proposed road network improvements along Hanson Road (duplication and selected intersection alterations) provide the opportunity to improve existing pedestrian and cyclist facilities in this area in accordance with Gladstone Regional council planning

All project vehicles will be operated by trained drivers and in accordance with safety regulations in relation to speed limits, use of lights and other warning devices on all occasions and other safe driving practices.

4.2.9 Road safety

Health and safety of all employed personnel and the community in which this Project will operate is of paramount importance to the proponents. A comprehensive health and safety system is in place throughout the proponent's operation. The Health and safety management system is required to be adhered to by all direct or indirect contractors working on this Project. The policy and procedures are available upon request.

These procedures are applied to road (and other forms) transport undertaken as part of the construction and operations of this proposed Project.

Traffic incident history

As identified in Table 2-11, Table 2-12 and Table 2-13 in Section 2 of this report the following road links were identified as falling within a 'very high risk' or 'high risk' category based on the number of crashes per million vehicle kilometres travelled (C/MVKT)

These roads were assessed against their proposed use by Project traffic. Although the proposed Project will add traffic to these roads to varying degrees this by itself cannot be considered to increase the likelihood of an accident. There are a range of factors that contribute to accidents which is not evident in the crash data made available.

The Project will adopt a range of operational health and safety measures pertaining to the operations of project vehicles that ensure safe driving techniques and other measures to reduce the risk of accidents. In the following list of roads details are provided on the peak number of additional number of Project vehicles to these roads at any one time.

Surat Development Road

The Surat Development Road as it passes through Tara has been identified as a Very High Risk Road for accidents. It has a current AADT of 2,462. This section of the road, although not located within the Area of Investigation Study Area will need to be used by Project traffic to access the Gilbert Gully Walloons Gas field Development Area. The Project at its peak will add an additional 85 vehicles per day, a 3% increase in traffic volumes. This additional traffic is not considered to be significant and unlikely to contribute to an increased safety risk on the link.

Warra-Kogan Road

Sections of the Warra-Kogan Road are located within the Area of Investigation Study Area and have been identified as being a very High Risk road for accidents. However, it is not proposed to be used by project traffic.

Gore Highway

A section of the Gore Highway near Toowoomba and located outside the Area of Investigation Study Area has been identified as being a very high or high risk road for accidents. However, the Gore Highway in this area will need to be used by Project traffic to access the Gilbert Gully Walloons Gas field Development Area. At its peak the Project will add only 20 vehicles to a road with an AADT of 14,800. This additional traffic is not considered to be significant and unlikely to contribute to an increased safety risk on the link.

Roma-Taroom Road

Sections of the Roma-Taroom Road are located within the study area and have been identified as being a high risk road for accidents. However, this road is not proposed to be used by project traffic.

Dawson Highway

The Dawson Highway, from the Glenlyon St intersection to the Breslin St intersection, has been identified as a High Risk road for accidents. It has a current AADT of approximately 13,010 vehicles south of the Park St intersection and approximately 20,259 vehicles west of the Breslin St intersection.

It is expected that Australia Pacific LNG will only utilise these intersection for the transport of pipe imported into Auckland Point for the construction of the gas pipeline. The Project traffic on this intersection will be limited to an additional six vehicles per hour during the pipe delivery period in 2011/2012. This is considered to be a negligible amount of additional traffic and is not expected to contribute to an increase in traffic incidents at this intersection.

Gladstone-Mt Larcom Road

The Gladstone-Mt Larcom Road is within the study area and has been identified as being a high risk road for accidents. However, this road is not proposed to be used by the Project traffic.

Warrego Highway

A section of the Warrego Highway heading west out of Dalby has been identified as being a High Risk road for accidents. Although located outside the Area of Investigation Study Area it has been included in the assessment for completeness as some Project traffic will need to use this stretch of the highway to access the Gas fields. It has an existing AADT of 7,191. Only a small amount of Project traffic will use this road and this additional traffic is not considered to be significant and unlikely to contribute to an increased safety risk.

Driver fatigue

The Project will aim to reduce private vehicle use as much as possible during construction, by providing transport to site, from designated pick up areas or to and from the local airport for fly in/out staff.

Journey management plans for vehicle travel will incorporate fatigue management considerations.

Construction and on-going service deliveries to project facilities will be in accordance with the traffic management plan and relevant transport regulations. This will include strict adherence to driver travel and required rest periods and the adoption of safe driving techniques.

4.2.10 Stock routes

Stock route impact assessment

Queensland's stock route network (SRN), as currently mapped by the Department of Environment and Resource Management (DERM) will be crossed by the gas pipeline and access roads on a number of occasions. The final pipeline route alignment and associated construction and service access roads, together with access roads to the gas field facilities have not been fully finalised to date. As such a detailed assessment is not possible at this stage. Full details of the potential impacts will be provided once alignments are confirmed along with timing, construction methods and operations in relevant traffic management plans.

The level of impact will be in part related to its level of present day as defined in the stock route classifications as identified in Table 4.52.

Table 4.52 Stock route classification

Classification	Cattle equivalent for a five year period
Primary	>9000
Secondary	3000–9000
Minor	<3000
Inactive	local and unrecorded movements

The degree of impact would be defined as follows:

- Minor – the underground pipeline crosses a stock route temporarily severing access during the construction period. A stock route road is used to deliver construction material for a short time.
- Moderate - stock route is crossed by an at grade access track or another project infrastructure item that may require some local area modification to the route – slight realignment, gated crossing, etc. A stock route road is a primary haul route during the construction phase. However, access is maintained and apart from temporary severance during construction and possible occasional use of an access track for inspections and maintenance impacts over the long term would be minimal.
- Significant - A processed new facility and/or access track severs the route requiring realignment or closure of the stock route access at this point.

Most of the impacts are expected to fall into the minor category as the pipeline will be buried and the need for new or altered roads that could impact on stock routes is limited.

Potential impacts include;

- Severance
- Disruption
- Increased risk of accidents for users

Stock route mitigation

Measures undertaken to minimise the impact on stock routes may include the following:

- Planning of operations in close cooperation with DERM, local councils and pastoralists
- Construction of project infrastructure that as far as possible avoids stock routes as far as practical

The sustainability objectives for the mitigation options are to develop project logistics and transport infrastructure that provide long term community benefits and reduce traffic impacts. Road construction practices and technology to reduce environmental impact and energy use will be adopted.

Post construction, stock routes will be rehabilitated to meet the surrounding conditions. It is expected that access would be maintained, or in some cases improved where practicable.

4.2.11 Road flooding

Sections of the State controlled and council road network that are planned to be used by Project traffic are prone to flooding. A detailed analysis of the impact on existing road infrastructure has been undertaken in the companion EIS document “Gas field Flooding Investigation” Nov 2009.

The Project will limit traffic movements during and after flood events, in line with local traffic control measures. The analysis has not identified any modifications of any waterway crossings on the State Controlled road network.

Should any section of these roads become untrafficable during periods of flooding then where possible alternative routes will be used. Should access not be achievable during prolonged flooding events then construction activates may need to be shut down and demobilisation for a period. The construction activities that may be affected by extreme weather events would be those associated with the gas pipeline and gas field construction. It is unlikely that the road based traffic associated with the construction of the LNG facilty in the Gladstone area would be affected by road flooding.

The Project has not identified any warrants for the alteration of any of the flood crossings on the State controlled network.

A number of Council controlled roads within the gas fields study area will be used by Project traffic and require alterations to accommodate this traffic during their planned use within the Project timeframe. Theses council roads and the level of proposed Project traffic that will use these roads is identified in Table 4.15, Table 4.16 and Table 4.17. Discussions with Council regarding the nature of these alterations including flood immunity will be undertaken to achieve an agreed operational standard.

Access roads will be required to be constructed to provide permanent access to proposed project facilities within the gas fields. The alignment of these roads at this stage is only preliminary and will require further investigation. Flood modelling in areas including these preliminary access road alignments has indicated the potential for flooding of these roads to occur. Discussions with government agencies will be held to determine an appropriate level of road immunity.

When road locations, designs and immunity are finalised it is proposed to undertake further hydraulic modelling to ensure impacts are minimised as far as practicable and mitigation of any changes to flood behaviour is achievable.

While a level of road immunity is not currently proposed, a 10 year ARI road immunity for most of these crossings is considered achievable through the use of appropriately designed cross road drainage features (culverts or bridges) in combination with road raising through floodplain areas in accordance with Queensland Governments Urban Drainage Manual (2007).

4.2.12 Environmental impacts

New roads will need to be constructed to access Project infrastructure. In determining the location of these facilities, consideration has been given to the proximity of existing roads and the local environment. The alignment of these is yet to be finalised.

Additionally road intersection alterations will need to undertaken during the project.

During all phases (construction, operation and ongoing road maintenance) of this project, sustainability measures will be implemented that will provide long term community benefits while minimising traffic impacts. The Project will also adopt road construction practices and technologies to reduce environmental impact and energy use, as far as practicable. In addition, the requirements of the *Environmental Protection Act 1994*, Main Roads Design Manual 2004, and other relevant

legislation will be adhered to ensure environmental impacts will be are kept to a minimum as far as practicable.

Earthworks, vegetation clearing, erosion, and runoff will be minimised as far as practicable, and sediment control and weed management measures will be put in place.

Dust control

Dust generation on roads used by project traffic during construction and operational phases may impact on roadside vegetation, the safety and general comfort of other road users, and adjoining land uses.

Australia Pacific LNG will implement conventional measures to minimise, as far as practicable, the generation of dust by project vehicles during construction. This may include regular application of water at appropriate locations, following Department of Transport and Main Roads ' standard specification MRS11.02 – Provision for Traffic.

Weed, pest and disease control

It is acknowledged that the Project is located within a weed and pest control area. The movement of project vehicles throughout the study area increases the risk of spreading weeds and pests.

Australia Pacific LNG will participate in pro-active weed management and will work closely with regional councils. This is detailed in Volume 5 Attachment 17 of this EIS. Additionally, Origin's Weed Management Procedure will be utilised to ensure that the risk of weed contamination is minimised.

Noise control

It is acknowledged that the Project will increase road traffic noise levels, particularly during construction, however it is not expected that the Project traffic will result in accepted noise thresholds for adjacent residences being exceeded.

Australia Pacific LNG will implement a traffic management plan to minimise, as far as practicable, the potential impacts of road traffic noise from Project traffic. This may include speed controls on project vehicles, management of night-time traffic along roads adjacent to residential or other sensitive land uses.

Spill control

It is acknowledged that the Project may increase the risk of product spill during the transportation of materials by road, for example fuel.

Australia Pacific LNG will implement a traffic management plan to minimise, as far as practicable, the potential impacts of product spill during the transportation of product and materials. This may include the use of suitably qualified fuel transport operators giving consideration to vehicle maintenance, driver training and cleanup procedures as part of emergency response plans.

4.2.13 Traffic management plan

For all road based construction activity associated with the Project, a Traffic Management Plan will be developed during the Front End Engineering Design (FEED) stage of the Project. The plan will be developed in conjunction with the relevant State and Local authorities and the local community.

The Traffic Management Plan will address the movement of heavy vehicles associated with the Project throughout the road network, by:

- Setting routes to be used by the heavy vehicles, generally restricted to existing heavy haul routes
- Restricting heavy vehicle movements during certain times of the day or week, such as on routes which traverse school zones
- Restricting vehicle speeds near residences
- The possible installation of temporary or permanent signage in high risk areas to warn road users of increased heavy vehicle activities.
- This traffic management plan will also address maintaining access for emergency vehicles and measures to be taken to prevent public access to project sites.

Conventional construction methods are expected to be used when constructing infrastructure works within the road reserve to mitigate the Project's impacts. At the FEED stage, Traffic Management Plans will be prepared according to DMR Specification MRS11.02 Provision for Traffic and the Manual of Uniform Traffic Control Devices (MUTCD). Australia Pacific LNG's road construction contractors will be required to implement the Plan when carrying out the works.

4.2.14 Pipe crossings

The proposed method of crossing is determined by the road formation, current road use and the existence of any utilities within the road corridor. Construction methods are generally open cut, bored, or in rare cases horizontal directional drilling (HDD). Casings would be rare in design of a pipeline/road crossing, and are discouraged for corrosion reasons.

Open cut

This construction method will generally be applied to crossing of unformed or gravel tracks and roads typically found in the rural locations. These are either Council-controlled or privately owned and maintained. They normally provide access to farms and some rural residential properties and carry very low volumes of traffic.

Consultation with Council and affected land owners will be undertaken prior to any construction works. During construction, alternative access arrangements will be provided following a traffic management plan. Access will be restored when works are completed.

Boring or HDD

Boring is the advancing of an auger in a straight line from one pit to another on either side of a roadway. Pipe boring may be undertaken when the pipeline needs to cross a railway, State road, or a local road if permission to open cut a trench is not granted. HDD is the drilling of a curved line from surface underground to surface. HDD may be undertaken at waterway crossings or at underground services where boring cannot be undertaken. In either case, the pipeline will be built and constructed following the relevant standards and regulations, including Australian Standard AS 2885 Pipeline – Gas and Liquid Petroleum, the Department of Transport and Main Roads' standard specification MRS 11.02, and Australian Standard AS 4799-2000 Installation of Underground Utility Services and Pipelines with Railway Corridors.

4.2.15 Oversized vehicles

During the construction of the LNG facility and the gas field plants oversized and/or overweight vehicles may need to travel along State controlled roads and in some cases in the gas fields along

council roads. Planning of these trip movements are still on-going., however the following oversized vehicles have currently been identified;

- Compressor unit – total mass 86t sourced from North America or Asia and shipped in multiple parcels
- Coolers – 1 per compressor at 19m x 5m x 5m, 42t total, generally sourced from North America
- Dehydration package – oversize loads with 2 required for each GPF. The transportation of the dehydration unit may be from Melbourne to the facility site.

For the LNG facility such loads are intended to be transferred directly to the facility via the MOF therefore avoiding roads in Gladstone. For the gas fields any oversized loads will likely be transported from the Port of Brisbane via Toowoomba using the Warrego Highway.

All such movements will be undertaken in accordance with State regulations and the Transport Infrastructure Act 1994. Traffic Management Plans will be in accordance with all operational permits issued.

4.2.16 Decommissioning and rehabilitation of temporary accesses

Accesses to temporary accommodation facilities , laydown areas and stockpile sites that have been constructed as part of the Project and will not form an operational/maintenance role post construction, will be decommissioned unless relevant Federal, State, Local agencies or landowners agree to leave them in place. All works will be reinstated to the requirements and satisfaction of the relevant state or local government authority. Possible decommission activities may include relinemarking, scarifying and landscaping of accesses and tracks and reinstatement of fencing.

4.3 Rail network

4.3.1 Methodology - rail

The EIS is required to discuss the following impacts on rail:

- Transport of workers
- Transport of pipe segments
- Pipeline crossings of the rail network

The primary sources of information used to address these requirements were:

- Queensland Rail (QR) Coal Rail Infrastructure Master Plan
- QR Working Papers 2nd Edition October 2008
- Consultation with QR.

Additionally, WorleyParsons knowledge of QR's system and operations was also utilised.

The analysis methodology for determining the impact on the rail network was based on assessing the capacity of the existing network and determining what additional infrastructure would be required. This was undertaken in consultation with QR.

Consultation

Discussions have been initiated with QR Intermodal Freight, and QR has been provided with the information on the timing of the Project and transport frequency required, and physical dimensions and mass of pipes required to be transported.

Further discussions with QR are planned in relation to QR planning for new infrastructure in the vicinity of Gladstone so that pipeline crossings can be included in QR engineering planning and designs.

4.3.2 Impact assessment

Transport of workers

There is currently no passenger rail network operating within the study area. A long distance passenger rail service operates along the coast between Brisbane and Cairns but does not stop in Gladstone.

At this point, the transport of workers by rail has been dismissed as a possibility. It is highly unlikely that QR or Queensland Transport would contemplate increased investment in passenger rolling stock, passenger facilities, or passenger subsidisation for daily commuting to and from a construction project. While passenger trains do operate on the Western Line, their schedules and operations are designed around long distance operation and they only pick up and let off passengers at major locations.

Therefore the main impact on rail will be in relation to under track crossings and transport of pipe segments, materials, and workers by road across and near rail.

Transport of pipe segments

The transport of pipe segments required for the construction of the main supply gas pipeline that runs between the gas fields and the LNG plant at Curtis Island could possibly be transported by rail to lay down areas at Moura and Miles. The pipe segments would be sourced from Auckland Point and Port of Brisbane.

An estimate of the transport task has been made based on the information contained in Section 3 of this report. This information is presented in Table 4.53 and

Table 4.54 below. Pipe segments were assumed to be 18m long.

Table 4.53 Material by rail transport program

Type	Material	Dia (In)	No of segments	Mass (Tonnes)	Start transport	End transport
Main Pipeline	Steel	42	19,912	233,189	1/03/2012	12/02/2013
Main Pipeline	Steel	36	2,439	24,387	1/03/2012	12/02/2013
Main Pipeline	Steel	30	2,054	17,013	1/03/2012	12/02/2013
High Pressure	Steel	22	79,926	237,859	7/06/2011	12/02/2013
Gathering network	HDPE	Varies *	133,333	-	7/06/2011	1/01/2045
TOTAL				512,448		

Table 4.54 Pipe transport task by corridors

Type	Average delivery rate (segments/ wk)	Main peak delivery rate (2*avge) segments/ wk	Gladstone - Moura avge segments/ wk	Brisbane - Miles avge segments/ wk	Townsville - Moura avge segments/wk	Total task
Main Pipeline	401	801	280	120	-	401
Main Pipeline	49	98	34	15	-	49
Main Pipeline	41	83	29	12	-	41
High Pressure	908	1817	636	272	-	908
Gathering network	76	152			76	76
TOTALS			979	420	76	1475

If transported by rail, the pipe segments would have to be transported to lay down points at Miles and Moura, and then moved by road to their destinations. This would require construction of rail sidings and support facilities at these destinations. A preliminary assessment of these locations has indicated that this is feasible although additional infrastructure would be required. In addition, an alteration and or modification of existing facilities will be required at Auckland Point and the Port of Brisbane.

Material transport by rail from Gladstone

Gladstone Container Terminal is owned by Gladstone Ports Corporation and is operated as a multi-user facility. Current terminal operators are Patricks Stevedores, K&S Freighters, and KG Smith & Co.

The facility is designed to handle all forms of containerised, break-bulk and general cargoes. Detailed information on the handling capacity of the port via a “port survey” is underway, however at this stage has not been completed. Additional handling opportunities or constraints may arise from the survey.

Should rail transport be further considered, the impacts on QR and Australia Pacific LNG would be as follows:

- Additional sidings would be required. Transporting the pipe by rail from Gladstone doubles handling, and even with an increase investment in sidings at the port or at lay down areas such as Miles, an increase in handling is unavoidable. This would increase HSE concerns and may result in increased risk of damage to the pipe.
- In addition, the cost and construction duration of additional sidings at lay down areas or within the Gladstone port is also not currently feasible due to time and budget constraints. A minimum investment of $8M is estimated to be required for each new siding. As the construction duration is anticipated to be approximately 24 months, this option would not be compatible with project requirements.
- Transporting the pipe by rail would require additional locomotives. Currently there is a locomotive and wagon shortage in Queensland.
- The rail lines are currently heavily utilised. Coal traffic on the rail lines currently takes precedence and has daily scheduled movements.

- Initial logistic calculations suggest that an additional port lay down area would be required to enable vessels to unload at normal port rate, and not be delayed by the rail option.
- The missing southern rail link between Theodore and Wandoan and other local phantom lines if operational would make the rail option more attractive. However, since these will not be restored in the life of the Project construction, rail remains less viable than road transport.

The use of the rail network will continue to be investigated.

Material transport by rail from Brisbane

Brisbane Multimodal Terminal (BMT) is the interface between rail, road and the container terminals at the port.

The integration of these transport modes, a dual-gauge rail link, and the location of the BMT behind the container terminals, enables the movement of large volumes of interstate and intrastate cargo into and out of the port by rail.

QR National and Pacific National run services to the BMT, connecting the port to major and regional Queensland centres as well as the eastern capital cities of Sydney and Melbourne.

The BMT has the ability to monitor freight containers as they move through the BMT. Freight forwarders, shipping lines and road-transport operators, can carry out an online search to locate their containers at the BMT.

Even though on paper the rail option is attractive, Australia Pacific LNG's initial discussions with QR held at QR on the 13th of August with Graeme Kruger identified the following major constraints:

- Brisbane to Miles rail traffic is currently 90% saturated due to carriage of coal, grain and livestock, leaving very little opportunity for increased freight movements, especially the volumes potentially required by the project.
- The length of our pipe (18m) is an issue in itself with limitations on weight, and length on existing wagons and rail lines being exceeded in some cases. 18m wagons do exist but are very scarce, the quantities required for the Project would exceed the current available wagons. The Toowoomba range will prove to be a real challenge for the total weights desired to be railed by the project.
- Transporting the pipe by rail from Brisbane doubles handling, and even with an increase investment in sidings at the port or at lay down areas such as Moura, an increase in handling is unavoidable. This would increase HSE concerns and may result in increased risk of damage to the pipe.

The decision on road or rail transport can only be made when the discussions with QR are complete, but for the reasons given above, road transport of pipe segments appears to be favoured on the basis of flexibility, reduced double handling, pipe integrity, and reduced need to alter resources and infrastructure for a relatively short requirement.

Pipeline crossings

There are four Under Track Crossings (UTX) in the study area as follows;

a) Moura Short Line, north of the Davis Road Crossing

b) Dawson Valley Branch Railway, between Argoon and Dakenba, adjacent to Jambin – Dakenba Road

c) Moura Short Line, along Dawson Highway

d) North Coast Line in Aldoga, adjacent to the Gladstone – Mt Larcom Road

The installations will be required to be carried out to QR and Australian standards, *(AS 4799-2000:Installation of Underground Utility Services and Pipelines with Railway Boundaries)* which include:

- Minimum 2000m cover to top of track
- Minimum 1200mm cover to bottom of table drain
- Heavy wall pipe between the boundaries of the rail reserve
- Pipeline warning signs on both sides of the rail reserve
- Concrete slabs beneath any table drains, unless the depth of cover under the drain exceeds 2m
- Crossing to be at nominal 90 degrees unless otherwise specifically approved
- May or may not be cased, subject to negotiation with authorities.

The location of each pipe crossing for rail will have to be investigated beforehand. It would be desirable to avoid a pipe crossing where there is an existing passing loop or duplicated track, or planning for such. If this is unavoidable, the pipeline crossing should be engineered for future construction over it.

The crossing at Aldoga will require investigation. QR is planning for expansion of traffic, and the following is planned for the Gladstone area in locations which could affect planning for the pipeline.

- Development of the Moura Link, a link from the Moura Line to Aldoga
- A new rolling stock maintenance and provisioning yard at Aldoga
- Quadruplicating of the North Coast Line between Mt Larcom and the new Wiggins Island infrastructure
- Additional tracks along the East End Mine branch line
- Provision for future tracks
- Provision of rail access for third party operators.

Road/rail crossings

Table 4.55 identifies road/ rail crossing points within the area of investigation.

Table 4.55 Road/ rail crossing points within the area of investigation

Rail line	Current operation on line	Road – rail crossing location description	Crossing type	Highway crossing	Chainage	AADT - current	Speed limit	Additional project traffic	Impact assessment
Western line between Toowoomba - Ipswich	Line carries a mixture of long distance passenger trains, grain trains, general freight and coal, the latter being the bulk of all train trips Averages 4-6 trains a day	West of Miles close to Leichhardt Highway north /Warrego intersection	Active control (flashing lights and signage)	Warrego Highway	1.135 – 44.099	1497	80km	138	Increased traffic due to Project not considered to warrant increased controls
Western line between Toowoomba - Ipswich	As above	Miles immediately south of Leichhardt south /Warrego intersection	Active control (flashing lights and signage)	Leichhardt Highway	0.00-32.020	489	60km	278	Increased traffic due to Project not considered to warrant increased controls
Western line between Toowoomba - Ipswich	As above	Chinchilla. Close to Warrego Highway/Wambo Street intersection	Active control (flashing lights and signage)	Warrego Highway	80.175-83.155	2751	60km	45	Increased traffic due to Project not considered to warrant increased controls

4.4 Shipping

4.4.1 Methodology – shipping

The vessel traffic scenarios collated together for this report are as follows:

- Background: A factual summary record is made of the existing wharfs, shipping movements, marine operations and channels current as of 2008 within Gladstone Harbour and also for the Great Barrier Reef. Small craft activity is also recorded. Section 2 of this report describes the base case.
- Background plus Australia Pacific LNG Project (referred to as the Australia Pacific LNG Case): This scenario adds the Australia Pacific LNG project onto the base case. For the LNG/LPG vessel trade the review is based on a timing of 2014, being the proposed start up of operations. For the construction vessel scenario (at FLNE) the appraisal is undertaken during the nominated construction period of 2011 to 2015 (first 2 trains) plus also the consideration of operational requirements for small craft transport to Curtis Island. The Project is described in Section 3 whilst its impact and mitigation is described in this section.
- Background plus Australia Pacific LNG Project plus other Gladstone newbuild significant projects (referred to as the Cumulative Case): This scenario adds other Gladstone newbuild port /marine projects onto the base case plus the Australia Pacific LNG project. For the LNG/LPG vessel and other commercial trade the review is timed for both 2014 being the proposed start up of the Project and also 2045 being at the end of the nominated life of the project. For both dates the trade in the port has been set as the nominal trade as tabulated in Table 2-1 of the report titled 'Port of Gladstone Shipping Operations Simulation – 2009 Future trade Scenarios' 7 Sept 2009. The newbuild trade includes commercial trading vessels using the Wiggins Island facility including Gladstone Pacific Nickel's requirements, four additional LNG developments, and four other trade facilities primarily located at Fisherman's landing. For the construction vessel scenario the appraisal is undertaken during the nominated construction period of 2011 to 2015 (first two trains) and includes the Australia Pacific LNG project and up to three other concurrently constructed LNG projects. Consideration includes the operational requirements for small craft transport to Curtis Island plus capital and maintenance dredging requirements.

The study work involved to produce this report has been predominately a review of documents produced by other organisations including Gladstone Ports Corporation, Gladstone project proponents, Maritime Services Queensland (MSQ), and consulting companies who have secured various commissions regarding component study work for projects in Gladstone.

The documents reviewed for this study included:

- Draft LNG Vessel Operating Parameters (status as at July 2009) as issued by Maritime Safety Queensland.
- Ports and Waterways Safety Assessment Workshop report for the Port of Gladstone (PAWSA workshop report). Refer Attendee list within the Report as representatives from virtually all Gladstone industries and relevant Government departments.
- Anchorage and Harbour Transit Safety Zones, Port of Gladstone report as issued jointly by QGC, Australia Pacific LNG, Gladstone LNG, and LNG Ltd.
- 'Gladstone LNG Project Vessel Interaction Study – Clinton Wharves' HR Wallingford. 08

September 2009.

- Maritime Safety Queensland Guidelines for Marine Construction Activities within Gladstone Harbour as issued by MSQ October 2009
- 'Port of Gladstone Capacity Study - Model Development and Validation' Aecom 26 August 2009
- 'Port of Gladstone Shipping Operations Simulation – 2009 Future trade Scenarios' 7 Sept 2009 Aecom.
- QGC Letter Response to PAWSA Report on Behalf of the LNG Industry 4 September 2009
- 'Western Basin Dredging and Disposal Project Draft Environmental Impact Statement' GPC October 2009
- 'Draft Project Description' CoP issue 301009
- 'Laird Point Gladstone Port LNG Ship Transit Risk Assessment' Lloyd's register 25 September 2009
- 'Gladstone LNG Projects – Joint Industry Navigation Simulations (March and April 2009) HR Wallingford
- 'Australia Pacific LNG study – Marine Design basis Report' June 2009. Bechtel on behalf of ConocoPhillips – Halcrow Inc.
- 'Preliminary Berth Downtime Assessment (Draft) - 30Sep09' Halcrow Inc
- 'GLNG Project Environmental Impact Statement' prepared for Santos Ltd March 2009
- 'Queensland Curtis LNG project – Environmental Impact Statement' QGC limited July 2009

Consultation

Two primary areas of concern have been raised:

- Environmental and safety issues arising from the increase in shipping in this marine environment including passage through the Great Barrier Reef Marine Park, transfer of goods and material from the mainland to and from the proposed facility on Cutis Island and vessel berthing arrangements at the proposed MOF facility servicing the LNG plant on Curtis Island
- Proposed marine operations at Auckland Point.

In October 2009 Australia Pacific LNG meet with Gladstone Ports Corporation - Port Infrastructure Planning Manager Gary Carter and Maritime Safety Queensland (MSQ) - Gladstone Harbour Master Mike Lutze. The consultation and involvement with GPC has been ongoing and wide ranging for all of 2009. As a result of this interaction there has been a number of working groups set up and a number of documents produced that relate to shipping operations to which GPC and MSQ indicated they were in general agreement. These documents included:

- Draft LNG Vessel Operating Parameters (status as at November 2009) as issued by Maritime Safety Queensland
- Ports and Waterways Safety Assessment Workshop report for the Port of Gladstone (PAWSA workshop report). Refer Attendee list within the Report as representatives from virtually all Gladstone industries and relevant Government departments.
- Anchorage and Harbour Transit Safety Zones, Port of Gladstone report as issued jointly by QGC, Australia Pacific LNG, GLNG, and LNG Ltd.

- Maritime Safety Queensland Guidelines for Marine Construction Activities within Gladstone Harbour as issued by MSQ October 2009.

4.4.2 Impact and mitigation assessment

Berthing/departure and downtime issues - impact and mitigation

The proposed site for the berth is in a sheltered location away from other commercial marine traffic. It will be a very safe berth for approaches and departures.

The Halcrow Technical Note 'Preliminary berth downtime Assessment – (Draft)' has assessed the LNG berth downtimes in terms of a 25 knot wind and a 1m wave height exceedance. The assessment has determined that the 25 knot wind will be exceeded 2.3% of the year and the 1m wave height exceeded less than 0.01% of the year. This preliminary estimate of downtime is quite acceptable to Australia Pacific LNG.

While the berth is unoccupied, a 50m safety zone will be applied to exclude small boats and uncontrolled ignition sources (the size of this safety zone is still subject to finalisation in consultation with the Regional Harbour Master).

Safety zones - impact

For transiting vessels Lloyd's Register North America Inc (LR) has carried out a risk assessment specifically for LNG/LPG tankers transiting Gladstone Port to/from the proposed berths at Laird Point ('LNG ship transit risk assessment' report). The review included assessing the shipping route, environmental conditions and shipping activities for all credible scenarios and accidental events have been considered for operations in the project. The process involved the key steps of hazard identification, consequence analysis, frequency and likelihood analysis, and risk analysis and development of risk control strategies.

Generally the key hazards are related to a loss of control of the LNGC followed by grounding or collision with another asset such as a berth or ship at berth. These are risks specific to operations of the LNGC/LPGC within the port. The other hazards relate to operation of the ferries, tugs and other smaller vessels, where the risks are more closely linked to management systems and human error.

Intentional discharge that may be caused by a terrorist attack is also briefly considered within the risk assessment. As part of this assessment a HAZID workshop identified two types of intentional acts during the transit through the port. Ecological protest groups could act to disrupt construction or production as part of a protest action. These groups do not typically attempt to damage equipment or endanger life but want to draw media attention to their viewpoints. The second type is terrorism, which aims to cause significant damage, loss of life and disruption to society. The actions from both these groups are high severity scenarios (significant business disruption and adverse media attention; or loss of life, damage to plant, business interruption and media attention) but with low likelihood based on safeguards in place such as security levels onboard LNGC, and shore support from government particularly from Office of Transport Security (OTS), intelligence agencies and advanced threat level alerts.

To satisfy the objectives, the scope of analysis covers loss of containment of LNG, LPG bunker fuels or other accidental discharges from a ship associated with the transit of the LNG or LPG ship through the port.

The Laird Point Gladstone Port LNG Ship Transit Risk Assessment report concluded as follows:

- The overall set-up at Gladstone Port is extremely safe, with navigation features, support systems and redundancy all contributing towards a low risk of an incident during transit.

- There are a number of hazards with potential for a major incident should there be a lack of sufficient control in managing the transit of the LNGCs to the berth. Key hazards include the passage through the Outer Channel, transit past other facilities at Auckland Point and other berths, transit past other planned LNG berths and interaction between the LNGC and support vessels and small craft during transit.
- The route through the port is acceptable with respect to channel draught, angles of turn and turning basin diameter for the largest anticipated LNGC that will visit the berth. It should be noted that largest vessels on this route through the port are not LNGC vessels but cape size coal carriers.
- The high level comparison with industry criteria determined that the outer channel width was less than recommended general guidelines. However it is accepted that specific modelling of transit through the port can provide establish acceptable specific requirements for channel width that differ from the general guidelines. A reduced channel width is acceptable given a scenario specific risk assessment and implementation of appropriate mitigation measures. Such an assessment and demonstration of acceptability was undertaken as part of the simulation studies
- The quantitative assessment of all incidents (such as a collision, grounding, capsizing, sinking, or exposure to specific hazardous conditions) occurring during the transit shows that the likelihood of all types of incidents is extremely low, less than 2.1 x 10-4 per LNGC visit. The likelihood of an incident resulting in a release of LNG is even lower, less than 2.1 x 10-6 per LNGC visit. The societal risk from the transit of LNGC through Gladstone Port is negligible.
- The frequency of ship strikes with whales in the GBRMP and Torres Strait is very low – an estimated 3.16x10-4 per year.
- Even though the likelihood of release of bunker fuel for single hull ships is low, the use of double hull construction utilised on all LNGC's reduces the likelihood further by an order of magnitude.

Safety zones - mitigation

An exclusion zone of 250m will be enforced at the two LNG jetties. Vessels manoeuvring to and from an adjacent berth and associated craft will be permitted to enter the exclusion zone subject to a set of procedures set by the Maritime Safety Queensland. LNG safety and security operational requirements will be in force whilst an LNG or LPG vessel is moored at the jetty and are described elsewhere.

The threat of deliberate acts of terrorism and sabotage is considered low at Gladstone. Therefore, a security zone for LNG ships transiting the harbour is not required at security Level 1 (the ISPS default security level). A security plan for terrorism will be developed in concert with the government agencies to address both types of security threats noted as impacts in the preceding clause. Provision of more information in this potentially public document is not appropriate.

A total of 28 recommendations were generated in the HAZID workshop for LNG transit incidents that were assessed to pose Significant Risk, and those assessed to pose Medium Risk, but with high consequence severity levels. These relate to scenarios that required additional consideration of the procedural controls, training on safe harbour boating for pilots, tug captains and small craft and recreational boaters, as well as use of tugs and other aids during traverse of Gladstone Port and berthing. The implementation of these recommendations will assist to ensure that the risks involved in LNGC/LPGC ship transit in the vicinity of the Gladstone port are reduced to as low as reasonably possible (ALARP).

The recommendations made in the LNG transit risk assessment study and workshop are listed below in Table 4.56. The recommendation priority is based on the Risk Rating for the incident associated with that recommendation.

Table 4.56 List of recommendations (Highest Risk to Lowest Risk)

No.	Recommendation	Ranking
1	GPC/RHM should consider requiring small boat operators to make security call prior to departure	High
2	Contribute to development of a safe harbour boating educational campaign for small boat, public and recreational boaters	High
3	Training (including simulation sessions) should be provided for pilots and tug captains on escort procedures, including indirect towage	High
4	LNG proponents to consider collaboratively contributing to provision of a dedicated Gladstone water police vessel to escort LNGC/LPGC through congested areas	High
5	GPC/RHM should consider requiring dredging vessels working in vicinity of the transit routes to be fitted with AIS and monitored by VTS	High
6	Provide navigational aids on the MOF	High
7	Provide fendering on MOF	High
8	Provide navigational aids on embarkation dock	High
9	Provide protection to personnel working in vicinity of moorings on own berths	High
10	Consider requiring the use of zero-energy mooring lines for LNGC and LPGC	High
11	GPC should provide channel markings and navigational aids along the new and widened channels	High
12	Ensure visibility of LNGC/LPGC at all times whilst at berth	High
13	Consider situating berths at location 2A to reduce risks associated with the trestle location and risks associated with chemical tankers (ammonia)	High
14	Ensure visibility of trestle at all times	High
15	Ensure visibility of berth at all times	High
16	Consider exclusion zones for small craft around trestle	High
17	Review procedures for ferry operations, to ensure sufficient numbers of layers of protection in cooperation with MSQ	Moderate
18	Coordinate and support Regional Harbour Master (RHM) in assessing adequacy of current ferry emergency response measures, and in developing ferry transit plans	Moderate
19	Minimize the use of anchorage – endeavour to time arrival so that anchoring is not required	Moderate
20	Consider requiring LNGC/LPGC to institute enhanced security training for their crews	Moderate

No.	Recommendation	Ranking
21	Ensure that facility and ship operations comply with national security plan and requirements of the security agencies	Moderate
22	Consider instituting formalized passage planning for inbound and outbound passages (including no-go and bail-out zones)	Moderate
23	Ensure ferry is equipped with adequate navigational equipment, including radar	Moderate
24	Ensure ferry crew are trained in ship navigation and rescue	Moderate
25	Ensure ferry is equipped with life saving equipment	Moderate
26	Consider stand down of construction/workers when LNGC/LPGC is approaching or departing	Moderate
27	Consider underwater LNG and LPG piping if location berthing Option 1B is used for berth	Moderate
28	Liaise with GPC to ensure maintenance dredging is scheduled and planned to minimise potential for collisions with dredgers.	Low

Generally the key hazards are related to a loss of control of the LNGC followed by grounding or collision with another asset such as a berth or ship at berth. These represent risks specific to operations of the LNGC within the port. The other items relate to operation of the ferries, barges, dredges, tugs and other smaller vessels, where the risks are more closely linked to management systems and human error.

Vessel interaction - impact and mitigation

GPC and MSQ in consultation with stakeholders have developed a list of draft LNG vessel operating parameters in 2009. These follow below:

1. These operating parameters have been developed based on navigation simulations with LNG carriers up to 220,000 m^3 with laden drafts up to 12.20m and arrival drafts to 11.00m. Maximum LOA 315m x 55m beam
2. No passing shall take place between LNG vessels and other vessels carrying dangerous goods
3. No passing shall take place between an LNG Vessel and a deep draft vessel during the transit of any channel area.
4. No overtaking shall take place between an LNG vessel and another vessel which can safely operate only within the channel during the transit of any channel area.
5. When port capacity dictates, the passing of LNG vessels may be permitted under strict guidelines to be formalized in the Port Procedure Manual, providing the LNG vessel is using 2 tethered escort tugs. This manoeuvre if scheduled, will be pre-approved by the RHM.
6. Separation between LNG vessels and other non LNG vessels in the channels will be as per existing port procedures. (IE: 1 hour for “Cape” class vessels and 30 minutes for “Panamax” & other vessels and shall be maintained throughout the transit. For the purposes of assessing the follow-on time for LNG vessels to a preceding vessel, LNG vessels shall be classified similar to

"Panamax Class" in that the draft of the vessel and the escort tug assistance allows for the option of safely aborting the transit at a number of alternative locations.

7. LNG Vessels may arrive and depart on all states of the tide. Preference will be given to arrival on Ebb tide (with slack water at the berth) and depart on flood tides.

8. A minimum UKC of 1.2m in the channel shall be retained throughout vessel arrivals and departures. A UKC of 1.2m is the minimum deemed satisfactory for swinging on arrival and departure for LNG vessels with drafts up to 12.00m.

9. LNG Vessels to have Electronic Chart Display and Information System, (ECDIS) and subscribed to "full" coverage. ECDIS may not be the primary chart system, but the ships officers must be trained and certified for the system on the vessel.

10. Whether the LNG vessel is swung to port or starboard is at the discretion of the ship's pilot and Master. However, good seamanship practice is to swing stern to the wharf

11. LNG vessels will transit all channels and cuttings with tug escorts (2 x 80t BP fully fitted for escort) at speeds up to about 10 knots with tugs made fast. Although the decision as to where to make the tugs fast will be made after consultation between the Pilots and the Master, it is recommended that both escort tugs should be attached on the stern (Tandem deployment) for inbound and outbound transits of the port.
Ships with only one towing bitt on the stern, with a minimum SWL of 200t, should deploy one escort tug made fast aft, with the second escort tug in passive escort mode while operating in the South Channels, and made fast at the bow while operating in the Inner Channels, when reduced transit speeds facilitate safe operation at the bow. It is poor practice to deploy tandem tugs made fast to the same bitt aft, as they will not have adequate separation for safe operation.

12. If weather conditions deteriorate in the South Channel, where wave exposure is higher (wave conditions greater than Hs 1.5 to 2.0m) such that there is a concern over the safety of tugs in a tandem deployment, a single escort tug attached to the transom may be deployed with the second tug in passive escort mode. It is poor practice for ships with only one towing bitt on the stern, with minimum SWL of 200t, to make both escort tugs fast to a single bitt (see above). One or more of the following practices shall also be adopted:

- the speed through the water is reduced to 8 knots or less in the outer channel transit OR
- the planned transit of the outer channels will be undertaken on a stemming tide OR
- the LNGC waits until weather conditions improve

13. LNG vessels will not be handled in weather conditions that make operations hazardous (wind speeds in excess of 25 knots and wave heights above 2.5m). The actual weather conditions to be determined at the time of the manoeuvre.

14. LNGC transits will be programmed for transits through the Clinton Bypass Channel. Transiting through the main Clinton Channel is feasible at reduced speeds. (In the vicinity of about 3 knots).

15. Tug allocation will initially be four tugs for all berthing/unberthing operations. This will be reviewed following an initial trial period (possibly six months, depending on the number of LNG transits during that time). After the trial period, three tugs of 80t BP may be utilised for all berthing/unberthing operations. Two tugs will act as escorts from the Fairway and a third will join the inbound vessel in the vicinity of G4 and be made fast subject to the discretion of the Pilot in charge, in conjunction with the Master. Until three tug operation is achieved, two tugs

will be released on departure in the vicinity of G4. Once three tug operation is achieved, one tug will be released in the vicinity of G4. Two tugs will always escort the vessel to the Fairway.

16. A standby tug with full firefighting capability will be on station whilst an LNGC is at the berth. A standby tug that is available to more that one LNG vessel may be acceptable and will be on immediate standby. (For further discussion and approval by the RHM. Modern engine warm-through systems make it unnecessary to keep the tug's engine running to achieve instant starting capability). A second tug should be available within 10 minutes.

17. In the case of an emergency departure from the berth is necessary, a second tug will be required in addition to the standby tug. (The response time for the second tug to be determined). Ten minutes is considered acceptable

18. Tugs normally assigned to LNG projects may be deployed in other port operations when not required by a LNG vessel.

19. Operating parameters covering LNG vessel draft/24 hour operation/weather conditions etc. will be set at a restricted level in the early stages of an LNG Operations Facility commencing. These parameters will be reviewed during the 'settling in period' where the working results can be validated against the simulation results in order to mirror or modify the "operational condition requirements" determined during simulation.

20. Once validation has completed then it is expected that LNG vessels will be handled during the hours of darkness subject to suitable navigation aids and weather conditions. (simulated first)

21. Pilot allocation will initially be 2 pilots for the transit (In & Out). This will be subject to review following experience of operations. (Possibly 6 months depending on the number of LNG transits carried out during that time).

22. Pilots will not be required to remain onboard an LNGC whilst alongside but must be available within the time specified for the second tug to be in attendance..

23. Vessel scheduling:

- Priority of shipping will remain as per existing Port Rules except as stated below.
- Ship scheduling will be carried out as at present by ship schedulers under the authority of the Regional Harbour Master and in accordance with the following Principles.
- LNG Vessels will advise their ETA's/ETD,s as soon as possible and confirm ETA at least 48 hours prior to arrival.
- The ship scheduler will schedule the movement of the LNG vessel after consultation with the vessel's Agent.
- Once the time slot has been agreed between the RHM and the Agent, then no other vessel may occupy that time slot.
- Other vessels that may experience delays may not occupy the time slot agreed for the movement of the LNG vessel except by mutual arrangement.
- LNG vessels that miss their time slot will be allocated the next available time slot the fits in with other port movements.
- Any vessels at risk of being tidally constrained at a berth shall have priority.

- All other movements shall take place on a first come first served basis.
- All vessel movements shall be subject to the approval of the Regional Harbour Master.
- For tandem tethered towage the vessels will be equipped with adequate bollards and fairleads to the required capacity and configuration Vessels with only a single towing bitt aft will make one tug fast on the stern and the second escort tug may operate in passive mode in the South Channels, and fast at the bow in the Inner Channels, when transit speeds are reduced.
- Vessels will have an International Association of Classification Societies, (IACS) Cap 2 classification for vessel 15 years and older.

This list of operating parameters determines interaction between commercial shipping with consideration for smaller craft.

For recreational and industrial marine activity within the harbour there will be some restrictions around the LNG berths. However, LNG traffic will impose no restrictions in the channel different than any other large ship currently transiting the port of Gladstone.

The exclusion zones around LNG berths will not restrict access to Graham's Creek.

Scheduling - impact and mitigation

All commercial trading vessel traffic is scheduled in the Port of Gladstone. Additional scheduling will eventuate with LNG vessel transits as the Draft LNG vessel Operating Parameters Document is a base document setting out a scheduling arrangement. The scheduling arrangement has been reviewed as part of the Port of Gladstone Shipping Operations Simulations. These simulations concluded that there would not be any overall marine transit delays as a result of the Australia Pacific LNG case.

Scheduling shall be undertaken in accordance with the Vessel Traffic services (VTS). All Gladstone Port VTS Operators are certificated to a standard set by the International Association of Lighthouse Authorities (IALA). A Slot Booking System is in use for the single lane channel passages and is communicated to the ship before the arrival of the LNGC. Slot booking regulates shipping movements within the port and allocates berthing priority, pilot bookings, tug requirements etc. All vessels over 20m in length are required to report to Gladstone VTS when navigating within the port.

Channel configuration and navigation aids - impact and mitigation

A combination of new fixed and floating aids will be used, primarily on the new channel north of Targinie Channel. The final configuration of these will be subject to the outcome of ongoing shipping simulations. The Gladstone Harbour Master and pilots have been involved in some simulations, and will have final say in, and approval of, the navigation layout.

Aids to navigation on common channels (channels which may be utilised by other projects) are not yet finalised. Details on navigation aids specific to the Project channel and Swing Basin will be shortly provided.

There are a number of channels within Gladstone that are located close to existing or proposed wharfs. The closest channel to a wharf is for the Clinton Channel alongside the existing Clinton wharves (RG Tanna wharfs). A vessel interaction study with the Clinton wharves has been undertaken by HR Wallingford and its results included in the report Gladstone LNG Project Vessel Interaction Study – Clinton Wharves'. The main conclusion of the report is that if vessels are using the main Clinton channel then they need to lower their speed to approximately three knots whilst passing the wharves. This information has been incorporated in to the 'Draft LNG Vessel Operating Parameters'.

Typical speeds for LNG vessels passing other berths will be on the order of six knots. Given the distance of the berths from the other channels (including the LNG berths on Curtis Island), the Vessel Interaction study indicates that this is a safe speed.

A carry-on pilot positioning unit will be provided to marine pilots for precisely locating the vessel within the channels, indicating position, speed, and rate of turn independent of the ship's navigational systems. The vessel's progress will be monitored by radar. All vessels will have a minimum of one pilot on board through the Port of Gladstone commencing at the Fairway Buoy (or as otherwise directed by the Gladstone Harbour Master).

Dredging construction – swing basin and shipping channel - impact and mitigation

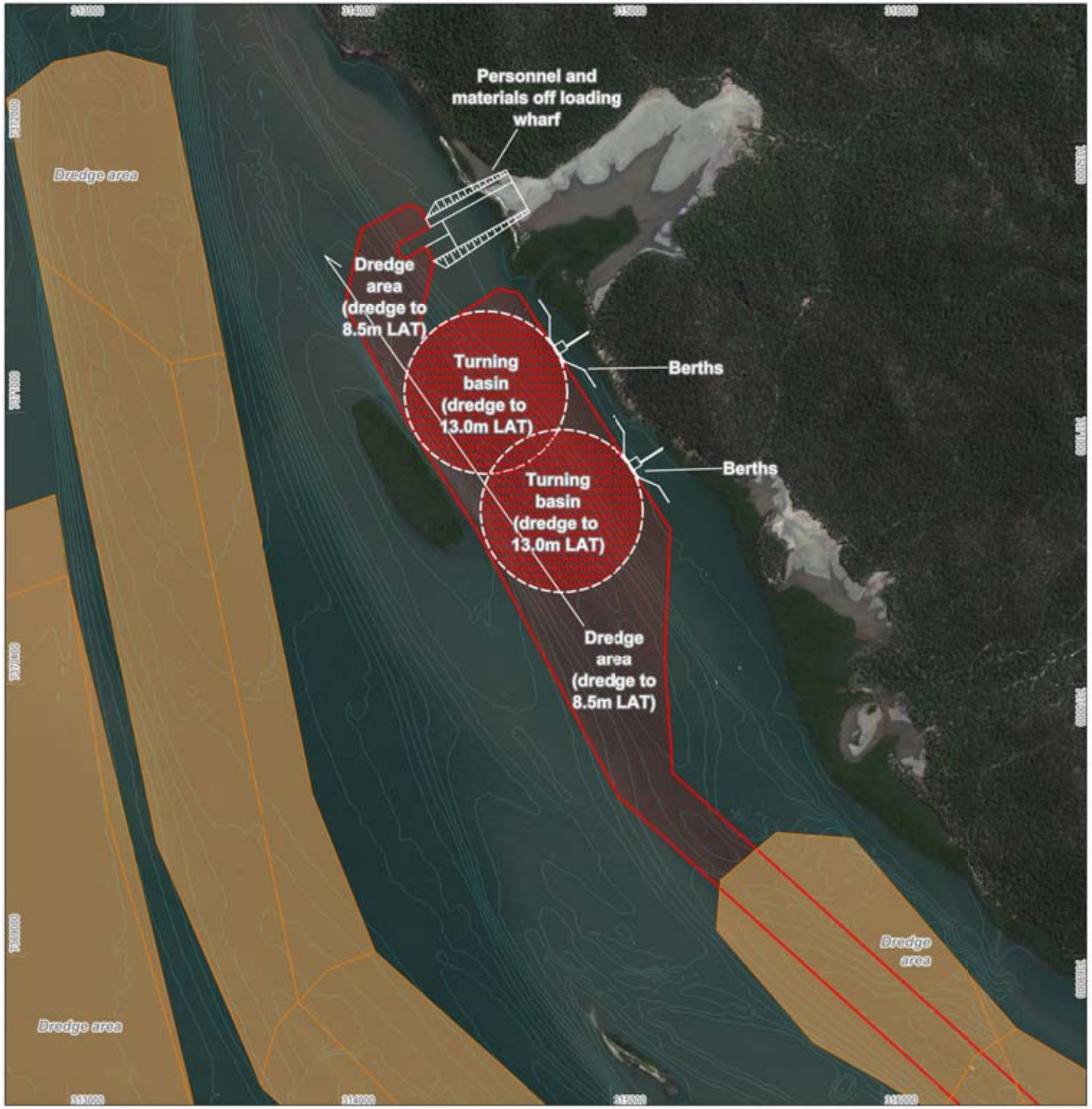
Development of the LNG plant will require the dredging of a new Swing Basin and Shipping Channel connecting the existing Targinie Channel to the LNG plant. The channel and swing basin will be required to accommodate barges and ships accessing the site during construction and LNG ships and operational vessels during the operation of the LNG plant. The material obtained from these dredging works will disposed off in the Western Basin Reclamation Area, which is adjacent Fisherman's Landing Reclamation and the proposed Fisherman's Landing northern Expansion

This dredging work will be undertaken by GPC as part of the Western Basin Dredging and Disposal Project (WBDDP). The WBDDP accommodates the long-term dredging and dredged material disposal required to provide safe and efficient access to the existing and proposed Gladstone Western Basin (Port Curtis, from Auckland Point to The Narrows) development areas

The WBDDP comprises dredging associated with the deepening and widening of existing channels and swing basins and the creation of new channels, swing basins, berth pockets and approaches for MOFs. It is proposed that dredged material be placed into reclamation areas north of Fisherman's Landing to create a land reserve to be used to service new port facilities.

GPC is currently in the process of gaining the necessary environmental approvals to undertake these works The reader is referred to the Queensland Department of Infrastructure and Planning website (http://www.dip.qld.gov.au/projects/transport/harbours-and-ports/port-of-gladstone-western-basin-strategic-dredging-and-disposal-project.html) for details on the Western Basin Dredging and Disposal Project. The Environmental Impact Statement for this dredging and disposal project examines the environmental effects that may arise from the dredging required to service the needs of the Australia Pacific LNG project.

Australia Pacific LNG's requirements for dredging (and disposal of dredged material) comprise an extension of the area of Stage 1A. The Stage 1A development is likely to have to constitute one of the first components in the overall stages in GPC's dredging development plan and Australia Pacific LNG is working with GPC on the environmental, planning and engineering feasibility requirements to undertake the development. Australia Pacific LNG's proposed dredged extent for option 2A is shown below in Figure 4.32.



Proposed dredge area 2A digitised from Bechtel CAD drawing 25978-100-40-MD-30002.dgn supplied on 11/09/2009.

Dredge areas translated from GPC CAD drawing of hotprint_030999.dxf supplied 15/09/2009.

Bathymetry contours calculated using Vertical Mapper from points data provided by Gladstone Ports Corporation.

Satellite imagery captured by GeoEye-1 on 24/03/2009.

0 250 500m

SCALE - 1 : 15,000 (at A3)

Map Grid of Australia Zone 56
Geocentric Datum of Australia 94

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Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	15/02/2010	Issued for use	JB	KM	DL	RB

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Figure 4.32 Proposed Dredging Extent

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0424	Rev: 0

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GPC will be the proponent for all dredging works and management of dredge material placement areas. The works will be undertaken in marine areas only and are not anticipated within Commonwealth lands.

Dredging requirements for the Australia Pacific LNG Project specifically include:

- MOF Channel: development of a temporary access channel to the Materials Offloading Facility for vessel use during the construction period of the Project.
- Approach channel and turning basin: extension of the new shipping channel past the GLNG & QCLNG berths connecting the existing Targinie Channel to the Australia Pacific LNG plant jetty and berths.

Considerations of the range of options for disposal or use of dredged material from Australia Pacific LNG dredging activities is discussed in GPC's EIS for the Western Basin Dredging and Disposal Project.

Towage and piloting requirements - impact

Requirements for the safe transit of LNG and LPG within Port Curtis has been nominally defined by MSQ and the GPC and is set out in the draft LNG vessel operating parameters. Pilotage will be required for LNG and LPG vessels using Gladstone Harbour. It is likely that two pilots board LNG vessels at the Fairway Buoy. This practice will be reviewed with industry after the first six months of operations.

Towage and piloting requirements - mitigation

It is suggested that four tugs will be required per LNG ship associated with the Project, including:

- Two 62 tonne or equivalent capacity (sourced from existing tug fleet or as replaced by existing capacity)
- Two 80 tonne bollard pull tugs, required in addition to the existing tug fleet (three 80 tonne tugs to be in place, with one spare tug to allow for downtime/maintenance).

The two 80 tonnes tugs will be escort tugs from the Fairway Buoy to the Gatcombe Channel. Shipping simulations indicate that escort tugs are not required to transit the harbour channels, but they will be used to assist the ship in the event of engine or rudder failure.

After an initial trial period, the requirement for four tugs will be reviewed, and an alternative configuration with three 80 tonne bollard pull tugs may be utilized.

Tug operators in the Port of Gladstone are experienced in management of bulk carriers in the Port. However, handling characteristics of LNG vessels vary from current vessel characteristics in the Port of Gladstone, due to a range of factors including:

- Different loaded and unloaded draught
- Higher windage on LNG vessels than on similar size vessels (e.g. Capesize coal carriers)
- Varying manoeuvrability due to different plant thrust including use of bow thrusters
- Lower loaded tonnage of LNG vessels compared to similar size vessels.

The Australia Pacific LNG Project has been working with, and will continue to work with, the tug fleet operator and tug masters to ensure that tug masters are adequately trained in management of LNG vessels. This has been and will continue to be undertaken primarily through involvement in shipping

simulations focussing on LNG vessel movement within the Port of Gladstone under a range of conditions, with simulations used to develop transit parameters and operational limits and determine the required channel width and test the effectiveness of the use of tugs. Training for pilots and tug masters will be undertaken prior to arrival of the first LNG carrier.

As with tug boat operators, the Australia Pacific LNG Project has undertaken shipping simulations exercises for LNG vessels in the Port of Gladstone with input from the Gladstone Harbour Master and pilots. Training of pilots through shipping simulation, in cooperation with the Harbour Master, will be ongoing and as required throughout the life of the Project. Pilots will be trained on LNG ship handling characteristics and emerging scenarios in the simulation.

Once the existing pilots are trained for LNG ship handling, new pilots will be trained according to the requirements of MSQ. It is expected that new pilots will rapidly become familiar with vessels that regularly call at the port.

In addition, harbour transit will be undertaken during daylight hours only for the first six months of operation, to allow tug masters, pilots and LNG vessel captains to gain familiarity with operation of LNG vessels in Gladstone harbour before 24 hour shipping operations commence.

The Pilot and Ship Master for all transits will be required to follow the port transiting requirements set out in a Vessel Transit Plan (VTP) developed for port LNG activities. The VTP will be prepared by MSQ and GPC in consultation with all LNG proponents in the Port, the Port's pilots, and other relevant stakeholders.

It is expected that the VTP will cover the following topics:

- Permission to enter the harbour procedures. These procedures will relate to berth availability, metocean and shipping traffic constraints and other GPC and MSQ pre-specified requirements
- Pilot boarding and disembarkation procedures. These procedures will require compliance with current Safety of Life at Sea (SOLAS) regulations with regard to equipment, and GPC's shipping and pilotage regulations
- Acceptable wind and sea state conditions for arrivals and departures
- Ship ballast draft conditions prior to entering the Harbour
- Tug configuration requirements. It is expected that one tug will escort the LNG vessel through the outer harbour, with a second tug escort in the inner channel, and a third and fourth tug awaiting at the jetty for berthing
- Transiting instructions and speed limits. It is intended that LNG shipping will have 24-hour access to the Port
- Required improvements to the existing navigational aid system in the Port
- Arrival and departure conditions for vessels and minimum vessel requirements
- Generalised vessel movement scheduling and traffic separation requirements
- Tug failure guidelines

Additionally, Masters of LNG Carriers calling at Gladstone Port who may be unfamiliar with the port are appraised of relevant information through the Master/Pilot information exchange. As well the port layout and channel depths, this information exchange includes ship's draught and other particulars, route to be taken to the berth, number of tugs and mooring arrangements and tidal information. In

addition, the locations of particularly sensitive environmental areas, such as seagrass beds and dugong habitats are known by the pilots who guide the ships into and out of the port.

Shipping quality assurance and control - impact and mitigation

All LNG vessels chartered by Australia Pacific LNG will be subject to inspections by accredited inspectors under the Ship Inspection Report Programme (SIRE) conducted under the auspices of the Oil Companies International Marine Forum (OCIMF). SIRE is a program focussing tanker industry awareness on the importance of meeting satisfactory tanker quality and ship safety standards.

In addition, the LNG vessels shall have an annual SIRE inspection, except vessels more than 15 years old as these must have a SIRE inspection every six months. SIRE inspectors and qualifications are determined by OCIMF.

As described in the SIRE Vessel Inspection Questionnaire, the program requires that participating submitting companies follow a uniform Vessel Inspection Procedure comprising an Inspection Element and a Report Element.

- The **Inspection Element** uses a series of detailed inspection questionnaires as appropriate for the type of vessel inspected. These questionnaires address issues associated with safety and pollution prevention. Inspectors who are employed, or contracted by submitting companies, must (with certain exceptions) answer all these questions.
- The **Report Element** is developed from the completed electronic questionnaire that is submitted by the Inspector, either directly to the SIRE web site, or to the submitting company for further processing prior to transmission to the vessel operator and to SIRE.

LNG Vessels will be inspected by the Project's Group Marine Assurance Superintendent in accordance to the OCIMF Tanker Management and Self Assessment (TMSA) program. The TMSA provides ship operators with a means to improve and measure their own management systems by assessing safety management systems against listed performance indicators.

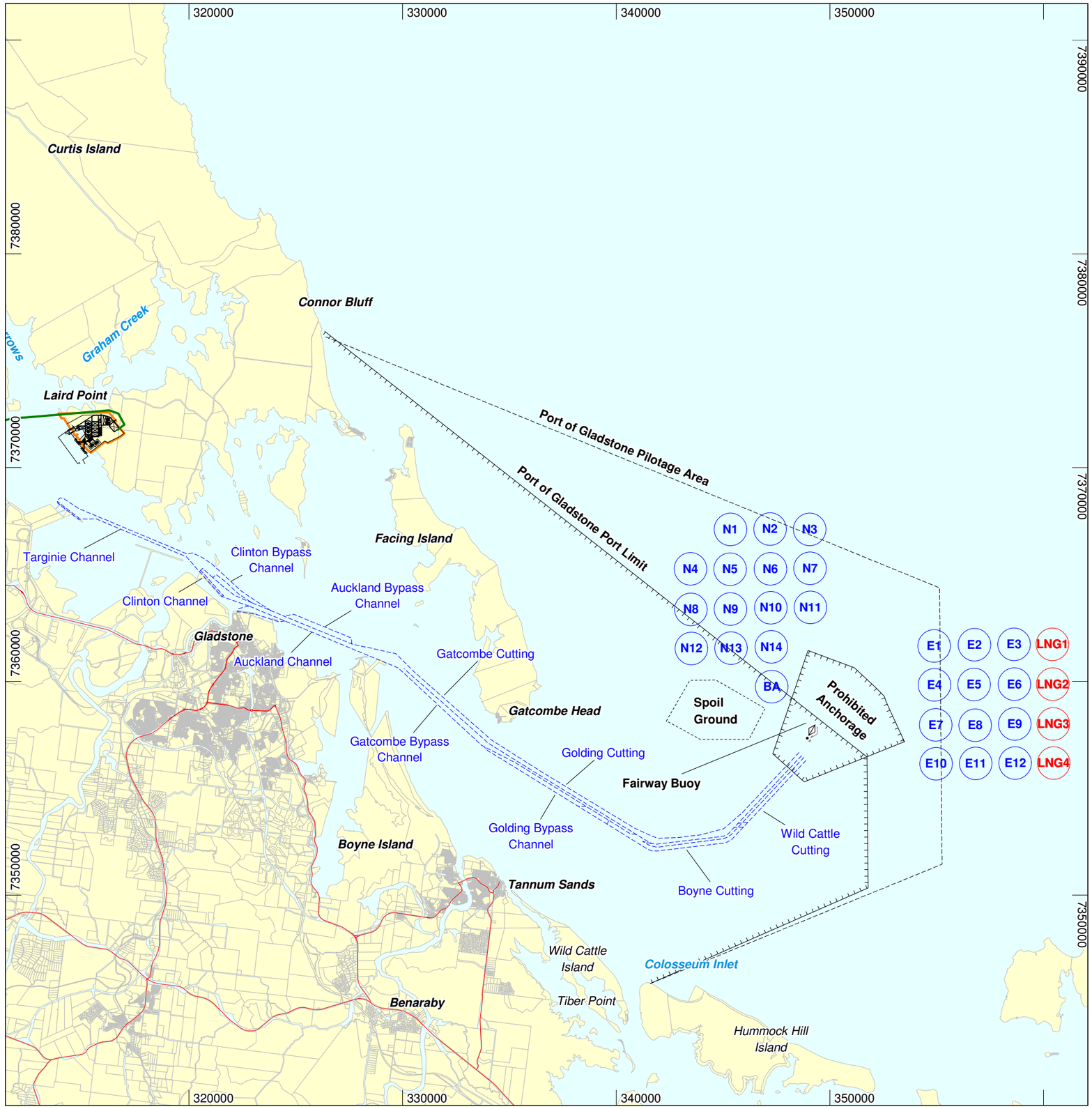
It is the expectation that vessel owners/technical managers should maintain a minimum TMSA score of two in all areas. TMSA submissions to OCIMF should be updated annually. BG Group also conducts its own assessment of vessel owners through annual office audits using an internal owner assessment process which incorporates the TMSA, as well as BG Group Standards, HSSE standards and Asset Integrity Standards.

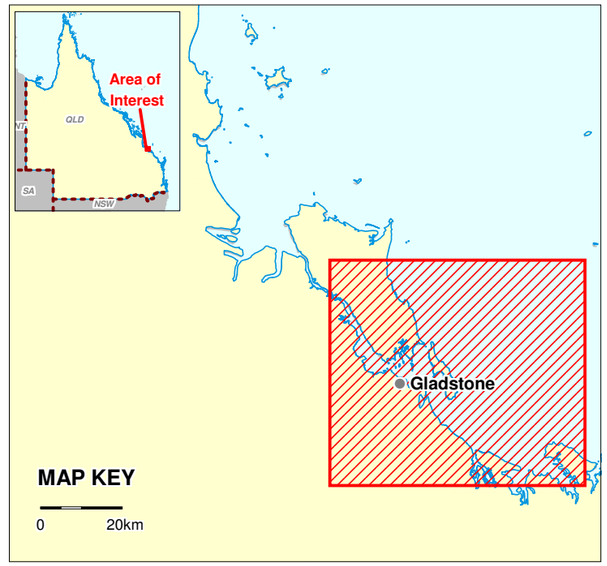
Chartered vessels older than 15 years are required to have a structural assessment from an acceptable class society. A vessel must have a minimum Condition Assessment Program rating of two before it is acceptable.

It is expected that ConocoPhillips will require minimum ship officer experience requirements. Masters are expected to have a minimum four years seagoing and two years LNG experience. Chief Officers are expected to have a minimum two years seagoing and one year LNG experience. The minimum LNG combined experience of the Master, Chief Officers and Gas Engineer should be at least four years.

Anchorage arrangements - impact and mitigation

The GPC proposed LNG anchorages is set out on Figure 4.33. Australia Pacific LNG proposes to use these anchorages.





LEGEND

- Existing shipping channel
- Preferred pipeline alignment
- Main road
- Proposed LNG plant site
- Conceptual LNG plant layout
- Existing anchorages
- Suggested LNG anchorages

Conceptual Site Plan 25509-100-P1-000-10005.dgn supplied by client 24/07/2009

0 5 10km

SCALE - 1 : 200,000 (at A3)

Map Grid of Australia Zone 56
Geocentric Datum of Australia 94

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Figure 4.33 Proposed LNG Anchorages

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0420	Rev: 0

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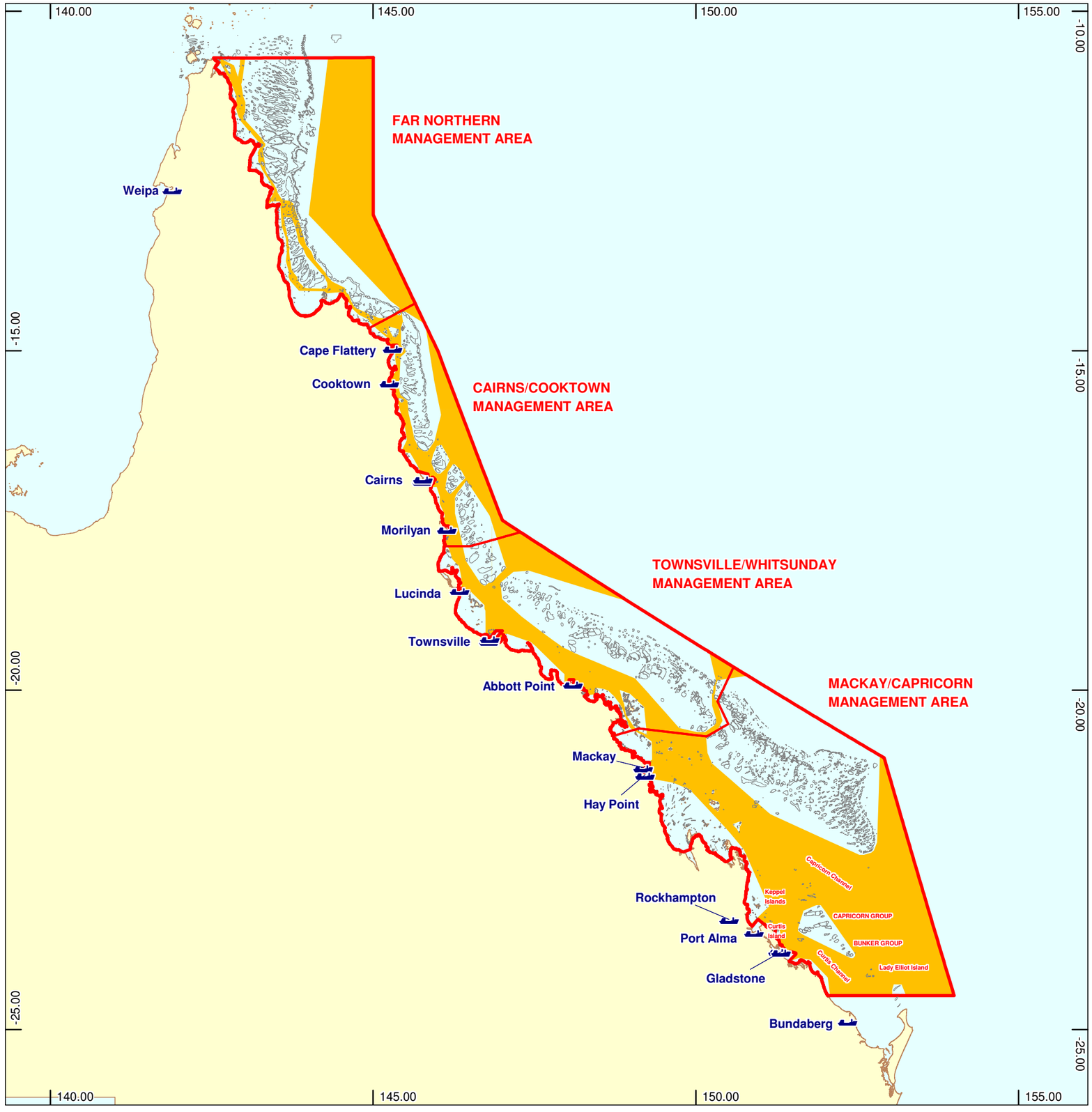
Management of shipping within the Great Barrier Reef Marine Park - impact and mitigation

Regarding the management of shipping within the GBRMP a range of measures have been investigated including

- Discussion with key agencies,
- Review of governing legislation (including applicable international conventions), and
- Proposed implementation of specific shipping management measures has been carried out

When transiting the GBRMP, ships may only navigate within the designated shipping area and the general use zone (note that under the Great Barrier Reef Marine Park Zoning Plan 2003, LNG carriers are classified as “ships”, regardless of length). The designated shipping area has been placed to minimise the impact on the shipping industry while having regard for Australia's international obligations. It takes into account past and forecast vessel usage patterns in the inner and outer shipping routes, existing recommended tracks and proposed new routes. The designated shipping area as specified by the Great Barrier Reef Marine Park Authority (GBRMP) is shown in Figure 4.34.



LEGEND

- Port locations
- Great Barrier Reef Marine Park boundary
- Great Barrier Reef Marine Park management area boundary
- Designated shipping area

0 200 400km

SCALE - 1 : 7,000,000 (at A3)

Latitude/Longitude
Geocentric Datum of Australia 94

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Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
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Figure 4.34 Designated Shipping Areas within the Great Barrier Reef Marine Park

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0428	Rev: 0

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4.4.3 Environmental impacts – Gladstone Port Marine Area

Bunkering, provisioning and waste - impact and mitigation

Bunkering (refuelling) of LNG/LPG vessels may be undertaken within the Port of Gladstone as part of normal operations. This activity would be carried out by the Port bunkering contractor at berth (i.e. alongside the LNG jetty). If undertaken, bunkering will not be carried out while LNG loading or propane unloading is in progress.

It is possible that some older carriers without double hull protection of the fuel bunker tanks may operate in the early stages of the Project. Given the small number of possible voyages over the first five years of terminal operation, the likelihood of a bunker spill is almost the same as a cargo tank breach. Therefore, the likelihood of an incident resulting in a release of bunker fuel is lower than 2.1 x 10-6 per LNG vessel visit.

Food and other consumables may be loaded onto vessels direct from barges while a vessel is at jetty, either before or after LNG loading or propane unloading operations. Removal of solid wastes may also be undertaken via unloading direct to barge by crane off vessel, with waste to be disposed of by an appropriately licensed waste management contractor. MARPOL prohibits “overboard” disposal of rubbish within 25 nautical miles of land and food waste within 12 nautical miles of land. In the case of Queensland, nearest land is taken from the reef. No removal or discharge of liquid waste is anticipated while vessels are within Gladstone harbour.

Sewage - impact and mitigation

LNG and LPG vessels will have secondary sewage treatment facilities on board. In accordance with the Transport Operations (Marine Pollution) Act 1995 (Queensland) (TOMPA) vessels associated with the Project will not discharge sewage and sullage within the Port of Gladstone. Sewage and sullage may be discharged in accordance with the TOMPA Act 1995 beyond 1 nm from land.

Ballast water management - impact and mitigation

In July 2001, the Australian Quarantine Inspection Service (AQIS) implemented mandatory ballast water management requirements for vessels engaged in international shipping. For ships arriving from outside Australian waters, where the potential risk is deemed to be high, the three approved options for the management of ballast water are:

- Full ballast water exchange at sea
- Tank to tank transfers
- No discharge of high risk ballast water in Australian waters.

For the project, LNG vessels will comply with these requirements through open sea sequential empty/refill of ballast tanks. Alternative methods of ballast water treatment are being investigated and studied by Australia Pacific LNG Group. However, none have proved acceptable to date.

Health/quarantine/customs - impact and mitigation

A system of radio pratique (license to enter port on assurance from the captain to authorities that the vessel is free from contagious disease) has been adopted for vessels with Gladstone as a first Australian port provided they are regular callers from disease free areas.

Potential foreshore damage - impact and mitigation

Potential foreshore damage arising from transit though the outer harbour up to the Clinton Channel will be qualitatively similar to impacts arising from current and ongoing transit of bulk vessels through these waterways.

Transit of LNG vessels along the proposed new channel from the existing Targinie Channel to the LNG jetty (including manoeuvring in the Swing Basin) represents extension of bulk shipping operations into a new area of Gladstone, with attendant potential for impacts on the foreshore.

The closest point on the mainland to the proposed new Shipping Channel/Swing Basin is the eastern extremity of the dredge reclamation area at Fisherman's Landing. Given the close distance and existing shipping operations within the Targinie Channel to Fisherman's Landing, potential mainland foreshore damage arising from QCLNG Project LNG shipping operations is expected to be minor to negligible.

At its closest point to Curtis Island the proposed new channel from Targinie Channel to the Australia Pacific LNG Project swing basin will pass approximately 250 m from Hamilton Point on Curtis Island. Once in the swing basin itself, LNG vessels will be manoeuvred to berth approximately 50 m from the existing line of mangroves. Vessel speed through the new LNG spur channel will be approximately 5 knots passing Hamilton Point and decreasing as the vessel approaches the Swing Basin. Once inside the Swing Basin, the vessel will come to a stop while it is turned around by tugs for mooring and bow-out departure.

Along Hamilton Point, at the closest point of approach, the coast is characterised by a rocky foreshore with some fringing mangroves in small bays. Adjacent to the swing basin the coastline is characterised by fringing mangroves on tidal mudflats. Current tidal flows in the area are estimated at up to 2 to 3 knots.

4.4.4 Environmental Impacts - shipping outside the Port of Gladstone

Impact and mitigation

As described previously LNG will be stored and transported as an unpressured low temperature liquid in ships specifically designed to transport LNG. LNG carriers (LNGC) are double-hulled ships and are specially designed to prevent leakage or rupture. LNG vessels will arrive approximately every two to three days at ultimate plant capacity (approximately 160 ships a year).

These ships will navigate through the Marine Park within the designated shipping area before entering the Port of Gladstone, and again navigate through the Marine Park Shipping Area when leaving the Port of Gladstone.

The level of existing shipping through the designated shipping channels is approximately 2,000 ship movements per year. The typical ships using these channels carry products like coal, sugar, iron ore and oil. The LNGC will represent an increase of 3% in shipping movements for the first LNG train.

It is also recognised that the LNGC's may use shipping channels which are beyond the eastern boundary of the Marine Park, therefore avoiding potential impacts on the Marine Park.

Risks to the environment

In 2003 the GBRMPA finalised a Great Barrier Reef and Torres Strait Shipping Impact Study. The report identified a series of risks posed to the Great Barrier Reef by shipping. These risks included:

- Maritime incidents in the region - shipping accidents can occur through collisions, groundings, foundering or stranding. Groundings and collisions make up around 45% of shipping accidents
- Oil pollution and spills
- Harmful effects of anti-fouling systems
- Introduced invasive marine pests- ballast water and hull fouling
- Discharge of waste at sea
- Air quality
- Interaction between trading ships and small craft
- Anchorages
- Erosion and bottom disturbance
- Heritage and cultural considerations.

The impact study then identified mechanisms for addressing the potential adverse impacts, and these were incorporated as appropriate into the Zoning Plan. The following describes how the identified risks relate to the shipping activities of the Australia Pacific LNG Project and what mitigation is appropriate.

Maritime LNG incidents

The LNG industry has had an impressive safety record over the last 50 years. Since international commercial LNG shipping began in 1959, for example, tankers have carried over 33,000 LNG shipments without a serious accident at sea or in port. Insurance records and industry sources show that there were approximately 30 LNG tanker safety incidents (e.g. leaks, groundings or collisions) through 2002. Of these incidents, 12 involved small LNG spills, which caused some freezing damage but did not ignite. Two incidents caused small vapour vent fires, which were quickly extinguished.

Oil pollution and spills

According to Lloyd's Register (2008), all newer ships have double hull protection around the forward and aft bunker fuel tanks. However, on some of the approximately 30 year old LNGCs, the engine room bunker fuel tanks are not within the double hull. For fuel efficiency and boiloff rate reasons, many of these older vessels will no longer be carrying LNG cargo by the time Gladstone LNG terminal starts operations. Additionally, the Australia Pacific LNG LNGCS are most likely to be powered by gas burning engines and will carry no or very limited quantities of bunker fuel. Overall, the likelihood of a bunker spill is almost non-existent, which can be said about a cargo tank breach as well.

ConocoPhillips as the Australia Pacific LNG operator of the LNG facility will have in place a corporate Global Marine Vetting Standard. This is a standard for vessel vetting and marine terminal clearance for vessels that load or unload at a facility operated by ConocoPhillips. This is to ensure prudent management of marine risk.

Harmful effects of anti-fouling systems

The International Maritime organisation has developed a protocol for banning the use of Tributyl tin (TBT) on all ocean going ships by 2008. No TBT is to be applied or reapplied after 1January 2003 and by 1 January 2008, no ships will have TBT on their hulls, or at the least, any existing TBT must be covered. In Australia, this is within the Antifouling Program as part of Australia's Oceans Policy.

Introduced invasive marine pests – ballast water and hull fouling

In 1998, the Australian Government announced its intention to develop a national system for addressing introduced marine species in Australia's Oceans Policy. Since that time, the National Introduced Marine Pests Coordination Group (comprising representatives from the Australian Government and State and Territory Governments, marine industries, scientists and conservation organisations) has been developing a National System for the Prevention and Management of Marine Pest Incursions. The National System has three core elements:

a) Prevention: mechanisms to reduce the risk of introduction and translocation of marine pests

b) Emergency response: systems to ensure coordinated emergency responses to any new incursions and translocations; and

c) Ongoing management and control: a coordinated management system for the ongoing management and control of introduced marine pests already in Australian waters.

In April 2005, an international Agreement on a National System for the Prevention and Management of Marine Pests Incursions was signed by the Australian Government and several State and territory Governments. This agreement was developed to ensure that measures to address introduced marine species are coordinated across jurisdictional boundaries, and that they are consistent with current or future international agreements relating to introduced marine species.

International measures are also being taken to prevent the introduction of these species in Australian waters from ballast water. An International Convention for the Control and Management of Ships Ballast Water and Sediments 2004 was recently developed to help reduce the risk of harmful aquatic organisms and pathogens being introduced by ships entering ports. Although it has yet to come into force, the Convention specifies that ballast water exchange should occur outside the Great Barrier Reef Marine Park. When these requirements cannot be met, areas may be designated where ships can conduct ballast water exchange.

The Australia Pacific LNG operators will keep abreast of the national and international legislative requirements, and should engage suitable marine transportation companies. .

Discharge of waste at sea

The International Convention for the Prevention of Pollution from Ships (MARPOL,73/78) regulates the discharge of operational ship-sourced pollutants (GBRMPA, 2009). Within the Great Barrier Reef, MARPOL is implemented through the Protection of the Sea (Prevention of Pollution) from Ships Act 1983, Transport Operations (Marine pollution) Act 1995, and the Great Barrier Reef Marine Park Act 1975.

MARPOL has six technical annexes, each regulating a particular type of pollution. Annexes I and II regulate oil and bulk noxious liquid substances. The MARPOL annexes describe the conditions under which these substances can be discharged, as well as design specifications for ships to minimise these discharges.

In addition, MARPOL places a duty on the ship's Master or operator to report any incident that involves a discharge or probable discharge of oil, noxious liquid substances or harmful packaged substances. The ship's Master or operators are also obliged to report any damage, failure or breakdown that affects the safety of the ship or reduces the ship's ability to navigate safely. The parties operating the Australia Pacific LNG shipping will have to comply with the requirements specified through MARPOL.

Air quality

Minimising the impact of air pollution is addressed through annex VI of MARPOL (GBRMPA 2003). The key features of the convention include the prohibition of deliberate emissions of ozone depleting substances, including halons and chlorofluorocarbons (CFCs); limits on emissions of nitrogen oxides (NOX) from diesel engines; and prohibition of the incineration on board ship of certain products, such as contaminated packaging materials and polychlorinated biphenyl's (PCBs).

It is expected that operator /charter parties will comply with the requirements specified through MARPOL.

Interaction between trading ships and small craft

The 2003 GBRMPA impact study identified that between 1991 and mid-2002, the Australian Transport Safety Bureau (ATSB) investigated 12 collisions between trading ships and smaller vessels off the coast of Queensland. Nine of the collisions occurred in the waters of the Great Barrier Reef and in all cases except one, the smaller vessel was a fishing trawler. The ATSB also investigated two reports of close quarters between trading vessels in the Great Barrier Reef.

The reports of the investigations identified non-compliance with aspects of the International Regulations for Preventing Collisions at Sea, 1972, by both trading ships and fishing vessel crews. Non compliance included inadequate watch keeping, failing to keep a proper lookout, unsafe speed or inappropriate lights and were factors in most of these collisions. Other contributing factors included lack of marine training of crews of fishing vessels and fatigue. It is expected that the operators /or charter parties shall fully comply with COLREGS.

Erosion and bottom disturbance

Australia Pacific LNG will expect charter parties to comply with the requirements of the Zoning Plan

Heritage and cultural considerations

Australia Pacific LNG will expect charter parties to comply with the requirements of the Zoning Plan.

Site security - impact and mitigation

Appropriate security risk assessments and mitigations plan will be developed to address security risks as they are identified in subsequent risk studies. Security plans will be aligned with emergency response and evacuation planning, law enforcement agencies and prevailing Queensland laws and regulations. Site security plans and procedures will be developed to cover:

- Construction site isolation
- Appropriate signs and warnings
- Controlled site access via a badge access systems
- Necessary training and orientation requirements
- A private security firm to provide security personnel for the site
- Public safety officers, police, constable or other law enforcement organisations to provide security for public on public property, roads or other public infrastructure

Quarantine inspections for construction phase - impact and mitigation

Approximately, 50 to 70 per cent of the Project's cargo will be shipped using multi-purpose Project vessels (break-bulk). All break-bulk cargo and containers will be subject to quarantine inspections during discharge/unloading. The level of inspection is subject to the nature and origin of the cargo and will be determined in consultation with the Australian Quarantine and Inspection Service (AQIS). Therefore, international cargo will be handled in a combination of ways:

- Break bulk carriers will stop off either at the Port of Brisbane or the Port of Gladstone as part of their routine passage and offload LNG Component cargo (pipelines) to the wharves. In the case of Brisbane, this offloaded cargo will be transported to Gladstone by either chartered marine barge/vessel or road transport. Customs clearance and AQIS inspections will be undertaken as part of normal Port procedures.
- While the use of coastal vessels will be the primary mechanism for transport to Gladstone, small shipments of individual items that cannot be marshalled to allow for the effective use of a chartered coastal vessel will require that they are transported by road or rail and handled through Auckland Point
- Charter vessels having an approximate capacity 10,000 dead weight tonnes (DWT) carrying cargo for the LNG facilty will be coming from international waters and discharging the cargo directly to the MOF. These will be predominantly break-pack and packaged deliveries. However, some bulk deliveries are anticipated, given that not all materials will fit within the volume of fixed shipping containers.
- Modules and major pre-assembled elements of the work and other oversized cargo coming from overseas will be handled on barges and delivered directly to the MOF at Laird Point. Approximately 20 to 25 deliveries of modules and major pre-assemblies are anticipated.

To facilitate inspections by the AQIS, a Quarantine/Bonded Area will be established on Curtis Island adjacent to the MOF and prior to the cargo being moved into the Project site for staging, technical inspection and release for installation. In the event that materials or equipment imported from overseas are offloaded at FLNE (not currently anticipated), the Project will work with AQIS to ensure that appropriate quarantine inspection facilities are provided. Only small amounts of this cargo will be able to off load at FLNE.

Gas supply pipeline - impact and mitigation

The Australia Pacific LNG project requires the main supply gas pipeline to be laid across the waterway just north of Laird Point. The currently preferred construction technique will be horizontal directional drilling and will require installation equipment on the mainland and Curtis island either side of the crossing. No marine plant will be required to lay the pipe and no traffic impact on the waterway is expected.

MOF

A nominal 300m construction safety zone around the MOF is assumed (with the size of this construction safety zone still subject to finalisation in consultation with the Regional Harbour Master). The construction safety zone will be demarcated with marker buoys and notices to mariners will be put in place in consultation with the Regional Harbour Master and as required by MSQ.

4.4.5 Fisherman's Landing North Expansion facility – project impacts

Marine transits and facility - impact and mitigation - construction

For Australia Pacific LNG case construction shipping will include up to approximately 140 one way personnel ferry journeys per month at peak (Fisherman's Landing to Curtis Island), plus approximately 70 barge journeys (direct to MOF) per month at the peak construction period, plus additional ferry journeys to Curtis Island for transport of consumables and equipment and for waste removal from site. Given that in 2008 a total of 1,417 cargo vessels (excluding pleasure craft) transited Gladstone harbour, this represents a significant increase in raw numbers of vessel movements. However, the overall impact on non-Project shipping and boating activities is anticipated to be less than the raw numbers suggest due to the fact that:

- Ferries used will be high speed, relatively low draft (not constrained to existing major shipping channels) and highly manoeuvrable, therefore, they will be able to operate around bulk carriers utilising the Port of Gladstone without significant impact on Port shipping operations
- Construction will be undertaken over approximately four years, but for much of this period the number of Project vessel movements will be significantly less than the peak numbers described above.

Additional constraints in the Western Basin include the proposed dredging operation which is planned to happen at the same time that the Australia Pacific LNG project will be constructed. The dredging operation is likely to add to marine traffic congestion.

An initial over view appraisal of the marine traffic suggests that congestion in the Western Basin/ Clinton and Auckland channel areas should not be a significant issue for the Australia Pacific LNG case. Both GPC and MSQ have confirmed their acceptance that the one LNG construction case (the Australia Pacific LNG case) would not present unreasonable traffic conditions.

Nevertheless, once further details and timing of the Australia Pacific LNG case is known a detailed schedule of marine operations and required transits should be undertaken to confirm and optimise marine traffic conditions.

Small craft vessel acceptance standards

Personnel ferries used within the Port of Gladstone will comply with a reasonable Marine Assurance Standard. This should require the following minimum activities to be undertaken:

Vessel acceptance standard: prior to approval for use in a QGC activity, all vessels employed in marine activity, whether contracted or sub-contracted, will be inspected according to the International Marine Contractors Association (IMCA) "Common Marine Inspection Document". This inspection will be performed by a suitably qualified inspector from an approved marine contractor. Vessels that have undergone an IMCA Common Marine Inspection within the previous 12 months will not require another prior to being accepted providing that:

- The latest inspection report is available for review
- Any "high" risk observations have been closed out
- An inspection is undertaken on the anniversary of the last inspection

Security: all vessels and port facilities will comply with the provisions of the *International Ship and Port Facility Security Code* (ISPS Code) Parts A&B.

Vessel Safety Management: Any vessel contracted by, or on behalf of, the Australia Pacific LNG Project will have a structured and documented safety management system (SMS). All systems shall demonstrate that quality management and quality system elements meet the requirements of the International Maritime Organization (IMO)26 regulations on the International Safety Management Code for the Safe Operation of Ships (ISM Code) and for Pollution Prevention (MARPOL). The ISM Code has been added to Chapter IX of the International Convention for the Safety of Life at Sea (SOLAS) and is now mandatory.

Vessel Age: Vessels on long-term charter will be less than 25 years' old at the expiry of the fixed term; except for AHTS (Anchor Handling and Tug Supply) Vessels where this age limit is reduced to 15 years.

This requirement may be waived subject to approval from a ConocoPhillips Shipping and Marine Assurance representative.

4.4.6 Auckland Point and Port of Brisbane

Pipes and other materials required to construct the gas pipelines may be shipped through Auckland Point.

In October 2009 a meeting with GPC indicated a proposed area set aside at Auckland Point for the construction activities of a number of LNG developments. This includes a pipe laydown area of approximately 11ha. Initial discussion with GPC indicates that this would probably be sufficient to cater for all LNG developments.

Regarding the movement of Project freight through the Port of Brisbane discussions held with the Business Development Department of Port of Brisbane Corporation (PBC) in November 2009, confirmed that a number of berths had been allocated for the importation of materials and that planning was underway to assess the amount of land they could make available for lay down areas.

4.4.7 Cumulative impacts

Commercial trading vessels - within Gladstone Port area - impacts

The Port Strategic Plan envisages an increase in planned Port capacity to 300 million tonnes of export capacity per year within the next 50 years, nearly four times the 2008 throughput. The effects of the cumulative LNG and LPG shipping is well within the expectations of the Port Strategic Plan, and is a viable component of the projected future role of the Port of Gladstone as a strategic industrial port for Queensland.

There is some uncertainty around how many projects will ultimately be developed, but in the longer term, with seven or eight LNG processing trains in the Western Basin planned, approximately 400 LNG ship visits per year would be anticipated. This equates to slightly over 1 LNG ship per day. When the port's current load of 4.2 piloted transits per day and an anticipated 2 ships per day contributed by stage 1 of the Wiggins Island Coal Terminal project are factored in, the LNG industry's contribution to total harbour traffic is only 15%.

As such the LNG industry is a relatively small contributor to overall port traffic. It should also be mentioned that the majority of LNG ships have drafts which are shallow enough that movement is not tidally restricted. This will allow for optimization of ship movements throughout the twenty-four hour day. Finally, there are many other similar industrial ports throughout the world that manage these and higher traffic levels safely and efficiently. The AECOM report 'Port of Gladstone Shipping Operations Simulation – 2009 Future trade Scenarios' 7 Sept 2009 has assessed the traffic flow within the Gladstone harbour with a range of LNG cumulative projects. The report concludes that delay times

associated with the cumulative growth of LNG traffic (including Gladstone LNG, Queensland Curtis LNG, and Australia Pacific LNG) are manageable and that minimisation of delays can be achieved through consideration of alternative scheduling mechanisms for LNGC's, such as vessel convoys.. While transit times for LNG vessels through the Port of Gladstone will vary, these shipping simulations undertaken to date suggest reasonable transit times. Consequently, it is expected that the LNG trade considered traffic conditions within the harbour will be acceptable. A system of improved management scheduling will be needed to be implemented and it is understood that both GPC and MSQ are committed to this outcome.

It is possible that cumulative small craft movements would impact the port performance for commercial trading vessels. It is suggested that further assessment of the combined effects of large and small craft traffic be assessed with a credible simulation package able to handle these different craft. This assessment should be undertaken with appropriate consideration of the likely marine traffic speed limits from passing vessels onto adjacent wharves.

The scheduling of all large vessels and to a certain extent small craft will be an important component of making the port run efficiently. And the methodology used for scheduling vessel movements in the port has a significant effect on port performance. This further analysis for scheduling should include the impacts of alternative scheduling methodologies on port performance and compare the existing scheduling activities at the port and the representation embodied in the model. Opportunity exists for optimisation of scheduling for LNG vessels as well as the other trades at the port, with potentially significant improvements in port performance achievable. Given sufficient towage resources, fleeting of LNG vessels is an example of an alternative approach to scheduling LNG vessels with the potential to minimise impact on other port operations, reduce delays and the need to modify channel configuration.

The simulation analysis should include all expected trade in the harbour and have a Sensitivity analysis component to gain further insight on the impact of increases in trade volumes at the port. Considerations for variations in LNG trade parameters (e.g. sensitivity to vessel size, loading rate) should also be included. Additionally, the analysis should review the impact if tug and pilot availability becomes restricted. If this is an important result of this further analysis then consideration of additional resources, either with the tug fleet or pilotage staff will need to be considered.

Safety - impacts

The overall safety zone recommendations contained within the Harbour transit risk report should be the same for all the Gladstone projects proposing LNG shipping and are:

At anchor outside the harbour, a 50 m safety zone for the safety of small craft around large vessels is recommended.

a) During LNGC transit, a ½-hour separation between another vessel proceeding in the same general direction ahead or astern of the LNGC is recommended.

b) A LNGC transiting Gladstone channels should not pass any other large ships going in the opposite direction during its transit. The LNGC must always have priority in the channel. Once the LNG carrier's transit has commenced, other small vessel traffic encountered en route should be expected to leave the channel clear for the LNG carrier.

c) Overtaking the LNGC by large ships, at any time during the transit, should not be permitted.

d) A campaign should be implemented to educate small boaters on hazards from approaching large ships which cannot manoeuvre outside the channels.

e) No special LNG cargo specific safety zone is required.

f) The recommended safety zone at the berth for LNG cargo loading is 200 - 250 m.

g) No LNG security zone is required when the maritime security risk is low. A security zone with an official escort may be required when the maritime security risk is deemed moderate to high.

Shipping outside the Gladstone Port area - impacts

The LNGC will represent an increase of three in shipping movements for the first LNG train. This may increase to 13% once the four trains are operational.

The EIS review considers that no significant cumulative impact is seen on the waters outside of the Gladstone port area.

4.4.8 Auckland Point Port facilities - cumulative

Marine transits and facility - impact and mitigation - Construction

An initial overview appraisal of the marine traffic suggests that congestion in the Western Basin/ Clinton and Auckland channel areas is likely to be a significant issue for the cumulative case. Both GPC and MSQ have indicated their concern if a number of LNG projects are constructed at the same time and use the Auckland Point facility.

Australia Pacific LNG has adopted Fisherman's Landing North Expansion (FLNE) as the primary embarkation point for the transfer of goods and personnel during the construction and operational phase of the LNG facility. This plan shifts a significant amount of LNG facility's marine traffic into the Western Basin and avoids the congestion around Wiggins Island compared to shipping from Auckland Point.

Once further details and timing of the cumulative is known to a greater understanding then a detailed schedule of marine operations and required transits should be undertaken to confirm and optimise marine traffic conditions. The methodology used for the scheduling simulations for the marine transits will need to be extensive and carefully planned.

LNG Operations – small craft consideration

The operational facility is to be located at FLNE. There is space to allow a facility large enough to moor vessels and move people at this location. Again, no significant marine traffic should occur under the cumulative operations and no further review of this case is warranted.

4.5 Air services

4.5.1 Methodology – air services

The Project's impact on air services was assessed by comparing project traffic to airport capacity and current flight schedules. Discussions have been held with the Western Downs Regional Council, Banana Regional Council, Maranoa Regional Council and Gladstone Regional Council about current operations and requirements for any future alterations to airports/aerodromes identified as potentially being impacted by the Project.

4.5.2 Impact assessment

Gladstone Regional Airport

Increased passenger numbers

The Gladstone Regional Airport may be impacted on by gas pipeline construction personnel operating out of accommodation facility 1 (The Narrows Crossing) and by personnel associated with the construction of the LNG facility on Curtis Island. The maximum impact will be during shift changes when personnel are bussed to and from the airport from the embarkation point.

Based on the assumption that all gas pipeline construction personnel operating out of accommodation facility 1 undertake a shift change during the one day, it is estimated that up to 150 people in any one day may pass through the airport during the pipeline construction period. Additionally, it has been estimated that based on a rotating shift pattern up to 80 Australia Pacific LNG personnel constructing the LNG facility may pass through the airport. Therefore, the maximum total increase in airport passengers during the construction of the gas pipeline and the LNG facility could be in the order of 230 passengers per day, on the days that the gas pipeline shift changes occur. This would only occur over a short timeframe of approximately three to four months of the gas pipeline construction. The typical daily passenger numbers during the peak construction period of the LNG facility will be in the order of 80 passengers per day. As passengers will be arriving by bus to the airport, there is not expected to be an impact on parking.

Cumulative impacts

During the construction of the pipeline out of accommodation facility 1 (The Narrows Crossing), construction of LNG facilities on Curtis Island will be undertaken by not only Australia Pacific LNG but also by Queensland Curtis Island LNG and Gladstone LNG. It is estimated that up to an additional 120 personnel associated with the construction of the LNG facility for the Queensland Curtis Island LNG and Gladstone LNG may pass through the airport in any one day during the same period. Therefore, as a maximum case, the total number of passengers that may utilise the airport may be up to 350 persons per day for a short duration during the construction of the gas pipeline.

Mitigation

As stated in Section 2.7, the Gladstone Regional Airport can cater for Dash 8-400 aircraft capable of carrying 70 persons.

During construction of the Australia Pacific LNG pipeline, specifically the section involving The Narrows Crossing, it is estimated that an additional three Dash-400 aircraft movements may be required to cater for the increased passenger numbers. Once this section of pipeline is complete, one or two additional Dash-400 aircraft movements may be required to cater for the daily rotation of LNG facility construction staff.

To cater for the increased passenger numbers arising from the construction of LNG facilities on Curtis Island by Queensland Curtis Island LNG and Gladstone LNG, an additional two Dash-400 aircraft movements may be required. In order to minimise the potential impacts, Australia Pacific LNG will work with industry to optimise roster timings and reduce daily passenger movement peaks.

The cumulative growth plans for the Gladstone region are complemented by the current upgrades being completed at the Gladstone Regional Airport. Flexibility for larger aircraft including jet service as well as more frequent service will afford advantages and opportunities to source resources more

efficiently throughout Australia. This combined with increased competition would benefit the projects as well as the community at large.

Australia Pacific LNG will work with the Gladstone Regional Council and relevant government agencies and service providers to determine the most appropriate options for the use of Gladstone Regional Airport.

LNG flaring

From time to time during the operation of the LNG plant, flaring (burn-off of excess gas) is required.

This facility is under a flight path to the Gladstone Regional Airport and it is recognised that this may be a potential danger to aircraft.

Australia Pacific LNG has undertaken modelling of this risk and details are provided in Volumes one to four, chapter 22 of this EIS.

Miles Aerodrome

Increased passenger numbers

The Miles Aerodrome is impacted by gas fields and gas pipeline construction and operations personnel during shift changes when personnel are bussed to and from the aerodrome.

Based on a rotating shift pattern, between 2012 and 2018 it is estimated that up to 120 people in any one day may pass through the aerodrome from personnel involved in construction activities in the gas fields. After 2018 this is expected to reduce to up to 50 people per day.

Similarly, based on a rotating shift pattern, in 2013/2014 it is also estimated that up to 120 people in any one day may pass through the aerodrome from personnel involved in construction activities on the gas pipeline.

Therefore, the total number of personnel estimated to be using the Miles aerodrome could be 240 people per day from 2013 to 2014, 120 people per day from 2014 to 2018 and 50 people per day thereafter.

Cumulative impacts

There was no information available to make an assessment of the cumulative impacts of other regionally-significant projects on the Miles aerodrome.

Mitigation

As stated in Section 2.7, the current aerodrome may be able to cater for Dash 8-200 aircraft capable of carrying 36 persons. To cater for the pipeline and gas fields construction traffic, up to an additional seven Dash 8-200 aircraft movements may be required. Up to four Dash 8-200 aircraft movements may be required from 2014 to 2018 and one to two aircraft movements may be required beyond 2018.

Australia Pacific LNG will work with Western Downs Regional Council and relevant government agencies and service providers to determine the most appropriate options for the use of Miles Aerodrome.

Process & Exhaust Gas Plume Rise

From time to time during the operation of the gas processing facility located 2.2km south west of the Miles Aerodrome, exhaust gas plume rises may occur which could possibly impact on aircraft operations.

Australia Pacific LNG has undertaken a Process & Exhaust Gas Plume Rise Assessment of this risk and have indentified measures to ensure that the safety of aircraft is not compromised. Details are provided in Volumes one to four, Chapter 22 of this EIS.

Biloela Airport

Increased passenger numbers

The Biloela Airport is impacted by the pipeline construction personnel during shift changes when personnel are bussed to and from the airport.

Based on a rotating shift pattern it is estimated that up to 120 people in any one day may pass through the airport during 2013/2014.

Cumulative impacts

There was no information available to make an assessment of the cumulative impacts of other regionally-significant projects on the Biloela airport.

Mitigation

As stated in Section 2.7, the current airport can cater for Dash 8-200 aircraft capable of carrying 36 persons. Therefore, to cater for the impact of the gas pipeline construction, up to an additional four Dash 8-200 aircraft movements may be required.

Australia Pacific LNG will work with Banana Shire Council, QantasLink and relevant government agencies and service providers to determine the most appropriate options for the use of Biloela Airport.

Roma Airport

Increased passenger numbers

The Roma Airport is impacted by gas fields construction and operations personnel during shift changes when personnel are bussed to and from the airport.

Based on a rotating shift pattern between 2012 and 2018 it is estimated that up to 60 people in any one day may pass through the airport. After 2018 this is expected to reduce to approximately 10 people.

Cumulative impacts

There was no information available to make an assessment of the cumulative impacts of other regionally-significant projects on the Roma airport.

Mitigation

As stated in Section 2.7, the current airport can cater for Dash 8-300 aircraft capable of carrying 50 persons. Therefore, to cater for the impact of the gas field construction, up to an additional one to two Dash 8-300 aircraft movements may be required up to 2018.

Australia Pacific LNG will work with Maranoa Regional Council and relevant government agencies and service providers to determine the most appropriate options for the use of Roma Airport and will support any future application by the Maranoa Regional Council for government funding to upgrade the Roma Airport.

5. Summary and conclusions

5.1 Project proposal

This traffic and transport technical report has considered the impacts of the construction and operations of the proposed Australia Pacific LNG Project.

The Project consists of three integrated components, as follows:

- Gas fields - further development and expansion of the CSG fields to the north-west and south-east of the existing Walloon gas fields development area, centred around Miles.
- Gas pipeline - construction of a gas pipeline between the gas fields and Gladstone.
- LNG plant, Curtis Island Gladstone - staged construction of a liquefied natural gas (LNG) plant and associated facilities at Curtis Island for processing and exporting LNG to international markets.

The Project will be developed in stages, with the construction and operation of the CSG fields proposed to commence upon project approval and continuing throughout the life of the project.

The assumed project timeframe is as follows:

- 2010 – Commencement of early works.
- 2011 - Commencement of construction of LNG facility at Curtis Island (trains one and two), gas pipeline and initial gas field infrastructure.
- 2014 – Commencement of operations (Train one) and Train two in 2015.
- 2018 – Commencement of construction LNG facility at Curtis Island (trains three and four).
- 2022 – Curtis Island LNG facility completed and at full operations.
- 2045 – Estimated date of completion for operation of gas fields.

The Project's operational life cycle is considered to be 30 years from 2014–2045.

This assessment has considered the cumulative impact of other regionally-significant projects on the study area transport network, including the other proposed LNG projects (namely the Queensland Curtis LNG, Gladstone LNG and Gladstone LNG-Fisherman's Landing projects).

The proposed Project generates a significant amount of traffic which will be distributed throughout the study area onto the existing State-controlled and local government road network.

Traffic associated with the construction and operational phases of work has been estimated based on assumed construction activities. The assumptions and details of the estimated traffic to be generated from the Project are contained in Section 3 of this report.

Figure 5.1 provides a summary of the estimated daily traffic volumes generated by the Project across the life of the Project for all construction and operational activities.

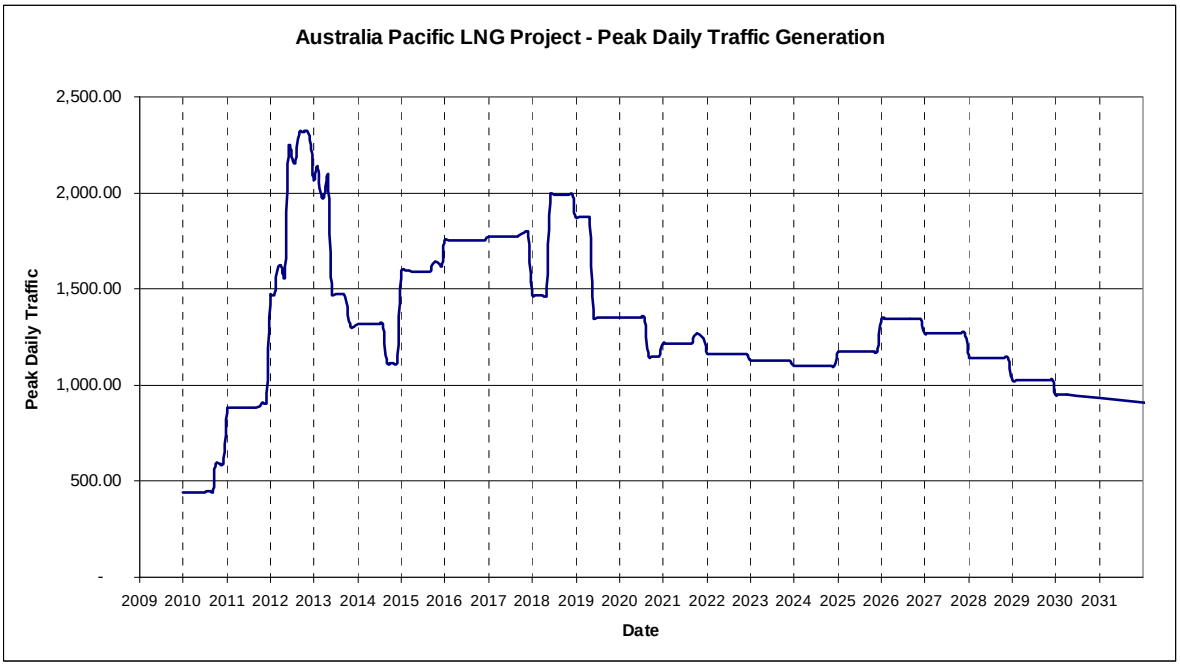


Figure 5.1 Project traffic

The traffic associated with the operational activities will be significantly less than that associated with the construction of the components. There will be two peak periods of traffic generated for the Project . The first will be at 2013, coinciding with the construction of the first stage of the LNG plant (trains one and two) and the gas pipeline. Another peak will occur in 2019 as construction of the second stage of the LNG plant (trains three and four) begins in parallel with the operation of the trains one and two.

5.2 Overall Project – impacts and mitigation

5.2.1 Road network impacts and mitigation

Road links

The following State-controlled road links within the study area have been identified in this assessment as requiring alterations within the planning horizon. However, the Australia Pacific LNG project is not regarded as the driver for bringing forward the need for the alterations. The following details outline alterations that are required:

- Warrego Highway Ch 0.0 to 1.09 (450m south of Moonie Highway to 640m north of Moonie Highway, Dalby), alter from two lane rural road to four lane rural road standard by 2025.
- Gore Highway Ch0.0 to 1.05 (Warrego Highway to bend), alter from two lane rural road to four lane rural road by 2010.
- Gore Highway Ch1.05 to 1.95 (Bend to 900m south), alter from two lane rural road to four lane rural road by 2012
- Gore Highway Ch1.95 to 3.52 (900m south of bend to 1.57km south of bend) alter from two lane rural road to four lane rural road by 2010
- Gore Highway Ch3.52 to 5.59 (1.57km south of bend to 3.64km south of bend) alter from two lane rural road to four lane rural road by 2017
- Moonie Highway Ch0.0 to 2.5 (Warrego Highway to 2.5km south), alter from two lane rural road to four lane rural road standard by 2027.

- Gladstone-Mt Larcom Road Ch 3.258 to 4.625 (Blain Drive to Red Rover Road) alter from two lane rural road to four lane urban road by 2020
- Gladstone-Mt Larcom Road Ch 4.625 to 12.292 (Red Rover Road to Reid Road) alter from two lane rural road to four lane urban road by 2027
- Dawson Highway Ch 2.24 to 3.13 (Blain Drive to Phillip Street) alter from four lane urban road to six lane urban road by 2028.
- Dawson Highway Ch 3.13 to 4.39 (Phillip Street to Penda Avenue) alter from four lane urban road to six lane urban road by 2016.
- Dawson Highway Ch 4.39 to 4.87 (Penda Avenue to Aerodrome Road) alter from four lane urban road to six lane urban road by 2023.
- Dawson Highway Ch4.87 to 10.3 (Aerodrome Road to Harvey Road) alter from two lane urban road to four lane urban road by 2029.
- Dawson Highway Ch19.05 to 21.75 (Bruce Highway to Taragoola Road) alter from two lane rural to four lane rural standard by 2030.

The cumulative impact of the other regionally-significant projects, particularly other LNG projects, does result in bringing forward the upgrading of the following road links:

- Gladstone-Mt Larcom Road Ch 3.258 to 12.292 (Blain Drive to Reid Road) alter from two lane rural road to four lane urban road. Alterations to be brought forward from 2020 to 2018 (Blain Drive to Red Rover Road) and from 2029 to 2028 (Red Rover Road to Reid Road).
- Dawson Highway Ch2.24 to 3.13 (Blain Drive to Philip Street) alteration from four lane urban road to six lane urban road. Alteration to be brought forward from 2028 to 2027.

Intersections

A number of State-controlled intersections within the Gladstone area have been identified as requiring an alteration to accommodate the Australia Pacific LNG Project traffic particularly that associated with the construction and operation of the LNG facilty.

There are a number of intersections within the study area that alteration works will be required to mitigate the impacts of the Project and other regionally-significant projects. These are summarised in Table 5-1 below.

Table 5.1 Road intersection Impacts and Mitigation

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Dawson Highway/Dawson Road/Breslin Street	Three-way signalised	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Blain Drive/Herbertson Street	Four-way, two-lane roundabout	The existing intersection will operate within capacity to 2021 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013. Alteration works recommended for the intersection include: • Addition of a free left turn lane on the Dawson Highway (South) approach. • Extension of the short right turn lane on the Blain Drive approach. • Conversion of the through/right lane on the Blain Drive approach to a left/through/right lane. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner, provided that the roundabout is signalised. Australia Pacific LNG will work with State and Local government and industry with respect to potential alterations required to meet the increased demands from regionally-significant projects. It is noted that DTMR has previously conditioned the Gladstone Pacific Nickel development to contribute to the cost of signalisation of the roundabout.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Dawson Highway/Philip Street/Shopping Centre	Four-way, two-lane roundabout	The existing intersection currently fails during the PM peak hour. It is noted that the roundabout would be expected to operate at a higher level as three legs of the roundabout are metered during the peak hour periods. The Project's traffic will have a worsening effect on the intersection's performance, particularly during the peak construction years of 2013 and 2019. Alteration works recommended for the intersection include: • Signalisation of the intersection. • Provision of three stand-up lanes on each of the Dawson Road approaches consistent with the planned mid block alteration to a six-lane road. • Free left turn lane on all approaches. • Right turn lanes on all approaches. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described opposite will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Dawson Highway/Penda Avenue	Two-lane roundabout	The existing intersection will operate within capacity to 2013 under background traffic only. The Project's traffic will have a minor impact on the operation of the existing intersection and will result in bringing forward the need for the alteration earlier to 2012. The alteration works recommended for the intersection include: • Signalisation of the intersection	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		• Provision of three stand-up lanes on each of the Dawson Highway approaches, consistent with the planned mid block alteration to six lanes. • Dual right turn lanes into Penda Avenue. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	alterations to meet the increased demands on the intersection.
Dawson Highway/Aerodrome Road	Four- way signalised	The existing intersection will operate within capacity to 2014 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection, resulting in the capacity being reached during the first peak construction year of 2013, which corresponds to the first peak year of the development associated with the construction of trains one and two. Alteration works recommended for the intersection include: • Additional stand-up lanes on both Dawson Highway approaches. This is consistent with the planned mid block alteration between Aerodrome Road and Philip Street to six-lanes. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Dawson Highway/Chapman Road/Harvey Road	Two-lane roundabout	The existing intersection will operate within capacity to 2014 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached during the first peak construction year of 2013. Alteration works recommended for the intersection include: • Signalisation of the intersection. • Provision of two stand-up lanes on each of the Dawson Highway approaches consistent with the planned mid block alteration to a four-lane road. • Free left turn lane all approaches. • Dual right turn lanes on Dawson Highway into Chapmen Drive and a single right turn lane on Dawson Highway into Harvey Road. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection..
Dawson Highway/Don Young Drive	Priority controlled T-intersection	The existing intersection will operate within capacity to 2018 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2017. The recommended alteration is signalisation of the existing intersection. Australia Pacific LNG will work with the Federal, State, Local Government and	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		industry in regard to the potential alterations to meet the increased demands on the intersection.	industry in regard to the potential alterations to meet the increased demands on the intersection.
Dawson Highway/Kirkwood Road	Priority controlled T-intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Bruce Highway	Four way priority controlled	The existing intersection will operate within capacity to 2012 under background traffic only. The Project's traffic will have a minor impact upon the operation of the existing intersection and will not result in bringing forward the need for the alteration earlier than 2012. DTMR is planning an alteration to a grade separated interchange. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Hanson Road/Blain Drive/Alf O'Rourke Drive	Four-way, single-lane roundabout	The existing intersection currently fails during the AM peak hour under background traffic only. The Project's traffic will have a worsening effect on the intersection performance, particularly during the peak construction years of 2013 and 2019. The recommended alteration works include: • Two circulating lanes.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		• Additional approach lane on Blain Drive. • Hanson Road (W) approach alteration to four-lanes, consistent with mid block alteration planning. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	industry in regard to the potential alterations to meet the increased demands on the intersection.
Hanson Road/Red Rover Road	Three-way single-lane roundabout	The existing intersection will operate within capacity to 2016 under background traffic only. The Project's traffic will have a minor impact on the operation of the existing intersection but will not result in bringing forward the need for the alteration earlier than 2016. The recommended alteration works include: • Two circulating lanes, additional approach lanes consistent with the planned four-lane alteration of Hanson Road and an additional approach lane on Red Rover Road. • An additional approach lane on Red Rover Road. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Gladstone-Mt Larcom Road/Landing Road	Priority controlled T-intersection	The existing intersection will operate within capacity to 2020 under background traffic only. The Project's traffic will have an impact on the operation of the existing intersection resulting in the capacity being reached by 2015.	The alteration works described adjacent will ensure that the cumulative impacts of all LNG projects and other regionally-significant projects are mitigated in a

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
		The recommended alteration to the intersection is to convert to a single lane roundabout. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.	satisfactory manner. Australia Pacific LNG will work with the Federal, State, Local Government and industry in regard to the potential alterations to meet the increased demands on the intersection.
Gladstone-Mt Larcom Road/Calliope River Targinie Road	Four-way priority controlled	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Bruce Highway/Gladstone-Mt Larcom Road	Priority controlled T-Intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Dawson Highway/Kariboe Street	Four way signalised intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Intersection	Current layout	Proposed mitigation treatment	
		Australia Pacific LNG Project	Cumulative
Warrego Highway/Leichardt Highway	Priority controlled T intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.
Warrego Highway/Leichardt Highway/Dawson Street	Four way priority controlled intersection	The existing intersection will operate within capacity for the full planning horizon under background traffic only. The Project's traffic will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.	The cumulative traffic from the regionally-significant projects will have a negligible impact on the operation of the existing intersection and the intersection will operate within capacity for the full planning horizon.

Pavement

The heavy vehicle traffic generated by the Project has identified that a large number of State-controlled road segments will require pavement rehabilitation works to be brought forward.

Australia Pacific LNG will work with the Federal, State, Local government and industry in regard to the potential alterations, monitoring and maintenance required to meet the increased demands on local infrastructure.

5.2.2 Rail network impacts and mitigation

The transport of pipe segments required for the construction of the main supply gas pipeline that runs between the gas fields and the LNG plant at Curtis Island could possibly be transported by rail to lay down areas at Moura and Miles. The pipe segments would be transported via Auckland Point and Port of Brisbane.

If transported by rail, the pipe segments would have to be transported to lay down points at Miles and Moura and then moved by road to final destinations. This would require construction of rail sidings and support facilities. A preliminary assessment of these locations has indicated that this is feasible although additional infrastructure would be required. In addition, an alteration and/or modification of existing facilities will be required at Auckland Point and the Port of Brisbane.

Initial discussions with QR have indicated that this option could realistically only apply to the Moura Line between Gladstone and Moura for the transportation of pipe sections for the construction of the gas pipeline. The Moura line is principally used by the coal industry with limited passing loops and overall capacity restricting its potential use.

Ongoing discussions are being held with QR about these options.

5.2.3 Shipping impacts and mitigation

The Australia Pacific LNG project will result in additional shipping movements within the Port of Gladstone, shipping channels to the open sea and to mainland facilities such as FLNE and Auckland Point.

A range of reports have been prepared that address various aspects of proposed construction and operational activities.

Shipping impacts and mitigation – outside Port of Gladstone

LNG ships will navigate through the Marine Park within the designated shipping area before entering the Port of Gladstone and again navigate through the Marine Park Shipping Area when leaving the Port of Gladstone.

Approximately 2,000 ship movements per year exist through designated shipping channels at present. Typically the cargo aboard these ships includes coal, sugar, iron ore and oil. The first train LNGC ships will increase shipping movements by 3%.

It is also recognised that the LNGC's may use shipping channels which are beyond the eastern boundary of the Marine Park, therefore avoiding potential impacts to the Marine Park.

The report Port of Gladstone Shipping Operations Simulation – 2009 Future trade Scenarios' 7 Sept 2009 Aecom identified that the proposed shipping for the Australia Pacific LNG project and others could be accommodated within existing channels, subject to meeting certain operational requirements.

A series of mitigation measures have been developed in close consultation with GBRMP, the Australian Quarantine and Inspection Service (AQIS) and the Gladstone Port Authority. The strategies address a range of issues that relate to safety and environmental impacts, including quarantine procedures.

Shipping impacts and mitigation –inside Port of Gladstone

The following ferry or barge journeys are required:

- Approximately 140 one–way ferry journeys per month during the peak construction period (FLNE to Curtis Island)
- Approximately 70 barge journeys (direct to MOF) per month at the peak construction period.
- Additional ferry journeys from FLNE to Curtis Island for transport of consumables and equipment and for waste removal from site.

Given that in 2008 a total of 1,417 cargo vessels (excluding pleasure craft) moved around the Gladstone harbour, the Project's requirements represent a significant increase in raw numbers of vessel movements.

However, the overall impact on non-Project shipping and boating activities is anticipated to be less than the raw numbers suggest due to the fact that the proposed ferries are highly manoeuvrable and operate around existing bulk carriers. As such the average yearly project vessel movements will be significantly less than the peak numbers described above.

A workshop was undertaken with Australia Pacific LNG and the Gladstone Port Authority and other regulatory agencies to address a range of issues that could arise with this proposal.

A total of 28 recommendations were generated in the workshop for incidents that were assessed to pose significant risk and those assessed to pose medium risk, but with high consequence severity levels. These relate to scenarios that required additional consideration of the procedural controls; training on safe harbour boating for pilots, tug captains and small craft and recreational boaters, as well as use of tugs and other aids during traverse of Gladstone Port and berthing. The implementation of these recommendations will ensure that the risks involved in LNGC/LPGC ship transit in the vicinity of the Gladstone Port are reduced to as low as reasonably possible.

FLNE will act as the point for uploading materials to the Curtis Island plant during the initial phases of construction until a MOF is built on the island to allow direct shipment of plant modules and other materials.

Pipes and other materials required to construct the gas fields, gas pipeline and other project infrastructure items will also be shipped through Auckland Point.

Cumulative assessment

The analysis has shown that the proposed Australia Pacific LNG shipping activities can operate successfully within agreed stated mitigation measures and operational standards for all aspects of operations within and outside the port.

In terms of cumulative impacts for shipping outside of the port, preliminary modelling has indicated that all of the proponents' shipping requirements could be accommodated.

Australia Pacific LNG has adopted Fisherman's Landing North Expansion (FLNE) as the primary embarkation point for the transfer of goods and personnel during the construction and operational phase of the LNG facility. This plan shifts a significant amount of LNG facility's marine traffic into the

Western Basin and avoids the congestion around Wiggins Island compared to shipping from Auckland Point.

However, should construction activities commence simultaneously concerns relating to capacity, safety and operational matters begin to surface. Assessments are based upon the assumption that the construction of all of three LNG projects would occur simultaneously. This may in fact not be the case. For shipping it is recommended that port simulation modelling be undertaken, based upon agreed operations for all proponents to fully assess the impacts.

5.2.4 Air services impacts and mitigation

Gladstone Regional Airport

The Gladstone Regional Airport may be impacted on by gas pipeline construction personnel operating out of accommodation facility 1 (The Narrows Crossing) and by personnel associated with the construction of the LNG facility on Curtis Island. The maximum impact will be during shift changes when personnel are bussed to and from the airport from the embarkation point.

Based on the assumption that all gas pipeline construction personnel operating out of accommodation facility 1 undertake a shift change during the one day, it is estimated that up to 150 people in any one day may pass through the airport during the pipeline construction period. Additionally, it has been estimated that based on a rotating shift pattern up to 80 Australia Pacific LNG personnel constructing the LNG facility may pass through the airport. Therefore, the maximum total increase in airport passengers during the construction of the gas pipeline and the LNG facility could be in the order of 230 passengers per day, on the days that the gas pipeline shift changes occur. This would only occur over a short timeframe of approximately three to four months of the gas pipeline construction. The typical daily passenger numbers during the peak construction period of the LNG facility will be in the order of 80 passengers per day.

During construction of the Australia Pacific LNG pipeline, specifically the section involving The Narrows Crossing, it is estimated that an additional three Dash-400 aircraft movements per day may be required to cater for the increased passenger numbers. Once this section of pipeline is complete, one or two additional Dash-400 aircraft movements may be required to cater for the daily rotation of LNG facility construction staff.

Construction of LNG facilities on Curtis Island will be undertaken by not only Australia Pacific LNG but also by Queensland Curtis Island LNG and Gladstone LNG. It is estimated that up to an additional 120 personnel associated with the construction of the LNG facility for the Queensland Curtis Island LNG and Gladstone LNG may pass through the airport in any one day during the same period. To cater for the increased passenger numbers arising from the construction of LNG facilities on Curtis Island by Queensland Curtis Island LNG and Gladstone LNG, an additional two Dash-400 aircraft movements per day may be required.

Australia Pacific LNG will work with industry to optimise roster timings and reduce daily passenger movement peaks.

The cumulative growth plans for the Gladstone region are complemented by the current upgrades being completed at the Gladstone Regional Airport. Flexibility for larger aircraft including jet service as well as more frequent service will afford advantages and opportunities to source resources more efficiently throughout Australia. This combined with increased competition would benefit the projects as well as the community at large.

From time to time during the operation of the Curtis Island LNG plant, flaring (burn-off of excess gas) is required. This facility is under a flight path to the Gladstone Regional Airport and it is recognised that this may be a potential danger to aircraft. Australia Pacific LNG has undertaken modelling of this risk and details are provided in Volume 5 Attachment 22 of this EIS.

Miles Aerodrome

The Miles Aerodrome is impacted by gas fields and gas pipeline construction and operations personnel during shift changes when personnel are bussed to and from the aerodrome.

The total number of personnel estimated to be using the Miles aerodrome could be 240 people per day from 2013 to 2014, 120 people per day from 2014 to 2018 and 50 people per day thereafter. Should the current aerodrome be capable of supporting Dash 8-200 aircraft, up to an additional seven Dash 8-200 aircraft movements may be required up to 2014. Up to four Dash 8-200 aircraft movements may be required from 2014 to 2018 and one to two aircraft movements may be required beyond 2018.

From time to time during the operation of the gas processing facility located 2.2km south west of the Miles Aerodrome, exhaust gas plume rises may occur which could possibly impact on aircraft operations. Australia Pacific LNG has undertaken a Process & Exhaust Gas Plume Rise Assessment of this risk and has indentified measures to ensure that the safety of aircraft is not compromised. Details are provided in Volume 5 Attachment 22 of this EIS.

Biloela Airport

The Biloela Airport is impacted by the pipeline construction personnel during shift changes when personnel are bussed to and from the airport. Based on a rotating shift pattern it is estimated that up to 120 people in any one day may pass through the airport during 2013/2014.

To cater for the impact of the gas pipeline construction, up to an additional four Dash 8-200 aircraft movements may be required.

Roma Airport

The Roma Airport is impacted by gas fields construction and operations personnel during shift changes when personnel are bussed to and from the airport. Based on a rotating shift pattern, between 2012 and 2018 it is estimated that up to 60 people in any one day may pass through the airport. After 2018 this is expected to reduce to approximately 10 people.

To cater for the impact of the gas field construction, up to an additional one to two Dash 8-300 aircraft movements may be required up to 2018.

5.3 Project component impacts and mitigation

The assessment methodology recognised that impacts from all three components of the Project will affect the same transport infrastructure or operations. As such, for practicality of reporting, the overall project impact was reported upon.

However, some of the Project impacts can be specifically attributed to a particular component of the development and this is reported below

5.3.1 CGS fields – impacts and mitigation

The following impacts of the proposed Project are more specifically attributed to the development and operation of the gas fields:

- Provision of appropriate intersection treatments at the CSG field access locations with State-controlled and local government roads. In it anticipated that the intersection treatments will be the minimum basic right turn (BAR) treatment / basic left turn (BAL) treatment as per the Department of Main Roads' Road Planning and Design Manual.
- For local government roads an alteration of the intersections with State-controlled roads is proposed to ensure adequate safe intersection sight distance and a minimum BAR/BAL treatment as per the Department of Main Roads' Road Planning and Design Manual.
- Alteration of a number of local government roads including Giliigulgul Road, McClennans Road, Crossroads Road, Horse Creek Road and Yuleba Taroom Road to a formation width of 9.2m and a seal width of 7m, including 0.5m sealed shoulders with flood immunity standards achieved in accordance with relevant local government requirements.
- Upgrading of a number of local government roads including Aerodrome Road, Avenue Road, Gunbarwoo Road, Kerrs Road, Wallan Creek Road, Cattle Creek Road, Seaside Road and Wallumbilla North Road to an unsealed formation width of 6-8m.
- Increased maintenance during construction activities on unsealed local government roads used for CGS field construction.

5.3.2 Gas pipeline – impacts and mitigation

The following impacts of the proposed Project are more specifically attributed to the development and operation of the gas pipeline:

- Provision of appropriate intersection treatments at the pipeline construction camp and lay down area access locations with State-controlled and local government roads. In it anticipated that the intersection treatments will be the minimum BAR/BAL treatments, as per the Department of Main Roads' Road Planning and Design Manual.
- For local government roads utilised by the construction of the pipeline, alterations at intersections with State-controlled roads is required to ensure adequate safe intersection sight distance and a minimum BAR/BAL treatments, as per the Department of Main Roads' Road Planning and Design Manual. The only exception will be the intersection of the Bruce Highway with the Narrows Road, which will require a higher standard of alteration to a channelised right turn treatment with a short right turn slot (CHR(S)).
- Upgrading a number of local government roads, including Crowsdale Camboon Road, Defence Road and Ponty Pool Road to an unsealed formation width of 6-8m.
- Increased maintenance during construction activities for unsealed local government roads used for pipeline construction.
- Minimise impacts to existing road and rail infrastructure crossings through the use of construction techniques such as boring and horizontal directional drilling.

5.3.3 LNG facility – impacts and mitigation

Within Gladstone, the transport infrastructure impacted upon is also used, albeit to a lesser extent, by the other two project components. These impacts and the proposed mitigation options are reported under overall project impacts.

Therefore, impacts that can be specifically attributed to the development and operation of the LNG facility are generally limited to Curtis Island itself. The following are identified:

- Part closure of the Esplanade Road on that part of the Island allocated to the LNG Plant. New access routes will be constructed to allow vehicular access on the island
- Construction and operation of the LNG Facility - wharf, MOF and other infrastructure will generate a range of shipping movements from ferry and barge trips to and from the mainland and the export of LNG on specialised LNG container ships
- Construction and operation of permanent ferry terminal on the mainland at FLNE.
- Potential development of a currently vacant site off Blain Drive (known as “Ash Pond #7”) for a temporary parking area for parking of construction staff vehicles working on Curtis Island who may be bussed to a embarkation point.

5.4 Assessment outcomes

A summary of the environmental values, sustainability principles, potential impacts and mitigation measures in relation to traffic and transport for the LNG facility is presented in Table 5.2 below.

In addition, Table 5.2 includes the residual risk for traffic and transport. A risk assessment has been undertaken to identify potential risks, causes and consequences from traffic and transport. Mitigation measures to reduce the risks have been nominated and the residual risk has been calculated.

Table 5.2 Summary of environmental values, sustainability principles, potential impacts and mitigation measures

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
Road					
The wellbeing of the local community and businesses. Efficient, sustainable and supportive transport network for all members of the local and business community. Flora and fauna habitat protection.	Minimise adverse socio-economic and environmental impacts Enhance the benefits associated with Australia Pacific LNG activities, products or services.	Increased congestion and delay on road network.	Additional volumes of oversize, heavy and light vehicle traffic due to quantity of materials required to construct and operate Project components.	Work with Federal, State, Local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include access road construction, flood mitigation measures and intersection and road alterations. Aim to reduce light vehicle use as much as possible during construction by providing transport to site, from designated pick up areas or to and from the local airport for fly in/out staff using busses. Develop traffic management and logistic plans to provide the safe and efficient movement of people and materials, following regulations and requirements of regulatory agencies.	Medium
		Damage and increased wear-and-tear on the existing road infrastructure due to heavy vehicles.	Additional volumes of oversize, heavy and light vehicle traffic due to quantity of materials required to construct and operate Project components. Use of unsealed roads.	Work with Federal, State, Local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include access road construction, flood mitigation measures, intersection and road alterations, pavement rehabilitation and road maintenance.	Medium

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
				Develop traffic management and logistic plans to provide the safe and efficient movement of people and materials, following regulations and requirements of regulatory agencies.	
		Increased risk of accidents on the road network resulting in Fatalities and injuries to persons Injury/death of fauna Damage to property Impact on company reputation Release of containments to the environment (product spill)	Vehicle defect or failure Incorrect management of load on vehicle Vehicle defect or failure Inadequate vehicle selection Collision (wildlife, fixed objects including power lines, third party vehicles) Road conditions and road design Driver error / Fatigue Environmental conditions and adverse weather Inadequate vehicle servicing and/or maintenance Environmental hazards such as glare from sunrise and sunset Lack of adequate awareness of vehicle movements associated with the project by local stakeholders Excessive speed and failure to follow road rules Poor visibility and line of sight viewing on regional road	Work with Federal, State, Local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include access road construction, flood mitigation measures, intersection and road alterations, pavement rehabilitation and road maintenance. Aim to reduce light vehicle use as much as possible during construction through provision of buses where possible to transport personnel to site, from designated pick up areas or to and from the local airport Work with Federal, State, Local government and industry to improve road safety through clear road signage, improve road alignments and intersection geometry To reduce the risk of accidents to employees and other transport network users from projects operations, Australia Pacific LNG will develop and implement detailed traffic management plans and transport and logistics management plans for construction and operating the project	High

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
			Lack of adequate planning Failure to follow vehicle and transportation procedures Lack of adequate awareness of vehicle movements associated with the project by local stakeholders	infrastructure. These plans will incorporate safety measures to be implemented. Stakeholder consultation undertaken in accordance with the provision of the Stakeholder Management Plan regarding vehicle and equipment movement activities Liaise with local police and road authorities A range of operational health and safety measure covering the operation of project vehicles will be implemented to reduce the risk of motor vehicles accidents. • Provide of driver training to relevant Australia Pacific LNG staff. Contractors will be required to have health and safety management system which includes safe driving. • Emergency response and Crisis management procedures • Health Safety and Environment Management plans & procedures • Journey Management Plans • Drug and Alcohol testing • Licensed bus drivers • Inductions, Driver Training and Awareness Notices Use of appropriate project vehicles including safety features for vehicles • Regular vehicle and equipment servicing	

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
				• Fire extinguishers in vehicles • Escort vehicles for oversized or heavy vehicles • Road side signage used for road works, dust suppression activities • GPS tracking system installed in Australia Pacific LNG and hire vehicles • Road suitability selection assessment process	
		Increased risk of adverse impact on the environment such as air pollution, noise, dust, land take, loss of habitat, runoff, pest and weed spread. Release of containments to the environment (product spill, oil leaks Inappropriate disposal of wastes such as cigarette butts, cans and food wrappers due to social behaviour Transportation and spread of pest and noxious weed Entanglement of flora species in vehicle exhaust system causing fire	Additional volumes of oversize, heavy and light vehicle traffic due to quantity of materials required to construct and operate Project components. Need to alter or construct new roads Use of unsealed roads. Construction of new access tracks. Not following vehicle and transportation procedures	Work with Federal, State, Local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include access road construction, flood mitigation measures, intersection and road alterations, pavement rehabilitation and road maintenance. Aim to reduce light vehicle use as much as possible during construction, by providing transport to site, from designated pick up areas or to and from the local airport for fly in/out staff. Journey management plans for vehicle travel will incorporate fatigue management considerations Develop traffic management and logistic plans to provide the safe and efficient movement of people and materials, following regulations and requirements of regulatory agencies.	Medium

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
		Injury/death of fauna		Environmentally sensitive road/bridge construction methodologies. During the construction, operation and ongoing maintenance of existing and new roads, measures will be implemented to ensure environmental impacts are reduced, as far as practicable, and works will also be carried out in accordance with the requirements of the *Environmental Protection Act 1994*, the Main Roads Design Manual 2004, and other relevant legislation Australia Pacific LNG will implement conventional measures to reduce, as far as practicable the generation of dust by project vehicles during construction. Australia Pacific LNG will participate in pro-active weed management and will work closely with regional councils. This will include wash down requirements (hygiene inspection and declaration) for vehicles coming from known weed infested areas, including training on company and own vehicles During all phases (construction, operation and ongoing road maintenance) of this project, sustainability measures will be implemented that will provide long term benefits while limiting traffic impacts, as far as practicable. Inductions, Driver Training and Awareness	

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
				Notices	
Shipping					
The wellbeing of the local community and businesses. Efficient, sustainable and supportive transport network for all members of the local and business community. Flora and fauna habitat protection.	Minimise adverse socio-economic and environmental impacts Enhance the benefits associated with Australia Pacific LNG activities, products or services.	Increased congestion in the Port of Gladstone	Increased shipping due to importation of pipes. Increased shipping due to importation of LNG facility construction materials and export of LNG product. Increased ferry and barge numbers for transportation to Curtis Island.	Development of shipping operations and protocols in consultation with regulatory agencies including additional cumulative modelling of shipping movements within the Port of Gladstone	Low
		Inadequate facilities to support importation of materials and personnel transit.	Inability of existing infrastructure to cope with demand. Inability to get adequate ferry services. Inability to secure the services or appropriate barges/cranes/ferries etc.	Australia Pacific LNG will continue negotiations with the GPC and the GRC to determine the most appropriate methodology for managing construction and operational traffic associated with the LNG facility via FLNE. Construct material offloading facility (MOF)	Low
		Increased risk of collision or accidents for shipping. Fatalities and injuries to persons Damage to property	Increased shipping due to importation of pipes. Increased shipping due to importation of LNG facility construction materials and export of LNG product.	Development of shipping operations and protocols in consultation with regulatory agencies.	High

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
		Loss of company reputation	Increased ferry and barge numbers for transportation to Curtis Island. Load shift Environmental conditions and adverse weather Collision with other vessels or grounding Lack of adequate planning Potential non-compliance with legislative and protocol requirements		
		Increased risk of adverse environmental impacts from release of containments to the environment such as oil spill, ballast discharge, Emissions to air Impact with marine fauna Bottom disturbance, damage to marine ecology Lighting nuisance	Increased shipping due to importation of pipes. Increased shipping due to importation of LNG facility construction materials and export of LNG product. Increased ferry and barge numbers for transportation to Curtis Island. Inappropriate disposal of wastes Fatigue of ship operators Loss of integrity of LNG carriers and other project marine vessels	Development of shipping operations and protocols in consultation with regulatory agencies.	Medium
Air					
The wellbeing of the local community and businesses. Efficient,	Minimise adverse socio-economic and environmental impacts	Increased congestion and delay at local airports and aerodromes	Movement of construction staff at breakdown/shift changes. Inadequate capacity at airport/aerodrome to support larger aircraft. Infrastructure not available or services	Work with Maranoa, Western Downs, Gladstone Regional and Banana Shire Councils and relevant Government agencies and service providers to determine the most appropriate use of the relevant airport/aerodromes.	Medium

Environmental values	Sustainability principles	Potential impacts	Possible causes	Mitigation measures	Residual risk level
sustainable and supportive transport network for all members of the local and business community. Flora and fauna habitat protection.	Enhance the benefits associated with Australia Pacific LNG activities, products or services.		reduced due to airport construction works.	Develop management and logistic plans to provide the safe and efficient movement of people and materials, following regulations and requirements of regulatory agencies. Manage work rosters to avoid peak times.	

Appendix A Abbreviations and Glossary

Abbreviations

Abbreviation	Meaning
AADT	Average Annual Daily Traffic
ABS	Australia Bureau of Statistics
AMC	Australian Maritime College
AMG	Australian Map Grid
APLNG	Australia Pacific Liquid Natural Gas – the Project
AQIS	Australian Quarantine and Inspection Service
ATSB	Australian Transportation Safety Board
BoM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CapIRTP	Capricornia Integrated Regional Transport Plan
CBD	Central Business District
CCRCMP	Curtis Coast Regional Coastal Management Plan
CD	Census district
CMVKT	Crashes per million vehicle kilometres travelled
CQLGA	Central Queensland Local Government Authority
CQPA	Central Queensland Ports Authority
CQRGMF	Central Queensland Regional Growth Management Framework
CQSS	Central Queensland Strategy for Sustainability – 2004 and Beyond
CSG	Coal Seam Gas
DCA	Definitions for Coding Accidents
DERM	Department of Environment and Resource Management
DGSM Act	*Dangerous Goods Safety Management Act 2001*
DIP	Department of Infrastructure and Planning
DME	Department of Mines and Energy
DoS	Degrees of Saturation
DTMR	Department of Transport and Main Roads
DWT	Dead weight tonnage
EIS	Environmental Impact Statement
EMP	Environmental Management Plan

Abbreviation	Meaning
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ESA	Equivalent Standard Axles
FEED	Front-end Engineering Design
FLW	Fisherman's Landing Wharf
GARID	Guidelines for Assessment of Road Impacts of Development
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GHG	Greenhouse Gas
GIRTP	Gladstone Integrated Regional Transport Plan
GIS	Geographic information system
GP	General purpose (wharf)
GPC	Gladstone Ports Corporation
GRC	Gladstone Regional Council
GLNG	Gladstone Liquefied Natural Gas
IAS	Initial Advice Statement
IDAS	Integrated Development Assessment System
IPA	Integrated Planning Act 1997
LGA	Local Government Authority
LNG	Liquefied Natural Gas
LNGC	Liquefied natural gas container
LOS	Level of Service
MVKT	Million vehicle kilometres travelled
MSQ	Maritime Safety Queensland
MT	Million tonnes
MTPA	Million tonnes per annum
PAWSA	Ports and waterways safety assessment
QCLNG	Queensland Curtis Liquefied Natural Gas
QR	Queensland Rail
RADS	Regional Airport Development Scheme
RPT	Regular Passenger Transport

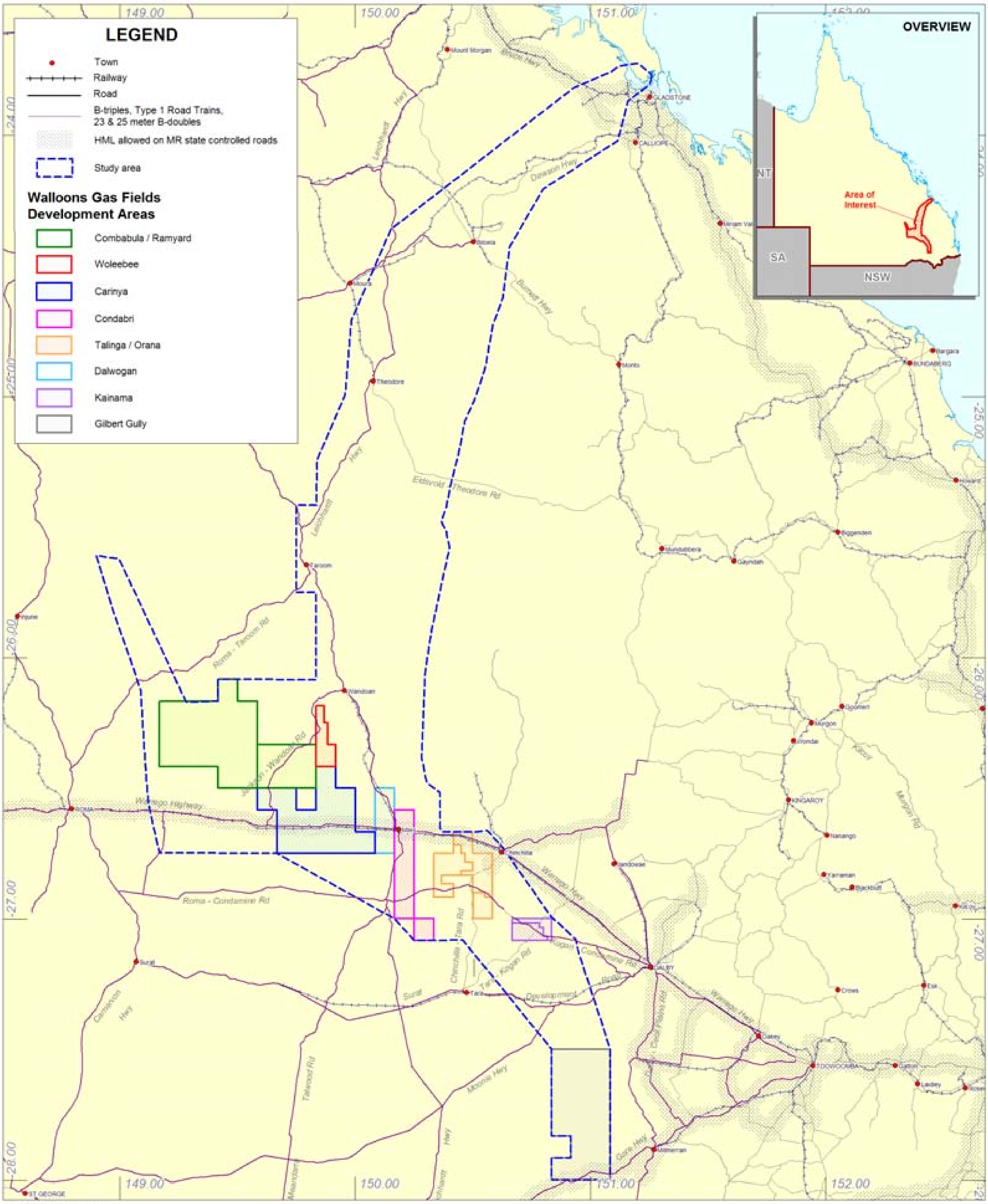
Abbreviation	Meaning
RHM	Regional Harbour Master
RIP	Roads Implementation Program
RIS	Regulatory Impact Statement
SBR	Surat Basin Rail
SDPWO Act	State Development and Public Works Organisation 1971
SRN	Stock Route Network
TOR	Terms of Reference
TSHD	Trailer Suction Hopper Dredge
VPD	Vehicles Per Day
VTS	Vessel Traffic Service
WICT	Wiggins Island Coal Terminal
WTF	Water treatment plant

Glossary of terms

Descriptor	Preferred wording/meaning
The Average Annual Daily Traffic (AADT)	A descriptor used by Main Roads and other agencies to describe the total number of vehicles along a stretch of road and at any given point as an average of recorded flows across a year
Climate Change	Any long-term significant change in the 'average weather' that a given region experiences. Average weather may include average temperature, precipitation and wind patterns. It involves changes to the variability or average state of the atmosphere for durations ranging from decades to millions of years.
Coal Seam Gas (CSG)	A form of natural gas extracted from coal beds.
Degree of Saturation (DoS)	A measurement output from the SIDRA road intersection analysis modelling software package, generally showing the level of congestion. The ratio of the number of vehicles entering an intersection at a specified period by approach leg and/or as a total average against capacity or road space available. Ratios of up to and over 1 indicate that existing capacity is being exceeded
Environmental Impact Assessment	The process used to assess the environmental impact of a proposed Project.
Environmental Impact Statement (EIS)	The information document prepared by the Proponent when undertaking an assessment of environmental impacts. It is prepared in accordance with Terms of Reference prepared or approved by government agencies. EIS is the term used by the *Environmental Biodiversity Conservation Act 1999* and the

	Environmental Protection Act 1994.
Greenhouse Gas	The gases present in the earth's atmosphere which reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect.
Initial Advice Statement	A document prepared for a proposed Project that is submitted to the Coordinator General so that a decision can be made as to whether the Project should be declared a 'significant Project for which an Environmental Impact Statement is required' under Section 26 (1) (a) of the *State Development and Public Works Act 1971* (Australia).
LOS	Level of Service. A measurement of the general level of comfort and convenience achieved by road users as defined by volumes of traffic against available capacity. A Main Roads standard measurement. It ranges from A, free flow traffic conditions to Level F, high levels of delay and congestion.
Peak hour	Hour in the morning or afternoon that experiences peak hour traffic volumes.
Proponent	The instigator of the Project (Australia Pacific LNG)
Risk	The potential impact of an event, determined by combining the likelihood of an event occurring and the consequence if it were to occur.
Stakeholders	A person or organisation with an interest or stake in a Project.
Sustainability	Definition in Brundtland Report, 1987 *"Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of the future generations to meet their own needs".*
Sweep path analysis	A check of the space required to turn a heavy vehicle.
Vehicles Per Day	Total number of vehicles using a defined road section.
Temporary accommodation facilities	On-site accommodation for the construction workforce.

Appendix B Heavy vehicle routes



N
W E
S

0 25 50km

SCALE - 1:1,500,000 (at A3)

Latitude - Longitude
Geocentric Datum of Australia 1994

B-triple network digitised from Queensland's B-triple Network map downloaded from http://www.mainroads.qld.gov.au website

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
A	12/01/2010	Issued for squad check	JC	DH		

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AUSTRALIA PACIFIC LNG

AUSTRALIA PACIFIC LNG LIMITED

AUSTRALIA PACIFIC LNG PROJECT
B-triple Network Map

Project No: 301001-00448	Figure: 00448-00-EN-DAL-0422	Rev: A

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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Appendix C Traffic generation and distribution

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LNG Facility

4 year development cycle

Potable Water	125000	litres/day - 20000 litre tanke
Raw water	93750	litres/day - 20000 litre tanke
Equipment	3180	loads - truck
Pipe	0	m - 200m/load
Electrical	377000	m - 2000m/load
Insulation	125000	sqm - 250sqm/load
Fuel	2	tankers/month - 20cu.m/tan
Concrete	37328	cu.m - 20cu.m/load
Grout	73	cu.m - 6cu.m/load
Steel	42223	tonnes - 10tonnes/load
Pavement	1737	cu.m - 20cu.m/load
Paint	14	loads - 5cu.m/load
Misc	5	loads/day - 50% truck, 50%
Preassemblies	0	items - ship delivered to cur

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APLNG Traffic Generation

Peak Daily

Component	LNG Facility
ID	LNG
Name	Fishermans
Capacity	0
Date of Commission	31/12/2014
Type	New
Comonent Build Time (days)	1460
Date component start of construction	1/01/2011
Date component end of construction	31/12/2014
Camp Build Time (days)	120
Date camp start of construction	3/09/2010
Date camp end of construction	1/01/2011
Unit of Measure	each

Peak Daily Traffic

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	500 mobile homes - arrive	Articulated	3/09/2010	1/01/2011	120	500	8.33	0.24	Brisbane - Fishermans
No. mobile homes - 500	150 mobile homes - depart	Articulated	31/12/2014	31/03/2015	90	375	8.33	0.24	Fishermans - Fishermans
	Mess, Office and ancillary facilities arrive	Articulated	3/09/2010	1/01/2011	120	40	0.67	3.00	Brisbane - Fishermans
	Landscaping	Articulated	3/09/2010	1/01/2011	120	20	0.33	6.00	Gladstone - Fishermans
	General materials	Articulated	3/09/2010	1/01/2011	120	40	0.67	3.00	Gladstone - Fishermans
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	2/09/2010	3/09/2010	1	1	2.00	1.00	GRCDepot - Fishermans
	Concrete trucks - 2 per day	Rigid	3/09/2010	1/01/2011	120	240	4.00	0.50	Yarwun1 - Fishermans
	Backhoe - travel to site	Articulated	2/09/2010	3/09/2010	1	1	2.00	1.00	GRCDepot - Fishermans
	4800m3 roadbase								
Access - Materials	20m3/truck	Articulated	27/07/2010	27/08/2010	31	120	7.74	0.26	Yarwun - Fishermans
	2400l bitumen								
Access width (m) - 6	2000l/truck	Rigid	27/08/2010	3/09/2010	7	1.2	0.34	5.83	Brisbane - Fishermans
	120m3 stone								
Access length (m) - 2000	20m3/truck	Articulated	27/08/2010	3/09/2010	7	6	1.71	1.17	Yarwun - Fishermans
Yarwun Quarry									
Access - Construction Machinery	Excavator x 2 - travel to site	Articulated	26/07/2010	27/07/2010	1	2	4.00	0.50	GRCDepot - Fishermans
council/local	Backhoe x 2 - travel to site	Articulated	26/07/2010	27/07/2010	1	2	4.00	0.50	GRCDepot - Fishermans
	Trucks x 4 - travel to site	Rigid	26/07/2010	27/07/2010	1	4	8.00	0.25	GRCDepot - Fishermans
Watering requirements/day - 76000	Roller x 2 - travel to site	Articulated	26/07/2010	27/07/2010	1	2	4.00	0.50	GRCDepot - Fishermans
Water Truck capacity - 38000	Water Truck - 2 per day	Articulated	3/09/2010	1/01/2011	120	240	4.00	0.50	GRCDepot - Fishermans
	Grader - travel to site	Articulated	26/07/2010	27/07/2010	1	1	2.00	1.00	GRCDepot - Fishermans
	75 camp construction staff								
	1.2 ppl per private car								
Staff	daily	Rigid	3/09/2010	1/01/2011	120	7500.00	125.00	0.02	GladstoneRes - Fishermans
	200L/day/person consumption								
Potable Water	75 people during access and camp construction	Rigid	3/09/2010	1/01/2011	120	0.63	0.01	190.00	WasteW - Fishermans
Consumption/day - 200									
Water Truck capacity - 38000									
Non-potable water	1 Non potable water truck per week during camp construction/operation	Articulated	3/09/2010	1/01/2011	120	296.05	4.93	0.41	Calliope - Fishermans
Watering requirements/day - 93750									
Water Truck capacity - 38000									
Fuel									
Fuel consumption/day@setup - 4200	1 Fuel truck per week during plant construction to supply camp	Articulated	1/01/2011	31/12/2014	1460	208.57	0.29	7.00	GFuel - Fishermans
Fuel truck capacity (L) - 34000									
Waste	1 solid waste truck per week during all construction	Articulated	3/09/2010	1/01/2011	120	17.14	0.29	7.00	BlainDr - Fishermans
Solid waste generation/person/day	1 liquid waste truck per week during all construction	Articulated	3/09/2010	1/01/2011	120	17.14	0.29	7.00	WasteW - Fishermans
Liquid waste generation/person/day									
Solid waste truck capacity									
Liquid waste truck capacity (L) - 18000									
Consumables									
Food consumption per person/day (kg) - 6									
Food truck capacity small (kg) - 5000									
Food truck capacity large (kg) -10000									
Other	Nil other								

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LNG FACILITY CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	1/01/2011	31/12/2014	1460	30	0.04	48.67	Gladstone - Fishermans
	Construction materials Ex Brisbane	Road Train	1/01/2011	31/12/2014	1460	30	0.04	48.67	Brisbane - Fishermans
	Equipment	Articulated	1/01/2011	31/12/2014	1460	3180	4.36	0.46	Brisbane - Fishermans
	Pipe	Articulated	1/01/2011	31/12/2014	1460	0	0.00	0.00	Brisbane - Fishermans
	Electrical	Articulated	1/01/2011	31/12/2014	1460	189	0.26	7.75	Brisbane - Fishermans
	Insulation	Rigid	1/01/2011	31/12/2014	1460	500	0.68	2.92	Brisbane - Fishermans
	Fuel	Articulated	1/01/2011	31/12/2014	1460	96	0.13	15.21	Brisbane - Fishermans
	Concrete	Rigid	1/01/2011	31/12/2014	1460	1866	2.56	0.78	Yarwun-Fishermans
	Grout	Rigid	1/01/2011	31/12/2014	1460	12	0.02	120.00	Yarwun-Fishermans
	Steel	Articulated	1/01/2011	31/12/2014	1460	4222	5.78	0.35	Brisbane - Fishermans
	Pavement	Rigid	1/01/2011	31/12/2014	1460	87	0.12	16.81	Brisbane - Fishermans
	Paint	Rigid	1/01/2011	31/12/2014	1460	3	0.00	521.43	Brisbane - Fishermans
	Misc	Articulated	1/01/2011	31/12/2014	1460	7300	10.00	0.20	Brisbane - Fishermans
Building - Construction Machinery	Most civil machinery already on site. No additional movement on public roads								
	Bull dozers x 2- travel to site	Articulated	31/12/2010	1/01/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Side Booms x 2 - travel to site	Articulated	31/12/2010	1/01/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Hevay Lift Cranes - travel to site	Articulated	31/12/2010	1/01/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Concrete trucks - 2 per day	Rigid	1/01/2011	31/12/2014	1460	2920	4.00	0.50	Yarwun-Fishermans
Access - Materials	All roads constructed during camp construction								225
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	225 lng facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	0.00	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	1/01/2011	25/05/2012	510	0.00	0.00	0.00	Gladstone Airport - Fishermans
	750 lng facility construction staff 1.2 person per car daily	Light	25/05/2012	20/05/2013	360	0.00	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	25/05/2012	20/05/2013	360	0.00	0.00	0.00	Gladstone Airport - Fishermans
	225 lng facility construction staff 1.2 person per car daily	Light	20/05/2013	13/08/2014	450	0.00	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	20/05/2013	13/08/2014	450	0.00	0.00	0.00	Gladstone Airport - Fishermans
	37 lng facility construction staff 1.2 person per car daily	Light	13/08/2014	6/11/2015	450	0.00	0.00	0.00	GladstoneRes - Fishermans
	38 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	13/08/2014	6/11/2015	450	0.00	0.00	0.00	Gladstone Airport - Fishermans
6.16	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	2618	10.27	0.19	Aerodrome - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	5236	20.53	0.10	Calliope - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	5236	20.53	0.10	MtLarcom - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	5236	20.53	0.10	Penda - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	5236	20.53	0.10	Chapman - Blaincpk
25.2	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	10710	42.00	0.05	Philip - Blaincpk
18.9	facility construction staff 1.2 person per car Daily	Light	1/01/2011	25/05/2012	510	8032.5	31.50	0.06	Dawson - Blaincpk

	facility construction staff 1.2 person per car									
25.2	Daily lng facility construction staff 20 person per bus	Light	1/01/2011	25/05/2012	510	10710	42.00	0.05	Harvey - Blaincpk	
126	Daily lng facility construction staff 20 ppl per bus	Rigid	1/01/2011	25/05/2012	510	3213	12.60	0.16	Blaincpk - Fishermans	
504	4 week shift lng facility construction staff 1.2 person per car	Rigid	1/01/2011	25/05/2012	510	642.6	2.52	0.79	GladstoneAir - Fishermans	
20.72	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	6216	34.53	0.06	Aerodrome - Blaincpk	
41.06666667	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	12320	68.44	0.03	Calliope - Blaincpk	
41.06666667	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	12320	68.44	0.03	MtLarcom - Blaincpk	
42	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	12600	70.00	0.03	Penda - Blaincpk	
42	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	12600	70.00	0.03	Chapman - Blaincpk	
84	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	25200	140.00	0.01	Philip - Blaincpk	
63	Daily lng facility construction staff 1.2 person per car	Light	25/05/2012	20/05/2013	360	18900	105.00	0.02	Dawson - Blaincpk	
84	Daily lng facility construction staff 20 person per bus	Light	25/05/2012	20/05/2013	360	25200	140.00	0.01	Harvey - Blaincpk	
420	Daily lng facility construction staff 20 ppl per bus	Rigid	25/05/2012	20/05/2013	360	7560	42.00	0.05	Blaincpk - Fishermans	
1680	4 week shift lng facility construction staff 1.2 person per car	Rigid	25/05/2012	20/05/2013	360	1512	8.40	0.24	GladstoneAir - Fishermans	
6.16	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	2310	10.27	0.19	Aerodrome - Blaincpk	
12.32	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	4620	20.53	0.10	Calliope - Blaincpk	
12.32	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	4620	20.53	0.10	MtLarcom - Blaincpk	
12.32	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	4620	20.53	0.10	Penda - Blaincpk	
12.32	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	4620	20.53	0.10	Chapman - Blaincpk	
25.2	Daily lng facility construction staff 1.2 person per car	Light	20/05/2013	13/08/2014	450	9450	42.00	0.05	Philip - Blaincpk	
18.9	Daily	Light	20/05/2013	13/08/2014	450	7087.5	31.50	0.06	Dawson - Blaincpk	

	lng facility construction staff 1.2 person per car								
25.2	Daily	Light	20/05/2013	13/08/2014	450	9450	42.00	0.05	Harvey - Blaincpk
	lng facility construction staff 20 person per bus								
126	Daily	Rigid	20/05/2013	13/08/2014	450	2835	12.60	0.16	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus								
504	2 week shift	Rigid	20/05/2013	13/08/2014	450	567	2.52	0.79	GladstoneAir - Fishermans
	lng facility construction staff 1.2 person per car								
10.36	daily	Light	13/08/2014	6/11/2015	450	3885	17.27	0.12	Dawson - Blaincpk
	lng facility construction staff 20 person per bus								
10.36	Daily	Rigid	13/08/2014	6/11/2015	450	233.1	1.04	1.93	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus								
84	4 week shift	Rigid	13/08/2014	6/11/2015	450	94.5	0.42	4.76	GladstoneAir - Fishermans
Potable Water	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								
Fuel	2 Fuel truck per week during plant construction to supply plant	Rigid	1/01/2011	31/12/2014	1460	417.14	0.57	3.50	GFuel - Fishermans
Waste	1 solid waste truck per week during all construction	Rigid	1/01/2011	31/12/2014	1460	208.57	0.29	7.00	BlainDr - Fishermans
	1 liquid waste truck per week during all construction	Rigid	1/01/2011	31/12/2014	1460	208.57	0.29	7.00	WasteW - Fishermans
Consumables	Nil consumables								
Other	Nil other								

LNG FACILITY OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Deliveries	Refrigerant: 2 per month	Articulated	31/12/2014	18/12/2064	18250	1200.00	0.13	15.21	Brisbane - Fishermans
	Diesel: 1 per month	Articulated	31/12/2014	18/12/2064	18250	600.00	0.07	30.42	GFuel - Fishermans
	Chemicals: 1 per month	Articulated	31/12/2014	18/12/2064	18250	600.00	0.07	30.42	Brisbane - Fishermans
	Other: 10 per week	Light	31/12/2014	18/12/2064	18250	26071.43	2.86	0.70	Gladstone - Fishermans
Maintenance Equipment	Nil maintenance equipment								
Staff	100 lng facility operation staff 1 person per private car 2 shifts per day	Light	31/12/2014	18/12/2064	18250	1825000.00	200.00	0.01	Harvey - Blaincpk
Staff	100 lng facility operation staff 1 person per private car 2 shifts per day	Light	31/12/2014	18/12/2064	18250	1825000.00	200.00	0.01	Blaincpk - Fishermans
Potable Water Consumption/day - 200 Water Truck capacity - 38000	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								

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APLNG Traffic Generation

Component	LNG Facility
ID	LNG
Name	Fishermans
Capacity	0
Date of Commission	1/10/2015
Type	New
Comonent Build Time (days)	1460
Date component start of construction	2/10/2011
Date component end of construction	1/10/2015
Camp Build Time (days)	120
Date camp start of construction	4/06/2011
Date camp end of construction	2/10/2011
Unit of Measure	each

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 500	500 mobile homes - arrive 150 mobile homes - depart Mess, Office and ancillary facilities arrive Landscaping General materials								
Building - Construction Machinery	Mobile cranes - travel to site Concrete trucks - 2 per day Backhoe - travel to site								
Access - Materials Access width (m) - 6 Access length (m) - 2000 Yarwun Quarry	4800m3 roadbase 20m3/truck 2400l bitumen 2000l/truck 120m3 stone 20m3/truck								
Access - Construction Machinery council/local Watering requirements/day - 76000 Water Truck capacity - 38000	Excavator x 2 - travel to site Backhoe x 2 - travel to site Trucks x 4 - travel to site Roller x 2 - travel to site Water Truck - 2 per day Grader - travel to site								
Staff	75 camp construction staff 1 ppl per private car daily								
Potable Water Consumption/day - 200 Water Truck capacity - 38000	200L/day/person consumption 75 people during access and camp construction								
Non-potable water Watering requirements/day - 93750 Water Truck capacity - 38000	1 Non potable water truck per week during camp construction/operation								
Fuel Fuel consumption/day@setup - 4200 Fuel truck capacity (L) - 34000	1 Fuel truck per week during plant construction to supply camp								
Waste Solid waste generation/person/day Liquid waste generation/person/day Solid waste truck capacity Liquid waste truck capacity (L) - 18000	1 solid waste truck per week during all construction 1 liquid waste truck per week during all construction								
Consumables Food consumption per person/day (kg) - 6 Food truck capacity small (kg) - 5000 Food truck capacity large (kg) -10000									
Other	Nil other								

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LNG FACILITY CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/10/2011	1/10/2015	1460	30	0.04	48.67	Gladstone - Fishermans
	Construction materials Ex Brisbane	Road Train	2/10/2011	1/10/2015	1460	30	0.04	48.67	Brisbane - Fishermans
	Equipment	Articulated	2/10/2011	1/10/2015	1460	3180	4.36	0.46	Brisbane - Fishermans
	Pipe	Articulated	2/10/2011	1/10/2015	1460	0	0.00	0.00	Brisbane - Fishermans
	Electrical	Articulated	2/10/2011	1/10/2015	1460	189	0.26	7.75	Brisbane - Fishermans
	Insulation	Rigid	2/10/2011	1/10/2015	1460	500	0.68	2.92	Brisbane - Fishermans
	Fuel	Articulated	2/10/2011	1/10/2015	1460	192	0.26	7.60	Brisbane - Fishermans
	Concrete	Rigid	2/10/2011	1/10/2015	1460	1866	2.56	0.78	Yarwun-Fishermans
	Grout	Rigid	2/10/2011	1/10/2015	1460	12	0.02	120.00	Yarwun-Fishermans
	Steel	Articulated	2/10/2011	1/10/2015	1460	4222	5.78	0.35	Brisbane - Fishermans
	Pavement	Rigid	2/10/2011	1/10/2015	1460	87	0.12	16.81	Brisbane - Fishermans
	Paint	Rigid	2/10/2011	1/10/2015	1460	3	0.00	521.43	Brisbane - Fishermans
	Misc	Articulated	2/10/2011	1/10/2015	1460	7300	10.00	0.20	Brisbane - Fishermans
Building - Construction Machinery	Most civil machinery already on site. No additional movement on public roads								
	Bull dozers x 2- travel to site	Articulated	1/10/2011	2/10/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Side Booms x 2 - travel to site	Articulated	1/10/2011	2/10/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Hevay Lift Cranes - travel to site	Articulated	1/10/2011	2/10/2011	1	2	4.00	0.50	Brisbane - Fishermans
	Concrete trucks - 2 per day	Rigid	2/10/2011	1/10/2015	1460	2920	4.00	0.50	Yarwun-Fishermans
Access - Materials	All roads constructed during camp construction								
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	225 lng facility construction staff 1.2 person per car Daily	Light	2/10/2011	23/02/2013	510	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	2/10/2011	23/02/2013	510	0	0.00	0.00	ladstone Airport - Fishermar
	750 lng facility construction staff 1.2 person per car daily	Light	1/03/2013	1/06/2013	92	0	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	1/03/2013	1/06/2013	92	0	0.00	0.00	ladstone Airport - Fishermar
	750 lng facility construction staff 1.2 person per car daily	Light	23/02/2013	18/02/2014	360	0	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	23/02/2013	18/02/2014	360	0	0.00	0.00	ladstone Airport - Fishermar
	225 lng facility construction staff 1.2 person per car daily	Light	18/02/2014	14/05/2015	450	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	18/02/2014	14/05/2015	450	0	0.00	0.00	ladstone Airport - Fishermar
	37 lng facility construction staff 1.2 person per car daily	Light	14/05/2015	6/08/2016	450	0	0.00	0.00	GladstoneRes - Fishermans
	38 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	14/05/2015	6/08/2016	450	0	0.00	0.00	ladstone Airport - Fishermar

Potable Water	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								
Fuel	2 Fuel truck per week during plant construction to supply plant	Rigid	2/10/2011	1/10/2015	1460	417.14	0.57	3.50	GFuel - Fishermans
Waste	1 solid waste truck per week during all construction 1 liquid waste truck per week during all construction	Rigid Rigid	2/10/2011 2/10/2011	1/10/2015 1/10/2015	1460 1460	208.57 208.57	0.29 0.29	7.00 7.00	BlainDr - Fishermans WasteW - Fishermans
Consumables	Nil consumables								
Other	Nil other								

LNG FACILITY OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Deliveries	Refrigerant: 2 per month Diesel: 1 per month Chemicals: 1 per month Other: 10 per week	Articulated Articulated Articulated Light	1/10/2015 1/10/2015 1/10/2015 1/10/2015	18/09/2065 18/09/2065 18/09/2065 18/09/2065	18250 18250 18250 18250	1200.00 600.00 600.00 26071.43	0.13 0.07 0.07 2.86	15.21 30.42 30.42 0.70	Brisbane - Fishermans GFuel - Fishermans Brisbane - Fishermans Gladstone - Fishermans
Maintenance Equipment	Nil maintenance equipment								
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	1/10/2015	18/09/2065	18250	684375.00	75.00	0.03	Harvey - Blaincpk
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	1/10/2015	18/09/2065	18250	684375.00	75.00	0.03	Blaincpk - Fishermans
Potable Water Consumption/day - 200 Water Truck capacity - 38000	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								

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APLNG Traffic Generation

Component	LNG Facility
ID	LNG
Name	Fishermans
Capacity	0
Date of Commission	31/12/2020
Type	New
Comonent Build Time (days)	1460
Date component start of construction	1/01/2017
Date component end of construction	31/12/2020
Camp Build Time (days)	120
Date camp start of construction	3/09/2016
Date camp end of construction	1/01/2017
Unit of Measure	each

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 500	500 mobile homes - arrive 150 mobile homes - depart Mess, Office and ancillary facilities arrive Landscaping General materials								
Building - Construction Machinery	Mobile cranes - travel to site Concrete trucks - 2 per day Backhoe - travel to site								
Access - Materials Access width (m) - 6 Access length (m) - 2000 Yarwun Quarry	4800m3 roadbase 20m3/truck 2400l bitumen 2000l/truck 120m3 stone 20m3/truck								
Access - Construction Machinery council/local Watering requirements/day - 76000 Water Truck capacity - 38000	Excavator x 2 - travel to site Backhoe x 2 - travel to site Trucks x 4 - travel to site Roller x 2 - travel to site Water Truck - 2 per day Grader - travel to site								
Staff	75 camp construction staff 1 ppl per private car daily								
Potable Water Consumption/day - 200 Water Truck capacity - 38000	200L/day/person consumption 75 people during access and camp construction								
Non-potable water Watering requirements/day - 93750 Water Truck capacity - 38000	1 Non potable water truck per week during camp construction/operation								
Fuel Fuel consumption/day@setup - 4200 Fuel truck capacity (L) - 34000	1 Fuel truck per week during plant construction to supply camp								
Waste Solid waste generation/person/day Liquid waste generation/person/day Solid waste truck capacity Liquid waste truck capacity (L) - 18000	1 solid waste truck per week during all construction 1 liquid waste truck per week during all construction								
Consumables Food consumption per person/day (kg) - 6 Food truck capacity small (kg) - 5000 Food truck capacity large (kg) -10000									
Other	Nil other								

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LNG FACILITY CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	1/01/2017	31/12/2020	1460	30	0.04	48.67	Gladstone - Fishermans
	Construction materials Ex Brisbane	Road Train	1/01/2017	31/12/2020	1460	30	0.04	48.67	Brisbane - Fishermans
	Equipment	Articulated	1/01/2017	31/12/2020	1460	3180	4.36	0.46	Brisbane - Fishermans
	Pipe	Articulated	1/01/2017	31/12/2020	1460	0	0.00	0.00	Brisbane - Fishermans
	Electrical	Articulated	1/01/2017	31/12/2020	1460	189	0.26	7.75	Brisbane - Fishermans
	Insulation	Rigid	1/01/2017	31/12/2020	1460	500	0.68	2.92	Brisbane - Fishermans
	Fuel	Articulated	1/01/2017	31/12/2020	1460	96	0.13	15.21	Brisbane - Fishermans
	Concrete	Rigid	1/01/2017	31/12/2020	1460	1866	2.56	0.78	Yarwun-Fishermans
	Grout	Rigid	1/01/2017	31/12/2020	1460	12	0.02	120.00	Yarwun-Fishermans
	Steel	Articulated	1/01/2017	31/12/2020	1460	4222	5.78	0.35	Brisbane - Fishermans
	Pavement	Rigid	1/01/2017	31/12/2020	1460	87	0.12	16.81	Brisbane - Fishermans
	Paint	Rigid	1/01/2017	31/12/2020	1460	3	0.00	521.43	Brisbane - Fishermans
	Misc	Articulated	1/01/2017	31/12/2020	1460	7300	10.00	0.20	Brisbane - Fishermans
Building - Construction Machinery	Most civil machinery already on site. No additional movement on public roads								
	Bull dozers x 2- travel to site	Articulated	31/12/2016	1/01/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Side Booms x 2 - travel to site	Articulated	31/12/2016	1/01/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Hevay Lift Cranes - travel to site	Articulated	31/12/2016	1/01/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Concrete trucks - 2 per day	Rigid	1/01/2017	31/12/2020	1460	2920	4.00	0.50	Yarwun - Fishermans
Access - Materials	All roads constructed during camp construction								
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	225 lng facility construction staff 1.2 person per car 2 week shift	Light	1/01/2017	26/05/2018	510	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	1/01/2017	26/05/2018	510	0	0.00	0.00	ladstone Airport - Fishermar
	750 lng facility construction staff 1.2 person per car daily	Light	26/05/2018	21/05/2019	360	0	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	26/05/2018	21/05/2019	360	0	0.00	0.00	ladstone Airport - Fishermar
	225 lng facility construction staff 1.2 person per car daily	Light	21/05/2019	13/08/2020	450	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	21/05/2019	13/08/2020	450	0	0.00	0.00	ladstone Airport - Fishermar
	37 lng facility construction staff 1.2 person per car daily	Light	13/08/2020	6/11/2021	450	0	0.00	0.00	GladstoneRes - Fishermans
	38 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	13/08/2020	6/11/2021	450	0	0.00	0.00	ladstone Airport - Fishermar
6.16	facility construction staff 1.2 person per car Daily	Light	1/01/2017	26/05/2018	510	2618	10.27	0.19	Aerodrome - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2017	26/05/2018	510	5236	20.53	0.10	Calliope - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2017	26/05/2018	510	5236	20.53	0.10	MtLarcom - Blaincpk
12.32	facility construction staff 1.2 person per car Daily	Light	1/01/2017	26/05/2018	510	5236	20.53	0.10	Penda - Blaincpk

	facility construction staff 1.2 person per car									
12.32	Daily	Light	1/01/2017	26/05/2018	510	5236	20.53	0.10	Chapman - Blaincpk
	facility construction staff 1.2 person per car									
25.2	Daily	Light	1/01/2017	26/05/2018	510	10710	42.00	0.05	Philip - Blaincpk
	facility construction staff 1.2 person per car									
18.9	Daily	Light	1/01/2017	26/05/2018	510	8032.5	31.50	0.06	Dawson - Blaincpk
	facility construction staff 1.2 person per car									
25.2	Daily	Light	1/01/2017	26/05/2018	510	10710	42.00	0.05	Harvey - Blaincpk
	lng facility construction staff 20 person per bus									
126	Daily	Rigid	1/01/2017	26/05/2018	510	3213	12.60	0.16	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus									
504	4 week shift	Rigid	1/01/2017	26/05/2018	510	642.6	2.52	0.79	GladstoneAir - Fishermans
	lng facility construction staff 1.2 person per car									
20.72	Daily	Light	26/05/2018	21/05/2019	360	6216	34.53	0.06	Aerodrome - Blaincpk
	lng facility construction staff 1.2 person per car									
41.06666667	Daily	Light	26/05/2018	21/05/2019	360	12320	68.44	0.03	Calliope - Blaincpk
	lng facility construction staff 1.2 person per car									
41.06666667	Daily	Light	26/05/2018	21/05/2019	360	12320	68.44	0.03	MtLarcom - Blaincpk
	lng facility construction staff 1.2 person per car									
42	Daily	Light	26/05/2018	21/05/2019	360	12600	70.00	0.03	Penda - Blaincpk
	lng facility construction staff 1.2 person per car									
42	Daily	Light	26/05/2018	21/05/2019	360	12600	70.00	0.03	Chapman - Blaincpk
	lng facility construction staff 1.2 person per car									
84	Daily	Light	26/05/2018	21/05/2019	360	25200	140.00	0.01	Philip - Blaincpk
	lng facility construction staff 1.2 person per car									
63	Daily	Light	26/05/2018	21/05/2019	360	18900	105.00	0.02	Dawson - Blaincpk
	lng facility construction staff 1.2 person per car									
84	Daily	Light	26/05/2018	21/05/2019	360	25200	140.00	0.01	Harvey - Blaincpk
	lng facility construction staff 20 person per bus									
420	Daily	Rigid	26/05/2018	21/05/2019	360	7560	42.00	0.05	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus									
1680	4 week shift	Rigid	26/05/2018	21/05/2019	360	1512	8.40	0.24	GladstoneAir - Fishermans
	lng facility construction staff 1.2 person per car									
6.16	Daily	Light	21/05/2019	13/08/2020	450	2310	10.27	0.19	Aerodrome - Blaincpk
	lng facility construction staff 1.2 person per car									
12.32	Daily	Light	21/05/2019	13/08/2020	450	4620	20.53	0.10	Calliope - Blaincpk
	lng facility construction staff 1.2 person per car									
12.32	Daily	Light	21/05/2019	13/08/2020	450	4620	20.53	0.10	MtLarcom - Blaincpk
	lng facility construction staff 1.2 person per car									
12.32	Daily	Light	21/05/2019	13/08/2020	450	4620	20.53	0.10	Penda - Blaincpk

	lng facility construction staff 1.2 person per car								
12.32	Daily	Light	21/05/2019	13/08/2020	450	4620	20.53	0.10	Chapman - Blaincpk
	lng facility construction staff 1.2 person per car								
25.2	Daily	Light	21/05/2019	13/08/2020	450	9450	42.00	0.05	Philip - Blaincpk
	lng facility construction staff 1.2 person per car								
18.9	Daily	Light	21/05/2019	13/08/2020	450	7087.5	31.50	0.06	Dawson - Blaincpk
	lng facility construction staff 1.2 person per car								
25.2	Daily	Light	21/05/2019	13/08/2020	450	9450	42.00	0.05	Harvey - Blaincpk
	lng facility construction staff 20 person per bus								
126	Daily	Rigid	21/05/2019	13/08/2020	450	2835	12.60	0.16	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus								
504	4 week shift	Rigid	21/05/2019	13/08/2020	450	567	2.52	0.79	GladstoneAir - Fishermans
	lng facility construction staff 1.2 person per car								
10.36	daily	Light	13/08/2020	6/11/2021	450	3885	17.27	0.12	Dawson - Blaincpk
	lng facility construction staff 20 person per bus								
10.36	Daily	Rigid	13/08/2020	6/11/2021	450	233.1	1.04	1.93	Blaincpk - Fishermans
	lng facility construction staff 20 ppl per bus								
84	4 week shift	Rigid	13/08/2020	6/11/2021	450	94.5	0.42	4.76	GladstoneAir - Fishermans
Potable Water	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								
Fuel	2 Fuel truck per week during plant construction to supply plant	Rigid	1/01/2017	31/12/2020	1460	417.14	0.57	3.50	GFuel - Fishermans
Waste	1 solid waste truck per week during all construction	Rigid	1/01/2017	31/12/2020	1460	208.57	0.29	7.00	BlainDr - Fishermans
	1 liquid waste truck per week during all construction	Rigid	1/01/2017	31/12/2020	1460	208.57	0.29	7.00	WasteW - Fishermans
Consumables	Nil consumables								
Other	Nil other								

LNG FACILITY OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Deliveries	Refrigerant: 2 per month	Articulated	31/12/2020	19/12/2070	18250	1200.00	0.13	15.21	Brisbane - Fishermans
	Diesel: 1 per month	Articulated	31/12/2020	19/12/2070	18250	600.00	0.07	30.42	GFuel - Fishermans
	Chemicals: 1 per month	Articulated	31/12/2020	19/12/2070	18250	600.00	0.07	30.42	Brisbane - Fishermans
	Other: 10 per week	Light	31/12/2020	19/12/2070	18250	26071.43	2.86	0.70	Gladstone - Fishermans
Maintenance Equipment	Nil maintenance equipment								
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	31/12/2020	19/12/2070	18250	684375.00	75.00	0.03	Harvey - Blaincpk
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	31/12/2020	19/12/2070	18250	684375.00	75.00	0.03	Blaincpk - Fishermans
Potable Water Consumption/day - 200 Water Truck capacity - 38000	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								

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APLNG Traffic Generation

Component	LNG Facility
ID	LNG
Name	Fishermans
Capacity	0
Date of Commission	1/10/2021
Type	New
Comonent Build Time (days)	1460
Date component start of construction	2/10/2017
Date component end of construction	1/10/2021
Camp Build Time (days)	120
Date camp start of construction	4/06/2017
Date camp end of construction	2/10/2017
Unit of Measure	each

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 500	500 mobile homes - arrive 150 mobile homes - depart Mess, Office and ancillary facilities arrive Landscaping General materials								
Building - Construction Machinery	Mobile cranes - travel to site Concrete trucks - 2 per day Backhoe - travel to site								
Access - Materials Access width (m) - 6 Access length (m) - 2000 Yarwun Quarry	4800m3 roadbase 20m3/truck 2400l bitumen 2000l/truck 120m3 stone 20m3/truck								
Access - Construction Machinery council/local Watering requirements/day - 76000 Water Truck capacity - 38000	Excavator x 2 - travel to site Backhoe x 2 - travel to site Trucks x 4 - travel to site Roller x 2 - travel to site Water Truck - 2 per day Grader - travel to site								
Staff	75 camp construction staff 1 ppl per private car daily								
Potable Water Consumption/day - 200 Water Truck capacity - 38000	200L/day/person consumption 75 people during access and camp construction								
Non-potable water Watering requirements/day - 93750 Water Truck capacity - 38000	1 Non potable water truck per week during camp construction/operation								
Fuel Fuel consumption/day@setup - 4200 Fuel truck capacity (L) - 34000	1 Fuel truck per week during plant construction to supply camp								
Waste Solid waste generation/person/day Liquid waste generation/person/day Solid waste truck capacity Liquid waste truck capacity (L) - 18000	1 solid waste truck per week during all construction 1 liquid waste truck per week during all construction								
Consumables Food consumption per person/day (kg) - 6 Food truck capacity small (kg) - 5000 Food truck capacity large (kg) -10000									
Other	Nil other								

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LNG FACILITY CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/10/2017	1/10/2021	1460	30	0.04	48.67	Gladstone - Fishermans
	Construction materials Ex Brisbane	Road Train	2/10/2017	1/10/2021	1460	30	0.04	48.67	Brisbane - Fishermans
	Equipment	Articulated	2/10/2017	1/10/2021	1460	3180	4.36	0.46	Brisbane - Fishermans
	Pipe	Articulated	2/10/2017	1/10/2021	1460	0	0.00	0.00	Brisbane - Fishermans
	Electrical	Articulated	2/10/2017	1/10/2021	1460	189	0.26	7.75	Brisbane - Fishermans
	Insulation	Rigid	2/10/2017	1/10/2021	1460	500	0.68	2.92	Brisbane - Fishermans
	Fuel	Articulated	2/10/2017	1/10/2021	1460	96	0.13	15.21	Brisbane - Fishermans
	Concrete	Rigid	2/10/2017	1/10/2021	1460	1866	2.56	0.78	Yarwun-Fishermans
	Grout	Rigid	2/10/2017	1/10/2021	1460	12	0.02	120.00	Yarwun-Fishermans
	Steel	Articulated	2/10/2017	1/10/2021	1460	4222	5.78	0.35	Brisbane - Fishermans
	Pavement	Rigid	2/10/2017	1/10/2021	1460	87	0.12	16.81	Brisbane - Fishermans
	Paint	Rigid	2/10/2017	1/10/2021	1460	3	0.00	521.43	Brisbane - Fishermans
	Misc	Articulated	2/10/2017	1/10/2021	1460	7300	10.00	0.20	Brisbane - Fishermans
Building - Construction Machinery	Most civil machinery already on site. No additional movement on public roads								
	Bull dozers x 2- travel to site	Articulated	1/10/2017	2/10/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Side Booms x 2 - travel to site	Articulated	1/10/2017	2/10/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Hevay Lift Cranes - travel to site	Articulated	1/10/2017	2/10/2017	1	2	4.00	0.50	Brisbane - Fishermans
	Concrete trucks - 2 per day	Rigid	2/10/2017	1/10/2021	1460	2920	4.00	0.50	Yarwun-Fishermans
Access - Materials	All roads constructed during camp construction								
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	225 lng facility construction staff 1.2 person per car 2 week shift	Light	2/10/2017	24/02/2019	510	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	2/10/2017	24/02/2019	510	0	0.00	0.00	ladstone Airport - Fisherma
	750 lng facility construction staff 1.2 person per car daily	Light	1/03/2019	1/06/2019	92	0	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	24/02/2019	19/02/2020	360	0	0.00	0.00	ladstone Airport - Fisherma
	750 lng facility construction staff 1.2 person per car daily	Light	24/02/2019	19/02/2020	360	0	0.00	0.00	GladstoneRes - Fishermans
	750 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	24/02/2019	19/02/2020	360	0	0.00	0.00	ladstone Airport - Fisherma

	225 lng facility construction staff 1.2 person per car daily	Light	19/02/2020	14/05/2021	450	0	0.00	0.00	GladstoneRes - Fishermans
	225 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	19/02/2020	14/05/2021	450	0	0.00	0.00	ladstone Airport - Fisherma
	37 lng facility construction staff 1.2 person per car daily	Light	14/05/2021	7/08/2022	450	0	0.00	0.00	GladstoneRes - Fishermans
	38 lng facility construction staff 20 ppl per bus 2 week shift	Rigid	14/05/2021	7/08/2022	450	0	0.00	0.00	ladstone Airport - Fisherma
Potable Water	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								
Fuel	2 Fuel truck per week during plant construction to supply plant	Rigid	2/10/2017	1/10/2021	1460	208.57	0.29	7.00	GFuel - Fishermans
Waste	1 solid waste truck per week during all construction 1 liquid waste truck per week during all construction	Rigid Rigid	2/10/2017 2/10/2017	1/10/2021 1/10/2021	1460 1460	208.57 208.57	0.29 0.29	7.00 7.00	BlainDr - Fishermans WasteW - Fishermans
Consumables	Nil consumables								
Other	Nil other								

LNG FACILITY OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Deliveries	Refrigerant: 2 per month Diesel: 1 per month Chemicals: 1 per month Other: 10 per week	Articulated Articulated Articulated Light	1/10/2021 1/10/2021 1/10/2021 1/10/2021	19/09/2071 19/09/2071 19/09/2071 19/09/2071	18250 18250 18250 18250	1200.00 600.00 600.00 26071.43	0.13 0.07 0.07 2.86	15.21 30.42 30.42 0.70	Brisbane - Fishermans GFuel - Fishermans Brisbane - Fishermans Gladstone - Fishermans
Maintenance Equipment	Nil maintenance equipment								
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	1/10/2021	19/09/2071	18250	684375.00	75.00	0.03	Harvey - Blaincpk
Staff	37.5 lng facility operation staff 1 person per private car 2 shift per day	Light	1/10/2021	19/09/2071	18250	684375.00	75.00	0.03	Blaincpk - Fishermans
Potable Water Consumption/day - 200 Water Truck capacity - 38000	Potable water generated by desal facility. No additional movement on public roads								
Non-potable water	Non potable water generated by desal facility. No additional movement on public roads								

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General Assumptions

Fuel truck	15,000	L capacity (from distribution centre) [rigid]
Fuel tanker	34,000	L capacity (from Brisbane) [articulated]
Concrete truck	7.4	m3 capacity (from Roma)
Water truck	20,000	L capacity [rigid]
Food truck	5,000	kg capacity
Gravel truck	40	m3 capacity (from distribution center)

Camps

Civil machinery required at camp for setup	12	Total No. each
Concrete requirement for camps	2.5	m3 per person@camp
Mess, Office and ancillary facilities	40	Loads
Landscaping	20	Loads
General Materials (conduit, plumbing etc)	1	Loads/30 staff
Access road construction - water requirement	40,000	L/day (from distribution center)
Non-potable water	20,000	L/week (from distribution center)
Water consumption	200	L/person/day
Solid waste trucks per week	1	Truck/week (to distribution centre) serving camp
Liquid Waste trucks per week	1	Truck/week (to distrubution centre) serving camp
Food consumed	6	kg/day/person
Fuel - Camp construction requirement	4,200	L/day
Fuel - Camp operation requirement	1,000	L/week
Camp construction staff	50	people
Establishment time - Camp (GPF)	90	days [major camp]
Establishment time - Camp (Other)	28	days [minor camp]

Gas Processing Facility Summary

Sealed Road Width	6.0	m
Sealed Road Pavement Depth	0.4	m
Sealed Road spray rate (bitumen)	1.2	L/m2
Aggregate Spread Rate	1	m3/80m2
Construction access road width	6.0	m (Camp to GPF)
Construction access road length	5,000.0	m (Camp to GPF)
Construction access road pavement depth	0.3	m (Camp to GPF)
Building pad width	400.0	m (for underfloor base gravel)
Building pad length	800.0	m (for underfloor base gravel)
Building pad gravel thickness	0.25	m (for underfloor base gravel)
Staff Travelling by car	20	people (rest by bus)
Construction materials ex Gladstone	30	truck loads
Construction materials ex Brisbane	30	truck loads
Truck loads per compressor	2	trucks/compressor unit
Truck loads per dehydration and power units	2	trucks/dehydration and power unit
Solid waste trucks per week	1	Truck/week (to distribution centre) serving GPF construction
Liquid Waste trucks per week	1	Truck/week (to distrubution centre) serving GPF construction
Additional construction machinery	6	Total No. each
Non potable water	20,000	L/week (from distribution center) serving GPF construction 1ML/day total water required. WTF water assumed for most quantity
Fuel - GPF construction requirement	2,200	L/day (allowed for in GPF component only)
Maintenance trucks during operation	2	trucks/week (new plants only)
Fuel - GPF operation requirement	1,000	L/week (new and upgraded) (allowed for in GPF component only)
Solid waste disposal	1	Truck/week (to distribution centre) serving GPF operation
Pipe	15,000	m per GPF
Total Weight	420,000	kg
Truck Load Capacity	29,400	kg
No trucks	14	trucks

GPF Details

Name	Constructed Capacity	Complete Construction	Comment	Closest Distribution Centre	Closest Airport	Type	Plant Built Time	Distance to road (m)	No. Compressors	No Dehydration/Power	Plant Name	Construction Staff	Concrete Required
GPF_CNS_03	150	1/10/2012		Miles	Milesair	New	365	8417	20	4	GPF_CNS_03	300	3000
GPF_COM_03a	75	1/08/2011		Roma	Romaair	New	365	10235	11	2	GPF_COM_03a	200	3000
GPF_LUK_02a	75	1/01/2016		Roma	Romaair	New	365	30	11	2	GPF_LUK_02a	200	3000
GPF_HCK_01a	75	1/09/2018		Miles	Milesair	New	365	30	11	2	GPF_HCK_01a	200	3000
GPF_MUG_06	75	1/04/2014		Roma	Romaair	New	365	30	11	2	GPF_MUG_06	200	3000
GPF_RCK_04a	75	1/10/2013		Roma	Romaair	New	365	1612	11	2	GPF_RCK_04a	200	3000
GPF_WOL_01	75	1/10/2016		Miles	Milesair	New	365	9755	11	2	GPF_WOL_01	200	3000
GPF_CAR_01a	75	1/03/2018		Miles	Milesair	New	365	30	11	2	GPF_CAR_01a	200	3000
GPF_ORA_03b	150	1/10/2013		Miles	Milesair	New	365	3268	20	4	GPF_ORA_03b	300	3000
GPF_OAN_04	75	1/10/2013		Miles	Milesair	New	365	1521	11	2	GPF_OAN_04	200	3000
GPF_CON_01b	150	1/10/2013		Miles	Milesair	New	365	1394	20	4	GPF_CON_01b	300	3000
GPF_CON_02b	75	1/10/2013		Miles	Milesair	New	365	1254	11	2	GPF_CON_02b	200	3000
GPF_CNN_04	75	1/06/2015		Miles	Milesair	New	365	30	11	2	GPF_CNN_04	200	3000
GPF_DAL_01b	75	1/10/2017		Miles	Milesair	New	365	1327	11	2	GPF_DAL_01b	200	3000
GPF_NGA_02	75	1/10/2019		Miles	Milesair	New	365	30	11	2	GPF_NGA_02	200	3000
GPF_BYM_03	75	1/10/2020		Miles	Milesair	New	365	30	11	2	GPF_BYM_03	200	3000
GPF_CAS_05	75	1/02/2022		Miles	Milesair	New	365	30	11	2	GPF_CAS_05	200	3000
GPF_KIA_01a	75	1/10/2015		Miles	Milesair	New	365	30	11	2	GPF_KIA_01a	200	3000
GPF_GIL_02	75	1/03/2018		Miles	Milesair	New	365	10251	11	2	GPF_GIL_02	200	3000
GPF_WAA_03	75	1/12/2027		Miles	Milesair	New	365	19613	11	2	GPF_WAA_03	200	3000
GPF_WAA_04	75	1/03/2025		Miles	Milesair	New	365	10684	11	2	GPF_WAA_04	200	3000
GPF_ZIG_05	75	1/06/2027		Miles	Milesair	New	365	12504	11	2	GPF_ZIG_05	200	3000
GPF_ZIG_06	75	1/06/2016		Miles	Milesair	New	365	8903	11	2	GPF_ZIG_06	200	3000
TALINGA	90	1/06/2013		Roma	Milesair	Upgrade existing	274	30	9	4	TALINGA	200	3000
GPF_LUK_02aii	75	1/09/2017		Roma	Romaair	Upgrade existing	274	0	9	4	GPF_LUK_02a	200	3000
GPF_COM_03aii	75	1/03/2012		Roma	Romaair	Upgrade existing	274	0	9	4	GPF_COM_03a	200	3000
GPF_COM_03aiii	75	1/11/2012		Roma	Romaair	Upgrade existing	274	0	10	2	GPF_COM_03a	200	3000
GPF_MUG_06ii	75	1/03/2016		Roma	Romaair	Upgrade existing	274	0	9	4	GPF_MUG_06	200	3000
GPF_RCK_04aii	75	1/12/2015		Roma	Romaair	Upgrade existing	274	0	9	4	GPF_RCK_04a	200	3000
GPF_CON_02bii	75	1/09/2014		Miles	Milesair	Upgrade existing	274	0	9	4	GPF_CON_02b	200	3000
GPF_GIL_02ii	75	1/12/2021		Miles	Milesair	Upgrade existing	274	0	9	4	GPF_GIL_02	200	3000

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Drilling Schedule

Drilling Staff	200	people at camp (2 workfront)
Construction materials per well Ex Gladstone	2	truck loads
Construction materials per well Ex Brisbane	4	truck loads
Pad length per well	7.5	m
Pad width per well	15	m
Pad gravel thickness	0.15	m
Pad concrete thickness	0.2	m
Concrete volume	22.5	m3
Drilling and workover rigs	2	per well
Fuel consumption per well	42,000	L (during construction)
Solid waste disposal	1	truck per well
Maintenance trucks/month	1	truck per well

FOR REPORT TABLE, REFER TO COLUMN BE

	Begin Drilling Date	End Drilling Date
GPF_CNS_03	1/01/2013	31/12/2021
GPF_COM_03a	1/01/2012	31/12/2027
GPF_LUK_02a	1/01/2012	31/12/2031
GPF_HCK_01a	1/01/2015	31/12/2031
GPF_MUG_06	1/01/2013	31/12/2027
GPF_RCK_04a	1/01/2012	31/12/2027
GPF_WOL_01	1/01/2015	31/12/2045
GPF_CAR_01a	1/01/2015	31/12/2045
GPF_ORA_03b	1/01/2010	31/12/2028
GPF_OAN_04	1/01/2010	31/12/2028
GPF_CON_01b	1/01/2010	31/12/2015
GPF_CON_02b	1/01/2010	31/12/2045
GPF_CNN_04	1/01/2010	31/12/2028
GPF_DAL_01b	1/01/2014	31/12/2045
GPF_NGA_02	1/01/2013	31/12/2045
GPF_BYM_03	1/01/2017	31/12/2045
GPF_CAS_05	1/01/2017	31/12/2045
GPF_KIA_01a	1/01/2016	31/12/2029
GPF_GIL_02	1/01/2017	31/12/2035
GPF_WAA_03	1/01/2017	31/12/2035
GPF_WAA_04	1/01/2017	31/12/2035
GPF_ZIG_05	1/01/2017	31/12/2035
GPF_LUK_02aii	1/01/2008	1/01/2009
GPF_COM_03aii	1/01/2008	1/01/2009
GPF_COM_03aiii	1/01/2008	1/01/2009
GPF_MUG_06ii	1/01/2008	1/01/2009
GPF_RCK_04aii	1/01/2008	1/01/2009
GPF_CON_02bii	1/01/2008	1/01/2009
GPF_GIL_02ii	1/01/2008	1/01/2009
GPF_ZIG_06	1/01/2017	31/12/2035

Total

HP Network (Gas and Water)

Average Diameter	558.8	mm (22 inch)
Average Wall thickness	12.3	mm (0.5 inch)
Average Weight	165.33	km/m
Segment length on truck	18	m
Segment weight on truck	2976.00	kg
Max truck load	29400	kg
Truck Tray Width	3200	mm
No Segments per truck (by weight)	9	segments
No Segments per truck (by width)	15	
Adopted Segments per truck	9	
Length of pipe per truck	162	m
Construction rate	0.4	km/day (all of works)
Construction Staff	80	people
Fittings and miscellaneous	2	truck per km of pipe
Construction machinery required	20	items per field
Fuel consumption	5,000	L/day
Solid waste disposal	1	truck per week

GPF	HP Pipe Length	Truck Loads
GPF_CNS_03	22.05	137
GPF_COM_03a	43.06	266
GPF_LUK_02a	46.11	285
GPF_HCK_01a	44.06	273
GPF_MUG_06	220.80	1363
GPF_RCK_04a	77.17	477
GPF_WOL_01	86.05	532
GPF_CAR_01a	58.68	363
GPF_ORA_03b	84.39	521
GPF_OAN_04	44.62	276
GPF_CON_01b	81.78	505
GPF_CON_02b	82.90	512
GPF_CNN_04	39.77	246
GPF_DAL_01b	21.27	132
GPF_NGA_02	54.35	336
GPF_BYM_03	36.85	228
GPF_CAS_05	77.99	482
GPF_KIA_01a	127.41	787
GPF_GIL_02	105.29	650
GPF_WAA_03	6.73	42
GPF_WAA_04	43.37	268
GPF_ZIG_05	7.33	46
GPF_LUK_02aii	0.00	0
GPF_COM_03aii	0.00	0
GPF_COM_03aiii	0.00	0
GPF_MUG_06ii	0.00	0
GPF_RCK_04aii	0.00	0
GPF_CON_02bii	0.00	0
GPF_GIL_02ii	0.00	0
GPF_ZIG_06	26.64	165
Total	1438.67	8892
Average	47.96	

HP Pipeline summary

Average pipe diameter	558.8	mm (22 inch)
Pipe length	1438.67	km
Pipe weight	237,859	tonne
Pipe segment length	18	m
No. segments on truck	9	
No. truckloads	3556.8	ex Gladstone
	5335.2	ex Brisbane/Newcastle
Begin transport date	7/06/2011	
	8892	
	0.4	

Gathering Network

Maximum Truck Height Loaded	4.6	m
Truck Tray Height	1.04	m
Maximum Load Height	3.56	m
Average Diameter	450	mm
No. Pipes Across	7	
No. Pipes High	7	
Pipes per Truck	49	
Length of Pipe Segment	18	m
Length of Pipe on Truck	882	m
Average Length of Gas Gathering Pipe/Well	1000	m
Average Length of Water Gathering Pipe/Well	1000	m
Truck Loads per Well (gas gathering)	1.13	Loads
Truck Loads per Well (water gathering)	1.13	Loads
Total Loads/ Well	2.27	Loads
Staff Gas and Water Gathering	120	people
Construction equipment	20	vehicles per field
Construction rate	0.2	km/day
Network build time	10	days
Fuel consumption	4,200	L/day
Fuel consumption	42,000	per gathering field
Solid waste removal	1	truck per well

report table here

Network Construction S	120	people
Pipe truckloads from Bri	1.13	truck loads
Pipe truckloads from Bri	1.13	truck loads
Construction vehicles	20	per network
Construction rate	200	m/day
Fuel consumption	42,000	L (during network construction)
Solid waste disposal	1	truck per network
No. pipes on truck	49	18m segments

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Water Treatment Facilities

			Online 1				Online 2				Online 3				Online 4			
GPF	WTF		Date	Capacity	Staff	Build Time	Date	Capacity	Staff	Build Time	Date	Capacity	Staff	Build Time	Date	Capacity	Staff	Build Time
GPF_CNS_03	Nil																	
GPF_COM_03a	WTF_MEL_01		1/01/2011	20	75	274	1/01/2012	20	75	274	1/01/2014	20	75	274	1/01/2016	20	75	274
GPF_LUK_02a	Nil																	
GPF_HCK_01a	Nil																	
GPF_MUG_06	Nil																	
GPF_RCK_04a	Nil																	
GPF_WOL_01	WTF_WOL_01		1/01/2015	20	75	274	1/01/2017	20	75	274								
GPF_CAR_01a	Nil																	
GPF_ORA_03b	Nil																	
GPF_OAN_04	Nil																	
GPF_CON_01b	Talinga WTF		1/01/2013	20	75	274												
GPF_CON_02b	WTF_CON_01		1/01/2012	20	75	274	1/01/2013	40	75	365	1/01/2016	20	75	274				
GPF_CNN_04	Nil																	
GPF_DAL_01b	Nil																	
GPF_NGA_02	WTF_HCK_01		1/01/2015	20	75	274												
GPF_BYM_03	WTF_BYM_01		1/01/2016	20	75	274	1/01/2020	20	75	274								
GPF_CAS_05	Nil																	
GPF_KIA_01a	Nil																	
GPF_GIL_02	WTF_GIL_01a		1/01/2015	20	75	274	1/01/2018	60	90	365								
GPF_WAA_03	Nil																	
GPF_WAA_04	Nil																	
GPF_ZIG_05	Nil																	
GPF_LUK_02aii	Nil																	
GPF_COM_03aii	Nil																	
GPF_COM_03aiii	Nil																	
GPF_MUG_06ii	Nil																	
GPF_RCK_04aii	Nil																	
GPF_CON_02bii	Nil																	
GPF_GIL_02ii	Nil																	
GPF_ZIG_06	Nil																	

Truck loads per RO unit	2	trucks per RO unit
Construction access road width	6.0	m
Construction access road length	5,000.0	m
Construction access road pavement depth	0.3	m
Building pad width	200.0	m (for underfloor base gravel)
Building pad length	200.0	m (for underfloor base gravel)
Building pad gravel thickness	0.25	m (for underfloor base gravel)
WTF construction machinery	12	Total items (includes provision for WTS, Brine pond)
Non potable water	20,000	L/week (from distribution center) during construction
		1ML/day total water required. WTF water assumed for most quantity
Fuel consumption	6,700	L/day during construction
Solid waste disposal	1	per week during construction
Liquid waste disposal	1	per week during construction
Operating Staff	10	people
Maintenance trucks during operation	2	trucks/week (new plants only)
Fuel - WTF operation requirement	1,000	L/week (new and upgraded)
Solid waste disposal	1	Truck/week (to distribution centre) serving WTF operation

Size	Staff	Build Time	Concrete required	Construction materials Ex Gladstone (Loads)	Construction materials Ex Brisbane (Loads)	RO Units
0	0	0	0	0	0	0
20	75	274	1000	20	20	5
40	75	365	2000	40	40	8
60	90	365	3000	60	60	12

WorleyParsons

APLNG Traffic Generation

Component — Gas Plant

ID	GPF_CNS_03
Name	GPF_CNS_03
Capacity	150
Complete Construction Date	1/10/2012
Type	New
Comonent Build Time (days)	365
Date component start of construction	2/10/2011
Date component end of construction	1/10/2012
Camp Build Time (days)	90
Date camp start of construction	4/07/2011
Date camp end of construction	2/10/2011
Construction staff	300
Concrete Required (GPF)	3000 m3
Access Road Length	8417 m

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	300 mobile homes - arrive	Articulated	4/07/2011	2/10/2011	90	300	6.67	0.30	Brisbane - GPF_CNS_03
No. mobile homes - 300	225 mobile homes - depart	Articulated	1/10/2012	30/11/2012	60	225	7.50	0.27	Miles - GPF_CNS_03
	Mess, Office and ancillary facilities arrive	Articulated	4/07/2011	2/10/2011	90	40	0.89	2.25	Brisbane - GPF_CNS_03
	Landscaping	Articulated	4/07/2011	2/10/2011	90	20	0.44	4.50	Brisbane - GPF_CNS_03
	General materials	Articulated	4/07/2011	2/10/2011	90	10.00	0.22	9.00	Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	27/06/2011	4/07/2011	7	1	0.29	7.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	4/07/2011	2/10/2011	90	101	2.25	0.89	Miles - GPF_CNS_03
	Backhoe - travel to site	Articulated	27/06/2011	4/07/2011	7	1	0.29	7.00	Brisbane - GPF_CNS_03
Access - Materials	Gravel truck	Road Train	28/04/2011	27/06/2011	60	505.0032	16.83	0.12	Miles - GPF_CNS_03
	60600.38l bitumen								
Access width (m) - 6	2000l/truck	Rigid	27/06/2011	4/07/2011	7	30.300192	8.66	0.23	Brisbane - GPF_CNS_03
	631.254m3 stone								
Access length (m) - 8416.72	20m3/truck	Articulated	27/06/2011	4/07/2011	7	31.5627	9.02	0.22	Miles - GPF_CNS_03
Access - Construction Machinery	Civil Machinery - travel to site	Articulated	21/04/2011	28/04/2011	7	12	3.43	0.58	Brisbane - GPF_CNS_03
	Water Truck	Rigid	21/04/2011	4/07/2011	74	148.00	4.00	0.50	Miles - GPF_CNS_03
Staff	140 gas plant construction staff								
	20 ppl per bus								
	2 week shift	Rigid	2/10/2011	1/10/2012	365	182.50	1.00	2.00	Milesair - GPF_CNS_03
	140 gas plant construction staff								
	20 ppl per bus								
	2 week shift	Rigid	2/10/2011	1/10/2012	365	182.50	1.00	2.00	Milesair - GPF_CNS_03
	20 gas plant construction staff								
	1 person per car								
	2 week shift	Light	2/10/2011	1/10/2012	365	521.43	2.86	0.70	Milesair - GPF_CNS_03
	40 establishment staff								
	20ppl per bus								
	2wk shift	Rigid	21/04/2011	2/10/2011	164	23.43	0.29	7.00	Milesair - GPF_CNS_03
	10 establishment staff								
	1 person per car								
	2wk shift	Light	21/04/2011	2/10/2011	164	117.14	1.43	1.40	Milesair - GPF_CNS_03
Potable Water									
Construction	Water truck	Rigid	21/04/2011	2/10/2011	164	82.00	1.00	2.00	Miles - GPF_CNS_03
Operation	Water truck	Rigid	2/10/2011	1/10/2012	365	547.50	3.00	0.67	Miles - GPF_CNS_03
Operation	Water truck	Rigid	2/10/2011	1/10/2012	365	547.50	3.00	0.67	Miles - GPF_CNS_03
Non-potable water	Water truck	Rigid	2/10/2011	1/10/2012	365	52.14	0.29	7.00	Miles - GPF_CNS_03
Fuel									
Camp Construction	Fuel truck	Rigid	21/04/2011	2/10/2011	164	45.92	0.56	3.57	Miles - GPF_CNS_03
Camp Operation	Fuel truck	Rigid	2/10/2011	1/10/2012	365	24.33	0.13	15.00	Miles - GPF_CNS_03
Camp Operation	Fuel tanker	Road Train	21/04/2011	1/10/2012	529	30.99	0.12	17.07	Brisbane - Miles
Waste	Solid waste truck per week during all construction	Articulated	4/07/2011	1/10/2012	455	65.00	0.29	7.00	Miles - GPF_CNS_03
	Liquid waste truck per week during all construction	Articulated	4/07/2011	1/10/2012	455	65.00	0.29	7.00	Miles - GPF_CNS_03
Consumables									
Camp Construction	Food truck	Rigid	21/04/2011	2/10/2011	164	4.92	0.06	33.33	Gladstone - GPF_CNS_03
	Food truck	Rigid	21/04/2011	2/10/2011	164	4.92	0.06	33.33	Brisbane - GPF_CNS_03
Camp Operation	Food truck	Rigid	2/10/2011	1/10/2012	365	65.7	0.36	5.56	Gladstone - GPF_CNS_03
	Food truck	Rigid	2/10/2011	1/10/2012	365	65.7	0.36	5.56	Brisbane - GPF_CNS_03
Other	Nil other								

GPF CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/10/2011	1/10/2012	365	30	0.16	12.17	Gladstone - GPF_CNS_03
	Construction materials Ex Brisbane	Road Train	2/10/2011	1/10/2012	365	30	0.16	12.17	Brisbane - GPF_CNS_03
	20 x compressors (ex Brisbane)	Oversize	2/10/2011	1/10/2012	365	40	0.22	9.13	Brisbane - GPF_CNS_03
	4 x Dehydration & Power package (ex Brisbane)	Oversize	2/10/2011	1/10/2012	365	8	0.04	45.63	Brisbane - GPF_CNS_03
	Gravel truck	Road Train	2/10/2011	1/10/2012	365	2000	10.96	0.18	Miles - GPF_CNS_03
	Pipes	Road Train	2/10/2011	1/10/2012	365	14	0.08	25.55	Brisbane - GPF_CNS_03
Building - Construction Machinery	GPF construction machinery	Articulated	25/09/2011	2/10/2011	7	6	1.71	1.17	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	2/10/2011	1/10/2012	365	405	2.22	0.90	Miles - GPF_CNS_03
Access to GPF/Camp	Gravel truck	Road Train	27/07/2011	25/09/2011	60	225	7.50	0.27	Miles - GPF_CNS_03
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	2/10/2011	1/10/2012	365	52.14	0.29	7.00	Miles - GPF_CNS_03
Fuel	Fuel truck	Rigid	2/10/2011	1/10/2012	365	53.53	0.29	6.82	Miles - GPF_CNS_03
	Fuel tanker	Road Train	2/10/2011	1/10/2012	365	23.62	0.13	15.45	Brisbane - Miles
Waste	Solid waste disposal	Articulated	2/10/2011	1/10/2012	365	52.14	0.29	7.00	Miles - GPF_CNS_03
	Liquid waste disposal	Articulated	2/10/2011	1/10/2012	365	52.14	0.29	7.00	Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

GPF OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Maintenance Vehicles	Maintenace trucks	Articulated	1/10/2012	19/09/2062	18250	5214.29	0.57	3.50	Miles - GPF_CNS_03
Maintenance Equipment	Nil maintenance equipment								
Staff	30 gas plant operation staff								
	20 ppl per bus								
	2 week shift	Rigid	1/10/2012	19/09/2062	18250	1955.36	0.21	9.33	Milesair - GPF_CNS_03
	10 gas plant operation staff								
	1 ppl per car								
	2 week shift	Light	1/10/2012	19/09/2062	18250	13035.71	1.43	1.40	Milesair - GPF_CNS_03
Potable Water	Water truck	Rigid	1/10/2012	19/09/2062	18250	7300.00	0.80	2.50	Miles - GPF_CNS_03
Non-potable water	Non-potable water to be available locally (drill water) No transport on public roads								
Fuel	Fuel truck	Rigid	1/10/2012	19/09/2062	18250	173.81	0.02	105.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	1/10/2012	19/09/2062	18250	76.68	0.01	238.00	Brisbane - Miles
Waste	Solid waste disposal	Articulated	1/10/2012	19/09/2062	18250	2607.14	0.29	7.00	Miles - GPF_CNS_03
Consumables	Food truck	Rigid	1/10/2012	19/09/2062	18250	438	0.05	41.67	Brisbane - GPF_CNS_03
	Food truck	Rigid	1/10/2012	19/09/2062	18250	438	0.05	41.67	Gladstone - GPF_CNS_03
Other									

Component — Drilling

ID	GPF_CNS_03
Begin Drilling Date	1/01/2013
End Drilling Date	31/12/2021
Drilling Staff	200

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	200 mobile homes - arrive	Articulated	4/12/2012	1/01/2013	28	200	14.29	0.14	Brisbane - GPF_CNS_03
No. mobile homes - 200	200 mobile homes - depart	Articulated	31/12/2021	28/01/2022	28	200	14.29	0.14	Miles - GPF_CNS_03
	General materials	Articulated	4/12/2012	1/01/2013	28	6.67	0.48	4.20	Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	27/11/2012	4/12/2012	7	1	0.29	7.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	4/12/2012	1/01/2013	28	68	4.83	0.41	Miles - GPF_CNS_03
	Backhoe - travel to site	Articulated	27/11/2012	4/12/2012	7	1	0.29	7.00	Brisbane - GPF_CNS_03
Staff	180 Drilling Rig Staff								
	20 ppl per bus								
	4 week shift continuous	Rigid	1/01/2013	31/12/2021	3286	1620.49	0.99	2.03	Milesair - GPF_CNS_03
	20 Drilling Rig staff								
	1 person per car								
	4 week shift continuous	Light	1/01/2013	31/12/2021	3286	3601.10	2.19	0.91	Milesair - GPF_CNS_03
	40 establishment staff								
	20ppl per bus								
	2wk shift	Rigid	4/12/2012	1/01/2013	28	4.00	0.29	7.00	Milesair - GPF_CNS_03
	10 establishment staff								
	1 person per car								
	2wk shift	Light	4/12/2012	1/01/2013	28	20.00	1.43	1.40	Milesair - GPF_CNS_03
Potable Water									
Construction	Water truck	Rigid	4/12/2012	1/01/2013	28	14.00	1.00	2.00	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/01/2013	31/12/2021	3286	3286.00	2.00	1.00	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/01/2013	31/12/2021	3286	3286.00	2.00	1.00	Miles - GPF_CNS_03
Consumables									
Camp Construction	Food truck	Rigid	4/12/2012	1/01/2013	28	0.84	0.06	33.33	Brisbane - GPF_CNS_03
	Food truck	Rigid	4/12/2012	1/01/2013	28	0.84	0.06	33.33	Gladstone - GPF_CNS_03
Camp Operation	Food truck	Rigid	1/01/2013	31/12/2021	3286	394.32	0.24	8.33	Brisbane - GPF_CNS_03
	Food truck	Rigid	1/01/2013	31/12/2021	3286	394.32	0.24	8.33	Gladstone - GPF_CNS_03
Other	Nil other								

Well Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Required per well	Average Trips per day per well		Route Description
Building - Materials	Construction materials Ex Gladstone	Articulated	1/01/2013	31/12/2021	365.25	2.00	0.01		Gladstone - GPF_CNS_03
	Construction materials Ex Brisbane	Articulated	1/01/2013	31/12/2021	365.25	4.00	0.02		Brisbane - GPF_CNS_03
	Gravel truck	Road Train	1/01/2013	31/12/2021	365.25	0.42	0.00		Brisbane - GPF_CNS_03
Pad - Materials	Concrete truck	Road Train	1/01/2013	31/12/2021	365.25	3.04	0.02		Miles - GPF_CNS_03
Building - Construction Machinery	Drill/workover rigs - Travel to site	Articulated	1/01/2013	31/12/2021	365.25	2	0.01		Brisbane - GPF_CNS_03
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/01/2013	31/12/2021	365.25	2.80	0.02		Miles - GPF_CNS_03
	Fuel tanker	Road Train	1/01/2013	31/12/2021	365.25	1.24	0.01		Brisbane - Miles
Waste	Solid waste disposal	Articulated	1/01/2013	31/12/2021	365.25	1.00	0.01		Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

Well Operation	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day		Route Description
Maintenance Vehicles	Maintenance truck	Articulated	1/01/2013	20/12/2062	365.25	12.00	0.07		Miles - GPF_CNS_03
Maintenance Equipment	Nil maintenance equipment								

Component — HP Network

ID	GPF_CNS_03	
Begin HP Network Construction	1/10/2012	[Same timing as GPF]
End HP Network Construction	25/11/2012	
Length of HP Pipe	22.05	km
Construction Rate	0.4	km/day
Construction Time	55.1	days
Truck capacity	162	m/truck
Staff	80	people

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	80 mobile homes - arrive	Articulated	3/09/2012	1/10/2012	28	80	5.71	0.35	Brisbane - GPF_CNS_03
No. mobile homes - 80	80 mobile homes - depart	Articulated	25/11/2012	23/12/2012	28	80	5.71	0.35	Miles - GPF_CNS_03
	General materials	Articulated	3/09/2012	1/10/2012	28	2.67	0.19	10.50	Brisbane - GPF_CNS_03
Building - Construction Machinery	Concrete truck	Rigid	3/09/2012	1/10/2012	28	27	1.93	1.04	Miles - GPF_CNS_03
Staff	60 HP Network Staff 20 ppl per bus 4 week shift continuous	Rigid	1/10/2012	25/11/2012	55.114575	9.06	0.33	6.08	Milesair - GPF_CNS_03
	20 HP Network staff 1 person per car 4 week shift continuous	Light	1/10/2012	25/11/2012	55.114575	60.40	2.19	0.91	Milesair - GPF_CNS_03
	40 establishment staff 20ppl per bus 2wk shift	Rigid	3/09/2012	1/10/2012	28	4.00	0.29	7.00	Milesair - GPF_CNS_03
	10 establishment staff 1 person per car 2wk shift	Light	3/09/2012	1/10/2012	28	20.00	1.43	1.40	Milesair - GPF_CNS_03
Potable Water									
Construction	Water truck	Rigid	3/09/2012	1/10/2012	28	14.00	1.00	2.00	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/10/2012	25/11/2012	55.11	22.05	0.80	2.50	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/10/2012	25/11/2012	55.11	22.05	0.80	2.50	Miles - GPF_CNS_03
Consumables									
Camp Construction	Food truck	Rigid	3/09/2012	1/10/2012	28	0.84	0.06	33.33	Brisbane - GPF_CNS_03
	Food truck	Rigid	3/09/2012	1/10/2012	28	0.84	0.06	33.33	Gladstone - GPF_CNS_03
Camp Operation	Food truck	Rigid	1/10/2012	25/11/2012	55.11	2.65	0.10	20.83	Brisbane - GPF_CNS_03
	Food truck	Rigid	1/10/2012	25/11/2012	55.11	2.65	0.10	20.83	Gladstone - GPF_CNS_03
Other	Nil other								

HP Network Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day per site		Route Description
Building - Materials	HP Pipe delivery	Articulated	1/09/2012	26/10/2012	55.114575	54.43	1.98	1.01	Gladstone - GPF_CNS_03
	HP Pipe delivery	Articulated	1/09/2012	26/10/2012	55.114575	81.65	2.96	0.68	Brisbane - GPF_CNS_03
	Fittings and miscellaneous	Articulated	1/10/2012	25/11/2012	55.114575	44.09	1.60	1.25	Gladstone - GPF_CNS_03
Building - Construction Machinery	Construction machinery - Travel to site	Articulated	1/10/2012	25/11/2012	55.114575	20	0.73	2.76	Brisbane - GPF_CNS_03
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/10/2012	25/11/2012	55.114575	18.37	0.67		Miles - GPF_CNS_03
	Fuel tanker	Road Train	1/10/2012	25/11/2012	55.114575	8.11	0.29	6.80	Brisbane - Miles
Waste	Solid waste disposal	Articulated	1/10/2012	25/11/2012	55.114575	7.87	0.29		Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

Component — Gas and Water Gathering

ID	GPF_CNS_03	
Begin gathering construction	1/01/2013	[Same timing as drilling]
End gathering construction	31/12/2021	[Same timing as drilling]
Staff	120	people

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	120 mobile homes - arrive	Articulated	4/12/2012	1/01/2013	28	120	8.57	0.23	Brisbane - GPF_CNS_03
No. mobile homes - 120	120 mobile homes - depart	Articulated	31/12/2021	28/01/2022	28	120	8.57	0.23	Miles - GPF_CNS_03
	General materials	Articulated	4/12/2012	1/01/2013	28	4.00	0.29	7.00	Brisbane - GPF_CNS_03
Building - Construction Machinery	Concrete truck	Rigid	4/12/2012	1/01/2013	28	41	2.90	0.69	Miles - GPF_CNS_03
Staff	100 Gathering Staff 20 ppl per bus 4 week shift continuous	Rigid	1/01/2013	31/12/2021	3286	900.27	0.55	3.65	Milesair - GPF_CNS_03
	20 HP Gathering Staff 1 person per car 4 week shift continuous	Light	1/01/2013	31/12/2021	3286	3601.10	2.19	0.91	Milesair - GPF_CNS_03
	40 establishment staff 20ppl per bus 2wk shift	Rigid	4/12/2012	1/01/2013	28	4.00	0.29	7.00	Milesair - GPF_CNS_03
	10 establishment staff 1 person per car 2wk shift	Light	4/12/2012	1/01/2013	28	20.00	1.43	1.40	Milesair - GPF_CNS_03
Potable Water									
Construction	Water truck	Rigid	4/12/2012	1/01/2013	28	14.00	1.00	2.00	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/01/2013	31/12/2021	3286.00	1971.60	1.20	1.67	Miles - GPF_CNS_03
Operation	Water truck	Rigid	1/01/2013	31/12/2021	3286.00	1971.60	1.20	1.67	Miles - GPF_CNS_03
Consumables									
Camp Construction	Food truck	Rigid	4/12/2012	1/01/2013	28	1.68	0.12	16.67	Brisbane - GPF_CNS_03
Camp Operation	Food truck	Rigid	1/01/2013	31/12/2021	3286.00	236.59	0.14	13.89	Brisbane - GPF_CNS_03
	Food truck	Rigid	1/01/2013	31/12/2021	3286.00	236.59	0.14	13.89	Gladstone - GPF_CNS_03
Other	Nil other								

Gathering Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads Required per well network	Average Trips per day per well network		Route Description
Building - Materials	Pipe Materials	Articulated	1/01/2013	31/12/2021	365	1.13	0.01		Townsville - GPF_CNS_03
	Pipe Materials	Articulated	1/01/2013	31/12/2021	365	1.13	0.01		Brisbane - GPF_CNS_03
Building - Construction Machinery	Equipment Travel	Articulated	25/12/2012	1/01/2013	7	20 (total - not per well)	5.71		Brisbane - GPF_CNS_03
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/01/2013	31/12/2021	365	2.80	0.02		Miles - GPF_CNS_03
	Fuel tanker	Road Train	1/01/2013	31/12/2021	365	1.24	0.01		Brisbane - Miles
Waste	Solid waste removal	Articulated	1/01/2013	31/12/2021	365	1.00	0.01		Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

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Component — Water Treatment Facilities

GPF ID	GPF_CNS_03
WTF ID	Nil
Online 1 - Begin Construction	0/01/1900
Online 1 - Completion Date	0/01/1900
Online 1 - Capacity	0
Online 1 - Staff	0
Online 1 - Build Time	0
Online 2 - Begin Construction	0/01/1900
Online 2 - Completion Date	0/01/1900
Online 2 - Capacity	0
Online 2 - Staff	0
Online 2 - Build Time	0
Online 3 - Begin Construction	0/01/1900
Online 3 - Completion Date	0/01/1900
Online 3 - Capacity	0
Online 3 - Staff	0
Online 3 - Build Time	0
Online 4 - Begin Construction	0/01/1900
Online 4 - Completion Date	0/01/1900
Online 4 - Capacity	0
Online 4 - Staff	0
Online 4 - Build Time	0

CAMP *Online 1*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 0	- 0 mobile homes - arrive - 0 mobile homes - depart General materials	Articulated Articulated Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	28 28 28	0 0 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site Concrete truck Backhoe - travel to site	Articulated Rigid Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	7 28 7	0 0 0	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Staff	-20 WTF construction staff 20 ppl per bus 2 week shift 20 establishment staff 1 person per car 0 2wk shift 40 establishment staff 20ppl per bus 2wk shift 10 establishment staff 1 person per car 2wk shift	Rigid Light Rigid Light	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0 0 0 0	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03
Potable Water Construction Operation Operation	Water truck Water truck Water truck	Rigid Rigid Rigid	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	0 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Miles - GPF_CNS_03 Miles - GPF_CNS_03 Miles - GPF_CNS_03
Consumables Camp Construction Camp Operation	Food truck Food truck	Rigid Rigid	0/01/1900 0/01/1900	0/01/1900 0/01/1900	0 0.00	0 0.00	0.00 0.00	0.00 0.00	Brisbane - GPF_CNS_03 Brisbane - GPF_CNS_03
Other	Nil other								

CAMP *Online 2*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 0	- 0 mobile homes - arrive - 0 mobile homes - depart General materials	Articulated Articulated Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	28 14 28	0 0 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site Concrete truck Backhoe - travel to site	Articulated Rigid Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	7 28 7	0 0 0	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Staff	-20 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 0 2wk shift 40 establishment staff 20ppl per bus 2wk shift 10 establishment staff 1 person per car 2wk shift	Rigid Light Rigid Light	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0 0 0 0	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03
Potable Water Construction Operation Operation	Water truck Water truck Water truck	Rigid Rigid Rigid	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	0 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Miles - GPF_CNS_03 Miles - GPF_CNS_03 Miles - GPF_CNS_03
Consumables Camp Construction Camp Operation	Food truck Food truck	Rigid Rigid	0/01/1900 0/01/1900	0/01/1900 0/01/1900	0 0.00	0 0.00	0.00 0.00	0.00 0.00	Brisbane - GPF_CNS_03 Brisbane - GPF_CNS_03
Other	Nil other								

CAMP *Online 3*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 0	- 0 mobile homes - arrive - 0 mobile homes - depart General materials	Articulated Articulated Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	28 14 28	0 0 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site Concrete truck Backhoe - travel to site	Articulated Rigid Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	7 28 7	0 0 0	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Staff	-20 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 0 2wk shift 40 establishment staff 20ppl per bus 2wk shift 10 establishment staff 1 person per car 2wk shift	Rigid Light Rigid Light	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0 0 0 0	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03
Potable Water Construction Operation Operation	Water truck Water truck Water truck	Rigid Rigid Rigid	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	0 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Miles - GPF_CNS_03 Miles - GPF_CNS_03 Miles - GPF_CNS_03
Consumables Camp Construction Camp Operation	Food truck Food truck	Rigid Rigid	0/01/1900 0/01/1900	0/01/1900 0/01/1900	0 0.00	0 0.00	0.00 0.00	0.00 0.00	Brisbane - GPF_CNS_03 Brisbane - GPF_CNS_03
Other	Nil other								

CAMP *Online 4*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials No. mobile homes - 0	- 0 mobile homes - arrive - 0 mobile homes - depart General materials	Articulated Articulated Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	28 14 28	0 0 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Building - Construction Machinery	Mobile cranes - travel to site Concrete truck Backhoe - travel to site	Articulated Rigid Articulated	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	7 28 7	0 0 0	0.00 0.00 0.00	0.00 0.00 0.00	Brisbane - GPF_CNS_03 Miles - GPF_CNS_03 Brisbane - GPF_CNS_03
Staff	-20 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 0 2wk shift 40 establishment staff 20ppl per bus 2wk shift 10 establishment staff 1 person per car 2wk shift	Rigid Light Rigid Light	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900 0/01/1900	0 0 0 0	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03 Milesair - GPF_CNS_03
Potable Water Construction Operation Operation	Water truck Water truck Water truck	Rigid Rigid Rigid	0/01/1900 0/01/1900 0/01/1900	0/01/1900 0/01/1900 0/01/1900	0 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	Miles - GPF_CNS_03 Miles - GPF_CNS_03 Miles - GPF_CNS_03
Consumables Camp Construction Camp Operation	Food truck Food truck	Rigid Rigid	0/01/1900 0/01/1900	0/01/1900 0/01/1900	0 0.00	0 0.00	0.00 0.00	0.00 0.00	Brisbane - GPF_CNS_03 Brisbane - GPF_CNS_03
Other	Nil other								

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WTF CONSTRUCTION *Online 1*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Gladstone - GPF_CNS_03
0	Construction materials Ex Brisbane	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	RO Units transport	Oversize	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	Gravel truck	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Building - Construction Machinery									
	WTF construction machinery	Articulated	0/01/1900	0/01/1900	7	0	0.00	0.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Access to WTF/Camp	Gravel truck	Road Train	0/01/1900	0/01/1900	30	0	0.00	0.00	Miles - GPF_CNS_03
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Fuel	Fuel truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	0/01/1900	0/01/1900	0	0.00	0.00		Brisbane - Miles
Waste	Solid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Liquid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 2*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Gladstone - GPF_CNS_03
0	Construction materials Ex Brisbane	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	RO Units transport	Oversize	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	Gravel truck	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Building - Construction Machinery									
	WTF construction machinery	Articulated	0/01/1900	0/01/1900	7	0	0.00	0.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Access to WTF/Camp	Gravel truck	Road Train	0/01/1900	0/01/1900	30	0	0.00	0.00	Miles - GPF_CNS_03
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Fuel	Fuel truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	0/01/1900	0/01/1900	0	0.00	0.00		Brisbane - Miles
Waste	Solid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Liquid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 3*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Gladstone - GPF_CNS_03
0	Construction materials Ex Brisbane	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	RO Units transport	Oversize	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	Gravel truck	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Building - Construction Machinery									
	WTF construction machinery	Articulated	0/01/1900	0/01/1900	7	0	0.00	0.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Access to WTF/Camp	Gravel truck	Road Train	0/01/1900	0/01/1900	30	0	0.00	0.00	Miles - GPF_CNS_03
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Fuel	Fuel truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	0/01/1900	0/01/1900	0	0.00	0.00		Brisbane - Miles
Waste	Solid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Liquid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 4*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Gladstone - GPF_CNS_03
0	Construction materials Ex Brisbane	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	RO Units transport	Oversize	0/01/1900	0/01/1900	0	0	0.00	0.00	Brisbane - GPF_CNS_03
	Gravel truck	Road Train	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Building - Construction Machinery									
	WTF construction machinery	Articulated	0/01/1900	0/01/1900	7	0	0.00	0.00	Brisbane - GPF_CNS_03
	Concrete truck	Rigid	0/01/1900	0/01/1900	0	0	0.00	0.00	Miles - GPF_CNS_03
Access to WTF/Camp	Gravel truck	Road Train	0/01/1900	0/01/1900	30	0	0.00	0.00	Miles - GPF_CNS_03
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Fuel	Fuel truck	Rigid	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	0/01/1900	0/01/1900	0	0.00	0.00		Brisbane - Miles
Waste	Solid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
	Liquid waste disposal	Articulated	0/01/1900	0/01/1900	0	0.00	0.00	0.00	Miles - GPF_CNS_03
Consumables	Nil consumables								
Other	Nil other								

WTF OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Maintenance Vehicles	Maintenace trucks	Articulated	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Miles - GPF_CNS_03
Maintenance Equipment	Nil maintenance equipment								
Staff	0 WTF operation staff 20 ppl per bus 2 week shift	Rigid	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Milesair - GPF_CNS_03
	10 WTF operation staff 1 ppl per car 2 week shift	Light	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Milesair - GPF_CNS_03
Potable Water	Water truck	Rigid	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Miles - GPF_CNS_03
Non-potable water	Non-potable water to be available locally (drill water) No transport on public roads								
Fuel	Fuel truck	Rigid	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Miles - GPF_CNS_03
	Fuel tanker	Road Train	0/01/1900	18/12/1949	18250	0.00	0.00		Brisbane - Miles
Waste	Solid waste disposal	Articulated	0/01/1900	18/12/1949	18250	0.00	0.00	0.00	Miles - GPF_CNS_03
Consumables	Food truck	Rigid	0/01/1900	18/12/1949	18250	0	0.00	0.00	Miles - GPF_CNS_03
Other									

GPF_CNS_03

Traffic Summary - Major items

Vehicle	Capacity	No. Loads	Quantity
Fuel truck	15000	805	12,079,841 L
Fuel tanker	34000	355	12,079,841 L
Concrete truck	7.4	930	6,879 m3
Water truck	20000	17619	352,377,547 L
Food truck	5000	2084	10,419,955 kg
Gravel truck	40	2770	110,797 m3

Total movements all vehicles on public roads	56,667	
Total trips all vehicles on public roads	113,334	
Total Distance Travelled	8,967,185	VKT
Average L/km	1.347	L/km
Average Trip Distance	79.1	km

APLNG Traffic Generation

Component — Gas Plant

ID	GPF_COM_03a
Name	GPF_COM_03a
Capacity	75
Complete Construction Date	1/08/2011
Type	New
Comonent Build Time (days)	365
Date component start of construction	1/08/2010
Date component end of construction	1/08/2011
Camp Build Time (days)	90
Date camp start of construction	3/05/2010
Date camp end of construction	1/08/2010
Construction staff	200
Concrete Required (GPF)	3000 m3
Access Road Length	10235 m

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	200 mobile homes - arrive	Articulated	3/05/2010	1/08/2010	90	200	4.44	0.45	Brisbane - GPF_COM_03a
No. mobile homes - 200	150 mobile homes - depart	Articulated	1/08/2011	30/09/2011	60	150	5.00	0.40	Roma - GPF_COM_03a
	Mess, Office and ancillary facilities arrive	Articulated	3/05/2010	1/08/2010	90	40	0.89	2.25	Brisbane - GPF_COM_03a
	Landscaping	Articulated	3/05/2010	1/08/2010	90	20	0.44	4.50	Brisbane - GPF_COM_03a
	General materials	Articulated	3/05/2010	1/08/2010	90	6.67	0.15	13.50	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	26/04/2010	3/05/2010	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	3/05/2010	1/08/2010	90	68	1.50	1.33	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	26/04/2010	3/05/2010	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Access - Materials	Gravel truck	Road Train	25/02/2010	26/04/2010	60	614.1246	20.47	0.10	Roma - GPF_COM_03a
	73894.952l bitumen								
Access width (m) - 6	2000l/truck	Rigid	26/04/2010	3/05/2010	7	36.847476	10.53	0.19	Brisbane - GPF_COM_03a
	767.65575m3 stone								
Access length (m) - 10235.41	20m3/truck	Articulated	26/04/2010	3/05/2010	7	38.3827875	10.97	0.18	Roma - GPF_COM_03a
Access - Construction Machinery	Civil Machinery - travel to site	Articulated	18/02/2010	25/02/2010	7	12	3.43	0.58	Brisbane - GPF_COM_03a
	Water Truck	Rigid	18/02/2010	3/05/2010	74	148.00	4.00	0.50	Roma - GPF_COM_03a
Staff	90 gas plant construction staff 20 ppl per bus 2 week shift	Rigid	1/08/2010	1/08/2011	365	117.32	0.64	3.11	Romeair - GPF_COM_03a
	90 gas plant construction staff 20 ppl per bus 2 week shift	Rigid	1/08/2010	1/08/2011	365	117.32	0.64	3.11	Romeair - GPF_COM_03a
	20 gas plant construction staff 1 person per car 2 week shift	Light	1/08/2010	1/08/2011	365	521.43	2.86	0.70	Romeair - GPF_COM_03a
	40 establishment staff 20ppl per bus 2wk shift	Rigid	18/02/2010	1/08/2010	164	23.43	0.29	7.00	Romeair - GPF_COM_03a
	10 establishment staff 1 person per car 2wk shift	Light	18/02/2010	1/08/2010	164	117.14	1.43	1.40	Romeair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	18/02/2010	1/08/2010	164	82.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/08/2010	1/08/2011	365	365.00	2.00	1.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/08/2010	1/08/2011	365	365.00	2.00	1.00	Roma - GPF_COM_03a
Non-potable water	Water truck	Rigid	1/08/2010	1/08/2011	365	52.14	0.29	7.00	Roma - GPF_COM_03a
Fuel									
Camp Construction	Fuel truck	Rigid	18/02/2010	1/08/2010	164	45.92	0.56	3.57	Roma - GPF_COM_03a
Camp Operation	Fuel truck	Rigid	1/08/2010	1/08/2011	365	24.33	0.13	15.00	Roma - GPF_COM_03a
Camp Operation	Fuel tarlker	Road Train	18/02/2010	1/08/2011	529	30.99	0.12	17.07	Brisbane - Roma
Waste	Solid waste truck per week during all construction	Articulated	3/05/2010	1/08/2011	455	65.00	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste truck per week during all construction	Articulated	3/05/2010	1/08/2011	455	65.00	0.29	7.00	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	18/02/2010	1/08/2010	164	4.92	0.06	33.33	Gladstone - GPF_COM_03a
	Food truck	Rigid	18/02/2010	1/08/2010	164	4.92	0.06	33.33	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	1/08/2010	1/08/2011	365	43.8	0.24	8.33	Gladstone - GPF_COM_03a
	Food truck	Rigid	1/08/2010	1/08/2011	365	43.8	0.24	8.33	Brisbane - GPF_COM_03a
Other	Nil other								

GPF CONSTRUCTION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	1/08/2010	1/08/2011	365	30	0.16	12.17	Gladstone - GPF_COM_03a
	Construction materials Ex Brisbane	Road Train	1/08/2010	1/08/2011	365	30	0.16	12.17	Brisbane - GPF_COM_03a
	11 x compressors (ex Brisbane)	Oversize	1/08/2010	1/08/2011	365	22	0.12	16.59	Brisbane - GPF_COM_03a
	2 x Dehydration & Power package (ex Brisbane)	Oversize	1/08/2010	1/08/2011	365	4	0.02	91.25	Brisbane - GPF_COM_03a
	Gravel truck	Road Train	1/08/2010	1/08/2011	365	2000	10.96	0.18	Roma - GPF_COM_03a
	Pipes	Road Train	1/08/2010	1/08/2011	365	14	0.08	25.55	Brisbane - GPF_COM_03a
Building - Construction Machinery									
	GPF construction machinery	Articulated	25/07/2010	1/08/2010	7	6	1.71	1.17	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	1/08/2010	1/08/2011	365	405	2.22	0.90	Roma - GPF_COM_03a
Access to GPF/Camp	Gravel truck	Road Train	26/05/2010	25/07/2010	60	225	7.50	0.27	Roma - GPF_COM_03a
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	1/08/2010	1/08/2011	365	52.14	0.29	7.00	Roma - GPF_COM_03a
Fuel	Fuel truck	Rigid	1/08/2010	1/08/2011	365	53.53	0.29	6.82	Roma - GPF_COM_03a
	Fuel tarlker	Road Train	1/08/2010	1/08/2011	365	23.62	0.13	15.45	Brisbane - Roma
Waste	Solid waste disposal	Articulated	1/08/2010	1/08/2011	365	52.14	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste disposal	Articulated	1/08/2010	1/08/2011	365	52.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

GPF OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Maintenance Vehicles	Maintenace trucks	Articulated	1/08/2011	19/07/2061	18250	5214.29	0.57	3.50	Roma - GPF_COM_03a
Maintenance Equipment	Nil maintenance equipment								
Staff	30 gas plant operation staff 20 ppl per bus 2 week shift	Rigid	1/08/2011	19/07/2061	18250	1955.36	0.21	9.33	Romeair - GPF_COM_03a
	10 gas plant operation staff 1 ppl per car 2 week shift	Light	1/08/2011	19/07/2061	18250	13035.71	1.43	1.40	Romeair - GPF_COM_03a
Potable Water	Water truck	Rigid	1/08/2011	19/07/2061	18250	7300.00	0.80	2.50	Roma - GPF_COM_03a
Non-potable water	Non-potable water to be available locally (drill water) No transport on public roads								
Fuel	Fuel truck	Rigid	1/08/2011	19/07/2061	18250	173.81	0.02	105.00	Roma - GPF_COM_03a
	Fuel tarlker	Road Train	1/08/2011	19/07/2061	18250	76.68	0.01	238.00	Brisbane - Roma
Waste	Solid waste disposal	Articulated	1/08/2011	19/07/2061	18250	2607.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Food truck	Rigid	1/08/2011	19/07/2061	18250	438	0.05	41.67	Brisbane - GPF_COM_03a
	Food truck	Rigid	1/08/2011	19/07/2061	18250	438	0.05	41.67	Gladstone - GPF_COM_03a
Other									

Component — Drilling

ID: GPF_COM_03a
Begin Drilling Date: 1/01/2012
End Drilling Date: 31/12/2027

Drilling Staff: 200

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	200 mobile homes - arrive	Articulated	4/12/2011	1/01/2012	28	200	14.29	0.14	Brisbane - GPF_COM_03a
No. mobile homes - 200	200 mobile homes - depart	Articulated	31/12/2027	28/01/2028	28	200	14.29	0.14	Roma - GPF_COM_03a
	General materials	Articulated	4/12/2011	1/01/2012	28	6.67	0.48	4.20	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	27/11/2011	4/12/2011	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	4/12/2011	1/01/2012	28	68	4.83	0.41	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	27/11/2011	4/12/2011	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Staff	180 Drilling Rig Staff 20 ppl per bus 4 week shift continuous 20 Drilling Rig staff 1 person per car	Rigid	1/01/2012	31/12/2027	5843	2881.48	0.99	2.03	Romaair - GPF_COM_03a
	4 week shift continuous 40 establishment staff 20ppl per bus	Light	1/01/2012	31/12/2027	5843	6403.29	2.19	0.91	Romaair - GPF_COM_03a
	2wk shift 10 establishment staff 1 person per car	Rigid	4/12/2011	1/01/2012	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
	2wk shift	Light	4/12/2011	1/01/2012	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	4/12/2011	1/01/2012	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/01/2012	31/12/2027	5843	5843.00	2.00	1.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/01/2012	31/12/2027	5843	5843.00	2.00	1.00	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	4/12/2011	1/01/2012	28	0.84	0.06	33.33	Brisbane - GPF_COM_03a
	Food truck	Rigid	4/12/2011	1/01/2012	28	0.84	0.06	33.33	Gladstone - GPF_COM_03a
Camp Operation	Food truck	Rigid	1/01/2012	31/12/2027	5843	701.16	0.24	8.33	Brisbane - GPF_COM_03a
	Food truck	Rigid	1/01/2012	31/12/2027	5843	701.16	0.24	8.33	Gladstone - GPF_COM_03a
Other	Nil other								

Well Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Required per well	Average Trips per day per well		Route Description
Building - Materials	Construction materials Ex Gladstone	Articulated	1/01/2012	31/12/2027	365.25	2.00	0.01		Gladstone - GPF_COM_03a
	Construction materials Ex Brisbane	Articulated	1/01/2012	31/12/2027	365.25	4.00	0.02		Brisbane - GPF_COM_03a
	Gravel truck	Road Train	1/01/2012	31/12/2027	365.25	0.42	0.00		Brisbane - GPF_COM_03a
Pad - Materials	Concrete truck	Road Train	1/01/2012	31/12/2027	365.25	3.04	0.02		Roma - GPF_COM_03a
Building - Construction Machinery	Drillworkover rigs - Travel to site	Articulated	1/01/2012	31/12/2027	365.25	2	0.01		Brisbane - GPF_COM_03a
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/01/2012	31/12/2027	365.25	2.80	0.02		Roma - GPF_COM_03a
	Fuel tanker	Road Train	1/01/2012	31/12/2027	365.25	1.24	0.01		Brisbane - Roma
Waste	Solid waste disposal	Articulated	1/01/2012	31/12/2027	365.25	1.00	0.01		Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

Well Operation	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day		Route Description
Maintenance Vehicles	Maintenance truck	Articulated	1/01/2012	19/12/2061	365.25	12.00	0.07		Roma - GPF_COM_03a
Maintenance Equipment	Nil maintenance equipment								

Component — HP Network

ID: GPF_COM_03a
Begin HP Network Construction: 1/08/2011 [Same timing as GPF]
End HP Network Construction: 25/09/2011
Length of HP Pipe: 22.05 km
Construction Rate: 0.4 km/day
Construction Time: 55.1 days

Truck capacity: 162 m³/truck
Staff: 80 people

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	80 mobile homes - arrive	Articulated	4/07/2011	1/08/2011	28	80	5.71	0.35	Brisbane - GPF_COM_03a
No. mobile homes - 80	80 mobile homes - depart	Articulated	25/09/2011	23/10/2011	28	80	5.71	0.35	Roma - GPF_COM_03a
	General materials	Articulated	4/07/2011	1/08/2011	28	2.67	0.19	10.50	Brisbane - GPF_COM_03a
Building - Construction Machinery	Concrete truck	Rigid	4/07/2011	1/08/2011	28	27	1.93	1.04	Roma - GPF_COM_03a
Staff	60 HP Network Staff 20 ppl per bus 4 week shift continuous 20 HP Network staff 1 person per car	Rigid	1/08/2011	25/09/2011	55.114575	9.06	0.33	6.08	Romaair - GPF_COM_03a
	4 week shift continuous 40 establishment staff 20ppl per bus	Light	1/08/2011	25/09/2011	55.114575	60.40	2.19	0.91	Romaair - GPF_COM_03a
	2wk shift 10 establishment staff 1 person per car	Rigid	4/07/2011	1/08/2011	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
	2wk shift	Light	4/07/2011	1/08/2011	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	4/07/2011	1/08/2011	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/08/2011	25/09/2011	55.11	22.05	0.80	2.50	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/08/2011	25/09/2011	55.11	22.05	0.80	2.50	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	4/07/2011	1/08/2011	28	0.84	0.06	33.33	Brisbane - GPF_COM_03a
	Food truck	Rigid	4/07/2011	1/08/2011	28	0.84	0.06	33.33	Gladstone - GPF_COM_03a
Camp Operation	Food truck	Rigid	1/08/2011	25/09/2011	55.11	2.65	0.10	20.83	Brisbane - GPF_COM_03a
	Food truck	Rigid	1/08/2011	25/09/2011	55.11	2.65	0.10	20.83	Gladstone - GPF_COM_03a
Other	Nil other								

HP Network Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day per site		Route Description
Building - Materials	HP Pipe delivery	Articulated	2/07/2011	26/08/2011	55.114575	54.43	1.98	1.01	Gladstone - GPF_COM_03a
	HP Pipe delivery	Articulated	2/07/2011	26/08/2011	55.114575	81.65	2.96	0.68	Brisbane - GPF_COM_03a
	Fittings and miscellaneous	Articulated	1/08/2011	25/09/2011	55.114575	44.09	1.60	1.25	Gladstone - GPF_COM_03a
Building - Construction Machinery	Construction machinery - Travel to site	Articulated	1/08/2011	25/09/2011	55.114575	20	0.73	2.76	Brisbane - GPF_COM_03a
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/08/2011	25/09/2011	55.114575	18.37	0.67		Roma - GPF_COM_03a
	Fuel tanker	Road Train	1/08/2011	25/09/2011	55.114575	8.11	0.29	6.80	Brisbane - Roma
Waste	Solid waste disposal	Articulated	1/08/2011	25/09/2011	55.114575	7.87	0.29		Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

Component — Gas and Water Gathering

ID: GPF_COM_03a
Begin gathering construction: 1/01/2012 [Same timing as drilling]
End gathering construction: 31/12/2027 [Same timing as drilling]

Staff: 120 people

CAMP	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	120 mobile homes - arrive	Articulated	4/12/2011	1/01/2012	28	120	8.57	0.23	Brisbane - GPF_COM_03a
No. mobile homes - 120	120 mobile homes - depart	Articulated	31/12/2027	28/01/2028	28	120	8.57	0.23	Roma - GPF_COM_03a
	General materials	Articulated	4/12/2011	1/01/2012	28	4.00	0.29	7.00	Brisbane - GPF_COM_03a
Building - Construction Machinery	Concrete truck	Rigid	4/12/2011	1/01/2012	28	41	2.90	0.69	Roma - GPF_COM_03a
Staff	100 Gathering Staff 20 ppl per bus 4 week shift continuous 20 HP Gathering Staff 1 person per car	Rigid	1/01/2012	31/12/2027	5843	1600.82	0.55	3.65	Romaair - GPF_COM_03a
	4 week shift continuous 40 establishment staff 20ppl per bus	Light	1/01/2012	31/12/2027	5843	6403.29	2.19	0.91	Romaair - GPF_COM_03a
	2wk shift 10 establishment staff 1 person per car	Rigid	4/12/2011	1/01/2012	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
	2wk shift	Light	4/12/2011	1/01/2012	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	4/12/2011	1/01/2012	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/01/2012	31/12/2027	5843.00	3505.80	1.20	1.67	Roma - GPF_COM_03a
Operation	Water truck	Rigid	1/01/2012	31/12/2027	5843.00	3505.80	1.20	1.67	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	4/12/2011	1/01/2012	28	1.68	0.12	16.67	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	1/01/2012	31/12/2027	5843.00	420.70	0.14	13.89	Brisbane - GPF_COM_03a
	Food truck	Rigid	1/01/2012	31/12/2027	5843.00	420.70	0.14	13.89	Gladstone - GPF_COM_03a
Other	Nil other								

Gathering Construction	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads Required per well network	Average Trips per day per well network		Route Description
Building - Materials	Pipe Materials	Articulated	1/01/2012	31/12/2027	365	1.13	0.01		Townsville - GPF_COM_03a
	Pipe Materials	Articulated	1/01/2012	31/12/2027	365	1.13	0.01		Brisbane - GPF_COM_03a
Building - Construction Machinery	Equipment Travel	Articulated	25/12/2011	1/01/2012	7	20 (total - not per well)	5.71		Brisbane - GPF_COM_03a
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water and waste water	Non potable water sourced from drill well. No additional movement on public roads								
Fuel	Fuel truck	Rigid	1/01/2012	31/12/2027	365	2.80	0.02		Roma - GPF_COM_03a
	Fuel tanker	Road Train	1/01/2012	31/12/2027	365	1.24	0.01		Brisbane - Roma
Waste	Solid waste removal	Articulated	1/01/2012	31/12/2027	365	1.00	0.01		Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

Component **Water Treatment Facilities**

GPF ID	GPF_COM_03a
WTF ID	WTF_MEL_01
Online 1 - Begin Construction	2/04/2010
Online 1 - Completion Date	1/01/2011
Online 1 - Capacity	20
Online 1 - Staff	75
Online 1 - Build Time	274
Online 2 - Begin Construction	2/04/2011
Online 2 - Completion Date	1/01/2012
Online 2 - Capacity	20
Online 2 - Staff	75
Online 2 - Build Time	274
Online 3 - Begin Construction	2/04/2013
Online 3 - Completion Date	1/01/2014
Online 3 - Capacity	20
Online 3 - Staff	75
Online 3 - Build Time	274
Online 4 - Begin Construction	2/04/2015
Online 4 - Completion Date	1/01/2016
Online 4 - Capacity	20
Online 4 - Staff	75
Online 4 - Build Time	274

CAMP *Online 1*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	75 mobile homes - arrive	Articulated	5/03/2010	2/04/2010	28	75	5.36	0.37	Brisbane - GPF_COM_03a
No. mobile homes - 75	75 mobile homes - depart	Articulated	1/01/2011	29/01/2011	28	75	5.36	0.37	Roma - GPF_COM_03a
	General materials	Articulated	5/03/2010	2/04/2010	28	2.50	0.18	11.20	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	26/02/2010	5/03/2010	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	5/03/2010	2/04/2010	28	25	1.81	1.11	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	26/02/2010	5/03/2010	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Staff	55 WTF construction staff 20 ppl per bus 2 week shift 20 establishment staff 1 person per car 75 2wk shift	Rigid	2/04/2010	1/01/2011	274	53.82	0.39	5.09	Romaair - GPF_COM_03a
	40 establishment staff 20ppl per bus 2wk shift	Light	2/04/2010	1/01/2011	274	391.43	2.86	0.70	Romaair - GPF_COM_03a
	10 establishment staff 1 person per car 2wk shift	Rigid	5/03/2010	2/04/2010	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
		Light	5/03/2010	2/04/2010	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	5/03/2010	2/04/2010	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2010	1/01/2011	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2010	1/01/2011	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	5/03/2010	2/04/2010	28	1.68	0.12	16.67	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	2/04/2010	1/01/2011	274.00	24.66	0.18	11.11	Brisbane - GPF_COM_03a
Other	Nil other								

CAMP *Online 2*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	75 mobile homes - arrive	Articulated	5/03/2011	2/04/2011	28	75	5.36	0.37	Brisbane - GPF_COM_03a
No. mobile homes - 75	75 mobile homes - depart	Articulated	1/01/2012	15/01/2012	14	75	10.71	0.19	Roma - GPF_COM_03a
	General materials	Articulated	5/03/2011	2/04/2011	28	2.50	0.18	11.20	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	26/02/2011	5/03/2011	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	5/03/2011	2/04/2011	28	25	1.81	1.11	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	26/02/2011	5/03/2011	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Staff	55 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 75 2wk shift	Rigid	2/04/2011	1/01/2012	274	53.82	0.39	5.09	Romaair - GPF_COM_03a
	40 establishment staff 20ppl per bus 2wk shift	Light	2/04/2011	1/01/2012	274	195.71	1.43	1.40	Romaair - GPF_COM_03a
	10 establishment staff 1 person per car 2wk shift	Rigid	5/03/2011	2/04/2011	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
		Light	5/03/2011	2/04/2011	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	5/03/2011	2/04/2011	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2011	1/01/2012	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2011	1/01/2012	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	5/03/2011	2/04/2011	28	1.68	0.12	16.67	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	2/04/2011	1/01/2012	274.00	24.66	0.18	11.11	Brisbane - GPF_COM_03a
Other	Nil other								

CAMP *Online 3*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	75 mobile homes - arrive	Articulated	5/03/2013	2/04/2013	28	75	5.36	0.37	Brisbane - GPF_COM_03a
No. mobile homes - 75	75 mobile homes - depart	Articulated	1/01/2014	15/01/2014	14	75	10.71	0.19	Roma - GPF_COM_03a
	General materials	Articulated	5/03/2013	2/04/2013	28	2.50	0.18	11.20	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	26/02/2013	5/03/2013	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	5/03/2013	2/04/2013	28	25	1.81	1.11	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	26/02/2013	5/03/2013	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Staff	55 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 75 2wk shift	Rigid	2/04/2013	1/01/2014	274	53.82	0.39	5.09	Romaair - GPF_COM_03a
	40 establishment staff 20ppl per bus 2wk shift	Light	2/04/2013	1/01/2014	274	195.71	1.43	1.40	Romaair - GPF_COM_03a
	10 establishment staff 1 person per car 2wk shift	Rigid	5/03/2013	2/04/2013	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
		Light	5/03/2013	2/04/2013	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	5/03/2013	2/04/2013	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2013	1/01/2014	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2013	1/01/2014	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	5/03/2013	2/04/2013	28	1.68	0.12	16.67	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	2/04/2013	1/01/2014	274.00	24.66	0.18	11.11	Brisbane - GPF_COM_03a
Other	Nil other								

CAMP *Online 4*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	75 mobile homes - arrive	Articulated	5/03/2015	2/04/2015	28	75	5.36	0.37	Brisbane - GPF_COM_03a
No. mobile homes - 75	75 mobile homes - depart	Articulated	1/01/2016	15/01/2016	14	75	10.71	0.19	Roma - GPF_COM_03a
	General materials	Articulated	5/03/2015	2/04/2015	28	2.50	0.18	11.20	Brisbane - GPF_COM_03a
Building - Construction Machinery	Mobile cranes - travel to site	Articulated	26/02/2015	5/03/2015	7	1	0.29	7.00	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	5/03/2015	2/04/2015	28	25	1.81	1.11	Roma - GPF_COM_03a
	Backhoe - travel to site	Articulated	26/02/2015	5/03/2015	7	1	0.29	7.00	Brisbane - GPF_COM_03a
Staff	55 WTF construction staff 20 ppl per bus 2 week shift 10 establishment staff 1 person per car 75 2wk shift	Rigid	2/04/2015	1/01/2016	274	53.82	0.39	5.09	Romaair - GPF_COM_03a
	40 establishment staff 20ppl per bus 2wk shift	Light	2/04/2015	1/01/2016	274	195.71	1.43	1.40	Romaair - GPF_COM_03a
	10 establishment staff 1 person per car 2wk shift	Rigid	5/03/2015	2/04/2015	28	4.00	0.29	7.00	Romaair - GPF_COM_03a
		Light	5/03/2015	2/04/2015	28	20.00	1.43	1.40	Romaair - GPF_COM_03a
Potable Water									
Construction	Water truck	Rigid	5/03/2015	2/04/2015	28	14.00	1.00	2.00	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2015	1/01/2016	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Operation	Water truck	Rigid	2/04/2015	1/01/2016	274.00	102.75	0.75	2.67	Roma - GPF_COM_03a
Consumables									
Camp Construction	Food truck	Rigid	5/03/2015	2/04/2015	28	1.68	0.12	16.67	Brisbane - GPF_COM_03a
Camp Operation	Food truck	Rigid	2/04/2015	1/01/2016	274.00	24.66	0.18	11.11	Brisbane - GPF_COM_03a
Other	Nil other								

WTF CONSTRUCTION *Online 1*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/04/2010	1/01/2011	274	20	0.15	13.70	Gladstone - GPF_COM_03a
20	Construction materials Ex Brisbane	Road Train	2/04/2010	1/01/2011	274	20	0.15	13.70	Brisbane - GPF_COM_03a
	RO Units transport	Oversize	2/04/2010	1/01/2011	274	10	0.07	27.40	Brisbane - GPF_COM_03a
	Gravel truck	Road Train	2/04/2010	1/01/2011	274	250	1.82	1.10	Roma - GPF_COM_03a
Building - Construction Machinery									
	WTF construction machinery	Articulated	26/03/2010	2/04/2010	7	12	3.43	0.58	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	2/04/2010	1/01/2011	274	135	0.99	2.03	Roma - GPF_COM_03a
Access to WTF/Camp	Gravel truck	Road Train	3/03/2010	2/04/2010	30	225	15.00	0.13	Roma - GPF_COM_03a
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	2/04/2010	1/01/2011	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Fuel	Fuel truck	Rigid	2/04/2010	1/01/2011	274	122.39	0.89	2.24	Roma - GPF_COM_03a
	Fuel tanker	Road Train	2/04/2010	1/01/2011	274	53.99	0.39		Brisbane - Roma
Waste	Solid waste disposal	Articulated	2/04/2010	1/01/2011	274	39.14	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste disposal	Articulated	2/04/2010	1/01/2011	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 2*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/04/2011	1/01/2012	274	20	0.15	13.70	Gladstone - GPF_COM_03a
20	Construction materials Ex Brisbane	Road Train	2/04/2011	1/01/2012	274	20	0.15	13.70	Brisbane - GPF_COM_03a
	RO Units transport	Oversize	2/04/2011	1/01/2012	274	10	0.07	27.40	Brisbane - GPF_COM_03a
	Gravel truck	Road Train	2/04/2011	1/01/2012	274	250	1.82	1.10	Roma - GPF_COM_03a
Building - Construction Machinery									
	WTF construction machinery	Articulated	26/03/2011	2/04/2011	7	12	3.43	0.58	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	2/04/2011	1/01/2012	274	135	0.99	2.03	Roma - GPF_COM_03a
Access to WTF/Camp	Gravel truck	Road Train	3/03/2011	2/04/2011	30	225	15.00	0.13	Roma - GPF_COM_03a
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	2/04/2011	1/01/2012	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Fuel	Fuel truck	Rigid	2/04/2011	1/01/2012	274	122.39	0.89	2.24	Roma - GPF_COM_03a
	Fuel tanker	Road Train	2/04/2011	1/01/2012	274	53.99	0.39		Brisbane - Roma
Waste	Solid waste disposal	Articulated	2/04/2011	1/01/2012	274	39.14	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste disposal	Articulated	2/04/2011	1/01/2012	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 3*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/04/2013	1/01/2014	274	20	0.15	13.70	Gladstone - GPF_COM_03a
20	Construction materials Ex Brisbane	Road Train	2/04/2013	1/01/2014	274	20	0.15	13.70	Brisbane - GPF_COM_03a
	RO Units transport	Oversize	2/04/2013	1/01/2014	274	10	0.07	27.40	Brisbane - GPF_COM_03a
	Gravel truck	Road Train	2/04/2013	1/01/2014	274	250	1.82	1.10	Roma - GPF_COM_03a
Building - Construction Machinery									
	WTF construction machinery	Articulated	26/03/2013	2/04/2013	7	12	3.43	0.58	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	2/04/2013	1/01/2014	274	135	0.99	2.03	Roma - GPF_COM_03a
Access to WTF/Camp	Gravel truck	Road Train	3/03/2013	2/04/2013	30	225	15.00	0.13	Roma - GPF_COM_03a
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	2/04/2013	1/01/2014	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Fuel	Fuel truck	Rigid	2/04/2013	1/01/2014	274	122.39	0.89	2.24	Roma - GPF_COM_03a
	Fuel tanker	Road Train	2/04/2013	1/01/2014	274	53.99	0.39		Brisbane - Roma
Waste	Solid waste disposal	Articulated	2/04/2013	1/01/2014	274	39.14	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste disposal	Articulated	2/04/2013	1/01/2014	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

WTF CONSTRUCTION *Online 4*	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Building - Materials	Construction materials Ex Gladstone	Road Train	2/04/2015	1/01/2016	274	20	0.15	13.70	Gladstone - GPF_COM_03a
20	Construction materials Ex Brisbane	Road Train	2/04/2015	1/01/2016	274	20	0.15	13.70	Brisbane - GPF_COM_03a
	RO Units transport	Oversize	2/04/2015	1/01/2016	274	10	0.07	27.40	Brisbane - GPF_COM_03a
	Gravel truck	Road Train	2/04/2015	1/01/2016	274	250	1.82	1.10	Roma - GPF_COM_03a
Building - Construction Machinery									
	WTF construction machinery	Articulated	26/03/2015	2/04/2015	7	12	3.43	0.58	Brisbane - GPF_COM_03a
	Concrete truck	Rigid	2/04/2015	1/01/2016	274	135	0.99	2.03	Roma - GPF_COM_03a
Access to WTF/Camp	Gravel truck	Road Train	3/03/2015	2/04/2015	30	225	15.00	0.13	Roma - GPF_COM_03a
Access - Construction Machinery	All access machinery already on site. No additional movement on public roads								
Staff	Staff travel daily to site from camp within internal constructed roads. No additional travel on public roads								
Potable Water	Potable water taken to site from camp. No additional movement on public roads								
Non-potable water	Water truck	Rigid	2/04/2015	1/01/2016	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Fuel	Fuel truck	Rigid	2/04/2015	1/01/2016	274	122.39	0.89	2.24	Roma - GPF_COM_03a
	Fuel tanker	Road Train	2/04/2015	1/01/2016	274	53.99	0.39		Brisbane - Roma
Waste	Solid waste disposal	Articulated	2/04/2015	1/01/2016	274	39.14	0.29	7.00	Roma - GPF_COM_03a
	Liquid waste disposal	Articulated	2/04/2015	1/01/2016	274	39.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Nil consumables								
Other	Nil other								

WTF OPERATION	Description	Vehicle Type	Beginning Date	Ending Date	Duration (Days)	Total Loads	Average Trips per day	Delivery Frequency (1 truck every xx days)	Route Description
Maintenance Vehicles	Maintenace trucks	Articulated	1/01/2011	19/12/2060	18250	5214.29	0.57	3.50	Roma - GPF_COM_03a
Maintenance Equipment	Nil maintenance equipment								
Staff	0 WTF operation staff 20 ppl per bus 2 week shift 10 WTF operation staff 1 ppl per car 2 week shift	Rigid Light	1/01/2011 1/01/2011	19/12/2060 19/12/2060	18250 18250	0.00 13035.71	0.00 1.43	0.00 1.40	Romaair - GPF_COM_03a Romaair - GPF_COM_03a
Potable Water	Water truck	Rigid	1/01/2011	19/12/2060	18250	1825.00	0.20	10.00	Roma - GPF_COM_03a
Non-potable water	Non-potable water to be available locally (drill water) No transport on public roads								
Fuel	Fuel truck	Rigid	1/01/2011	19/12/2060	18250	173.81	0.02	105.00	Roma - GPF_COM_03a
	Fuel tanker	Road Train	1/01/2011	19/12/2060	18250	76.68	0.01		Brisbane - Roma
Waste	Solid waste disposal	Articulated	1/01/2011	19/12/2060	18250	2607.14	0.29	7.00	Roma - GPF_COM_03a
Consumables	Food truck	Rigid	1/01/2011	19/12/2060	18250	876	0.10	20.83	Roma - GPF_COM_03a
Other									

GPF_COM_03a

Traffic Summary - Major Items

Vehicle	Capacity	No. Loads	Quantity
Fuel truck	15000	5978	89,664,247 L
Fuel tanker	34000	2637	89,664,247 L
Concrete truck	7.4	4002	29,612 m3
Water truck	20000	28103	562,052,476 L
Food truck	5000	3849	19,246,015 kg
Gravel truck	40	5121	204,837 m3
Total movements all vehicles on public roads	118,696		
Total trips all vehicles on public roads	257,392		
Total Distance Travelled	51,701,259	VKT	
Average L/km	1.734	L/km	
Average Trip Distance	217.8	km	