2. Background and Project Rationale

2

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2. Background and Project Rationale

TOR Requirements:
This section is to provide the justification for the project, with particular reference made to economic and social benefits, including employment and spin-off business development. This section should also describe feasible alternatives, including conceptual, technological and locality alternatives to the Project and include discussion of the consequences of not proceeding with the project.

The background leading to the initiation of the project's consideration should be provided. It should include the political and government context as well as some general information about the Project in the local and regional context.

2.1 Overview of Existing Transport Infrastructure

The Gateway Motorway and the Gateway Bridge are key elements of the National Highway System within SEQ. The Gateway Motorway connects the Pacific Motorway at Eight Mile Plains in the south, with the Bruce Highway at Bald Hills in the north, an overall length of approximately 40km. The section of the Gateway Motorway that comprises the GUP extends from Mt Gravatt-Capalaba Road in the south to the northbound off ramp to Nudgee Road in the north, a length of approximately 19.75km (Figure 1.1). This section of the Gateway Motorway includes the Gateway Bridge which is owned by the State Government.

The Motorway is the eastern element of the outer Brisbane ring road system and provides a bypass of the Brisbane CBD for north/south traffic as well as providing local access to Brisbane Airport and, the industrial and port facilities located within the ATC area. Figure 2.1 illustrates the State Controlled Roads and National Highway network in the greater Brisbane area.

2.1.1 Existing Road Network

The Gateway Motorway intersects several major arterial roads within the Brisbane road network. The roads are either State Controlled Roads or part of the BCC local road network with the exception of Airport Drive which is owned by BAC. The major road network that intersects with the existing Motorway includes:

- Mt Gravatt-Capalaba Road;
- Old Cleveland Road;
- Wynnum Road;
- Port of Brisbane Motorway;
- Lytton Road;
- Kingsford Smith Drive (partially via the Links Avenue and Fison Avenue West ramps);
- East-West Arterial Road/Airport Drive;
- Toombul Road; and
- Nudgee Road.

Other roads within the local network that cross (over or under) or directly connect to the Gateway Motorway are:

- Weedon Street West, Mansfield (across the northbound on-ramp at Mt Gravatt-Capalaba Road);
- Greendale Way, Carindale;
- Belmont Road, Belmont (this includes an off and on ramp to the southbound carriageway;
- Meadowlands Road, Belmont; and

Gateway Upgrade Project

KEY

National Highway

Other Major State Controlled Roads or Local Authority Roads

Source: Main Roads District Maps

L:\graphics\jobs57\9210NZ\State Roads and National Highway.cdr June 2004

Queensland Government, Department of Main Roads

Australian Government, Department of Transport and Regional Services

Connell Wagner

FIGURE 2.1
National Highway and Major Road Network in the Greater Brisbane Area

- Ingham Court, Murarrie (a private road into a private property adjacent to Bulimba Creek).

Further detail on the road network is provided in Section 5.

2.1.2 Existing Public Transport Network

The Integrated Regional Transport Plan (IRTP) has set a target for increased use of public transport by 50% to 10.5% of all trips. However, census data for 1992 to 2001 shows declining use of public transport.

Bus Services

Brisbane Transport's (BT) scheduled public transport services use the Gateway Motorway and Bridge for the 599/598 Great Circle Route (via Murarrie Rail Station, Queensport Road and travelling via the Gateway Motorway between Lytton Road and East West Arterial via Gateway TAFE).

This service runs line-haul along the Motorway. There are no bus stops or stations within the Motorway corridor.

No private bus operators use the Gateway Motorway between Mt Gravatt-Capalaba Road and Nudgee Road for scheduled public transport services. Inter-regional buses use the Gateway Motorway to travel between the Brisbane Airport and the Gold Coast or the Sunshine Coast.

Taxi Services

Taxi companies regularly use the Gateway Motorway for taxi services within the corridor.

Rail Services

The GUP crosses existing rail infrastructure at 3 locations. The rail lines traverse generally east west and there is no north south rail corridor serving the area through which the GUP passes. The Gateway Motorway currently crosses the Cleveland Branch Rail Line at Murarrie, the Pinkenba Rail Line at Eagle Farm and passes under the Brisbane Airport Rail Line near Brisbane Airport. There are no station or interchange facilities at any of these crossings.

Ferry Services

The Brisbane River City Cat and Brisbane River ferry services do not extend as far east as the Gateway Bridge, with the nearest ferry terminal located upstream at Hamilton to the west.

Pedestrian and Bicycle Facilities

There are no existing pedestrian facilities within the corridor of the Gateway Motorway, including the existing bridge. Local pedestrian networks exist within the adjacent local road network and include the cross roads as discussed above. An existing pedestrian underpass under the Motorway exists at Ambara Street, Belmont (CH11500 – refer Volume 3). This facility will be maintained as part of the GUP.

Other local bikeway corridors exist within the Bulimba Creek area south of the Brisbane River land along Schulz Canal/Kedron Brook Floodway north of the Brisbane River. The local road network can be utilised for on road cycling. Bicycles are prohibited from the Gateway Motorway and the existing bridge.

2.1.3 River Users

The Gateway Bridge provides some 59m of vertical clearance and 236m of horizontal clearance for river traffic. River users include various barges, recreational boating and larger shipping. It is proposed that the new bridge would have a similar clearance.

2.2 Existing Gateway Bridge

The existing Gateway Bridge, opened in 1986, is a three span balanced cantilever concrete bridge with adjacent approach structures on each side. The overall length of the existing bridge is 1,627m. The main bridge span over the river is 260m (centre of pier to centre of pier) with adjacent side spans of 145m. The southern approach ramp structure is approximately 361m long and consists of 5 spans of lengths ranging between 60 – 88m. The northern approach ramp structure is approximately 716m long and consists of 10 spans of lengths ranging between 60 – 88m.

The bridge has 3 traffic lanes in each direction (north and south) separated by a rigid concrete median. The bridge is the easternmost road crossing of the Brisbane River with the next upstream bridge being the Story Bridge, some 11.5km west. The bridge has been designed to allow for maritime traffic to pass underneath on the Brisbane River and to allow aviation traffic to pass over to access the nearby Brisbane Airport.

Given the constraints of the shipping clearances below and aviation restrictions above, the bridge rises to a pavement level of approximately RL 64.2m (AHD) and a soffit level of RL 59.1m (AHD) above the river. This results in road grades of approximately 5.3% on both the southern and northern approaches.

The Gateway Bridge has operated as a tolled bridge since opening. The concession period for the toll continues to 2016. The Gateway Motorway does not operate as a tolled road. The bridge is currently tolled in both directions with the toll varying between $1.10 for Class 1 (motorcycles), $2.20 for Class 1, 2 and 3 vehicles (cars or cars and trailers and 2 axle trucks without trailer, respectively) and $5.50 for Class 4 vehicles (3+axles trucks).

A multi-lane toll plaza and associated administration buildings are located on the southern approach to the bridge, just to the north of Lytton Road. Current toll collections systems include electronic “E-toll” (automatic payment), manual touch-tag (automatic payment), automatic cash (no change given), manual cash (no change given) and manual cash (with change given).

Currently significant traffic volumes use the Gateway Bridge, in the order of 90,000 vehicles per week day with about 7,500 vehicles per hour over the six lanes during the weekday peak hour periods. Weekday traffic in excess of 100,000 vpd has been recorded on the bridge in 2004. The introduction of full ETC to the Gateway Bridge with associated traffic management would permit an increase in the hourly throughput at peak times and would lead to increased weekday traffic capacity to in excess of 125,000 vehicles per day. Details of traffic flows on the bridge are provided in Section 5 with a summary provided in Section 2.4.1.

2.3 Regional Planning Context

2.3.1 Population Growth

The SEQ population continues to grow increasing the demand for transport related services.

- SEQ has the highest concentration of population in the State with 64.4% of the population and an average annual growth of approximately 2.5% over the past 5 years (compared with 1.7% for the State as a whole);

- Using current population projections, it is expected that Queensland will accommodate 38.8% of the growth in Australia's population between 1996 and 2036. Seventy seven percent of this is expected to occur in SEQ, which equates to 30% of the total growth of the nation. This creates special challenges and pressures on infrastructure; and
- The State Infrastructure Plan (Strategic Directions) 2001 states that "Transport infrastructure must be developed in a way that will ensure the region's potential is not compromised by transport inefficiencies or traffic congestion due to urban growth".

2.3.2 Economic Activity

A total of 36,000 jobs in SEQ are estimated to be dependent upon the ATC area that is served by the Gateway corridor, including 15,000 related to the Airport, 7,500 related to the Port and 13,500 related to other industrial and commercial activities in the ATC. By 2009-10, 51,000 jobs in SEQ are expected to be generated by activities within the ATC (Economic Associates 2002).

The seaport is Australia's third largest container port, with port tonnes growing from 15mt (145,000 containers) in 1988-89 to 25mt (570,256 containers) in 2003. The airport is Australia's third largest in terms of passenger movements activity, with total passenger movements growing from 2.6 million (1977/78) to 12.3 million (2002/03), with forecasts of around 22.2 million (2012/13) and 35.4 million (2022/23).

Tourism is Queensland's second largest industry in terms of its Gross State Product (GSP) (Department of Tourism, Racing and Fair Trading 2001). In 1999 approximately $7 billion or 58% of all tourism visitor expenditure in Queensland was incurred in Brisbane, the Gold Coast and the Sunshine Coast. Brisbane, the Gold Coast and the Sunshine Coast are the third, sixth and tenth most popular day trip destinations in Australia, totalling 16.6 million visits or 11% of all day visits made by Australians in 1998.

The tendency for tourist travel within Queensland to be road-based and for international arrivals to be air-based signifies the significance of the Gateway corridor in facilitating tourist activity to and within Queensland (Economic Associates 2002).

A more detailed analysis of the freight task generated by this economic activity, the South East Queensland Freight Study, forecasts that even with some modal shift to rail, the road freight tasks in SEQ will double within 20 years.

Forecasts indicate that it is very likely that:

- Economic activity in SEQ generally, and ATC specifically will grow strongly in the foreseeable future; and
- The freight task for non-bulk freight and the transport task will grow similarly.

A detailed analysis of the economic impacts of to the GUP is provided in Section 20 of the EIS.

2.3.3 Industry Competitiveness

New major industrial precincts and associated industrial growth have the potential to impact upon the Gateway corridor because of its strategic nature in linking inter-modal hubs to regional networks. The following two major precincts require direct transport service through the corridor:

- ATC (2,300ha over 25 years). Located from the mouth of the Brisbane River to Colmslie and Eagle Farm on the south and north sides of the river, respectively. Taking in the Port of Brisbane and Brisbane Airport, and serviced by major road and rail connections, ATC is already a major industrial and transportation distribution centre for Queensland and northern New South Wales. The ATC is a major industry precinct and transport hub to Australian and Asian markets; and

- Carole Park Industrial Estate: (146ha over 5 years). Strategically located adjacent to the main Brisbane-Sydney-Melbourne and Brisbane-Darwin national highways and the Logan Motorway (connecting to the Port of Brisbane, Brisbane Airport, the rail freight interchange at Acacia Ridge and the Gold Coast). The estate is located in close proximity to the major industrial centre of Acacia Ridge/Wacol/Carole Park and is suited for industry uses requiring large sites (DSD 2001).

A key requirement that specifically relates to the Gateway corridor identified in the State Infrastructure Plan is the "Improvement of access routes and freight distribution capacities in freight corridors and between Business and Industry Centres, and the ATC area".

2.3.4 Strategic Planning Response

The challenge of population growth and economic activity in SEQ are recognised in strategic planning documents, such as:

- Regional Framework for Growth Management (2001);
- Integrated Regional Transport Plan for South East Queensland (1997);
- Transport 2007, An Action Plan for South East Queensland (2001); and
- State Infrastructure Plan (Strategic Directions 2001).

Regional Framework for Growth Management

The Regional Framework for Growth Management (RFGM) sets the framework for the desirable pattern of urban development in SEQ. The RFGM describes the preferred distribution of population and commercial centres. As such it has provided the basic demographic and land use inputs to subsequent transport planning for SEQ in recent years.

The strategy contains actions to ensure:

- A continuous and integrated system of designated high capacity freight roads which maximise separation of heavy freight traffic from urban areas and give priority to freight movements;
- Freight transport needs, as part of local economic development strategies are prioritised;
- Freight corridors and terminal sites are protected from incompatible adjacent development;
- Links between freight nodes in the SEQ region; and
- A northern freight linkage to the Port of Brisbane.

To support the RFGM the Integrated Regional Transport Plan (IRTP) for SEQ recognises the importance of enhancing road access in the Gateway corridor:

> *"On a regional basis, ensuring effective access to important economic nodes such as the Port of Brisbane and Brisbane Airport has been a priority", and "Planning is needed for a possible second river crossing near the Gateway Bridge to support regional travel and freight movements along the corridor".*

Integrated Regional Transport Plan (IRTP) for SEQ

The IRTP published in 1997 identified a 25 year transport development plan for SEQ. The Plan identified the Gateway Motorway corridor as an important strategic transport opportunity. It recognised that upgrading of the Gateway Motorway corridor should be carried out to ensure its role in supporting regional movement and economic development.

Transport 2007

Transport 2007 provides a detailed action plan for transport in SEQ up to 2007 within the framework of the IRTP and endorsed the need for upgrading of the Gateway Motorway corridor.

2.4 Need for the Project

TOR Requirements:
State the objectives that have led to the development of the Project. Outline the events leading up to the Project's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and action already taken within the Project area.

This section should also provide a statement of the objectives of the EIS. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives.

The EIS should address the specific objectives and justification for the Project. Issues to be addressed include:

- The strategic, economic and environmental implications of the Project;
- The need for the project based on studies including modelling of existing and project traffic volumes;
- Compliance with the Integrated Regional Transport Plan for South East Queensland;
- The short-term and long-term strategic implications of the Project in terms of the local and regional road network and the demands on infrastructure arising from new proposals; and
- The Project's compatibility with National guidelines and standards.

This section summarises the existing and future traffic and transport deficiencies in the GUP vicinity that have led to the formulation of the GUP proposal as defined in this EIS. It also identifies consequences and benefits of proceeding with the GUP. The information in this section is supported by Section 5 and Appendix E that deal with traffic and transportation in detail and by Section 20 that presents the economic impacts associated with the GUP.

2.4.1 Objectives of the Project

The GUP has been developed in the context of the Queensland Government's aim to deliver innovative transport solutions that connect people, goods and services. In particular, the Transport portfolio aims to provide the necessary infrastructure to meet particular transport needs.

The objectives of the project are to improve the transport system in the area of the GUP to:

- Alleviate future forecast traffic congestion in the GUP vicinity;
- Provide improved access to Port of Brisbane and Brisbane Airport;
- Avoid increased congestion on alternative roads through Brisbane City;
- Enable and support continued growth of the local region; and
- Stimulate economic growth of the Brisbane region and SEQ.

Using current population projections it is expected that Queensland will accommodate 38.8% of the growth in Australia's population between 1996 and 2036. Seventy seven percent of this is expected to occur in SEQ, which equates to 30% of the total growth of the nation. This creates special challenges and pressures on infrastructure.

Land uses within the Gateway corridor generate significant economic activity including significant volumes of road freight movements that use the Gateway Motorway and the Gateway Bridge. The most significant economic drivers are:

- Port of Brisbane, particularly the Fisherman Islands port facilities;
- Brisbane Airport and the developing Airport Park;
- ATC commercial and industrial precincts; and
- Eagle Farm and Hamilton industrial areas.

Commercial vehicles currently represent 16% of all Gateway Bridge traffic.

Further objectives of the GUP are:

- The provision of adequate traffic capacity and accessibility to and from these major land uses to allow the forecast overall economic development of the area;
- The provision of reliable, cost effective arterial road access to the National Highway system, the state arterial network, the Brisbane City arterial network, the seaport and the airport, to allow economic activity and future growth in these areas; and
- Provide adequate infrastructure to maintain the operations (and thus economic growth and employment) of the seaport and airport at a time when both ports are extended periods of growth.

2.4.2 Existing Traffic Congestion and Network Deficiencies

The Gateway Bridge and sections of the Gateway Motorway in the GUP area are approaching peak traffic capacity in both the morning and evening peak hours with motorists experiencing increasing delays within the area north and south of the Bridge.

Weekday traffic volumes in the vicinity of the Bridge are currently peaking at around 100,000 vehicles per day (vpd), with a count of 100,584 for the Bridge on 20 February 2004. Traffic volumes in the northbound morning peak direction are now close to capacity for around 3 hours, given the current toll plaza configuration. Similarly, traffic volumes in the southbound afternoon peak direction are now at capacity for around 3 hours, given the capacity of the southbound approach roads to feed the Bridge. Under these conditions, traffic growth can only occur in the contra-peak directions as well as the offpeak periods. Increasingly, peak spreading will occur as motorists re-time trips to avoid peak direction traffic congestion.

Troutbeck (2004) has indicated that the weekday capacity of the Gateway Bridge with full electronic tolling is around 125,400 vpd, based on limited peak spreading and the week day capacity could reach 140,000 vpd based on extensive peak spreading behaviour (assuming there is sufficient capacity on the approach roads).

The morning peak occurs before 9:00am then reduces between the hours 9:00am and 3:00pm followed by equally significant volumes during the evening peak. The morning peak volumes are larger than the evening peak for the northbound direction. The evening peak volumes are larger than the morning peak for the southbound direction. Traffic movements on the Bridge are approximately 50/50 in the north and south directions over a typical day.

The hourly capacity of the Bridge in the north or south directions with full ETC is about 5,400 vehicles per hour, however the current toll booth capacity is only about 4,500 vehicles per hour. The northbound average weekday traffic flow between 7:00am and 8:00am is currently about 4,500 vehicles per hour. The evening southbound flow is of a similar order. Hourly peak traffic volumes for the Gateway Bridge are at or near capacity of the existing toll collection facilities and upstream Motorway sections.

The Gateway Motorway is experiencing significant average annual traffic growth rates. Traffic modelling for the GUP has predicted 25% growth in cross river trips between 2001 and 2021, based on population and employment growth estimates for SEQ and current trip patterns.

In addition to the constraints posed by the Gateway Bridge capacity, the section of the Motorway between Nudgee Road in the north to Mt Gravatt-Capalaba Road in the south is rapidly approaching full capacity with congestion already occurring intermittently on several sections. This section of road requires immediate increased capacity (GHD 2003a).

The Gateway Motorway and Second River Crossing Planning Study (GHD 2003) has assessed the existing and future demands of the Gateway Bridge and the approaches. The investigation found that there is an immediate need for additional approach capacity both north and south of the river, with augmentation of river crossing capacity to follow. The strategic analysis for augmenting capacity on the northside indicates that a new deviation is preferred, rather than upgrading the existing Gateway Motorway alignment.

Traffic analysis using 2001 traffic volumes indicates that the following sections of the Motorway are at or above capacity:

- Gateway Motorway between Airport Drive and Kingsford Smith Drive;
- The section of the Motorway between the on/off ramps south of Kingsford Smith Drive (at Fison Avenue and Links Avenue) and the Gateway Bridge; and
- Gateway Motorway between Old Cleveland Road and Wynnum Road.

The analysis also shows that other sections of the corridor and feeder roads are approaching their capacity. They include:

- Gateway Motorway between Airport Drive and Toombul Road;
- East West Arterial Road/Airport Drive between Nudgee Road and Lomandra Drive (recently upgraded); and
- Other sections of the Gateway Motorway between the Pacific Motorway and the Gateway Bridge.

If nothing is done to relieve the congestion on the Gateway Motorway and Gateway Bridge, the existing congestion would increase further on various sections of the Motorway. The increased demands would lead to increased travel times, increases in local air and noise pollution and the potential for further increases in the use of alternative routes, including local suburban roads with consequent adverse impacts.

2.4.3 Future Traffic Forecasts

The Gateway Motorway corridor is forecast to experience continued growth in average weekday traffic volumes. By 2011, the daily traffic is predicted to increase by about 30,000 vehicles to 117,000 vehicles per day. A deterioration in average speeds for morning peaks is expected in the order of 23% by 2011 with about a 69% reduction by 2021 in the Gateway corridor. A similar deterioration in average speeds is also expected in the evening peaks on the Gateway Motorway and its immediate vicinity.

Traffic demand forecasts undertaken for the EIS (Section 5) with tolls maintained in real terms indicate that overall traffic volumes can be expected to increase from around 87,000 vehicles per day (vpd) in 2003 to 136,000 vpd by 2021.

Traffic modelling shows that at present, 14% of the daily use of the Gateway Bridge is heavy commercial vehicles (ie QML Classes 3 and 4) and this proportion is forecast to increase to 16% by 2021.

By 2021, it is forecast that, without any constraint imposed by a lack of sufficient traffic capacity, potentially 50% of the forecast bridge traffic will have an origin or destination in the airport or ATC area. The balance would be "other" trips – a high proportion of which would be making longer distance trips of a regional or sub-regional nature.

The future capacity of critical road elements is shown in Table 2.2.

Table 2.2 Forecast Capacity Status of Key Elements of the Motorway

Timing	Forecast Traffic Scenario
At 2006:	• Traffic volumes on all sections of the Gateway Motorway north of the Bridge to Toombul Road exceed capacity; • Traffic volumes on the section between Old Cleveland Road and Wynnum Road exceed capacity; • The Gateway Bridge is approaching the identified bridge capacity volume assuming the current toll plaza configuration remains; • Roads adjacent to the Motorway which are approaching capacity include Nudgee Road, sections of Sandgate Road and Kitchener Road, which are driven by congestion on the parallel sections of Gateway Motorway; and • Traffic volumes on Airport Drive exceed capacity.

Timing	Forecast Traffic Scenario
At 2011:	• All the sections of the Gateway Motorway between Old Cleveland Road in the south, including the bridge, and Toombul Road in the north and have reached capacity; • There is an increase of traffic diverted through Ascot as indicated by local roads such as Nudgee Road, Kitchener Road and Sandgate Road which are approaching capacity; and • Volumes on Kingsford Smith Drive are approaching capacity.
2016 to 2021:	• During this period there are few additional roads reaching capacity as many had already reached capacity by 2011. However the East West Arterial is approaching capacity by 2016; and • Despite growing congestion, the analysis shows an increase in demand for travel on the Gateway Motorway and Bridge. However, the volume of traffic will be constrained by the congestion on the Motorway approaches to the bridge and local roads leading to the Gateway corridor.

Overall, if nothing is done to relieve congestion in the corridor, the predicted levels of congestion can be summarised as follows:

- The southern and northern approaches to the Gateway Bridge will fail first;
- The worsening congestion on the approaches diverts further demand to the local road networks and therefore constrains growth in the bridge volume;
- Congestion on the northern approach forces traffic into other parts of the network west of the Gateway Motorway including Nudgee Road, Kitchener Road and Sandgate Road; and
- Congestion on the southern approach forces traffic into other parts of the network including Creek Road, Wynnum Road and Lytton Road.

2.4.4 Strategic Importance of the Corridor

The importance of the Gateway Motorway to the road network, and the need for maintaining effective traffic flows in this region, is evidenced in the IRTP by the following statements:

- *"On a regional basis, ensuring effective access to important economic nodes such as the Port of Brisbane and Brisbane Airport has been a priority"; and*
- *"Planning is needed for a second river crossing near the Gateway Bridge to support regional travel and freight movements along the corridor".*

Chapter 20 provides details of Port and industrial developments that are occurring in the local region served by the GUP and indicates the areas of strong growth and future proposed development. A summary of key aspects is provided in the following paragraphs.

The Gateway Motorway corridor is strategically located as the north-south arterial spine servicing the ATC area, including the airport and seaport, and the established commercial industrial suburbs in Brisbane's north. The economic activity and future growth in these areas relies upon reliable, cost-effective arterial road access to the National Highway System, the state arterial network, the Brisbane City arterial network, the seaport and the airport.

The Port of Brisbane is a major driver of economic and freight activity in SEQ with total trade transport of 25 million tonnes in 2003. The Port accounts for over $7 billion of total overseas exports from the region and the equivalent of 570,256 containers.

BAC has invested over $450 million over the past 7 years in moving Brisbane Airport towards the Airport City concept. Passenger movements in the order of 12.3 million in 2003 and airfreight totalling 150,000 tonnes have underpinned the BAC investment in industrial/commercial sectors at the airport. It is estimated that Brisbane Airport currently has 8,000 full time employees working in businesses at the airport with another 18,000 in the region directly dependent on the airport's activities.

The importance of the corridor for supporting SEQ economic development is better reflected by its role for carriage for commercial vehicles. Traffic modelling undertaken for the Cross River Strategy Study sponsored by Queensland Transport, MR and BCC (QT et al 2002) shows that the Gateway Bridge is the most important road cross-river link for commercial vehicles.

The Gateway Motorway is also a nominated "dangerous goods" route whereby trucks carrying hazardous goods are required to use the Motorway when passing through or servicing the area. The Gateway Bridge is also characterised by:

- A long average trip length of 41km; and
- A significant proportion of regional through travel (ie between locations outside the Brisbane Statistical Division (BSD)) accounts for 6% of use, with a further 18% of trips associated with travel to or from areas outside the BSD to the north, south and west (QT et al 2002).

Economic Development

Land uses within the Gateway corridor generate significant economic activity including significant volumes of road freight movements that use the Gateway Motorway and the Gateway Bridge. The most significant economic drivers are:

- Port of Brisbane, particularly the Fisherman Islands port facilities;
- Brisbane Airport and the developing Airport Park; and
- ATC commercial and industrial precincts, including Eagle Farm, Pinkenba and Hendra industrial areas on the north side and Hemmant, Murarrie and Lytton on the south side of the Brisbane River.

Heavy commercial vehicles (ie QML Classes 3 and 4) currently represent 11% of all Gateway Bridge traffic.

The overall economic development of the area is directly dependent on the corridor providing adequate traffic capacity and accessibility to and from these major land uses.

In particular, the Port of Brisbane is forecast to increase its trade transport from 25 million tonnes in 2003 to 37 million tonnes in 2013 at an average annual growth of 5.3%. The Brisbane Airport is also forecast to increase from the current 12.3 million passenger movements to 22.2 million by 2012/13 at an average annual growth of approximately 5.9%.

Commercial and industrial land developments are earmarked for estates owned by the Port of Brisbane Corporation, DSDI and a number of key private sector proponents in the ATC.

Reduced accessibility and increasing road congestion resulting from inadequate road infrastructure could seriously affect the operations of the seaport and airport at a time when both ports are heading for extended periods of growth.

Mix of Motorway and Local Network Traffic

Traffic using the Gateway Motorway and the Gateway Bridge for significant length journeys in the north/south direction is estimated at 18% of the traffic crossing the Gateway Bridge. That is, of traffic crossing the Gateway Bridge 18% of journeys travel the complete length of the Motorway from Mt Gravatt-Capalaba Road in the south to Nudgee Road in the north.

The remaining 82% of vehicles use the Gateway Bridge, as a link in their journey along the surrounding road network.

Notably there are significant volumes of east/west traffic using sections of the Motorway at the following locations:

- Old Cleveland Road to Wynnum Road;
- Lytton Road to Kingsford Smith Drive; and
- Kingsford Smith Drive to Airport Drive.

The use of the Gateway Motorway for partial journeys is a result of either a lack of an alternative parallel route or existing congestion within a parallel route.

2.4.5 Emerging Constraints

With current trends, the level of transport service provided by the Gateway Motorway will fall well below desirable standards within the next decade. Traffic analysis undertaken during the development of the GUP Business Case and the Gateway Motorway Second River Crossing Planning Study indicates the following situation:

- The existing Gateway Bridge will reach traffic capacity in the period 2006-2011;
- The existing southern approach to the Gateway Bridge will reach capacity before 2006; and
- The existing northern approach to the Gateway Bridge reached capacity prior to 2003.

In addition, there are a series of related issues that will become more dominant in the future:

- Traffic growth combined with the lack of alternative routes for cross-river traffic will result in reduced accessibility to both the Brisbane Airport and to the Port of Brisbane with increases in the consequences of congestion such as crashes and incidents. The need for additional capacity through road widening and alternative routes will increase in importance;

- At present, the Gateway Motorway between the Gateway Bridge and Airport Drive serves regional movement and sub-regional movements (primarily to/from the Brisbane Airport) due to the absence of a properly formed network of supporting arterial roads in this area. The resultant mixing of traffic functions in conjunction with the existing substandard road alignment (in engineering terms) combined with the short spacing between interchanges has led to excessive weaving manoeuvres.

These constraints have led to a situation where this section of the Motorway is at capacity in peak periods and has a relatively high accident rate and associated accident costs. These high accident costs and underlying congestion also have high attendant social costs. In addition, the physical condition and capacity of some sections of the existing Gateway Motorway are deficient and need to be upgraded.

2.4.6 Consequences of Not Undertaking the GUP

Future development in the ATC area will be largely dependent upon increased activity at the seaport and airport that in turn requires efficient and convenient landside transportation links. However, without improvements to rectify emerging constraints in the Gateway Motorway corridor, including the Gateway Bridge, the following negative impacts are predicted to occur:

- Unacceptable delays in traffic, causing traffic to divert to other river crossings closer to the CBD and local arterial roads, with attendant traffic intrusion into local communities;
- Increasing accident rates in the corridor, and attendant road user and social costs, as traffic volumes exceed acceptable design standards;
- Reduced accessibility to the Port of Brisbane and to the Brisbane Airport at a time when seaport trade throughput and passenger movements are growing strongly;
- Unacceptable economic outcomes for the ATC area resulting from loss of opportunities for strategically important and commercial development; and
- Failure to achieve acceptable service and performance requirements on this strategically important transport corridor.

2.4.7 Conclusion

There is an identified need to improve the transport system in the area of the GUP to:

- Alleviate future forecast traffic congestion in the GUP vicinity;
- Provide improved access to the Port of Brisbane and Brisbane Airport;
- Avoid increased congestion on alternative roads through Brisbane City;
- Enable and support continued growth of the local region; and
- Stimulate economic growth of the Brisbane Region and SEQ.

2.5 Options Analysis

TOR Requirement:
This section is to provide a description of the various road alignment and configuration options that were assessed in the Gateway Motorway and Second River Crossing Planning Study to determine the preferred alignment. Options should be discussed in sufficient detail to enable an understanding of the reasons for selecting the preferred alignment option and rejecting others. Reasons for selecting the preferred alignment should be delineated in terms of technical, commercial, social and natural environment aspects. The alternative of taking no action should also be discussed.

Relevant illustrations, maps and drawings that show the location of the assessed alignment options in the local and regional context should accompany this section.

The previous section presented the case for the GUP and the consequences of not proceeding. This section reviews the various options that have been considered in developing the GUP proposal presented in this EIS. The planning for the GUP has included consideration of a broad range of options for design and implementation. The options have been reviewed in terms of project objectives including commercial, environmental and social dimensions. This section outlines the studies and

analysis undertaken to identify a project that could achieve the transport objectives within an acceptable social, environmental and economic context.

The key options considered as part of the planning process are summarised in Table 2.3.

Table 2.3 Summary of Key Options Considered in Planning the Motorway Upgrade and New River Crossing

Aspect	Option	Sub-option	Status
Motorway Alignment (northern)	Western (existing alignment)		NA – Does not resolve existing congestion
	Central deviation		Proposed
	Eastern deviation		NA – Conflict with airport
Motorway Alignment (southern)	Existing motorway		Proposed, least cost and least impact option
River Crossing	Duplication of bridge	Next to adjacent bridge	Proposed
		Separate from existing bridge	No other suitable site
	4 lane tunnel		NA – too restrictive and costly
Motorway Widening	Number of lanes	Increase by 2 lanes	Mt Gravatt-Capalaba to Wynnum
		Increase by 4 lanes	Wynnum to Lytton
	Widening at edges		Some places
	Use of median strip		Proposed
New Interchanges	2nd Airport access		Proposed
Visual Treatment	Various themes		Proposed
Tolling facilities	ETC		Favoured
	Manual tolling and ETC		NA – additional land requirement and decrease in traffic flow (not favoured at this stage)
Motorway Management	Tidal flow		NA
	Peak spreading		NA for Bridge

Table Note:
NA = Not adopted

Table 2.3 represents a simplified summary of options considered for the section north of the Brisbane River. In many instances combinations of various aspects were considered. In the case of route option alignment development and including consideration of schemes and elements for the project components, there were over 350 different possible options that could be assessed.

2.5.1 Overview of Key Planning Studies

The Planning Study to investigate the provision of a second river crossing in the vicinity of the existing Gateway Bridge, and the upgrading of the Motorway between Mt Gravatt-Capalaba Road and Nudgee Road was undertaken between 2001 and 2003. This study was commenced by Egis Consulting Australia and subsequently finalised by GHD (who acquired Egis Consulting in 2002) in 2003.

The Planning Study investigated future traffic demand for the Gateway Motorway corridor and developed a concept planning alignment for a possible upgrading of the Motorway. In particular, the Planning Study identified the need for a second bridge crossing in the vicinity of the Gateway Bridge and a new Gateway Motorway deviation through the sites of the old and new Brisbane Airport and across Kedron Brook Floodway.

The Planning Study comprised five separate parts:

- Part A - Strategic Corridor Planning - Gateway Motorway, Mt Gravatt–Capalaba Road to Nudgee Road. Gateway Motorway and Second River Crossing Planning Study Mt Gravatt-Capalaba Road to Nudgee Road - Concept Planning - Executive Summary of Report Volumes 1 to 7;
- Part B – Route Location, Corridor Assessment and Concept Planning for a second river crossing and 4 lane deviation of the existing Gateway Motorway between Lytton Road and Nudgee Road;
- Part C1 –Feasibility Review for an upgrade of the existing Gateway Motorway between the Gateway Bridge and Nudgee Road;
- Part C2 – Project Proposal Report for the upgrading of the Gateway Motorway-Airport Drive Interchange; and
- Part D - Concept Planning for a 6 lane upgrade of the Gateway Motorway South between Lytton Road and Mt Gravatt Capalaba Road.

The key reports associated with these various project parts include:

- Volume 1 – Mt Gravatt – Capalaba Road to Nudgee Road –Strategic Corridor Planning Report;
- Volume 2 – Lytton Road to Nudgee Road – Draft Route Location and Corridor Assessment Report;
- Volume 3 - Lytton Road to Nudgee Road –Review of Environmental Factors (Concept);
- Volume 4 - Lytton Road to Nudgee Road –Concept Planning Report;
- Volume 5 - Mt Gravatt – Capalaba Road to Lytton Road - Review of Environmental Factors (Concept);
- Volume 6 - Mt Gravatt – Capalaba Road to Lytton Road - Concept Planning Report;
- Volume 7 - Mt Gravatt – Capalaba Road to Nudgee Road - Community Consultation Report.

A number of specialist studies were undertaken subsequent to the Planning Study including investigations into migratory birds, potential impacts on Moreton Bay Ramsar sites and targeted surveys for threatened flora at Bulimba Creek.

Connell Wagner was subsequently commissioned by GUP in December 2003 to undertake the EIS for the GUP and to assist the project team with the development of the project Business Case. Within this commission, the Planning Study alignment of the Gateway Motorway has been altered to allow for outcomes of the EIS and for further development and refinement of the engineering following additional traffic modelling and analysis.

2.5.2 Planning Study Analysis and Outcomes

Environmental Route Identification and Analysis

The Gateway Motorway and Second River Crossing Planning Study (GHD 2003c) undertook a route identification study between Lytton Road and Nudgee Road. A Geographical Information System (GIS) was used to assist in the identification of viable corridor options for a second Gateway Motorway bridge and associated northern deviation that minimised both social and environmental impacts, principally by avoiding sensitive areas.

The process to identify these corridors was divided into five main stages:

1. Identification of issues;
2. Collection of data on environmental and social issues that are sensitive to the construction and operation of a road;
3. Assigning sensitivity values for each environmental and social issue;
4. Selection of the least cost corridor option derived from the sensitivity maps; and
5. Field investigation to verify broad suitability of corridors.

Identification of Issues

The initial investigations identified that the environmental and social impacts likely to be associated with the construction and operation of a road in the study area included:

- Impacts on Moreton Bay and Ramsar areas;
- Impacts on native vegetation and flora;
- Impacts on surface waters and flooding;
- Impacts on airport land and associated developments;
- Impacts on industrial land uses;
- Visual and landscape impacts; and
- Cultural and European heritage issues.

Based on mapping and assessment of the issues, route identification was undertaken using INCA modelling software. The software is based on GIS technology and uses a system of ratings and weightings to identify route options.

Selection of the least cost route takes into account all constraints while keeping the road to a reasonable length. The variation in width of corridors reflects the availability to move within that corridor. Corridors were identified from the existing Gateway Bridge through to the Nudgee Road.

A sensitivity analysis was undertaken using a variety of weighting scenarios. These scenarios included models with environmental, built and social environment bias. Over 30 scenarios were run.

Different weightings were used for the issues to derive three general corridor concepts. These corridor concepts were then refined to produce three viable options, including:

1. Eastern Option

Identified when environmental issues were considered most important while existing infrastructure and planning issues were effectively ignored. This alignment had a significant impact on the airport, and was subsequently eliminated as a viable alternative.

2. Central Option

Identified when all issues were weighted based on professional input from the Planning Study team. This alignment is generally consistent with the alignment identified in the Brisbane Airport 2003 Master Plan. This option was submitted as a preferred alignment for preliminary design.

3. Western Option

This option followed the existing Motorway alignment and was identified when all issues were given equal weighting.

The location of the alignment options is shown in Figure 2.2.

Route Option Alignment Development

Route option alignment development was guided in the first instance by the viable route options discussed above. However, the viable route options were refined to address engineering factors. These factors related to specific design elements that need to be incorporated into each option and included:

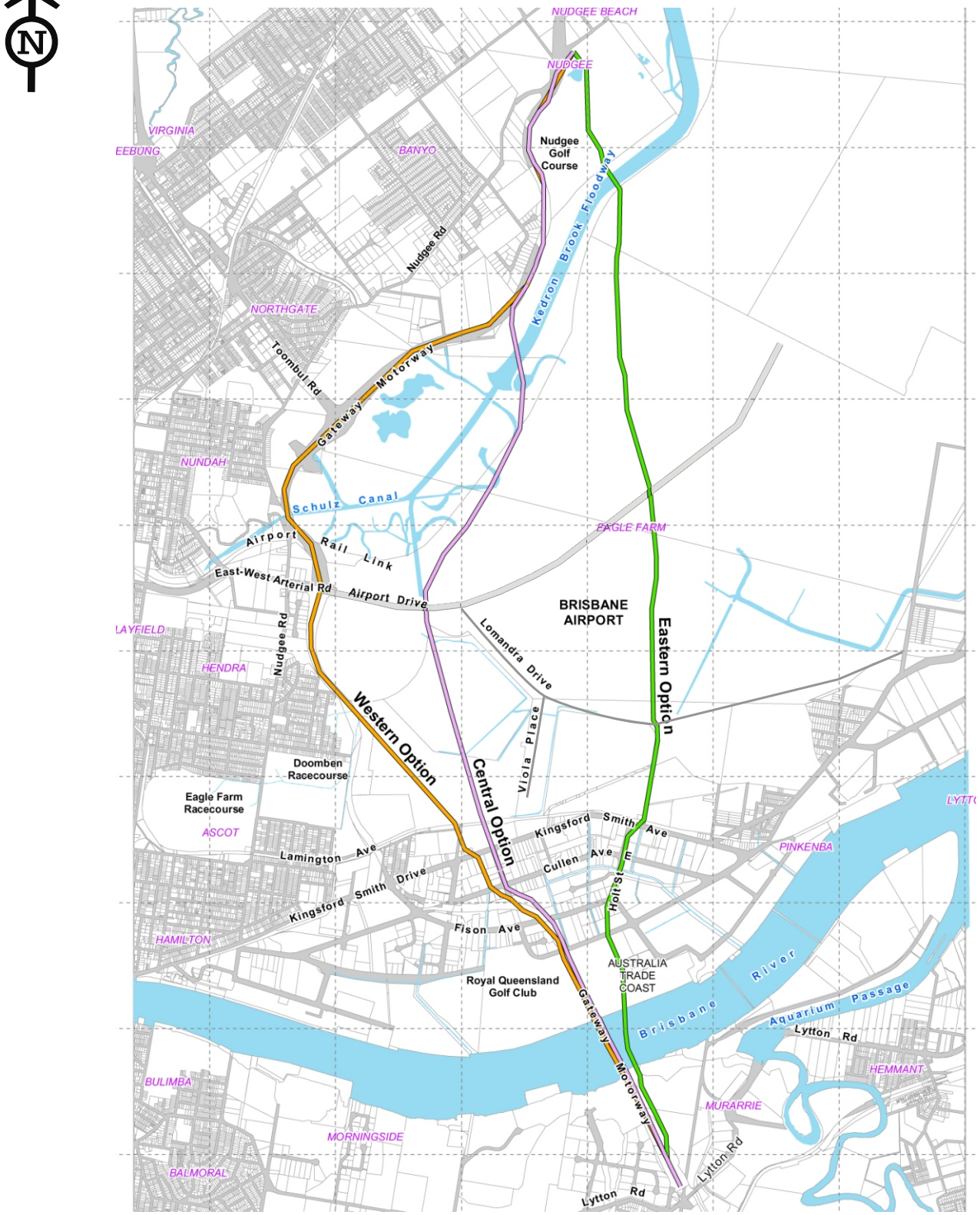
- Geometric design;
- River crossing type, bridge or tunnel;
- Toll plaza location and interchanges;
- Road operational characteristics; and
- Other physical constraints.

Scheme Development

Based on the environmental route location analysis, and discussions with key stakeholders, two river crossing locations (schemes) were developed for preliminary investigation utilising a bridge or tunnel option.

For each of these schemes and options a number of roadway elements were considered which included:

- Tolling arrangements;
- Southern bifurcation arrangements;
- Airport Drive interchange with existing Gateway Motorway;
- Airport Drive intersection with new deviation;
- Second airport access on deviation; and
- Northern bifurcation and existing Motorway improvements to Nudgee Road.



Q:\graphics\graphics\jobs\579210NZ\Planning Study Route Options April 2004

Queensland Government Department of Main Roads
Australian Government Department of Transport and Regional Services
Connell Wagner

FIGURE 2.2
Planning Study Route Options

Corridor Options Evaluation

The corridor schemes and options were evaluated in terms of the following critiera:

- Engineering feasibility (constructability and staging);
- Cost of construct;
- Property impacts;
- Traffic operations;
- Number and significance of services affected;
- Benefits/travel timing savings and vehicle operating cost savings); and
- Environmental (natural, social and built environment impacts).

Sensitivity testing of the alternatives was undertaken by varying the component scores for each criterion, between ranges as determined by the level of confidence associated with each criterion.

The Planning Study evaluation identified the following key elements as the most appropriate option:

- Six lane bridge river crossing;
- Bifurcation using embankment option;
- Airport Drive interchange (service with east-west arterial flyover);
- Second airport access on deviation; and
- Northern bifurcation and Nudgee Road realignment.

Planning Study Consultation

During the Planning Study various consultation activities were undertaken. These activities are summarised in Table 2.4.

Table 2.4 Summary of Consultation Activities Undertaken during Planning Study

Planning Study Concept	Consultation Activity
Strategic Corridor Planning Phase	• Briefings for elected representatives
	• Briefings with Stakeholders
	• Newsletters
	• E-mail and facsimiles
	• Advertisements/media
	• Information Line
	• Web page
	• Public Displays
Gateway North Route location and Concept Planning and Gateway South Concept Planning	• Briefings for elected representatives
	• Meetings with owners and tenants of potentially directed impacted property and property adjacent to the Motorway

Identification of Preferred Option

The transport modelling completed in Part A of the Planning Study concluded that additional capacity in the corridor was required to cater for anticipated growth. The modelling indicated the immediate need for additional approach capacity both north and south of the river, with augmentation of river crossing capacity to follow, most likely in the period 2006 to 2011.

The preferred alignment of the Gateway Motorway upgrade between Mt Gravatt-Capalaba Road and Lytton Road has been significantly influenced by the alignment of the existing Motorway. The alignment of the 6 lane upgrading within this section can provide maximum benefit for the network within financial and economic constraints. By adopting these principles the upgrade of the existing corridor is able to provide the greatest long term benefit for the investment made.

2.5.3 Tidal Flow on Gateway Bridge or Peak Spreading

The potential for tidal flow solutions to extend the usable life for the existing Gateway Bridge for two way operations was also investigated. Using hourly traffic count data obtained from Queensland Motorways Limited (QML) the directional split of traffic flows was investigated. The investigation found that during the morning peak the directional split for traffic is 59% in the northbound and 41% in the southbound direction. During the afternoon peak the directional split northbound and southbound is 57%/43%. If a 4/2 lane split on the bridge was adopted it was found that the non-peak direction reached capacity in the 2 lanes in which it operated. As a result the use of tidal flow solutions for the existing Bridge were not further investigated.

The opportunity to extend the existing Bridge life through "peak spreading" by traffic demand management techniques was also investigated. In the last few years, the northbound traffic in the morning peak period has spread from a distinct 1 hour traffic flow to a 2 hour traffic flow, and will shortly have a spread further to around 3 hours. The southbound afternoon peak period currently extends for around 3 hours and will continue to spread.

The longer peak periods are driven by the demand increasing above the capacity of the system. Some users of the bridge would adjust their travel time and allow for this excessive demand. An increase in the peak period will also be accompanied by significantly increased travel time delays and traffic queues.

Given the economic growth potential of the surrounding area from a local, national and international perspective, it is important to provide a reliable level of service at all times on the Bridge and it was is considered undesirable for the peaks to be increased beyond the present time period.

2.5.4 Full Electronic Tolling

With the conversion of the existing toll collection facilities to full electronic toll collection the weekday capacity of the existing Gateway Bridge can be marginally increased to 125,000 vpd with limited peak spreading. However, peak period capacities are reached prior to 2011.

2.5.5 No Gateway Upgrade Project

In the absence of the upgrade of the Brisbane River crossing, there will be a progressive increase in vehicle congestion with consequent degradation in travel times of vehicles passing over the bridge and adverse financial impacts on users and the community in general. It would also be likely to increase in excess flows diverting to other traffic routes through the city that would also degrade those routes.

2.5.6 Public Private Partnership Option

The Queensland Government has proposed that the GUP be developed as a Private Public Partnership (PPP) and has established a six stage process "Value for Money" Framework for project delivery. The stages in this process involve:

1. Service Identification
2. Preliminary Assessment
3. Business Case
4. Expressions of Interest
5. Bidding Process
6. Management of Project Agreements

The EIS supports the Business Case Development stage. Progression to the subsequent stages is dependent on obtaining the necessary approvals and suitable commercial arrangements.

2.6 Costs and Benefits

TOR Requirements:
This section is to discuss the following:

- The economic costs and benefits to industry and the wider community
- The regional social impacts including employment and skills development (training) required directly for the Project and indirectly for any ancillary works to the Project.

2.6.1 Project Costs

Table 2.5 summarises the GUP cost estimates for works between Mt Gravatt-Capalaba Road to Nudgee Road, including the new Gateway Bridge.

This project cost estimate includes allowances for design and project management costs, land acquisition, management reserve and appropriate contingency. The estimate is in 2002 dollars.

Table 2.5 Concept Planning Capital Cost Estimates (Mt Gravatt-Capalaba Road to Nudgee Road)

Technical Solution Requirement	Capital Cost Estimate ($2002)
Duplication of the Gateway Bridge, including immediate approach roadways (Lytton Road to Kingsford Smith Drive)	$525 million to $620 million
Gateway Motorway to south (between Mt Gravatt-Capalaba Road and the bridge)	$220 million to $250 million
Gateway Motorway to the north including an additional four lane deviation and second airport access interchange north of Airport Drive	$455 million to $530 million
Preliminary Capital Cost Estimate – Total	**$1,200 million to $1,400 million**

2.6.2 Economic Benefits

The GUP represents a sizeable project that has a total estimated cost of $1.2-$1.4 ($2002) billion.

Direct economic benefits accruing to the region and state from the GUP construction stage include:

- Contribution to Gross Regional Product (GRP) – estimated at $683 million;
- Full time equivalent employment creation over 4 to 5 year construction period - 5,919; and
- Wages and salaries through employment - $465 million.

Additional economic benefits will accrue for the operations phase as follows:

- Gross output - $24.6 million;
- Gross Regional Product - $15.4 million;
- Wages and Salaries - $11.7 million; and
- Full time equivalent employment - 258.

Further details on the economic benefits of the GUP are provided in Section 20.