Airport Link
Phase 2 – Detailed Feasibility

EIS CHAPTER 16

ECONOMIC ENVIRONMENT

- October 2006

Contents

16. Economic Environment

This chapter addresses Section 5.11 of the Terms of Reference. It describes the existing economic environment (local and regional) and evaluates the benefits and impacts of the Project on the economic environment. An evaluation framework for the assessment includes:

- *Definition of economic objectives and scope of the project;*
- *A timeframe for the analysis that reflects the economic life of the principal asset;*
- *Identification of an appropriate project-specific discount rate*
- *An outline of all costs and benefits of the Project for users and the broader community in terms of transport network effects, employment and the environment; and*
- *Identification of the distribution of net benefits and net costs to key stakeholders residing or operating within the study corridor.*

All efforts are made to quantify costs and benefits including social and environmental. A computable general equilibrium analysis has been conducted that captured socio-economic effects. Consideration has been given to major transport projects in the vicinity of the Project that are under construction or have proceeded to the tender process. The analysis generally adheres to the Queensland Treasury Project Evaluation Guidelines.

16.1 Existing Economic Environment

The existing economic environment analysis includes:

- Detailed analysis on major economic centres for which the project would improve access;
- A street survey to identify economic activities in the study corridor; and
- Assessment of the National Institute of Economic and Industry Research (NIEIR) Brisbane Long Term Planning Economic Indicators study (October 2005).

16.1.1 Major Economic Centres Impacted by the Proposed Airport Link

The proposed Airport Link tunnel would provide improved access and thus significant benefits to the following major economic centres:

- Brisbane Airport;
- Port of Brisbane;
- Australia TradeCoast including TradeCoast Central (northern side of Brisbane River);
- Centro Toombul Shopping Centre; and
- Westfield Chermside Shopping Centre.

Each of these centres depends for their success on high capacity transport access. Because of their geographic situation in relation to the tunnel alignment there can be little doubt that Airport Link will have an effect on each of them to greater or lesser degree. From an economic point of view it is important to understand the performance and projected future of each centre so as to understand the broader improvements to regional prosperity that may be able to be supported by Airport Link.

Other commercial and industrial land uses north of the Brisbane River within the influence of the Project are:

- Port of Brisbane's Eagle Farm Estate comprising 26 hectares which accommodates industrial warehousing, commercial offices and distribution;
- Private commercial and industrial parks in the Gateway North area around Eagle Farm, Pinkenba, Hamilton and Hendra;
- Other major industrial and commercial estates in the Outer North area including Geebung, Zillmere, Banyo, Brendale, Narangba and Burpengary.
- Stafford City Shopping Centre; and
- Centro Lutwyche Shopping Centre has been addressed in the street level survey.

Brisbane Airport

Brisbane Airport occupies 2,700 hectares and is Australia's third largest in passenger movement numbers. Brisbane Airport is operated by the Brisbane Airport Corporation (BAC) under a 50 year lease with an option for an additional 40 years from the Commonwealth of Australia. Road access is mainly via Airport Drive from the East-West Arterial and Gateway Motorway. The Airtrain rail link provides access to the Brisbane Citytrain network and beyond. The airport operates 24 hours a day and has approximately 130 businesses with more than 8,000 full time staff. A further 10,000 people are directly dependent on airport activities for their income.

Total revenue passenger movements at Brisbane Airport over the 10 years, 1995-96 to 2004-05, are shown in **Table 16-1**. The Table demonstrates significant increases in domestic and international passenger usage at a total average annual growth rate of 6.7%.

Table 16-1 Brisbane Airport Revenue Passenger Movements

Year	Domestic	International	Total	Growth (%)
1995-96	7,170,517	2,065,369	9,235,886	8.5%
1996-97	7,430,023	2,252,855	9,682,878	4.8%
1997-98	7,467,388	2,270,089	9,737,477	0.6%
1998-99	7,544,120	2,290,219	9,834,339	1.0%
1999-00	8,104,245	2,430,019	10,534,264	7.1%
2000-01	9,927,901	2,538,692	12,466,593	18.3%
2001-02	9,297,170	2,476,511	11,773,681	-5.6%
2002-03	9,398,278	2,442,918	11,841,196	0.6%
2003-04	10,867,634	2,912,444	13,780,078	16.4%
2004-05	11,874,173	3,483,857	15,358,030	11.5%

The 2001-02 year saw a downturn in aviation activity in Australia that resulted from the aftermath of the September 11 terrorist attacks, the demise of Ansett, the SARS epidemic and the recessive economic conditions in Australia and internationally. Since 2001-02, passenger movements through Brisbane Airport have increased at an average annual growth rate of 10.1% with total movements increase in the last two years 16.4% and 11.5%, respectively. Domestic passenger movements over the past three years have increased at an average annual rate of 9% while international passenger movements have exhibited an even higher average annual growth rate of 13.5%.

The increase in passenger movements at Brisbane Airport over the past decade, and significantly over the past three years, has heightened pressure on the adjacent road network. This is particularly evident in the local AM and PM traffic peaks in and around the network on the Gateway Arterial between Nudgee Road and the

Kingsford Smith Drive that coincide with the peak for domestic aircraft arrivals and departures.

Air freight at Brisbane Airport was 152,710 tonnes in 2004/05 comprising of 98,694 tonnes in international air freight and 54,013 tonnes in domestic air freight.

Over 9 years, Brisbane Airport Corporation has invested $450 million to transform Brisbane Airport from a traditional state capital air passenger hub to the Airport City concept. The Brisbane Airport 2003 Master Plan contains the planning framework for development to 2023. Implementation of the master plan has commenced, initiating developments to promote significant business, industry and employment opportunities for Brisbane and the SEQ region.

Port of Brisbane

The Port of Brisbane, particularly its port facilities at Fisherman Islands, is a major driver of economic activity in South East Queensland and further afield. The Port of Brisbane is Australia's third largest container port and its fastest growing. The port's trade provides a reliable barometer of broader economic activity in South East Queensland.

While the port facilities will not have direct road connectivity via the Airport Link, heavy vehicle traffic will use the road network including the proposed Airport Link for origin and destination freight movements. Total cargo trade through the Port of Brisbane has been rising steadily over the past decade, from 18.8 million tonnes in 1995/96 to 26 million in 2004/05 at an average annual growth rate of 3.8%. Container throughput at the port has increased over the same period from 249,439 in 1995/96 to 726,145 in 2004/05 at an average annual growth rate of 19.1%. The port accounts for over $7 billion of total overseas commodity exports (91.4%) from South East Queensland.

The use of heavy vehicles to move containers into and out of the port from various industrial locations and depots in South East Queensland and beyond has a major impact on the Brisbane road network. This existing trade results in significant heavy vehicle traffic from the north and south via the Gateway Motorway to Fisherman Islands and to a lesser extent via major arterials such as Lutwyche Road.

Australia TradeCoast (ATC)

The ATC is the primary trade and industrial area for Brisbane and SEQ. With the Port of Brisbane, Brisbane Airport and about 8,000 hectares of land, the area is recognised one of Australia's leading industrial, commercial and logistics centres and a key generator of output and employment.

The Port of Brisbane Corporation has land for industrial development on both sides of the Brisbane River including Fisherman Islands, Port of Brisbane Business Park, Whyte Island Industrial Estate, Colmslie Business Park and Eagle Farm Industrial Estate. Other existing or planned industrial estates within the ATC including:

- Metroplex on Gateway (Murrarie)
- Gateway Business Park (Murrarie)
- Murrarie Business Park
- Rivergate Marine and Industry Park (Murrarie)
- Portlink Industrial Park (Hemmant/Queensport)
- Gateway Industrial Precinct (Pinkenba)

The Queensland Government, through the Department of State Development and Innovation (DSDI), has been developing three industrial estates within the ATC:

- Lytton Industrial Estate;
- Hamilton Industrial Estate which is now completed; and
- Murrarie Development Precinct.

Brisbane City Council's 36 hectare Trade Coast Central Stage 1 project on the old Brisbane Airport site is scheduled to commence in late 2006. The remaining 110 hectares are set aside for future industrial and commercial use.

Outer North

Brisbane's northern industrial activities are gradually shifting to the metropolitan outskirts at Brendale, Narangba, Burpengary and North Lakes. Further releases of industrial land have occurred in the Banyo Industrial Estate, Northlink Business Park (Banyo) and in Zillmere. These Outer North additions to industrial land were around 140,000 sqm in 2005 or 18% of total industrial land released in the metropolitan area.

The Outer North Industrial land is relevant to the Gympie Road corridor for access. Growth in the Outer North will have impacts on the proposed Airport Link for cross city commercial trips from the South and Western corridors. From a road network perspective, these developments in the Australia Trade Coast and particularly in the Trade Coast Central and the Outer North are expected to generate increased traffic activity in the Airport Link tunnels.

Road infrastructure is vital to the effective and efficient operations of existing industrial estates and to the future development of new estates. Continuing strength of the Queensland economy and substantial population growth in SEQ of around 2.5% per annum drives the commercial and industrial property market and the employment that it generates.

16.1.2 Street Level Survey

A street survey of the Airport Link corridor identified 483 economic establishments with the most common business type being "Clothing and Soft Good Retailing" at 9.73% (47 businesses). In the Junction Road to Clayfield section it accounted for over 68% of businesses. This was marginally higher than "Furniture, Houseware and Appliance Retailing" and "Other Personal and Household Good Retailing" which each represented 9.52% of the total. "Specialised Food Retailing" and "Cafes and Restaurants" represented less than 15% of the total sample. 22 "Specialised Food Retailing" businesses are located in the Toombul Shopping Centre.

The major economic generators that would be impacted by the Airport Link Project are the combined Royal Brisbane Hospital (RBH), Centro Lutwyche Shopping Centre and Centro Toombul Shopping Centre.

Economic or community (including education) generators identified from the street survey were:

- RNA Show Grounds
- Citilink Business Centre;
- Royal Brisbane Professional Centre;
- Homemaker City;
- Office Works;
- Crown Hotel;
- Kedron Park Hotel;

- Department of Emergency Services Complex;
- Kedron State High School; and
- Windsor State School.

Bowen Bridge Road (Herston) to the corner of Gympie Road and Stafford Road (Kedron)

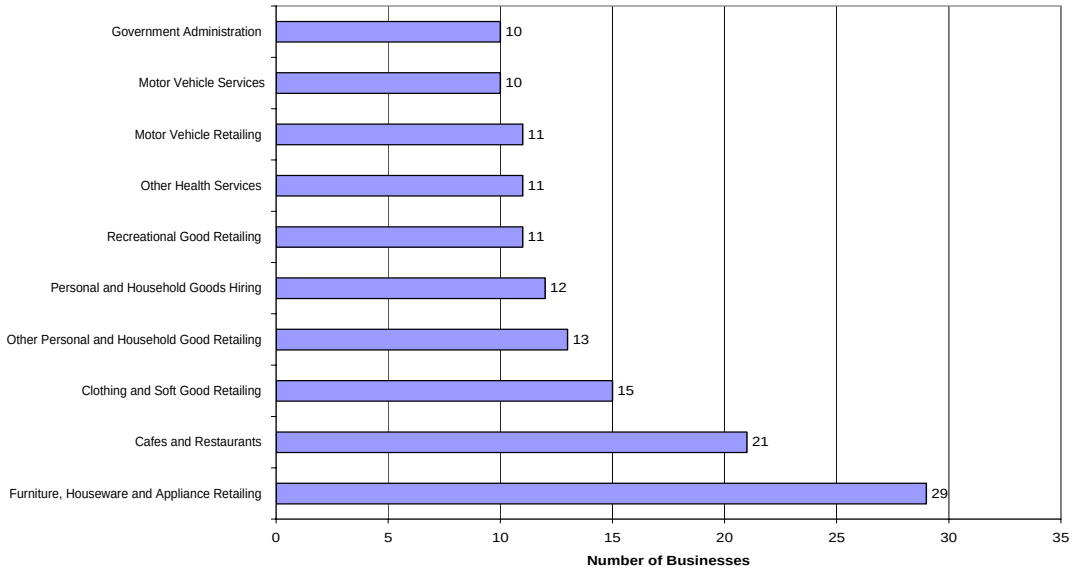
The Lutwyche Road-Gympie Road corridor from Herston to Kedron is a health, retail, commercial, education and business corridor located in close proximity to the city. The survey identified 277 businesses in this section not including specific services and retail activity in the RBH precinct..

The RBH precinct, with over 5,000 staff is a key economic and community generator that includes the Queensland Institute of Medical Research and health professional education and conference facilities through the Faculty of Medicine, University of Queensland. The hospital is critical infrastructure for local, regional, and state economies, and will be instrumental in the future land use planning for the precinct.

The RNA showgrounds hosts the historical EKKA event annually, as well as trade shows and other events. The RNA has a draft master plan, although no decisions or approvals for implementation are in place.

Figure 16-2 shows the top 10 business types by ANZSIC Business Classification in the Herston to Kedron section.

- **Figure 16-2 Top 10 Business Types for Bowen Bridge Road (Herston) to the corner of Gympie Road and Stafford Road (Kedron) section**



The most common business type “Furniture, Houseware and Appliance Retailing” represents 29 businesses, mostly in Homemaker City and Centro Lutwyche Shopping Centre.

Centro Lutwyche Shopping centre

The Lutwyche Shopping centre, on the corner of Lutwyche Road and Chalk Street, accommodates over 50 retail businesses. The centre is located 5 km from the city in a strong residential, high density population centre. Homemaker City on the corner of the Newmarket Road and Lutwyche Road has retail space of 9,463 square metres. The Department of Emergency Services head office on the corner of Lutwyche Road and Kedron Park

Road includes Queensland Fire and Rescue, Queensland Ambulance, Counter Disaster Rescue Services and the State Disaster Coordination Centre. Stafford City Shopping Centre at 400 Stafford Road has 75 speciality retail stores including 3 major retailers and a cinema complex. The centre has taxi and bus service connections to both local areas and Brisbane city.

Westfield Chermside Shopping Centre

Westfield Chermside Shopping Centre is a key northern Brisbane retail and commercial centre on the corner of Gympie Road and Hamilton Road Chermside. It provides easy access to consumers and suppliers and is a key centre for public transport. It accommodates 250 specialty stores including five major stores and a cinema complex along with 3,800 car spaces.

The Westfield Chermside Shopping Centre, a planned mixed use area with medium density housing under the current City Plan, is the largest retail complex in northern Brisbane and is a major generator of traffic. Car parking will soon increase to 6,200 spaces. Chermside Shopping Centre is a key location that could benefit significantly from the proposed Airport Link tunnel.

Junction Road (Eagle Junction) to East-West Arterial (Clayfield)

From Junction Road (Eagle Junction) to the East-West Arterial (Clayfield) are 206 businesses, with "specialised food retailing" being the most common type representing 8.7% (35 of 206). The Toombul Shopping Centre is a regional shopping complex on Sandgate Road, one of the key arterials leading to Brisbane City. There are 150 retailers in the shopping centre including four major retailers and 2,500 car parks that, in certain sections, are prone to flooding. BCC approval is in place for refurbishment that will provide extra leasing space of 3,000m^2, and more undercover and deck car parking. Toombul Shopping Centre is the primary retail complex in the eastern section of the proposed Airport Link corridor catchment.

A medium level of economic activity occurs at the Junction Road/Sandgate Road intersection with 22 businesses. This area could represent a potential development due to the condition of several buildings especially on the western side of Sandgate Road.

Brisbane Long Term Planning Economic Indicators (NIEIR)

The National Institute of Economic and Industry Research (NIEIR) report, "Brisbane Long Term Planning Economic Indicators" presented some useful economic indicators and forecasts for the Brisbane Local Government Area (LGA) that are relevant to this Project.

Total Manufacturing produced $25 billion output (21% of total output) in 2004 with Chemicals and Petroleum having the highest contribution of $7 billion. This sector is a major user of the Brisbane and regional road network for origin and destination freight movements. Business Services had $12 billion (10%) output and Property Services had an output of $11 billion reflecting the rapid growth in residential, commercial and industrial property development and market activity over recent years.

Employment estimates in the NIEIR report are based on location of work, not where people live. In 2004, approximately 800,000 people were employed in the Brisbane Urban Footprint with over 72% of these in the Brisbane LGA. Brisbane Inner City is the largest employment generator in the region with an estimated 223,892 people employed in the Inner City including Herston, Highgate Hill, Kangaroo Point, Kelvin Grove, Milton, New Farm, Newstead, Paddington, Red Hill, South Brisbane, Spring Hill, West End and Woolloongabba. Business Services and Manufacturing have the highest employment levels in the Brisbane LGA with estimates of 74,328 and 65,433, respectively. Nearly 90,000 people are employed in Business Services in the Brisbane Urban Footprint representing 11% of all workers, followed by Education at 8% and Health Services at 7%.

Major employment areas in Outer North and Outer South Brisbane each have 8.6% of the Brisbane workforce or a total of over 100,000 people. Growth in these Outer industrial regions may be facilitated by the proposed Airport Link as it will provide a pivotal cross city link. The main employment generators in adjacent LGAs are Logan City and Ipswich City with 51,988 and 45,849, respectively. Both of these are forecast to increase their employment contribution to the greater Brisbane area. Business Services with 43,570 has the highest industry representation in the Inner City. Manufacturing was highest in Outer Brisbane with 43,813 employed.

Average car ownership in the Brisbane LGA is 1.58 cars per household decreasing towards the CBD with the Inner City having average household car ownership of 1.16. There is a higher reliance on private vehicles in the outer suburbs due to longer travel distances to work, reduced flexibility, access to public transport and a higher proportion of families living in the outer suburbs. Outer West had the highest car ownership with 2.1 vehicles on average per household while the Outer North had an average of 1.68 vehicles per household.

Cross city passenger vehicles for private and business travel and heavy vehicle freight movements will continue to increase with the location of future industrial estates in the Outer North, Outer South and Outer West corridors and the Australia Trade Coast. The Brisbane CBD and other Inner City will continue to be the primary location for Business and Property Services.

16.2 Future Economic Environment

16.2.1 Brisbane and South East Queensland Economic Trends

The Brisbane City Council and the Queensland government have adopted key policy and planning directions to guide future land use and the provision of economic and social infrastructure in Brisbane city and South East Queensland. The *South East Queensland Regional Plan* and its complementary *SEQ Infrastructure Plan and Program (SEQIPP) 2006 – 2026* highlight population increase from the current 2.6 million to about 3 million by 2016 and 3.7 million by 2026. The region is predicted to have one of the fastest growth rates of any major urban regions in Australia.

The SEQIPP identifies that population increase will generate 425,000 new jobs by 2026. The significance of Brisbane in the region is exhibited by the fact that 90% of Brisbane's residents work within BCC boundaries and approximately 50% of residents from surrounding local government areas (Pine Rivers, Redcliffe and Caboolture to the north, Logan and Redlands to the south east and Ipswich to the west) travel to work in Brisbane. This trend has significant implications for cross city travel particularly in the morning and afternoon peaks when congestion adversely affects the network. Employment growth in the Brisbane CBD and Brisbane City's outer areas is forecast to increase by 19% and 45%, respectively, between 2006 and 2016. The Australian TradeCoast's employment growth is forecast to increase by 95% over the same period.

About 90% of freight movements in SEQ originate or have their destination in Brisbane and urban freight movements are estimated to be growing by 4% per annum. The SEQIPP highlights the projected increase in population and subsequent expansion of economic activity and employment as the reason the timely provision of new transport infrastructure to support this forecast growth.

16.2.2 Economic Growth

In October 2005, the National Institute of Economic and Industry Research (NIEIR) prepared a report for Brisbane City Council titled "Brisbane Long Term Planning Economic Indicators". This report identified out of region exports as the key driver for growth and geographical location of economic activity in the region. Out of region exports in the region were $41 billion in 2004 and are estimated to grow by an average annual rate of 4% to $98 billion by 2026.

In 2004, it is estimated that 29% of out of region exports were generated in the Inner City. This is forecast to decrease to 27% in 2026 as a result of an increase in residential and commercial growth and rising land values in the Inner City which will force some of these activities to Outer areas. The main beneficiaries in the Outer regions are Outer North East, Outer East and the Outer South East in the Brisbane City, Caboolture Shire and Ipswich City in the other LGAs. This movement of major industrial estates to outer metropolitan areas has already commenced.

The Inner City attracts a high proportion of young couple households less likely to have children. These households have high disposable incomes and could be less likely to be price sensitive to a user pay toll road.

High levels of productivity normally occur in areas with high levels of manufacturing and or transport services. Higher growth rates will have higher productivity as a result of economies of scale. Brisbane is forecast to experience high growth rates and levels of productivity with the Outer regions forecast to experience slightly higher levels due to location of manufacturing. Approximately 1.2 million people are expected to be employed in the Brisbane Urban Footprint by 2031, which represents an increase of 67% over 2004. Brisbane City will continue to be the single largest employment generator in the region with 330,000 to 375,000 people employed.

The major employment sectors of Business Services, Manufacturing, Health Services and Household Goods Retailing will continue to be the strongest employers in 2026. General Construction shows the biggest sub division increase and will be the second largest employer in most scenarios employing approximately 90,000 people.

The combined Inner City areas are expected to grow at slightly higher rates than the Outer regions. However, this does not reflect the disproportionate growth across the Inner City. The Inner City and Inner West are estimated to grow by 45% and 60% respectively. This is significantly higher than the remaining Inner regions which are estimated to grow by a combined estimated 15%. The demand in the Inner City will place additional pressure on our transport networks to and from the city.

Brisbane Airport

Brisbane Airport's current significant economic impact on South East Queensland (SEQ) is set to continue with the planned future development of the Brisbane Airport City concept. Forecast growth in domestic and international passenger numbers, air freight and increased aviation and other commercial development will fuel future economic activity at the airport precinct. Brisbane Airport will continue to operate as a 24 hour curfew free global trade and commercial centre. The development of seven master planned aviation, commercial and industrial precincts over 970 hectares will serve as the cornerstone of the Airport City concept. These precincts are being developed in accord with the Brisbane Airport Master Plan 2003.

Brisbane Airport Corporation Limited (BACL) has indicated in its 2003 Master Plan that proposed developments will be staged to match future industry trends and demands and that the timing of aviation infrastructure investments may be subject to global influences outside the control of BACL. Proposed commercial and industrial developments at the airport are likely to proceed to meet regional demand planned over the next decade and that the Airport Link will be required to support this planned development and economic activity.

Port of Brisbane

The Port of Brisbane, a primary economic driver in South East Queensland, has experienced a decade of record trade growth and projections to 2025 forecast that this trend is likely to continue. To meet this projected growth the Port of Brisbane Corporation has embarked on a 25 year plan to reclaim around 270 hectares of land at Fisherman Islands to provide an additional 1,800 metres of wharves and related infrastructure. Construction of

an additional container wharf (wharf 10) has already commenced and is scheduled for completion in 2008.

The Port of Brisbane Corporation has identified the need for additional wharves and port land to facilitate projected trade growth and economic activity with the region based on the following projections:

- Trade projections to 2025 showing growth in all cargo types, with strong average annual growth in containers (6.9%) and break bulk (2.9%)
- Total trade volumes to reach 60 million tonnes by 2025
- Container volumes for 1998/99 of 357,703 twenty foot equivalent units (TEUs) are 22% above the projections in the 1992 Strategic Plan and container volumes are to reach up to 1.9 million by 2025.
- Demand for port land to exceed existing supply at Fisherman Islands by 2007.
- Demand for quayline to exceed available deep-water frontage on Fisherman Islands by 2009.
- By 2025, an additional 222ha of land will be required for industrial and commercial development over and above existing capacity at Fisherman Islands.

16.3 Strategic Assessment Property Economic Impacts

A comparative analysis of the associated property economic impacts that the project may have before and after construction was undertaken as an integral part of the economic assessment of the project.

16.3.1 Classification of the Benefits and Impacts

The proposed tunnel alignment provides a number of potential economic outcomes for land owners, business operators and both the local and broader community in the study corridor. All benefits and impacts are broken down into:

- Tangible effects –those that flow to individual land owners and/or the community to which a monetary value can be recognised with reference to the local market place; and
- Intangible effects –those for which there is no market representative and which can only be valued subjectively.

The study reported herein focuses on the tangible effects that are expected to accrue in the operational phase of the separate, though closely located projects, the Airport Link and the interim Northern Busway. Any intangible effects that may arise due to the implementation of the projects have not been included or identified in the analysis.

In assessing level of impacts, the following grading system was used. For negative impacts:

- 1	- 1.5	- 2	- 2.5	- 3	- 3.5	- 4
No Impact	Minimal Impact	Slight Impact		Moderate Impact		High Impact

For benefits:

+ 1	+ 1.5	+ 2	+ 2.5	+ 3	+ 3.5	+ 4
No Benefit	Minimal Benefit	Slight Benefit		Moderate Benefit		High Benefit

Zonation of impacts

Primary (more affected) and secondary (less affected) zones of impact are recognised, based upon the dominant land uses that have arisen historically as a result of their proximity to the arterial roads.

Primary Zone

The primary zone comprises mainly:

- Major redevelopments e.g. Homemaker Centre,
- By and large much of the outbound side of Lutwyche Road as it is the most highly developed,
- Restaurants and hotel/motel accommodation,
- Residential and commercial properties affected by easement on title,
- Small automotive retail clusters with associated uses e.g. after market products and accessories, and
- Older retail strips which now house service industries.

The primary zone can be expected to be the most affected because businesses that are located along Lutwyche Road are heavily reliant upon the passing traffic for trade. Many of these businesses are destination businesses, which means, that people will travel extra distances for the non-mainstream services that are provided. Development and the types of businesses operating in the primary zone are predominantly non-complimentary and are fragmented due to:

- The inability for investors, developers and owner occupiers to secure reasonable sized parcels of land that would enable redevelopment, and
- Many of the commercial and retail properties having reached obsolescence in their functional life, making them desirable to businesses that require a reasonable level of exposure and cannot afford premium retail or commercial rents for that exposure in other major locations of trade.

Secondary Zone

The secondary zone is where there is a clear transition to residential land uses. Small commercial and retail businesses may be in the secondary zone. However, impacts from Airport Link are considered to be minimal on these businesses. The boundary between primary and secondary zones is generally one street block east or west of Lutwyche Road.

16.3.2 Current Tenure and Land Uses

Land within the study corridor is ascribed various permissible uses under current Brisbane City Council statutory planning instruments. The study corridor comprises a mixture of commercial, retail and residential land uses.

Along Lutwyche Road from Bowen Hills/Herston to Ferny Grove Rail Overpass there is a strong presence of fringe commercial office buildings, automotive service providers and ancillary businesses, short stay accommodation, restaurants and a number of large bulky goods retail outlets surrounded by smaller fragmented retail premises. This area also includes a significant volume of residential properties are located one street block east and west of Lutwyche Road.

Along Lutwyche Road from the Ferny Grove Railway to Kedron is a significant amount of strip retail shops housing a number of service industries, Lutwyche Shopping Centre, large retail bulky good outlets, hotels, fitness centres and a well established node of detached residential dwellings. This area also includes a significant volume of residential properties one street block east and west of Lutwyche Road.

The Kedron to Toombul north-eastern area of the study corridor is made up of well established, detached one and two level residential dwellings. Owner occupied residential is the most probable use of these properties. This area also contains a large amount of retail premises within Toombul Shopping Centre.

Scattered amongst the various land uses throughout the study corridor are parks, schools, churches and other community infrastructure.

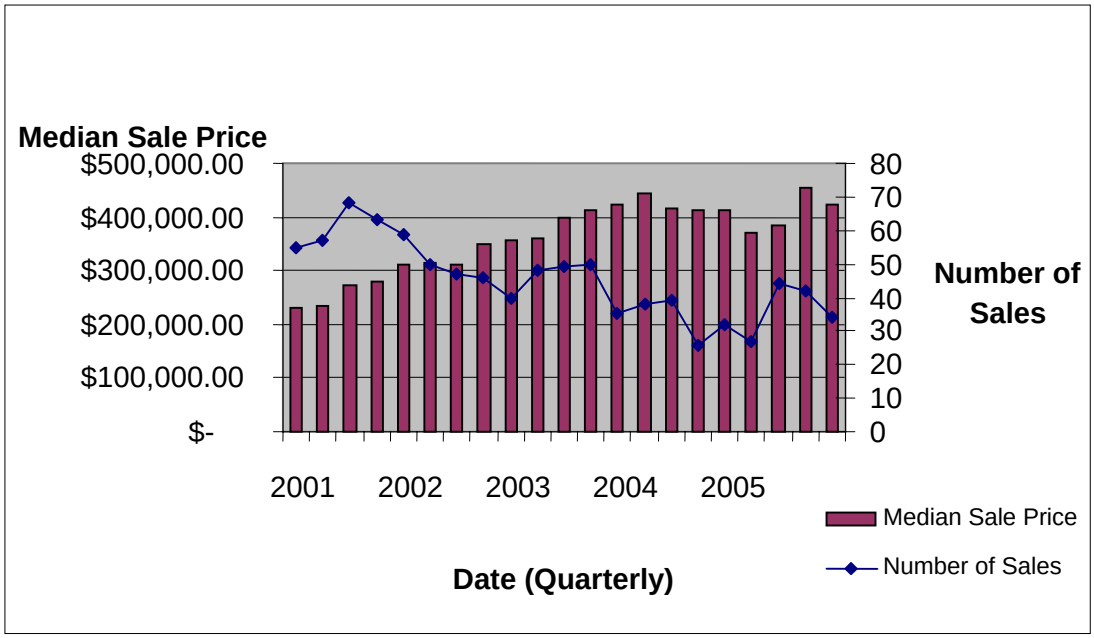
16.3.3 Property Market Trends

Historically, certain land uses have been determined by the market place. Along Lutwyche Road the operating nature of the businesses has been a result of natural market forces over time with the resultant development pattern being fragmentary and non-complimentary in land uses. This type of fragmented development pattern is discussed through this report on a section by section basis.

Herston Road to Ferny Grove Rail overpass on Lutwyche Road.

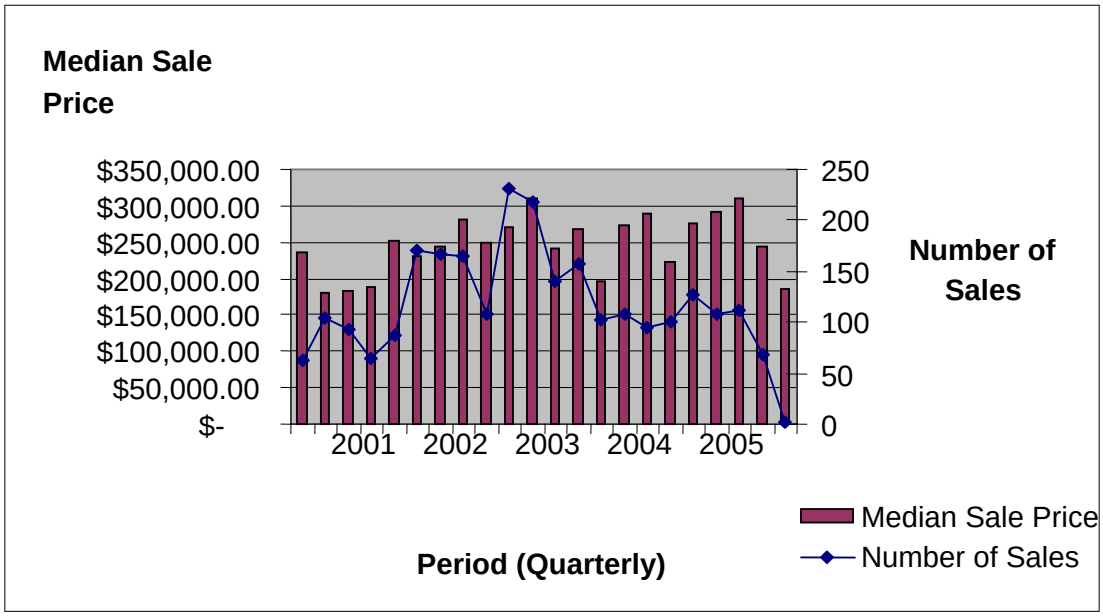
Residential properties are located one street block back (ie east and west) from Lutwyche Road. The residential properties consist of improved sites with land sizes in the range of 400 to 820 square metres. Current average house prices are $464,000 which represents an increase of 58% (11% per annum) on average property prices since late 2001, when prices were around the $270,000 mark. Aggregated sales for residential properties in Bowen Hills, Herston and Windsor as the median sale price and number of sales per quarter over the last five years are shown in **Table 16-3**.

- **Table 16-3 Aggregated Residential Sales Cycle for Bowen Hills, Herston and Windsor (Source: RP Data)**



The aggregated sales cycle of multi-unit and building unit sales for Bowen Hills, Herston and Spring Hill is provided in **Table 16-4**. It shows the spread of higher residential developments in the inner northern Brisbane CBD fringe area. The results are slightly skewed by inclusion of Spring Hill. However, as potential development sites become less available in Spring Hill, it is expected that developers will move towards the Royal Brisbane Hospital and further north along the study corridor in search of development sites.

- **Table 16-4 Aggregated Multi-Unit and Building Unit Sales Cycle for Bowen Hills, Herston and Spring Hill (Source: RP Data)**

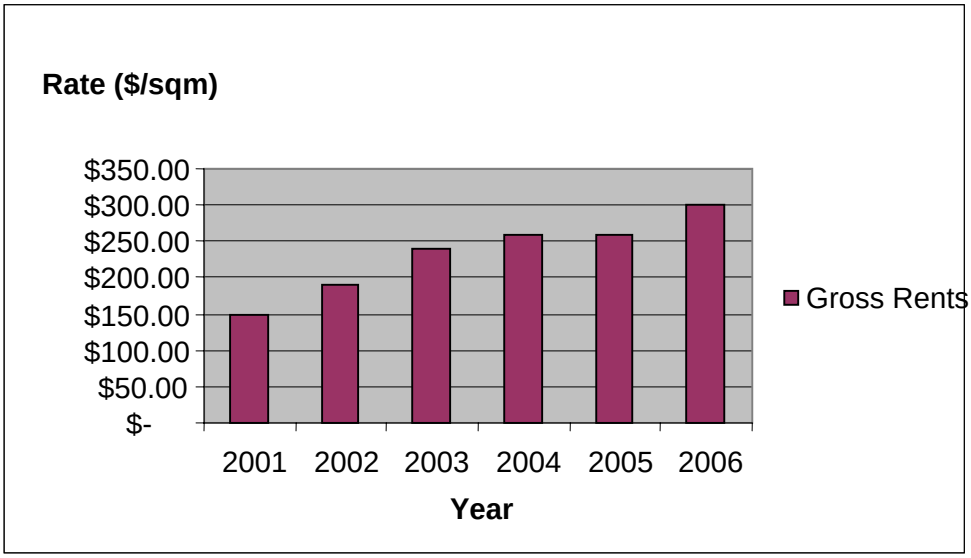


Commercial businesses within the Bowen Hills/Herston to Ferny Grove Railway area have been identified as car dealerships, service stations, hotels/motels and professional offices. Brisbane's fringe market has performed strongly throughout late 2005 and early 2006. This strong performance is due to solid market fundamentals including, rental growth due to tight leasing conditions in the CBD, white collar growth and low vacancy rates.

Tight leasing conditions with all time low vacancy rates of 4.2% within the fringe market has resulted in rental growth in the vicinity of 20% for high quality fringe properties due to landlord's new bargaining power in lease negotiations. This increase in demand has resulted in a decrease in the incentives offered to the market. Current leasing rates for commercial tenancies are in the order of $240/sqm to $300/sqm gross for refurbished newer office space.

Table 16-5 depicts the movement of gross rents in the area over the last five years. Much of the increase in rentals was due to the upgrades undertaken on the Royal Brisbane Women's Hospital in 2002, which displaced a number of office space users within the hospital premises to commercial premises in the surrounding area.

- **Table 16-5 Gross Commercial Rentals for the Bowen Hills, Herston, Windsor section**



Increased investor competition for office property in a tightly held market, increasing construction costs which are limiting new construction and the small amount of new supply within the market easily being outweighed by high levels of net absorption and demand have all contributed to this capital growth yield compression that over the last five years.

Retail properties within the area include bulky good retail outlets such as those in the Windsor Homemaker Centre, various restaurants and strip retail outlets. Newer retail properties have seen significant increases in market values over the past five years. However, due to the tightly held nature of properties in the section there have been very few significant sales over the past five years. This tightly held nature is also reflected in the commercial market, which has therefore made it difficult to find up to date sales data. The fragmented nature of properties on Lutwyche Road limits the potential purchasers as the properties hold little redevelopment potential due to the unreasonable size of the allotments. Current asking rents for retail premises in the area are in the order of $200/sqm to $250/sqm.

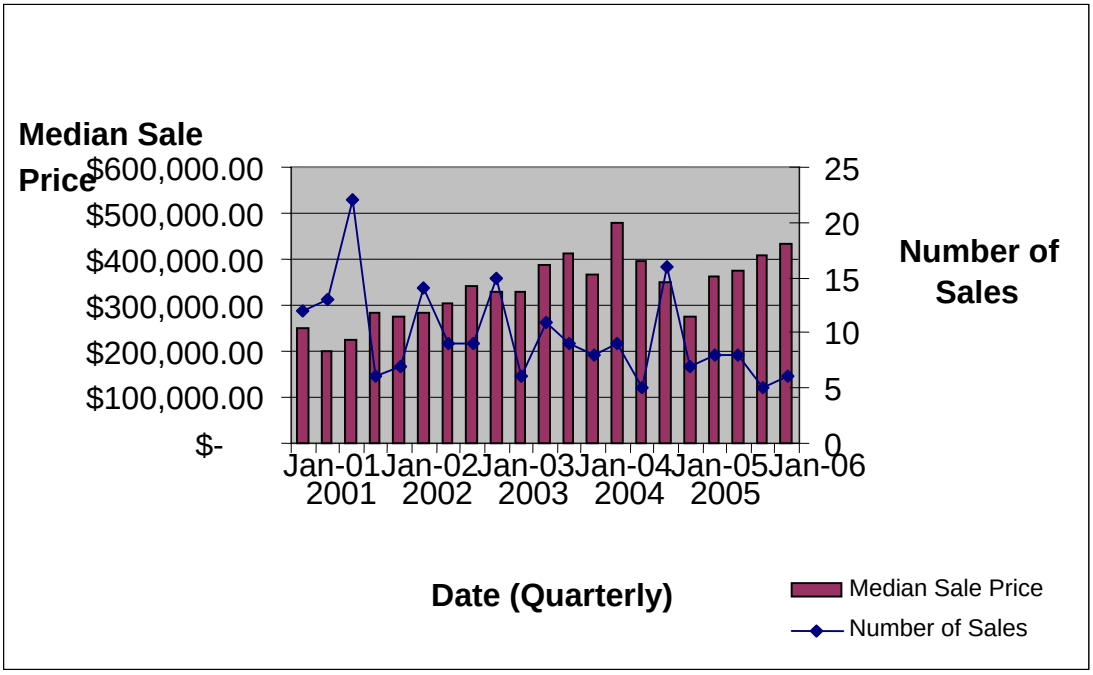
Industrial properties are limited to sites close to Enoggera Creek and/or the Inner City Bypass. This is due to many previously industrial sites having been converted for better uses, as a result of changing transport routes and the increased difficulty of access by larger vehicles.

Ferny Grove Rail overpass to Kedron

The general land uses are mixed use developments, residential, commercial and retail outlets. Residential properties range from 400 to 800 square metres and are producing average house prices in late 2005 of $390,000. This is a 14% per annum increase over a 5 year period where houses prices were $276,000 in early 2002. This increase is due to many factors such as the Lutwyche's proximity to the city, location to other well established suburbs such as Albion and Clayfield, prolonged low interest rate environment and people's overall increased purchasing power due to increased wages and the first home owners grant.

Table 16-6 shows the residential sales cycle for Lutwyche over the last five years in terms of the number of sales and median sale price per quarter.

- **Table 16-6 Residential Sales Analysis in Lutwyche**



Commercial property in this area comprises small one and two level professional offices used by legal, computer, accounting and financial firms. This area has seen strong growth in the office fringe market due to solid market fundamentals such as significant rental growth, tight leasing conditions, record low vacancy rates, and office demand outweighing supply. Recent sales in the study corridor are achieving a sales range of $1000 to $1400 per square metre.

Retail properties along Lutwyche Road in this area include Lutwyche Shopping Centre, ribbon development retail centres, restaurants and individual and conglomerated bulky goods retail outlets. Retail properties in this section control a significant proportion of the land along Lutwyche Road. These retail properties have all seen significant increases in market values over the past 5 years, especially large sites or where a developer has been able to purchase a group of smaller contiguous allotments.

However, most of the retail is contained in strip centres with fragmented ownership and non – complimentary services provision. Recent sales evidence indicates that current prices for strip retail shops in the corridor range from $900 to $1200 per square metre. Current rents for the area are in the range of $220/sqm to $280/sqm gross.

Like the Bowen Hills/Herston to Ferny Grove Railway area, there have been very few significant sales over the past two to three years due to the fragmented property ownership. Because of these effects, there appears to be little interest in properties in the area by investors and developers as it is difficult to secure reasonable sized portions of land with the potential for redevelopment.

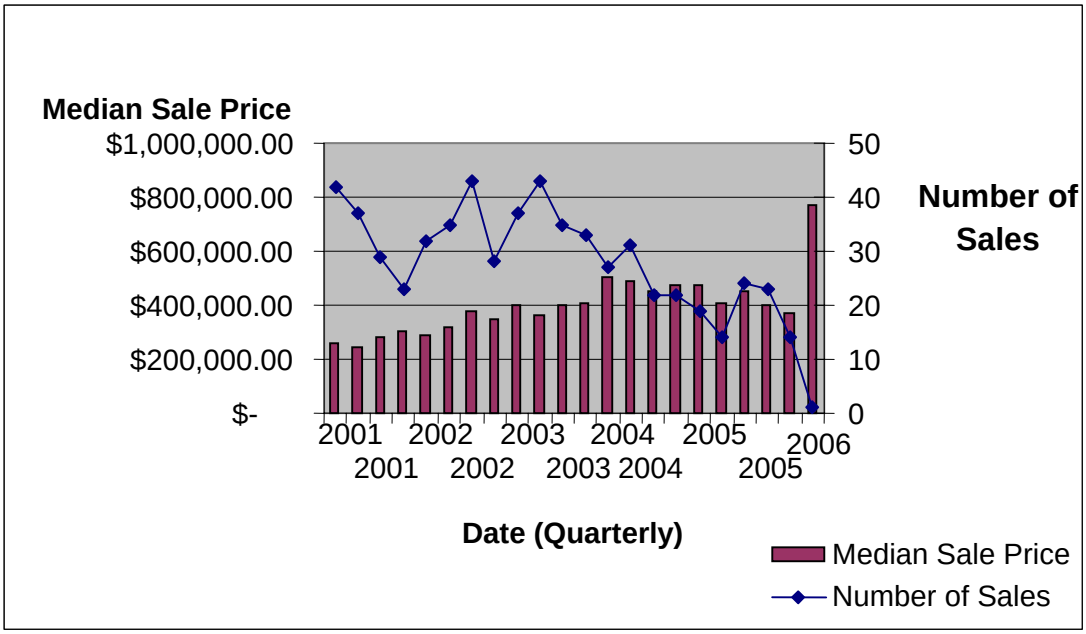
There are very few vacant or improved sites left in these areas of the corridor with the potential for redevelopment. This lack of redevelopment potential is mainly due to the fragmented nature of the businesses within these sectors. The fragmented nature of this area is a direct result of development patterns over time. The lower quartile of the area around Lutwyche/Kedron to the east is included in the Clayfield/Wooloowin District Local Plan, discussed below.

Corner Kedron Park Road/ Lutwyche Road to East West Arterial adjacent to Toombul Shopping Centre

This component of the study corridor comprises predominantly improved residential sites and a significant amount of centrally located retail at Toombul Shopping Centre.

Residential properties are presumed to be mainly owner occupied with blocks ranging from 400 to 850 square metres. The area has seen an average percentage increase of 67% (or 13% per annum) over the last 5 years, with the average house price in late 2001 of $320,000 increasing to $476,000 in late 2005. Much of this positive growth can be attributed to the proximity of other older well established suburbs on Brisbane's northside such as Clayfield, Nundah and Albion. Table 16.7 shows the residential sales cycle over the last five years in this north eastern part of the study corridor.

- **Table 16-7 Residential sales analysis for Wooloowin. Source: RP Data**



The Airport Link Project may cause some uncertainty in the market place in this area due to community consternation in some quarters and a decrease in buyer sentiment in the short-term. However, this area is a well established suburb, which has experienced a continuous level of nominal growth over the last five years as depicted in **Table 16.7** and it is expected that there will be no detrimental effects on the sales rate. The single sale in the second quarter of 2006 should be disregarded as it is not an average.

A large proportion of the retail premises are located within Toombul Shopping Centre. Due to the lack of available leasing information, it is difficult to provide leasing rates being achieved in the centre. Rents have been estimated to be in the range of $800/sqm to $950/sqm gross. Since the shopping centre's purchase in mid 2003, it has undergone significant external refurbishment. BCC has approved an application to undertake a further stage of refurbishment to increase car parking capacity and provide more retail space.

Strip retail with local area uses such as bottle shops, bakeries, small grocery stores and professional services exist along Junction Road and service the surrounding residential catchment area.

The predominant land use within the area is for residential and retail purposes. There appears to be no inherent development issues affecting the properties in this area as a large proportion of all available sites have been

developed. There are however two Local plans which encompass this part of the study corridor. The Clayfield/Wooloowin District Local Plan contains specific additional local planning requirements and seeks to preserve low and low-medium density housing. This plan also includes the lower portion of land uses such as Lutwyche Shopping Centre and surrounding residential sites.

The Toombul-Nundah Major Centre Local Plan aims to preserve Toombul Shopping Centre as the main focus for retailing activity in the area and regulates development of Nundah Village and other commercial sites just north of the Sandgate Road Nundah Village Bypass tunnel entrance.

16.3.4 Market Acceptance

Research by Knight Frank suggests that the flow-on effects from other similar underground and on or above ground infrastructure projects that have been undertaken in Australia over the past few years does provide an overall generally positive outcome in the longer term.

Past Projects

Dandenong Industrial Region – Melbourne

Due to improvements in road infrastructure and increasing consumption of land, average land values across Melbourne have risen significantly over the past year. Conversion of industrial land to residential land, particularly within Melbourne's inner region, has resulted in significant increases in land values and strong capital growth in recent years.

The Mitcham – Frankston tollway is a road infrastructure project that is expected to provide medium to long term positives to the Dandenong industrial region. With the Mitcham-Frankston tollway not due for completion until 2008, its impact upon the Dandenong region as one of Melbourne's key industrial hubs is already being realised. Completed projects such as the CityLink Tollway in the late 1990s are catalysts for the successful long-term property value growth created by major infrastructure projects.

Industrial land values in the Dandenong region increased significantly over the six month to January 2005. Smaller lots (0.25ha) grew by 12.5% to $135/sqm and larger lots (1.6ha) increased by 11% to achieve $100/sqm. Land values are forecast to continue to rise due to the shortage of serviced industrial land in the region, high demand, and completion of the Mitcham – Frankston tollway.

In the short term this project has a negative impact. However, medium to longer term benefits from the Mitcham – Frankston Tollway will provide an uplift in capital values and demand from industrial property users for location in the area.

Craigieburn Bypass Industrial Precinct (CBIP) – Melbourne

The 17km Craigieburn Bypass links the Hume Freeway near Mt Ridley Road at Craigieburn, to the Metropolitian Ring Road at Thomastown making it the principal gateway to Melbourne from the north. The road has been designed to reduce travel times, provide fuel savings to motorists and the freight industry, reduce traffic congestion, enhance road safety on the Hume Highway, and remove traffic from local roads.

Construction started in May 2002 and the first four kilometres from the Metropolitan Ring Road, at Thomastown to Cooper Street, Epping were opened in December 2004. More than 24,000 vehicles use this section daily. It is anticipated that the Craigieburn Bypass will deliver close to $1 billion worth of safety and economic benefits to Victoria, including:

- Reduced traffic congestion – motorists will avoid 13 sets of traffic lights along the Hume Highway

between the Metropolitan Ring Road, Campbellfield and Mt. Ridley Road, Craigieburn;

- Reduced travel times between Craigieburn and the Metropolitan Ring Road – it will now take approximately 10 minutes compared with 40 minutes;
- Improved road safety for motorists accessing businesses and homes along, and near the Hume Highway;
- Encouraging traffic to use the main road network rather than local roads;
- Improved access for the freight industry transporting goods to markets; and
- Reduced fuel and vehicle operating costs for private motorists and for freight industries.

During construction, much attention was drawn to the region from investors, developers and tenants, resulting in considerable growth in the industrial localities of Craigieburn, Somerton, Epping, Broadmeadows and Thomastown. This pent-up demand for the area resulted in the increase of land values and prime rents, which in turn increased capital values for completed projects.

Industrial land values in the CBIP in 12 months to September 2005, for smaller sized lots (0.25ha) grew by 17.5% to average $155/sqm, with larger lots (1.6ha) jumping by 26.5% to average $103/sqm. Before the project's completion, it was anticipated that demand for industrial stock within the CBIP would intensify in the short to medium term, encouraging further land value growth within the precinct.

Significant growth is also expected to occur due to the completion of other major infrastructure projects such as P&O's inland rail port at Somerton. The intermodal facility is located within the Austrak Business Park on the Hume Highway.

The CBIP has provided an overall neutral effect by its implementation in the short-term. However, it has unlocked a large amount of the surrounding en-globo land which has had a positive effect on land values and will continue to do so into the longer term.

It can be concluded from these two examples, that as a result of infrastructure upgrades, the impact that efficient infrastructure has on industrial property is generally an overall above the line positive impact. Across Melbourne in general, these upgrades have resulted in major improvements in transportation efficiency, providing easier access to sea ports, airports, the CBD, and access to a broader employee catchment source.

Subiaco – Perth

The Subiaco 2000 concept plan was released in 1990 to address key issues in urban form and highlighted many opportunities for redevelopment in the area. The Institute for Sustainability and Technology Policy at Murdoch University prepared a report outlining the benefits for the development of Subiaco Urban Village centred on the Subiaco rail station and surrounding unused industrial land.

To ensure success of an urban village, the undergrounding of the Fremantle Rail Line in Subiaco was deemed necessary by urban planners. The Subiaco Redevelopment Authority was established in 1994 to undertake works on the 80 hectare site. The $70 million project released under-utilised land and created an opportunity for the integrated urban land development of Subi Centro. Since the project's inception, there has been a lack of empirical evidence to qualify the effect that the undergrounding of the rail line and having an easement in volumetric title, has had on land values in Subiaco.

Since 1998, achievable sale rates have nearly tripled, from $575/sqm in 1998 to $1607/sqm in 2005 (15.6% per annum). In the September 2005 Real Estate Institute of Western Australia (REIWA) market update commented that Subiaco has had an average 5 year increase of 12% on established houses and 3.1% on land sales since the completion of Subi Centro. These data indicate an increase due to the undergrounding of the railway.

Redevelopment of Subiaco has had a positive long-term flow-on effect, on the growth of sales for the area.

16.3.5 Property Impacts of Airport Link Project

A key objective of the Airport Link Project is to minimise impacts of the project on surrounding areas to protect people's livelihoods, lifestyle and local amenity. An advantage of tunnels over surface roads, which often require extensive acquisition of property along the entire corridor, is that tunnels generally only require acquisitions near where the tunnels connect to the surface. The more common requirement for tunnels is the subsurface land through the resumption of volumetric title. If Airport Link proceeds it would occupy a corridor up to 50 metres wide and up to 60 metres below ground level and would pass beneath some private properties. The Queensland Government and Brisbane City Council would need to acquire sub-surface volumetric titles for private properties above the tunnel. However, the acquisition of land, 20 to 60 metres beneath the ground level, is unlikely to affect the surface property value in a highly developed urban environment. Therefore, acquisition of this subterranean volumetric title is expected to have little if any effect on property values.

16.3.6 Impact Assessment

Comparative Analysis

The comparative analysis shown in **Table 16-8** is not intended to draw absolute conclusions about dollar increases or decreases in value, probable realisations or compensation amounts. Street level survey data of land uses have been used to analyse the effect of the probable operational phase impacts of the closely located though separate projects, interim Northern Busway and Airport Link.

- **Table 16-8 Airport Link Comparative Assessment**

Precinct/Study corridor	Zone	Negative Effect	Impact Rating	Benefit	Impact Rating	Total Unweighted Impact	Total Weighted Impact	Impact Effect Value Range
1. Herston Road to Ferny Grove overpass	Primary	'- Decrease in Traffic: Loss of Exposure or Trade	- 3	-Decrease in Traffic: reduced noise	+2	-1	-1.90	-10% to -18
	Secondary			- Decrease in Traffic: reduction in 'rat runners'	+2.5	+2.5	+2.5	+5% to + 12%
		Total:	**-3**	**Total**	**+4.5**	**0**	**+0.6**	
2. Ferny Grove Rail Overpass to just north of Stafford Rd/ Lutwyche Rd Intersection	Primary	- Decrease in Traffic	-3	-Decrease in Traffic: Reduction in noise	+2	-1	+1.2	+5% to +12%
		Total	**-3**	**Total**	**+2**	**-1**	**+1.2**	
3. Cnr Kedron Park Rd/Lutwyche Rd to East West Arterial on Sandgate Rd, Toombul	Primary	-Decrease in Traffic: loss of Exposure & Trade	-3	-Decrease in Traffic: reduction in noise & 'rat runners'	+2	-1	+0.25	+7% to +10%
	Secondary	No qualitative negative impacts	0	-Decrease in Traffic: reduction in 'rat runners'	+3	+3	+3	+7% to +12%
		Total	**-3**	**Total**	**+5**	**+2**	**+3.25**	

Herston Road to Ferny Grove Railway

The street level survey reveals that the primary zone in this area contains 101 retail and commercial properties and 27 residential properties. As Lutwyche Road carries a high volume of traffic everyday, both sides of Lutwyche Road contain an even spread of the commercial and retail businesses.

As these businesses are fast moving consumer goods businesses, they rely heavily upon the passing traffic for exposure. A reduction in the level of traffic passing their business in the short-term will result in decreased exposure and possibly trade. A reduction in value of 10% to 18% in the Primary Zone could be expected. This reduction will be reflected in the property rental rate due to the reduction in trade that may occur as a result of the loss of exposure. However, it is anticipated that there will be an-uplift in values in the range of 5% to 12% for properties contained within the Secondary Zone due to the reduction in drivers trying to decrease their travel time to the city.

Ferny Grove Railway to Stafford Rd/ Lutwyche Road intersection, Kedron

There are 67 commercial and retail premises and 38 residential properties along Lutwyche Road with a greater number on the outbound side suggesting that a larger impact due to reduction in traffic will occur on the western side of Lutwyche Road.

The impact that a reduction in traffic will have in the Primary Zone of this area is considered to be similar to

that which could possibly be experienced in the Bowen Hills/Herston to Ferny Grove Railway area which is 10% to 18%. Once again a majority of the businesses located within this section are fast moving consumer goods businesses and rely heavily upon the high level of exposure that they receive from passing traffic. In the Secondary Zone however, a potential uplift of 7% to 15% could be expected due to the reduction in drivers that regularly cut through the area during periods of peak traffic.

Once again, the true impact by both the reductions in traffic and busway stations on the Primary and Secondary Zone in the Ferny Grove Railway to Kedron area will be due to market forces over the medium to longer-term.

Kedron Park Road/ Lutwyche Road to East West Arterial adjacent to Toombul Shopping Centre

There are 210 retail and commercial businesses in this area with 144 of them within Toombul Shopping Centre. Therefore, only the effect on the remaining 66 retail and commercial premises has been analysed. Toombul Shopping Centre is a major retail centre and will not be adversely affected by the Airport Link as has been a destination for more than 20 years and it contains a number of shopping attractors such as larger chain food outlets, banking and finance services, theatres and clothing companies.

A reduction in traffic in the primary and secondary zones in this area is expected to provide an-uplift in value in the range of 7% to 10% and 7% to 12%, respectively. Whilst a reduction in traffic in the primary zone will reduce the number of impulse buyers passing the existing strip retail located along Junction Road and Rose Street, it will reduce the 'rat runners' who travel through the area in peak periods of traffic to escape Sandgate and Lutwyche Roads. The extent of the impacts, will need to be studied on a case by case basis.

16.3.7 Future (post 2012 with both projects in place)

Given the information obtained on other major transport infrastructure projects in Australia, both the projects appear that they can, on balance, provide substantial benefit in the medium to long term.

Overall benefits that could be achieved in the long term are:

- Reduction in traffic along Sandgate and Lutwyche Roads;
- Reduction in air pollution;
- Potential uplift in residential streetscape and amenity;
- Increased redevelopment opportunities for more intensified land uses;
- Greater accessibility to major retail centres such as Centro Lutwyche via public transport, can potentially increase trade and revenue for businesses in the centre and locally;
- Greater efficiencies for transportation;
- Reduction in 'rat runners' through built up residential areas;
- Greater accessibility to other key infrastructure such as the Domestic and International Airports;
- Increase in social amenity; and
- Gradual long term growth of capital values and leasing rates above the base line.

Land around Airport Link connections at Kedron and Clayfield, provides opportunities for medium to higher density residential and commercial developments. A number of medium density residential buildings exist around the proposed north-eastern connection along Sandgate Road heading inbound and a significant number of pre-existing higher density residential units exist on the Nundah side of Toombul Train Station. Construction is almost complete of two new unit developments within 2 to 5 minutes walking distance of Toombul Train

Station. There still exist a number of sites near Toombul Station and Ross Park for the development of higher density Transit Oriented Developments.

At the North-western connection, there could be an opportunity for the development of higher density residential and smaller sized commercial buildings. The area which would best suit developments of this type would be around the Stafford Road and Gympie Road intersection where there are new bulky goods retail outlets surrounded by smaller fragmented and non-complimentary businesses such as adult stores and second hand car dealerships. In the future all these current land uses may be deemed inferior by the market place and development into higher and better uses may occur.

16.3.8 Conclusion

The different property types in the study corridor will attract different scales of impact depending upon current land use. For example, a reduction in traffic will positively impact residential uses and negatively impact retail and some commercial uses. Provision of a more efficient transport hub for example will positively impact Toombul Shopping Centre as it is a destination and does not rely on passing trade or exposure.

Projected impacts on property are summarised in **Table 16-9**.

Table 16-9 Property Economic Impacts Summary

Use	Positive	Negative
Single Residential	▪ Reduced traffic ▪ Lower noise levels ▪ Less impacts from lights at night ▪ Uplift in value above base line over time ▪ Potential upzoning of land surrounding busway stations over time	▪ Effect of volumetric acquisition
Multi-Residential	▪ Higher positive impact on access due to reduced traffic ▪ Improved access to public transport ▪ Uplift in value above base line over time	
Retail Strip Shops	▪ Reduced noise ▪ Easier access ▪ Improved transport ▪ Uplift in value above base line over time	▪ Reduced exposure ▪ Reduced impulse buyers ▪ Particularly impacted is high volume fast moving consumer goods. eg Take away food outlets, service stations etc.
Retail Centres	▪ Easier access by improved transport will have a positive impact on trade ▪ Uplift in value above base line over time	▪ Reduction in exposure
Commercial	▪ Easier access to places of work for employees ▪ Reduced noise ▪ Uplift in value above base line over time	▪ Reduced exposure ▪ Effect of volumetric acquisition and redevelopment opportunities

The impact assessment indicates an overall positive future benefit to the study corridor. Development of the two separate projects, interim Northern Busway and Airport Link, to alleviate traffic problems is the first step in the process to unlock under-utilised land within the study corridor. The second step will evolve due to natural market forces and assistance from government to improve the on-ground streetscape of the study corridor.

In the medium to longer-term, it is evident from the research data used in this analysis, that there will be an-uplift in property values above the base line through this period. A large proportion of the achievable positive growth will occur as a result of natural market forces.

16.4 Airport Link Project — Economic Analysis

Terms of Reference for the Airport Link Project require an economic analysis of the project to identify and examine all benefits and costs of the Project and their distribution within the local and regional communities. As is usual with all major projects this analysis is achieved with standard methods to provide an understanding of economic conditions in the region and the study corridor in particular, economic benefits and costs and any alternatives. Alternatives were considered in the pre-feasibility studies and based upon evaluation reports the State Government and Brisbane City Council decided to proceed to this Detailed Feasibility phase with the proposal that is the subject of this EIS.

Measures of benefits and costs underlie the concept of economic efficiency. An allocation of resources increases economic efficiency if the sum of the benefits to those who gain by that allocation exceed the sum of costs to those who lose. Economic efficiency can be determined by calculating the Net Present Value (NPV) which is the calculation of net benefits (Present Value of benefits minus Present Value of costs) over the concession period and also Benefit Cost Ratio (BCR) which is the ratio of the total Present Value of benefits over the Present Value of costs.

Benefits and costs analysed are those that have been monetised by using data from actual markets (i.e. capital costs, operating costs, labour prices, vehicle operating prices etc). Austroads/DMR have provided draft road user costs parameter values for 2005 while capital expenditure (CAPEX) base costs and operating expenditure (OPEX) costs have been sourced from the project's cost schedules.

Results of this analysis ought not to determine the Project, but need to be considered alongside other major social, environmental and planning related project impacts upon which it would be difficult/impossible to place a dollar value. The analytical model employed conforms to DMR standards and to the Queensland Government's Project Evaluation Guidelines.

The economic analysis inclusions and exclusions are outlined in **Table 16-10**.

Table 16-10 Inclusions and exclusions from the Economic Analysis

Inclusions	Exclusions
▪ Changes in consumers and business journey times including freight and vehicle operating costs ▪ Changes in the number of accidents as a result of VKT in the future network ▪ Impacts on noise, local air quality and water quality ▪ Includes accessibility impacts to the extent that behavioural responses to tolling are reflected in journey time and VKT on the network ▪ Includes sensitivity tests on social discount rate, additional growth of 1% post 2026 for benefits. (in addition to population growth), and a range of risk estimates for both CAPEX and OPEX.	▪ Any evidence of land use impacts in the form of land value capture in the corridor ▪ Broader local, regional and state economic impacts as determined by computable general equilibrium modelling ▪ The impacts on broader integration with other government land use policies ▪ No allowance was made for the costs of disruption during construction. Traffic modelling was not undertaken at this micro level and the traffic impacts were not quantified as a result of this. ▪ Costs of required upgrades in the Do Minimum case were not included in the analysis as these works were not costed (These costs could be offset against the Project CAPEX which would improve the BCR). ▪ Impacts on pedestrians and cyclists ▪ Net impacts on amenity biodiversity, landscape and heritage.

Base Case Do Minimum

The analytical model provides for the Project Case as described herein to be compared to the Base Case which assumes a Do Minimum scenario. The Do Minimum changes are documented in detail in the traffic section of

the EIS and has assumed road network infrastructure improvements including the NSBT and the Gateway Upgrade Project.

Project Case

The CAPEX cash flow base costs for the Airport Link project that have been used in the economic analytical model are shown in **Table 16-11**.

- **Table 16-11 Airport Link CAPEX base costs summary (January 2006 prices) used in CBA Model**

Item	2007/08 Risk Adjusted (P50) Jan 06 $,000	2008/09 Risk Adjusted (P50) Jan 06 $,000	2009/10 Risk Adjusted (P50) Jan 06 $,000	2010/11 Risk Adjusted (P50) Jan 06 $,000	2011/12 Risk Adjusted (P50) Jan 06 $,000	2012/13 Risk Adjusted (P50) Jan 06 $,000	Total Risk Adjusted (P50) Jan 06 $,000
Land	109,815						109,815
Preconstruction	22000						22,000
Construction							
Council/State		11,778	11,778	11,778	11,778	5,889	53,000
Equipment		110,911	52,591	52,591	52,591	-	268,686
Materials		116,623	116,623	116,623	116,623	-	466,493
Labour		45,173	45,173	45,173	45,173	29,094	209,785
Subcontractor		109,640	109,640	82,015	167,085	166,243	634,624
Overheads		159,732	94,674	94,674	94,674	94,674	538,427
Subtotal		553,858	430,479	402,854	487,924	295,899	2,171,013
Total Capex	131,815	553,858	430,479	402,854	487,924	295,899	2,302,828

These CAPEX costs used in the analysis have the following key assumptions:

- All costs are valued in real terms (constant January 2006 prices) as opposed to nominal prices (i.e. future prices at which goods and services are to be provided);
- The impact of inflation is eliminated from the CBA since it is assumed that the costs will remain constant in real terms;
- All costs are risk adjusted costs;
- Capital charges and interest costs are financial transactions and are excluded from the CBA. Financial transactions are resource transfers from one part of the economy to another and do not increase or decrease the supply of a resource in the economy.

The OPEX for the Airport Link project includes all anticipated cost items over the 45 year concession for the following:

- Major repairs and replacements;
- Power consumption;
- Routine maintenance;
- Salaries and wages;
- Insurances;
- Water treatment plant;
- Other materials and services.

The estimated total OPEX for the Airport Link over the concession period is approximately $1.3 billion inclusive of profit and overheads.

Special purpose vehicle costs for revenue and maintenance administration costs have been excluded from the CBA because they are predicated on the operator's toll expenditures and revenues. Tolls are transfer payments in the context of CBA and are generally excluded.

16.4.1 Northern Busway Integration

The sections of Stage 2 of the separate, though geographically closely located, Northern Busway project and their likely interface with the Airport Link are:

- Section 1 (Royal Children's Hospital to Northey Street) – significant capital works, predominantly bridging structure, station near the Hospital, and insignificant physical interaction with Airport Link;
- Sections 2 and 3 (Northey Street to Constitution Street to Stoneleigh Street) –smaller scale capital work of surface bus prioritisation works (ie interim works to be replaced by the ultimate configuration). Section 2 may interact with North-South Bypass Tunnel and Airport Link depending on how these projects interact with Lutwyche Road; and
- Section 4 and 5 (Stoneleigh Street to Felix Street to Sadlier Road) – significant capital work, predominantly tunnel structure at Lutwyche and Kedron, significant physical local interaction with Airport Link particularly at Kedron Brook.

The Interim Northern Busway Project is defined as Section 1 and Sections 4 and 5, above. The purpose of identifying an interim project is to identify those parts of the Stage 2 works that are proposed to be constructed at the same time as the Airport Link Project and thus those parts that will have a cumulative economic effect with Airport Link.

16.4.2 Economic Modelling Assumptions

The most significant data inputs to the economic model are:

- CAPEX and OPEX cost estimates;
- Network traffic data for the Base Case and Airport Link Project Case; and
- Discount rate.

Other critical inputs are the parameter values used in the determination of travel time savings, vehicle operating costs (saving), road safety (savings) and environmental/externality (benefits). The current DMR/AustRoads (draft) standards for these values are in 2005 dollars.

Table 16-12 lists assumptions that have been used in the development of the Airport Link model.

Table 16-12 Airport Link CBA Model Assumptions

ITEM	ASSUMPTIONS
1. Price Terms	CAPEX, OPEX and benefits are recorded in real terms (i.e. constant January 2006 prices)
2. CAPEX	Construction cash flows commences in 2007 (land acquisition and preconstruction costs) and is to be completed by August 2012. The

ITEM	ASSUMPTIONS
	cost estimate is based on the Concept Design Report.
3. CAPEX Risk Adjustment	Construction costs risk estimates include values for retained and transferable risks. CAPEX risk values are expressed in real terms.
4. Operating and Expenditure (OPEX) Costs	OPEX cost schedule has been taken from the O&M Estimate Final Report. It excludes the Special Purpose Vehicle (SPV).
5. OPEX Risk Adjustment	The Project's OPEX is risk adjusted and includes retained and transferable risks over the operating period of the Project. OPEX risk values are provided in real terms.
6. Sunk Costs	Costs that have been incurred pre 2007 on feasibility and other studies are sunk costs and are **excluded** from the CBA.
7. Capital Charges including Interest	These items are **excluded** from the CBA because they are considered a transfer of resources from one part of the economy to another. Also these items are implicitly included in the discount rate.
8. Depreciation	Depreciation is excluded from the CBA because it does not have a direct economic effect. Depreciation in the form of replacement investment can generally be included in a CBA (but not in the case of the Airport Link Project) if the infrastructure asset has to be replaced during the period of analysis
9. Timing	The Project timing is as follows: ■ Land acquisition and Preconstruction starts in 2007. ■ Construction starts 1 July 2008. ■ Construction ends August 2012. ■ Operations start 1 September 2012.
10. Discount Rate	The discount rate as advised by Queensland Treasury is 6.8% in real terms. A social discount rate of 5.5% is to be used as part of a sensitivity test. The discount rate is used to convert CAPEX and OPEX that occur in different time periods to present values so that the values can be readily compared. The underlying principle is the social time preference in that society prefers to receive goods and services now rather than deferring to a later time period.
11. Concession Period	45 years including 50 month construction period.
12. Period of Analysis	45 years including 50 month construction period.
13. Benefit Assessment Period	40 years 9 months following the completion of construction in August 2012 and the commencement of operations of the link. Assessment period assumed is September 2012 to June 2053.
14. Traffic Data-Baseline	Future base traffic data without the Airport Link in place have been provided and include the following: ■ Traffic assignment years commencing in anticipated opening year 2012, 2016, 2022 and 2026. ■ Network base case traffic data for assignment years by: - Vehicle Hours Travelled (VHT), Vehicle Kilometres Travelled (VKT), average speed etc); - AM peak, PM peak, business hours and other hours; and - Vehicle type (light and heavy vehicles) and road type (motorway, expressway, arterial, suburban, district and local). ■ Base traffic network covers the Brisbane Metropolitan Area or Brisbane Statistical Division (BSD). ■ Base traffic network includes impacts of: - Gateway Upgrade Project (GUP); and - North South Bypass Tunnel (NSBT).
15. Traffic Data (Future Network with Airport Link Project)	Future base traffic data with the Airport Link in place have been provided and include the following: ■ Traffic assignment years commencing in anticipated opening

ITEM	ASSUMPTIONS
	year 2012, 2016, 2022 and 2026. ■ Network base case traffic data for assignment years by: ■ Vehicle Hours Travelled (VHT), Vehicle Kilometres Travelled (VKT), average speed etc; ■ AM peak, PM peak, business hours and other hours; and ■ Vehicle type (light and heavy vehicles) and road type (motorway, expressway, arterial, suburban, district and local). ■ Future traffic network covers the Brisbane Metropolitan Area or Brisbane Statistical Division (BSD). ■ Project Case has been based on one tolling situation. ■ Base future network includes impacts of: ■ GUP; and ■ NSBT.
16. Vehicle Segmentation	Vehicle segmentation by: ■ Light vehicles (Private cars); ■ Light Vehicles (Business cars); ■ Heavy vehicles.
17. Vehicle Occupancy	Vehicle occupancy rates for AM peak, PM peak, business hours and other hours are generally taken from the most current SEQ Travel Surveys.
18. Average Travel Speed	Calculated from VHT and VKT by vehicle category, time of day and assignment years.
19. Annualisation	330 for both light vehicles and heavy vehicles.
20. Inter Assignment Year Interpolation	Linear average annual growth between traffic assignment years.
21. Benefits Escalation beyond 2026	Assuming that the last traffic assignment year is 2026, annual traffic growth may be assumed to increase consistently with medium forecast population growth in the Brisbane Moreton Statistical Division
22. Travel Time Parameter Values	DMR/AustRoads draft values for Road User Costs (2005). Values are available for vehicle category/occupancy/freight for peak, business hour and other hours.
24. Accident Benefits	Average accident costs by road types (local, district, sub arterial, arterial, expressway and freeway) in terms of cost per million vehicle kilometres of travel (MVKT) is used. Values in accident costs will be on 2005 prices.
25. Environment and Externalities	Environmental costs for noise, air and water pollution. Parameter values have been sourced from the Draft Austroads/DMR 2005 values.
26. Residual Value	The terminal value of the Airport Link Project after the end of the 45 year concession period is assumed to zero.
27. Sensitivity	Sensitivity testing parameters: ■ Social discount rate variation at 5.5%; ■ Low and high risk adjusted CAPEX and OPEX estimates; and ■ Additional 1% population growth on benefits post 2026.
28. Decision Outputs	The following CBA decision outputs have been delivered for the Airport Link Project: ■ Benefit Cost Ratio; ■ Net Present Value; ■ Present Value Costs; and ■ Present Value Benefits segmented by travel time benefits, VOC benefits, road safety benefits and environmental benefits.
29. Treatment of Tolls in CBA	Tolls represent a means by which some of the benefits to the users of the Project (as measured by their implicit willingness to pay for reduced travel time or improved safety) can be transferred in whole or in part (in the form of cash payments by the users) to the State or private agency that operates the facility. Such transfer payments are considered outside the scope of the CBA model.

16.4.3 Results

Major transport infrastructure projects such as the proposed Airport Link will improve socio-economic opportunities in the study area by generating direct road user benefits to the users via improved travel times, reduced travel costs, improved travel comfort, safety and improved environmental externalities.

Results of the economic analysis of the Airport Link as a stand alone Project with a CAPEX base cost of approximately $2.3 billion and OPEX of around $1.3 billion over 45 year concession period at a discount rate of 6.8% are shown in **Table 16-13**.

Table 16-13 Airport Link Economic Analysis Results

Output	Present Value ($)
Present Value of Costs	$2,239,429,888
Present Value Benefits	$2,370,540,594
Net Present Value (NPV)	$131,110,706
Benefit Cost Ratio (BCR)	**1.1**

The Net Present Value (NPV) is the value of the discounted total future benefits minus discounted total future costs over the 45 year concession period. A positive NPV is an economic criterion for proceeding with the Project although other non CBA factors also need to be considered. The economic analysis of the Airport Link project returned an NPV of $131 million which indicates that the project is economically viable.

The Benefit Cost Ratio (BCR) is the discounted total benefits divided by the discounted total costs (i.e. CAPEX and OPEX). The BCR of 1.1 indicates that the present value of benefits provides a 10% return in value over the concession period for the project.

The Present Value of User Benefits of the Airport Link project are shown in **Table 16-14**.

Table 16-14 Present User Benefits

Output	Present Value ($)	Benefits (%)
Travel time savings	$1,716,703,984	72%
Vehicle operating costs savings	$487,311,107	21%
Environmental benefits	$84,650,045	4%
Road safety benefits	$81,875,458	3%

Travel Time Savings

Estimation of changes in travel times is an important aspect of determining the economic effects of providing a new major road infrastructure link in the network. Projects which improve traffic flows provide motorists with improved journey time, less congestion in the network and enhanced network reliability that may result in time savings are assessed as having economic value.

Travel time estimates are calculated using aggregates of:

- Travel speed for each vehicle class (motor vehicles, light commercial and heavy vehicle classes);
- Average annual daily traffic by vehicle class (AADT);
- Route distance;
- Average occupancy by vehicle class; and
- Value of time per occupant and for freight by vehicle class.

The approach taken has been to use Network Vehicle Hours Travelled (VHT) data for assignment years 2012, 2016, 2022 and 2026. This data has been segmented by traffic modellers on the basis of vehicle class (i.e. passenger cars and heavy vehicles) and by period of travel (i.e. morning peak 7am –9am, afternoon peak 4pm – 6pm, business hours 9am – 4pm and other hours 6pm – 7am). Cars have been further delineated into cars (private), cars (business) and light commercial vehicles using preferences data from 2001 BSTM VO1 model output. The significance of delineating private versus business purposes and peak and business/other hours is that each has a different occupancy rate per vehicle and, in the case of cars (business – peak/business hours) and Light Commercial (peak/business hours), a higher assigned economic parameter value (value of time).

Table 16-15 provides value of travel time on a $ per person / hours by vehicle class, time of travel and private/business.

- **Table 16-15 Estimated Values of Urban Travel Time – Occupant and Freight Payload Values**

Vehicle Type	Occupancy Rate	Value/occupant (person-hour)	Freight travel time Values/vehicle-hour
Cars – private	1.6	$10.74	-
Cars – business	1.4	$34.35	-
Rigid trucks			
- light commercial (2 axle, 4 tyre)	1.3	$21.05	$1.13
- medium (2 axle, 6 tyre)	1.3	$21.35	$3.06
- heavy (3 axle)	1.0	$21.80	$10.48
Articulated Trucks			
- 4 axle	1.0	$22.09	$22.56
- 5 axle	1.0	$22.39	$28.78
- 6 axle	1.0	$22.39	$31.03

Table 16-16 shows the travel time savings net benefit segmented by vehicle type.

- **Table 16-16 Present value off travel time savings by vehicle type**

Vehicle Segment	Present Value ($)	% Travel Time Benefit
Cars (Business)	$319,494,571	18%
Cars (Private)	$1,262,776,995	74%
Light Commercial	$82,005,803	5%
Heavy Commercial	$52,426,616	3%
Travel Time Benefits Total	**$1,716,703,984**	**100%**

Travel time savings represent the largest economic net benefit to Airport Link and are valued at over $1.7 billion in net present value terms. Private cars are the largest contributor to travel time savings over the 45 year concession period.

Vehicle Operating Cost Savings

Road projects can directly affect the cost of operating vehicles by improving traffic flow and better road conditions. Vehicle Operating Costs (VOC) savings will be derived from improved road conditions that impose less stress on vehicles.

VOC are based on a combination of variables including fuel and oil consumption, maintenance and repair,

capital depreciation, insurance costs, road condition and grade and vehicle speed.

VOC parameter values and journey speed vehicle operating cost models which incorporate these values are periodically updated by ARRB with the latest being in the Austroads publication, Economic Evaluation of Road Investment Proposals – Unit Values for Road User Costs (Draft), Austroads 2005.

Two journey speed vehicle operating cost models are generally used in this economic evaluation to determine VOC, namely the Urban Freeway Model and the Urban Stop Start Model. The Freeway Model is used for predicting the effects of average journey speed on VOC in freeway conditions where average speed are greater than 60km/hr, while the Urban Stop Start Model is used for more built up road conditions where average speeds are less than than 60km/hr.

The equation for both conditions is the same but the coefficients comprising the models are different and reflect the more efficient use of vehicles in the urban freeway driving conditions. The equation is as follows:

Urban Model: $c = A + B/V + C*V + D*V^2$
Where:

- A, B, C and D = model coefficients (**Table 16-17**)
- V represents all day average link speed (km/hr);
- C = vehicle operating costs (cents/km)

Table 16-17 Parameter values for urban VOC models

Vehicle Type	Freeway Model				All Other Roads			
	A	B	C	D	A	B	C	D
Cars	15.331	141.5	0.00	0.00015	8.246	446.3	0.0	0.000609
LCV	24.311	826.0	0.00	0.00034	7.917	1387.6	0.2	0.001362
HCV & Buses	58.224	6317.0	0.00	0.00005	14.198	69254.3	0.2	0.002

The traffic modellers have provided Network Vehicle Kilometres Travelled (VKT) data and Average Speed data for the assignment years 2012, 2016, 2022 and 2026. The VKT data have been further delineated on the basis of vehicle classes namely cars, light commercials and heavy vehicles. The VKT for the above vehicle classes is multiplied by the respective cents/km to calculate the $ vehicle operating costs for the Do Minimum Base Case and the Airport Link Project Case Network VKT. **Table 16-18** shows the findings for the VOC by road type and vehicle segment.

Table 16-18 Present value of VOC by road type and vehicle segment

Vehicle Type	Cars	Heavy Vehicles	Total
Road Type	**Present Value ($)**	**Present Value ($)**	**Present Value ($)**
Motorway	-$302,161,403	-$164,701,560	-$466,862,962
Expressway	$7,776,516	$643,889	$8,420,406
Arterial	$332,557,417	$252,453,613	$585,011,030
Suburban	$120,054,393	$84,825,918	$204,880,311
District	$63,325,153	$38,388,475	$101,713,628
Local	$30,763,537	$23,385,158	$54,148,695
Present Value ($)	**$252,315,614**	**$234,995,493**	**$487,311,107**

Road Safety Benefits

Road related accidents result in a multitude of adverse socio-economic impacts on the community, government services and the private sector. Some of the more significant of these impacts are:

- Immediate and ongoing medical costs;
- Unquantifiable emotional suffering;
- Property damage;
- Police and emergency services response costs;
- Road safety infrastructure enhancements;
- Lost productivity;
- Higher insurance premiums; and
- Legal costs.

The standard process for quantifying the accident reduction benefits arising from changes in the road network is to use an average accident cost measure per $ million VKT. As the number of VKT by road type on the network changes as a result of the project, so will the value of the accident reduction benefits. Therefore if the impact of the project on the network results in a reduction in VKT for various road types it will reduce the number of accidents in the network. This method uses VKT for two main road link class groupings (i.e. motorways, expressways, arterials, suburban, district and local) and an average accident cost per million VKT for each road grouping. The equation for valuing accident decrease benefits is as follows:

Net $ Accident Benefits = The sum of (million VKT for each road grouping X Average Accident Cost per million VKT) for the Project Case less the same for the Do Minimum Base case. **Table 16-19** presents average accident costs by road type in terms of cost per million kilometres of travel (MVKT) for all crashes.

- **Table 16-19 Adverse Accidents by Road Type**

Road Type	Crash Cost ($ per m VKT)
Motorway	$18,200
Expressway	$18,200
Arterial	$58,300
Suburban	$80,100
District	$80,000
Local	$80,100

The average accident costs per MVKT by road type have been applied to the net difference in annual VKT travelled for each road type in the assignment years of 2012, 2016, 2022 and 2026. The discounted road safety benefits by road type are as follows:

- **Table 16-20 Discounted road safety benefits**

Road Type	Present Value ($)	% Road Safety Benefit
Motorway	-$36,008,606	-44%
Expressway	$1,394,225	2%
Arterial	$54,612,916	67%
Suburban	$37,383,946	46%
District	$16,355,126	20%
Local	$8,137,851	10%
Road Safety Total	**$81,875,458**	**100%**

Motorways achieved a disbenefit to the Project of -$36 million. This is the result of the increase in VKTs on the motorway. Arterial roads contribute over $54 million dollars to the economy over the concession period.

Environment and Externality Benefits

A range of direct and indirect impacts on the built and natural environments need to be considered and assessed in the EIS process. The environmental impacts that can be valued and have implications for the analysis are:- noise, local air quality and water quality.

It is assumed that traffic using the proposed Airport Link tunnel will specifically generate noise, local air quality, greenhouse gases and water quality benefits. The basis for these benefits arises from the shifting of forecast at grade traffic from the existing road network to the road tunnel.

Table 16-21 specifies Airport Tunnel traffic VKT on an average weekday and for a year using the Austroads externality unit cost for urban passenger vehicles and urban freight vehicles

- **Table 16-21 Externality Unit Costs - Urban**

Externa-lity	Passenger Vehicle (cents per km)	Heavy vehicle ($ per 1000 tonne km)	Assumption
Noise	0.78	2.56	Tunnel infrastructure such as the Airport Link Project will eliminate surface traffic noise for those vehicles using the link but will result in a greater concentration of noise emissions at the portals. The primary assumption is that the Airport Link tunnel will remove around 331,000 VKT (2012) to 410,000 VKT (2026) daily from surface roads. This traffic displacement to subgrade will have beneficial traffic noise impacts along the length of the 6km tunnel. Notwithstanding this, there will be additional noise impacts on roads leading to portals (See Chapter 10 of this EIS.
Local Air Pollution	2.34	23.36	Similar to noise above where the Airport Link tunnel will generate sub surface VKT and also the network will exhibit an easing of congestion and freer running of vehicles at more efficient driving speeds. Vehicle emissions from surface roads are released at ground level and rely on atmospheric dispersion to reduce the pollutant concentrations. Ground level emissions realises adversely impact on populations in the corridor. The tunnel will employ a ventilation system where air is drawn into the tunnel from portals and ventilation inlets. Air will then be discharged from the tunnel through ventilations outlets. These outlets are at an elevated point above ground level that facilitates the dispersion of the filtered air into the atmosphere. Therefore it is generally concluded that tunnels will have local air quality benefits because of the elevated points of emission from the ventilation outlets. (See Chapter 9 of this EIS) In addition the reduction in surface traffic in the network will generate air quality benefits with the tunnel constructed.
Water Quality	0.34	2.22	Tunnel traffic will reduce surface traffic elsewhere in the network. Pollutants from vehicles have adverse impacts on the local water quality. Pollutants that are deposited on roadways include heavy metals, organic chemicals, particulants, tyre residue, oils, rust etc. These pollutants enter surface water and groundwater from runoff from the roadway. The increased impervious surface area associated with the road pavement also speeds the conveyance of water runoff into local creeks. Similar pollutants will be deposited on tunnel roads, walls and ceilings but will be treated as part of the water treatment service within the tunnel (See Chapter 8 of this EIS).

Table 16-22 shows the environmental benefits for the Project option by environmental type and vehicle type.

Table 16-22 Discounted environmental benefits by vehicle type

Vehicle Type	Cars	Heavy Vehicles	Total
Environmental Benefit	**Present Value ($)**	**Present Value ($)**	**Present Value ($)**
Noise	$9,605,330	$3,824,697	$13,430,027
Air Pollution	$28,815,990	$34,900,360	$63,716,350
Water Pollution	$4,186,939	$3,316,729	$7,503,668
Total Environmental Benefits	**$42,608,259**	**$42,041,786**	**$84,650,045**

16.4.4 Sensitivity Analysis

A sensitivity analysis was undertaken on social discount rate, additional growth of 1% post 2026 for benefits. (in addition to population growth), and a range of risk estimates for both CAPEX and OPEX. **Table 16-23** summarises the alternative parameters used in the sensitivity analysis and the overall results.

- **Table 16-23 Sensitivities modelled**

Sensitivity	Details	Undiscounted CAPEX	Undiscounted OPEX	NPV ($)	BCR
Project Case	Project risk adjusted CAPEX/OPEX; 6.8% discount rate.	$2.3 billion	$1.3 billion	**$131,110,706**	**1.1**
2	Project risk adjusted CAPEX/OPEX; 5.5% discount rate.	$2.3 billion	$1.3 billion	**$694,232,512**	**1.3**
3	*Low risk adjusted CAPEX/OPEX; 6.8% discount rate.	$2.2 billion	$1.2 billion	**$243,441,346**	**1.1**
4	**High risk adjusted CAPEX/OPEX; 6.8% discount rate.	$2.5 billion	$1.5 billion	**-$63,072,038**	**1.0**
5	Project risk adjusted CAPEX/OPEX; 6.8% discount rate; Population growth plus 1% post 2026.	$2.3 billion	$1.3 billion	**$260,198,717**	**1.1**

***** Low risk adjusted CAPEX/OPEX are based on the P10 estimate which is a 10% likelihood of the project being delivered for less than this amount.

****** High risk CAPEX/OPEX are based on the P90 estimate which is a 90% likelihood of the project being delivered for less than this amount.

Key findings from the sensitivity analysis include:

- BCRs are in the range of 1.0 to 1.3, which are breakeven or a better investment result from an economic perspective. It should be noted however, that as a result of rounding, Sensitivity 4 achieved an NPV of -$63 million.
- The results of the sensitivity testing concluded little impact to BCRs with ranges of 1.0 to 1.3;
- There was however, a significant impact on the NPVs with returns in the range of $694 million (Sensitivity 2) and -$63 million (Sensitivity 4); and
- Sensitivity 2 (5.5% discount rate) achieved the best economic return with an NPV of $694 million and BCR of 1.3.

16.5 Induced Travel Demand

The operational phase of the Airport Link Project from 2012 may impact on travel behaviour in the corridor and broader road network.

Significant road infrastructure improvements such as the Airport Link will reduce congestion, improve network connectivity and thereby reduce the generalised cost of driving. The resulting increase in vehicle travel demand vis-à-vis demand that would have otherwise occurred without the Project consists of generated traffic of which "induced travel" is a subset.

Induced travel is that part of *generated traffic* that is the increase in vehicle demand (ie total VKT) due to increased motor vehicle trip frequency, relatively longer trip distances or shifts from other transport modes but excludes travel shifted from other times and routes).

The BSTM Base Demand Model that has been developed for the traffic modelling of the Airport Link Project has addressed induced demand into the model by applying an elasticity of demand of -0.2 to the forecasted traffic changes.

The traffic modelling identified that daily induced private vehicle demand is forecast to be approximately 20,600 additional daily trips in 2012 or a very minor 0.49% of the total daily network trips of 4,219,000. In 2026 the daily induced private vehicle demand is forecast to increase to 34,700 private vehicle trips or only 0.67% of total 5,180,800 private vehicle trips in the modelled network.

The traffic modelling concluded the relatively minor nature of daily induced private vehicle demand across all networks with the NSBT and Airport Link included in the model (see also Chapter 5 of the EIS).

16.6 Conclusions

The Airport Link Project case with risk adjusted CAPEX of $2.3 billion and a discount rate of 6.8% returns a BCR of 1.1 and a NPV of around $131 million over the 45 year concession period. These investment results provide an economic justification for the project proceeding.

Travel time savings at $1.7 billion (in present value terms) contribute the major benefit followed by vehicle operating costs, road safety and environmental. Road Safety and environmental benefits may be understated since they are driven by proposed tunnel VKT rather than network traffic data.

The sensitivity testing of the Airport Link Project Case returned BCRs in the range of 1.0 to 1.3, which is breakeven or a better investment result from an economic perspective.

16.7 Computable General Equilibrium Modelling

The economy-wide effects of the proposed Airport Link have been estimated using the MONASH Multiregional Forecasting (MMRF-GREEN) model of the Australian economy. MMRF-GREEN is a dynamic multiregional computable general equilibrium (CGE) model that captures the behaviour of economic agents in each Australian state and territory. Results for Queensland are provided for the period 2007, when preconstruction activities are scheduled to commence, to 2052. For the construction period, 2007 to 2012, state results for Queensland are also decomposed into the effects on South East Queensland (SEQ) and the rest of Queensland.

The MMRF-GREEN model divides Australia into eight regions (six states and two territories) and eleven regions within Queensland (the state's statistical divisions). At the state level there is detailed modelling of the behaviour of five types of economic agents: industries, capital creators, households, governments, and foreigners. For a description of MMRF see Adams, et al (2000 and 2003) and for the parameters, assumptions

and simulations used in the analysis of Airport Link see Technical Report 13 –Economics in Volume 3.

Results

The detailed results of the modelling are provided in Section 5 of Technical Report No 13 – Economics in Volume 3 of the EIS. **Table 16-24** shows the employment effects on South-East Queensland for aggregated sectors for the construction period. The detailed results are summarised here.

During the construction phase the project generates an increase in national employment which generates an increase in GDP. However, national real household consumption is negatively affected during the construction phase as resources are diverted towards investment. During the operating phase national real GDP is slightly increased due mainly to the small technological improvement associated with operation of Airport Link. This is accompanied by a slightly elevated national real household consumption.

However, Queensland, displays a different pattern of results. During the construction phase employment and gross state product in Queensland both increase. While real consumption is squeezed Australia-wide, since we assume that the project is financed in a macroeconomic sense from domestic savings, the residents of Queensland only contribute part of the saving. This means that real household consumption increases in Queensland during the construction period.

However during the operating phase, Queensland residents pay for Airport Link via a toll. Since it is assumed that a large portion of the benefits are consumed in the form of increased leisure time for Queensland households (and accident and environment savings are not modelled), Queensland real household expenditure falls relative to the baseline in this phase.

It should be remembered that the picture for Queensland households is still positive from the Airport Link. When the other benefits are added to real household consumption the picture becomes positive.

Table 16-24 Impact of Airport Link on employment in South-East Queensland

	2007	2008	2009	2010	2011	2012
Primary Sector	0	-4	-13	-13	-14	-9
Manufacturing	16	385	285	276	355	235
Utilities	1	18	10	7	8	1
Construction	104	2,577	2,029	1,897	2,267	1,443
Trade and Hotels	56	1,378	992	889	1,178	297
Road transport	7	188	112	94	117	-274
Other Transport	2	54	18	11	19	2
Other Services	58	1,427	1,082	983	1,178	590
Total SEQ	**244**	**6,011**	**4,512**	**4,144**	**5,006**	**2,285**
Rest QLD	**65**	**1,580**	**1,093**	**975**	**1,203**	**317**

MMRF models agents at the state level. While top-down decomposition methods that allow sub-state regional results to be generated, this methodology is really only suitable for shocks that occur fairly evenly across the state (Giesecke, 1999). To model a region-specific shock requires a bottom-up multiregional model that treats the behaviour of economic actors at the sub-state level. A model of this type has become available over the past few years. It is entitled TERM (Horridge, et al., 2005). However, this model is not sufficiently developed in terms of its dynamic properties and its handling of the transport sector for it to be used in the present study. It is intended, however, time permitting, to conduct some comparative-static simulations with TERM to provide

additional information that would allow a decomposition of Queensland results to the South East region for both construction and operating phases. At present, a top-down decomposition is used for the construction phase only. This is achieved under the simple assumption that all of the impact on the construction industry occurs in SEQ. This together with local multiplier effects, implies that the vast bulk of the employment effect occurs in the south-east of the state.

16.8 Project Justification – Economic Perspective

Traffic using the proposed Airport Link Project is a function of existing and forecast population and commercial and industrial land use and economic activity in the Airport Link geographic corridor, and the broader Brisbane metropolitan area and surrounding local authority services.

The South East Queensland Regional Plan highlights that the population of the region is forecast to increase from the current 2.6 million people to about 3.7 million in 2026. The Brisbane metropolitan area is forecast to increase from 1.55 million to more than 2 million by 2016.

Economic activity in the Brisbane metropolitan area is forecast to continue to expand with Brisbane Airport, the Port of Brisbane and other major commercial and industrial development in the outer North area likely to be a catalyst for substantial economic growth.

In particular, total revenue passenger movements of Brisbane Airport have increased from 9.2 million in 1995 / 96 to 15.4 million in 2004 / 05 at an average annual growth rate of 6.7%. This increase in passenger movements at Brisbane Airport over the past decade has placed heightened pressure on the road network that feeds into the airport from the Brisbane CBD and the broader Brisbane metropolitan area. The continued implementation of the Brisbane Airport 2003 Master Plan and the ongoing development of the seven master planned aviation, commercial and industrial precincts will also be a significant generator of additional traffic and employment.

The Port of Brisbane has experienced significant trade growth over the past decade which is forecast to continue in the medium to long term. The port is Australia's third largest container port and growth in container segment has increased from 249,438 containers in 1995 / 96 to 726,145 containers in 2004 / 05. Total container volumes are projected to reach around 1.9 million in 2025.

The Australia Trade Coast including Trade Coast Central and the Outer North, Outer South and Outer West areas will also be the location for future significant industrial and commercial development that will continue to fuel economic activity and economic growth in the broader Brisbane region.

Efficient freight movements will be required to support and facilitate this projected economic activity. The Transport Plan for Brisbane 2002 – 2016 states that about 90% of freight movements in South East Queensland originate or has its destination in Brisbane. Urban freight movements are estimated to be increasing at a rate of 4% annually.

The South East Queensland Regional Plan identifies that the increase in the region's population will generate an additional 425,000 jobs by 2026. The Transport Plan for Brisbane highlights that existing and future employment growth is becoming decentralised in the Brisbane Metropolitan area. The significance of Brisbane in the region is exhibited by the fact that 90% of Brisbane's residents work within Brisbane City Council boundaries and approximately 50% of residents from surrounding local government areas travel to work in Brisbane. This trend has significant implications for cross city travel particularly in the morning and afternoon peaks when congestion adversely affects the network. Employment growth in the Brisbane CBD and Brisbane City's outer areas is forecast to increase by 19% and 45% respectively between 2006 and 2016.

The proposed increase in the region's and Brisbane's population and the projected expansion of economic activity has increased the need for new road infrastructure such as the Airport Link to support the projected growth. The Airport Link Project will be a key influence on the future pattern and rate of economic development in the region and in Brisbane.

The major economic conclusions from the Airport Link CBA model and the Computable General Equilibrium Modelling are as follows:

- The Airport Link Project case with risk adjusted CAPEX of $2.3 billion and a discount rate of 6.8% returns a BCR of 1.1 and a NPV of around $131 million over the 45 year concession period. This investment results provide an economic justification for the Project proceeding.
- Travel time savings at $1.7 billion (in present value terms) contribute the major benefit at 72% of total benefits followed by VOC at $488 million (21%), road safety at $82 million (3%) and, environmental / externalities at $85 million (4%).
- The sensitivity testing of the Airport Link Project Case returned BCRs in the range of 1.0 to 1.3, which are breakeven or a better investment result from an economic perspective.
- The Airport Link CAPEX of $2.3 billion and OPEX of $1.3 billion over the 45 year concession period represents a significant investment catalyst that will result in significant direct and indirect benefits to the Brisbane, the South East Queensland and the Queensland economies.
- Queensland however, displays a different pattern of results. During the construction phase there is an increase in Queensland employment and gross state product, generated by construction of the Airport Link. The impact of the Airport Link on employment in South East Queensland will range from 6,011 FTE's when the construction starts in 2008 to 2,285 FTE's during the last year of construction in 2012. Real consumption is squeezed Australia-wide since the Project is financed in a macroeconomic sense from domestic savings and the residents of Queensland will only contribute part of the saving (less than a fifth). This means that real household consumption increases to around $137 million in Queensland during a typical year in the construction period.
- During the operating phase, Queensland residents pay for the Airport Link via a toll. Since it is assumed that a large portion of the benefits are consumed in the form of increased leisure time for Queensland households (and accident and environment savings are not modelled), Queensland real household expenditure falls relative to the baseline in this phase.

The Airport Link will be a very significant section of road infrastructure that will support and facilitate population and key economic growth areas in Brisbane and the region. The Airport Link CBA model results provide an economic justification for proceeding with the Project, while the CGE modelling results in positive economic impacts for Queensland and South East Queensland from the construction and operations phases of the project.