# Airport Link

## CHAPTER 22

## CONCLUSIONS & RECOMMENDATIONS

- October 2006

# Contents

# 22. Conclusions & Recommendations

*This chapter addresses Section 7 of the Terms of Reference. Its purpose is to provide a balanced overview of the Project and its impacts and benefits, together with any recommendations considered necessary as a result of the environmental impact assessment process. The chapter outlines the approach proposed to be taken in project implementation through reference to the draft Outline Environmental Management Plans and through the mitigation measures proposed to address the predicted impacts and optimise where possible the predicted benefits, as measures seeking to ensure the Project contributes to ecologically sustainable development.*

## 22.1 Conclusions

The conclusions drawn from the environmental impact assessment process relate primarily to the key issues underlying the Airport Link Project in terms of its rationale, the traffic and transport implications, the economic implications, the project delivery impacts and mitigation measures, the operational impacts and mitigation measures, and the environmental management approach proposed during project delivery and operation.

### 22.1.1 Rationale for Airport Link

The Queensland Government and the Brisbane City Council have been working towards achieving a sustainable balance between travel demand, transportation capacity and land use planning through a number of key strategies over many years. A key and underlying objective is the integration of land use planning and transport planning as the principal means for managing travel demand in the face of sustained population growth. Secondary strategies entail the enhancement of public transport and forms of active transport to reduce reliance on the private vehicle as the primary form of transport for the region's population.

The *South East Queensland Regional Plan* is directed towards managing regional population growth over the next twenty years. During that time, the population could grow by 40,000 to 60,000 people each year, leading to a regional population of 3.71 million in 2026 (SEQRP Regional Population Projections, medium growth series). In 2026, the forecast population for the metropolitan area is 2.58 million, compared to 1.77 million in 2004. The pattern of future settlement seeks to encourage increased densities in the existing urban areas while accommodating people in designated areas (i.e. the 'urban footprint'). Much of the population growth is expected to be accommodated in the local government areas of Brisbane, Caboolture, Pine Rivers, Ipswich, Gold Coast and Redlands. To a lesser extent, the remaining seven local government areas in the SEQ region will share and accommodate the remaining population growth.

This sustained population growth, combined with the radial road pattern and the concentration of employment in Brisbane, contributes towards a challenging transportation scenario. That is, the surface road network is already congested as people move across the region to access jobs and high-order services. The public transport system, despite enjoying significant growth in patronage in recent years, is not keeping up with the travel demand generated from a dispersed settlement pattern, dispersed employment centres and a radial transportation network.

The studies for this EIS have confirmed and adopted the regional planning strategy that transport planning needs to encourage less reliance on private vehicle travel. By 2026 the increased public transport patronage would represent a doubling of current levels to over 900,000 public transport trips per weekday. With enhanced public transport, the reduction in vehicle trips in the network is estimated as 4%. With no enhancement, public transport would account for between 7% and 8% of travel demand. By 2026, total travel demand including commercial vehicles is forecast to be 45% higher than current levels, reaching 5.5 million vehicle trips on an average weekday.

Very strong growth in demand to key trip generators is anticipated within the immediate catchment of Airport Link. By 2026, the central city will have a forecast increase of over 55% in vehicle demand based mostly on employment. The Australia TradeCoast (North) will generate increased travel demand over 300% higher than current levels, reaching almost 80% of the level of central city vehicle traffic generation.

With population increases and increasing economic activity at the Australia TradeCoast, a general increase in congestion is predicted on the road network across the years. Without significant improvements to the road and public transport network, peak period journey travel times are forecast to increase significantly compared to the current level. For example, a southbound peak period trip in 2026 from Chermside to Fortitude Valley will have an average travel speed of 20 km/hr, compared to 31 km/hr currently. For a north-bound trip over the same route, the forecast 2026 northbound PM peak speed is only 14 km/hr. This reduction in service will be experienced across the network.

Assessment of travel demand in Brisbane's inner north indicates that on the arterial roads currently about 60% of trips are cross-city, 35% are destined for the Central City and only 5% is local traffic. Much of the traffic congestion on the arterial network in inner north Brisbane is caused by traffic wanting to get "somewhere else" but being forced to use the roads through the suburbs.

Against this scenario, a 'do nothing' response will have severe, adverse consequences for the economic, social and environmental conditions of the City now and would severely constrain its development in the future.

### 22.1.2 Integrated Transport Solution

The Airport Link Project is identified in the South East Queensland Infrastructure Plan and Program 2005 - 2026 (SEQIPP), as a potential road infrastructure improvement to serve the Brisbane metropolitan area. SEQIPP also provides for the provision of the Northern Busway from Herston northwards to Aspley and then to Bracken Ridge. The implementation of the Northern Busway Project may occur in stages and relies upon the relief of surface congestion, particularly on Lutwyche Road, for this to occur. In addition to relieving congestion, the Airport Link Project, with the Northern Busway Project, is expected to provide additional road capacity to meet anticipated travel demand to the year 2026.

To improve the mode share for public transport, the Queensland Government (TransLink) and the Brisbane City Council are investing in the metropolitan public transport system through continued improvements to service delivery, bus routes, and fleets of gas-powered buses. Other major initiatives, such as integrated ticketing across the modes of public transport contribute to a more attractive and accessible system. However, the continued pressure from population growth also dictates a need to enhance road capacity for business, leisure and freight trips through and across the northern suburbs of Brisbane.

The Airport Link Project would address strategic gaps in Brisbane's road network by providing an enhanced road connection to the intra-state road system and the regionally significant roads that provide for both radial and orbital functions within Brisbane. These improvements will facilitate cross-city travel movement in an environment where there is increasing travel demand to, and between, major economic activity and employment nodes serving the region. These include the Brisbane CBD and the Australia TradeCoast precinct, including Brisbane Airport.

Opportunities to enhance public transport operations on surface roads would be created with Airport Link. Greater use of public transport can be supported by providing opportunities on Lutwyche Road for reclamation of freed up road space from general traffic use for either bus, or transit (high occupancy vehicle) lanes. In particular, potential for a cost-effective staging of the Northern Busway Project would be available. Potential for transit lanes on Sandgate Road is also created.

The Airport Link Project would relieve traffic congestion and improve travel time reliability. Users of both the toll road facility, and the un-tolled surface roads, would benefit from travel time savings, particularly freight vehicles. An effective integrated transport network supports competitiveness of industry and business.

The environment for pedestrian and cyclist travel on the surface network would be improved with the Airport Link Project, by reducing traffic demands on the local road system, particularly through activity centres and near public transport stations. Walking and cycling networks provide flexibility for travel as well as significant health and environmental benefits.

Airport Link would generally improve the amenity of inner urban redevelopment areas such as Albion and Lutwyche, as well as other locations in close proximity to high quality public transport, by reducing vehicular traffic. Consolidation of inner urban areas supports aspirations for a more compact urban form in South East Queensland.

While some adverse effects have been identified and assessed, there is clear support for the Airport Link Project as a key component in an overall strategy to improve the efficiency of Brisbane's road network.

### 22.1.3 Economic Implications

The Airport Link Project will respond to traffic and transport demand arising from forecast population growth, commercial and industrial land use, and economic activity in the Airport Link corridor, broader Brisbane metropolitan area and surrounding local authorities.

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 as likely catalysts for substantial economic growth. In particular, the increase in passenger movements at Brisbane Airport over the past decade has and will continue to place pressure on the road network that feeds into the airport from the Brisbane CBD and the broader Brisbane metropolitan area. Similarly, 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, with strong growth in container movements projected to 2025.

The Australia TradeCoast will 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.

Regional population growth is expected to generate an additional 425,000 jobs by 2026, with employment growth in the Brisbane CBD and Brisbane City's outer areas forecast to increase by 19% and 45%, respectively, between 2006 and 2016. Future employment growth is becoming decentralised in the Brisbane Metropolitan area. At present, approximately 90% of the Brisbane labour force works within Brisbane City Council boundaries and approximately 50% of the labour force residing in surrounding local government areas travel to work in Brisbane. This has significant implications for cross-city travel particularly in the morning and afternoon peaks when congestion adversely affects the network.

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.

With a risk-adjusted capital cost of $2.3 billion, and a discount rate of 6.8%, the Airport Link Project will have a benefit cost ratio of 1.1, and a nett present value of $131 million over the 45 year concession period. The value

of travel time savings available from the Project is $1.7 billion, in present value terms, while the value of vehicle operating cost savings is estimated to be $488 million. Road safety and environmental benefits are valued, collectively, at $167 million in present value terms.

The impact of the Airport Link Project on employment in South East Queensland will range from approximately 6,000 full-time employees with the commencement of construction in 2008 to approximately 2,300 full-time employees during the last year of construction in 2012.

The Airport Link Project 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 cost benefit analysis (CBA) model results provide a economic justification for proceeding with the Project, while the computable general equilibrium (CGE) modelling indicates positive economic impacts for Queensland and South East Queensland from the construction and operation phases of the Project.

### 22.1.4 Design for Sustainability

The development of the Airport Link Project concept has occurred in conjunction with a comprehensive process of community consultation and environmental investigation and testing. Within the scope of the Project objectives, the process has sought to reduce, if not avoid, potential impacts from design, construction and operation. Design criteria and mitigation strategies were developed in consultation with relevant State and local government agencies, community groups and stakeholders, including the traditional people of the area.

In addition to this integrated process, the design and construction aspects were developed within a framework of ecological sustainability relating to urban water management; air quality management; resource use, re-use and management; corridor rehabilitation and regeneration; environmental management, and community consultation and capacity building. The design for the Project includes sufficient flexibility to permit subsequent installation of enhanced ventilation and filtration equipment, in the event such equipment becomes effective and beneficial in its overall impacts for removing potentially harmful pollutants from tunnel air.

The Airport Link Project is significant in terms of its scale, duration of construction, and operational life. It has the potential to shape the future direction and form of development of the inner northern suburbs as traffic flows change and potential benefits and impacts are realised in local and wider areas. It is anticipated that land use change will occur both along the approach roads to the project portals as well as along the Lutwyche Road and Sandgate Road corridors as the benefits of freed road space and potentially enhanced public transport services become available. As development and land use activity intensifies around the urban centres in the corridor, including the transport stations and areas benefiting from enhanced accessibility due to the Airport Link Project, the potential for travel demand management increases.

Concurrently, the design development process has been modified to accommodate the implementation of the Northern Busway Project through changes in alignment and arrangements of the surface connections. Implementation of both the Airport Link Project and the Northern Busway Project will deliver significant benefits in travel demand management and will present a sustainable response to rapidly-deteriorating traffic conditions on the northern approaches to the City centre and the Brisbane Airport.

Having regard to the long-term nature of the Project, the design development process has sought to minimise long-term impacts through urban design and rehabilitation measures, and to off-set construction impacts through a range of mitigation measures which have the potential to impart long-term benefits in the communities impacted by construction. Some of these mitigation measures provide opportunities for long-term community involvement, building capacity and building awareness and ownership of important community resources in the study corridor. For example, the mitigation measures for the construction sites adjacent to Schulz Canal and

Kedron Brook provide opportunities for an integrated response involving community groups, the Proponent, State and local government agencies and the Contractor.

### 22.1.5 Project Delivery Impacts & Mitigation Measures

The delivery mode for the Airport Link Project is expected to generate the potential for a range of physical, environmental, social and economic impacts. A summary of the more significant, potential impacts and the possible mitigation measures is provided below.

#### *Construction & Worksites*

Construction worksites will be established in Windsor, Kedron, Lutwyche and Clayfield. Enclosed structures and worksheds will be erected within the worksites to manage the impacts of construction noise and dust emanating from the tunnel portals. Spoil storage, handling and loading will also occur within acoustic lined worksheds. The worksite at Windsor will be contiguous with that for the NSBT Project, and will require the acquisition of land. Access will be via Federation Street from Lutwyche Road. The north-western worksites at Kedron and Lutwyche will sit adjacent to the Kedron State High School and the Wooloowin State School respectively. Construction worksite layout, operation and management in these locations need to reflect and respond to the access and operational requirements of those schools.

The scale of the worksheds, spoil and conveyor systems will vary between construction worksites, but generally will be large and somewhat out of context with the local setting. This will be a short-term impact arising from the mitigation and management of noise and dust construction impacts through the provision of the worksheds and the enclosures. The visual impacts of the workshed can be mitigated through the application of innovative designs and architectural treatments (e.g. building graphics, materials, colours, and lighting).

Rehabilitation of the construction worksites post-construction is important to mitigate potential impacts such as soil erosion, sedimentation, dust and weed growth. With land use planning, the re-use of worksites can be managed to achieve acceptable long-term outcomes, consistent with orderly planning objectives and the character of the locality.

#### *Construction Traffic and Access*

The scale of the construction project entails a significant transport task, both for materials into the construction worksites and construction spoil leaving the worksites. Construction spoil removal will generate flows of heavy vehicles along arterial roads over 24 hour periods (Monday 6.30am to Saturday 6.30pm), managed from a central point to avoid congestion, maintain smooth and efficient movements through the City's traffic, and to minimise and mitigate potential impacts associated with heavy vehicle movements (e.g. noise and air quality).

The proposal is to seek a comprehensive approach to construction traffic management, dealing with traffic movements on arterial roads, required changes to local traffic movements and access arrangements for adjacent properties, safety management, vehicle maintenance and management to mitigate air quality and noise impacts, and management of labour force traffic and parking demand. A key element of the construction management strategy is the establishment of a co-ordination committee comprising the Department of Main Roads, Queensland Transport, the Coordinator General, and the Brisbane City Council, to address the coordination and management of construction traffic and transport network performance during the construction phase.

#### *Construction Noise and Vibration*

The construction of the Airport Link Project will likely entail the use of techniques and machinery with the potential to impact on sensitive receptors through the generation of noise, regenerated noise, or vibration, or a combination of these effects. Such techniques could include drilling and blasting, the use of rock-breaking

equipment, surface earthmoving plant and equipment, and tunnelling machines such as roadheaders and tunnel boring machines. The environmental effects of each construction technique are different, requiring mitigation and management measures tailored to the technique and the characteristics of the location in which they are to be employed.

The management approach is to establish goals for maintaining reasonable environmental conditions for properties above or adjacent to the construction works, having regard for their particular use (e.g. residential, commercial, community facilities, hospitals, aged care). The onus falls on the Contractor to adopt such measures as necessary to achieve the goals, or, to adopt mitigation measures appropriate to the circumstances so construction can proceed and the daily life and economic activity of the City can be maintained.

An important element of the management strategy for construction noise and vibration is the procedure for receiving, handling and responding to complaints. The construction process must be supported by a comprehensive, responsive, open and accessible complaints handling and corrective action system.

### *Construction Air Quality*

With the scale of construction works, including open or exposed works, (e.g. road works, cut and cover construction, worksites) there is considerable potential for airborne dust impacts on adjacent properties. Considering the sensitivity of some of these properties, the containment of potential dust nuisance to the worksites is an important aspect for effective environmental management during construction. Also, management of the haulage and placement of construction spoil is an important aspect of dust control.

Regular and frequent monitoring of dust-fall at adjacent properties to the worksites will assist in ensuring the environmental objectives for construction air quality are achieved.

### *Groundwater Movement and Settlement*

With the construction of tunnels, there is the potential for groundwater movement towards the construction due to dewatering. In some locations along the route for the Airport Link Project, there is the potential for some settlement of the ground accompanying groundwater drawdown. The magnitude of settlement, and the risk, is considered to be small, but important nevertheless. Considering the range of flow-on effects from groundwater movement, it is important to minimise the risk and mitigate and manage the potential impacts. Apart from detailed hydrological investigations and on-going monitoring, the most effective means of minimising the risk of groundwater intrusion to the tunnel construction is to line or water-proof the construction as quickly as possible. A range of construction techniques are available to achieve this outcome.

Post-construction there will be an on-going need to monitor groundwater seepage into the tunnels, and in the event of such seepage, to collect, treat and dispose of such material in a controlled and approved manner.

### *Flora and Fauna*

The construction works in and around Enoggera Creek, Kedron Brook and Schulz Canal have the potential to modify the urban ecology, mostly through the loss of habitat or refuge areas. While these corridors are already heavily modified as a consequence of human settlement, there is a need for effective rehabilitation and revegetation as quickly as possible after completion of the works. There is an opportunity for a high level of community involvement in the rehabilitation process through consultation on the design and implementation of planting plans. It may even be possible for community involvement in the rehabilitation works and on-going maintenance.

### *Landscape and Visual Impacts*

The construction works will take place in locations, which for the most part, are highly visible in their settings. The removal of mature trees (Clayfield, Windsor), the removal of housing and other buildings (Windsor, Lutwyche, Kedron), the extent of the worksites, and the scale, height and bulk of the worksheds, will combine to impose visual impacts on the localities of each of the worksites. While such impacts are short-term, they are also of some prolonged duration when compared with other construction projects. The scale and duration of the Airport Link Project construction task requires that particular care be taken to mitigate the landscape and visual impacts of construction. This should occur in a progressive manner to limit the extent of the impact at any time.

### *Cultural Heritage*

There are several places of cultural heritage significance along the route of the Airport Link Project. Construction in the vicinity of such places needs to be carefully executed to ensure their heritage values are retained. Construction near such places will be conducted in accordance with approved cultural heritage management plans in accordance with relevant legislation. Such plans will need to be in place prior to the commencement of construction works on or adjacent to the places of cultural heritage significance.

### *Social Impacts*

Implementation of the Airport Link Project will require the acquisition of properties at Windsor, Kedron, Lutwyche and Clayfield. These acquisitions will cause the displacement of some residents and some people with limited resources to deal with their relocation. The acquisitions will also entail the removal of housing stock and the loss of some street trees, which have contributed to the character of the inner northern suburbs for some time. While there is no ready mitigation measure for these impacts, there can be some off-sets in the form of urban design and landscaping treatments in and around the project works to ensure that, post construction, the Airport Link Project contributes not just to the accessibility of the City, but also to the landscape of the study corridor.

During construction, as previously noted, there is the potential for the works to impact on the operations of community infrastructure, such as schools and community facilities adjacent to worksites. Careful management, supported by on-going and effective consultation with program and facilities managers, is required to ensure concerns and impacts are addressed and resolved to the extent reasonable and practicable.

Connectivity within the study corridor needs to be maintained during construction. Comments during the preliminary consultation process indicate the importance of connectivity with community facilities and infrastructure such as transport, shopping, open space and schools. Safety in accessing such places is also very important as is the ability to retain existing pedestrian and cycle paths, particularly along Kedron Brook.

### *Land Use & Planning*

During the construction phase, there is some potential for land use changes in the study corridor. This is particularly the case for the areas around the construction worksites and the surface works. Careful planning and management of the development process is required to ensure long-term land outcomes are consistent with good planning and the objectives for the area expressed in *City Plan 2000*. It will also be important to ensure that *City Plan* has realistic expectations and provisions for the study corridor, and sites adjacent to the construction worksites, to avoid the potential for unintended development outcomes.

## 22.1.6 Operational Impacts & Mitigation Measures

The range of potential operational impacts from the Airport Link Project is much narrower than for the project delivery or construction phase. The potential operational impacts are likely to include local traffic impacts, traffic noise, air quality (ambient air), groundwater impacts and land use and social impacts.

### *Local Traffic Impacts*

With the introduction of major new road infrastructure into the network of the inner northern suburbs of Brisbane, it is expected that traffic flows will redistribute to take advantage either of the freed road space or the capacity of the new road. In doing so, the potential arises for traffic to use local streets or for traffic flows to become congested in local areas.

As with other parts of the road network, the Brisbane City Council and the Department of Main Roads work together to ensure that the road network functions well and in a manner appropriate to its structure (i.e. arterial roads function as arterial roads, local roads function as local roads). However, there is no proposal to artificially constrain the road network to favour or force use of the Airport Link Project.

One impact of the Airport Link Project is to link more traffic with motorways such as the Inner City Bypass, and the arterial roads, such as Gympie Road and Stafford Road. This is an appropriate use of road space. Congestion on other arterial roads, such as Sandgate Road inbound from the East West Arterial and Lutwyche Road inbound from Gympie Road, will be reduced as a consequence of project operations. Similarly, there is likely to be a redistribution of traffic away from local roads which serve as 'rat-run' alternatives to the congested arterial routes. Airport Link will also be attractive to freight movements, particularly between the CBD and the Brisbane Airport and Australia TradeCoast, easing the freight component of traffic flows on the congested inner city arterials.

These beneficial impacts will create opportunities for public transport and other forms of transport to become more effective in addressing travel demand in the inner northern suburbs.

### *Traffic Noise*

With the forecast increase of traffic on the arterial roads approaching the tunnel portals, there is a corresponding risk of increased traffic noise. With the reconfiguration of some of the surface roads in the immediate vicinity of the portals, to accommodate the new infrastructure, modelling for this impact assessment indicates there will be increases in traffic noise, which are likely to be noticeable and potentially intrusive if no mitigation measures are taken. This risk is particularly high where buildings have been removed adjacent to the roadways, leaving buildings to the rear exposed to levels of road traffic noise not previously experienced.

To mitigate the impacts of road traffic noise, a conventional approach would entail the installation of noise barriers. In some locations, the barriers may need to be high (in the range of 6.0 m – 8.0 m). In themselves, barriers of this scale present impacts on the local community, in terms of loss of views and aspect, microclimate, potential changes to circulation and connectivity, and potential changes in safety and security. Urban design measures such as landscaping and use of appropriate materials will be identified to mitigate the impacts of the noise barriers. Prior to the installation of noise barriers along major roads, innovative urban design measures should be developed to achieve acceptable acoustic and community outcomes.

### *Air Quality*

An issue of community interest and concern is that of potential impacts on air quality from the operation of the tunnel ventilation system, and the ventilation outlets. The existing ambient air quality across the study corridor is generally good, with all traces of motor vehicle-based pollutants well below the stringent ambient goals adopted in the EIS for ambient air quality. Regardless of whether the Airport Link Project proceeds or not, there is expected to be an improvement in air quality in the Brisbane airshed due to the use of cleaner fuels and improved engine technologies in motor vehicles. This improvement is off-set somewhat by the predicted increase in travel demand deriving from forecast population growth.

The Airport Link Project would contribute to ambient air quality through the operation of the ventilation system and the release of vitiated air from the ventilation outlets at Windsor, Kedron and Clayfield. The proposed ventilation system is intended to minimise the impacts of vitiated tunnel air upon the ambient environment through high-level, high speed dispersion and subsequent dispersion. The detailed modelling and analysis for this impact assessment indicates the contributions of the ventilation outlets to ambient air concentrations for particular pollutants is very low, and well below the stringent air quality goals adopted for the purpose of impact assessment.

The other source of motor vehicle-based air pollution is the major road network. As traffic congestion increases, the roadside concentrations of motor vehicle emissions also increase. The concentration of emissions diminishes rapidly with distance from the roadside. The EIS findings are presented in terms of concentrations at the kerb and then at distances of 10 metres, 30 metres and 50 metres.

Some changes in air quality along the major arterials are predicted as a consequence of changes in traffic flows due to the Airport Link Project. In some circumstances, the reductions in traffic flows are predicted to lead to reductions in roadside concentrations of vehicle emissions. In other cases, the forecast increases in daily traffic flows are predicted to lead to increased roadside concentrations of vehicle emissions. This latter scenario occurs along Gympie Road, south of Rode Road and Stafford Road, east of Webster Road. In all cases, the roadside concentrations are below the goals for ambient air quality, even though such goals are not intended to be applied to such circumstances.

The health risk assessment has concluded that there will be no appreciable change in community health as a consequence of the Airport Link Project, either in relation to the operations of the ventilation outlets or the changes in roadside concentrations of vehicle emissions.

### *Groundwater*

Groundwater in the study corridor is contained in two different aquifer types. Between Federation Street, and Windsor Avenue and Norman Avenue, Lutwyche, the tunnel will pass through rock with no primary porosity. Groundwater is contained in a typical fractured rock aquifer of joint planes and other fractures. In this section the tunnel will act as a drain for groundwater. However, no measures to prevent inflow are proposed as an equilibrium will be achieved some years after construction and, as the watertable is now well beneath the root zone of any surface vegetation, lowering of the watertable should have no effect on the surface. A drainage system with provision for a collection sump and pumping facilities are likely requirements of detailed design.

In the driven tunnels between Kedron and Sandgate Road the different rock type encountered requires a different approach to groundwater control. Because of the alluvial aquifer in this area it will be necessary to line the tunnel walls against groundwater ingress immediately. The cut and cover tunnel in the alluvium, adjacent to Sandgate Road, needs to be sealed against groundwater ingress to prevent recharge of the aquifer with salt water from the tidal Schulz Canal.

### *Land Use and Social Impacts*

Land use change and demographic change are constants in a rapidly growing city, and it is the case with Brisbane. In the corridors serving the central City, pressures for land use change are also constant. Social change usually accompanies, and often drives land use change. Along Lutwyche Road, land use change has been constrained in some locations by the effects of traffic congestion, such as difficult access, limited parking and land availability. The Airport Link Project is expected to relieve traffic congestion and provide opportunities for enhanced public transport along Lutwyche Road and Sandgate Road. Land use change could be expected to follow these improvements and will need to be managed to ensure the advantages of change are optimised and the costs either avoided or minimised.

City Plan is the primary instrument for managing land use change in the City. It is reviewed regularly to maintain an appropriate balance in development and infrastructure planning. The potential for land use change in the study corridor should be managed through this process of regular and systematic review of City Plan. As part of the urban regeneration framework outlined in Chapter 20 of this EIS, a coordinated approach to social change is required to manage impacts on housing and community facilities.

### 22.1.7 Approach to Environmental Management

The physical, environmental and social impacts of construction will require a performance-based approach to mitigation and management to ensure community concerns are addressed and environmental values are retained during and post-construction. By adopting a performance-based approach, greater flexibility becomes available for the community, the Proponent and the Contractor to communicate and resolve the most appropriate response to particular issues.

Through the draft Outline EMP, environmental objectives and performance criteria are established for the construction phase and the operational phase of the Project. The environmental objectives are intended to address community and environmental concerns about potential impacts of the Project. The performance criteria are intended to provide direction and confidence in terms of how the environmental performance of project delivery and implementation will be assessed. While mitigation measures intend to achieve the objective and performance criteria are provided in the draft Outline EMPs, there may be other solutions to effective impact avoidance, minimisation, mitigation or management.

This performance-based approach also provides a degree of flexibility for the detailed design development, construction and operation of the Airport Link Project. It may be possible to achieve the environmental objectives while also achieving improvements in each of the phases of the Project.

## 22.2 Mitigation Measures

Mitigation measures required for implementation of the Airport Link Project during both its construction and operational phases are set out in **Table 22-1**. The costs of these mitigations would be borne by the project.

In addition to the mitigation measures set out below, the Proponent should:

- Investigate the potential for multiple use of ventilation stations, where possible and appropriate, to provide for or support community facilities or project administration, or both, prior to finalising the detailed concept design for the Project; and
- In conjunction with the coordinating committee to be established in response to the recommendations of this EIS, investigate physical and functional integration with the Northern Busway Project, to the extent possible, for the purpose of minimising and mitigating construction impacts.

While these works are required to mitigate project impacts, the intention is to undertake the works to a high standard, consistent with the over-arching desire to provide future generations with a Project that continues to enhance the liveability of the City long after construction is complete. In addition to the urban regeneration initiatives to be completed as part of the Airport Link project summarised above, there are also a range of urban design treatments proposed as part of the construction works, including:

- Sculptural panels for flyovers and acoustic screens;
- Feature panels for concrete and earth ramps on tunnel roadways;
- Portal treatments, which could include the use of steel, glass and concrete relief panels; and

- Comprehensive landscaping around the portals and worksites for visual screening and relief.

### Table 22-1: Urban Mitigations

| Category | Location | Mitigation Measures | Priority |
|---|---|---|---|
| **Toombul/Clayfield** | | | |
| Urban Design | Sandgate Road (Grace Street to Junction Road)<br>Junction Road (Sandgate Road to Rose Street)<br>Rose Street (Junction Road to Park Road) | Boulevard works including:<br>■ street tree planting;<br>■ footpath pavement improvements;<br>■ lighting; and<br>■ selected character elements. | High<br>(undertaken as project works) |
| Pedestrian & Cycleways | Sandgate Road intersection | Reinstate pedestrian crossing at the intersection of Sandgate Road and East West Arterial intersection | High<br>(undertaken as project works) |
| | Melton Road to Kalinga Park (Diggers Drive) | Relocate pedestrian and cycle path from southern side of Schulz Canal to northern side;<br>Provide pedestrian and cycle crossing at Melton Road | |
| | Eagle Junction (Alma Road, Stuckey Road, Elliott Street) | Provide pedestrian and cycle connections into Kalinga Park and Kedron Brook open space corridor | |
| Open space | Kalinga Park, Eagle Junction<br>Ross Park, Toombul<br>Melrose Park, Kalinga | Reinstate park & mitigate infrastructure including:<br>■ comprehensive landscaping at the Toombul connection;<br>■ planting enhancement to that section of Kalinga Park disturbed by construction activities;<br>■ amenities & BBQ facilities;<br>■ lighting (not Melrose Park);<br>■ children's play equipment at Kalinga Park;<br>■ provision of park entry to Kalinga Park from Jackson Street; and<br>■ adolescent/young adult facility at Ross Park. | High<br>(undertaken as project works) |
| Waterways | Schulz Canal (between Melton Road & Sandgate Road) | Ecological restoration and floodway including:<br>■ natural wetland reconstruction; and<br>■ wetland planting. | High<br>(undertaken as project works) |
| | Relocation of Kedron Brook tributary with Schulz Canal (in Kalinga Park) | Engineering works<br>Ecological restoration and floodway including:<br>■ natural wetland reconstruction; and<br>■ wetland planting | High<br>(undertaken as project works) |
| **Kedron/Lutwyche** | | | |
| Urban Design | Gympie Road (Kedron Brook – Broughton Road)<br>Stafford Road (Gympie Road to Clarence Road)<br>Park Road<br>Kedron Park Road (Gympie Road to Park Road) | Boulevard works including:<br>■ street tree planting;<br>■ pavement improvements; and<br>■ lighting.<br>Selected character elements<br>Footpath pavement improvements in Lutwyche Rd (railway to Newmarket Rd only) | High<br>(undertaken as project works) |

| Category | Location | Mitigation Measures | Priority |
|---|---|---|---|
| Pedestrian & Cycleways | Kedron Brook (Crossing of Gympie Road) | Provision of pedestrian and bikepath;<br>Pedestrian/cycle bridge over Kedron Brook; and<br>Extension of path through open space to Kedron Brook. | High<br>(undertaken as project works) |
| | Kedron Brook (Gympie Road to Shaw Road | | |
| | Brook Road | | |
| Open Space | Kedron (east end of Fifth Ave, adjacent to Kedron Brook) | Develop park and landscaped space on DMR land:<br>▪ comprehensive landscaping;<br>▪ amenities & BBQ facilities; and<br>▪ lighting. | High<br>(undertaken as project works) |
| Waterways | Kedron Brook (Gympie Road to Shaw Road) | Engineering works<br>Ecological restoration and floodway:<br>▪ natural wetland reconstruction; and<br>▪ wetland planting. | High<br>(undertaken as project works) |
| **Windsor** | | | |
| Urban design | Lutwyche Road (Ferny Grove Railway to Newmarket Road) | Boulevard works:<br>▪ street tree planting;<br>▪ pavement improvements;<br>▪ lighting;<br>▪ selected character elements; and<br>▪ footpath pavement improvements in Lutwyche Road (railway to Newmarket Road only). | High<br>(undertaken as project works) |
| Pedestrian & Cycleways | Windsor – Lutwyche (Chalk, McLennan, Lane Streets, Windsor Park, Flynn Oval) | Provision of pedestrian and cyclepath; and<br>Appropriate level of urban design treatments including theme street planting & lighting. | Medium<br>(completed within 2 yrs of project opening) |
| Open Space | Windsor (Mann Park, Flynn Oval) | Reinstate park & mitigate infrastructure:<br>▪ comprehensive landscaping along bikepath and boundaries;<br>▪ planting enhancement to Enoggera Creek;<br>▪ amenities & BBQ facilities; and<br>▪ lighting. | High<br>(undertaken as project works) |
| Waterways | Enoggera Creek (from Horace Street to Flynn Oval) | Ecological restoration:<br>▪ wetland planting | High<br>(undertaken as project works) |

## 22.3 Recommendations

The Airport Link Project addresses the anticipated traffic congestion in the inner northern suburbs arising from sustained population growth and economic activity in the Brisbane metropolitan area. The project will provide an effective link, for general traffic and freight, between the existing and future major employment centres in the City, while also easing traffic congestion on inner northern arterials. Public transport services can be enhanced as part of an integrated transportation response to an existing and worsening problem. Traffic congestion of local roads presently serving as alternative routes to the arterials will also be eased.

However, the scale of the Airport Link Project is such that, during construction, it will impact upon communities in Windsor, Kedron and Lutwyche, and Clayfield. During the operations phase, the Airport Link Project will have fewer impacts in very localised areas. The impacts, both during construction and operations, will require careful, performance-based management to meet community concerns and expectations.

### 22.3.1 Recommendation 1

Having regard for the benefits and the impacts of the Airport Link Project presented in this EIS, it is recommended the Project proceed subject to:

(a) developing and implementing detailed environmental management plans for the construction phase and the operational phase; and

(b) implementation of the specific mitigation measures set out in section 22.2 of this EIS.

In making the recommendation, the Coordinator-General is requested to:

(i) assess the EIS;

(ii) recommend the Airport Link project proceed;

(iii) State conditions for the Project under section 39 of the *State Development and Public Works Organisation Act 1971*; and

(iv) recommend conditions for the Project under section 39 of the State Development and Public Works Organisation Act 1971 including for designating the project corridor or land required for parts of the Project as 'community infrastructure' under the Integrated Planning Act 1997, if required.

### 22.3.2 Recommendation 2

It is further recommended to the Coordinator-General that:

(i) Necessary approvals and permits be sought for the Project including as required under City Plan, *Integrated Planning Act 1997*, *Environmental Protection Act 1994* and the *Queensland Heritage Act 1992*;

(ii) Brisbane City Council commence a program of local planning in the study corridor to address and manage the potential land use changes that might arise during the construction phase and the operational phase of the Project;

(iii) The Queensland Government (Department of the Coordinator-General, Department of Main Roads, Queensland Transport) and the Brisbane City Council establish a coordinating committee to manage effects on the transportation network arising from the delivery of major projects in northern Brisbane, including the NSBT Project, the Airport Link Project, the Northern Busway Project and the Gateway Upgrade Project;

(iv) The Queensland Government (Department of Community Services, Department of Housing) and the Brisbane City Council establish a coordinating committee to develop a framework for urban regeneration, leading to the coordinated delivery of programs in the study corridor, particularly during the construction phase of the Project.