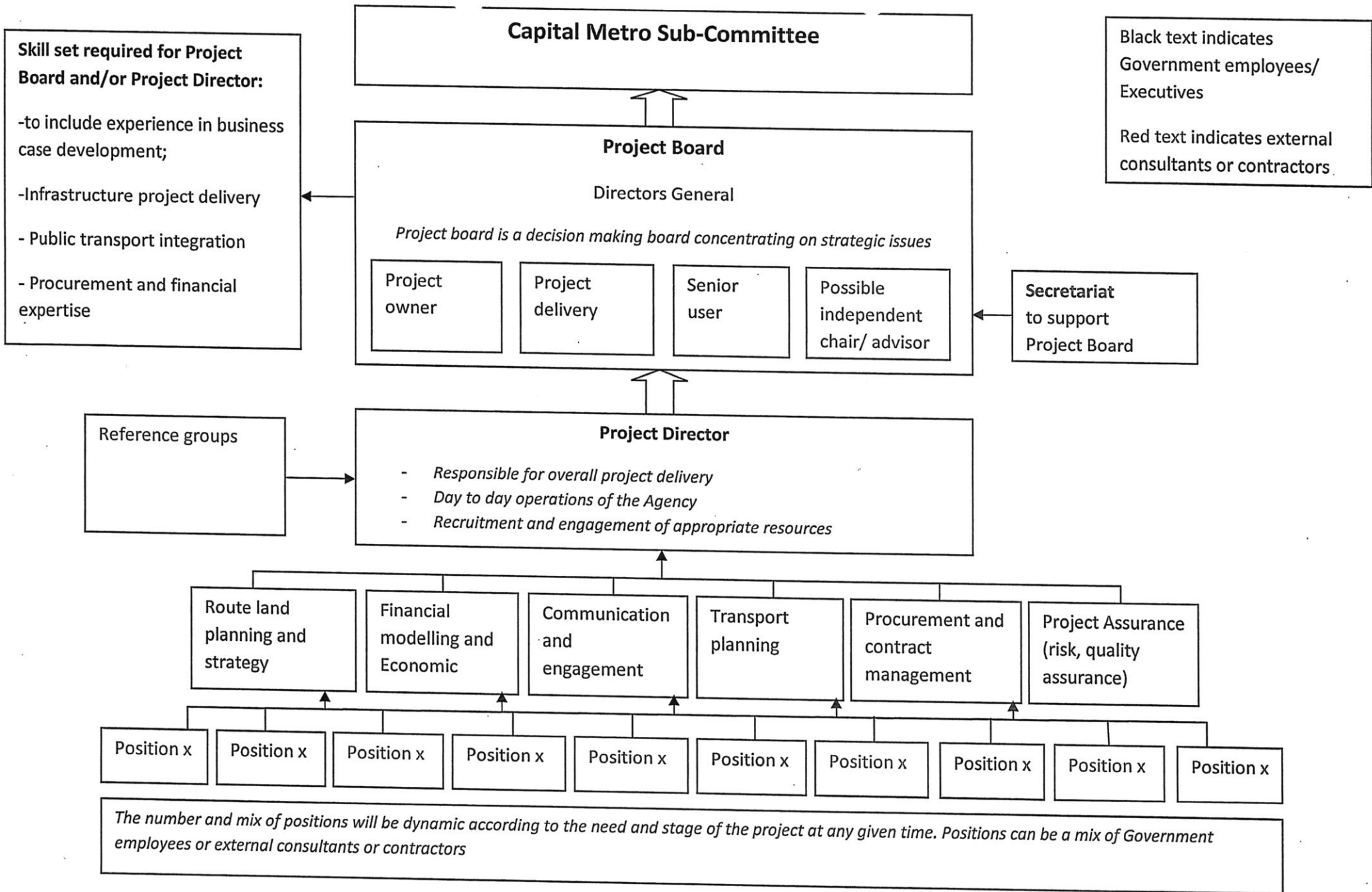


- The development of a light rail system will represent a significant capital investment in transport infrastructure and will implement strategies and actions identified in Transport for Canberra and the ACT Planning Strategy.
- However, the real value of the Capital Metro project is in enabling transformation of how the city develops and its capacity to encourage growth in economic activity, particularly at the anchor points both in Gungahlin and the City and for this first stage in particular, along the transit corridor.
- Quite apart from the redevelopment potential that will become apparent in privately owned properties along the corridor, the Government has significant land holdings as well.
- In fact, the ACT Government owns around 235 hectares, or 2.35 million square metres of land across some 32 sites, with potential yields estimated to be in the vicinity of around a million new dwelling units, as well as related commercial and retail opportunities.
- The City to the Lake project will also free up investment opportunities for over a million square metres of developable land, over and above the four major infrastructure projects the combined value of which is likely to approach a billion dollars.
- The benefit to potential investors of the Territory undertaking the risk, yield, infrastructure and release sequencing analyses is that there will develop a level of certainty in terms of what, where and when investment opportunities are likely to come to the market.
- This first stage of the light rail is a critical step along the path of transforming and future proofing our great City.



000970

## Capital Metro Agency discussion

David Dawes (interim Chair)

Glenn Bain (interim Project Director)

Dan Stewart (acting DG EDD and CEO LDA)

### Discussion / Decision points:

1. Establishment of identity prior to AA changes on 1 July
  - a. Division of LDA?
  - b. First Board meeting
  - c. Accommodation
  
2. Source of funds and available Budget
  - a. LDA funding envelope
  - b. ESDD uncommitted funds
  
3. Resources
  - a. ACTPS personnel to fill Org Chart positions
  - b. External people to fill Org Chart positions
  - c. Arrangements with TAMS
  
4. Job Descriptions for Project Director and for Independent Chair
  
5. Potential candidates for Independent Chair



### ***Capital Metro***

As part of the original plan for the City, Walter Burley Griffin designed the major avenues in Canberra, including Northbourne Avenue, to include electric street cars, operating within broad central medians. Both the National Capital Plan and the Territory Plan have identified Northbourne Avenue as part of the Intertown Public Transport network. The Capital Metro project continues this vision.

The Capital Metro light rail project is the first stage of a Canberra wide light rail network, and will be the backbone of Canberra's public transport network, combined with the Frequent Network of buses.

Capital Metro Stage 1 will be a light rail service with vehicles capable of carrying up to 200 people at 8 to 10 minute frequencies along a 12 kilometre route from Hibberson Street in Gungahlin to the City Centre.

Work on Capital Metro is well underway. We are integrating transport and land use planning with existing or planned infrastructure to create revitalised centres, provide better and greater access to public transport, generate a range of housing and commercial opportunities, and optimise land and infrastructure use in the ACT.

The Capital Metro project will enable transformation of how the city develops with its capacity to encourage activity, particularly at the anchor points both in Gungahlin and the City and for this first stage in particular, along the transit corridor.

As a key landowner, and as a land manager under the leasehold system, a unique opportunity exists for the ACT Government to both directly and indirectly encourage urban renewal along the corridor, and indeed at the key anchor points.

Capital Metro provides an opportunity to influence the development pattern on the corridor from what is essentially a transport (car and bus) route between Gungahlin and the City, with little activity in between. Our vision is to make the corridor a vibrant boulevard and to create along Northbourne Avenue an approach route worthy of the Nation's Capital.

# City to Gungahlin Transit Corridor

## Infrastructure Australia Project Submission



AUGUST 2012



**ACT**  
Government  
Environment and  
Sustainable Development



## Contents

Executive Summary .....	1
1 Introduction.....	5
1.1 Purpose .....	5
1.2 Background .....	5
1.3 A Package Approach .....	6
2 About the Project .....	8
2.1 Project Objectives .....	8
2.2 Proposed Works .....	9
2.3 Transport, Land Use and Pricing Scenarios.....	9
3 Alignment with Government Objectives.....	15
3.1 Alignment between ACT and Commonwealth Government Objectives .....	15
3.2 Alignment with Nation Building Program 2.....	17
3.3 National Capital Plan.....	17
3.4 ACT Government Objectives.....	18
4 Problem Identification, Assessment and Analysis.....	19
4.1 Identification and Assessment.....	19
4.2 Analysis.....	23
5 Assessment of Options.....	25
5.1 Summary of Options .....	25
5.3 Demand Impacts.....	26
6 Next Steps .....	30
6.1 Establishment of the Gungahlin to City Project Office .....	30
6.2 Feasibility and Forward Design Works.....	30
6.3 Funding Requirements.....	31
Appendix A: Stages 1 – 6 .....	33
Stage 1 – Goal Definition .....	36
Stage 2 – Problem Identification .....	38
Stage 3 – Problem Assessment.....	39
Stage 5 – Option Generation .....	50
Stage 6 – Option Assessment .....	54
Appendix B: Stage 7 Template.....	62
Appraisal Summary Table 1: Demand and Economic Modelling Assumptions .....	62
Appraisal Summary Table 2: Monetised Cost Benefit Analysis Results .....	77
Appraisal Summary Table 3: Benefit-Cost Ratio Sensitivity Testing .....	85
Appraisal Summary Table 4: Non-Monetised Benefits and Costs.....	86
Appraisal Summary Table 5: Information Sources .....	88



Costs, Risks and Funding .....	89
Staging.....	89
Risk Management .....	89
Environmental Risks.....	97
Need for Government Funding.....	98
Need for Commonwealth Government Funding .....	99
Delivery Strategy.....	100
Governance Strategy .....	101
Economic Appraisal Table: BRT under a Business As Usual Land Use Scenario.....	102
Economic Appraisal Table: LRT under a Business As Usual Land Use Scenario .....	104
Economic Appraisal Table: LRT under a Higher Density Land Use Scenario .....	108
Footnotes.....	110



## Executive Summary

### Introduction

The ACT Government is constantly working towards supporting a more sustainable Canberra, evidenced by its complementary ACT Planning Strategy and Transport for Canberra strategy that are setting a strong framework for the integration of transport and land use planning to deliver a more compact and sustainable city and Territory.

In its submission to Infrastructure Australia in 2011, the ACT Government outlined its intentions to investigate the feasibility of developing rapid transit in the Gungahlin to City corridor. The Gungahlin to City Rapid Transit Corridor Project (the 'Project') was commissioned subsequently in late 2011 to assess the prospects of rapid transit.

As a direct output of the Project, an Outline Business Case was prepared for the ACT Government for its consideration in April 2012. Subsequent updates to the design, costs and demand have been made, the results of which are presented in this submission.

### About the Project

This submission seeks \$15 million in funding from the Nation Building Program 2 for the forward design and planning of the City to Gungahlin Transit Corridor. Forward design and planning will include: further demand modelling and economic assessment (including triple bottom line analyses); feasibility and preliminary design of Dickson station, Gungahlin terminus and City connections; design of transit oriented development options including a public transport network review; a vehicle options feasibility study; and infrastructure feasibility and design work.

The City to Gungahlin Transit Corridor is a 12.5km rapid transit link between Gungahlin, Canberra's fastest growing district, and the City. The corridor comprises Flemington Road and the nationally significant Northbourne Avenue, and is the primary transport corridor connecting Canberra's growing northern suburbs with the City and the South.

The Government has considered the economic outcomes of investing in either bus rapid transit (BRT) or light rail transit (LRT) under a business as usual land use setting and against higher population and employment densities in the Project Corridor.

This Project goes beyond simply providing a transport based solution to a transport problem. While an investment in rapid transit infrastructure is a cornerstone of proposed interventions within the Project Corridor, the Project firmly integrates transport and land use as a means to drive investment in a more compact, sustainable Canberra.

### Key Issues

The low residential densities and the dispersed nature of activity centres and employment in Canberra do little to improve the productivity of the Canberra economy, reduce car dependency, sustain public transport operations or reduce greenhouse gas emissions. These problems will be magnified by future population growth that is anticipated within the Project Corridor.

**Growing population:** The Gungahlin to City Corridor connects Canberra's fastest growing district, Gungahlin with the City and the Parliamentary Triangle, Canberra's focal points for civic and employment activities. Over the past decade, population levels within the Gungahlin district grew at an average rate of 6.8% per annum. Population levels in Gungahlin under a business as usual case are projected to come close to doubling by 2031, compounding current congestion, social exclusion and housing affordability concerns under a business as usual scenario.



**Growing congestion:** The key roads forming the Project Corridor - Flemington Road and Northbourne Avenue - are fast approaching capacity. Although capacity on alternative routes including Gungahlin Drive and Majura Parkway could be expanded, these routes do not directly serve the City and there are few options to increase road capacity outside of current road corridors.

Without intervention, future growth within the Project Corridor will serve to lead to a further decline in road speeds, increasing travel time impeding access to employment, community facilities, social and recreational activities.

**Impacts on the broader bus network:** As a key bus corridor, the degradation of travel speeds along the Project Corridor also impact on the speed, efficiency and reliability of cross-regional bus services operating beyond the Project Corridor, impacting on passengers across the North as well as those travelling to and from the Central National Area and Parliamentary Triangle.

**Unsustainable development patterns:** From an international standpoint, Australian city population densities are lower than that of their global counterparts – even more so for Canberra. Low densities are increasing car dependency, placing upward pressure on per capita costs for providing public transport and community services over larger areas and raising social exclusion and service access issues.

### **The Project's Potential**

Investment in rapid transit along the Project Corridor has the potential to unlock a number of economic development opportunities:

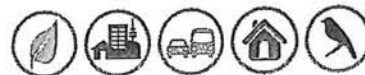
**Increasing the transport capacity of existing corridors:** There are few options to increase capacity outside of existing road corridors. During peak periods, existing bus services operating along Northbourne Avenue carry more passengers than all cars combined. An investment in rapid transit along the existing corridor will significantly increase its carrying capacity, provide vital capacity to cater for future growth and optimise the use of existing assets.

**Promoting economic productivity:** A number of opportunities have already been identified by the ACT Government to increase residential and commercial densities on significantly underdeveloped sites along the Project Corridor. These include public housing redevelopments, a redevelopment of the Dickson Group Centre and the potential redevelopment of land currently occupied by the exhibition centre and Canberra Racecourse. As a key landowner and land manager under the Territory's leasehold system, a unique opportunity exists for the ACT Government to encourage urban renewal within the Project Corridor, both directly and indirectly. Providing additional transport capacity is a significant enabler of further development of, and investment in, these sites, maximising existing land capacity within the Project Corridor.

**Promoting greater sustainability:** As part of the Project, the ACT Government will actively support increasing density and a strong mix of activities along the Project Corridor to encourage localised travel and trips, which could be serviced by the rapid transport system. Where inter-town travel is required to connect with employment hubs, faster and more reliable public transport services, facilitated by either BRT or LRT, will encourage a greater use of public transport.

**Part of a broader network:** The Project Corridor is the backbone of the Government's 2031 Strategic Public Transport Plan Network that establishes the future public transport network for Canberra. This network will deploy Rapid and Frequent bus services that will significantly enhance service frequencies and legibility of public transport services. The network and cross-regional services meeting with the Project Corridor will originate as far out from Tuggeranong, Fyshwick, Queanbeyan and Molonglo Valley. When realised in full, corridors that combine urban renewal, redevelopments and transport investment will be extended to other corridors such as Constitution Avenue and Commonwealth Avenue.

**Supports cross-government city-building initiatives:** The Project will support other work being undertaken jointly with the Commonwealth Government, including a \$42m commitment to redeveloping Constitution Avenue and \$500,000 for the Realising the Capital in a City master plan that will focus on planning along Commonwealth Avenue.



Both projects propose new dedicated bus infrastructure, cycle paths and urban amenity treatments to facilitate future urban redevelopment. Similar measures are proposed along the Project Corridor.

Economically efficient: Preliminary cost-benefit analyses undertaken suggest that, despite the higher cost of delivery, rapid transit has the potential to be economically viable. Rapid transit may still be viable even without land use and pricing measures but these complementary measures significantly enhance the projected level of economic returns and increase the likelihood of the Project achieving its economic, social and environmental aims.

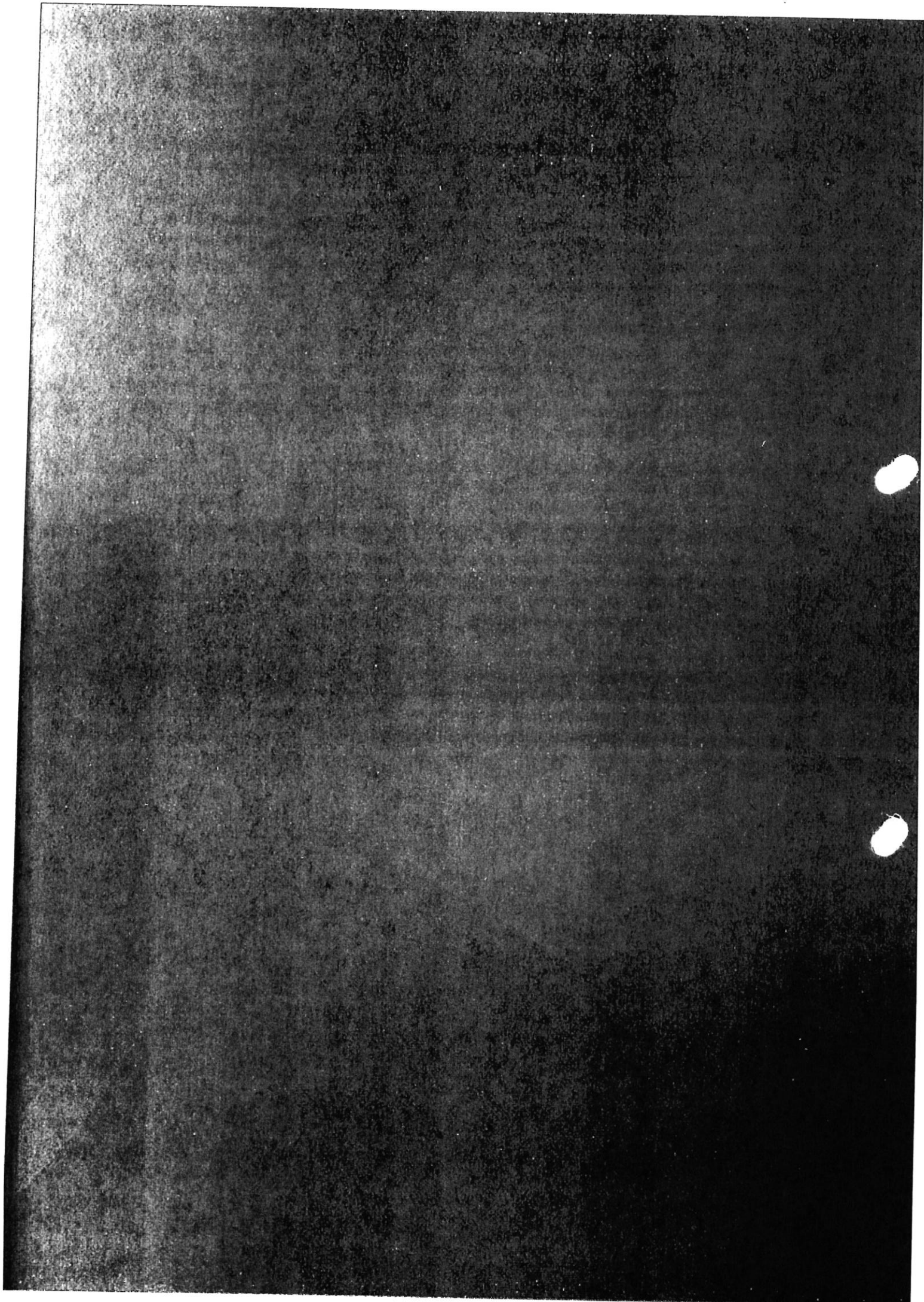
#### **The ACT Government's commitment**

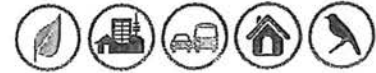
The ACT Government is committed to the continued development of the Project. As part of the 2012–13 ACT Budget, the ACT Government established the Gungahlin to City Project Office. The Project Office will ensure that transport, land use and public housing planning and developments are considered and implemented in an integrated manner and will continue to move the Project towards a more detailed Feasibility and Forward Design stage.

There are many issues including cost and financing that need to be considered by the ACT Government and the community before determining which mode is preferred and what circumstances that an investment may be made. The planning and feasibility work that will be carried out under agreed funding from Infrastructure Australia is required for, and will support, either mode.

Community consultation undertaken as part of the Project indicated a strong community preference for light rail given its aesthetics as well as its greater potential to facilitate significant mode shift. The Project also considered bus rapid transit as it may deliver a more cost-effective outcome. Further feasibility work has been identified to inform these decisions.

Preliminary economic assessments indicate that under the right circumstances, investment in rapid transit has the potential to be economically beneficial. On this basis, this submission proposes that the City to Gungahlin Transit Corridor Project be considered as a project with 'Real Potential' by Infrastructure Australia and for funding from the Commonwealth Government on a 50:50 basis to progress the Project to the detailed Feasibility and Forward Design stage.





# 1 Introduction

## 1.1 Purpose

The ACT Government is constantly looking for ways to achieve Territory and national goals which, amongst other things, include encouraging more people to use public transport. Greater public transport usage potentially reduces congestion on roads. In turn, lower levels of congestion can have a positive impact on an economy's productivity and capacity, promote competition and lead to sustainable urban development.

The Gungahlin to City Corridor (the 'Project Corridor') has been prioritised by the ACT Government for rapid transit investment. The Project Corridor is the primary transport corridor that connects Canberra's northern suburbs with the City and the South, and accordingly is an integral part of the Transport for Canberra's 2031 Frequent Network.

Serving as Canberra's fastest growing corridor, the Project Corridor already experiences significant congestion issues during peak periods which impacts adversely on car and bus travel. This submission outlines the economic potential of a package of measures primarily focused on investment in rapid transit with complementary land use and pricing measures to remediate current transport issues that impede the efficient operation of transport and improve sustainability and expand capacity to cater for future growth along the Corridor.

Based on the recent feasibility work, this submission proposes that the City to Gungahlin Transit Corridor Project be considered as a project with 'Real Potential' and for funding from the Commonwealth Government on a 50:50 basis to progress the Project to a more detailed Feasibility and Forward Design stage.

## 1.2 Background

At its inception, Canberra was planned as a polycentric city with the Parliamentary Triangle and the City serving as the city's civic centre with provision for town centres at Belconnen, Tuggeranong and Woden, Gungahlin and Weston Creek as time progressed. Parkways and rapid transit links were intended to be built between each town centre and the City.

Whilst the parkways are ingrained into the shape of Canberra, the aspiration of developing the envisaged rapid transit link continues to this day. This submission represents a contemporary view of the viability of rapid transit, building on the findings of many studies that have been undertaken to date both within the Corridor and across Canberra.

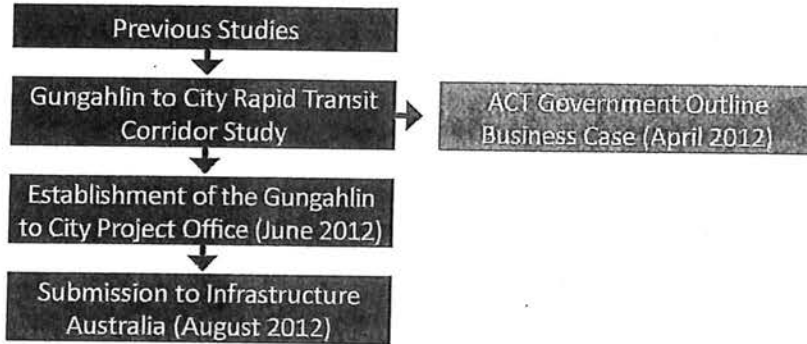
In its submission to Infrastructure Australia in 2011, the ACT Government outlined its intentions to investigate the feasibility of developing rapid transit in the Gungahlin to City corridor. The Gungahlin to City Rapid Transit Corridor Project (the 'Project') was commissioned subsequently in late 2011 to assess the prospects of rapid transit. As a direct output of the Project, an Outline Business Case was presented to the ACT Government for its consideration in April 2012.

Underlining its commitment to developing the Project Corridor, the ACT Government announced in its 2012-13 Budget the establishment of a dedicated agency, the Gungahlin to City Project Office, to focus on integrating the Government's position on transport, public housing and land use policies and developments within the Project Corridor.

Figure 1 outlines the steps undertaken by the ACT Government to develop the material to inform our submission to Infrastructure Australia.



**Figure 1: Current Project Status**



This submission represents the next step in the development of the rapid transit concept. This submission broadly reflects the findings of the Outline Business Case, which identified the need for further refinements to be undertaken on the design of the scheme and associated costings and to advance the demand modelling. The economic benefits and costs presented in this submission reflect those refinements.

### 1.3 A Package Approach

This submission goes beyond simply providing a transport based solution in an attempt to solve a transport related problem. This submission presents an assessment of packages, whereby transport based measures are combined with complementary land use measures and parking pricing measures. Table 1 details the scope of each measure:

**Table 1: Package Components by Measure**

<b>Transport Measures</b>	<p>For the purposes of this study, transport measures are differentiated only by two forms of rapid transit – bus rapid transit (BRT) and light rail transit (LRT).</p> <p>As a complement to investments in either BRT or LRT, design and costings also allow for improvements in pedestrian and cycleway paths that will enhance local accessibility and improve public transport accessibility.</p>
<b>Land Use Measures</b>	<p>Land use measures are primarily aimed at investigating how increases in residential and commercial densities within the Project Corridor would assist in not only increasing public transport patronage but also placing downward pressure on private vehicle travel. In combination with transport measures, changes in land use provide a perspective on the often neglected link between the two measures and highlighting the importance of policy settings and its contribution to a sustainable long-term outcome.</p>
<b>Parking Charge Measures</b>	<p>Parking charge measures represent a third but important prong to better manage demand and ensure that all beneficiaries, not just public transport users, contribute to the development of additional (public) transport capacity and the improved outcomes such an investment may bring to both public transport and car users.</p>

By considering transport investment, changes in land use and increased parking charges, the rapid transit options considered in this submission potentially provide a national showcase for transit oriented land use changes, with strong potential to facilitate urban renewal in the residential and commercial markets along the Corridor.

Although it is typical of proponents to present a preferred option to Infrastructure Australia, four ‘do-something’ options are presented to Infrastructure Australia. There exists clear trade-offs between the level of capital cost, level of service and amenity and the willingness of Canberrans, whether through taxes or user charges. Given the size of the trade-offs, further investigation, the partial funding of which is the subject of this submission, to inform the community and stakeholders of this trade-off, is deemed warranted before further filtering is undertaken.



It is pertinent to note that the urban renewal and transit-orientated development paradigms run parallel to the intentions of this Project. Authorities worldwide are seeking to deliver improved community outcomes at a local level whilst providing transport connectivity by consolidating and co-locating different activities in distinct locations and corridors. The activation of these concepts requires a proactive and integrated approach by authorities that appropriately mix investment with policy measures to achieve welfare outcomes beyond the returns that can be achieved through investment alone.

A packaged approach can make more effective use of available land, support economic diversity and development, and improve social equity and liveability, all of which resonate closely with Infrastructure Australia's strategic goals to promote the sustainable development of Australian cities and regions.

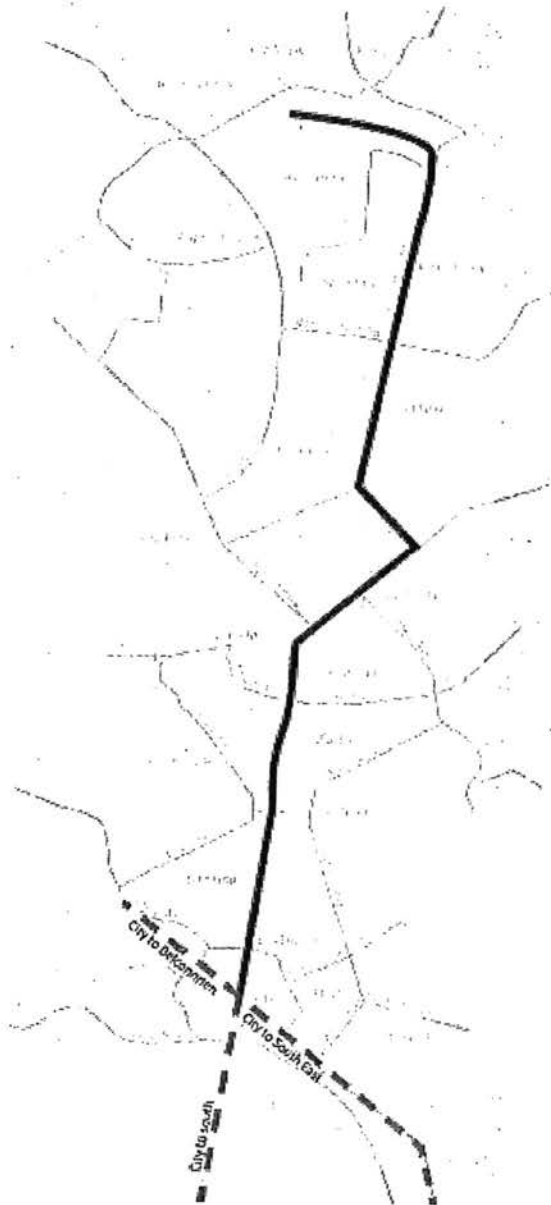
However, there exists a pragmatic rationale: the ACT Government recognises that a rapid transit investment and its benefits in Canberra simply cannot materialise without a realistic consideration to how it could be funded and how it might contribute to the sustainable development of the city.

A common thread through previous studies suggests a transport only approach results in a conundrum. Smaller scale interventions like bus lanes are likely to deliver minimal changes in sustainability. On the other hand rapid transit may be economically beneficial but given the cost and the small size of the ACT Government's budget, cannot be funded just by taxpayers. A cohesive, packaged approach whereby higher densities contribute to higher public transport demand and a majority of funding is drawn from beneficiaries, is the only realistic means by which large scale transport projects have a chance of being delivered.

This Overview Document provides a summary of the Infrastructure Australia submission. The submission outlines, at a pre-feasibility level, the potential economic outcomes that may arise from an approach to invest in rapid transit with complementary land use and pricing interventions.



## 2 About the Project



### 2.1 Project Objectives

The Project seeks to assess the feasibility of a rapid transit corridor between Gungahlin and the City along Flemington Road and Northbourne Avenue using either BRT or LRT technologies. It also assesses the impact of higher population and employment densities, and higher parking charges on the viability of rapid transit services operating along the Project Corridor.

The proposed works aim to achieve the Project's goals, which include:

- Provide greater connectivity and capacity between future growth centres and the City
- Encourage greater use of more sustainable transport modes, such as public transport and active transport.
- Encourage further economic development within the Gungahlin to CBD corridor.

These goals were subsequently expanded into seven objectives to allow for closer alignment to Infrastructure Australia's (IA) seven strategic goals:

- **Delivering transport capacity** by increasing public transport capacity and speeds along the Project Corridor to service fast growing population levels and economic activity
- **Supporting Canberra's core** by improving accessibility and in turn supporting Canberra's role as the nation's capital and pre-eminent federal political and administrative centre
- **Supporting economic diversity and development** by promoting an increase in the level and diversity of economic activity by increasing the mix and number of residents and employment
- **Improving equity and liveability** by enhancing access to key centres and community facilities and promoting a broader diversity of housing and improving home affordability
- **Maintaining and improving the amenity** by reinforcing the design of Northbourne Avenue consistent with Burley Griffin's original intention as the primary National Gateway
- **Managing road congestion** by increasing the attractiveness of non-car modes to reduce levels of car dependency by providing high quality public and active transport infrastructure
- **Creating an environmentally friendly transport system** aimed at reducing levels of greenhouse gas emissions, air and noise pollution by reducing levels of car dependence and increasing the level of public and active transport usage.



## 2.2 Proposed Works

The Project proposes the following capital works within the Project Corridor to achieve the aforementioned objectives:

- The development of a segregated rapid transit corridor between City and Gungahlin separated from general traffic
- Supporting off-road infrastructure in the form of bus stations at City, Dickson and Gungahlin to facilitate interchanging with the existing ACTION bus network
- With LRT, LRT specific infrastructure including rolling stock, signalling, power supply, substations and depots
- A separated off-road cycleway and footpaths along the length of the Project Corridor to facilitate access and egress from the corridor and to encourage higher levels of active transport.

The Project also considers the effect of higher rates of population and employment growth, and parking charges based on land use policy settings within the Project Corridor on:

- Number of high density, mixed use residential and commercial developments along Northbourne Avenue and Flemington Road
- Encourage greater retail and commercial frontages adjacent to the kerbside in appropriate locations
- Increasing parking charges to encourage public transport use and to ensure that the costs of the Project are shared by all beneficiaries.

## 2.3 Transport, Land Use and Pricing Scenarios

The Project proposes more than just an investment in public transport infrastructure. As part of the Project, a range of complementary policy measures in the form of maximising current land use policies and take up and higher parking pricing have been considered to complement the proposed transport investment which are aimed at maximising the economic and financial returns on investment.

A comprehensive approach that integrates transport investment, land use changes and pricing is proposed as a pragmatic approach to address the ACT Government's objectives to improve economic, financial, environmental and social sustainability.

Accordingly, a number of transport, land use and pricing scenarios were developed and tested with each other. Scenarios considered either BRT or LRT against a business as usual bus based system, maximised take up of residential and commercial land within the Project Corridor, and higher parking charges to incentivise a shift to public and active transport and to ensure that all beneficiaries contribute to the funding of transport infrastructure.

The final iteration of scenario development process filtered all but three transport scenarios, two land use scenarios and a parking charge scenario, which have been assessed in more detail and form the basis of the analysis for the current submission. These scenarios are summarised in Table 2.

**Table 2: Shortlisted Scenarios**

Transport	Land Use	Parking Charges
<ul style="list-style-type: none"> <li>• Business as usual</li> <li>• BRT</li> <li>• LRT</li> </ul>	<ul style="list-style-type: none"> <li>• Business as usual</li> <li>• Higher density</li> </ul>	<ul style="list-style-type: none"> <li>• Increased parking charges in the City as well as other designated Town Centres</li> </ul>



## Transport Scenarios

### Business as Usual

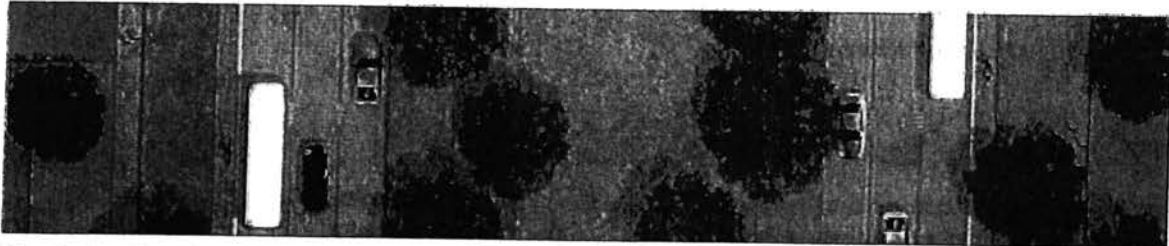
The 'business as usual' transport scenario assumes that, apart from committed road and public transport initiatives, including the gradual implementation of the *2031 Strategic Public Transport Plan*, no further changes to the network are proposed.

Improvements in public transport will still be made across Canberra under the business as usual case although no significant changes are proposed along the Project Corridor. The business as usual scenario is based on the *2031 Strategic Public Transport Plan*, the cornerstone of which will be the introduction of high frequency services provided along the identified Frequent and Rapid corridors. Under this scenario, the current limited stop Red Rapid service that travels between Gungahlin and Fyshwick via the City will continue to be the primary public transport link between Gungahlin and the City.

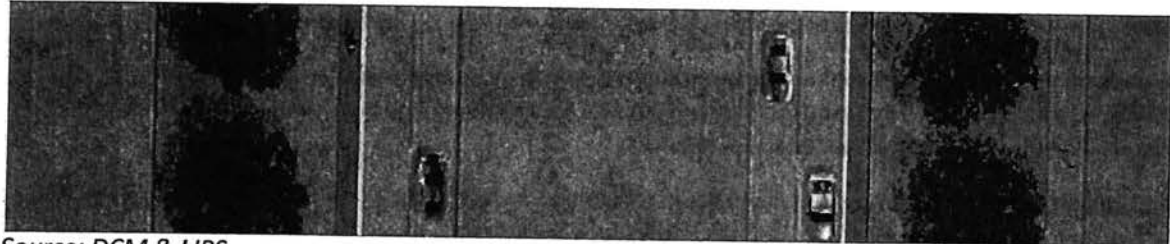
While the Strategic Public Transport Plan will bring about a better level of legibility to the public transport network, it should be noted that bus services would continue to share road space with general traffic along the Project Corridor, which is expected to become increasingly congested over time. Figure 2 depicts the existing alignments of the Project Corridor under the business as usual transport scenario.

Figure 2: Business As Usual

*Northbourne Avenue*



*Flemington Road*



Source: DCM & URS

### Bus Rapid Transit

Unlike conventional bus services, BRT systems typically operate on dedicated lanes and corridors, separated from other forms of road traffic. The South East Busway in Brisbane is an example of a BRT system (see Figure 3).

Figure 3: South East Busway in Brisbane

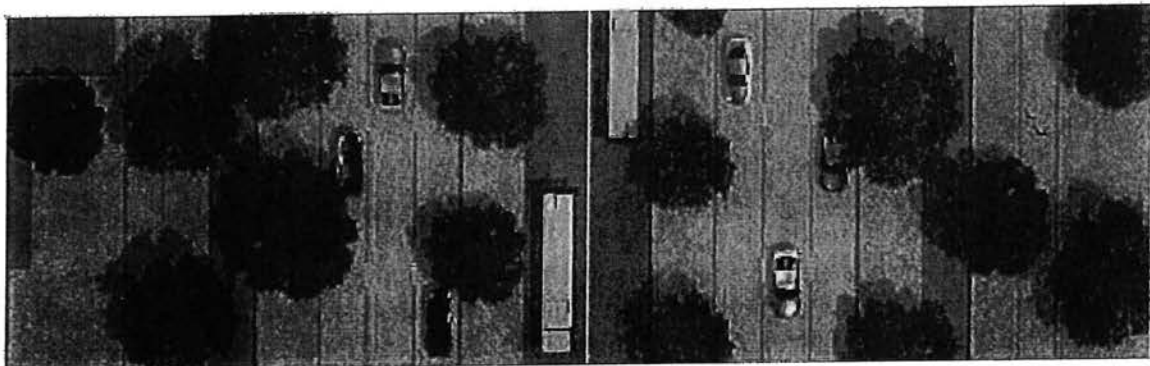




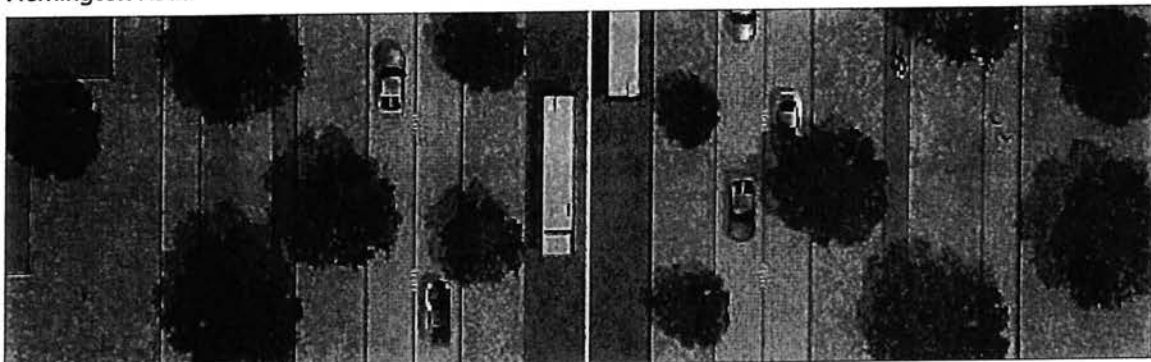
The separation of services from general traffic allows for higher travel speeds, improved service reliability and increased frequencies relative to conventional bus services. BRT systems also allow operations to be integrated with a broader bus network by connecting BRT services with feeder services or allowing conventional bus routes use a portion of the BRT corridor.

Under the BRT scenario, new bus lanes would be constructed in the median along Northbourne Avenue and Flemington Road. In addition, bus bays would be constructed along the Corridor to allow limited or express services to bypass other stopping bus services. It is intended that conventional bus services would also be able to make use of these dedicated bus lanes. Figure 4 depicts the design and alignment of Northbourne Avenue and Flemington Road under this scenario.

**Figure 4: Project Corridor Cross Section under BRT**  
*Northbourne Avenue*



*Flemington Road*



Source: DCM & URS

New stations would be constructed at Gungahlin, Dickson and Civic to facilitate interchanging with the existing ACTION bus services. The corridor would allow for 15 stops between Gungahlin and Civic and be integrated with the existing No.200 route (known as Red Rapid) from there onwards. It is expected that this service will operate at five minute intervals during peak periods.

For planning purposes, construction is assumed to take three years after the completion of forward design and procurement.

### **Light Rail Transit**

LRT is an alternative form of rapid transit. It typically has a lower capacity and speed than that of conventional heavy rail and metro rail services but higher capacity and speed of traditional street-running tram services as well as conventional bus services. The main benefit of an LRT system is that it provides higher levels of amenity, travel speed, reliability and capacity compared to conventional bus and tram services within an urban environment without the high costs associated with conventional heavy rail systems.

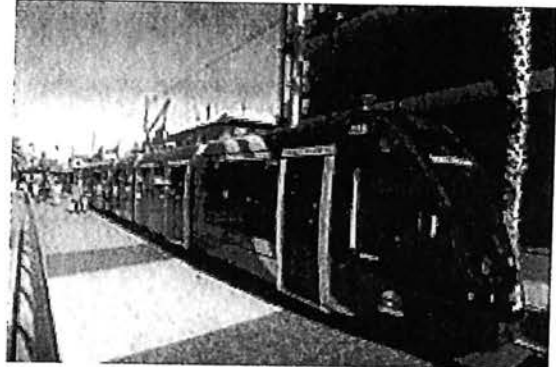


This higher level of service is achieved by through the use of dedicated rail corridors separated from other vehicles traffic, while still being able to run on-street to provide improved accessibility through major activity centres. A key feature of LRT systems is the ability to integrate LRT infrastructure and operations within an existing urban environment, allowing for the possibility of promoting further urban development. Figure 5 and Figure 6 illustrate LRT in Adelaide running on both dedicated track as well as on-street.

**Figure 5: Adelaide Metro Light Rail Service Running on Dedicated Track**

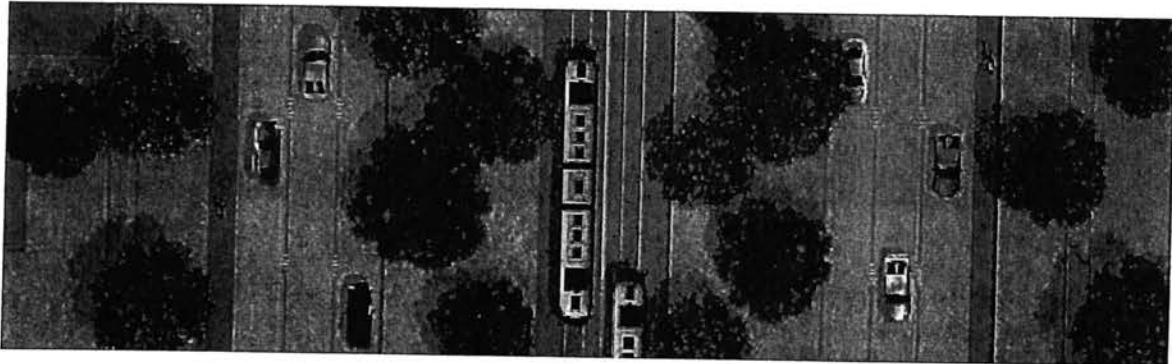


**Figure 6: Adelaide Metro Light Rail Service Running On-Street in Glenelg**

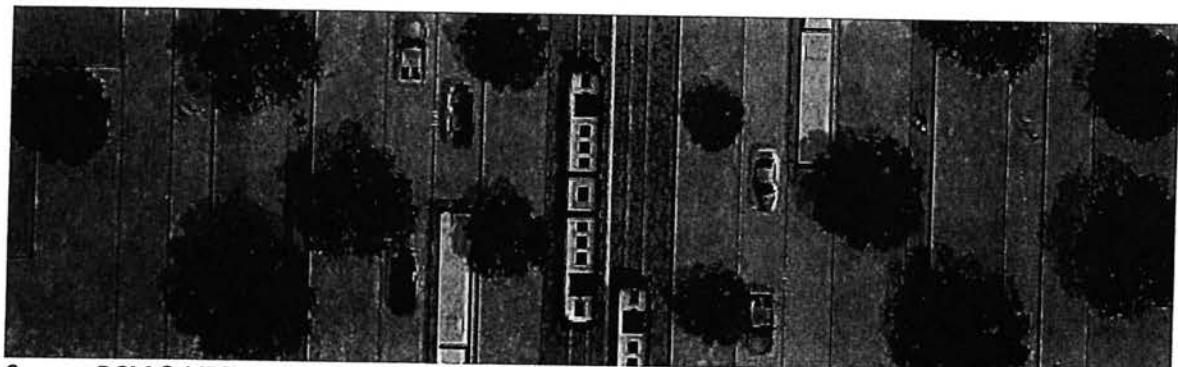


The LRT scenario would be based on a similar treatment used with BRT in that the light rail corridor would be built in the median along Northbourne Avenue and Flemington Road. Light rail tracks would be embedded into the road surface along Northbourne Avenue to allow for the sharing between light rail and buses. Along Flemington Road, only light rail services would operate in the median to maximise the running speed of light rail services. Figure 7 depicts the design and alignment of Northbourne Avenue and Flemington Road under this scenario.

**Figure 7: Project Corridor Cross Section under LRT Northbourne Avenue**



*Flemington Road*



Source: DCM & URS



New stations at Gungahlin, Dickson and Civic would be developed to support interchanges with conventional bus services. The new light rail service would replace the existing Red Rapid service between Gungahlin and Civic and be integrated with the remaining Red Rapid route from there onwards. It is expected to operate at seven and half minute headways during peak periods.

As part of this option, supporting operating infrastructure would be developed including rolling stock, signalling, power supply, substations and depots. For planning purposes, construction is assumed to take three years after the completion of forward design and procurement.

### Land Use Scenarios

Should the investments in transport infrastructure be sufficiently attractive to potential users, the investments themselves could generate changes in land use. The Project is likely to improve accessibility through reduced travel times, decongestion and improved travel time reliability. In turn, improvements in accessibility may drive land use changes. People and industries may choose to move the location of their residence, employment, business centres and alter their logistics chains to take advantage of faster travel times and improved accessibility. Accordingly, transport investments, in particular light rail investments, may result in redevelopment around stations.

Alternatively, even without significant changes to existing planning controls, the Project Corridor has a number of properties that could be redeveloped to support urban densification. For instance, the ACT Government owns the motor registry and tourist information site at Dickson as well as public housing complexes along Northbourne Avenue. The eventual redevelopment of which would fall within the remit of the newly established Gungahlin to City Project Office.

The intertwined nature of the issues facing the Project Corridor mean that an integrated transport-land use approach is likely to optimise the economic outcomes of investments in the Project Corridor. Two land use scenarios were developed to reflect possible urban outcomes from government intervention, whether through investment in transport or through changes in land use scenarios – a ‘business as usual’ outcome or a higher density scenario.

### Business as Usual

The ‘business as usual’ land use scenario is based on current ACT Government population and employment projections, which are used for whole of government decisions. Current Government projections assume that the combined ACT – Queanbeyan population would exceed 500,000 people by 2031. Queanbeyan population is included because the transport network model includes Queanbeyan.

To cater for future population growth, historic development patterns (mainly ‘greenfield’ development in the districts of Molonglo, Outer Gungahlin and Queanbeyan) would continue into the future. Under this scenario there is no significant change to land use policies and planning controls in the study area.

### Higher Density

The higher density land use scenario assumes higher residential and commercial densities through a faster realisation of the Project Corridor’s development potential without changes to existing land use controls or policies in the Territory Plan. The urban outcomes implied by the scenario may arise through a market response to transport investment, as well as through adjustments in land use settings, urban renewal programs or through a combination of these factors.

The scenario allows for recent amendments in planning controls for: Dickson, Gungahlin Town Centre, Inner North urban housing and City area (ANU Exchange and Griffin Legacy). Under the higher density scenario, population and employment levels would be 38% and 21% higher than under the business as usual land use scenario within the Project Corridor by 2031.

The Higher Density land use scenario assumes that total ACT-Queanbeyan population and employment levels remain in line with that of the ‘business as usual’ land use scenario for consistency. Accordingly, higher densities within the Project Corridor are based on a slower release of greenfield land developments.



### **Increased Parking Charges**

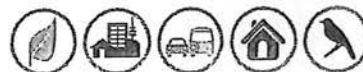
Transport infrastructure development should not only be concerned with the provision of capacity but also effective management of transport demand.

Canberra has the lowest parking rates amongst Australian capital cities. Colliers International estimated that daily rates in Canberra at \$10. By comparison, the average rate across Australian cities was \$39 per day with Sydney and Melbourne having the highest rates at \$64 and \$66 respectively<sup>1</sup>. Low parking fees encourages private vehicle use, which imposes a range of costs on society and infrastructure.

The use of parking charges is one realistic lever that was considered to incentivise a greater use of public transport. A revision in parking rates could provide the following outcomes:

- Encourage a greater use of public and active transport along the Project Corridor
- Ensure that all beneficiaries contribute to the cost of the Project
- Secure an additional funding source for the Project

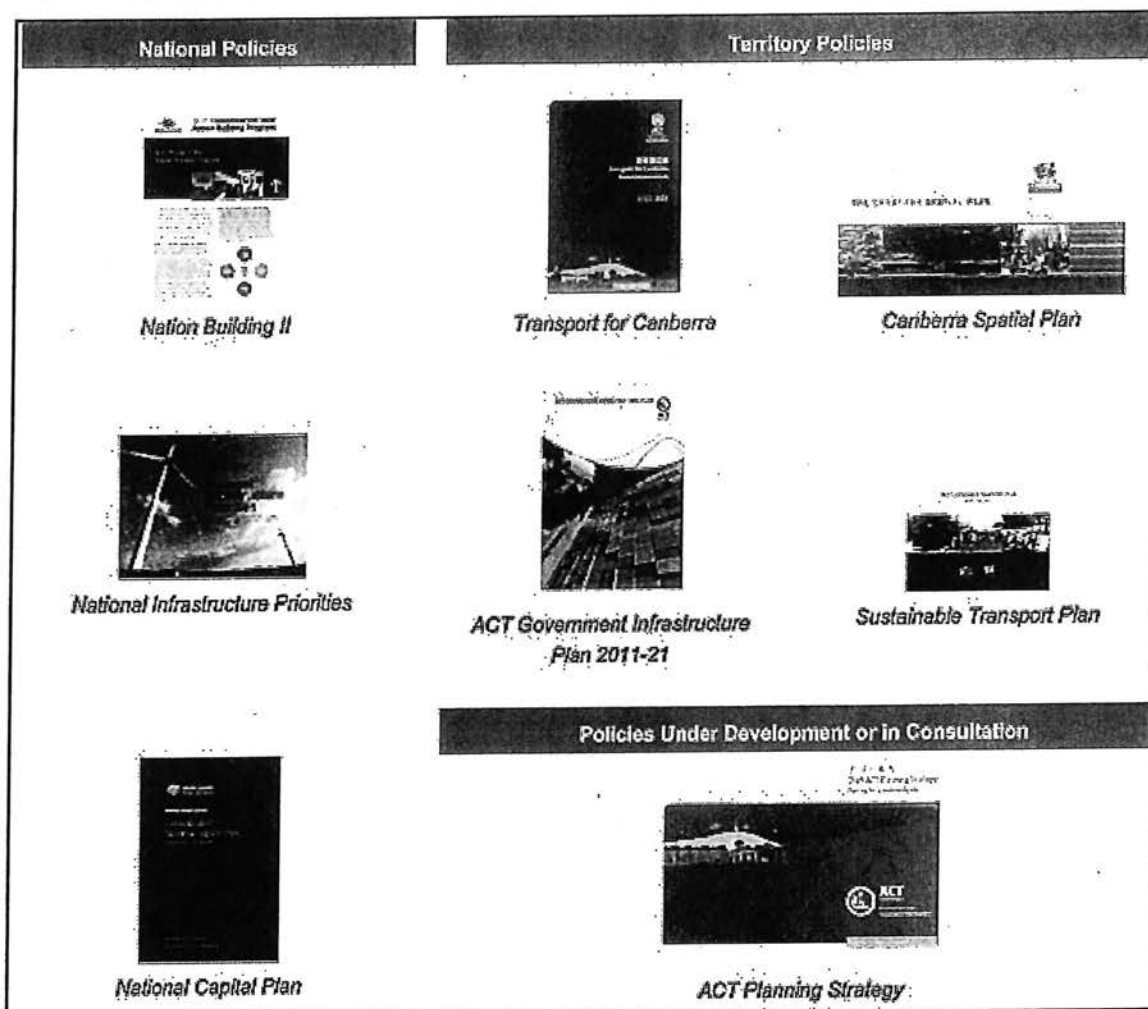
Providing higher parking fees are captured by the ACT Government and hypothecated towards improving transport, there exists opportunities for positive dialogue to discuss the potential for a broader based approach to funding rapid transit. For instance, the community consultation process for the ACT Government's Time to Talk Canberra 2030 revealed that Canberra's residents were reasonably well informed with respect to the need for wider public transport options and the trade-offs required to deliver these options. Survey participants discussed trade-offs they would be willing to accept including the increase of parking charges to moderate private vehicle use<sup>2</sup>.



### 3 Alignment with Government Objectives

#### 3.1 Alignment between ACT and Commonwealth Government Objectives

The development of the Project has given due consideration to how the Project aligns not only with ACT Government strategic concerns but also how the Project aligns with the objectives of the nation. The ACT Government believes that there is a strong and significant alignment between the Project and a number of objectives, principles and strategies put forward by the following national and territory policies:



Of note, the Project aligns well with a number of Infrastructure Australia's Strategic Priorities. These seven Strategic Priorities concern themselves with:

- The expansion and increase of Australia's productivity
- Diversification of Australia's economic capabilities and the development of cities and regions to build on the nation's global competitive advantage
- Improvement of social equity and quality of outcomes, including the reduction of greenhouse emissions.

These Strategic Priorities ultimately informed the need for strategies to encourage better planning and governance, and reducing the multiplicity of rules and regulations from a decision and policy making perspective. It also informed the need to enhance international trade through improving export capacity and reducing the loss of productivity in capital cities due to ageing transport networks.



Table 3 demonstrates the linkages between the objectives defined for the Project with Territory and Commonwealth Government objectives.

**Table 3: Alignment of Project, Territory and National Objectives**

IA Objective	Territory Objective	Project Objective
<b>Expand Australia's productive capacity</b>	Managing growth responsibly and sustainably by taking a regional approach to urban settlement as part of the <i>ACT Planning Strategy</i> .	<b>Delivering transport capacity</b> The Project aims to increase travel speeds, reliability and frequency of public transport services along the Project Corridor, ultimately aimed at providing capacity for growing activity centres and cater for population growth.
<b>Increase Australia's productivity</b>	<i>ACT's Planning Strategy</i> aims to improve people's mobility and creating more choices in travel by integrating investment in Canberra's transport networks with the land use it services to enhance productivity on existing assets.	<b>Managing road congestion</b> The Project aims to reduce levels of car dependency and increase public and active transport mode shares by increasing the frequency, reliability and speed of public transport services and through the provision of high quality walking and cycling infrastructure.
<b>Diversify Australia's economic capabilities</b>	The <i>ACT Planning Strategy's</i> objective on improving the mobility of people and increasing travel mode options will be supported through an integration of investment in Canberra's transport networks with the surrounding land use it services.	<b>Supporting economic diversity and development</b> The Project aims to contribute to the diversification and development of economic activity by enhancing the role of town and group centres located along the Project Corridor.
<b>Build on Australia's global competitive advantage</b>	Creating a more prosperous region by promoting the strengths of a clean, knowledge based economy is part of the <i>ACT Planning Strategy</i> which is aligned with Australia's vision for a more efficient and sustainable economy in the future.	<b>Supporting Canberra's core</b> The Project aims to improve accessibility to the City and the Parliamentary Triangle by providing faster and more frequent services to the City and improving connections to ongoing destinations.
<b>Develop our cities and/or regions</b>	The implementation of the <i>2031 Strategic Public Transport Plan</i> will facilitate increases in densities in established town centres and along key transport corridors. This will support the <i>ACT Planning Strategy's</i> objective of taking a regional approach to urban settlement to promote responsible and sustainable planning.	<b>Maintaining and improving the amenity of Northbourne Avenue</b> The Project seeks to reinforce the linear alignment of Northbourne Avenue by maintaining the avenue of trees and adding the permanency of dedicated bus lanes or light rail tracks and retain Northbourne Avenue's role as the primary National Gateway.
<b>Reduce greenhouse emissions</b>	<i>Transport for Canberra's</i> Frequent Network includes a commitment for the introduction of an environmentally friendly public transport fleet to reduce greenhouse gas emissions and particulates.	<b>Creating an eco-friendly transport system</b> By reducing levels of car dependence, increasing levels of public and active transport usage and changing the urban form, the Project aims to reduce levels of greenhouse gas emissions, air and noise pollution.
<b>Improve social, equity and quality of life in our cities and regions</b>	The <i>ACT Planning Strategy</i> calls for building the capacity to improving the quality of the public realm and access to services and information. This will provide more lifestyle opportunity choices as it aims to renew town centres as the hub for community life.	<b>Improving equity and liveability</b> The Project aims to enhance access to key centres and community facilities through improved public and active transport, relied upon by the less well off, the disadvantaged and the elderly.



### 3.2 Alignment with Nation Building Program 2

Nation Building II is the Commonwealth Government's next step in developing the nation's infrastructure network. Nation Building 2 places a significant emphasis on improving Australia's productivity with an overarching objective is to "lift Australia's productivity through nationally significant land transport infrastructure". Beginning in 2014–15, Nation Building 2 will build upon the first phase by continuing to provide a solid foundation for addressing Australia's transport infrastructure needs going forward.

Nation Building 2 identifies four key investment themes, all aimed at improving the productivity of Australia's economy through investment in infrastructure and through using assets, both new and existing, better. These four themes, of which this Project directly addresses two, are:

1. **Connecting people** by encouraging reliable and efficient land transport infrastructure to connect people across the nation
2. **Innovation** through enhancements, plans and developments to current and future land transport networks
3. **Moving freight** by supporting economic growth through efficient and connection freight networks
4. **Safety** by improving the safety and sustainability of national rail and road networks

#### Connecting People

The Australian Government wants to ensure that national, urban and regional road and rail links are maintained in an efficient, productive and sustainable manner. The 'Connecting People' theme has the following objectives:

- **Connecting cities** – to improve the connectivity between cities and major population centres
- **Urban living** – to enhance urban liveability and access to essential services
- **Pinch points** – to increase capacity and efficiency and reduce congestion in urban areas

The Project is directly aimed at improving connectivity between key centres and activity generators in Canberra including Gungahlin, Mitchell, Dickson and the City by bypassing current and emerging pinchpoints along the Project Corridor. Indirectly, the Project will improve connections to other centres including Barton, Woden, Tuggeranong and Queanbeyan by facilitating and expediting the movement of cross-regional Rapid services between Gungahlin and the City.

The Project aims to enhance urban living by not only improving accessibility to employment, education civic activities and other essential services but also by increasing the density and mix of residential and commercial activities along the Project Corridor.

#### Innovation

A key element of the Project is the integrated nature in which land use and transport settings will be delivered. For economic viability, the Project is likely to require the delivery of higher densities within the Project Corridor over a long period of time. Governance structures to ensure progress towards this objective are somewhat unique. As a first step, the recently established Gungahlin to City Project Office is well positioned not only integrate transport and land use planning but also ensure the realisation of the requisite transport and land use outcomes.

### 3.3 National Capital Plan

Although planning with the nation's capital largely resides with the ACT Government, the Commonwealth Government still plays a role to ensure that Canberra's image and position as the nation's capital is upheld. The Commonwealth Government, through the National Capital Authority, outlines its planning intentions and controls through the National Capital Plan.



The National Capital Plan aims to ensure that Canberra is planned and developed in accordance with its national significance. The National Capital Plan identifies Northbourne Avenue as a Main Avenue and National Approach Route. As such, the objective for its planning and development is to establish and enhance the identity of the approaches to the Central National Area as roads of national significance and, where relevant, as frontage roads for buildings which enhance the National Capital function and as corridors for a possible future inter-town public transport system, improving public transport along the Corridor, promoting more diverse urban development and reducing pressure on yet to be developed greenfield residential sites.

### 3.4 ACT Government Objectives

The City to Gungahlin Project Corridor resonates strongly with current ACT Government policy and objectives on transport and planning.

#### **Transport for Canberra**

Transport for Canberra is the ACT Government's strategy for a more effective and efficient transport system to meet the needs of the community while reducing the environmental impacts of transport. Its proposed policies for 2011 to 2031 build on the 2004 Sustainable Transport Plan and are aligned with the draft 2011 ACT Planning Strategy.

These include further reduction in traffic congestion and greenhouse gas emissions while continuing to increase the use of active and public transport from 20% in 2011 to 23% in 2016 and 30% in 2026. The strategy addresses four broad categories of public transport, active travel, managing roads and vehicles, and managing travel demand.

The cornerstone of the Transport for Canberra Plan is the establishment a public rapid transit system capable of operating services at 15 minute (or better) intervals all day through main corridors based on the *2031 Strategic Public Transport Plan Network*. The Project, should it be developed, would be part of the first stage of a wider rapid transit system identified by Transport for Canberra that will connect major activity centres such as, Belconnen, Barton, and Woden with City. These rapid transit routes will be critical in achieving a metropolitan-wide public transport network as they will link with Frequent Local lines in many of these activity centres to form the planned Frequent Network.

#### **ACT Planning Strategy**

The draft ACT Planning Strategy proposes nine strategies to deliver the community's 'desired future scenario for Canberra' (through *Time to Talk Canberra 2030*), while taking into account recent developments and evidence arising from research and implications of challenges ahead, such as climate change.

The key target of the strategy is to achieve 50% of new housing to be established within the urban area of Canberra so as to support other ACT Government policy outcomes, including the legislated greenhouse gas emissions target for 2060.

The Project would support the creation of opportunities for increased density and dispersed employment by leveraging off existing structures of activity centres and inter-town transport connections. It would also alleviate mobility concerns and create more choices for travel by integrating investment in Canberra's transport networks with the land uses it services.

#### **ACT Government Priorities 2011–12**

2011–12 government priorities for improving access to and use of public transport include the development of a feasibility and proposal study for Northbourne Avenue rapid public transport options, including light rail. These studies were completed in 2011 (Northbourne Avenue Bus Priority, Cycleway Facility and Dickson Bus Station Feasibility Study and Northbourne Avenue Transport Corridor Final Proposal Report).

This business case builds on these studies, as the next step in implementing the first stage of the Rapid network envisaged in the Strategic Public Transport Network Plan.



## 4 Problem Identification, Assessment and Analysis

### 4.1 Identification and Assessment

As part of the Project Study, a range of underlying trends and issues have been identified that are currently or expected to impact the Project Corridor and therefore affect the attainment of Government objectives. The following section provides a brief outline of the problems within the Project Corridor.

#### Rapid Population Growth

The districts of Gungahlin and North Canberra, both of which surround the Project Corridor, are home to the fastest and highest levels of population growth with average annual growth rates outstripping the City average (see Table 4).<sup>3</sup>

Table 4: Population Growth by District

District (SSD)	2001	2011	Average Annual Change	
			Growth	Growth Rate
North Canberra	38,585	49,674	1,109	2.6%
Belconnen	85,601	94,947	935	1.0%
Woden Valley	32,494	34,530	204	0.6%
Weston Creek-Stromlo	23,662	23,760	10	0.0%
Tuggeranong	90,875	88,382	(249)	(0.3%)
South Canberra	23,324	26,880	356	1.4%
Gungahlin-Hall	24,398	47,067	2,267	6.8%
<b>ACT</b>	<b>319,317</b>	<b>365,621</b>	<b>4,630</b>	<b>1.4%</b>
Queanbeyan	41,598	52,620	1,102	2.4%

Source: ABS Cat. No 3218.0.

These high levels of growth are expected to continue and current forecasts suggest that the population level in the Gungahlin district could reach 90,000 by 2031, or 91% higher than in 2011.<sup>4</sup>

It is not unreasonable to conclude that Northbourne Avenue would cater for a significant share of the projected growth. Given current infrastructure, the likely increase in traffic volumes as a result of this growth will likely be largely driven by private vehicles. Apart from the resultant congestion, this outcome would have a negative impact on the government policy of achieving higher public and active transport mode shares along the Project Corridor.

The Project aims to increase public transport services and quality along the Corridor. This would play a critical role in ensuring that transport supply is able to cope with fast growing population levels and economic activity in major activity centres along the City to Gungahlin Corridor.

#### High Car Dependency and Poor Public Transport Usage

Journey-to-Work (JTW) data indicates that Canberra has a high level of car dependency. Private vehicle as the preferred mode to work has maintained a mode share greater than 80% between 1976 and 2006 (see Table 5). While the Project Corridor boasts the second highest level of public transport in Canberra, on average, this decreases significantly closer to Gungahlin where nine out of every 10 trips is made by car.<sup>5</sup>



**Table 5: Canberra Journey to Work Mode Share 1976 – 2006**

Mode	1976	1981	1986	1991	1996	2001	2006
Car driver	71.3%	70.9%	72.6%	70.7%	72.7%	73.9%	73.5%
Car passengers	13.8%	12.4%	11.4%	12.1%	10.2%	9.4%	8.7%
<b>Sub-total: private transport</b>	<b>85.1%</b>	<b>83.3%</b>	<b>84.0%</b>	<b>82.8%</b>	<b>82.9%</b>	<b>83.3%</b>	<b>82.2%</b>
Public transport	8.9%	9.9%	9.7%	9.9%	8.3%	6.7%	7.9%
Bicycle only	0.9%	2.1%	2.1%	2%	2.2%	2.3%	2.5%
Walk only	4.6%	4.0%	3.6%	4.0%	4.3%	4.2%	4.9%
Other modes	0.5%	0.6%	0.6%	1.4%	2.3%	3.5%	2.4%

Source: ACTPLA (2009)

By improving the quality of public transport services and reducing overall travel distances and times, the project aims to increase the attractiveness of public transport (and active transport). This would contribute to a reduction in the level of private vehicle reliance in Canberra. Through more intensive development of the Project Corridor, which will be enabled through higher transport capacity, there exists an opportunity to accommodate future population growth and economic development in a more sustainable manner and reduce reliance on greenfield development.

### Growing Road Congestion

High population growth in conjunction with high levels of private vehicles will result in increased traffic volumes. During peak travel times, sections of the Project Corridor particularly Northbourne Avenue, are already congested operating close to capacity. Based on current traffic conditions, road congestion adds approximately 15 minutes to a car trip during peak periods. This constraint is evident by long queues and delays that currently exist along the corridor during peak periods (see Figure 8).

**Figure 8: Congestion on Northbourne Avenue during the Morning Peak**

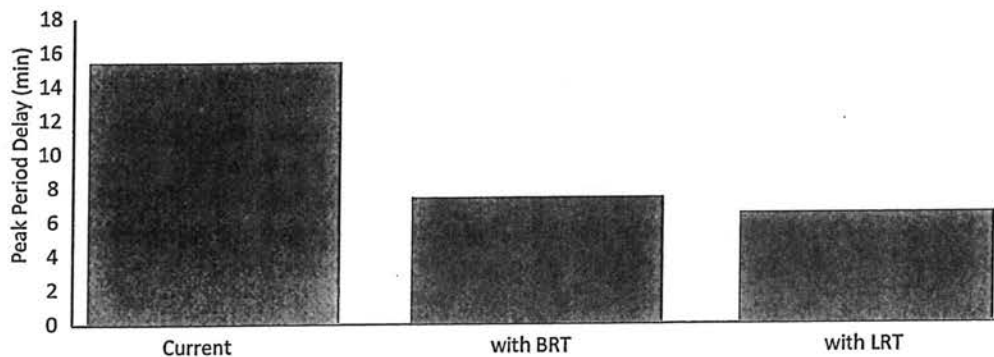


Source: ESDD

ESDD estimate with investment in BRT or LRT, current delays could be reduced by more than half as shown in Figure 9, a benefit that could be expected to grow over time should an investment in rapid transit be made.



**Figure 9: Estimated Peak Period Delays for a Trip between Gungahlin and the City for General Traffic**

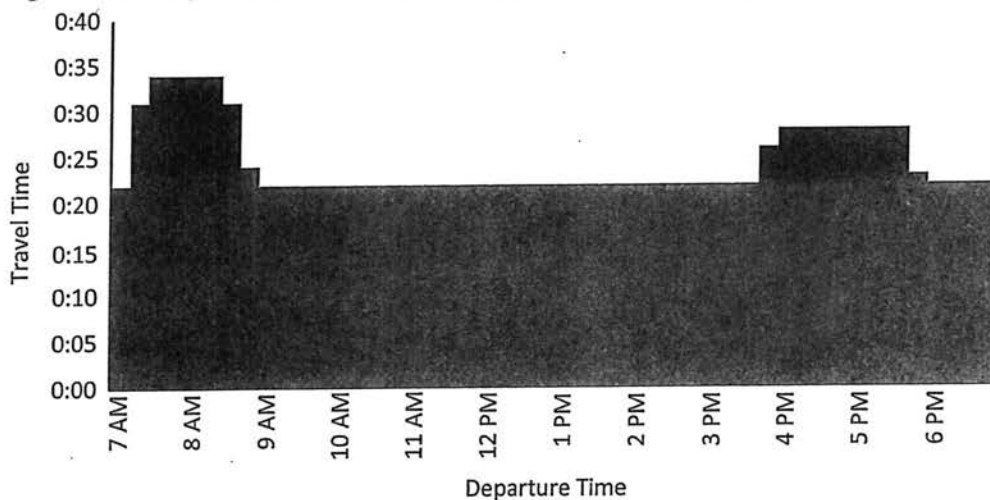


Source: ESDD

Traffic congestion is not only an irritant for residents but it also impacts negatively on the costs of doing business through longer travel times and unreliability which affect economic activity and productivity. Road congestion also impacts on the efficiency and attractiveness of road-based public transport systems, of which, Canberra is likely to rely on for the foreseeable future.

With limited bus priority currently provided within the Project Corridor, road congestion impacts adversely on the efficiency of bus operations. Figure 10 below illustrated increases in bus travel times along the Project Corridor during peak periods. It should be noted that timetabled times do not include unexpected travel time which would likely increase average travel times further, particularly during the peak.

**Figure 10: Red Rapid Route 200 Gungahlin to Civic: Current Timetabled Travel Times**



Source: ACTION Buses (2011)

The impact of congestion on buses is not limited to residents living along the Project Corridor. Northbourne Avenue is a key bus corridor and acts as a trunk for most bus services originating in Canberra's northern suburbs and south of Lake Burley Griffin as far out as Tuggeranong and Fyshwick. As the *Transport for Canberra 2031 Strategic Network Plan*, which envisaged more cross-regional (Rapid) bus services to operate along the corridor from destinations including Queanbeyan and Molonglo Valley, the impacts of congestion in the Project Corridor will broaden over time. In short, congestion in the Project Corridor has a broad impact on many residents across Canberra.

By increasing the attractiveness of non-car modes through increasing the frequency, capacity, reliability and speed of public transport services and through the provision of high quality walking and cycling infrastructure, the Project can be an effective facilitator to managing congestion.



### Low Land Productivity

From an international standpoint, Australian city population densities are lower than that of their global counterparts – they tend to be more spread out in terms of urban settlement. This is especially the case for Canberra. A lower population density has several economic and social implications.

On average, it would tend to result in a higher per capita cost for providing public transport and community services. Lower densities increase the risk of social exclusion as appropriate public services may be less accessible to residents. For the ACT Government, lower densities adversely impact the potential yield on property based charges, a key concern as the ACT Government relies on property related charges for half of its annual revenue.

The Project will promote an increase in the level and diversity of economic activity along the Project Corridor in the City, along Northbourne Avenue and in key town centres including Dickson and Gungahlin by increasing the mix and number of residents and employment positions as well as by improving public transport accessibility along the Project Corridor.

### Employment and Population Mismatch

Although planning policies in Canberra have sought to increase self-containment to reduce demand for longer distance travel, it is apparent that the spatial distribution of employment is such that in most areas in Canberra, it is difficult to achieve high levels of self-containment.

Most districts in Canberra have insufficient employment to cater for all working age residents and moreover, many of these positions are taken by residents living in other districts. Only in North Canberra, South Canberra and Woden districts, the centre of Canberra, are there more employment positions than residents. Table 6 outlines the number of jobs per person in each district and the proportion of jobs provided within each district taken by district residents.

**Table 6: 2006 Employment Outcomes by District**

District	Number of Jobs per Person	Proportion of District Jobs Taken by District Residents
North Canberra	2.55	23%
South Canberra	3.68	14%
Woden	1.30	23%
Weston	0.36	42%
Belconnen	0.55	61%
Tuggeranong	0.33	73%
Gungahlin	0.39	43%
Queanbeyan	0.56	58%

Source: ACTPLA (2009)

Without significant changes in how employment is distributed across the territory, no realistic land use scenario can be expected to provide significant growth in employment at town centres.

Hence, it is likely that residents living on the northern end of the Project Corridor will generally need to travel towards the City in order to seek employment for the foreseeable future. Growing congestion on key transport links to employment in the City and the Parliamentary Triangle will increasingly inhibit the efficient movement of labour to these important employment hubs, decreasing the productive capacity of the city.



### High Greenhouse Gas Intensity

Greenhouse gas emissions in the ACT are relatively higher as a result of low residential densities and the associated prevalence of detached dwellings increasing the energy intensity of households. Furthermore, the ACT's higher level of car use and resultant low utilisation of public and active transport combine to increase carbon emissions from overall vehicle use. Without intervention, increasing traffic volumes and congestion, arising from high population growth, will combine to increase transport-related emissions even further.

By reducing levels of car dependence, increasing levels of alternative transport usage and intervening on Canberra's urban form, the Project aims to reduce levels of greenhouse gas emissions, air and noise pollution.

### Diminishing Corridor Amenity

As one of the first impressions for new visitors entering Canberra, its design and treatment sets the tone for the city's character. It is also Canberra's key commercial address for apartments and businesses alike, serving a variety of land uses. Therefore the quality of its urban environment can be considered to be important.

Although Northbourne Avenue provides some form of capacity for all modes of transport, the attractiveness of non-car modes is somewhat limited. Combined with a high level of car usage and congestion, the walking (and for public transport users, the waiting) environment is compromised, due to exposure to high levels of traffic and associated noise, accidents and pollutants. In such a car dominated space, it can also become quite difficult to develop urban forms that encourage the desired future character of the Avenue as a place of activity and vibrancy.

The Project aims to improve accessibility to the City and the Parliamentary Triangle by providing faster, more frequent services with higher levels of capacity and in turn supporting Canberra's role as the nation's capital and preeminent federal political and administrative centre as well as the City Centre's role as the preeminent municipal commercial centre.

## 4.2 Analysis

There are a myriad of current and future challenges due to rapid population growth and its associated impacts. Many of the issues explored in this submission can be traced back to the planning and delivery of both land releases and transport in Canberra.

### Urban Planning

Canberra was originally planned as a polycentric city where planners intended for residents to work and live in the same town centre, reducing the need for longer distance travel. Prior to WWII, much of Canberra's development was confined to the districts of North and South Canberra located close to the city.

Over time, large quantities of affordable land were released on the fringes of the city. Although the intention was to link outlying suburbs to town centres that would provide employment, shopping and community services, employment did not decentralise and little investment was made in high capacity public transport links that would have otherwise connected the suburbs to the town centres and the City.

Instead, employment agglomerated in the City and Parliamentary Triangle, requiring the workforce to travel longer distances either by car or using bus services, which operated at low frequencies and struggle to match the faster speeds of car travel.

This outcome is not an unfamiliar outcome in an Australian context although even by Australian standards, densities in Canberra are low. Low density living tends to lead to longer journeys that are spread over a greater area. These types of trips are more difficult to serve through public transport.

While density is not the only factor to support public transport, mixed use developments and higher density housing along public transport corridor will mutually support each other.



Integrating these two aspects with the public transport corridor improvement will significantly contribute to sustainability, productivity and social benefits.

### **Road Focused Investments**

Traditionally, government investment in transport has favoured a supply-side approach for road infrastructure. This is due to the high demand for private motor vehicles, its cost-effectiveness in connecting new residential estates and the relative limited recurrent costs of developing road infrastructure despite the congestion and other costs road use brings.

Road investment in Canberra has acted as a deterrent to public transport use due to the development of high quality arterials allowing for faster travel speeds and therefore lowering total journey times. In particular, over the past few decades, a number of investments were made in motorway grade parkways to join the various town centres across Canberra. Although provision had been made for rapid transit, evident in the provision of the wide medians that are provided along many key road corridors in Canberra, investment did not materialise.

Furthermore, as public transport shares the road supply with general traffic, any resulting congestion would also serve to deteriorate the performance of bus services.

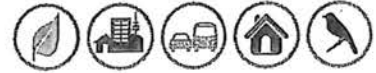
### **Current Bus Network Design**

The current design of the public transport network in Canberra significantly affects its attractiveness as a mode of transport of choice for passengers. With a focus on providing service coverage, bus routes are circuitous, increasing travel times and wait times for passengers. The following attributes of the bus network serve to further reduce the attractiveness of public transport in Canberra:

- The bus network is currently designed to maximise service coverage, requiring multiple routes operating at low frequencies to service a particular area to ensure that 95% of residents are no further than 500m from a route
- Termination of local services at the local town centre with travellers required to transfer for onward travel to the City and other destinations
- Significant differences in the routing and frequency of services between weekday peak periods, weekday off-peak periods and on weekends.

The Project, by improving public transport services and by encouraging a change in land use patterns, aims to reduce car dependency and increase public transport usage. Changes in transport and land use proposed by the Project are outlined in the following chapter. The ensuing options, based on combinations of the scenarios, aim to address the identified issues by:

- Improving the competitiveness of public transport services by providing priority and separating such services to increase their service speeds and reliability
- Incorporating land use changes as a driver of increasing social and environmental sustainability of Canberra through higher densities and greater mixed uses and support the economic and financial sustainability of an investment in public transport
- Increase transport capacity to enable further economic development within an established corridor in order to reduce reliance on greenfield developments
- Investigate the merits of adjusted parking prices as a means of better managing levels of car use and provide a secondary source of funding for an investment in rapid transit



## 5 Assessment of Options

### 5.1 Summary of Options

In order to address the problems identified in the previous section, a number of scenarios for the Project Study, as outlined in Section 2.2, have been identified which include transport, land use and parking charge scenarios. Five options were developed, with four do-something options outlined below against a base case:

- BRT with business as usual land use and higher parking charges
- LRT with business as usual land use and higher parking charges
- BRT with higher density land use and higher parking charges
- LRT with higher density land use and higher parking charges

### 5.2 Capital Costs

The outturn capital costs of the Project have been provided by the Project's cost estimator URS. The following cost drivers have been included in the assessment of the capital costs:

- Direct costs: construction costs of works specifically covering the cost of plant, labour, materials and specialist contractors
- Indirect costs: planning, design, mobilisation and government costs.

The concept design used to inform this submission assumed that rapid transit infrastructure would be built in the median of Northbourne Avenue and Flemington Road. The width of the median on both roads is sufficiently wide to cater for rapid transit without altering the position of existing general traffic lanes.

This concept design informed a cost estimation based on unit rates, quantities and average lengths, allowing for the following significant cost components (where applicable):

- The introduction of segregated rapid transit lanes in the median of the Project Corridor
- Modifications and additions to two bridges on Flemington Road
- Below rail infrastructure (track, trackbed and crossovers)
- New stops and stations
- Electrification including sub-stations, overhead wiring and support systems
- Signalling
- Rollingstock and depots
- Ancillary modifications including the introduction of segregated cycleways and widening of footpaths

On an undiscounted basis, the upfront capital costs for the BRT and LRT are estimated to be \$276 million, and \$614 million respectively. A detailed breakdown of costs for BRT and LRT is provided in Table 7:



**Table 7: Breakdown of Undiscounted Upfront Capital Costs (2011 Prices in \$ million)**

Cost Component	BRT		LRT	
	Cost	Prop.	Cost	Prop.
Preliminaries, design and government costs	\$51	18%	\$113	18%
Enabling, general construction planning and management	\$28	10%	\$28	5%
Below rail infrastructure	-	-	\$102	17%
Bridges	\$14	5%	\$14	2%
Separated rapid transit lanes	\$25	9%	\$25	4%
Road works and medians	\$10	4%	\$10	2%
Utilities and drainage	\$33	12%	\$33	5%
Footpaths and cycle paths	\$4	1%	\$4	1%
Signalling	\$10	4%	\$10	2%
Electrical supply	\$13	5%	\$88	14%
Passenger interface and communications	\$29	11%	\$42	7%
Depots	\$48	17%	\$91	15%
Fleet	\$11	4%	\$55	9%
<b>Total</b>	<b>\$276</b>	<b>100%</b>	<b>\$614</b>	<b>100%</b>

Source: URS

### 5.3 Demand Impacts

The Canberra Strategic Public Transport Model (CSTM) was used as the basis to assess the demand impact for each option, which is maintained by ESDD. CSTM is a typical four-step Strategic Public Transport demand model covering the ACT and Queanbeyan.

The demand projections for each project scenario were tested under two sets of land use, population and employment assumptions: a 'business as usual' land use scenario and a 'higher density' land use scenario.

The 'business as usual' land use projections are based on ACT Government Chief Minister and Cabinet Directorate land use projections. The 'higher density' land use projections were prepared by ESDD and URS, which reflects an assumption of a faster realisation of the Project Corridor's development potential without relying on changes to existing land use controls or policies in the Territory Plan. Table 8 outlines the first and final model year results for 2011 and 2031 and provides high level demand model results for the whole of the ACT transport system.



Table 8: High Level Demand Model Results for whole of ACT transport system

Year	2011				2031	
Land Use	BAU		BAU		Higher Density	
Mode	BAU	BAU	BRT	LRT	BRT	LRT
<b>Passenger trips</b>						
Public transport	16,900	38,400	43,600	43,700	43,700	43,800
Car	239,300	291,300	286,500	286,300	285,600	285,400
<b>Total passenger trips</b>	<b>256,200</b>	<b>329,700</b>	<b>330,100</b>	<b>330,000</b>	<b>329,300</b>	<b>329,200</b>
<b>Average journey time (mins)</b>						
Public transport	62.3	57.4	55.7	55.5	53.6	53.5
Car	12.4	12.8	12.5	12.5	11.4	11.4
<b>PT Mode Share</b>	<b>6.6%</b>	<b>11.6%</b>	<b>13.2%</b>	<b>13.3%</b>	<b>13.3%</b>	<b>13.3%</b>
<b>PT Fare Revenue</b>	<b>\$ 20,100</b>	<b>\$ 45,600</b>	<b>\$ 51,800</b>	<b>\$ 52,100</b>	<b>\$ 52,000</b>	<b>\$ 52,200</b>
<b>Passenger kilometres travelled</b>						
Public transport	210,100	506,100	591,700	596,500	574,400	579,300
Car (driver only)	1,870,800	2,072,900	2,032,600	2,030,300	1,959,600	1,957,400
<b>Passenger hours</b>						
Public transport	17,500	36,700	40,400	40,400	39,000	39,100
Car	49,400	62,300	59,500	59,400	54,300	54,200
<b>Total passenger hours</b>	<b>66,900</b>	<b>99,000</b>	<b>99,900</b>	<b>99,800</b>	<b>93,300</b>	<b>93,300</b>
<b>Change in passenger hours</b>						
PT passenger hours - cont users			-1,100	-1,200	-800	-800
PT passenger hours - new users			6,400	6,600	16,500	16,600
PT passenger hours - lost users			-1,600	-1,600	-13,400	-13,400
Car passenger hours - cont users			-1,500	-1,500	-3,000	-3,000
Car passenger hours - new users			1,700	1,800	18,400	18,300
Car passenger hours - lost user			-3,000	-3,100	-23,400	-23,400



Table 9: Change in Demand Metrics for the whole of the ACT transport system (2031 versus 2011)

Land Use	BAU			Higher Density	
Mode	BAU	BRT	LRT	BRT	LRT
<b>Passenger trips</b>					
Public transport	127.0%	157.8%	158.9%	158.5%	159.5%
Car	21.7%	19.7%	19.6%	19.3%	19.2%
Total passenger trips	28.7%	28.8%	28.8%	28.5%	28.5%
<b>Average journey time (mins)</b>					
Public transport	-7.7%	-10.6%	-10.9%	-13.9%	-14.1%
Car	3.6%	0.7%	0.5%	-7.9%	-8.1%
PT Mode Share (percentage point change)	5.0%	6.6%	6.7%	6.7%	6.7%
PT Fare Revenue	127.0%	157.8%	158.9%	158.5%	159.5%
<b>Passenger kilometres travelled</b>					
Public transport	140.9%	181.6%	183.9%	173.4%	175.8%
Car (driver only)	10.8%	8.6%	8.5%	4.7%	4.6%
<b>Passenger hours</b>					
Public transport	109.5%	130.6%	130.7%	122.5%	123.0%
Car	26.1%	20.5%	20.3%	9.9%	9.6%
Total passenger hours	47.9%	49.3%	49.2%	39.4%	39.3%

### Economic Appraisal

The economic evaluation was undertaken on an incremental basis which compared the Project options against a without project case using a discounted cash flow technique on the basis of a real discount rate of 7% and undertaken in accordance with ATC and Infrastructure Australia investment appraisal guidelines.

All values are expressed in 2011 dollars. The benefits of the project were assessed over a 30 year evaluation period commencing after construction.

The following economic benefits were assessed as part of the economic appraisal:

- Change in generalised journey times
- Unperceived vehicle operating cost savings
- Avoided environmental externality
- Avoided accident costs
- Avoided road damage
- Incremental fare revenue
- Incremental parking revenue

The following economic costs were assessed as part of the economic appraisal:

- Construction costs
- Asset maintenance costs
- Incremental public transport operating costs



Table 10 outlines the headline economic results for the economic evaluation.

**Table 10: Economic Results for Project Options**

Economic Indicator	BRT with BAU Land Scenario	LRT with BAU Land Scenario	BRT with Higher Density Land Scenario	LRT with Higher Density Land Scenario
Benefit cost ratio	1.98	1.02	4.78	2.34
Net present value (\$m)	\$243.3	\$10.8	\$939.1	\$701.1
NPVI	\$0.68	\$0.01	\$2.62	\$0.87
Internal rate of return	14.6%	7.2%	26.7%	15.7%

The pre-feasibility economic evaluation results shows that the all core Project options have the potential to generate positive economic returns under the business as usual and higher density land use settings. This median outcome supports the notion that rapid transit investment within the Project Corridor has real potential to deliver net economic benefits.

Of the transport options, BRT is projected to deliver higher economic returns.

On the other hand, the economic returns that can be delivered through LRT investment alone are likely to be economically marginal and the net economic outcome for LRT under even minor adverse circumstances is likely to result in negative economic returns.

Also, it should be noted that there is a high underlying level of sensitivity associated the evaluation of the incremental parking revenue stream. Should this stream only materialise in part, economic outcomes may differ from those presented above. Further assessment during the Feasibility and Forward Design stage is necessary to affirm these estimates.

These observations underline the need to consider supporting land use settings in combination with transport improvements. Should these occur collectively, projected economic outcomes are likely to be significantly enhanced.



## 6 Next Steps

### 6.1 Establishment of the Gungahlin to City Project Office

As a clear indication of the ACT Government's commitment to progressing the Project to the Feasibility and Forward Design stage, the ACT Government established the Gungahlin to City Project Office in its 2012-13 Budget. The Project Office recognises the link between transit and the redevelopment of the corridor. The Project Office will coordinate current and future projects of various directorates within the corridor, including transit corridor feasibility and design, redevelopment of public housing and corridor planning studies to explore development scenarios to support higher densities and the like.

### 6.2 Feasibility and Forward Design Works

Should the Project proceed into the Feasibility and Forward Design Stage, further feasibility, design and planning work will need to be commissioned by the ACT Government to assess the Project's feasibility in detail. Full government funding for the next stage of the Project's development is considered appropriate.

**Table 11: Proposed Feasibility and Forward Design Works**

Development	Possible Investigations
<b>Option development</b>	<p>More detailed project staging analysis to assess the appropriate timing of the investment to ensure that enhanced public transport capacity when it is warranted by the growth in demand</p> <p>Further definition of the transport modes to be used Frequent Network is required to ensure that options and treatments applied along the Project Corridor will align with treatments and investments applied across the remainder of the Frequent Network</p>
<b>Detailed design</b>	<p>Product definition including vehicle options and LRT/BRT infrastructure and operational specifications</p> <p>Detailed design of the Project Corridor, Dickson Station and the Gungahlin Terminus</p>
<b>Cost estimation</b>	<p>Refinement of the capital cost estimates, which should be based on a detailed design and include an appropriate project contingency as a result of a probability based project risk assessment process</p>
<b>Public transport operations</b>	<p>Rationalisation of the assumed bus network to ensure the appropriate level of bus service is provided, to maximise the level of integration of rapid transit within the current network and to ensure that operating costs and the level of operating subsidy for public transport services are optimised</p>
<b>Land use</b>	<p>Refined land use analysis to ensure that the population and employment distributional and growth impacts are assessed in detail, reflect a sustainable level of growth in terms of demand and supply, and are reflected in the demand assessment and economic benefits quantification</p> <p>Refined land value capture analysis to ensure all of the potential revenue sources are captured to contribute to the funding of the project</p>
<b>Demand modelling</b>	<p>Detailed strategic modelling of the preferred option to ensure the service characteristics of the proposed options (BRT or LRT or a combination of the two) are appropriately reflected. This may involve the commissioning of stated preference studies to better assess the willingness to pay for (or alternatively the willingness to use) BRT and LRT services</p> <p>Model validation and calibration using updated demand data including 2011 Journey to Work data</p>
<b>Environmental Assessment</b>	<p>Confirm whether an Environmental Impact Statement will need to be prepared for the Project</p>
<b>Planning approvals</b>	<p>Confirm what planning approvals will be required to progress the Project</p>



Development	Possible Investigations
<b>Governance</b>	Consider what governance arrangements will be required to facilitate the integrated development of the Project Corridor, with a specific emphasis on the integration of land use and transport outcomes
<b>Procurement</b>	<p>Development of an appropriate procurement strategy to fully scope the optimum approach to the future development of the project</p> <p>Further investigation is required to identify components of the Project that are most amenable for private sector involvement and assess the financial attractiveness of private sector involvement using a Public Sector Comparator approach to assess value for money.</p>

### 6.3 Funding Requirements

The Feasibility and Forward Design Stage is projected to cost an additional \$30 million over 2013–14 and 2014/15. A 50:50 split in funding for the Feasibility and Forward Design Stage is proposed between the ACT and Commonwealth Government. A 50:50 split in funding for the Feasibility and Forward Design Stage is sought from the Commonwealth Government on the basis that the Project is:

- *Consistent with National Building 2 objectives:* The Project directly addresses 3 of Nation Building II objectives: Connecting People, Safety and Innovation
- *Consistent with the objectives of projects funded under the Commonwealth Government's Liveable Cities Program:* The Project aims at exploring opportunities for cooperation between the ACT Government and the private sector to directly address issues including climate change, affordable housing, traffic congestion and a growing, ageing population
- *Corridor of national significance:* Northbourne Avenue, which forms a large part of the Project Corridor, has been identified within the National Capital Plan as a corridor of national significance. Proposed investments as part of the Project are aimed at reinforcing the nationally significant ceremonial role of the Avenue. A number of design elements are likely to be required that are over and above the requirements for typical rapid transit projects in order to meet the requirements of the National Capital Plan.
- *Opportunity to develop an integrated land use-transport governance structure:* A number of parties including the Productivity Commission, Infrastructure Australia and COAG have outlined the need for improved governance in relation to the development of Australia's cities. The ACT Government's commitment to the establishment of the Gungahlin to City Project Office, aimed at coordinating transport, redevelopment of public housing and land use planning, provides a potential special-purpose vehicle to promote and realise potential transport and land use outcomes outlined within this submission.

Funding arrangements for the Project for 2012–13 were finalised as part of the 2012–13 ACT Budget. This funding will be allocated to community consultation and further feasibility analysis.

It is intended that matching ACT Government funding will be sought as part of the next Budget cycle (2013–14). Should the ACT Government receive a Commonwealth Government contribution, these funds are proposed to be used to accelerate the Feasibility and Forward Design Stage, with a focus on:

- Developing an integrated land use-transport governance framework
- Consider the development of a special-purpose vehicle to assist in the realisation of the Project's benefits including overseeing governance arrangements in relation to developments within the Corridor
- Investigating opportunities for private sector financing
- Investigating pricing mechanisms to optimise the level of upfront and recurrent government funding including land value capture opportunities

