

4 Strategic need

This chapter discusses the strategic need for the CBD Metro project. It presents the NSW Government's strategic policy and planning framework with respect to land use, transport and the environment, the key trends and drivers relevant to the strategic policy context, the demands and constraints on existing transport networks, and the role of a metro network in meeting Sydney's strategic transport needs.

The Director-General's requirements

Strategic Justification - describe the strategic need, justification and objectives for the project (including performance indicators and patronage scenarios), and consistency with NSW Government directives and the aims and objectives of relevant State policies and publications, such as the State Plan (2006), City of Cities: A Plan for Sydney's Future (2005), the Inner West Subregion – Draft Subregional Strategy (2008), and the Sydney City Subregion – Draft Subregional Strategy (2008).

4.1 Strategic policy and planning framework

4.1.1 Metropolitan Strategy

Sydney is a significant global city. Its population is expected to grow to six million in the next 25 years (Department of Planning 2008), with resulting pressure on transport infrastructure. Decisions that are made now will decisively shape Sydney's future, and will contribute not only to its liveability in the coming decades, but also to its economic status as a global city.

City of Cities: A Plan for Sydney's Future (Department of Planning 2005) is the overarching planning framework for Sydney, setting the parameters for residential and economic development in centres and corridors. Also known as the *Metropolitan Strategy*, it divides the metropolitan area into a number of subregions served by five regional cities comprising Sydney, North Sydney, Parramatta, Liverpool and Penrith.

This is the first planning strategy for Sydney that has adopted a subregional structure and reflects the expected future pattern of growth across a number of centres and enterprise corridors with the aim of improving equality of access to employment, services and community and recreation facilities.

The vision for Sydney in 2031, as articulated in the *Metropolitan Strategy*, is for:

- A series of stronger cities within the metropolitan area providing jobs and services closer to where people live.
- Improved opportunities for the growth and expansion of employment, housing, retailing and services within major centres.
- A robust 'global economic corridor' providing a concentration of economic and employment activity in centres along the corridor from Port Botany and Sydney Airport through to the Sydney CBD, North Sydney and Macquarie Park.



- More jobs in centres such as Parramatta and Penrith, and in Western Sydney around the junction of the M4 and M7 Motorways.
- The urban footprint of the city to be contained to preserve valuable agricultural lands in the Sydney Basin.
- More equitable access to housing, employment, services and open space while preserving the character of existing neighbourhoods.
- An expanded transport network to improve connectivity and access between centres and enterprise corridors.

The *Metropolitan Strategy* plans that by 2031, 70 per cent of Sydney's growth will be in the existing urban footprint. It also plans for the dispersed aggregation of employment across the strategic centres. The *Metropolitan Strategy* is supported by subregional strategies for 10 subregions. The (draft) subregional strategies act as a broad framework for the long-term development of the area, guiding government investment and linking local and state planning matters.

Each subregional strategy includes population and employment targets developed in consultation with local government, other state agencies and industry and community stakeholders.

The highest increase in total dwellings in the existing urban area is being planned for the Sydney City subregion – an increase of 72 per cent compared with 2004 (NSW Government 2008a). Significant increases are also planned for the Inner West and West Central subregions with a 32 per cent and 42 per cent increase in dwellings to 2031 (NSW Government 2007a; 2008b).

With regard to employment, Sydney City, together with Inner North and West Central, are planned to continue to contain the highest job share, with up to 19 per cent of the jobs in Sydney City, 12 per cent in Inner North, and 14 per cent in West Central (NSW Government 2007a; 2008a; 2008b).

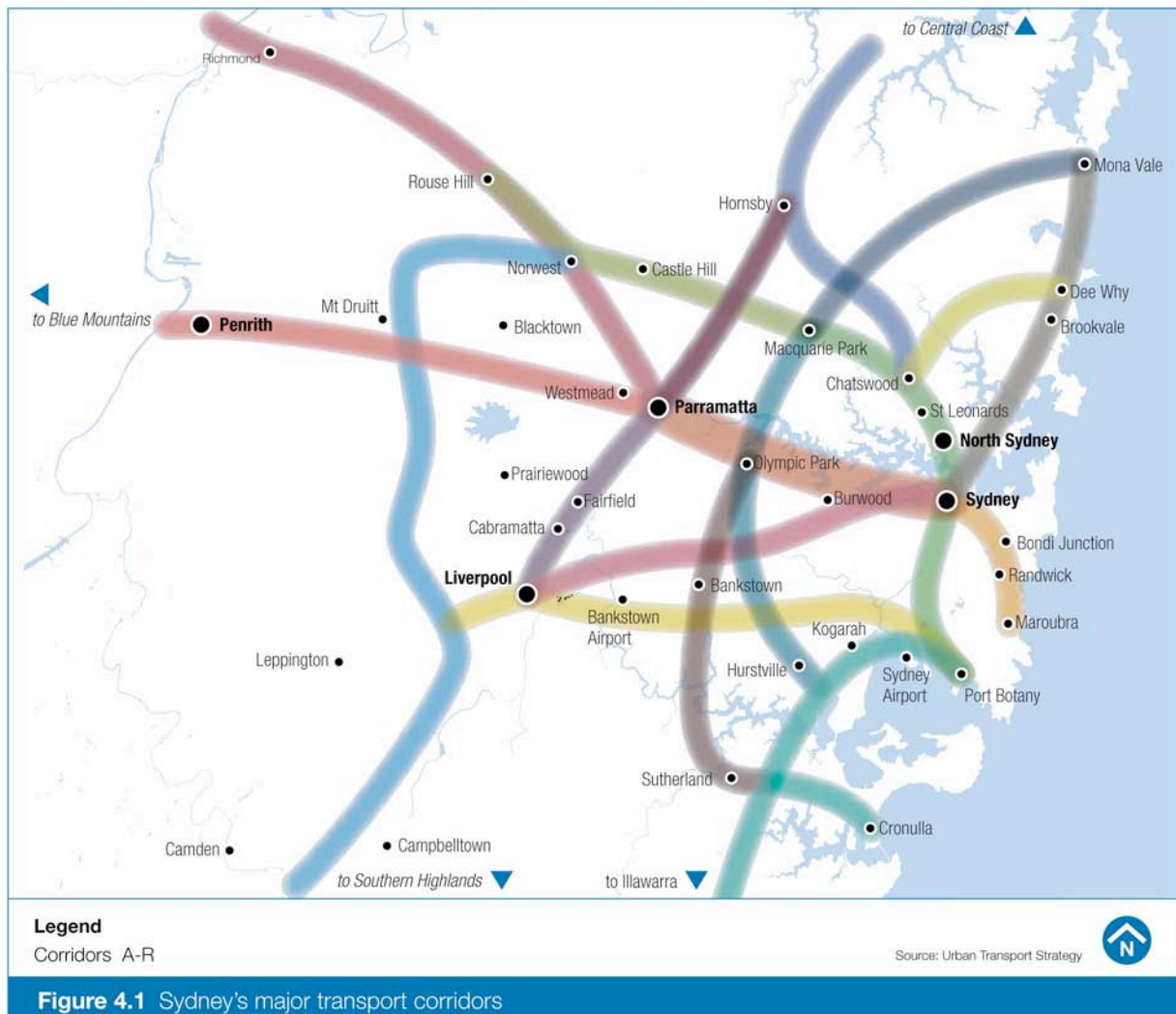
4.1.2 Strategic transport framework

The continued growth of Sydney presents economic opportunity along with sustainability and amenity challenges. A dispersed model of urban development tends to require more expansive levels of transport investment across all modes. The NSW Government's strategic response is to encourage a significant proportion of this growth into corridors supported by new, high quality transport.

Consistent with the *Metropolitan Strategy*, the NSW Government's *State Plan* (NSW Government 2006b) sets out the following strategic transport related priorities and targets:

- Increase the share of trips made by public transport to and from the Sydney CBD during peak hours (to 75 per cent by 2016, compared with 72 per cent in 2003).
- Increase the proportion of total journeys to work by public transport in the Sydney metropolitan region (to 25 per cent by 2016 compared with 21 per cent in 2003).
- Improve service quality and customer satisfaction.
- Increase densities in centres and concentrating activities near public transport, together with an improved transport system, to contribute to 'jobs closer to home' (increase proportion of people living within 30 minutes by public transport from a strategic centre).
- Maintain and invest in infrastructure.

The NSW Government's 2006 *Urban Transport Statement* (NSW Government 2006a) 'profiled' the main travel and transport corridors through which Sydney rail, car, bus and other travel occurs on a daily basis – 18 corridors in total, carrying at least two thirds of Sydney's travel movements every day, as shown in Figure 4.1.



The 18 identified corridors incorporate four major corridors linking into Sydney CBD, including two corridors that are already the busiest transport corridors in Sydney:

- The western corridor between Parramatta and Central Sydney, accounting for 9.3 million passenger kilometres of daily travel.
- The north-western corridor linking Macquarie Park to the CBD and Sydney Airport/Port Botany, accounting for 8.3 million passenger kilometres of daily travel.
- The south-eastern corridor towards Maroubra/Malabar, accounting for 2.3 million passenger kilometres of daily travel.
- The north-eastern corridor towards the northern beaches area, accounting for 2.7 million passenger kilometres of daily travel.

The *Urban Transport Statement* acknowledges that addressing the transport demands of Sydney is complex and requires a combination of infrastructure and non-infrastructure solutions across all



modes. Specifically, the *Urban Transport Statement* included investigation of a metro system as part of the overall approach.

On 11 June 2009, the Premier announced a significant reform in the delivery of transport services and infrastructure, with the establishment of the new super-agency, NSW Transport and Infrastructure, taking control of all transport and roads coordination, policy and planning functions.

The immediate focus of the new department is to develop a single direction for transport services and, together with the Department of Planning, to develop a single transport blueprint for NSW that integrates urban growth and transport delivery. A key component of the transport blueprint is the NSW Government commitment to developing a metro network for Sydney to realise the objectives of the *Metropolitan Strategy*.

4.1.3 Subregional strategic framework

Inner West Subregion – Draft Inner West Subregional Strategy (2008)

The Inner West subregion is located between Sydney City and Parramatta and covers the local government areas (LGAs) of Ashfield, Burwood, Canada Bay, Leichhardt and Strathfield. The subregion is strongly influenced by its proximity to Sydney City and is the main corridor for east-west movements of both people and goods across the metropolitan region.

In July 2008, the NSW Government exhibited the (draft) *Inner West Subregional Strategy*. The Strategy's objective is to guide land use planning until 2031. Key directions in the Strategy include:

- Support and differentiate the role of strategic centres.
- Protect employment lands.
- Promote Parramatta Road as an enterprise corridor.
- Improve housing choice and create liveable and sustainable communities.
- Manage traffic growth and local travel demand.
- Protect and promote recreational pursuits and environmental assets.

With respect to managing traffic growth, the draft Strategy explicitly recognises the North West Metro (which, at the time, incorporated the CBD Metro) and the West Metro as important to increasing public transport capacity and providing fast and frequent connections to the city and north-west. The CBD Metro would be critical as an enabler for these future metro lines.

Sydney City Subregion – Draft Sydney City Subregional Strategy (2008)

The Sydney City subregion comprises the City of Sydney. In July 2008, the NSW Government exhibited the (draft) *Sydney City Subregional Strategy*. It provides key directions to guide land use planning through to 2031. These include:

- Reinforce global competitiveness and strengthen links to the regional economy.
- Plan for sustainable development of major urban renewal projects.
- Ensure adequate capacity for new office and hotel developments.
- Plan for housing choice.
- Develop an improved and increasingly integrated transport system that meets the subregion's multiple transport needs.

- Improve the quality of the built and natural environment and aim to decrease the subregion's ecological footprint.
- Enhance the subregion's prominence as a diverse global cultural centre.

Key strategic transport directions in the draft Strategy relevant to the CBD Metro include:

- To support public transport access to the Sydney CBD by increasing capacity.
- To continue to improve the efficiency and convenience of transport operations within the city centre.
- To support the CBD's interchange role through measures such as improved interchange facilities.

The draft Strategy explicitly identifies the need for additional rail capacity from the city centre to the Inner West. It identifies the city section of the North West Metro (essentially the CBD Metro as now defined) as allowing easy and convenient transfers from the existing CityRail network. It also recognises the need for a station at Pyrmont to allow for transfers to the existing light rail.

4.1.4 Local government strategic planning framework

Sustainable Sydney 2030 – City of Sydney's strategic planning framework

Sustainable Sydney 2030 is an initiative of the City of Sydney, reflecting its current strategic thinking in making Sydney more sustainable, vibrant and successful. *Sustainable Sydney 2030* aims to complement the NSW Government's *Metropolitan Strategy* and *State Plan*, and has a vision for the development of the City to 2030 and beyond, into a 'green, global, connected City'.

The document acknowledges that radial rail and bus networks perform a major role moving commuters to work in the City Centre, but have failed to keep pace with growth.

Key parts of the vision include:

- Sydney will be easy to get around with a local network for walking and cycling, and transit routes connecting the City's villages, City Centre and the rest of Inner Sydney. The City will be easy to get to with an upgraded regional transit network that builds on the existing network.
- The City will help contain the Sydney Region's urban footprint by planning for new housing opportunities integrated with vital transport, facilities, infrastructure and open space.
- Sydney will remain Australia's most significant global city and international gateway, with premium spaces for business activities and high quality jobs in the City Centre.

Sustainable Sydney 2030 presents a multi-pronged strategy to reduce car use in the city and move more people by public transport. A key aim is to make it easier to move around the city centre and eliminate bus congestion. The plan includes actions such as the identification of a network of local bus services, and the steady reduction of parking spaces in the city to deter people from driving into the CBD to reduce congestion. The plan also aims to provide more sustainable, higher volume and frequent public transport services, supporting upgrades to the existing regional rail system and new metro rail lines, and a light rail loop.

Leichhardt 2020 + Strategic Plan

Leichhardt Municipal Council has developed a strategic plan that establishes a direction and framework to guide the community, councillors and staff to build a 'sustainable and liveable community'. The Plan includes a number of goals and objectives relating to integrated transport and improving accessibility as a strategic shift to reduce dependency on private cars and to reduce impacts on local communities and the environment.



While many of the key service areas would be assisted by the CBD Metro, of particular relevance is that of accessibility. The goal for the key service area of accessibility identified in the Plan is for 'easy access for people, services and facilities that promote the amenity and sustainability of the community'. The Plan includes specific objectives of direct relevance to the project, namely:

- Develop transport systems that integrate local access needs with regional transport.
- Develop strategies to target specific issues and modes of transport to provide access through a bike plan, shuttle buses, meter parking, traffic control, road safety, street sharing, car share, public transport, etc.

The Plan's measures of success include easy and equitable access for all and a strong, connected community. Further discussion on the accessibility benefits to the local community is provided in Chapter 14.

4.1.5 Strategic environmental framework

Action for air

Action for Air is the NSW Government's 25-year air quality management plan for the Greater Metropolitan Region, covering Sydney, the Lower Hunter and the Illawarra (DEC 2006a). It contains a range of measures to reduce emissions from transport, industrial, commercial and domestic sources in order to control the two main air pollutants of concern: photochemical smog (ozone at ground level) and fine particle pollution.

The key transport related objectives of *Action for Air* include:

- Integration of air quality goals and urban transport planning.
- Provision of more and better transport choices.

Long-term improvements and enhancements of the public transport system are identified as key requirements for protecting and improving air quality across the Sydney Basin and achieving these transport related objectives.

NSW Greenhouse Plan

The *NSW Greenhouse Plan* directs NSW Government action to reduce greenhouse emissions from its own activities and to work with other stakeholders to reduce emissions from theirs (NSW Greenhouse Office 2005). The stated objectives of the plan are to:

- Increase awareness among those expected to be most affected by the impacts of climate change.
- Begin to develop adaptation strategies for those climate change impacts that we cannot avoid.
- Put NSW on track to meet its targets of limiting 2025 emissions to 2000 levels and reducing emissions by 60 per cent by 2060.

The plan specifically recognises the need to curb growth in transport emissions while maximising transport choice. The CBD Metro is consistent with this approach.

Note: The NSW Government is developing a Climate Action Plan, which will replace the *NSW Greenhouse Plan*.

4.2 Population and employment drivers

4.2.1 Population

In 2006, the Sydney region had a population of around 4.3 million people. This is forecast to reach six million by 2036 (Department of Planning 2008), which represents a 40 per cent increase over the 30-year period.

About 69 per cent of the projected population growth will be due to natural increase, with net migration comprising the remaining 31 per cent. To cater for this growth, the Sydney region will need to provide for:

- 640,000 new homes.
- 500,000 more jobs.
- 7,500 hectares of industrial land.
- 6.8 million square metres of additional commercial floor space.
- 3.7 million square metres of additional retail space.

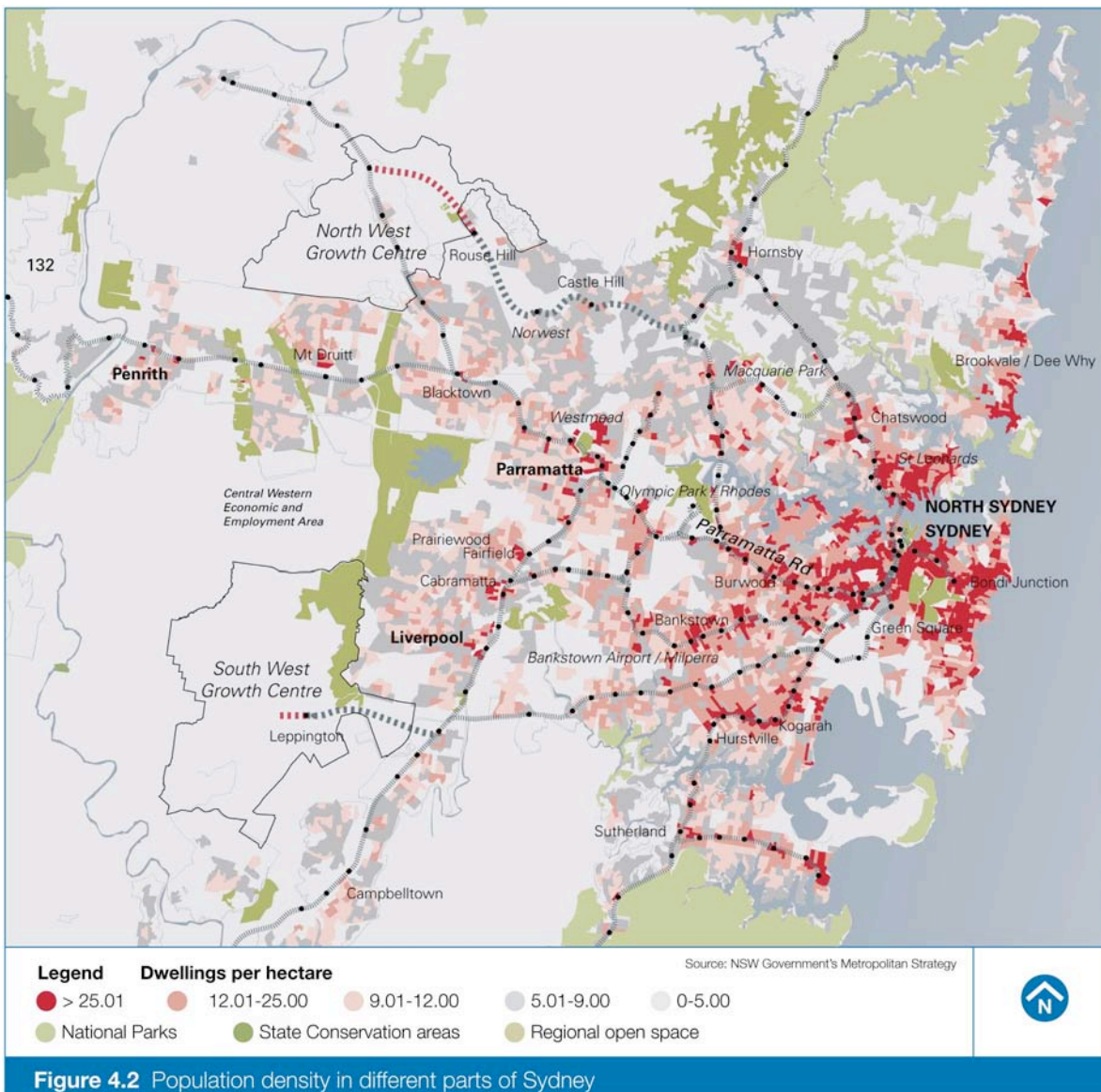
Notwithstanding the policy directions expressed in the *Metropolitan Strategy*, current market forces have meant that 90 per cent of the population growth of Sydney has occurred in the existing urban footprint. This market shift appears to reflect the changing demographic and lifestyles of the existing population (smaller households); and the type of housing sought by recent immigrants (typically higher and medium density) and rising energy costs associated with long-distance commuting.

A substantial proportion of this growth is forecast in the eastern half of Sydney, which already has a significantly higher density than the western areas (see Figure 4.2). The urban areas of Sydney City, the Inner West and West Central subregion are planned to have one of the highest rates of growth in dwellings. Sydney City is expected to experience a 72 per cent growth up to 2031, West Central over 40 per cent and the Inner West over 30 per cent.

Concentrating growth in existing centres would have substantial environmental benefits. In particular, it would reduce travel times, pollution, congestion and car dependence, and support the use of public transport.

To support the growth in existing urban areas, the *Metropolitan Strategy* plans for a housing mix near jobs, transport and services. The Strategy also emphasises the need for an adequate supply of land and sites for residential (re-)development around high quality transport nodes.





4.2.2 Employment

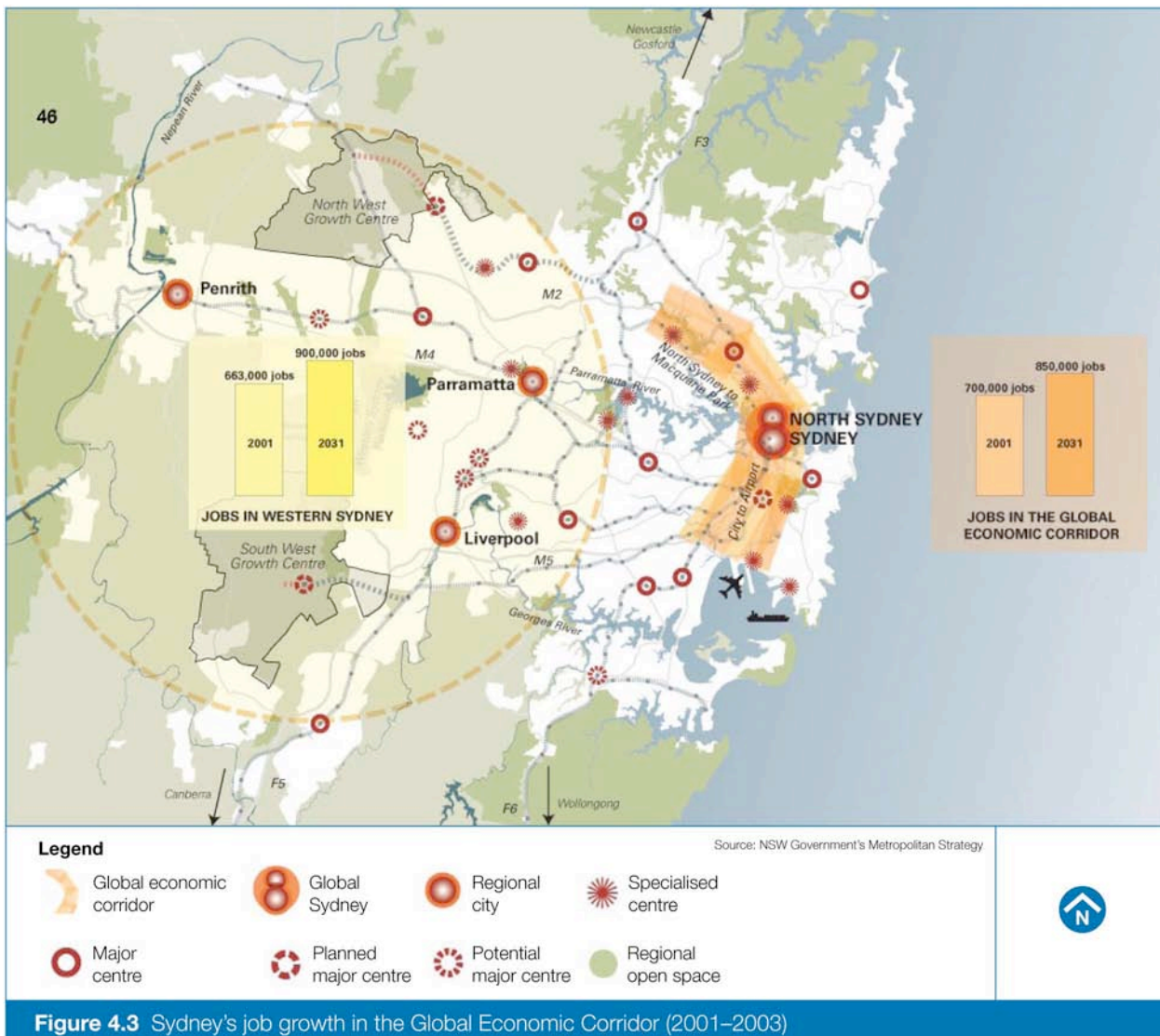
The number of jobs in Sydney is linked to the population of the area and to its ability to attract business and compete in the global economy. Sydney's employment growth is likely to continue the pattern of recent years, reflecting the evolution of the economy toward higher value business activities, many with a global orientation. There would be a greater demand for retail goods, personal and domestic services, and health and leisure services.

The NSW Government is planning for up to 500,000 more jobs by 2031, in addition to the two million forecast in the *Metropolitan Strategy* in 2006. One-third of all future jobs is expected to be concentrated in existing centres, with good public transport access, and a further 10 per cent in specialised economic centres, such as Macquarie Park and Norwest Business Park.

It is forecast that key employment areas are forecast to grow as follows:

- The Sydney CBD – together with North Sydney – provides more than 300,000 jobs, representing around 13 per cent of the total number of jobs in the Sydney Metropolitan area. It is the most concentrated employment centre in Sydney. The CBD will remain a core generator of economic growth and jobs, with a forecast of 470,000 jobs by 2031 – an increase of around 16 per cent over the 30-year period. Of this, the 22-hectare development at Barangaroo would create an effective major extension of the CBD, with 500,000 square metres of commercial floor space on the site providing for up to 22,000 jobs and residential floor space for up to 1,500 residents.
- A high proportion of jobs are concentrated in office, business and technology parks, particularly in the Global Economic Corridor. This corridor encompasses Macquarie Park, Chatswood, St Leonards, North Sydney in the north; the Sydney CBD and Pyrmont-Ultimo, and major research, health and education facilities, residential and industrial areas; and Sydney Airport and Port Botany to the south. Around 700,000 of Sydney's jobs are located in the Global Economic Corridor, providing over 32 per cent of Sydney's total jobs. The government is planning for around 150,000 new jobs in this corridor up to 2031 (see Figure 4.3 below).
- North Sydney and Macquarie Park form key components of the Global Economic Corridor. North Sydney is the second largest office market in Sydney and the sixth largest office market in Australia. It provides over 49,000 jobs, and is set to reach an employment capacity target of 60,000 jobs by 2031 (Inner North Subregional Strategy 2007). Macquarie Park is the northern anchor of the Global Economic Corridor and comprises Macquarie University, Macquarie University Research Park, Macquarie Centre, Macquarie Park and Riverside Corporate Park. Macquarie Park currently provides around 32,000 jobs with an employment capacity growth target of over 23,000 by 2031.
- Jobs are forecast to grow strongly in the west central part of the city. This area contains growing employment areas such as the western end of the Parramatta to City Corridor, Sydney Olympic Park, Rhodes, Parramatta, the Westmead specialised health and biotech centre, the major centre at Bankstown and Bankstown Airport. This broader area will become a major subregional employment hub. In particular, the Metropolitan Strategy aims to strengthen Parramatta as Sydney's second CBD. Parramatta has over 40,000 jobs, with a growth target of 18,000 extra jobs by 2031 as set by the (draft) *West Central Subregional Strategy* (2007a).





4.3 Travel and transport network demands

4.3.1 Travel demand characteristics

Sydney metropolitan area

Sydney's transport network has close to 16 million trips on an average week day. These trips are made up of passenger, commercial and freight trips, with a complex variety of trip purposes expanding well beyond journeys to work.

On average, each person now makes about 3.8 trips a day. On weekends, there are 13.4 million trips, at a rate of about 3.3 trips per person. The number of trips made for non-work related activities has increased significantly over the last two decades. Today, there is a large diversity in travel purposes, with only 25-35 per cent work-related, consisting of about 15-20 per cent commuting from home to work and 10-15 per cent due to work-related business. The majority of trips are now for activities such as shopping, recreation and personal business.

The growth in demand for travel in Sydney is already outstripping population growth. The number of daily trips has grown across Sydney in the past two decades, with a 30 per cent increase in average weekday trips (Department of Planning 2005). While Sydney's population grew by 21 per cent over the past two decades, the number of car trips grew by 41 per cent and the number of cars by 58 per cent.

The higher-than-anticipated travel demand growth in inner areas is increasing the strain on existing transport capacity, both road and rail-based, particularly in the eastern half of Sydney. Pressure on the Global Economic Corridor (spanning from Macquarie Park, North Sydney, Sydney CBD to Sydney Airport and Port Botany) and along the western corridor from Parramatta to the CBD is particularly acute. The emerging economic corridor from Westmead, through Parramatta, Sydney Olympic Park–Rhodes and Macquarie Park will become more important over the next 25 years as a series of major commercial projects are completed, further increasing the demand for travel on the existing transport network.

Overall demand for public transport has increased over the past two years, with train trips experiencing the biggest increase (2.7 per cent) among all modes between 2005 and 2006 (Transport Data Centre 2008a), placing additional pressures on the public transport network. In the short term, pressures on the public transport network are being addressed by the NSW Government through strategies such as the Rail Clearways program, the recent completion of the Epping to Chatswood Rail Line, development of the strategic bus corridor network, implementation of the CBD Bus Strategy, introduction of high-frequency Metrobus routes using high capacity buses, and the rollout of new buses and trains.

Projections by the NSW Government's Transport Data Centre (2008a) indicate the transport network has limited spare capacity, particularly in the medium to longer term. These transport growth projections indicate that the entire transport system requires significant support and enhanced investment to maintain and improve the infrastructure and services required as Sydney continues to grow.

Sydney CBD

The Sydney CBD has more jobs than any other centre in the metropolitan area. During the 1990s, some 60,000 jobs were created in the CBD and it had the highest population growth of any local government area in Sydney. Inner suburbs are also growing strongly, a trend associated with the recent rise in apartment living. International visitors to Australia, almost half of whom arrive in Sydney, doubled during the 1990s. The CBD has three-quarters of all hotel accommodation in the metropolitan area.

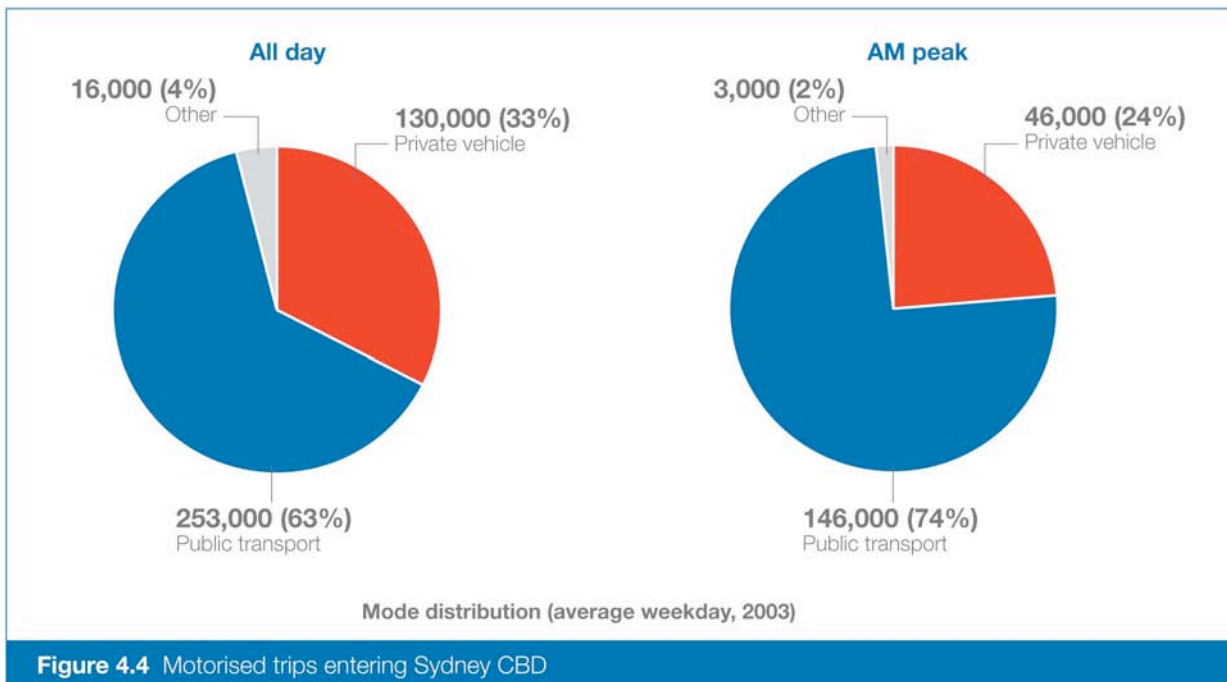
As a result, the number of trips attracted by the city is higher than any other centre in the metropolitan area. As shown in Figure 4.4, on an average weekday (2003), an estimated 399,000 motorised trips enter the Sydney CBD, of which almost 50 per cent enter during the AM peak (Transport Data Centre 2006). In the morning peak, 84 per cent of these trips are for work purposes.

While car-based work trips to the Sydney CBD are below 30 per cent (well below other Australian cities) there is congestion on both road and rail routes approaching the CBD and within the CBD. This congestion affects the quality of existing public transport services and constrains future jobs growth in the CBD.

In 2008, nearly 1,300 State Transit and private buses carried almost 50,000 people into the Sydney CBD during each morning peak (a two-hour period). In addition, over 500 buses carried over 12,000 people out of the CBD in the same period. In the evening peak (three hours), nearly 1,500 buses carried over 55,000 people out of the CBD with almost 900 buses carrying over 12,000 people in the opposite direction (Ministry of Transport/State Transit 2008).

Due to projected population and employment growth, the demand for travel within the CBD is estimated to rise by 32 per cent by 2021, while the demand for travel to and from the CBD is expected to rise by 22 per cent.





4.3.2 Existing transport systems and constraints

High recent growth rates in population and employment in the eastern part of Sydney have placed considerable pressure on Sydney's transport network. These pressures – and transport upgrade requirements – are presented in this section.

Road network

The road network plays an important role in providing access between Sydney's strategic centres. The most heavily used and congested roads are part of the Sydney motorway network, in particular, the M5, Eastern Distributor, Warringah Freeway and M4 Motorway.

Travel speeds have been gradually decreasing over time, with congestion increasing during morning and afternoon peak periods. Congestion levels are expected to increase with growth in travel demand although it will be moderated on parts of the network where road and public transport investment is planned. Two of the most congested corridors are those approaching the CBD from the inner north (Victoria Road) and the inner west (City West Link and Parramatta Road).

The cost of congestion in Australia was estimated at \$9.4 billion (2005), of which Sydney contributes \$3.5 billion. The cost of congestion in Sydney is forecast to rise to \$7.8 billion by 2020 (Bureau of Transport and Regional Economics 2007). Increasing travel times caused by road congestion will:

- Reduce opportunities for people to travel between their homes and work, education, health and leisure facilities.
- Reduce social amenity and the liveability of Sydney.
- Impose costs on individuals and businesses, which in turn affect both the state and national economy and reduces Sydney's global competitiveness.
- Increase greenhouse gas emissions.

Rail

Sydney has a major commuter rail network, operated by RailCorp under the 'CityRail' name that forms the backbone of Sydney's growing public transport commuter task. The majority of passenger rail travel is focused on the Sydney CBD, with about 60 per cent of morning rail trips across the metropolitan area proceeding to or through the Sydney CBD.

The rail network accommodates a complex set of services, including long-distance intercity passenger services, outer suburban express passenger services, slower all-stops passenger services, and services for transporting freight. Both passenger and freight services share a limited number of tracks and consequently have to operate within constraints. Freight trains, for example, are not permitted to operate in the Sydney area during suburban peak periods due to curfew restrictions designed to limit delays to passenger services. Outside these times, however, the ability of many suburban corridors to maximise passenger services is restricted as a result of the need to share operations with freight services.

The NSW Government has undertaken major investment in recent years to support and sustain rail. The Rail Clearways program, the Epping to Chatswood Rail Line and acquisition of new rolling stock are all multi-billion dollar projects that have improved the reliability, comfort and capacity of the heavy rail system.

These investments – together with planned investment in the next decade – address medium-term capacity requirements and establish the foundation for more substantial longer term reforms. However, this investment is not expected to be sufficient to accommodate longer term population and employment growth and associated travel demand.

Currently, the most congested part of the rail network is the corridor operating from Parramatta to the Sydney CBD (the Main West rail corridor). The Main West rail corridor caters for long-distance commuters from Sydney's outer west, Blue Mountains and Central Coast (from Strathfield), as well as passengers joining the line from suburbs in the inner west, south-west and north-west. The infrastructure between Strathfield and Redfern (comprising six tracks) is the most heavily used part of the network, as trains are required to service both local (stopping) and regional (express) movements. It is operating during the AM peak period, at a load factor between Parramatta and the CBD of over 130 per cent for the significant majority of its length (where a loading of 100 per cent means all passengers have a seat).

The new Epping to Chatswood Rail Line was opened in February 2009. It connects Epping and Chatswood via twin underground rail tunnels with three new stations at Macquarie University, Macquarie Park and North Ryde. The new rail line provides direct rail access for the first time to the expanding business and educational hub between Epping and Chatswood. When fully integrated into the CityRail network in the second half of 2009, the new link will provide some relief to passenger loads on both the Northern Line and the Main West Line, increasing the long-term capacity of the network by providing an alternative path to Sydney's CBD from the north. It will free up some capacity on the Main West rail corridor, east of Strathfield, enabling an additional 18,000 passengers to travel on the Western Line each day. Since opening, around 10,000 customers have been using the three new stations on the link each weekday, with an additional 2,000 travelling directly between Epping and Chatswood.

It is anticipated that these recent and planned investments will not be sufficient to accommodate longer term travel demand. Even assuming the implementation of the current capital works investment program, including the Clearways program and projects as outlined in the NSW Government's State Infrastructure Strategy, the Main Western rail corridor will experience the highest rail load factors (volume/seat occupancy) in the AM peak period of any rail corridor.

Overcrowding is forecast to increase further, particularly on the section of the network between Blacktown and the Sydney CBD. Other services with passenger loads exceeding seat capacity include the Illawarra Line, Northern Line and South Line.



By 2031, overcrowding on various sections of the rail network will have reached levels which are expected to force a significant percentage of travellers to either change the times of their journeys, switch modes, or not travel, imposing a very significant economic and social cost on the NSW economy and on individual travellers, and leading to increased environmental damage as private vehicle journeys increase.

Bus

Buses are pivotal to Sydney's transport system. In 2008, nearly 1,300 State Transit and private buses carried almost 50,000 people into Sydney CBD during each morning two-hour peak period. In addition, over 500 buses carried over 12,000 people out of the CBD in the same period. In the evening three-hour peak period, nearly 1,500 buses carried over 55,000 people out of the CBD, with almost 900 buses carrying over 12,000 people in the opposite direction (Ministry of Transport/State Transit 2008).

In the immediate future, buses will continue to perform the bulk of the task in the key non-rail CBD corridors such as the M2 from the north-west, Military Road, Victoria Road, Oxford Street, Anzac Parade and Parramatta Road.

Accelerated implementation of strategic corridors and bus priority routes across Sydney, upgrading and expansion of bus fleets, increased use of technology to improve operations and greater integration of the bus and rail networks would improve travel times and reliability. However, buses servicing the CBD corridors are most at risk of declining performance as road congestion increases with population and employment growth.

Significant congestion is likely to occur on parts of the bus network by 2031, assuming current levels of planned investment. Sydney CBD would be a constraint point because of limitations on the capacity of bus access to the CBD and the need for more buses to access CBD interchange points.

More buses in the Sydney CBD will reduce amenity, through noise, exhaust emissions, congestion and the use of road and kerb space for bus stops. Opportunities for expansion are limited without significant investment.

Victoria Road is one of the busiest bus-based corridors in Sydney, and one of the most unreliable in terms of peak travel times due to the high levels of traffic congestion. In 2008, more than 120 buses carried almost 6,000 people into the city in the morning peak two hours on Victoria Road (Ministry of Transport/State Transit 2008). Once these buses reach the city, they contribute significantly to congestion and suffer slow travel times as they traverse the northern part of George Street to reach Circular Quay. The Inner West Busway will provide additional dedicated bus lanes to address congestion in the short to medium term. However, these roads would need significant enhancement to cater for any sustained increase in demand in the long term.

A significant number of buses also use Parramatta Road and the Harbour Bridge to carry people into the city in the morning two-hour peak period. Over 8,000 people travel into the city by bus via Parramatta Road/Broadway, and over 21,000 people come into the city by bus over the Harbour Bridge.

Bus congestion levels on Victoria Road approaching the CBD in the AM peak by 2031 are expected to be amongst the highest of any bus corridor in Sydney.

Ferries

Sydney's passenger ferries provide a small, but critical, service for the travelling public. Most ferry services are run by Sydney Ferries, which operates 3,270 services a week along eight routes on Sydney Harbour and the Parramatta River. These routes feed into a central hub at Circular Quay.

Due to the restricted geographic coverage, travel by ferry accounts for only 0.2 per cent of average weekday trips by residents of the Sydney Statistical Division (SD), and less than one per cent of all

journey to work trips. Three per cent of total trips to the Sydney CBD are by ferry (Transport Data Centre 2009).

Sydney Ferries, which carries around 14 million passengers a year, estimates that the market share of patronage is distributed as follows:

- 91 per cent of passengers pass through Circular Quay wharf.
- 47 per cent of patronage is from the Manly service.
- 43 per cent of patronage is from the Inner Harbour and Eastern Suburbs services.
- 10 per cent of patronage is from the Parramatta River services.

The planned new ferry wharf at Barangaroo, together with a new pedestrian tunnel linking into the CBD Metro, will be a great additional distribution point for travel to and through the CBD.

While ferries will continue to play a unique role in supporting Sydney's transport task, especially in the AM peak for travel from suburbs along the Parramatta River and around the harbour, the scale and customer markets for ferry operations will remain small compared with rail and bus services.

Light rail

Light rail was first introduced in Sydney in 1997, between Central Station and Wentworth Park and was extended in 2000 from Wentworth Park to Lilyfield. The system is owned and marketed by Metro Transport Sydney (MTS), a privately-owned Australian company, and operated under contract for MTS by Veolia Transport Sydney (formerly Connex Group Australia). MTS also own the Sydney Monorail.

The system and its operation are governed by a Project Deed with the Director-General of Transport. This sets out the term of the concession (which reverts to NSW Government ownership in February 2028), service standards, as well as effectively giving the company "first right of refusal" for any proposed extensions to the light rail network. Under the terms of the Deed, the company takes all revenue risk. There is no fare integration with other modes and no government fare subsidy.

The numbers of passengers using the light rail is not formally audited by the government, nor are detailed figures released by MTS. MTS claims patronage as more than 3.5 million trips per year.

Monorail

The Sydney Monorail was opened in 1988, and is owned by Metro Transport Sydney (MTS), operating under contract by Veolia Transport Sydney. MTS claims patronage of over four million trips per year.

The 3.5-kilometre one-way loop links Darling Harbour with the Sydney CBD, with stations at City Centre (Pitt and Market streets), the Galleries Victoria (Pitt and Park streets), World Square (Liverpool Street), Chinatown, Paddy's Markets, Convention, Harbourside, and Darling Park. The loop takes 12 minutes for one circuit, operates with headway of three to five minutes, and has a theoretical capacity of around 5,000 passengers per hour. There is no fare integration with other modes.

Cycling and walking

Sydney residents made over 120,000 bicycle trips on an average weekday and almost 160,000 bike trips on an average weekend day in 2005. Bicycle trips account for about one per cent of trips per day. Although this is a small share of the total transport task, bicycle use has been growing strongly: by 23 per cent on weekdays and 58 per cent on weekends since 2001. The cycling mode share for journey to work to the Sydney CBD increased from 0.5 per cent in 2001 to 0.8 per cent in 2006.

The existing cycle routes are of varying quality and are not well connected or integrated. The network includes mostly on-road facilities in the form of shoulder lanes and shared paths. Cyclists are also



permitted to use bus lanes, however due to potential safety issues, generally only competent and confident cyclists use them.

Public bicycle parking is limited to bicycle stands and smart poles in the study area. No storage cages are provided at CityRail stations in the CBD.

Bicycles are permitted on CityRail services free of charge on the weekend and in off-peak periods on weekdays, and by purchasing a child's ticket during peak times (6-9am and 3.30-7.30pm on weekdays).

Bicycles are permitted on Sydney Ferries but are not allowed to be taken on buses in Sydney.

4.4 Why a metro network for Sydney?

Sydney's complex network of road, rail and bus is already at capacity on key points of the network – points that are also experiencing the highest rates of population and employment growth. To maximise and support growth and sustainability, Sydney requires a comprehensive transport solution.

The new super-agency – NSW Transport and Infrastructure – is developing a single transport blueprint for NSW that integrates urban growth and transport delivery to provide a comprehensive transport solution.

A key component of the transport blueprint is a metro network, with the CBD Metro as its initial stage.

Metro rail has been selected because overseas experience has shown that it has the ability to meet the sustainable mass transit challenges of modern cities.

Metro would be an essential addition to Sydney's transport system and, over time, it is expected to be as significant as, and fully integrated with, the roads, rail and buses that underpin Sydney's communities and economy. A metro system, capable of carrying 29,000–40,000 passengers per hour per direction would add a significant, high quality service to Sydney's constrained transport network.

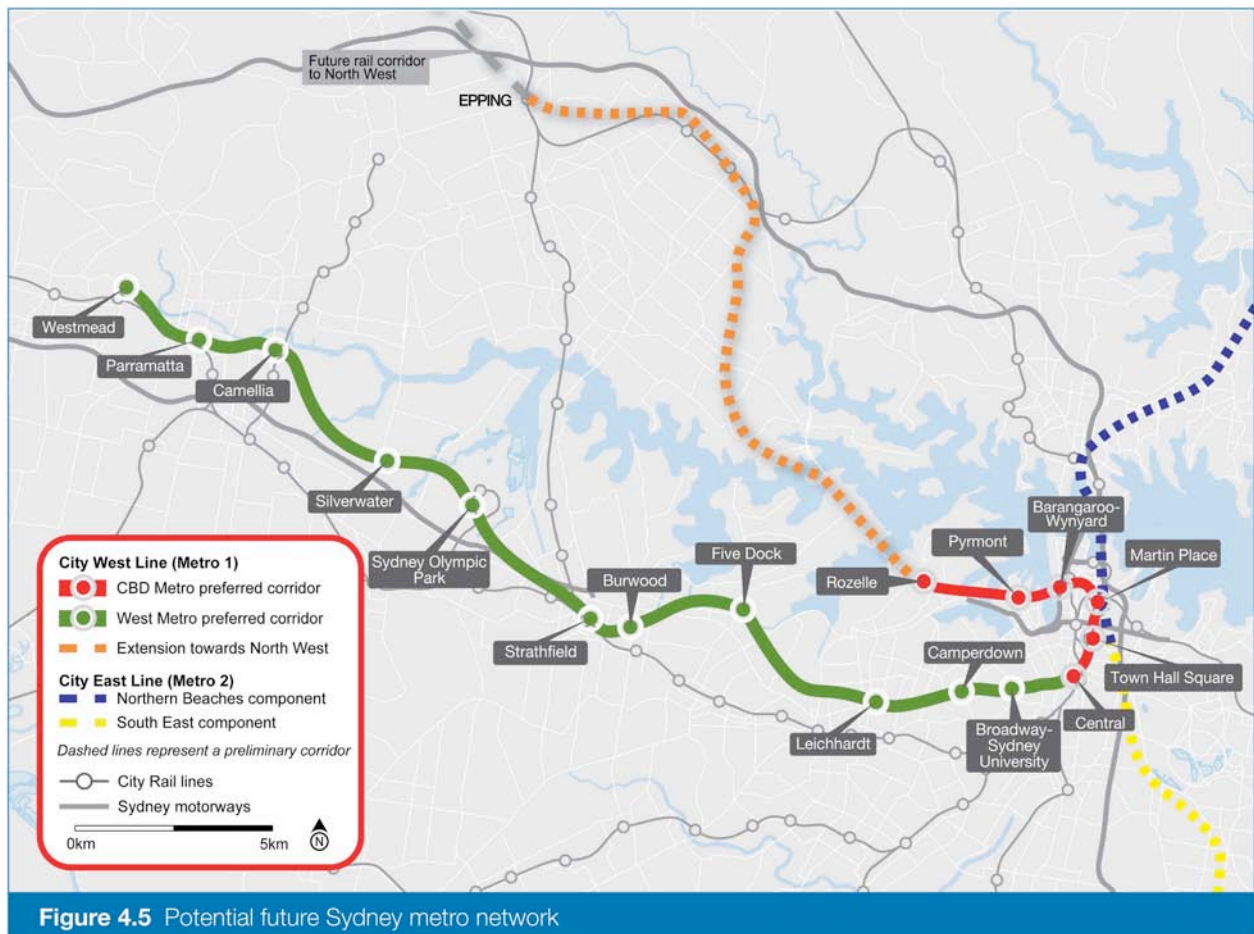
The metro system – the currently proposed CBD Metro and its later extensions– would also help to meet the land use challenges outlined in the *Metropolitan Strategy*, by driving population and employment growth around key transport centres and corridors, promoting urban renewal, reducing road congestion and promoting economic prosperity.

In the short term, the CBD Metro would serve the area between the CBD and Rozelle. In the longer term, a broader metro network is planned, including an extension from Rozelle towards the north-west, following the Victoria Road corridor. The metro network would be targeted to serve major transport corridors that are not currently serviced by mass transit, or do not have the capacity to meet future needs. This is expected to include many of Sydney's most heavily used and congested bus corridors, such as Parramatta Road, Victoria Road, Anzac Parade and Military Road.

As shown in Figure 4.5, two metro lines would form the basis of this broader metro network:

- Metro Line 1 (City West line) – from Westmead to the CBD and then beyond Rozelle to the north-west.
- Metro Line 2 (City East line) – from Malabar via Maroubra, the Prince of Wales Hospital and University of NSW to the city and beyond to the Northern Beaches.

These lines would support future growth in the north-west, and in the longer term, in the south-east and north. In the very long term, this network could be extended to major cross-regional corridors of demand. The future development of the metro system will be guided by a wider *Metro Network Strategy* being developed by Sydney Metro.



The proposed *Metro Network Strategy* links land use and transport planning and delivers on the state's strategic objectives for improved urban environments with reliable transport access. It would provide a fast and frequent rail service linking key population and employment centres, and support major destinations such as Parramatta and Macquarie Park, making them more attractive as employment locations.

Consistent with the *Metropolitan Strategy's* vision for Sydney in 2031, a metro network for Sydney would:

- Support a series of stronger centres within the metropolitan area, providing jobs and services closer to where people live.
- Support the growth and expansion of employment, housing, retailing and services within major centres.
- Support the development of the Global Economic Corridor.
- Support urban intensification to preserve valuable agricultural lands.
- Provide more equitable access to housing, employment, services and open space while preserving the character of existing neighbourhoods.



- Provide an expanded transport network to improve connectivity and access between centres and enterprise corridors.

It would also support the key objectives in *Action for Air* and the *NSW Greenhouse Plan* for protecting and improving air quality across NSW.

The two proposed metro lines are described in the following sections.

4.5 Metro Line 1 (City West line)

Metro Line 1 – from Westmead to the CBD and then beyond Rozelle to the north-west – would be the first line in Sydney’s metro network, providing a fast, reliable service running every few minutes.

Metro Line 1 would support a fundamental shift in the pattern of urban growth, and support the regeneration and renewal of inner and middle-ring suburbs.

As shown in Figure 4.5, Metro Line 1 would comprise:

- The CBD Metro – a rail corridor through Sydney’s CBD, from Central Station to Rozelle.
- The West Metro – from Westmead to Central Station via Parramatta, Sydney Olympic Park and the Inner West.
- The North West Metro – following the Victoria Road corridor from Rozelle to Macquarie Park and Epping.

Metro Line 1 would provide fast and frequent rail services linking key population and employment centres, and support major destinations, such as Sydney CBD, Parramatta, Sydney Olympic Park and Macquarie Park, making them more attractive as employment locations. The Metro Line 1 is also targeted to connect major health and education precincts like Westmead, Sydney University, the University of Technology and Macquarie University.

4.5.1 The CBD Metro

Section 4.6 presents the CBD Metro in more detail.

4.5.2 West Metro

The western component of the Metro Line 1 (the West Metro) would focus on Sydney’s busiest transport corridor between the Sydney CBD and Parramatta. Parramatta and the inner west would continue to grow as employment, retail, entertainment, education, health and residential precincts, with accelerated urban renewal and growth expected to occur.

The West Metro would also free up capacity on the CityRail network, take buses off city streets and facilitate the introduction of new, cross-regional bus services. It would improve travel times significantly across each sector. A trip from Leichhardt to Central, for example, would take just six minutes, instead of the current fastest peak-hour journey of 15 minutes by bus.

Following a jointly-funded feasibility study, the Australian Government has provided \$91 million for pre-construction activities for the West Metro, including a full Environmental Assessment and finalisation of the alignment and station locations in consultation with the community.

4.5.3 North West Metro

An extension to the north-west from Rozelle (the North West Metro) would provide fast travel options for residents in the Victoria Road and Epping Road /M2 corridors. This includes a section of Sydney's second busiest transport corridor – linking Macquarie Park to the CBD and Sydney Airport/Port Botany – which accounts for 8.3 million passenger kilometres of daily travel. The line would further support the Global Economic Corridor, which accounts for over 32 per cent of Sydney's total jobs. Feasibility work on a north-western extension linking into the Macquarie Park area is also being conducted. This builds upon previous work undertaken as part of North West Metro.

4.6 CBD Metro – the first stage

4.6.1 The need for CBD Metro as the first stage

The CBD Metro would be the critical first stage of the broader metro network. Its key strategic benefits would include:

- Relief to the greatest capacity constraint on the entire transport network – the CBD – while providing for future metros to the west and north-west.
- Provision of an alternative means for commuters to move around the CBD, relieving existing crowded rail and bus networks, particularly at key locations such as Central, Wynyard and Town Hall.
- Facilitation of wider timetable and investment choices for the commuter rail network.
- Relief of heavily congested bus services operating into and through the CBD, which currently compete with pedestrians, cyclists, delivery vehicles and cars.
- Support for the planned Barangaroo development and, in the future, the Bays Precinct and Blackwattle Bay area.

While the CBD Metro would provide significant benefits on its own, it would also be of strategic importance as an enabler of the entire metro network, forming the central spine to which all other metros would link or interchange. The NSW Government therefore regards it as the critical first step in the transformation of Sydney's transport system.

4.6.2 Demand forecasts

The CBD Metro is expected to serve a range of different customer markets. It would initially be a stand-alone metro line. Later, as it develops into Metro Line 1, it would extend to Parramatta/Westmead in the west and towards the Macquarie Park area in the north-west. Specific customer markets for the CBD Metro include:

- Central – passengers transferring to and from CityRail services terminating at Sydney Terminal.
- Bus – metro transfers, particularly at Martin Place, Town Hall and Barangaroo-Wynyard.
- Heavy rail – metro transfers, particularly at Barangaroo-Wynyard.
- Barangaroo – as a major employment growth area and with transfers from a future ferry terminal.
- Pyrmont – particularly as an employment destination, but also as an origin and special events station.



- Rozelle – walk up and bus transfers.
- Intra CBD – business and tourism travel.

Demand forecasts have been provided using the Zenith model of Sydney, developed for Sydney Metro by Veitch Lister Consulting. The model reflects the choice of trip frequency, destination, mode and route for travel undertaken by residents and visitors during an average weekday.

The model is calibrated against surveys of travel behaviour in Australian capital cities to reflect the demand for travel by residents and visitors during an average weekday, within Sydney. The model has been validated against the Sydney Household Travel Survey (HTS), Journey-to-Work (JTW) information (Australian Bureau of Statistics 2006), as well as traffic counts provided by the Roads and Traffic Authority (RTA) and passenger and ticket counts provided by RailCorp.

The Zenith model provides a range of demand forecasts, resulting from changes in land use or demography, and from changes in transport infrastructure, services or prices. Factors such as changes to preferences for transport modes, economic development, fare levels and structures, parking policies and road congestion levels would also influence future patronage. The Zenith outputs were compared with available literature and with outputs from the Sydney Strategic Travel Model (STM) from the Transport Data Centre (TDC) to ensure an appropriate basis for use in metro planning and evaluation.

Preliminary analysis of the Metro Line 1 from Parramatta/Westmead, via Sydney CBD along the Victoria Road corridor towards the north-west indicates that the line would attract between 55,000 and 74,000 boardings in the AM peak hour (2031). Between 17,000 and 23,000 of these boardings are estimated to occur on the CBD Metro component of the Metro Line 1. It is estimated that a two to three minute frequency with five-car train sets with a high seating arrangement would be able to meet the peak line load demand in 2031. Should the demand be higher than anticipated, arrangements can be made to increase the capacity by increasing service frequency, reconfiguring seats to increase the train capacity, accepting higher loadings levels, or changing to six-car train sets.

These forecasts recognise the demand that can be achieved when the CBD Metro is coupled with other strategies on the CityRail network which utilises the under-utilised terminating capacities at Sydney Terminal and the fast and efficient transfers that would be provided at the CBD Metro station at Central. Table 4.1 provides an overview of the AM peak line load and boarding estimates¹ for 2031 for the CBD Metro as a stand-alone project, as well as for the CBD Metro with the West Metro extension, and the Metro Line 1 (CBD Metro extended to the west and north-west).

It should be noted that these estimates are based on total population and employment growth forecasts that are consistent with the planned total growth as indicated in the *Metropolitan Strategy* – that is, 5.3 million people and 2.5 million jobs by 2031. A higher growth assumption and/or a redistribution of growth around corridors/nodes with good public transport services would increase the estimated range of metro boardings by five to 10 per cent.

¹Boardings are the number of people getting on the metro at all stations.

Table 4.1 CBD Metro patronage forecasts – AM peak hour boardings (2031)

	CBD Metro ¹	CBD + West Metro	CBD + West + North West Metro
Boardings			
	21,000–28,000	45,000–60,000	55,000–74,000
		CBD component 19,000–25,000	CBD component 17,000–23,000

¹ In evaluating future demand for the CBD Metro as a stand-alone project, a future operational strategy for the CityRail network has been assumed, with some increase services into the under-utilised Sydney terminals.
Source: Sydney Metro, Zenith demand estimates (LU3A), July 2009

As a stand-alone project, the CBD Metro would have 50–65 million annual passengers. The Metro Line 1 could attract between 130 to over 200 million passengers by 2031.

As shown in Table 4.1, a stand-alone CBD Metro is expected to attract between 21,000 and 28,000 passengers in the 2031 morning peak hour. The full Metro Line 1 project is expected to attract nearly three times this patronage. Within Metro Line 1, the CBD Metro component would attract 17,000 to 23,000 passengers. This value is less than as a stand-alone project as some passengers that would join CBD Metro only at Central or Rozelle would use other metro stations under the Metro Line 1 scenario.

Figure 4.6 and Figure 4.7 illustrate the forecast (2031) number of passengers who would board and alight at each CBD Metro station, under both the stand-alone and Metro Line 1 project scenarios.

As shown in these figures, for the stand-alone CBD Metro, about a third of all boardings in the morning peak would occur at Central – mostly passengers transferring from CityRail services. At the other end, moderately high boardings would occur at Rozelle, with passengers transferring from buses.

Central CBD stations (Town Hall Square, Martin Place and Barangaroo-Wynyard) and Pymont would account for the vast majority of boardings in the morning peak.

As part of Metro Line 1, boarding at Central Station would decrease as metro passengers could board services west of Central. Similarly, at the northern end, boardings at Rozelle Station would be less. The CBD stations and Pymont Station would still account for the vast majority of metro alightings – with Martin Place predicted to be the busiest station with up to 12,000 passengers alighting in the peak hour. In comparison, CityRail reports 2007 peak hourly station exits at Town hall and Wynyard of about 22,000 passengers each.

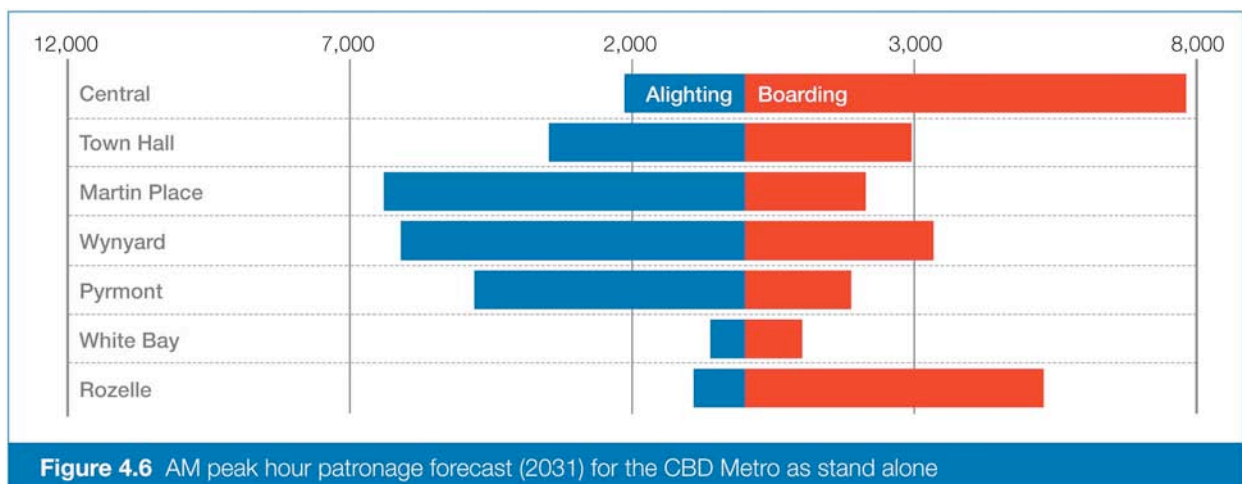


Figure 4.6 AM peak hour patronage forecast (2031) for the CBD Metro as stand alone



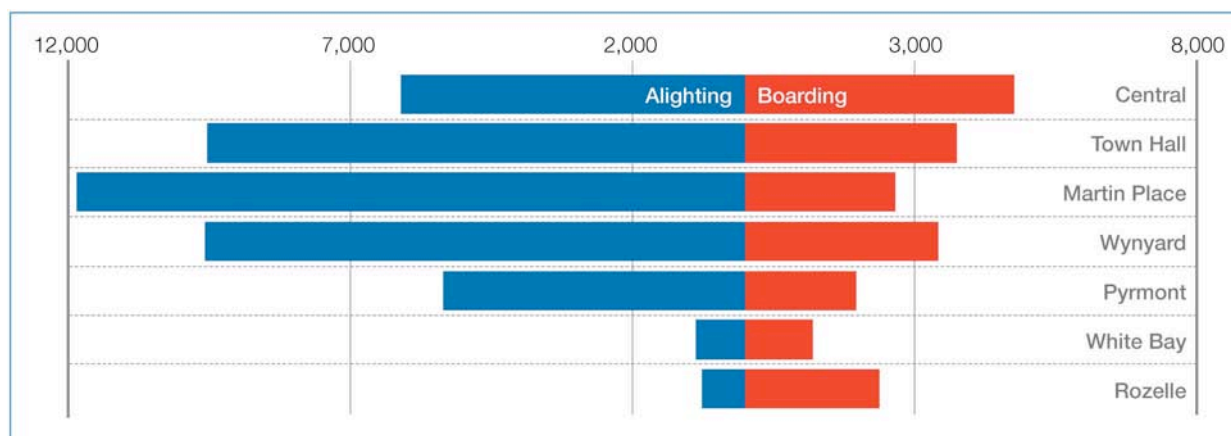


Figure 4.7 AM peak hour patronage forecast (2031) for CBD Metro stations as part of Metro Line 1

To estimate patronage figures for the first full year of operation and subsequent years, a ramp-up profile based on the Australian Transport Council (ATC) guidelines has been used. The ATC guidelines state that “the change in circumstance for most initiatives in Australia is likely to be modest, and changes in demand largely achieved within months of commencement of small initiatives and two to three years of larger initiatives” (Australian Transport Council 2006).

It is expected that demand for the CBD Metro would be high upon opening, given the substantial travel time savings it would bring to public transport users. However, it is acknowledged that people take time to adjust their travel patterns to the new services, so a three-to-four-year ramp-up period has been assumed. Table 4.2 shows the estimated patronage ramp-up for the CBD Metro.

Table 4.2 CBD Metro AM peak hour ramp-up profile

Year of operation	Ramp-up profile	AM peak hour boardings
First full year	80%	12,500 – 16,500
Second full year	85%	13,500 – 15,000
Third full year	95%	15,500 – 20,500
Fourth full year	100%	16,500 – 22,000

These ramp-up assumptions were compared with a number of ramp-up profiles of various new rail schemes around the world (including Joondalup Perth Urban Rail, Sydney Airport Line, Hong Kong Airport Line, Croydon (London) Tramlink, and Marseilles (France) Mass Transit). Overall, the project assumptions are consistent with this research.

4.7 CBD Metro objectives

A set of specific objectives has been developed for the project. These are outlined in Table 4.3 with key performance indicators (that is, measures of success).

Table 4.3 CBD Metro objectives and key indicators

No.	Objective	Key indicator(s)
1	<p>Provide a metro network enabler that:</p> <ul style="list-style-type: none"> Accommodates the planned extension of the Metro Line 1 to the west and north-west. Facilitates the planned expansion of the broader metro network via the Metro Line 2 to the south-east and north-east. 	<ul style="list-style-type: none"> Government's commitment to the broader network. Provision in the design to allow for: <ul style="list-style-type: none"> Future extensions from Central and Rozelle, without significantly affecting CBD Metro operation. High frequency services and increased passenger flows at key locations, without affecting reliability or running times. Capability to expand Rozelle stabling and maintenance depot. Long-term planning to protect feasible metro corridors.
2	<p>Deliver additional mass transit capacity where it is needed most – in and around the Sydney CBD – by:</p> <ul style="list-style-type: none"> Attracting passengers away from existing crowded rail networks, including at key stations such as Central, Wynyard and Town Hall. Providing alternative means for those using heavily congested bus services operating into and through the CBD. 	<ul style="list-style-type: none"> Additional public transport capacity provided to and through Sydney CBD. Reduction in vehicle kilometres travelled. Reduction in travel time to and through Sydney CBD. Improvements to pedestrian safety and reduced pedestrian walk times. Improvements to cyclist accessibility and integration.
3	<p>Make best use of the CityRail network and create a wider range of timetable and investment choices for the existing commuter rail network.</p>	<ul style="list-style-type: none"> Creation of opportunities to reconfigure the heavy rail network, provided by the CBD Metro and a wider metro network, resulting in increased capacity on heavy rail corridors into the CBD.
4	<p>Soundly link land use planning with transport planning to deliver on the state's strategic objectives for improved urban environments with reliable transport.</p>	<ul style="list-style-type: none"> Provision of a metro station at Barangaroo that supports the planned development by being well linked into it and providing the gateway for it. Provision of a station at White Bay to support planned development at the Bays Precinct.
5	<p>Contribute to the environmental and social sustainability and strong economic global position of the city.</p>	<ul style="list-style-type: none"> Opportunity for sustainable land use and lifestyle options along the CBD Metro corridor. Improved safety. Improved environmental outcomes. Application of best practice sustainability principles in the metro design. Project provides positive economic agglomeration benefits to the Sydney CBD. Delivery model provides value for money.

These objectives and key performance indicators have been carried through the entire assessment process. In justifying the project, Chapter 22 examines the performance of the CBD Metro project against these key indicators



