Integrated Transport Strategy
City of Stirling
Integrated Transport Strateg

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FOREWORD

The way that people access activities and places can significantly impact social, economic and environmental outcomes in the local community. The City of Stirling has developed an Integrated Transport Strategy, which aims to provide for a diverse range of travel demands throughout the community efficiently and effectively. The strategy profiles key transport issues for the City to address and identifies existing strengths to build sustainable transport practice on. It is intended that the Strategy will foster joint capacity between various levels of government, the private sector and the wider City of Stirling community in developing a sustainable and efficient transport network which delivers for all. The Strategy will, foremost, build on the City’s position a ‘City of Choice’.

Councillor David Boothman
Mayor
City of Stirling
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EXECUTIVE SUMMARY

The City of Stirling’s Integrated Transport Strategy provides for a strategic approach to transport in the City with a view to enhancing social, economic and environmental outcomes. The Strategy integrates land use and transport planning, pedestrian amenity, cyclist amenity, public transport, parking and demand management and reflects the need to consider different aspects of transport planning including physical infrastructure, policy and governance and travel behaviour in an integrated manner at both the local and regional level. The Strategy develops the long-term vision that ‘it is intended by 2025, the City of Stirling will form part of an integrated transport network that provides all community members with a choice of accessible, resource efficient methods to connect their home, work and leisure activities’. The Strategy will also feed into the City’s Local Planning Strategy, which the City is required to prepare to guide its Local Planning Scheme and also contributes to meeting goals contained within the City’s 2009 - 2012 Strategic Plan.

The Strategy contains broad objectives and outcomes for transport planning and identifies issues, opportunities and trends in transport. Objectives and outcomes are to be developed more fully within Implementation Plans which are to be prepared and reviewed on a three yearly basis and which will build on the key opportunities profiled throughout the Strategy.

The Strategy Objectives include: -

- To encourage more sustainable transport of people and goods;
- To enable efficient movement of people and goods;
- To improve accessibility for pedestrians, cyclists and public transport users to a variety of destinations;
- To equitably provide for transport needs throughout the community;
- To encourage public transport modes over private transport modes.

Key opportunities raised within the Strategy and areas for further investigation include

- The introduction of a number of Light-Rail Transit (LRT) routes along major activity corridors including Scarborough Beach Road, Beaufort Street and Wanneroo Road and through Stirling City Centre which could be implemented without significant State or Federal government;
- The introduction of a new Heavy Rail Circle Route along Reid Highway to form part of a metropolitan-wide rail route to provide time competitive cross-metropolitan travel;
- The introduction of high frequency and direct bus services to connect existing centres;
- Continuing to work with State Government agencies to progress activity centre and activity corridor studies;
- Building stronger private-public relationships to fund improvements;
- Adopt a Footpath policy and Strategic Pedestrian Cyclist Network;
- Examine opportunities for mixed use development around key connection points.

Key issues to be addressed in the Strategy include high levels of car dependence; local and global environmental, economic and social costs including climate change and peak oil and lacking/inconsistent State and Federal Government support for the City’s transport initiatives.

Of significance, the City is one stakeholder in planning for transport in the City of Stirling Local Government Area. While the City can facilitate and plan for sustainable and efficient transport and in cases provide infrastructural support, it takes collaboration between the City and other Government bodies to provide for a better transport system and for the community to respond favourably to sustainable transport modes to develop a fully integrated approach to transport planning.
PART 1

Strategy
OVERVIEW

The City of Stirling’s Integrated Strategy will provide a strategic approach to transport planning in the City with a view to enhancing social, economic and environmental outcomes in the City.

KEY VISION STATEMENT:
It is intended that by 2031, the City of Stirling will form part of an integrated transport network that provides all community members with a choice of accessible, resource efficient transport methods to connect their home, work and leisure activities.

The Strategy integrates Land Use and Transport Integration, Pedestrian Amenity, Cyclist Amenity, Public Transport, Freight, Parking and Demand Management reflecting the need to consider different aspects of transport planning including physical infrastructure, policy and governance and travel behaviour in an integrated manner with regard to both local and regional contexts.

STRATEGY OBJECTIVES

The key objectives of the City’s Integrated Transport Strategy are:-

Objective 1
To encourage more sustainable transport of people and goods.

Objective 2
To enable efficient movement of people and goods.

Objective 3
To improve accessibility for pedestrians, cyclists and public transport users to a variety of destinations.

Objective 4
To equitably provide for transport needs throughout the community.

Objective 5
To encourage public transport modes over private transport modes.

THE ROLE OF THE STRATEGY

The Integrated Transport Strategy:-

- Identifies issues, opportunities and trends;
- Develops the long term vision, objectives and outcomes and;
- Identifies key opportunities for implementation

Implementation Plans will be prepared on a three yearly basis with collaboration with relevant Business Units. More detail pertaining to staging of actions and establishing funding streams will be developed as part of these Plans.

CITY OF STIRLING STRATEGIC PLAN

The Integrated Transport Strategy builds on the objectives of the City’s 2004-2008 Strategic Plan (soon to be replaced with the 2009-2012 Plan). The Strategy contributes to the City’s mission to ‘create quality lifestyle and sustainable development’.

CITY OF STIRLING PLANNING FRAMEWORK

Strategies such as the Integrated Transport Strategy help to shape the City’s Local Planning Strategy (in turn the Local Planning Strategy guides strategy development). Local Planning Strategies guide Local Planning Schemes, as required by the Western Australian Planning Commission. The development of a Local Planning Strategy is a main initiative of the 2009-2012 Strategic Plan.
BACKGROUND

Key Concepts & Principles that underpin the Strategy

Managing traffic & motor vehicles better

Land use and Transport Integration

Trip Generators to be responsible for travel demand

Mode Integration

Securing funding/ resourcing for infrastructure

Travel Demand Management

Community Input

Government Coordination

Key Transport Issues

Gaps in the public transport network & cyclist network west to east

Gaps in provision of local centres and poor centre design which limits walking

Too few activity attractors around transit

Increasing public transport capacity issues

Little State/Federal Government support for City’s transport initiatives

Poor access to train stations
- Lack of feeder buses
- Parking supply
- Poor pedestrian networks

Parking management issues

High levels of car dependence

Local & Global environmental, social & economic costs - including climate change, and peak oil

Trip Generators to be responsible for travel demand

Mode Integration

Securing funding/ resourcing for infrastructure

The Integrated Transport Strategy has been developed with various forms of community input including:-
- Local Area Planning
- Community Survey/Forums findings
- Stirling City Centre Community Engagement
- Engineering Design Studies into Pedestrian Networks
- TravelSmart Programme Findings
- 2006 Census Information

To deliver a sustainable and efficient integrated transport system there is also need for the City to work with State Government service providers, planning bodies and the development industry to fund and plan for transport.
**BACKGROUND**

New Light Rail Services and bus services are being proposed/implemented as part of strategic planning projects.

Building stronger private-public relationships to fund improvements/build capacity.

Community Support exists for focusing on more sustainable transport modes.

Introduction of Intelligent Transport Systems.

Reviewing the Development Assessment process to account for transport issues better and to encourage sustainable transport.

Examining paid parking, carpark rationalisation and introduce more cash in lieu for parking (use funds for other modes).

Activity Centre and Local Centre regeneration programmes to create pedestrian orientated environments with land use mix.

Examining paid parking, carpark rationalisation and introduce more cash in lieu for parking (use funds for other modes).

Increased densities around Northern Suburbs Stations.

Examine opportunities for mixed use development around key connection points.

Adoption of Footpath Policy and Strategic Pedestrian/Cyclist Network.

**Key Opportunities**

for the City (potential areas of action which will be worked through in Implementation Plans)

- Introduction of Business Travel Plans (looking at how the workforce travels).
- Working with the Public Transport Authority to improve services and stations so as to provide for new services.
- Working with Main Roads Western Australia to introduce more cycle friendly streets.
- Activity Centre and Local Centre regeneration programmes to create pedestrian orientated environments with land use mix.

**Priorities, Staging and Transition**

The Strategy Vision and Objectives are to be achieved in the long-term. Action needs to be taken now towards realising objectives - but consideration must be given to current practice and realities. It is expected that an incremental/transitional approach to change be taken.

In dealing with these issues:-
1. First steps generally include relationships/partnership establishment (where relevant) and setting up funding streams;
2. Infrastructure can then typically be provided;
3. Changes to travel behaviour can then generally be expected;
4. Strategies to control travel behaviour i.e. deterrents for driving could then be imposed.

The Strategy profiles outcomes and these will be used to frame Implementation Plans which will be completed on a three yearly basis with further input from key stakeholders. Implementation Plans will provide detail as to how movement toward the long-term focused outcomes can be achieved. Such actions could directly or indirectly relate to meeting or contributing towards objectives, that is, the ‘outcomes’ are not to be taken to preclude any particular action until further investigation occurs. Key opportunities for the short to medium term are also outlined throughout the strategy which could provide some ‘starting points’ for further action.
OUTCOMES

The following statements reflect how the City’s transport system should be characterised over the long-term (by 2031).

LAND USE AND TRANSPORT INTEGRATION
- The City consists of a network of centres and employment areas which comprise a diverse range of high activity uses;
- High frequency public transport services connect the City’s centres and employment nodes;
- The built form and infrastructure in the City’s activity centres provide high levels of pedestrian and cyclist amenity and safety;
- High activity land uses are located around railway/light rail stations and bus stations;
- Local centres are highly accessible by pedestrians and cyclists, meet a variety of local needs and are community focal points;
- Land use configurations create connective pedestrian networks;
- Service provision is considered in conjunction with transport planning.

PEDESTRIAN AMENITY
- Travel by foot within the City is safe, direct and convenient;
- All streets within the City (excluding short cul-de-sacs) have a footpath on at least one side;
- Private and public activity generators are well integrated into the pedestrian network;
- The urban form at centres and key destinations maximizes pedestrian movement with high levels of provision for weather protection;
- Pedestrian amenity is improved through the increased provision of shade, seating, street scaping and public art and the creation of places people want to be;
- The pedestrian network is well signed and easily navigable;
- Pedestrian movement is given higher priority to other modes of transport;
- The pedestrian network is fully compliant with the Disability Discrimination Act.

CYCLING AMENITY
- The City has bicycle friendly network allowing cyclists to easily travel anywhere within the City;
- Travel by bicycle within the City is safe, direct and convenient with minimal impediment from traffic or pedestrians;
- The movement of cyclists is given priority over the movement of vehicles;
- Safe, secure and appropriate end of trip facilities are provided in major developments, centres and transport modes;
- Cyclist routes are clearly signed and easy to navigate.
- The City actively works to support and encourage community members in cycling for transport, through the provision of education, skills-training and associated services.
PUBLIC TRANSPORT

- The City supports and lobbies for the introduction of the Heavy Rail Circle Route and additional railcars to meet demand increases;
- The City supports and lobbies for the development of light-rail routes and infrastructure along the City’s activity corridors and through Stirling City Centre;
- Major transit routes throughout the City provide high-frequency and reliable services;
- High frequency bus services (15 minutes during day, more than 15 minutes during peak) and/or light-rail services interconnect local areas, local centres and mass transit services*;
- The location of bus stops/light-rail stops allow for ease of trip transfer;
- The provision of bus shelters is prioritised along high frequency routes and maximised along other important routes;
- High levels of activity around transit stations and stops make public transport use a safe and attractive option;
- The design of bus shelters and transit stations are functional; make public transport use safe and add to local sense of place;
- Increased pedestrian, cyclist accessibility to stations and increased bus services feeding into stations, reduces dependence on Park N Ride facilities (particularly at-grade parking facilities);
- Bus movement along major routes is prioritised over private motor vehicle transport;
- High quality destination-orientated information is provided at the City’s bus stops and interchanges
- All forms of public transport (train, bus and light-rail) form an integrated network (both physically and operationally).

FREIGHT

- The City supports and lobbies for future introduction of rail-based freight;
- The freight network allows for the efficient movement of goods throughout the City, connecting with industrial areas and integrating with the metropolitan freight network;
- Freight movement is prioritised along designated freight corridors as to discourage its presence on local roads;
- The need to transport goods is minimised through centralisation of freight producing activity in industrial areas and integrated land use and transport planning;
- Pedestrian and cyclist amenity is maintained where freight must enter local areas, activity centres and/or other areas where there are likely to be pedestrians and cyclists.
- Industrial activity is maintained and continued to be confined to industrial areas.
PARKING

• Demand for parking across the City is reduced through increased use of alternative transport modes;
• Carpark designs reduce the amount of ground-level space required and the impact upon the urban form;
• Reciprocal parking opportunities are maximised;
• Pedestrian links within parking areas are provided and are safe, legible and connect with surrounding activity uses;
• Formalised on-street parking is encouraged in appropriate locations as a traffic calming tool;
• Timed and paid parking is used strategically to manage parking demand and occupancy, and revenue is utilised to support sustainable travel modes;
• Demand generators are responsible for managing and reducing the parking demand they create and the promotion and support of alternative transport modes;
• Real-time information is used in high-demand parking areas, to control and minimise vehicular movements;
• Centralized and controlled parking facilities incorporated into regional and high demand activity centres

DEMAND MANAGEMENT

• The TravelSmart programme is expanded to assist community members with travel behaviour change;
• Demand generators actively promote the use of sustainable travel modes and fund the provision of services and infrastructure to enable this.
• New major developments develop and implement Sustainable Travel Plans as a condition of development approval.
• Telecommuting, video conferencing, home-offices and other technologies are encouraged to reduce the need for travel to conduct business;
• Economic Development initiatives encourage the employment of locally-living staff members by local businesses
• Transport movement is managed through Intelligent Transport Systems;
• Car sharing and car pooling schemes operate in major activity centres and in/among major employment bases.
• Energy efficient vehicles are encouraged through incentive programs, parking infrastructure and lobbying the Government to support these vehicle types.
INTEGRATED TRANSPORT STRATEGY MAP

Key proposed networks of activity centres, transport links and interchanges

Proposals will depend on input from State Government Agencies and other agencies and alternative strategies may need to be pursued.
### Strategy Map – Key

Coloured icons/lines on the Strategy Map represent aspects to be implemented or improved as part of the City’s Integrated Transport Network.

#### Activity Centres – Town Centres / Regional Centres - Existing
- Will consist of a wide range of high activity generators such as retail, commercial, offices, high density residential and community facilities;  
- Centres will link with public transport facilities and services;  
- The built form and infrastructure in activity centres will provide high levels of access for non-motorised forms of transport including pedestrians and cyclists.

#### Activity Centres - Industrial - Existing
- The key land uses in these areas are industrial;  
- Major activity generators (such as commercial activities) are limited to some parts of the industrial area, where access to sustainable modes of transport is maximised;  
- Some parts of industrial areas will consist of more freight generating activity; but there will still be provision for access for other modes of transport to and from such areas.  
- Freight networks connect with these areas.

#### Activity corridors (High priority Public Transport Improvement/ Light Rail Routes)
- Will provide linkage between activity centres;  
- Activity will orientate towards the main thoroughfare to form a chain of activity or central axis;  
- Light rail services will provide frequent services along the corridor with stops provided at various activity nodes along it (bus services may fulfil this function in the short-term).

#### Major Public Transport Routes

**Rail**
- Provides rapid transit between major centres and stations;  
- Local bus services link with transit stations to serve local communities;  
- Pedestrian and cyclist amenity is maintained around the stations to maximise access by non-motorised modes of transport.

**Buses**
- Services connect major activity centres/zones as well as local communities;  
- Services run frequently (15 min during day, more than 15 min during peak) and link with more localised complimentary services;  
- Pedestrian and cyclist amenity is maintained around stops to maximise access by non-motorised modes of transport  
- Where major services cross each other (at key connection points), provision is made for simple and efficient transfers and high quality mixed use is encouraged.
PART 2

Background Report
INTRODUCTION

Overview

The City of Stirling Integrated Transport Strategy has been developed to provide broad outcomes to increase the efficiency and sustainability of the transport network over the City over the next 20 to 25 years.

The strategy profiles key issues and opportunities relating to the many aspects of transport planning so as to form an integrated approach to planning for transport. Key outcomes are then profiled which generally aim to address the issues, capitalize on opportunities and of which account for the broader planning framework. It is intended that Implementation Plans will then be developed which will pay greater attention to developing the actions required to reach the outcomes over time.

The strategy ultimately brings together social, economic and environmental aspects and draws on the integration of transport planning, land use planning and behavioural strategies to provide for an efficient, equitable and sustainable transport system; which builds on the City’s position as a City of Choice.
Background

Considerations in Transport Planning
There are many competing demands on a transport system - Transport systems need to enable people to carry out a variety of functions and to get to various destinations; it must provide for efficient movement of goods; account for varying mobility constraints and commuting behaviours whilst accounting for potential environmental externalities.

Movement throughout the City is largely characterised by travel by private motor vehicles. Since the 1950’s, (the time period over which most of the City was developed) the focus in planning for transport has largely been to build roads and provide for private car use, which has subsequently increased car dependency. This generally leads to a reinforcing 'spiral' of car use and need to build more roads (Victoria Transport Policy Institute, 2007a). Automobile dependence has largely created an urban environment of which is highly inappropriate for pedestrians, cyclists and public transport users, whilst also creating much congestion on roads and inefficient movement patterns.

The current transport system also presents issues relating to the natural environment. On the one hand, excessive car use can contribute to global environmental problems such as climate change. Meanwhile, localized environmental problems can develop as a result of present travel behaviour, such as a reduction in air quality and poorer health outcomes in the community. Australian communities, however, are well placed to make changes to reduce the impact of such outcomes given their high per-capita use of resources (Department of Environment and Heritage, 2001).

These reasons alone suggest the need to change travel behaviour in the community. There is also growing awareness of the depletion of oil resources, which also points to the need for change. Whilst alternative energy sources are developed, there is little to ensure that these will adequately replace current demands on fuel, at least in the short-term period. In the meantime, oil prices have been particularly volatile over recent years.

Meanwhile, various attitudes exist towards transport use throughout the City. For businesses, an efficient transport system is an important element of production. For individuals, an efficient transport system allows individuals to meet the various travel demands in their life, whether it be partaking in recreational activities or commuting to work. At the same time, there is appreciation throughout the community for the need for a safe network and a healthy environment.

All the while, there exist different attitudes towards travel which can also impact transport patterns. If the transport system does not account for commuter behaviour, attitudes and lifestyles, then it is unlikely to be effective. Informing, educating and promoting sustainable transport options forms an important aspect of transport planning and are core functions of the City's TravelSmart programme.

Ultimately, the Integrated Transport Strategy acknowledges the role of the motor vehicle in the community, but identifies how to increase accessibility through other transport modes and encourages their use. This is to ensure that a broad spectrum of community members can partake in a large range of activities whilst mitigating the environmental, social and financial costs of past travel patterns.
As to address these issues, key concepts to consider include:-

- Integrating land use and transport planning to reduce travel demand/increase efficiency of travel;
- Integrating different transport modes to encourage use of alternative travel modes;
- Trip generators to be accountable for their trip generation and the promotion of sustainable travel behaviour and demand management strategies;
- The need to identify appropriate funding and resourcing mechanisms to provide sustainable transport infrastructure;
- The need for a coordinated response among all levels of government as well as various stakeholders and agencies, to develop efficient and sustainable transport networks. (This provides opportunities for partnership building and the development of shared capacity whilst building on regional initiatives).
- The need for community input so as to provide valuable insight into transport issues and opportunities; to ensure that the transport system is responsive to travel needs in the community and to foster joint capacity to deliver better transport solutions.

The City of Stirling has developed the **Local Area Planning Process** as a tool for facilitating community participation in all areas of planning including transport planning. Local Area Planning is a contemporary approach to planning that concentrates on planning for a defined area, rather than plans based on individual issues or plans which cover broad areas. Given the localized issues which effect transport planning, there are many opportunities for transport planning and local area planning to work in coordination to generate local solutions to transport issues. However, there is still a need to take a balanced approach to transport planning which responds to various local needs as well as regional planning and what is going to be of benefit to the City at large. The outcomes of Local Area Planning in the field of transport planning will be used to determine implementation plan outcomes in addition to this Strategy. Thus so far, the results of Local Area Planning across Dianella, Carine/Hamersley, Balcatta and Stirling are such that there is increasing support for Council spending on sustainable travel and infrastructure.
City of Stirling Planning Principles
A set of guiding principles have been established to guide the development and implementation of this strategy, these principles are:

**Sustainability**
Sustainability requires balancing the current and future needs of the community, the environment and the economy to provide quality of life for today and tomorrow's communities.

**Community Capacity**
Individuals, groups and organisations will be empowered to become active citizens through the provision of information about plans and decisions that affect them, opportunities to be involved in the planning and decision making process, and support of community initiatives.

**Equality & Equity**
All members of the community have an equal right to enjoy a quality lifestyle and specific locations, user groups or segments of the community will not be disadvantaged. Inter generational equity also requires that the rights and needs of future generations will also be provided for.

**Financial Responsibility & Resource Efficiency**
The City must be responsible and accountable in how it uses and manages public funds, assets and resources. This strategy will guide investment, spending, maintenance, and natural resource use in an efficient, equitable and sustainable manner.

**Choice and Diversity**
This strategy will encourage and provide for choice and diversity in lifestyle, cultures, housing, transport and environments.

**Proactive Leadership**
The City and the stakeholders in planning in the City play a proactive and innovative role in facilitating change driven by a clear vision for the future
Strategy Vision
By 2025, the City of Stirling will form part of an integrated transport network that provides all community members with a choice of accessible, resource efficient transport methods to connect their home, work, leisure and activity places.

Strategy Objectives

The key objectives of the City’s Integrated Transport Strategy are:-

Objective 1
To encourage more sustainable transport of people and goods.

Objective 2
To enable efficient movement of people and goods.

Objective 3
To improve accessibility for pedestrians, cyclists and public transport users to a variety of destinations.

Objective 4
To equitably provide for transport needs throughout the community.

Objective 5
To encourage public transport modes over private transport modes
PLANNING CONTEXT

Study Area
This strategy is to guide transport planning over the City of Stirling, which covers over 100sqkm of the Perth Metropolitan Area. The City’s population is fast approaching 185,000. Much of the City consists of residential land uses, most of which has developed to a low or medium residential. The City also consists of regional open space, industrial areas and several commercial/civic centres such as the Stirling City Centre and Mirrabooka Regional Centre. Planning in the City of Stirling is guided overall by the City’s Local Planning Strategy, under which the Integrated Transport Strategy sits.

Regional Context
The City of Stirling is located in Perth’s northern suburbs. The City of Perth is the primary commercial centre within the Perth Metropolitan Area and suburban development generally radiates from the City Centre. Several strategic centres also exist throughout the metropolitan area including the Stirling City Centre, which is intended to be a primary activity node within the City of Stirling. Other key strategic centres in proximity to the City of Stirling are Morley and Joondalup. Key transport links are provided by way of the road and freeway network, with the Mitchell Freeway providing the key transport corridor to the northern suburbs. Reid Highway provides a major west-east corridor through the City. Transit provision is provided by way of the Perth-Clarkson railway of which runs the length of the freeway as well as various local bus services.

Figure 1: Map of the City of Stirling
The City of Stirling is surrounded by the City of Joondalup and City of Wanneroo to the north, City of Swan and City of Bayswater to the east and Town of Vincent and Town and Cambridge to the south. Given that the City of Stirling is located within a large urban area, the transport planning in these municipalities must also be considered. It is expected that where appropriate and possible, the City would deliver on transport planning initiatives in conjunction with surrounding local government authorities.
National and Global Context

Significant Global and National issues will have a dramatic impact on transport in the coming years. Two of the issues that will have the greatest impact on transport throughout the world and particularly in the City of Stirling will be the reduction in greenhouse gas emissions and the impact of peak oil.

The City of Stirling, together with most local governments in Australia, will be significantly impacted by these two issues due to the high level of car dependence. Car usage is a significant emitter of greenhouse gases and consumes large amounts of petroleum.

Peak Oil

In future, our energy supply is likely to become more vulnerable to disruption, and our energy costs could increase, according to the International Energy Agency (IEA). The World Energy Outlook 2006, states that “energy supplies are neither secure nor sustainable” (IEA, 2006). Demand for fossil fuels is soaring, increasing the depletion rate of these nonrenewable energy sources.

Although a divergent range of professional opinions exist concerning the timing of the peaking of world oil and gas production, most forecasts place the peaking somewhere between 2005 and 2020. As suggested by the earlier figure, some commentators are of the view that world output of conventional crude oil has already peaked. Amongst the “early peakers” are some eminent voices as Chris Skrebowski (editor of Petroleum Review), Colin Campbell and Jean Laherre (retired petroleum geologists), the late Samsan Ali Bakhitari (former vice president of the Iranian National Oil Company) and Matt Simmons (a Houston investment banker financing the energy industry, who was Undersecretary for Energy in the first Bush administration). The German based Energy Watch Group has placed the timing of the peaking of conventional crude oil as 2006. The most optimistic estimates are generated by some professional economists and oil companies, including Cambridge Energy Research Associates (which expects peaking not to occur prior to 2030) and the Exxon Corporation, which does not foresee any problem supplying increasing volumes of oil into the future.

However the exact timing is of little significance from a planning perspective due to the long lead times associated with rebuilding the urban infrastructure. As noted by Robert Hirsch, author of a US Department of Energy report published in February 2005 entitled Peaking of World Oil Production: Impacts, Mitigation & Risk Management, “Mitigation will require an intense effort over decades. This inescapable conclusion is based on the time required to replace vast numbers of liquid consuming vehicles and the time required to build a substantial number of substitute fuel production facilities. There will be no quick fixes. Even crash programmes will require more than a decade to yield substantial relief ”. Moreover, as noted by the Senate Committee Report into Australia’s Future Oil Supply and Alternative Transport Fuels (Commonwealth, 2007), the optimistic scenarios are underpinned by an unbridled faith in people’s ability to find creative responses to problems, (in this case discovery of major new reserves, design of technology capable of economically extracting lower grade fossil fuels, etc) whereas it is more prudent to consider likely estimates of known reserves, and alternatives that are currently available.

In May 2006, the Portland City Council resolved to adopt a Peak Oil Task Force. The Task Force published its report in March 2007. It predicts major consequences for food production, transport and land use, the economy and employment, and public services. Most of the findings and recommendations are consistent with other studies prepared over the years.

As transportation (both freight and passenger) becomes more costly, significant changes to transport and
land use can be expected. The importance of rail and water transport for goods movement will increase, while road and air freight will significantly contract. This will increase demand for inter modal facilities in industrial areas. There will be growing demand for housing near jobs, services and public transport. The poor could be pushed out to edges of communities, where they would be required to spend more income on transport. The relocation of business & housing may create new neighbourhood and town centres. There is likely to be increased pressure for mixed use and higher density development, which may conflict with zoning restrictions. Business may shift closer to customers, workers and inter modal transport. Maintenance of road infrastructure will be difficult due to loss of revenue as a result of declining fuel tax receipts (fewer cars on the road) and falling government revenues generally. The price of asphalt, an oil derivative, will rise. Hence the cost of road maintenance and construction will increase significantly.

Some of the responses to diminishing supplies of crude oil and natural gas will be international in scope, and many new initiatives could occur under the auspices of supra-national bodies such as the IEA. Many actions will also take place at the level of the individual nation-state.

International and national measures likely to be pursued with increased vigour include securing alternative energy supplies, improving energy-efficiency standards in motor vehicles and aircraft, structural adjustment of national economies, and increased exploration efforts. Some of these responses could contradict initiatives to reduce Greenhouse Gas pollution. For example coal liquefaction (converting coal into synthetic oil) would result in a net increase in carbon emissions unless technical solutions such as carbon capture and storage are able to work. Likewise, improving energy efficiency may not by itself succeed in reducing per capita consumption of fuel to the extent envisaged due to the workings of the so called “Rebound Effect”, whereby savings are offset by greater use (such as when motorists respond to what effectively becomes cheaper motoring due to enhanced fuel economy standards by driving longer distances). National governments are also likely to place renewed emphasis on public transport provision, and some may elect to become more engaged in urban and regional planning. These measures could prove more effective solutions in the long run to addressing the twin dilemma of a global energy crisis and climate change.

At the local authority level, policy measures most likely to effectively mitigate the adverse impact of declining economically efficient energy supplies are related to reducing dependency on the private motor vehicle. These responses will complement work on climate change mitigation, and include many of the items on the “New Urbanist” agenda including, but not limited to, increasing the integration of transport and land use, improving the pedestrian environment, reducing car dependent low density sprawl, and increasing the role of alternative transport. The previous section outlined in more detail the types of changes to the built environment that should be pursued. Although these responses will prove to be highly effective, they can only yield results in the medium to long-term future.

In terms of strategic land use planning, the major contribution that can be made includes the following initiatives. Residential infill development should be targeted in areas proximate to public transport and community and commercial services. The City should make use of the enhanced development opportunities to enter into constructive “Public Private Partnerships” that facilitate major upgrades to the pedestrian environment and transit infrastructure (the Activity Centre/Corridor Improvement Funds). These can take the form of mandatory developer contributions in higher density areas and further contributions in return for concessions or “bonuses”. Applying fees for on-street parking and introducing congestion charging on key road arteries could also be used as additional funding mechanisms. Enhanced transit services and infrastructure will help connect residents to areas providing employment and places in the metropolitan area offering other important
services such as hospitals and universities.

Since rail transport is far more efficient than road freight, there will likely be renewed interest in railways as arteries for transporting our goods. Industrial areas, and large shopping precincts that can make use of rail-based infrastructure could well thrive at the expense of their counterparts lacking this infrastructure. The City could examine the scope for utilising the northern passenger line for freight distribution in order support the Osborne Park and Balcatta industrial areas. Alternatively, should an expansion of light rail occur, (such a network could quite conceivably be financed by developers with possible further contributions from State Government), it may be possible to carry goods as well as passengers on the network, thereby easing the burden on retailers, manufacturers and businesses in the wholesale sector.

**Climate Change**

According to Ian Dunlop who chaired the Australian Greenhouse Office Experts Group on Emissions Trading climate change is arguably the greatest challenge facing humanity. The scientific evidence linking climate change to the increasing carbon concentration in the atmosphere, arising from human activity, is now overwhelming. Absolute proof of the linkage will not emerge for decades. However the evidence is sufficiently clear that urgent precautionary measures should be taken to reduce carbon emissions if dangerous consequences are to be avoided.

Climate change policy is an exercise in risk management. Measures must be taken firstly to mitigate climate change to prevent it occurring and secondly, to the extent that some change is inevitable, to adapt to it, even though the potential impact will remain uncertain. Due to the accelerating rate of human-induced carbon emissions, now increasing at around 3-5% per annum, and the lag before any corrective measures take effect, there is little time to implement these measures.

Climate change has thus far expressed itself in a drying winter climate for the South West region of Australia. According to the CSIRO, rainfall has declined by 10%, while runoff into dams has fallen by 30% since the 1970s. There could be a further decline in precipitation of between 5% and 40% by 2030. In addition an increased frequency of catastrophic storm and other weather events are expected to increase as global warming continues.

The CSIRO also predicts greater vulnerability to coastlines, with high-end projections showing a rise in sea levels of 0.8m by the end of this century. CSIRO and the Australian Greenhouse Office (AGO) also warn of increased power disruptions, as demand for electricity rises while water scarcity creates issues for power generation (need for adequate volumes of cooling water). Coastal reserves are likely to experience significant erosion, and municipalities may respond by constructing sea walls. Alternatively they may decide this option is excessively costly and opt for a phased retreat from the sea and accept the loss of public assets. More extreme sea level rises are considered to represent a less probable scenario; however it should be noted that there is an increasing level of concern about so called “non linear” change, or global “tipping points”, which, although difficult to forecast accurately, could result in sudden, dramatic global climatic changes, some of which would entail major sea level rises.

In response to Climate change the Federal Government has committed to a 60% reduction in Australia’s greenhouse gas emissions by 2050, based on 2000 emissions. The State and Federal Governments are awaiting the finalisation of the Garnaut Report which will provide the government with a recommendation for a target for greenhouse gas reductions by 2020. These reductions are going to have a significant impact on
Australia’s transport sector. Currently Transport accounts for approximately 15% of Australia’s greenhouse gas emissions. Therefore a significant reduction in greenhouse gas emissions by 2020 will require either a significant reduction in vehicle use or a significant improvement in fuel efficiency. The later would require new technologies to be developed and taken up by the market within the next 12 years. However given that Australia’s vehicle fleet has an average age of 10.5 years and that over 88% of the vehicle fleet uses petrol a significant drop in fuel consumption is unlikely in this time frame.

**Costs of Current Transport Patterns**

Current dependence on private motor vehicles for transport present significant costs. Not only are there financial costs associated with running motor vehicles, but there are other economic and social costs of congestion through private vehicle use. The Federal Department of Transport and Regional Services (2005) has recently released its Report “Estimating urban traffic and congestion cost trends for Australian cities” which estimates that the social cost of congestion will increase from approximately $215 Million in 2005 to approximately $1.1 Billion in 2020. Loss of business time, inefficient vehicle uses and visual pollution all contribute to these costs.

**Transport and Demographic Profile**

This section of the Strategy profiles key travel behaviour and demographic information for the City so as to provide background rationale to the strategy and highlight various transport needs in the community.

**Current Travel Behaviour**

Transportation over the Perth Metropolitan Area is dominated by car use. This holds true for the City of Stirling, where the dependence on the motor vehicle is even greater. 70% of trips made to work in the City are made by motor vehicle. In contrast, there are low proportions of people who walk, cycle or telecommute. Of particular concern is that there have been significant increases in the total number of trips to work made by a single occupant driver and decreases in trip sharing, over recent years. While the statistics used here only reflect trips made to workplaces, they strongly represent travel behaviour throughout the City. It is also of note that whilst the figures suggest that train patronage has decreased, significant increases in patronage on all train lines has occurred over the last two to three years, caused by rising fuel costs and a doubling of the rail car fleet. This suggests growing demand for alternative transport modes.

Dependence on motor vehicles and lower levels of use of sustainable transport modes is generally similar over the different parts of the City. The percentage of trips made by sole occupant vehicles is however slightly lower in areas such as Mt Lawley and Inglewood. Access to major employment destinations throughout the City such as Osborne Park, Herdsman, Balcatta and Stirling Regional Centre are dominated by car use (Car use making up 84.6%, 83.9%, 85.4% and 67.6% of travel to these destinations respectively) (Australian Bureau of Statistics, 2001).

With a tenfold increase in the price of crude oil over the last ten years, the dominance of car use is clearly unsustainable. This is particularly concerning with the continuing trend in the increase of the price of oil due to the impact of peak oil (as discussed previously).
Future Travel Behaviour

As discussed previously the Federal Government has committed to a 60% reduction in carbon emissions by 2050 and is awaiting the outcome of the Garnaut Report to commit to a 2020 target. This together with the likely impact of peak oil, will significantly alter travel behaviour over the next 12 years. It is likely there will be a reduction in car usage and an increase in use of alternative modes, particularly public transport for work related trips. Currently only 8% of all trips in the Perth Metropolitan Area are by public transport and much greater provision for public transport will need to be made. In 2005, the State Government doubled the number of rail cars on the network, however to date this increase in capacity has been absorbed by latent demand and these vehicles are now close to capacity during peak periods. To cope with a significant increase in patronage due to carbon emission cuts and the impacts of peak oil, the number of public transport vehicles required over the next 12 years is to be significantly greater than currently exists.
Trip Generation

Population Increases

The pressure on the City’s transport system is expected to increase not only due to greater costs associated with motor vehicle travel but due to an increase in trip generation. The City’s residential population is expected to grow from approximately 185,000 people in 2006 to approximately 230,000 people in 2030, which is likely to add to travel demand levels. Increased commercial activity in areas such as Herdsman Business Park and Stirling City Centre is likely to further contribute to transport capacity issues.

![City of Stirling forecast population and average household size, 2006 to 2031](image)

**Figure 4**: Expected Population Growth over the City
(City of Stirling, Profile ID, 2006)

Trip Generation through Work-Home Proximity

The ability for people to work locally can significantly impact the extent to which people need to travel. The City has approximately eight job opportunities for every ten people who wish to work, yet only 30% of the City’s workforce work within the City. This suggests that opportunities exist for greater employment of City residents within the City’s boundaries to reduce travel demand in the future. In spite of where people work, (whether it is in Stirling or beyond Stirling), the majority of commuters still rely on motor vehicles for transport. This would also need to be addressed to induce shifts more sustainable travel behaviour (Refer to Figure 5 for Work-Trip destination distribution graph).

As mentioned previously with the impacts of carbon emission reductions, peak oil and strategies by the State Government to increase the amount of local employment opportunities, there is likely to be a significant change in trip generation over the coming 12 years. This could include an increase in cycling for short distance trips and public transport for longer journeys.
Car Ownership

The number of cars owned by City residents is generally lower than is the case across other parts of Perth, there being a lower proportion of households having two or more cars across the City than there is across other parts of Perth. However, the number of households with two or more cars over the City has increased over the 2001-2006 period, whilst the number of households with either no cars or one car decreased over the same period. This suggests a growing tendency to drive privately for transportation. Households in the localities of Carine, Hamersley, Gwelup, Karrinyup, Trigg and Stirling tend to have a greater number of cars per household. This may be due to larger families, families with older children, higher incomes and/or the nature of these localities.
Special Transport Needs
Some sections of the community have special needs and it may be appropriate to make additional provision to cater for such needs such as the aged, youth and disabled. It is of note however that the Integrated Transport Strategy has been developed to maximise the efficiency of travel for all sectors of the community and form an efficient travel network, so it is intended that all needs of those disadvantaged in the community will be met.

Generally the City of Stirling has an older population than the rest of Perth, with significantly greater proportions of those aged over 60. This number of aged residents is likely to grow over coming decades. At present localities including Dianella, Tuart Hill/Yokine and Menora have significant proportions of those aged 60 or over, whilst much growth in the proportion of residents aged 60 or over is expected in areas such as Carine and Hamersley over the next 20 years.
Provision of alternative modes of transport may be more necessary in areas, which are currently deemed to be at greater disadvantage. The Index of Relative Socio-economic Disadvantage is derived from attributes such as low income, low educational attainment, high unemployment, jobs in relatively unskilled occupations and variables that reflect disadvantage rather than measure specific aspects of disadvantage (e.g., Indigenous and Separated/Divorced). The Index of Relative Socio-economic Disadvantage has “...been constructed so that relatively disadvantaged areas (e.g.... areas with many low income earners) have low index values. These generally include areas over the north-east of the City.

Figure 8: Age Profile in the City of Stirling and Perth Metropolitan Area

Figure 9: Levels of Disadvantage over the City of Stirling
FOCUS AREA 1

INTEGRATED TRANSPORT & LAND USE
FOCUS AREA 1 - INTEGRATED TRANSPORT AND LAND USE

Overview

“Transport is a derived demand driven by the need for people to get from one place, where they do something, to another place where they do something else. People don’t generally travel for the sake of travelling.” (Western Australian Planning Commission 2003)

The Integrated Transport Strategy (ITS) is underpinned by an awareness of how activity bases and transport affect each other. The need to travel is an induced demand, that is, people rarely travel for the sake of travelling itself but because they need to get to a particular destination, which asserts a relationship between movement and places. The extent to which people travel and the mode by which people travel is therefore influenced by the arrangement of activities throughout the urban area. Integration of land use and transport planning can therefore have a significant bearing on transport. The City has significant influence over land use and transport integration, given its control over land use through zoning and development control.

A major component of land use and transport integration is to match activity bases with accessibility to sustainable modes of transport including transit, pedestrian networks and cyclist networks. This is considered at three levels throughout the strategy – regional, local and site.

Background Context

Regional Scale
At a broad spatial scale, such as over the entire urban area of Perth, it is beneficial to have areas of significant activity which are highly accessible by sustainable modes of transport, if the transport network is to be sustainable and efficient. It is beneficial to have areas designated as activity centres, such as Strategic Regional Centres and to have good public transport services to connect these centres (Good transport services may include heavy rail or high frequency bus/light rail services). The cross-connections can then form activity corridors, which are chains of development nodes, which are linked by transit. Activity should be confined to these activity centres not only because this is likely to reduce the variety of trips generated in the community, but because this also provides centralized hubs of social and economic activity and increases the economic viability of mass transit services (particularly with regard to two way flows when centres are established at either end of transport route). It is beneficial to have a large range of high generating land uses, such as retail, offices and high density development within the centres so as to increase the ability to make multi-purpose trips, thereby reducing trip generation and to decrease the work-home gap. The nature of the built and urban form and pedestrian and cyclist amenity in such centres also bears significant impact on travel patterns in such environments. On the other hand, areas that already have good levels of transit provision should be capitalised on and activity in and around such areas should be increased.

Meanwhile, other areas that are less accessible should typically have fewer activity generators. These may include typical areas of suburban low-density development. The transport needs of such areas should however not be ignored and localised bus services and improvements to the pedestrian/cyclist networks are often appropriate in such areas. Local Centres can also be established in such areas to provide for local/regularly demanded needs in the community. This can minimize the need to travel long distances on a regular basis and support walking and cycling as modes of transport. Services for local communities such as retail, medical and recreational services would ideally be co-located within a local centre, which similarly to the larger activity centres, allows multipurpose trips to be made. Local centres can link together by way of public transport to
form a network of activity as to maximize accessibility to larger centres. The provision of local centres can also provide local employment opportunities and travel demands can be reduced when those who live in an area work close by (linking local employment with local residents will be explored in further detail under Focus Area 7 of the Strategy). The provision of higher density development around such nodes can also work to reduce work–home gaps and maximize access to facilities and services.

Consideration of land use and transport integration is not new in planning throughout Perth, with the Corridor Plan (1970), outlining the need to contain urban development to transport spines and Metroplan (1990) attempting to reinforce connections between land use and transport planning throughout Perth. The Metropolitan Transport Strategy (Government of Western Australia, 1995), the primary guiding document for transport planning in Perth, restated the importance of considering land use and transport together, upon referring to the need to:

- “Locate major generators of travel demand in existing centres that have good transport links”;
- “Promote residential development within areas that have a variety of good transport links”;
- “Provide and enhance transport infrastructure in a manner consistent with land use objectives”; and
- “Take full account of transport costs when assessing urban development proposals.”

The latest Planning Strategy for the Perth Region, Network City further builds on the need to integrate land use and transport planning. Network City outlines the benefits of concentrating activity in areas with high levels of accessibility through the development of activity centres and activity corridors to link centres and provides a conceptual framework for the development of centres throughout the Perth Metropolitan Area (Western Australian Planning Commission, 2004b). The development of centres throughout the City of Stirling should be consistent with the framework of development advocated in Network City to ensure that development is consistent with and builds on wider networks of centres.

Network City also refers to the need to maintain accessibility at the local level to those services and amenities, which are required on a frequent basis, to reduce travel demands throughout the community. Network City identifies the need for those activities, which are demanded on a daily basis to be located in close proximity (i.e. less than a 500m walking distance) to homes and workplaces such as basic services, convenience retail and parks (Western Australian Planning Commission, 2004a).

Figure 10: Accessibility demands – Adapted from Network City (Taken from Western Australian Planning Commission, 2004)

The Western Australian Planning Commission’s Liveable Neighbourhoods also builds on the concept of providing services at a local scale and integrating land use and transport planning so as to encourage the use
of non-motorised transit modes. The Community Design component of Liveable Neighbourhoods is based on the development of neighbourhood centres which service local communities, which are connected to larger town centres/activity centres as represented in Figure 11. Liveable Neighbourhoods refers to the need for such neighbourhood centres to be located along major connectors in the local area as to ensure that these centres are visible in local areas. Liveable Neighbourhoods also encourages the focus of activity generators around transit.

![Figure 11: Example of community design as promoted in Liveable Neighbourhoods (as taken from Liveable Neighbourhoods, Western Australian Planning Commission, 2004a)](image)

**Site Level and the Built Form**

Land use and transport integration not only refers to broad areas, but also relates to land use and development at the site level. Fine-grain urban design detail, street-scapes and the built form can significantly impact pedestrian and cyclist amenity, safety and traffic control.

The following outlines how various elements of the built and urban form can influence amenity:

**Building Design**

Building scale, height, bulk and architectural style can all impact the relationship that pedestrians have with their environment. Imposing buildings can reduce the quality of the street-scape and can reduce pedestrian amenity. It may additionally reduce opportunities for interaction between the street and activities, of which limits passive surveillance.
Figure 12: Buildings, which relate to the street-scape, should be encouraged

Setbacks and Car parking
Setbacks and the positioning of car parking is a significant influence on the extent to which an area is amenable to pedestrians and cyclists. For one, large setbacks with parking at the front of buildings will increase the distance that pedestrians and cyclists must travel to the point of entry into buildings. It is likely to also reduce the quality of street-scape and opportunities for passive surveillance. On-street parking is generally preferred as it reduces the need for significant building setbacks and can provide a buffer for pedestrians against traffic. Meanwhile, buildings, which are built closer to the street, can provide a more intimate street-scape, and increases the tendency for motor vehicles to travel more slowly, (Parking requirements are discussed further under Focus Area 7 of the Strategy).

Seating and Shading
Amenities such as seating and shading need to be given consideration as to make pedestrian environments amenable and pleasant to be in. Seating should fit in with the surrounding landscape, be located in locations where people are likely to want to sit, and should be visually pleasing to add to the visual amenity.

Street trees and awnings can provide shading for pedestrians on the street. There should also be thought given to the provision of shading and shelter in strategic sites and where people are likely to congregate. The need for shading by street trees should also be balanced with maintenance requirements and appropriate placement so as not to disrupt lines of path or sight-lines.
Public Art
Public art can significantly impact the sense of place and make an area more aesthetically pleasing for pedestrians to be.

Street Networks
The connectivity of the street network can significantly enhance amenity for pedestrians and cyclists. The more direct the street network is, the greater the amenity that can be afforded for pedestrians and cyclists. A grid-based road network (as represented in Figure 14) will generally afford greater connectivity than curvilinear streets or cul-de-sacs, which otherwise tend to extend walking distances.

Figure 13: In ‘Subi-Centro’ shading takes into account the line of passage

Figure 14: Modified Grid layout as taken from Liveable Neighbourhoods (Western Australian Planning Commission, 2004a).
Opportunity and Constraints Analysis

Early development of the City of Stirling was characterized by activity centres, which were linked by rail and trams. Commercial hubs were focused along the railway and tram lines such as Mt Lawley (Beaufort Street) and Osborne Park (Main Street). Meanwhile, residential activity was located further away from the transit nodes, but still within walking distance. The development of such urban forms facilitated high levels of accessibility. With the advent of increased motor vehicle use in the 1950’s, urban development was no longer confined by the need to ensure that all activities were accessible by public transport or foot. The motor vehicle allowed greater dispersion in urban development and greater separation in land uses. As a result, greater diversification in trip demands were generated throughout the City and greater journey distances were created between homes and workplaces. This resulted in growing dependence on motor vehicles given the dispersal of activities, the viability of mass transit reduced (Western Australian Planning Commission, 2003). Much of the City of Stirling was developed when planning was dominated by car use and as such land use configurations support mass transit services poorly and induce motor vehicle dependency. There are however many strategic opportunities to increase land use and transport integration over the City.

Activity Centres

Location of Centres and Connections

There are several hubs of activity throughout the City – from Major Strategic Centres such as Stirling to Main-Street forms of development at Mt Lawley, to Business and Industrial Parks at Balcatta, Herdsman and Osborne Park. Many such centres are also identified in Network City as “Activity Centres”. The City’s activity centres are generally poorly integrated with sustainable modes of transport such as transit, pedestrian and cyclist networks. In promoting sustainable transport, the provision of public transport between major activity centres is typically most feasible for centres can be many kilometres apart, although cycling can also be an effective travel mode between centres (and is discussed in further detail in Focus Area 3 in the Strategy).

Figure 15 represents the extent to which high-quality public transport services link with activity centres across the City, as well as other important employment precincts (The green lines represent the more significant gaps in the network). While Stirling City Centre is also provided with a rail/bus station, most other activity centres poorly link with other centres throughout the City *

Particularly significant shortfalls exist between the following destinations;

- Balcatta Industrial Area and Warwick Station;
- Karrinyup and Scarborough;
- Mirrabooka and Balcatta Industrial Area;
- Mirrabooka and Stirling Regional Centre;
- Glendalough Station towards Mt Lawley.

There are however new proposals to increase the connectivity between centres throughout the City.

- New light rail services are being proposed to connect Glendalough with Herdsman Business Park and Stirling Station (part of which is illustrated in Figure 15), as well as new services along Beaufort Street, Wanneroo Road and Scarborough Beach Road to Scarborough (as illustrated in Figure 14).
- Various new bus services to connect Stirling City Centre with Mirrabooka, Claremont, Glendalough, Subiaco and Maylands. (as illustrated in Figure 16).

* While mass transit services connect with this centre, it is recognised there are other issues affecting the integration of the centre with sustainable modes of transport - as will be discussed further)
Figure 15: Transit & Land Use Integration
Figure 16: New Proposals - New Regional Bus Routes and Light Rail
Herdsman Business Park Proposed Route

- **Proposed Route**
- **Alternate Route (subject to Council)**

**PROPOSED**
**Glendalough Station**
Depart station via left Scarborough Beach Rd, left slip road, left Harborne St, right Parkland Rd, right Walters Dr, continue around Walters Dr through to Hasler Rd, exit Hasler Rd from southern link, left Jon Sanders Dr, left Parkland Rd, left Harborne St, right Scarborough Beach Rd, right into Glendalough Station.

**PROPOSED (alternate)**
**Glendalough Station (via southern car park)**
Depart station via left Scarborough Beach Rd, left slip road, left Harborne St, right Parkland Rd, right Walters Dr, continue around Walters Dr through to Hasler Rd, exit Hasler Rd from southern link, left Jon Sanders Dr, left Parkland Rd, left Harborne St, right slip road, right Pollard St, left Cayley St, left into Glendalough Station.

**Figure 17**: Herdsman CAT Route
A CAT bus service has also been recently implemented which connects Herdsman Business Park with Glendalough Station (Route is shown in Figure 17). Parking concessions have been granted to land owners in the area and cash in lieu has been used to contribute to funding of the service. There has been general support from local developers to generally contribute to such services as well (more detail regarding funding of services is explored under the Public Transport section of the Strategy).

The City must also take into account the role of activity centres outside of the City, as part of a holistic approach to transport planning throughout the Perth Metropolitan Area. The City of Perth is a significant employer for City of Stirling residents and as the primary commercial focus in the wider region, bears significantly on travel patterns throughout the City. As such, high levels of accessibility between destinations throughout the City of Stirling and the Perth CBD benefit many who commute to the City for work, recreational and educational purposes. The Perth-Clarkson railway provides a key link between the Stirling Regional Centre, whilst various bus routes service between areas such as Perth and Mt Lawley and between Perth and Mirrabooka. Meanwhile, the regional importance of centres such as Morley should also be considered in planning for efficient and accessible transport networks. Establishing such networks will involve collaboration between the City and the State Government and the City and surrounding local governments. Stirling City Centre has a particularly strong relationship with the Perth CBD, for establishing Stirling City Centre as a key employment node north of Perth, provides two-way demand between Perth and Stirling, which is an important component of maximizing the efficiency of the transport network.

**Functionality of Centres**

The functionality of many of the City’s activity centres and the extent to which people without motor vehicles are able to move within the centres is limited, which impacts travel choices to and within such centres. For one, there is typically lacking land-use diversity in centres, with the absence of high-density residential or ‘shop top’ development. This means that opportunities to reduce the gap between workplaces and residences are foregone and that opportunities for multi-purpose trips are similarly foregone. This integration reduces opportunities for trips made on foot or bicycle and integration with transit. In some centres, there are also few strong activity generators at all. Car-parking or vacant sites often occupy land in centres, this representing inefficient space utilisation and reducing opportunities for trips to be made by foot.

Land use zoning can have significant impact on the types of land uses that develop within activity centres and a range of activity bases are encouraged in the Business Zone in District Planning Scheme 2 (soon to be replaced with a similarly functioning Regional Centre Zone in Local Planning Scheme 3). The Scheme introduces a provision to encourage shop-top development in centres which could address some functionality issues in centres. Yet zoning controls may not necessarily generate the desired land uses in the activity centres. To supplement current zoning provisions, there may be opportunities to examine the economic functions of the centres as part of Economic Development plans and projects. The forthcoming Commercial Centres Strategy will further guide the functionality of the City’s centres. The City is also embarking on major urban regeneration programmes that provide opportunities to examine the land use and functionality of the City’s activity centres such as the Mirrabooka Regional Centre and Stirling City Centre. Similarly, review of the City’s Industrial Areas will provide opportunities to examine land uses and functionality of these areas. It would be particularly beneficial to use this process to identify areas within such Business and Industrial Precincts where strong activity nodes could develop, so as to provide for the needs of the local workforce and to concentrate major activity generators such as office developments.

There is particularly strong need to consider how to stimulate development of vacant sites as these frequently prevent the creation of fully-functioning activity centres. There may be opportunities to use differential rating
with the particular intention to stimulate development in centres. It is not only vacant sites within activity centres that are concern however, with vacant residential lots in the City of Stirling placing more pressure to develop in outer metropolitan areas and contributing to urban sprawl.

The nature of the built form, street network connectivity and provision for cyclists and pedestrians within the centres is also typically poor, limited or lacking; which restricts the extent to which commuters will use more sustainable transport modes to and within such centres. While it is important that the quality of the built form and pedestrian and cyclist amenity is maximised across the City, it is particularly important to consider these factors within larger activity centres for the enhanced benefits this can provide. Numerous centres will consist of large big-box style buildings, large car-parking areas and poor street-scaping, which contributes minimally to the area’s aesthetic and sense of place and reduces pedestrian/cyclist amenity (Figure 19 illustrates the impact on activity centres such elements can present). (More issues concerning the built-form and street connectivity, which can impact centres, are discussed later within this Focus Area of the Strategy under “Built and Urban Form”, while the provision for cyclists and pedestrians is given greater consideration within Focus Area 2 and 3). Appendix 1 profiles further observations made in the City’s activity centres regarding the provision for sustainable transport modes. Major urban regeneration programmes/projects again provide significant opportunities to address these aspects of centres. Meanwhile, efforts are being taken to overcome accessibility problems within areas such as the Herdsman, Osborne Park and Balcatta Industrial areas, with the Mixed Business Guidelines providing incentives for the development of greater pedestrian amenity.

There are opportunities to significantly enhance the functionality of the City’s major centres if:

- A pedestrian connection was afforded between Scarborough Beach Road and Walters Drive in Herdsman Business Park, (this requiring Council acquisition of land along this corridor) – refer to Figure 18;
- Road connections through the Mirrabooka Regional Centre and Stirling City Centre were improved (The Stirling Regional Centre and Mirrabooka Regional Centre Improvement Strategies intend to address shortfalls).

Figure 18: Lacking connectivity in Osborne Park/Herdsman Business Park
Figure 19: Current Development in Stirling City Centre contrasted with a mixed-use engaging town centre

Utilising Existing Transit
There are areas over the City which are afforded good public transport access, but where there are few strong activity generators to capitalise on the transit services. These typically include areas around transit stations (Stirling, Warwick, Glendalough) as depicted in Figure 20.
Figure 20: Transit Nodes
There are however various constraints to increasing land-use and transport integration around the City’s transit stations, including:

- The area around Glendalough Station are characterised by land uses, which per unit of area, attract few people, such as car yards and other industrial uses. The area around the Warwick Station is mostly characterised by (R20) low-density residential development, which also reduces any potential for the station’s catchment to be extended. Mt Lawley Station is similarly surrounded by low density (R12.5) residential activity and heritage protected.
- The walkable catchment to the stations throughout the City of Stirling is limited by Mitchell Freeway (in the case of Stirling, Glendalough and Warwick).
- The prior existence of commercial/retail centres - Commercial/retail at Innaloo; Main Street, Osborne Park and Centro Warwick Shopping Centre, which are close to but not within the prescribed distance of what is walkable from the station, limit the viability for high trip generating activity within closer proximity to the stations;
- In its current form the land between the City of Stirling Administrative Centre and Stirling Interchange cannot be built on due to soil contamination;
- Much land around Stations is occupied with Park N Ride Stations, when more intense land uses could in theory occupy such spaces.

There are however opportunities to overcome such constraints

- The Mt Lawley Station could be relocated towards the corner of Walcott and Lord Streets as to better capitalise on the centre there (this would require the City to work with the Public Transport Authority)
- The Stirling City Centre project is poised to introduce high activity generating land uses near Stirling Station
- The Glendalough Railway Station Precinct Study could introduce more activity around Glendalough Station
- The Carine-Hamersley Local Area Plan is proposing that High Density Residential R-60 be introduced around the Warwick Train Station south of Beach Road.
- Undergrounding ‘park n ride’ facilities.

The City must also be cognisant of proposals for extensions to the current transit network. Currently there are two heavy rail lines that transverse the City which connect the City’s residents to the City of Perth. The rail system does not cover some major employment destinations such as Balcatta Industrial Area, Mirrabooka Regional Centre and Malaga Industrial Area, which as described are currently poorly serviced by transit (approximately 125,000 people work over these destinations). A possible heavy rail service along Reid Highway with stations at Wanneroo Road, Mirrabooka and Alexander Drive could be introduced to link such centres. This could extend to form a loop around the Metropolitan Area to connect major employment nodes such as Bassendean Industrial Area, the Airport (domestic and international), Forrestfield/Kewdale, Canning Vale, Jandakot Airport and Bibra Lake Industrial Area, which follows Roe and Tonkin Highway and the existing Fremantle-Kewdale freight line (as per Figure 21). It would additionally connect with all existing railway lines in the Metropolitan Area.

Heavy rail along this route is considered to be essential as it would provide a time competitive journey compared to the motor vehicle. Currently many of the Industrial areas are served by infrequent bus services and surveys conducted by the City show that car usage is as high as 97% in the Herdsman Business Park and Balcatta Industrial area. This is mainly due to the fact that access to these areas by public transport is very poor. Many places like Malaga and Forrestfield, Kewdale, Bibra Lake and Canning Vale are too far from existing rail lines and therefore journey times are not time competitive.
Furthermore as the route follows the Reid, Roe and Tonkin Highway reservations and the Kewdale to Fremantle Freight Rail line, it would be grade separated all the way and enable journey times 50% faster than bus and light rail services running along road routes.

In addition
- Part of the heavy rail circle route has been constructed (Thornlie spur) and infrastructure (tunnels) and land has been purchased for stations between the Mandurah line and the Armadale line;
- The majority of the median strip along Reid Highway is wide enough to accommodate heavy rail;
- The service would serve approximately 400,000 residents who have limited access to public transport;
- The proposal would increase the viability of the airport rail (as most of the travel would be non-airport related).

The City should lobby the State Government and ensure any works within the Reid highway Reservation do not compromise this proposal.
Key opportunities
The City could pursue the following actions to address the issues (Please note that these are not direct actions and that actions are to be formalised within Implementation Plans).

- The City to work with the PTA to introduce new bus services to connect Stirling City Centre with Maylands, Mt Lawley, Subiaco, Claremont and Mirrabooka (thereby connecting major transit hubs and centres and addressing various service shortfalls);
- The City to work with the PTA to improve service provision between centres where there are still service deficiencies (and where possible provide rapid, high frequency transit along such routes);
- To use major urban design and works projects to develop activity corridors and centres and have high density development and high activity generating land uses around these areas (such as the Stirling City Centre Project, Mirrabooka Redevelopment Project and Activity Corridor Studies) - This will involve working with State Government and/or other Local Governments. (It should be noted that there is significant demand for development along Beaufort Street which helps with the development of that particular corridor, but corridors such as Wanneroo Road will require greater stimulus to create effective activity corridors);
- To continue to develop design guidelines for commercial centres which advocate Main Street Principles (as have been recently prepared for Karrinyup Regional Centre);
- To ensure that vacant landholdings are developed through differential ratings;
- To use programmes such as OPIAS to review the functionality of the City's Industrial and Business Precincts with regard to supporting sustainable modes of transport;
- To encourage high-quality mixed use development at key bus/light rail connections sites (as indicated on the Strategy map).
- The introduction of a pedestrian link between Scarborough Beach Road and Walters Drive (encourage developer contribution, incentives);
- The City to lobby for new heavy rail proposals, account for these in its future planning and identify new opportunities for land-use and transport integration along them;
- Transport Assessments to be implemented to ensure that land uses and development in activity centres support the creation of active places;
- Mt Lawley Train Station to relocated towards the intersection of Lord and Walcott Street so as to better integrate the station with the surrounding activity centre and;
- Residential density to be increased around major transit hubs (such as Warwick Station) in Carine and Hamersley;
- To increase the use of parking concessions or provide density bonuses to generate contributions towards sustainable transport (to explore this as part of activity centre/corridor studies such as Scarborough Beach Road Activity Corridor Study)

(Please note that forthcoming sections of the Strategy address other aspects of land use in Activity Centres such as parking)
Local Areas

Local Areas in the context of this section of the Strategy refer to those areas outside major activity centres. While these generally consist of low activity generators such as low-medium density residential development; the provision for sustainable transport is still important throughout such areas for there needs to be a fully integrated transport system and accessibility should be maximized for all commuters. Any major gaps in the network are likely to see current levels of motor vehicle use continue. There are also particular uses such as retirement villages outside of major centres where there is a strong need for public transport infrastructure (Provision for cycling and pedestrian access over all parts of the City is examined within Focus Area 2 and 3 of the Strategy).

It is important if locally demanded services and facilities can be provided throughout local areas so as to reduce travel demands and maximize the extent to which local areas can be self-sufficient. There are many local centres throughout the City, which provide convenience functions for local communities as are illustrated in Figure 22. Many of the City’s older areas developed on the tradition of corner stores, which provided regularly demanded services at a local level. Many small centres exist in older areas of the City such as Tuart Hill, Joondanna and Mt Lawley. One the other hand, newer areas of development throughout the City such as Carine/Hamersley, new residential estates (Princeton/Roselea) and the City’s industrial/commercial hubs such as Osborne Park and Herdsman have very few centres, reflecting deficiencies in local amenity.

Despite the provision of centres, a number of issues face existing local centres and affect the ability for local residents to access local centres by way of sustainable modes of transport. These issues include:

- The economic viability of such centres is limited as big-box centres often draw custom from the local catchments;
- Many local centres are poorly located along roads which offer little passing trade;
- Wider networks of travel are based around motor vehicle use, which in turn tends to encourage any travel to be made in motor vehicles, regardless of whether it is possible to use other modes;
- The urban and built form of local areas limits the extent to which there is direct access to local centres (i.e. poor passive surveillance, poor connectivity); and
- Lacking connection to other centres by way of sustainable modes of transport (ideally, high frequency bus services would connect centres and bus stops and shelters would integrate with the centres)
- Lacking sense of community development/sense of place which would otherwise attract custom to the centre and make these places where pedestrians want to be.
Figure 22: Local Centres
Furthermore, a range of locally demanded facilities and services should ideally be provided in local centres or within a local community hub. Instead retail and recreational facilities are often located apart. Whilst not all centres need recreational and community facilities, some effort to congregate such activities would be beneficial, wherever appropriate, to increase the incidence of multi-purpose trips. The City currently looks to integrate community facilities with commercial centres.

There are also benefits in increasing residential catchments around local centres, this typically lacking over the City. The Local Area Planning process could provide opportunities to examine land uses around local centres and opportunities to increase access to the centres and bridge work-home gaps. This can also increase the viability of the centres.

Key opportunities the City has to support Local Centre development of local centres, encourage the use of such centres and enhance access to them is provided by:

- Assessment of viability/functionality of centres in the Commercial Strategy and the coverage of centres over the City with regard to walking catchments;
- Work with the Public Transport Authority to link centres through improved/rationalised bus services;
- The City’s Local Centre Upgrade programme which seeks to get private developers/shop owners to work with the City to improve the functionality, amenity and the aesthetic of local centres;
- The Local Area Planning Process – whereby opportunities are identified to enhance development around local centres;
- Continuing to collocate recreational facilities within such precincts where feasible;
- Ensuring the provision of local centres within any new subdivisions/strategically reviewing local centre locations and identifying opportunities for new local centres (particular in the northern belt of suburbs from Carine to Mirrabooka).

**Urban and Built Form**

The urban and built form of both major activity centres and local areas over the City typically fails to consider how people want to move and how they feel within an area. Many areas have become uninviting for pedestrians and cyclists.

Most residential areas are low to medium density and the built form throughout such areas largely fails to address the street. Garage walls, fencing and large setbacks often impose barriers between homes and streets. This limits opportunities for social interaction as well as the level of safety, both real and perceived on the street.
The built form and whether or not it encourages people to walk and cycle is particularly important in the City's activity centres, given that these areas can potentially generate the most activity on foot and bicycle. Common issues with commercial centres throughout the City, which can limit the potential for walking and cycling, include:

- Inactive frontages, which are characterised by unattractive walls or fences, which reduce passive surveillance and fail to contribute to sense of place;
- Large areas of car park at the front of properties, which increases the distance between the street and buildings which extends walking distances and provides areas for anti-social activity to develop;
- Large areas of vacant land, which reduces the cohesiveness of activity centre;
- Poor street scaping and landscaping which fails to add to the attractiveness of areas.

Stirling Regional Centre (as illustrated in Figure 23) is typical of development in the City and is characterised by many of the abovementioned problem. The dominance of big-box retailing, restricted interaction between the street and shops and the presence of car parking and vacant areas of land reduces pedestrian and cyclist amenity for it adds to commuting distances. (It is noted that as of 2008 the Centre is subject of a major redevelopment planning process - the Stirling City Centre Project and this should help to overcome such issues)

Meanwhile, many local centres (as illustrated in Figure 24) throughout the City also suffer from poor built form. Such centres are often characterised by vacant areas of land (in or around them) and large car parking areas between the street and the shops/buildings. Meanwhile, the buildings often fail to address the street. The rear of shops are often characterised by large expanses of blank wall with little provision made to ensure that there is passive surveillance throughout these areas.
In dealing with the aforementioned problems there are opportunities to:

- Ensure that development assessment is accompanied by more thorough transport assessment. The City has already developed a transport assessment framework and requires major developers to submit transport plans, yet steps need be taken to ensure that these are implemented to account for all modes of transport and the local transport context;
- Ensure that design guidelines and urban design projects facilitate the use of sustainable transport modes and contribute to street-scape and develop performance criteria to assure this occurs;
- Use major development projects to address built form issues;
- Develop centres along Main Street Principles of Liveable Neighbourhoods; and
- Implement developer contributions/cash in lieu schemes to develop more inviting, safe and amenable street-scapes, particularly around activity nodes, as well as the introduction of public art.

**Road Layout and Street Connectivity**
The City has a mix of grid and curvilinear street patterns, largely influenced by the various eras over which development over the City. Older areas of development in the City tend to be grid street based while postwar development is largely based on networks of curvilinear streets and cul-de-sacs.

**Figure 25 & 26**: Joondanna (left) has a largely grid based road system, which is conducive to increased pedestrian amenity, Carine (right) has a largely curvilinear and cul-de-sac road system, which can hinder pedestrian amenity
It would be unrealistic to expect that the road layout throughout the City could be entirely retrofitted as to increase connectivity. Yet as the City ages more opportunities to retrofit the City may develop. Specific problem areas could also be identified and addressed. The City is currently undertaking a review of the pedestrian and cyclist network as to identify opportunities for enhanced connectivity.

There could be potential benefits in:

- Providing developer incentives to provide access ways; and
- Auditing connectivity (as will be discussed in Focus Area 2).

**Outcomes**

- The City consists of a network of centres and employment areas which comprise of a diverse range of high activity uses;
- High frequency public transport services connect the City’s centres and employment nodes;
- The built form and infrastructure in the City’s activity centres provide high levels of pedestrian and cyclist amenity and safety;
- High activity land uses are located around railway/light rail stations and bus stations;
- Local centres are highly accessible by pedestrians and cyclists, meet a variety of local needs and are community focal points;
- Land use configurations create connective pedestrian networks;
- Service provision is considered in conjunction with transport planning.
FOCUS AREA 2 - PEDESTRIAN ACCESSIBILITY

Overview
A significant element of sustainable and efficient transport planning is pedestrian accessibility and amenity. Not only does walking present environmental benefits over motor vehicle transport, but it provides opportunities for local social and economic relationships to develop and provide to health benefits to communities. Furthermore, there are no financial costs incurred when walking for transport and it is also available to a wide range of community members such as youth or those who cannot drive. The pedestrian network should be accessible to all community members and there is a particular need to provide for those with mobility impairments so as to ensure the creation of an equitable transport system. Provision for pedestrian amenity is further important for it can also impact transit use.

Focus Area 1 of this Strategy considered the need to match activity with accessibility and for built forms to enhance pedestrian amenity throughout the City. The following section explores associated infrastructure requirements. The need to provide for pedestrians exists over all parts of the City so as to create connective pedestrian networks. It is recognized that motor vehicle traffic need also be accommodated for, so this section also considers mitigating the problems motor vehicle transport can impose on pedestrians.

Background Context
Planning for pedestrian amenity throughout the Perth Metropolitan Area is guided by “Perth Walking: Metropolitan Region Pedestrian Strategy” (Government of Western Australia, 2000). This Strategy takes into consideration “The Australian Pedestrian Charter” (Pedestrian Council Australia, 2007) which outlines the right among pedestrians to be able to walk to where they need to go and the special attention which should be paid to pedestrians with mobility issues.

The key elements of an effective pedestrian network include:

- Highly connected footpath networks;
- High quality footpaths and high levels of pedestrian amenity (sufficiently wide paths, at-grade and direct crossings, few obstructions; lighting; shading) and;
- Minimal conflict between pedestrians and motorists.
- Pedestrian connections between public and private activity generators

The City can provide for pedestrians through the provision of footpaths (both on roads and in reserves) and associated amenities such as lighting and shelter/shade which can also impact levels of pedestrian amenity. The City is also responsible for street trees which can provide shade for pedestrians, and bears influence over the provision of awnings/shade from buildings (as referred to in Focus Area 1).

The City can also influence the design of local roads, which can significantly impact how traffic influences pedestrian movement is affected by traffic. Pedestrians and motorists can ‘share streets’ so as to allow pedestrian activity on the street and interaction across the street, whilst still providing for motor vehicles. It is particularly beneficial for local streets near schools, community facilities and activity centres to be characterised this way. Traffic calming and providing pedestrian refuge are important elements in creating shared street-scapes which can involve the provision of pedestrian nibs out onto the street, wide median strip refuges, narrow streets and on-street parking. Traffic calming can also consist of bringing activity towards the street, to create a sense of enclosure. Driveway rationalisation can also enhance pedestrian amenity, as it reduces the number of crossovers pedestrians must cross.
There are instances where space for pedestrians and motorists should be clearly separated, particularly along roads with heavy traffic volumes. Footpaths may need to be provided some distance from the road to reduce the impacts of traffic on pedestrians. A buffered effect may also be afforded by on street parked cars. In crossing roads, there is often a need to provide crossovers or to prioritise pedestrian movement over intersections. Ideally, at grade access over roads should be provided as opposed to building overpass style crossovers as these are more expensive and can force pedestrians to detour, yet sometimes they are necessary, such as over major highways.

In its most extreme form, segregating pedestrians and motor vehicle traffic can be by way of providing car-free zones. In some areas, both globally and in Perth, roads have become completely pedestrianised. Such measures are usually taken in activity centres, whereby there are likely to be significant activity generators such as retail land used and where there would be a significant volume of pedestrian traffic along the thoroughfare to substantiate the closure of a road to motor vehicle traffic. The City of Subiaco, for instance, has taken this approach along some of its streets towards the town centre of Subiaco. Cafes and restaurants then lead out from the pedestrian malls, which generate active spaces of which can be used by all community members. Meanwhile, motor vehicle traffic is detoured along other streets and therefore remains accommodated for in the road network.

There is also a need to ensure that the pedestrian network is clear and legible. This can be afforded by way of signage and/or landmark buildings. This can encourage people who are not familiar with different areas, to still walk around them, when they need to do so. The development of a strong sense of place can also add to the comfort and amenity of pedestrian trips - for it can make pedestrians feel like they are in a place they want to be.

**Figure 27:** King Street Perth is a shared street space with a pacified traffic regime

**Figure 28:** Vehicle dominated roads have been converted into pedestrian access ways, which become nodes of activity in Subiaco.
Opportunities and Constraints Analysis
The Pedestrian Network
The City of Stirling provides a footpath network of which generally follows the existing road hierarchy, transects some reserves and includes Pedestrian Access Ways (PAWS). Yet the effectiveness of the investment into this infrastructure is questionable as it fails to form a comprehensive pedestrian network. 50% of streets in the City are without footpaths on either side. Figures 29 to 30 provide snapshots of footpath networks typical throughout the City and refer to amenity-related problems associated with such networks.

The provision of footpaths in the City has been at the request of local residents. Whilst this allows for the system to be responsive to local residents' needs, it has led to the lacking strategic provision of footpaths (that is, there has been little consideration to connect footpaths with major destinations) and the creation of a disjointed pedestrian network.

The City is developing a Footpath Policy that aims to increase the network’s connectivity and address significant gaps in the network. This will see local residential areas and activity centres connected and will prevent residents from being able to veto the introduction of strategic footpath links. All streets (except cul-de-sacs 20m or less in length) are to have a footpath under this plan. The policy prioritises the installation of footpaths on major roads, pedestrian routes and near bus stops. The policy is yet to be adopted by Council and will form an integral component of establishing an efficient and sustainable transport networks. (Funding is also to be allocated to footpaths by Council). It is also of note that research into developing this Policy identified high levels of community support for the introduction of footpaths on a more strategic basis as opposed to the current status whereby residents can veto footpath implementation.

In terms of creating a fully integrated pedestrian network there remain other barriers - for instance the current road layout and subdivision patterns restricts connectivity in places (as illustrated in Figure 29 and 30). While rearranging the road network throughout the City may not be feasible, strategic analysis of the existing network to identify opportunities for increased connectivity would still be beneficial. As redevelopment opportunities across the City increase, new opportunities to retrofit existing subdivision layouts may arise, as may opportunities for major landowners to contribute to the creation of pedestrian connections.

Figure 29 Balcatta Nollamara Example
- Gaps in network, footpaths fail to link up with others and lead to dead ends;
- Network fails to focus on any particular community focal point;
- Few streets where footpaths are on either side

Figure 30 Doubleview, Innaloo Example
- Connectivity lacks in Innaloo area overall
- West – east connectivity in Doubleview area is lacking
- Few streets where footpaths are on either side of the street
Pedestrian connections should also extend into major destinations (public and private). Currently, numerous developments provide little amenity for pedestrians in this regard. The City has implemented a Transport based assessment into its development assessment process to attempt to address such issues. However, when these assessments have been undertaken, the focus has been on ensuring motor vehicle access with less emphasis on access to alternative transport modes. As part of these proposals, footpaths should be designed to integrate well into the site and into strategic footpath networks, as opposed to being added to plans as an after thought. These assessments must also be applied effectively and consistently across the City in order to help create a connected pedestrian network, this not having always occurred in the past.

In developing a connected pedestrian network, the City also requires that the Western Australian Planning Commission support the implementation of footpaths. In the past, the City has included footpaths as conditions of development, to then have the Commission remove them.

![Image of a connected pedestrian network](image)

**Figure 31**: Footpath networks/ Pedestrian Safe Spaces often fail to link all activity generators in the community

Pedestrian Access Ways (PAWS) are an important part of the pedestrian network particularly, generally where the street-layout is more curvilinear. While these may maintain pedestrian network connectivity, they sometimes attract anti-social behaviour and become rundown. Many PAWS throughout the City are subject to ‘Requests for Closure’ by adjacent residents for these reasons. When closures are requested, Council takes a balanced consideration of anti social behaviour and local accessibility. Council will determine whether the PAW should be closed, depending on the significance of the risk posed, the potential for amelioration techniques, and the impact of closure on wider pedestrian networks (as determined in Policy N101005 and by the Commission’s Planning Bulletin No. 57). Meanwhile, PAWs are discouraged within new residential areas and instead there is a focus on developing more connected street networks in such areas.

To ensure that pedestrian networks are maintained, the City could examine the following:-

- More innovative design responses could be developed so as to avoid the need for PAW closure on the basis of security/safety problems. For instance, before supporting PAW closure, opportunities for adjacent properties to look out onto the PAW and to use permeable fencing along the PAW so as to enhance passive surveillance, could be examined.
- The City could be more proactive in examining PAW design to avoid the occurrence of safety concerns forming the impetus for PAW closures.
- PAW Closure assessment guidelines could more strongly articulate the need to explore wider impacts of closure on residential communities (i.e. in a 400 metre catchment).
It would also be beneficial if the Western Australian Planning Commissions Planning Bulletin was not as focused on closure of pedestrian-access-ways and focused on identifying opportunities to retain these access-ways.

**The Quality of the Pedestrian Network**

With regard to the quality of the pedestrian network, the City has embarked on improving the quality of the footpaths and increasing the width of footpaths in order to ensure that they are safe for all users. However, problems still exist in the network, which include:

- Few crossing points and indirect linking crossing points;
- Pedestrians faced with many obstacles when crossing roads;
- Cross over points are not at grade;
- Lack of pedestrian refuge over roads and streets too wide for pedestrians to cross safely,
- Lack of shade, shelter and weather protection, and
- Uninviting centres and street-scapes.

In addressing such issues, the City can audit the existing pedestrian network and road network in relation to how well pedestrians can commute and to identify areas where it could be possible to create ‘shared’ pedestrian/motorist spaces. It may be difficult to address all issues that may emerge, however identifying key problem spots and addressing these may deliver significant benefits to pedestrians.

![Figure 32: Poor Pedestrian connections](image)

The regeneration of existing centres may also provide opportunities to manage traffic and pedestrian movement better and create places where people want to be. Some small areas of the City could be entirely pedestrian based such as parts of Stirling City Centre. Improvements to the transport assessment process (as part of development assessment) could also assist to provide greater levels of pedestrian amenity, whereby a condition of development is to provide high quality pedestrian connection between activity generators and the wider pedestrian network.

Traffic calming initiatives can also generate significant benefit to pedestrians and also increase motorist safety, yet there has been little in the way of traffic calming across the City. The City has however begun to design narrower streets so as to prioritise pedestrian amenity over private vehicles. (Focus Area 1 examined opportunities to influence the built form and this could also serve to pacify traffic).

In relation to creating buffer areas between roads and pedestrian networks, Council has resolved that paths should be located alongside roads to enable the continuation of front yards into verges. While this is appropriate for local roads where traffic volumes are not large enough to create accessibility problems for pedestrians, further investigation into the appropriateness of this along busier roads may be warranted to provide effective buffering between pedestrians and cyclists.
Some small pockets of the City could be completely pedestrian based such as parts of the City’s major activity centres such as Stirling.

A major barrier to improving pedestrian amenity is that the Western Australian Planning Commission accepts road designs which do not effectively provide for all transport modes, which means that Liveable Neighbourhood concepts are not being applied. The City could work with the Commission to ensure that road designs are appropriate and overcome this significant barrier to effective implementation.

Ultimately, pedestrian based infrastructure must also be Disability Discrimination Act compliant. This means that the City is obliged to provide pedestrian infrastructure which provides high quality universal access. The City should continue to build on its existing pedestrian infrastructure to increase the extent to which the pedestrian network provides for the mobility impaired.

Of final note, is that there is further need to ensure that the footpath network is clear and legible, yet there is typically minimal information regarding the best routes to facilities and centres available to pedestrians by way of signage. TravelSmart is working to identify strategic sites where pedestrian orientated signage would be most useful. There is a need to ensure that signage is appropriately aimed at the pedestrian level as well. It is also beneficial to have way-finding landmarks to help orientate pedestrians and work to improve centres could address this deficiency.

Key opportunities to maximise pedestrian accessibility include:
• Finalising and adopting the Footpath Policy (a key priority for Council);
• Using centre and reserve upgrades to address strategic shortfalls in the pedestrian network, to maximise the quality of pedestrian amenity and develop places that pedestrians want to walk in;
• Developing funding mechanisms to provide for increased pedestrian amenity (i.e. Developer contributions upon re-zoning areas to a higher residential density and cash in lieu contributions) *
• Development assessment to ensure that high quality pedestrian links are afforded between high activity generators and the street and that impediments to pedestrian movement are reduced;
• Working with Main Roads Western Australia to develop pedestrian friendly street-scapes;
• Working with Western Australian Planning Commission to ensure that footpaths are provided and that the Commission adopts effective and appropriate road designs.
• Encouraging residents to request street trees as to provide shading;
• Identifying where it may be more appropriate to keep pedestrian networks away from the road network and where buffers (in the form of footpaths being provided located in from the road reserve) should be provided;
• Identifying key locations for increased signage to guide pedestrian orientation and
• Identifying key locations for pedestrian crossing points.

* Please note that this would likely just be a contribution on part of the developer towards Council’s own funding of footpath improvements/extensions.

**Outcomes**
• Travel by foot within the City is safe, direct and convenient;
• All streets within the City (excluding short cul-de-sacs) have a footpath on at least one side;
• Private and public activity generators are well integrated into the pedestrian network;
• The urban form at centres and key destinations maximizes pedestrian movement with high
levels of provision for weather protection;

- Pedestrian amenity is improved through the increased provision of shade, seating, street boxing and public art and the creation of places people want to be;
- The pedestrian network is well signed and easily navigable;
- Pedestrian movement is given higher priority to other modes of transport;
- The pedestrian network is fully compliant with the Disability Discrimination Act.
FOCUS AREA 3
CYCLIST ACCESSIBILITY
FOCUS AREA 3 - CYCLIST ACCESSIBILITY

Overview
Many trips currently made by private motor vehicle could easily be made by bicycle instead. Cycling provides the flexibility and independence of travel that a motor vehicle can provide, allows travel over significant distances, and allows a reasonable quantity of small sized goods to be transported. Bicycles are affordable to purchase and have almost no on-going running costs, making cycling attractive to those who cannot or choose not to pay the expenses associated with owning and running motor vehicles.

Cycling has an extremely low impact upon the urban form and the environment. Bicycles require little road space, can be parked in very small spaces, and do not degrade road infrastructure as quickly as motor vehicles. Cycling creates no greenhouse gas or particulate emissions, and offers health benefits through increased physical activity.

While many people choose to cycle for recreation, fewer choose to cycle for transport. If the City is to increase the number of trips taken by bicycle instead of by private motor vehicle, considerable effort will be needed to create a City that allows cyclists of all abilities to travel between destinations with the same level as ease, safety and directness as when they travel by car.

Background Context
Bicycle planning throughout the Perth Metropolitan Area is guided by Bike Ahead: Bicycle Strategy for the 21st Century (n.d.). This strategy identifies the need to:
- Provide infrastructure and facilities that serve the needs of all cycle users and
- In doing so ‘define, protect and implement’ a regional cycle network;
- Integrate bicycle use with public transport; and
- Provide information and signage to orientate cyclists.

The strategy guides the creation of the Perth Bicycle Network, an interconnected network of signed cycling routes which is supplemented by local cycling routes within each local government area, and which allows cyclists to travel across the Perth metropolitan area. Routes are provided along a network of dedicated on-road bicycle lanes, shared (bicycle/pedestrian) paths, and on the road network itself where appropriate (bicycles share road space with motorised vehicles).

An effective bicycle network should aim to provide cyclists with a safe cycling environment free from impediment and danger; minimise the number of times that a cyclist must give way to other traffic (including pedestrians) or slow down to navigate obstacles; and provide direct routes which minimise the need for ‘detours’.

The network should also link with activity centres and transit nodes to allow cyclists access to destinations with the same convenience that car drivers enjoy, and allow cyclists to combine their cycle journey with other modes of transport thus maximising the number and diversity of trips that can be made by bicycle. Ideally, bicycles should be permitted on public transport services to make cycling for transport as convenient as possible – for example where a bicycle is needed at both ends of a public transport journey and to maximize opportunities for mode integration.
The provision of suitable end of trip facilities is crucial in encouraging cyclists to cycle for transport and to combine cycling with other modes of transport. Bicycle parking, lockers and showers should all be provided at major transit stations, activity centres, work places and other destinations that cyclists may wish to access. Local government planning guidelines mandate the provision of end of trip facilities in large, new developments; however facilities should also be encouraged in older developments and as shared facilities where many small businesses or landowners are located close together.

As well as being direct, convenient and safe, cycling networks should be clearly signed and easily navigable by cyclists. Signage should direct cyclists to activity centres and other destinations, should be clearly visible and easily read by cyclists, and should also alert motorists to the presence of cyclists in that area.

**Opportunities and Constraints Analysis**

**Bicycle Networks**

Cycling routes within the City of Stirling form part of the Perth Bicycle Network (PBN). Routes are provided through a network of

- Shared paths (cyclists must share with pedestrians),
- On-road dedicated bicycle lanes, and
- On-road cycling, (cyclists must share space with motorised vehicles).

In general, on road-cycling routes are located on local roads, while primary distributor roads provide either dedicated bike lanes or shared path facilities. Some district distributor roads also have shared-use paths, as illustrated in Figure 34. Recreational shared-use paths are also provided in many of the City’s reserves, providing facilities for recreational cycling but not cycling as a mode of transport. (The City’s Bicycle Network is outlined in Figure 35).

![Figure 34: Shared Path](image)

In comparison to neighbouring local government areas, facilities for cyclists within the City of Stirling are poor. Problems include:-

- The cycling network does not adequately serve some parts of the City including strategic centres such as Mirrabooka or Stirling, and industrial areas such as Osborne Park, Herdsman Business Park and Balcatta. As major employment nodes these areas have the potential for a significant volume of cycle commuting to occur, however, poor access for cyclists and the lack of end of trip facilities are major barriers at the current time.
- Many primary distributors which could potentially provide direct cycling routes have no facilities for cyclists
Figure 35: Bicycle Network in the City of Stirling (This is not the City’s Plan but a representation of existing infrastructure)
and are unsuitable for on-road riding. Alternative routes are not direct and require cyclists to take frequent detours, adding time and inconvenience to a journey;

- Few safe or direct cycling routes run east-west over the City;
- The cycle route along Mitchell Freeway is disjointed, which would otherwise serve as a continuous cyclist thoroughfare into the City.

The City’s policy of constructing footpaths (and often shared use paths), only where specifically requested and petitioned for, has constrained the strategic value of the footpath and cycle-way network. There is room for significant improvement to the way that cycling facilities are planned for and provided around schools, activity centres and other destinations within the city. The fact that bicycle facilities are generally installed only as part of a larger road works program also means that cycling facilities remain fragmented for many years until the final stage of road works occur. The City is planning to review and redevelop its Bike Plan in early 2009 which will provide the opportunity for a more strategic approach to planning and developing a cycling network.

### Cycling Infrastructure

#### Infrastructure Design

Within the Perth Metropolitan area (including the City of Stirling) there are few dedicated bike paths, and consequently in most circumstances cyclists have to share space with either motorised traffic or pedestrians. Cyclists are thus often forced into a trade-off between the relative safety of shared paths which comes, with the inconvenience of having to accommodate pedestrians and frequently stopping at driveways and side-street intersections; or the more convenient and direct route option of on-road riding, which requires cyclists to ride in a less safe environment and interact with often unaccommodating motorised traffic.

While on-road bike lanes can offer a third solution – the directness and convenience of a dedicated cycling space which is separated from motorised traffic, on-road bike lanes are often not the infrastructure option of choice amongst local government engineers. Across the Perth metropolitan area, local governments (including Stirling) have historically favoured the construction of shared paths over the provision of dedicated cycling spaces – either on-road bike lanes or off-road bike paths – so much so that grant funding available from the State Government for the construction of on-road bike lanes is under-applied for by local governments.

Even where bike lanes are provided, in many cases there are just as many hazards and problems for cyclists as on roads with no dedicated cycling space. Traditionally low cycling priorities and site constraints mean that bike lanes are terminated before roundabouts and intersections, leaving cyclists to merge with motorised traffic and fend for themselves in the very areas where they need most protection from fast-travelling vehicles. Alternative road designs are used in eastern states and overseas to overcome these problems and provide a safer and more continuous cycling environment. To provide a truly continuous, safe and convenient cycling network, the City must begin to explore, develop and implement such opportunities.

Many roads within the City of Stirling were originally constructed at nine to ten metres wide, resulting in excessive vehicle speeds. By reducing the carriageway available to motorists, bike lanes can function as a traffic calming tool at the same time as improving safety for cyclists. However, bike lanes are very rarely utilised by city engineers in this way, and measures such as chicane and medians are more often used. However, these options often reduce the safety of cyclists: chicane often do not have ‘cyclist by-pass’ lanes and force cyclists in front of cars, while solid median islands create “squeeze points” between cyclists and overtaking cars. Whilst the majority of roads in the City of Stirling would comply with Austroads Standards for shared use by motorised and non-motorised vehicles, poor driving standards and the presence of kerb side
obstacles such as drainage pits are not conducive to a safe cycling environment. A prime example of this is West Coast Drive, where the road is now so dangerous for cyclists that only those who can travel at 40 or 50 km/hr choose to ride there.

It should be noted that the current position adopted by Main Roads Western Australia contributes to these issues and poses a major barrier to the creation of more cycle-friendly streets within the Perth metropolitan area. On-road bike lanes designed and constructed by a local authority should meet the design guidelines set out in Austroads Part 14, which allows for lane widths of 3 meters for cars plus a bike lane of 1.2 meters. However, at the current time Main Roads Western Australia will not line-mark a bicycle lane on any road which does not meet their internal road design guidelines, which require a minimum vehicle lane width of 3.2 meters or 3.5 meters for bus routes. Where space is limited, traffic-calmed roads are often retrofitted with 4.2 meters shared use lanes (motorists and cyclists) separated by a 2 meters median, rather than the 3.2 meters or 3.5 meters car lane/1.2 meters bike lane plus median required under Main Roads standards.

This design is used to allow sufficient clearance between cyclists and overtaking motorists, however the lack of marked bike lanes does not afford cyclists the protection of a dedicated space for use, and does not raise motorists’ awareness of a cyclists' right to use the road. In addition, the 4.2 meters lane widths can still encourage excessive speeds, and the “squeeze points” created mean that cyclists generally avoid these roads.

This road design does however present a significant opportunity to increase the provision of cycling facilities. If Main Roads Western Australia were to change their position regarding the endorsement of roads constructed to Austroads standards, many kilometres of these 4.2 meters lane roads within the City could be line-marked to provide dedicated bicycle lanes. It is therefore recommended that the City begin negotiations with Main Roads Western Australia to encourage this positional change.

To summarise, if the City of Stirling is to create an environment in which cyclists can travel freely and safely, the current engineering practices and infrastructure design standards used will need to be reviewed and cycle-friendly options used routinely. The City should consider the safety and needs of cyclists as comparable to those of motorists and be able to compromise when space is limited. Both should be given equal importance when designing and upgrading roads.

Suitability for use by target group
As mentioned previously, many West Australian local governments including the City of Stirling, favour shared paths as the infrastructure option of choice for cyclists. While in part this decision may be based upon real or perceived constraints which prevent the provision of alternative options, often this choice is cultural.

Little consideration has historically been given to the type of cyclists expected to utilise the facility, and whether the facility provided is appropriate for those cyclists. The needs of a commuter cyclist (direct high-speed route) are very different from those of a child cyclist (safety and slow speed) and different infrastructure choices should be made depending upon the intended purpose of the cycling route. In some circumstances, it may be necessary to provide several infrastructure choices along the same route to serve the needs of all cyclists.

The recent review of the Perth Bicycle Network highlighted the difference between the infrastructure that is currently being provided for cyclists and the infrastructure that cyclists actually want. Cyclists nominated
dedicated bike lanes as their infrastructure of choice for cycling on both quiet local roads and moderately busy roads, and dedicated bike paths for cycling on very busy roads. For all three road types, shared paths were only the third (of four) preferred options. Cyclists also rated dedicated bike paths as their path type of choice, followed by divided paths (separate area for pedestrians and cyclists), while shared paths rated as their least favourite option.

High use shared paths along rivers, coastlines and other scenic locations often experience higher levels of conflict between cyclists and pedestrians, and the suitability of shared facilities in high use areas is now starting to be questioned within Western Australia (including within the City). Pedestrians and cyclists have different needs and expectations and as path usage increases it may not be possible to meet these needs simultaneously. Many European cities with high rates of cycling favour dedicated facilities for cyclists – particularly along high-use routes – to enable cyclists to travel unimpeded by pedestrians.

Again, if the City of Stirling is to create an environment which encourages cycling, it will need to reconsider its future infrastructure choices. It will need to make strategic decisions about the types of cycling infrastructure it installs, based upon the intended user group and route purpose, as opposed to adopting a one-solution fits all approach.

**Signage**

Presently, cyclists in the City of Stirling are provided with little in the way of signage. Only Perth Bicycle Network routes are signed, and while the routes were fully signed when established in the 1990’s, street tree removal, underground power projects, vandalism and theft mean than many signs are now missing. Additionally, pole-mounted signage is not ideal for cyclists, whose line of sight falls more downwards than upwards, and the small size of the signs limits the amount of information that can be presented. Destination information presented on the existing signage is also often not ideal. While “ultimate” destinations are generally listed, cyclists travelling to key locations on-route to the final destination signed are often left unguided.

On-road or pavement markings has proven to be successful in several locations around Perth and the City. On road markings are also effective in alerting drivers of motorised vehicles to the presence of cyclists, and reinforce the legitimacy of cyclists to ride on the road.

Until very recently, Main Roads Western Australia were the only agency authorised to install bicycle route markings on roads. In late September 2008, Main Roads Western Australia agreed in principal that the City of Stirling could take over responsibility for the installation and maintenance of such marking themselves, on a trial basis. This decision creates an opportunity for the City of Stirling to start work on improving the signage of bicycle routes within its boundaries.

Figure 36 & 37: One of few examples where bicycle signage directs people to places they are likely to need
End of Trip Facilities and Mode Integration

The City of Stirling has historically provided end of trip facilities only at civic and public recreational facilities. In commercial and institutional centres, end-of-trip facilities are considered the responsibility of developers or employers. A bicycle parking policy is being developed for the City of Stirling, which mandates the need for end of trip facilities in new developments. The policy applies to non-residential development in excess of 400m² gross floor area, and multiple dwelling residential development involving five or more units. The policy requires facilities to be located (where possible) at the front of premises, at ground level and where there is appropriate passive surveillance, and showers and lockers must be provided when 10 or more bicycle spaces are needed.

While this policy will support and encourage cycling to larger developments, it is possible that cyclists will remain uncatered for in areas where many smaller developments take place. Joint-ownership or communal end of trip facilities may be an appropriate solution in these situations, where several small developments contribute towards a centrally located end of trip facility for use by individuals from many different organisations. Such a facility has previously been considered elsewhere, by the City of Subiaco, but was never progressed.

The policy is also only able to secure end of trips facilities for commercial centres actively being developed or redeveloped. Where it is desired that facilities are provided in existing centres, the City of Stirling will need to consider other mechanisms or incentives to encourage the introduction of these.

End of trip facilities at transit hubs allows for the integration of cycling and public transport journeys. The provision of end of trip facilities in these areas is the responsibility of the Public Transport Authority. Bicycle parking is available at all bus and train stations within the City of Stirling, however, few have secure storage facilities available (the only station with bicycle lockers is Stirling Station). Even where lockers are provided, it is important for there to be other storage facilities as well as showers – which are unavailable at all stations. The bicycle lockers should also be highly visible to ensure that people are aware that the lockers are there. While it may currently be impractical to provide all these facilities at all stations and stops (due to physical space restrictions and the cost), major private developments in the immediate surrounding area may have potential to provide facilities or facilities could be shared among different activities in a centre.

Allowing bikes on board public transport services may provide a more effective means of integrating the two travel modes. Currently, bicycles may be taken on any train outside of peak times, but only in non peak-flow directions during the hours of 7am and 9am, and 4.30pm and 6.30pm. Peak flow train services are already near full capacity and little physical space is available in carriages for bicycles. While extra carriages and specific areas for bicycles could in theory allow bikes to be transported during peak hours, there is little support for this idea within the Public Transport Authority at the current time. Bicycles are not currently permitted on any bus within Perth, and although interstate examples of bicycle-carrying buses exist, there is little support for this idea within Western Australia.

International and interstate experience generally shows much greater innovation in how bicycles have been incorporated into the wider transport network. Over the long term, some of these examples should find a place within the City of Stirling’s transport network. The City can continue to lobby the Public Transport Authority to consider the suite of opportunities available.
Promoting Cycling in the Community

Similarly to motor vehicle travel, cycling requires the traveller to master a level of competency in controlling their vehicle and to understand and follow rules governing the movement of vehicles on carriageways. Surprisingly, the ability to ride a bike competently is a skill that many people have never learnt, or have not practiced in many years, and many others can ride but are not confident in their ability. Because of the speed of travel and the need for interaction with either vehicles or pedestrians, riding a bike for the first time or after a long period of not riding can be daunting prospect and can even prevent many potential riders from cycling at all.

Within the City of Stirling there are currently no dedicated support services for would-be cyclists. A number of adult-rider classes are run by private service providers or cycling advocacy groups, but are infrequent. Bicycle education for children was previously provided free of charge through the Western Australia Police Service but this service ceased recently. Despite efforts by cycling advocacy groups and some State government departments, no equivalent service has been established although several service providers offer a similar service for a fee.

The City of Stirling is currently working with the Department for Education and Training and potential service providers to try to re-establish Bike Ed within the City. If successful, this program would be expanded to encompass adult learners and may require dedicated staff time and resources to run.

Outcomes

- The City has bicycle friendly network allowing cyclists to easily travel anywhere within the City;
- Travel by bicycle within the City is safe, direct and convenient with minimal impediment from traffic or pedestrians;
- The movement of cyclists is given priority over the movement of vehicles;
- Safe, secure and appropriate end of trip facilities are provided in major developments, centres and transport modes;
- Cyclist routes are clearly signed and easy to navigate.
- The City actively works to support and encourage community members in cycling for transport, through the provision of education, skills-training and associated services.
FOCUS AREA 4
PUBLIC TRANSPORT
FOCUS AREA 4 - PUBLIC TRANSPORT

Overview
There is significant potential to increase the use of public transport across the City. Public transport is considered a sustainable transport mode, for when used efficiently it presents fewer environmental costs than private motor vehicles per trip made. Furthermore, it is accessible to a higher proportion of the community given that it is affordable and accessible to all age groups. Increasing public transport use is consistent with the objective of the State Government’s Metropolitan Transport Strategy to redistribute trips made in motor vehicles to public transport and builds on recent infrastructure projects across the Perth Metropolitan Area to improve the public transport system. It is also important that public transport be provided before significant reductions in private vehicle usage can be expected. Focus Area 1 of this Strategy examined the need to consider land use and transport together in order to maximize the effectiveness of transport infrastructure. This section of the strategy builds on this topic, discussing infrastructure requirements, maximizing the efficiency of services and maximising accessibility to services.

Background Context
An effective public transport system is characterised by high levels of service coverage; and direct, reliable and frequent services. This can typically be achieved where it connects high-density areas and activity nodes, for the viability of services increases under this urban model. Typically, however given the dispersed nature of urban development over the City, some qualities of the system will need to be foregone to achieve other qualities (i.e. the objective of increased directness and service frequency services may conflict with the objective of wide coverage and frequent stops).

Public transport systems over the Western World generally consist of rail and buses (and increasingly light rail). Rail is of benefit when the key objective is to move many passengers at high speeds and at high levels of efficiency. Rail services are also highly visible in the community and are generally well-used. It is useful if train services are complimented by bus services which can cover wider areas with greater flexibility. The speed, frequency and directness of such bus services will typically be less than rail services, for it is generally not viable to deliver a system with such characteristics if it is also to cover large areas. It is otherwise (generally) expensive and inefficient to have high-frequency and direct services that cover wide areas.

It is generally beneficial to have rail as the dominant transit mode and for bus services to feed into/permeate out of train stations. Bus services then can connect with local areas. Some bus services can be high-frequency, but it may only be viable to only have some services operating at a higher frequency if the bus network is to also extensively cover suburban areas. So as to increase the efficiency of bus services, bus priority measures (such as bus lanes and preferential traffic signalling) can also be introduced which can be particularly important along major transit routes. Pedestrian accessibility should, however, remain a higher priority as part of an integrated and sustainable transport system and should not be jeopardised by public transport movement. The location of transit stops and time-tabling of services is another important consideration, so as to facilitate efficient trip transfer and encourage public transport use in the community.

Light rail is increasingly being used in cities as part of public transport networks. With increasing densities and increasing global recognition that the dominance of the car will be reduced in the coming years due to carbon emission cuts and the impacts of peak oil, light rail has never had a better time to make a comeback to the streets of Perth. The benefit of light-rail is such that it can offer relatively direct services like heavy rail but can be more easily implemented than heavy rail and more readily integrated with the existing urban fabric.
Compared to buses, light rail has many benefits including greater capacity, place making, easier route identification and narrower lane widths when running in dedicated lanes. Furthermore, global studies have shown that both heavy rail and light rail systems have a 25% patronage bonus compared to bus services on similar routes and frequencies. This is mainly due to the greater comfort and preference by commuters for rail based services.

It is not only the public transport services themselves that will impact their patronage. Associated infrastructure can also significantly impact the use of public transport. The design and quality of bus stops/stations and train stations can impact whether or not people use public transport.

- Shelters/stops/stations should be designed and located so as to be safe places i.e. Not closed/boxed off; they should be well-lit and located near activity as to provide passive surveillance;
- Bus stops should provide adequate weather protection (the number of shelters that are provided should be maximised);
- Public amenities (such as shops, toilets, seating) should, where possible, be located near stops/shelters/stations to enhance the amenity for and comfort of patrons;
- Shelters and stations should be designed so as to contribute to local sense of place and the creation of a place people would want to be.

The provision of information regarding services and to orientate commuters can also significantly impact public transport use. It is particularly beneficial if such information is provided in a real-time capacity so as to provide commuters with greater assuredness when using public transport.

Meanwhile, the extent to which people can walk to/cycle to transit stations can also impact the extent to which people use transit. This is particularly important, for once people make one leg of their journey by way of motor vehicle, they are more likely to make the rest of their journey by way of motor vehicle as well. The City need also be mindful of the need to ensure that bus stops/shelters do not present impediments to pedestrian movement along paths and do not present significant traffic problems.

There should still be attention paid to the provision of park ‘n’ ride facilities as well, given that there are presently high levels of car dependence in the community and that park ‘n’ rides can play a significant role in shifting private motor vehicle trip to public transport trips in the long term, however, it would be beneficial to reduce the dependence on park ‘n’ ride as a greater proportion of commuters begin to use alternative modes to access stations.

Public transport in the City of Stirling is operated and managed by the Public Transport Authority (PTA) which controls public transport over the entire Perth Metropolitan Area. As such, the extent to which the City can influence the provision of public transport is constrained as the PTA influences the routes of bus services, frequencies, time-tableing and bus stops/shelters. Issues such as the reliability of services and comfort of public transport, which have been shown to influence travel behaviour are therefore largely outside the City’s control. Yet the City still has significant scope to increase the effectiveness of the local public transport system by working with the PTA and through its role in the provision of associated infrastructure.

The City is still able to influence: -
- The provision of services by way of lobbying/collaborating with the PTA;
- The provision and location of bus stops and shelters so as to support land use and transport planning;
• The quality of bus stops and bus/train stations so as to ensure they provide high levels of amenity and are safe and comfortable places to be;
• The level of security and safety around public transport stops/stations;
• The integration of transit and pedestrian and cyclist trips (by way of pedestrian/cyclist infrastructure and end of trip facilities);
• The provision of information services to guide public transport use;
• The provision of park ‘n’ ride facilities; and
• The extent to which the movement of transit is prioritised over the road network.

Opportunities and Constraints Analysis

Rail Network

Existing Lines and Rail Services
The primary transport corridor throughout the City is provided by way of the Northern Suburbs railway line. Train stations that service the City along this line are located at Glendalough, Stirling and Warwick. A second rail service through the City is provided by way of the Perth-Midland Railway, which has one stop within the City at Mt Lawley. Refer to Figure 38 for the railway routes and stations.

Figure 38: Transit Nodes and Railway Lines
The use of rail services in the City has increased over recent years, since the introduction of the Northern Suburbs Line and there are now capacity issues during peak times. This growth also corresponds to increased costs to run private vehicles. The City can lobby the Public Transport Authority to purchase additional trains to meet increased demand.

The extent to which the City’s rail network works in synergy with bus services and cycling and pedestrian networks is limited however, with much dependence on car travel to and from major stations along the Northern Suburbs line. The ‘Park ‘n’ ride’ facilities that surround stations limit the potential for active land uses around stations of which would otherwise increase the extent to which people can integrate transit with pedestrian and cyclist trips. Meanwhile, the stations on the Northern Suburbs line are located in the middle of the Mitchell Freeway reserve, thereby limiting the pedestrian catchment of the station. Given that the legibility of the urban form is often limited in the streets around train stations, pedestrian and cyclist accessibility to the stations is often restricted further. Opportunities to integrate land use and transport planning, including planning for rail accessibility, were profiled in Focus Area 1 of the Strategy, while opportunities to integrate cyclist and train travel are also explored under Focus Area 3.

There are a number of bus services that connect with stations on the Northern Suburbs line and further routes have been proposed under Focus Area 1, as part of moves to better connect activity centres and transit hubs. Increasing accessibility to stations for buses would prove to be a more sustainable outcome and reduce the growing dependence on ‘park ‘n’ rides’. Yet, there are limitations with regard to how more buses could connect with train stations, whereby there is limited space for additional buses at the stations. To overcome this issue, the City could liaise with the Public Transport Authority to upgrade stations. Meanwhile, there are no bus routes connecting with the Mt Lawley Train Station. As part of moves to introduce new services across the City, greater connectivity with this station could be created.

It is of importance however that provision is still made for park ‘n’ ride facilities at railway stations. While the Western Australian Planning Commission does not encourage parking around centres, it still forms a highly effective means of encouraging some shift towards public transport use given Perth’s current high levels of car dependence. Over the long-term, provision for alternate modes may however reduce the need for park ‘n’ ride facilities. Mechanisms to increase the occupancy of vehicles entering the park ‘n’ rides and kiss ‘n’ rides may also help to alleviate parking pressures. Alternatively, the implementation of multi-level or underground parking, as opposed to at-grade parking, could be beneficial.

**New Railway Line**
As discussed in Focus Area 1, there is potential to construct a new heavy rail route within the Reid Highway reservation (Figure 21). This route would form the basis of a Circle Rail Route that would connect with all the existing heavy rail lines in Metropolitan Perth. More detail is provided in Focus Area 1 regarding this proposal.

**New Light Rail Transit**
As discussed in Focus Area 1 (and as illustrated in Figure 16), there is also potential to construct new light rail transit routes over the City. Perth previously had an extensive tram network that extended north and south of the Swan River. The City of Stirling had numerous routes running through its boundaries right up until the late 1950’s. These included Beaufort Street, Walcott Street, Scarborough Beach Road and Main Street services. The built form along these roads is a consequence of the tram lines and would still largely be conducive to the re-introduction of such services.
The City is also currently working with the Western Australian Planning Commission on the Scarborough Beach Road Activity Corridor Study which is a comprehensive transport, land use and urban design study. One component of this study is to determine the width required for light rail infrastructure along Scarborough Beach Road and contribution payments from landowners for this infrastructure in return for parking concessions. This model of contributions for high quality public transport services may be extended to Beaufort Street and Wanneroo Roads. Further lobbying of the State Government is also critical in ensuring that light rail becomes a reality over the next 15 years.

Significantly, there is a need to ensure that any future light rail transit is integrated with existing public transport systems (both physically in allowing for ease of trip transfer and operationally) to ensure that it forms an effective component of an integrated transit network. Increasing bus services (particularly high frequency services) may also be required as an interim measure where the feasibility of light-rail is limited. In saying this, opportunities for light-rail are increasingly likely to emerge over time and it is already important to consider the application of light rail over the City.

Bus Services

Other parts of the City of Stirling are serviced by buses which are operated by the Public Transport Authority. Bus services provide transport to a range of destinations throughout the City including major centres and local residential areas.

The frequency and directness of bus services over the City is varied. Some of the bus services are listed below and those marked with an asterisk are of relative high-frequency and direct (approximately 15 minutes during non-peak):-

- The Circle Route, which links many key centres in and around the City of Stirling on a high frequency basis, such as the Stirling Regional Centre, Morley, Dianella as well as the Stirling Train Station. The Circle Route links a number of transit services that radiate out of Perth as well*;
- Services along Alexander Drive (Perth – Mt Lawley – Dianella - Malaga)*
- Services along Wanneroo Road (Perth – Tuart Hill – Balcatta – Balga)*
- Services along Scarborough Beach Road (Glendalough – Innaloo – Doubleview – Scarborough)*
- Services between Stirling and Warwick Station via Carine, Karrinyup, Hamersley, Balcatta
- Services between Stirling and Glendalough via Main Street, Osborne Park, Balcatta
- Morley to Perth via Inglewood, Mt Lawley via Beaufort Street Mirrabooka to Perth via Nollamara, Yokine; and
- Mirrabooka to Morley via Dianella.

There are some general problems with the frequency of services over non peak periods; services not extending into the evening or over weekends; and with routes being indirect. Meanwhile, some parts of the City are poorly serviced by buses (although this is in large due to poor pedestrian connections to public transport).

The following opportunities exist to improve the bus network (in conjunction with the PTA):-

- Develop activity centres and introduce high-frequency bus routes between the centres (some of which have been proposed in Focus Area 1);
- Introduce developer contributions/cash in lieu schemes towards public transport infrastructure to help address shortfalls;
- Introduce new local services - the PTA has indicated that a new service to Princeton/Roselea is a
There are also proposals for services to be run on an increased frequency timetable and/or for improvements to existing services along Alexander Drive, Beaufort Street, between Perth and Morley and along Scarborough Beach Road. A new CAT service through Glendalough has been operating (from September 2008) which intends to address significant service shortfalls through Herdsman Business Park and Osborne Park. The increase in the City’s population and workforce over the next 20 years will see considerable high rise infill development around Stirling Train Station, Glendalough Train Station, Mirrabooka Regional Centre and Scarborough Beach which will also work to support the introduction of new routes.

It is also beneficial if converging bus services provide for efficient trip transfer. Yet it can be difficult to coordinate timetables to allow for this and the PTA has already made efforts to coordinate services. The co-location of stops and the provision of high-quality infrastructure at these stops, to allow for comfortable commuter waiting and transferral, would however be beneficial. The ITS Strategy Map indicates areas where major transit routes; existing and future; converge and where such considerations are particularly important. Most of the converging points are already centres though some are not (such as at the intersection of Morley Drive and Flinders Street). Where there is not an activity centre at such a location, there may be scope for the introduction of high-quality mixed use development at these sites to contribute to the amenity of these points.

Public Transport Associated Infrastructure

The major public transport nodes in the City include train and bus interchanges, these allowing for trip transfer between different public transport services and different travel modes. Appendix 2 profiles issues affecting the major transit stations throughout the City relating to their aesthetics, facilities and accessibility. The PTA is responsible for maintaining and developing such facilities, though the City can work with the PTA and the community to identify priorities for improving facilities; develop new stations or re-develop existing stations. The ideas and concepts explored under Focus Area 1 (Integrated Land Use and Transport) should however help to make stations safer and more amenable places, by way of having places with activity around stations and integrating bus and rail stations into town centres. Centre improvement programmes provide scope to achieve such outcomes. On this note there have been discussions with the PTA over the future of the Mirrabooka Bus Station and it is likely that this will be renovated as part of the Mirrabooka Regional Centre Improvement Strategy.

Access to public transport over the City is more generally provided by way of bus stops. While the PTA designates public transport routes, the City can determine the location of stops. Bus stops in some cases are located adjacent to local commercial centres or facilities, which is beneficial for it allows greater access to such activity bases, can provide higher amenity around the stops and maximises activity around the bus stops thereby enhancing passive surveillance. In some cases, however, bus stops will still need to be located directly outside residential homes. An overall strategic approach to the positioning of bus stops is however lacking, which could otherwise maximise the extent to which bus stops are located outside commercial areas and facilities and allow for different routes to converge. Stops have been provided in response to strong community pressure and residents can also veto the placement of stops where they may have actually provided benefit to the community. A strategic approach to the siting of bus stops would help to overcome residents vetoing the placement of stops. Council must however remain mindful of pedestrian and cyclist movement around bus stops as well as how motor vehicle flow could be impacted by the positioning of bus stops.
Some bus stops in the City have bus shelters. While the City controlled their provision in the past, the Public Transport Authority now has this responsibility. Nonetheless, the City could still work with the Public Transport Authority to influence the provision of shelters. Opportunities to increase the provision of bus shelters, particularly along key routes indicated by the Integrated Strategy Map could be examined by the City and worked through, in conjunction with the Public Transport Authority. The City need also ensure that the stops are well-lit (as explored in Focus Area 1 also) and Disability Discrimination Act compliant.

Opportunities to increase the extent to which bus shelters reflect local sense of place should also be examined in conjunction with the Public Transport Authority. The City of Subiaco, for instance, has bus stops which provide a point of interest. The City of Stirling has developed a Local Centres Urban Design Guide, which may be useful in determining colour schemes for bus shelters. There may also be opportunities to integrate community arts projects with the design and enhancement of bus shelters.

Figures 39, 40 & 41: Bus Shelter in the City of Subiaco, which adds a point of interest to the street-scape (left) and more standard shelter designs in the City both new and old (middle and right)

Prioritisation Measures
There may be provision for future bus prioritisation throughout some areas of the City by way of bus lanes. There are however limits to which the road network should specifically cater for buses as separate bus lanes will require additional space and resources and potentially impose traffic problems. In many cases it may not be feasible to implement bus lanes due to space requirements. Other measures to prioritise bus journeys include filter lights, which would favour the movement of buses over private motor vehicle traffic, although these could also cause traffic delays. For these reasons, the introduction of bus prioritisation may be met with community opposition. Extensive community consultation would be required in order to ensure that bus priority measures could be implemented. However, the City could still work with the PTA to determine the feasibility of the introduction of bus lanes along the City’s major transport routes and the PTA currently has funding for the introduction of a bus lane along Alexander Drive. An additional benefit of bus lanes is that they can provide space for future light rail reserves.

Information Services
The PTA is primarily responsible for the provision of public transport information services. Train stations throughout the City have real-time information whilst bus stops will often have signs with routes and times and destinations. Yet there are no bus stops where real time information is provided. Moreover, the full range of destinations, which could be accessed on a bus service, are rarely provided. Meanwhile, some bus stops do not have any information at all. Patrons do however have access to Transperth staff at major stations and an on-line journey planner, which is operated by Transperth.

It would prove costly to install real time information services at each bus stop throughout the City. There should at least be timetable information provided at stops and more information provided as to where services go. It would be useful for the City, as a major local authority, to liaise with the PTA to audit where it would be
particularly beneficial to have real-time/high quality information, this likely to be along the corridors specified in the Strategy Map and intersection points. The City also has opportunities to increase the provision of information regarding local transport services as part of its Community Development activities/ Travel Smart programme.

**Figure 42:** Signage provided at bus stops to provide timetable and directional information. Such information should be provided at all bus stops throughout the City.

**Funding Mechanisms**

Increased public transport provision and improvements to public transport services can be at least in part funded by developers. Provisions which generate cash-in-lieu as well as those which place the onus of demand management on trip generators, can provide public transport funding. There are also opportunities for large developers to contribute to public transport infrastructure in exchange for development concessions. This approach is already being trialled in areas such as Stirling Regional Centre so as to support the introduction of new services in and around this centre and would also work well along Beaufort Street given that there is much commercial demand along this corridor. The City may also work with major landowners such as educational facilities or retirement villages to determine whether contributions can be made to fund services which directly benefit their operations (the Department for Planning and Infrastructure is now requesting they have more input into working with Universities, particularly in developing bus services). Experience with implementing the Glendalough CAT bus shows that the development industry has supported private contributions to fund new services.

Key Opportunities include:-

- Working with developers to generate support to contribute to the cost of the introduction of new transport services (as has been done in Glendalough);
- Increasing the use of parking concessions or provide density bonuses to generate contributions towards public transport (to explore this as part of activity centre/corridor studies such as Scarborough Beach Road Activity Corridor Study).

**Mode Integration**

Integration between public transport and pedestrian and cyclist networks as well as the inter-relationship between public transport and parking infrastructure have predominantly been explored in other sections of the strategy.

**Outcomes**

- The City supports and lobbies for the introduction of the Heavy Rail Circle Route and additional railcars to meet demand increases;
- The City supports and lobbies for the development of light-rail routes and infrastructure along the City’s activity corridors and through Stirling City Centre;
- Major transit routes throughout the City provide high-frequency and reliable services;
- High frequency bus services (15 minutes during day, more than 15 minutes during peak) and/or...
light-rail services interconnect local areas, local centres and mass transit services*;

- The location of bus stops/light-rail stops allow for ease of trip transfer;
- The provision of bus shelters is prioritised along high frequency routes and maximised along other important routes;
- High levels of activity around transit stations and stops make public transport use a safe and attractive option;
- The design of bus shelters and transit stations are functional; make public transport use safe and add to local sense of place;
- Increased pedestrian, cyclist accessibility to stations and increased bus services feeding into stations, reduces dependence on Park N Ride facilities (particularly at-grade parking facilities);
- Bus movement along major routes is prioritised over private motor vehicle transport;
- High quality destination-orientated information is provided at the City’s bus stops and interchanges
- All forms of public transport (train, bus and light-rail) form an integrated network (both physically and operationally).
FOCUS AREA 5
FREIGHT
FOCUS AREA 5 - FREIGHT

Overview
The efficient movement of freight over the City is needed to satisfy the needs of the City’s businesses and encourage business growth. Globalisation, increased just-in-time processing as well as the general growth occurring throughout the Greater Perth Region is placing additional pressure on the freight system. Meanwhile, there is the need to consider the impact of climate change and peak oil on freight movements. On the other hand, the impact that freight often imposes on local communities (with issues such as noise pollution and severance common along freight corridors) and the possibility for conflict between the development of activity corridors and the freight network throughout the City, must be also accounted for in transport planning.

Background Context
The freight network should provide for efficient movement of freight between major areas of production and distribution, which are generally larger industrial areas but also commercial centres. The freight network throughout the City of Stirling consists of a network of major roads, with no provision for freight movement by rail. Ultimately, the current dependence on road freight is unsustainable and is likely to generate many problems into the future.

Where a high level of dependence on road based freight exists, a key concern is to mitigate the impacts of on urban communities and other road users such as pedestrians and cyclists. Road networks, which carry high volumes of freight, are largely inappropriate environments for other activities and for more sensitive land uses to abut (i.e. aged care institutions, schools). In addition, the presence of freight will often restrict access among other users. Therefore, it becomes important to isolate freight from activity corridors and residential areas and prioritise the movement of freight along designated routes/corridors and impose controlled access. Freeways and major highways will typically be most appropriate environments for heavy freight patronage.

Whilst efforts can be taken to separate freight from significant areas of activity and residential areas, freight may need to access businesses within centres and travel through local residential areas and areas where pedestrians and cyclists will also commute. Amenity for all road users must be maintained in establishing an integrated transport network. Freight derived issues such as severance and noise pollution can also bear significant impact on the development of local communities. Maintaining access for local traffic and pedestrian overpasses can prove effective in overcoming the issue of severance whilst the placement of buffers such as commercial/industrial land uses along freight corridors can prove effective in dealing with noise issues.

Ultimately, the City has little influence over freight networks given the highly metropolitan wide nature of freight, yet it can still play an important role in working with State Government, in controlling the function of industrial areas and in mitigating the effects of freight on local areas.

Opportunities and Constraints Analysis
Freight Networks
The Western Australian Planning Commission has issued a Draft Statement of Planning Policy Metropolitan Freight Network (Western Australian Planning Commission, 2004). The key purpose of the policy is to identify and protect the metropolitan freight road and rail network. The network is to provide for efficient freight movement between primary industrial and commercial areas and reduce the impact of freight on surrounding developments and local areas, which are reflected in this Strategy.
The City of Stirling’s freight network is based on the Metropolitan Freight Network. The network follows major controlled ‘Primary Distributor’ roads such as Reid Highway, Mitchell Freeway and Wanneroo Road as well as various ‘District Distributor’ roads such as Main Street and Hutton Street. Main Roads Western Australia (MRWA) is responsible for Primary Distributors whereas the City is responsible for District Distributors. The network is outlined in Figure 43.

Meanwhile, the State Government’s Planning Strategy for Metropolitan Perth, Network City distinguishes between corridors that are appropriate for freight and those which should be activity corridors.

The City of Stirling’s Freight Network and the proposed freight and activity corridors within Network City are illustrated in Figure 44 according to the legend below:

- The existing/proposed City freight network (red);
- Activity corridors and activity centres (blue);
- Network City’s proposed freight network (green); and
- Industrial areas – these being typical sources of freight.
Mitchell Freeway and Reid Highway are identified as freight corridors in the City’s existing freight network and within Network City. These are ideal routes for freight movement for they allow efficient movement of freight and link major industrial centres including Osborne Park, Balcatta and Malaga (which is just beyond the City’s eastern boundary). Increasing the efficiency of the freight corridor network could be achieved through overpasses along Reid Highway (at Mirrabooka Avenue and Alexander Drive). The City has lobbied the Government for funding towards these projects and it is likely (as of early 2009) that the State Government will provide such funding. The reduction in motor vehicle dependence that is anticipated upon increasing accessibility for other transport modes is also expected to reduce the dependence on these major roads by motor vehicles. This is then likely to increase the ability for freight to travel efficiently. Ultimately however, the City does not have much authority over these roads - with the Department for Planning and Infrastructure and Main Roads Western Australia designating and managing these roads respectively.

There are also numerous other roads included in the City’s Freight Network, some of which have been identified as activity corridors in Network City or run through important activity centres. The presence of high levels of freight along such corridors would limit their functions as activity corridors as pedestrian and cyclist amenity would be impacted. Where both blue and red feature along Roads in Figure 44, such a problem is of concern. These roads include most of Wanneroo Road, Morley Drive, Scarborough Beach Road, West Coast...
Highway, Main Street and Ellen Stirling Boulevard. It is reasonable to expect that some freight vehicles will need to use such routes, but it may be appropriate to encourage the use of other roads for freight movement, namely Reid Highway and Mitchell Freeway. Improving Reid Highway and Mitchell Freeway to enhance the provision they make for freight would also support this. Again the City would need to work with Main Roads Western Australia to ensure such roads provide for all road users.

Other roads such as Alexander Drive north of Reid Highway and West Coast Highway north of Karrinyup Road could support moderate to high levels of freight movement for they are wide roads with few access roads and in the case of Alexander Drive abut industrial land uses as well. These are identified in Network City as possible freight corridors. Reid Highway and Mitchell Freeway should, however, remain the focus of the freight network for they can provide for efficient freight movement and are set well away from sensitive land uses.

Stephenson Highway may also form a future freight route, connecting Fremantle to Osborne Park. However, whether this is required is in question. If developed, the way the highway navigates through Stirling City Centre is yet to be determined. If this is to form a link in the Metropolitan Freight Network, then the City and Stirling City Centre stakeholders will need to be mindful of maintaining accessibility for other modes of transport through and in the vicinity of the Stirling City Centre. (Which is occurring already as of early 2009).

**Rail Freight Networks**

A key recommendation of the Freight Network review is to increase the share of freight trips on rail, particularly for container traffic. The City of Stirling currently has no freight rail lines and the existing passenger lines are no longer utilised for freight as they once were. With the recommendations from the Freight Network Review and the likely impacts of carbon emission cuts and peak oil there is an opportunity to re-evaluate freight movements on existing rail lines and future light and heavy rail lines. Such moves would ultimately reduce the impact of freight on local centres.

In Europe light rail lines are being utilised for freight traffic between midnight and early morning to deliver goods to local businesses along these routes. Until the early 1990’s the Perth Metropolitan Rail Network was still used for the traffic of freight around the Perth Metropolitan Area. This ceased with the electrification of the network, however a portion of the Fremantle line is still shared with freight trains. Most rail systems worldwide share the network between passenger and freight services. In Perth there is potential for the existing passenger lines to be used for freight services, particularly between the hours of midnight and 5am when no passenger services are being run. This would require re-integration with the freight lines, the construction of spur lines with appropriate industrial areas and leadership from the State Government. The City can however lobby for the introduction of freight by rail. It should also be noted that the City is currently investigating the potential for light-rail-transit in areas such as Osborne Park, which should also be taken into account when planning for future rail based freight proposals.

**Freight in Local Areas/Activity Centres**

Whilst efforts are being taken to designate freight corridors as to avoid impact on local communities, in some cases local businesses will require freight to come into local areas. Freight must also get into the industrial areas from the major freight routes and will need to use local roads in doing so. Opportunities to deal with associated problems include:

- The identification of problem hot spots where freight is common and ensuring that pedestrian and cyclist
amenity is enhanced in these areas;
• Examination of opportunities to limit the times freight vehicles serve particular areas (i.e. non peak times);
• Review of loading and delivery zone provisions within activity centres as to avoid conflicts between freight vehicles and pedestrians;
• Concentration of major freight generating activity to locate only in the areas close to the freight network and within particular nodes within industrial areas;
• Maintaining pedestrian and cyclist networks over the City (as outlined in Focus Area 2 and 3).

The prioritisation of freight along the freeway network reduces the extent to which freight severs and imposes negatively on communities. Major industrial areas abut these thoroughfares, which reduce the extent to which these roads impact on sensitive land uses. Further more, a number of overpasses cover these roads.

Reducing Freight
Essentially minimising the need for freight in the first place would be beneficial in reducing problems with freight. Greater integration of land use and transport planning (as has been explored in Focus Area 1 of the Strategy) would be of benefit (namely mixed use development).

Industrial Area Protection
A key role of the City in dealing with freight relates to its control over the development of industrial areas, given that these are key sources of and destinations for freight. Amendment 492 to District Planning Scheme 2 has recently been gazetted which looks to maintain traditional industrial activities within industrial areas and control the amount of showroom development in industrial areas. Such initiatives should curb the diffusion of existing freight patterns across the Perth Metropolitan Area.

Outcomes
• The City supports and lobbies for future introduction of rail-based freight;
• The freight network allows for the efficient movement of goods throughout the City, connecting with industrial areas and integrating with the metropolitan freight network;
• Freight movement is prioritised along designated freight corridors as to discourage its presence on local roads;
• The need to transport goods is minimised through centralisation of freight producing activity in industrial areas and integrated land use and transport planning;
• Pedestrian and cyclist amenity is maintained where freight must enter local areas, activity centres and/or other areas where there are likely to be pedestrians and cyclists
• Industrial activity is maintained and continued to be confined to industrial areas.
FOCUS AREA 6

PARKING
FOCUS AREA 6 - PARKING

Overview
The need to provide for parking requirements is growing over the City as its residential population and commercial activity increases. However, the provision of parking comes at a significant cost to local governments and communities - in terms of the financial resources required to provide parking and the loss of land for more productive activities. Furthermore, parking can present a significant blight on urban landscapes. To focus on satisfying the growing demand for parking in an unco-ordinated fashion is seen to be unsustainable, for the costs it presents and given that this approach generally increases demand for more parking areas, as commuters increasingly expect parking to be available and choose to drive (Victorian Transport Policy Institute, 2007c).

It is ultimately preferable to encourage commuters to use alternative transport modes so as to reduce the need for parking areas. Yet any strategy which aims to reduce parking provision need account for Australia’s (and Perths in particular’s) ‘love affair’ with the car. Efforts to reduce the dependence on parking, in the absence of viable alternatives, is likely to be difficult. Consequently, there should be a large focus on how to manage existing parking areas more efficiently so as to avoid the need to use more areas for parking. There need be consideration for where parking should be provided and how it should be provided; as opposed to providing more parking on an ad-hoc basis. Better management of parking areas can also help to increase accessibility among and encourage use of, alternative transport modes (such as public transport, cycling and walking). Over the long-term, as greater provision is made for alternative modes, reductions in the need for parking could then be expected.

There are also special parking needs that need also be considered within an Integrated Transport Strategy. Bicycle parking has been examined within Focus Area 3 of the Strategy, while ‘Park N Ride’ issues and opportunities have been examined in Focus Area 4.

Background Context
The traditional approach to parking provision has been to predict how much parking is needed and then provide more parking spaces to meet demand. Local authorities have tended to either provide parking themselves or have required private developers to provide parking, so as to allow self-containment of parking demand on-site. This has generally resulted in unco-ordinated parking provision. In addition, parking has also usually been provided on the basis that it should meet maximum levels of demand, leaving many parking spaces under-utilised. This contrasts with general pre-conceptions that there is too little parking to meet current levels of demand.

The provision of parking is also increasingly expensive, with increasing land values and costs of construction adding to the overall cost of parking. It has been estimated that it costs $1 million to provide 25 parking bays, financial resources of which could be channelled into more productive and sustainable activities and land uses.

Of particular significance, Network City - advocates that parking in centres should be reduced and that use of more sustainable transport modes should be encouraged. This strategy primarily works towards this metropolitan-wide objective. There is however still a need to consider how the transition towards parking reduction should occur, which this Strategy aims to examine.

Parking Management
An alternate approach to providing for parking in the community is ‘parking management’. Instead of simply
providing more parking; parking management looks to how parking areas can be managed better so as to reduce the need for additional parking resources and/or the number of parking spaces required.

Parking Management can involve:-

Share/Reciprocal Parking
Allowing for car parking spaces to be shared among various users or reciprocally, that is the same car park is used by different users over different times, can significantly increase the utility of existing parking areas. There may however be a need to coordinate various parking demands for this to work. There is also benefit in having a mix of land uses (as has been referred to within Focus Area 1) to support this, as this potentially allows for greater use over different times of the same parking facilities. What is more, the greater the pool of users then the greater the opportunities for parking facilities to be shared. As such, it can be particularly beneficial if developers pay cash in lieu to the City so that centralized parking facilities may be developed in activity centres (Victorian Transport Policy Institute, 2007).

Car Park Design
Car parking areas can often be designed to be used with greater efficiency, thereby reducing the need to supply additional land for parking. This also has the benefit of providing more navigable parking areas thereby reducing the need to drive around for parking spaces and providing for safer traffic movements through parking areas. Strategies include:

- Redeveloping/organizing existing parking areas as to utilize all space;
- Providing some spaces for smaller vehicles and clearly designating such spaces;
- Clearly marking all spaces as to use space efficiently;
- Ensuring the high repair of parking areas so as to contribute to how well that space is used. (Landscaping, general cleanliness, surrounding building design and appropriate storm water management can impact the effectiveness of parking areas).
- Ensuring that parking areas are safe from crime

Parking control
As so to increase the utility of parking bays the following can be useful:-
- Higher occupancy vehicles are given priority access to the most convenient spaces (this would also encourage telecommuting); and
• Parking duration could be limited around locations which are most frequented throughout the community to encourage greater turnover of parking spaces.

Information
Parking and associated problems can be reduced if information is provided to direct motorists through parking areas and if information is provided regarding parking space availability and parking regulations. Informed motorists are more likely to be able to navigate through parking areas effectively and efficiently; and spaces are more likely to be used efficiently. If motorists are properly informed of parking options and alternate transport options, they are also more likely to be less resistant to parking regulations. Ideally information should be provided in a real-time format, to ensure its relevance to motorists.

Paid-Parking
Charging for parking can (in particular instances) be appropriate to reduce the need for parking and/or to control the use of parking areas. Where paid-parking is introduced, the user becomes more responsible for the parking demand they create (which is consistent with the user-pay principle) and more trips are likely to be shifted to alternative transport modes. Paid-parking has been shown to be effective given that people will often pay for the convenience and assuredness of obtaining a parking space while use of alternative modes is seen to increase.

Yet, charging for parking may not be appropriate in all areas. If there is a need to stimulate economic activity in an area, then charging for parking may be seen to further stifle growth there. Studies have shown that charging for parking is more appropriate in areas where there are existing high levels of parking occupancy. It follows that areas that are high travel demand generators are often more appropriate locations for paid-parking schemes. Measures to reduce parking in such locations would be particularly useful given that much travel would be to and from such places in any case. It is also important that provision for alternate transport modes be made prior to the introduction of such schemes.

Mode Integration
Parking management can also impact pedestrian amenity (as referred to in Focus Area 1 and 2). Car parking can dissect the urban form as it can create large voids of unutilised space and create car-based environments which disconnect pedestrians from activity generators. Key provisions to ensure that parking areas do not significantly impact pedestrian amenity include:

• On-street parking and rear parking (to avoid large carparks that pedestrians must travel through);
• Maintaining pedestrian access through parking areas which connect to activity generators (maintenance of paths, introduction of traffic calming etc);
• The adoption of Crime Prevention Through Environmental Design principles in the design of parking areas as well as appropriate lighting and security.

On-street parking and at-rear parking are also seen to have less visual impact on the urban form and on-street parking is also a traffic calming tool.

Meanwhile, it is intended that upon better management of existing parking resources that there would be few issues with parking spilling over into residential areas. Yet in the event that parking does spillover into such areas, there should be mechanisms to prevent reduction in pedestrian and local resident amenity. Further regulations such as residential parking permits and restrictive parking will be required on streets in residential areas.
Parking Funds
Funds from paid-parking and cash-in-lieu from parking can be useful for the City to use to support the provision of sustainable transport modes (It is of note that cash-in-lieu calculations should include cost of land to reflect the real-cost of parking). This in turn can reduce the demand for parking.

Opportunities and Constraints Analysis

Recent studies into parking over the City indicate that:-
- While there are high-demand parking areas, parking issues across the City are more due to poor management as opposed to an overall supply problem;
- Parking arrangements over the City tend to be highly dysfunctional (with little in the way of shared/reciprocal parking or parking controls to otherwise make optimal use of parking areas);
- Parking arrangements often present significant urban blight and barriers to pedestrian amenity;
- There is a focus on planning for maximum levels of parking demand (which tends to result in poorly utilised parking areas);
- There is little incentive for people to reduce their dependence on motor vehicle travel and use alternative transport modes given an abundance of free-parking.

Many of the mechanisms to deal with the City’s parking issues are included in the City's Parking Policy, which was adopted in 2006 and which has been incorporated into draft Local Planning Scheme No.3.

The City’s Parking Policy aims to:-
- Facilitate the development of adequate parking facilities;
- Ensure safe, convenient and efficient access for pedestrians, cyclists and motorists (with regard to areas within and around parking areas);
- Ensure that a major parking problem is unlikely to occur;
- Ensure that parking does not have a detrimental impact on the character and amenity of residential areas; and;
- Ensure that the provision of parking does not discourage the use of alternative forms of transport, nor is detrimental to urban design.

The Policy primarily sets out car parking standards and variations to such standards where:-
- Reciprocal parking exists between various land uses;
- Various uses will not create significant influxes in parking demand at one given time of day;
- Parking demand both in the short and long-term can be satisfied and;
- Various other criteria are met.

Alternatively, where a development is located near existing parking areas (as indicated in Figure 47), a high frequency bus route, train station or town centre; various parking concessions may be granted at Council’s discretion. Where developers have identified a parking shortfall, cash-in-lieu contributions may be required. The policy therefore promotes the use of more sustainable transport modes and reducing the dependence on parking.

The City also requires the submission of transport assessments for developments that would generally otherwise create significant parking demands or could make use of existing public transport. Such statements can refer
to vehicle access arrangement; provision for service vehicles; operation times; daily traffic volumes and type of vehicles (staff and customers); the location of nearest bus stops/train stations; impact on accessibility for pedestrians and cyclists; anticipated parking demand as well as assessment of the potential impact of parking on the amenity of the surrounding area. The assessment is again (in part) aimed at providing parking efficiently throughout the City and reducing unnecessary parking.

There are however various opportunities available to the City to further influence (and over time reduce) parking provision so as to provide for a more sustainable and efficient transport system. These opportunities include:-

- Ensuring that Transport Assessments are implemented fully and account for both site and local transport considerations;
- Encouraging shared/reciprocal parking by working with major activity generators to re-assess parking requirements and helping to implement reciprocal parking schemes;
- Auditing where existing parking areas could be upgraded or re-configured so as to use such spaces more efficiently and increase pedestrian amenity through parking areas; and for the City to then facilitate or support upgrades;
- Giving scope for cash-in-lieu from parking to be spent on more strategically located parking facilities;
- Examining the introduction of more comprehensive guidelines to control parking layout and design/maintenance;
- Considering the use of parking limits in key locations around activity generators so as to make greater use of the most convenient spaces and so as to encourage high-occupancy vehicles to use such areas (this would be particularly beneficial as part of centre renewal projects);
- Investigating the nature of information that motorists and pedestrians require in parking areas and seeing that signage/information is provided accordingly;
- Considering the use of residential parking permits to reduce overflow parking into residential areas;
- Ensuring that ‘Transport Assessments’ make developers responsible for the parking they generate and...
encourage the use of more sustainable modes;
• Using TravelSmart to educate landowners and developers about smart parking provision; and
• Monitoring the efficiency of parking areas over time.

There is little in the way of paid-parking schemes over the City. There is only one paid-parking facility near the Glendalough Train Station. There are however opportunities for more paid parking in key destinations. If the City provides paid parking then it is also likely to encourage commercial operators to follow suit. The economic viability of centres should however not be compromised where implementing paid-parking schemes. It is deemed to only be a viable option where existing parking areas are seen to be highly utilised; where centres are highly frequented or where paid parking would not deter activity from a centre. The Town of Vincent, City of Subiaco, City of Joondalup and City of Melville have paid-parking, so it is not uncommon throughout the Perth Metropolitan Area. The City can identify sites where paid-parking could be implemented and then seek community and local business views on paid-parking to determine its feasibility. It is re-interated, however, that work towards providing public transport and other modes must be in place before introducing paid-parking (or reductions in parking more generally).

The City is also developing a Parking Strategy which has involved investigation into city-wide parking issues and profiles opportunities to manage parking issues. The Integrated Transport Strategy has been developed with the objectives of this Strategy in mind (which have been reflected on and drawn upon in the previous discussion). In particular, the Parking Strategy will focus on parking management from a City of Stirling organisational perspective.

The City’s draft Local Planning Scheme 3 additionally makes reference to the potential for Council to prepare a Parking and Access Plan over any land/building for the better provision and coordination of parking, access or circulation of vehicles. Preparation of such plans would help to address issues such as the location and form of access/egress; vehicle circulation; parking and integration of parking facilities. Once LPS 3 is endorsed, these plans have great potential to address many key parking issues in the City of Stirling’s centres.

Outcomes

• Demand for parking across the City is reduced;
• Carpark designs reduce the amount of ground-level space required and the impact upon the urban form;
• Reciprocal parking opportunities are maximised;
• Pedestrian links within parking areas are provided and are safe, legible and connect with surrounding activity uses;
• Formalised on-street parking is encouraged in appropriate locations as a traffic calming tool;
• Timed and paid parking is used strategically to manage parking demand and occupancy, and revenue is utilised to support sustainable travel modes;
• Demand generators are responsible for managing and reducing the parking demand they create and the promotion and support of alternative transport modes;
• Real-time information is used in high-demand parking areas, to control and minimise vehicular movements
• Centralized and controlled parking facilities incorporated into regional and high demand activity centres
FOCUS AREA 7

DEMAND MANAGEMENT STRATEGY
FOCUS AREA 7 -DEMAND MANAGEMENT STRATEGIES

Background Context
Travel is a demand-driven activity; that is, travel is undertaken in order to achieve an objective and is not generally an objective in itself. Demand generators are the locations, activities, or other attractions which people travel to in order to achieve the objective. Demand generators include educational facilities; businesses; shopping centres and recreational locations.

Transportation Demand Management (TDM) also known as Mobility Management, is a general term for strategies that result in more efficient use of and reductions in the use of transportation resources. Demand management strategies influence how people travel (mode), why they travel, where they travel to, how far and how often they travel, and can reduce the need to travel entirely.

In its broadest context, demand management encompasses many of the ideas previously discussed in this strategy, such as the provision of infrastructure and services which make travel by non-car modes possible; the control of parking to make driving a less attractive option; and appropriate land use to create self-contained and accessible communities which reduce the need to travel as far.

However, much of human behaviour is driven by habit, familiarity and routine, and the provision of services and infrastructure which enables changes in travel mode will not necessarily result in the travel behaviour change occurring. This is where TravelSmart can have a significant role.

TravelSmart
TravelSmart is the brand-name for a package of programs developed by the State Government to influence the way that people travel. TravelSmart is based upon social marketing principals, and works with individuals, communities, schools, workplaces and local government to address the barriers to sustainable travel.

TravelSmart programmes work by:-
• Identifying and addressing both real and perceived barriers to change;
• Providing education and information to allow individuals to make informed choices;
• Providing skills and competencies necessary for the individual to carry out the behaviour change;
• Providing opportunities for the individual to trial the new behaviour in a non-threatening and supportive environment; and
• Providing programs support and resources as specific to the individual and their circumstances as possible.

TravelSmart programs are highly effective, with the most well-known, the TravelSmart Household program, achieving reductions in car use of around 10%. Programs usually require little capital outlay but are time and labour-intensive. However, cost-benefit analysis show them to be one of the most effective ways of changing travel behaviour. Analysis of the South Perth TravelSmart Household program showed a cost/benefit ratio of between 3.1 to 4.7 over a 25 year period (Government of Western Australia, 2002). The effectiveness of TravelSmart programs is due to their individualized approach – those who are receptive to travel change are supported to make the change, while those with no interest are left alone.

The City of Stirling TravelSmart programme was conducted over 2006/2007 in Mt Lawley, Coolbinia, Osborne Park, Yokine, Joondanna, Tuart Hill, Menora, Inglewood and Dianella and replicated the success of the
programme that occurred in other areas. There was an 11% reduction in car trips (where the respondent was the driver), as well as 24% increase in public transport use, 45% increase in pedestrian trips and 72% increase in cycling trips (this was, however, recorded from low base levels). The mode share of sustainable modes (public transport, walking cycling) increased from 22% to 29% and there was minimal impact on mobility recorded.

Responsibility and accounting for Travel Demand
While considerable effort is being expended by government agencies in trying to manage travel demand, to date there is little or no requirement for demand generators to actively participate in the demand management process. Currently, developments are required under town planning guidelines to provide an adequate availability of parking spaces and more recently end of trip facilities. However, even where parking concessions are approved, the demand generator is not required to actively discourage travel to their premises or to try and encourage travellers to travel there using sustainable modes.

In the UK, policies have been introduced to address transport and travel issues at the national level. A key component of these policies is the engagement of demand generators in the process of demand-management – that is, schools, hospitals, businesses and other demand generators are required - with support from relevant authorities – to be actively involved in encouraging travel by sustainable modes of transport and discouraging car use. In addition, the UK’s Town and Country Planning Act (1990) provides local authorities with the power to enter into legally binding agreements with land developers, and is often used to engage developers in the process of demand management or the provision of infrastructure to support sustainable travel modes. Consequently, there is now a national requirement in the UK for all schools and hospitals to develop and implement travel plans, including the setting and achievement of mode share targets, and many private developments have a similar travel plan requirement.

Bridging the Work-Home Gap
"Work is something you do, not something you travel to" (Woody, 1995). Leonhard, Woody, The Underground Guide to Telecommuting, Addison-Wesley 1995. Modern communicative technologies have provided various options to allow people to work from home (telecommuting) or to establish home businesses and home offices. Telecommuting and working from home can take much traffic off roads at peak periods and provide local goods and services, and for this reason is advocated within the Network City model.

The work-home gap can also be reduced if people live close to where they work. The land use and transport integration component of this strategy looked into how a mix of land uses in activity centres could help to achieve this. Yet, those who live locally should ideally work locally as to maximise the benefits that this set-up can produce. However, it is recognised that this would be impossible to control and often impractical as well. Developing a diverse range of local employment options means that different skills sets in local areas can be harnessed locally. Examining how local residents skills can match the needs of local employment sector though economic based strategies is also of significant benefit.

Managing Travel Better
Flexi-time arrangements
Peak period congestion – both on roads and in the public transport system – is an artefact of Australia’s school and business operations. Most individuals are expected to physically be at their place of employment or education by 8.30am or 9.00am, which leads to a short-duration high-volume demand for travel followed by a lull once everyone has arrived at their destination. Both within the public transport system and the road network, there is significant capacity available outside peak periods, but very limited spare capacity during the peak. Flexi-time arrangement offer the opportunity to spread these peaks.
Encouraging efficient vehicles and efficient use of vehicles.
While it will still be necessary to sometimes use a car for travel purposes even in the most balanced transport system, those cars should be used as efficiently as possible: that is, maximum travel should be achieved through the least use, and to some extent through the least ownership, of cars.

Efficiency can be achieved in three ways: through car pooling, where two or more people travel in the same vehicle at the same time; car sharing, where multiple people own or utilise one vehicle and take it turns to use it as needed; and trip-chaining, where several home-destination trips are amalgamated into one home-multiple destination journey. Car-pooling should however not take priority over the use of more sustainable modes.

Car-sharing is an idea new to Western Australia, although it has been around several years in New south Wales and Victoria, and is widely accepted in the US and UK. Car-share schemes are usually privately run by commercial providers, or can be provided through strata fees in high-density developments. Members pay a joining fee and then “hire” a share car for as long as they need it, usually in increments of one hour time blocks. Car share schemes can significantly reduce the expense associated with owning and running a private vehicle, while providing individuals with access to a vehicle equivalent to that if they owned the vehicle themselves. Car sharing schemes have been shown to reduce total car kilometres travelled by participants – presumably because car-sharers also walk cycle and use public transport more often and reduce the average vehicle ownership level as families decide that they can do without a second car and simply car-share instead. Car sharing schemes can also be of benefit to developers as it can reduce the number of parking bays which need to be provided ( one bay provided for a share car instead of a second bay for each residence).

One final point to consider is that of vehicle efficiency. Over the last 40 years, the average fuel economy of Australian cars has hardly changed (Public Transport Users Association, 2007). While technological changes have resulted in more fuel-efficient engines, larger heavier cars air conditioning and luxurious “extras” have meant that our vehicles use just as much fuel as ever. However, larger heavier cars also bring with them a whole range of other negative impacts: more wear and tear on road infrastructure, a need for wider roads and car parks; reduce road-user visibility creating safety hazards; longer stopping times in emergency situations, and more damage to vehicles and humans in crash situations. If we are to create a balanced and equitable transport system within Stirling, we need to consider measures to encourage the use of smaller, safer and more fuel-efficient vehicles above the use of larger cars and four wheel drives.

Intelligent Transport Systems
Intelligent Transport Systems utilise technology to improve the efficiency of the transport network, which can be beneficial in reducing both carbon emissions and oil use. This can include digital display boards to notify transport user of best options (which way to drive, where to park etc), linking of traffic lights to give priority to public transport and reduce stopping and ramp metering on freeway ramps to keep freeways flowing.

Opportunities and Constraints Analysis
Travel behavioural programmes – Travel Smart opportunities
The City of Stirling has been involved in the TravelSmart program since 2006. While considerable progress has been made, there remains many projects which have not been possible to progress because of lack of resources. It is anticipated that in future years the demand for TravelSmart interventions will significantly increase. The large number of businesses moving into the Osborne Park, Herdsman and Balcatta business areas are expected to create additional traffic and parking pressures in future years, and TravelSmart interventions will be required to address this. The program will also need to be extended to promote the use of new transit services being planned for the City, to engage the school community in a Travel Planning process to build upon the work so far done, and increased staff time devoted to cycling education issues is
also required.

The TravelSmart Household program was delivered during the 2006-07 financial year with 14,000 City residents invited to participate. This represents only a small portion of the City’s total resident population, however it is currently unlikely that the program will be offered to the rest of the City’s residents. The program is funded through a partnership with the Department for Planning and Infrastructure (DPI) (partnering local governments pay only 10% of the programs costs). However the DPI has no plans to partner with the City of Stirling to run the program again. It may be possible for the program to be offered further if the City can secure alternative revenue sources to fund it, for example from parking cash-in-lieu funds. Alternatively, a modified version of the program could potentially be offered by City staff if additional staff resources were provided for this purpose.

Responsibility and accounting for Travel Demand

Within the City of Stirling, all significant developments (those along District Distributor Roads or would require at least 50 parking bays under the City’s Planning Scheme) are required to submit a transport assessment. However, there is currently no mechanism by which developers can be required to develop and implement a Travel Plan for their site, which includes the setting and achievement of mode-share targets. While it is currently possible for this to be included as a condition of development approval, history has shown that even simple conditions such as the provision of footpaths to support pedestrian access are frequently overturned by the WAPC. Such plans can also raise opportunities for demand generators to contribute to costs of providing for sustainable transport (cash in lieu).

Within Australia there are only a few examples where the implementation of Travel Plans for new developments have been mandated. The most significant of these within Western Australia is at the Queen Elizabeth II Medical Centre in Nedlands, where development approval has been granted only on the condition that a Travel Plan be developed and implemented, and that specified mode-share targets are achieved. This outcome had been possible only because of the involvement of the State Government in the re-development process, but paves the way for the introduction of similar conditions elsewhere.

The significant development occurring within the Herdsman Business Park and Stirling Regional Centres, in close proximity to major public transport facilities, presents a significant opportunity for the City to introduce the requirement for Travel Plans in the area. Investigation of the mechanisms required to make this a legally-binding requirement should be initiated, and support from associated agencies such as the WAPC should be sought.

Additionally, opportunities exist to introduce Travel Plans to the Stirling school communities. Travel Plans could be required from private schools undergoing redevelopment or expansion through the same legal mechanism as that applied to businesses. Public schools, which would not be subject to these policies, could however be required to develop Travel Plans through a school parking policy. The City of Melville have introduced a policy that all schools must participate in TravelSmart activities before the City will undertake any infrastructure work to enhance or expand parking provision on crown land, and a similar policy within Stirling could expand these requirements to the development of a comprehensive Travel Plan.

Bridging the Work – Home Gap

Telecommuting

The Metropolitan Transport Strategy suggests that around 4% of all trips could be eliminated by 2029 through telecommuting (Government of Western Australia, 1995). Currently there are no formal provisions to
encourage telecommuting. Typical issues include reductions in social interaction, insurance issues and the creation of other trips in place of the trip to work. Yet, studies show that telecommuting can be effective in reducing travel demand. The Sensis® Business Index in 2007 found that 81% of companies who currently allow telecommuting felt that the arrangements had a positive impact upon their business, but despite this, only 33% were intending to allow more staff to telework in the future. Ninety-five per cent of businesses who did not currently permit teleworking were sure that they would not be implementing it in the future, but only 27% could identify specific reasons why not. The report concluded that while businesses had found teleworking positive, and while those businesses with teleworking had performed better than others, there was not a large amount of enthusiasm displayed by businesses for adopting or increasing teleworking in their businesses (Sensis, 2007).

If telecommuting is to be widely used by the Stirling business community as one strategy to manage travel demand, it is likely that the City will need to run interventions and programs to encourage its adoption, as research shows that it is unlikely to happen to the necessary degree, on its own.

Home Offices and Businesses
The City of Stirling’s DPS 2 outlines that home businesses are permitted throughout all residential areas of the City as well as various commercially orientated zones, under classifications of Home Occupation and Home Businesses. However, home businesses may not be appropriate in some locations because they can present local parking and access issues, and can also disperse travel patterns if they attract a significant customer base. In addition, home businesses are not always appropriate for some industries as they could cause significant land use conflicts (i.e. manufacturing against residential). There are however opportunities to use Local Area Planning to identify support for home businesses in different areas and to integrate the concept more closely into economic development planning.

Local Employment
The provision of diverse employment opportunities and housing would maximize opportunities for local residents to work locally. The City’s Housing Strategy seeks to increase housing diversity and will address this point, while the City’s Economic Development programmes and centre development should seek to maximize employment diversity. Economic and Community Development can also look to match local residents with local employment, build on local skill sets in fostering new local employment opportunities and to encourage skill-generation in local industry. Not only will this reduce transport demands but it will also contribute to community development.

Managing Travel Better

Flexi-time Arrangements
An apparently simple solution to the problem of peak-hour congestion would be to spread the peak – that is, widen the period of time when most people need or desire to travel. This could be partially achieved by businesses extending operating hours and offering flexi-time arrangements to employees, so that the period over which employees are travelling to (and from) work is extended.

However, despite the apparent simplicity of this solution it may be hard to implement. The traditional nine to five working day is just that – a tradition – and moving away from this will take a shift in culture and thinking from both the business community and employees themselves. Many businesses currently offer flexitime but enforce “core” hours of attendance, which results in only a small possible shift in work hours. True flexitime would allow a much wider range of working hours to be possible, but may raise organisations issues such as sufficient staff availability during busy periods and difficulties in liaison with clients and customers. In addition,
flexitime may be perceived as inconvenient or too difficult by staff with family or other commitments, or who simply prefer the traditional working day.

**Carpooling/Car Sharing**

In Perth (in 1991), 63% of all trips were taken as driver-only trips and only 13% as a passenger in a car (a car-pool situation). There is a huge potential to increase the number of car-pooling trips made within Perth and the City of Stirling, and measures such as priority lanes for multi-occupant vehicles on roads and preferential parking for car-poolers at major destinations have been successful in assisting this to happen elsewhere. A number of car-pooling software packages are available free of charge or for a small cost to match up potential car-poolers. While car-pooling can be highly successful, it requires a “threshold concentration” of individuals wanting to travel to or from the same destination at approximately the same time. The major barrier for car-pooling to succeed is that it reduces the opportunity for spontaneous travel that is a major attraction of driver-only trips: a driver who is taking a car-pool passenger home cannot leave work early or stop off at the shops on their way.

Within Stirling, areas such as the Herdsman Business Park and Stirling Regional Centre may benefit from both car-sharing and car-pooling schemes. Because of the employee density within the area, it is likely that many individuals living in the same suburb will be travelling to the Herdsman area at roughly the same time each day. In addition, while many businesses need access to a vehicle for work-related travel during the day, many cars would be used for only a short period. Economies of scale could be achieved by the introduction of a “fleet” of share cars available for all businesses in the area to use, which would also reduce the need for individuals to drive to work so that their car is available for business use. Similarly, development concessions could encourage the introduction of residential car-share schemes within private high density developments such as those under consideration for the Stirling Regional Centre.

Car pooling could be encouraged to many key destinations through the provision of preferential parking arrangements. Many destinations such as shopping centres and workplaces are not under City of Stirling control, however the provision of car-pooling bays could be encouraged in new developments or re-developments through planning guidelines, schemes or concessions.

**Intelligent Transport Solutions**

There are a growing number of technological applications which could be applied to manage the City’s transport networks so that they are more efficient. Digital Display Boards could be installed along the City’s major roads and the Mitchell Freeway to control traffic and installed in major parking areas so as to better manage parking areas. For Intelligent Transport Solutions to control traffic along main roads, the City must liaise with Main Roads and the Department for Planning and Infrastructure. The City would also need to work with the Public Transport Authority to identify where traffic signals could be operated so as to prioritise public transport movement.

**Encouraging efficient vehicles**

The City has a number of opportunities to encourage the use of more efficient motor vehicles:

- Physical engineering of our environment – i.e. car parks which can only be accessed by smaller vehicles (this could have the added benefit of increasing utility of parking areas and reduced costs of parking provision for both the City and developers).
- Pricing mechanisms – for example small-car-only car parks would be free while spaces suitable for larger vehicles attract a fee;
- Preferential treatment of more sustainable vehicles – for example small-car only parking close to the
Outcomes

- The TravelSmart programme is expanded to assist community members with travel behaviour change;
- Demand generators actively promote the use of sustainable travel modes and fund the provision of services and infrastructure to enable this.
- New major developments develop and implement Sustainable Travel Plans as a condition of development approval.
- Telecommuting, video conferencing, home-offices and other technologies are encouraged to reduce the need for travel to conduct business;
- Economic Development initiatives encourage the employment of locally-living staff members by local businesses
- Transport movement is managed through Intelligent Transport Systems;
- Car sharing and car pooling schemes operate in major activity centres and in/among major employment bases.
- Energy efficient vehicles are encouraged through incentive programs, parking infrastructure and lobbying the Government to support these vehicle types.
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### APPENDIX 1: TRANSPORT IN ACTIVITY CENTRES

<table>
<thead>
<tr>
<th>Centre</th>
<th>Provision for motor vehicles</th>
<th>Public Transport Provision</th>
<th>Provision for pedestrians</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stirling Regional Centre</strong></td>
<td>Scarborough Beach Road, Mitchell Freeway, Cedric Street and Ellen Stirling Boulevard form a comprehensive street network, car-park based land uses</td>
<td>Stirling Interchange is located in the centre, Circle Route, 400/402 series to Perth-Scarborough</td>
<td>Poor urban form and lacking pedestrian/cyclist amenity, large tracks of vacant land and car park detract from amenity, Freeway dissects ped-shed.</td>
<td>Predominantly car based access to the centre</td>
</tr>
<tr>
<td><strong>Mirrabooka Regional Centre</strong></td>
<td>Some distributor roads, car park based land uses</td>
<td>Bus station provides bus services, no dominant transit service to centre</td>
<td>Poor urban form and lacking pedestrian/cyclist amenity, large tracks of vacant land and car park detract from amenity</td>
<td>Predominantly car based access to the centre</td>
</tr>
<tr>
<td><strong>Karrinyup Regional Centre</strong></td>
<td>Karrinyup Road serves centre, car park based land uses</td>
<td>Bus station provides bus services, no dominant transit service to centre</td>
<td>Car parks surround the dominant activity base as to reduce pedestrian and cyclist amenity</td>
<td>Predominantly car based access to the centre</td>
</tr>
<tr>
<td><strong>Osborne Park, Herdsman Business Park,</strong></td>
<td>Scarborough Beach Road and Hutton Street form major transport links to the area, many car park based land uses</td>
<td>Glendalough Station, 400/402 bus service along Scarborough Beach Road</td>
<td>Footpath provision generally lacks throughout area, lacking connectivity particularly between Scarborough Beach Road and Walters Drive</td>
<td>Given the concentration of activity, public transport use is viable. However, in most areas there are high levels of motor vehicle dependency</td>
</tr>
<tr>
<td><strong>Balcatta Industrial Area</strong></td>
<td>Serviced by Wanneroo Rd, Reid Hwy, Mitchell Fwy, Balcatta Rd, Erindale Rd</td>
<td>Minimal – few bus services, no train station</td>
<td>Large setbacks, car parking and building bulk reduces pedestrian access</td>
<td>Car based travel almost essential</td>
</tr>
<tr>
<td>Centre</td>
<td>Provision for motor vehicles</td>
<td>Public Transport Provision</td>
<td>Provision for pedestrians</td>
<td>Outcome</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Main Street, Osborne Park</td>
<td>Serviced by Hutton Street and Main Street</td>
<td>Moderate provision bus services along Main Street</td>
<td>Large setbacks and car parking areas characterize centre</td>
<td>Greater provision for motor vehicle based transport, thus encouraging motor vehicle use</td>
</tr>
<tr>
<td>Beaufort Street, Mt Lawley</td>
<td>Serviced by Beaufort Street and Walcott Street, on street parking characterizes centre</td>
<td>Bus services run frequently along Beaufort Street, between Morley and Perth</td>
<td>More intimate environment for pedestrians</td>
<td>Whilst the pedestrian and public transport user is given some priority, motor vehicle use persists, possibly due to a larger network of dependence over the City</td>
</tr>
<tr>
<td>Beaufort Street, Inglewood</td>
<td>Serviced by Beaufort Street</td>
<td>Bus services run frequently along Beaufort Street, between Morley and Perth</td>
<td>Some variation in setback and built form, some car parking/large setbacks -increases walking distances between land uses</td>
<td>Whilst the pedestrian and public transport user is given some priority in some areas, motor vehicle use persists, possibly due to a larger network of dependence over the City</td>
</tr>
<tr>
<td>Edith Cowan University, Mt Lawley</td>
<td>Serviced by Alexander Drive</td>
<td>Bus services run frequently along Alexander Drive and link directly to Perth. Many services however fail to stop at the university itself</td>
<td>Footpaths are provided, however pedestrians must navigate though parking</td>
<td>Some transit use and pedestrian activity, yet motor vehicle use is still highly prevalent</td>
</tr>
<tr>
<td>Wanneroo Rd, Tuart Hill</td>
<td>Serviced by Wanneroo Road</td>
<td>Bus services run along Wanneroo Road as a cumulatively high frequency</td>
<td>The centre is poorly organized for pedestrians, with non-uniform setbacks, large parking areas and minimal landscaping</td>
<td>Car movement is prioritised</td>
</tr>
<tr>
<td>Centre</td>
<td>Provision for motor vehicles</td>
<td>Public Transport Provision</td>
<td>Provision for pedestrians</td>
<td>Outcome</td>
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</tr>
<tr>
<td>Doubleview</td>
<td>Serviced by Scarborough Beach Road</td>
<td>Bus services connect the centre between Glendalough Station and Scarborough</td>
<td>The centre is car park focused, with little consideration for pedestrian access connection, landscaping</td>
<td>Car movement is prioritised to and within the centre</td>
</tr>
<tr>
<td>Stirling Central, Westminster</td>
<td>Serviced by Wanneroo Road and also adjacent to Reid Highway</td>
<td>Bus services follow Wanneroo Road, but are dislocated from main activity generators</td>
<td>Parking dominates the areas surrounding activity bases</td>
<td>Car movement is prioritised to and within the centre</td>
</tr>
<tr>
<td>Northlands</td>
<td>Serviced by Wanneroo Road</td>
<td>Bus services follow Wanneroo Road, but are dislocated from main activity generators</td>
<td>Parking dominates the areas surrounding activity bases</td>
<td>Car movement is prioritised to and within the centre</td>
</tr>
<tr>
<td>Dianella</td>
<td>Serviced by Alexander Drive</td>
<td>Bus services run frequently along Alexander Drive and link directly to Perth, the Circle Route also runs past. However little integration between services occurs</td>
<td>The centre is car based, with lacking connective footpath networks and car parks creating a blight on the urban form</td>
<td>Some transit use, yet motor vehicle use is still highly prevalent. Lacking provision for pedestrians</td>
</tr>
<tr>
<td>Dog Swamp and Flinders Square</td>
<td>Serviced by Wanneroo Road</td>
<td>Bus services follow Wanneroo Road, but are dislocated from main activity generators</td>
<td>Parking dominates the areas surrounding activity bases</td>
<td>Car movement is prioritised to and within the centre</td>
</tr>
</tbody>
</table>
## APPENDIX 2: BUS STATION ASSESSMENT

<table>
<thead>
<tr>
<th>STATION</th>
<th>Is the area a place people want to wait? Is there anything to do?</th>
<th>Is it easy to get to nearby activities?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stirling Interchange</td>
<td>No- Freeways surrounds the station; - Little to occupy time at station i.e. no coffee shop, news-agency; - Building is beginning to age.</td>
<td>No- Minimal at-grade access for pedestrians; - No activity base directly surrounding the station; - Car park surrounds station; - The freeway restricts access from the station; Lacking room to extend the provision of bus services to and from Stirling</td>
</tr>
<tr>
<td>Glendalough</td>
<td>No- As above</td>
<td>No - Car yards directly surround most of the catchment- Poor road network connectivity surrounding station</td>
</tr>
<tr>
<td>Warwick</td>
<td>No- As above</td>
<td>No- Car park surrounds significant parts around the station - Few activity generators surround the station – low density residential land uses primarily surround the station</td>
</tr>
<tr>
<td>Mirrabooka Bus Station</td>
<td>No- Design of station not open – generating lacking passive surveillance through the area- Building has aged, unattractive- Moves to relocate the station to be better integrated with other activity and to form part of an open street precinct are not to be delivered.</td>
<td>No- Whilst located within an activity centre, large under-used spaces surround the station-Road network around the station is largely disconnected and difficult for commuters to navigate effectively</td>
</tr>
<tr>
<td>Karrinyup Bus Station</td>
<td>Generally no – the bus station is next to Karrinyup Shopping Centre but the centre does not open out onto the station at all</td>
<td>Yes – close to Karrinyup Shops</td>
</tr>
</tbody>
</table>

City of Stirling