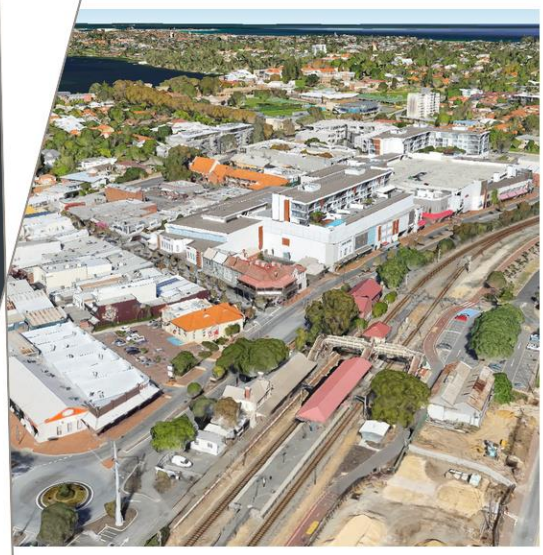
Claremont

Traffic, Transport & Parking Strategy

CW1089600



Prepared for
Town of Claremont

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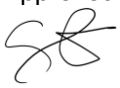

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1 Introduction

This Traffic, Transport and Parking Strategy (TTPS) is intended to define the existing and future transport requirements for the Town of Claremont across all transport modes, according to the needs of the individual land uses, precincts and corridors. It supports the Claremont Town Centre Activity Centre Plan to provide solutions to meet the transport and movement elements of government policies.

The Strategy is designed to be consistent with the Department of Planning's *Guidelines for Preparation of Integrated Transport Plans* and to focus on an integrated transport model, which includes land-use decisions, parking, public transport, road and pedestrian/cycling infrastructure.

The outcomes of the Strategy include a direction for the ultimate transport provision for the Town based on assessment of the existing network at the neighbourhood, district and regional level, and a detailed understanding of the growth potential across the LGA. This transport vision aims to ensure that the system can meet the needs of residents, employees and visitors even while the environment and transport opportunities change.

The following Strategy is an opportunity to create a high-quality integrated planning and transport environment that supports economic, environmental and social activities. Within town centres, mixed-use areas, local communities and near transport nodes, the pedestrian environment drives the design of the network, informed by the road environment and adjacent land uses. Other modes provide crucial links or efficient access within precinct boundaries and there is a balance required between pedestrian demands and the requirements of other modes.

The Strategy provides a guide to navigating the challenges faced, as we seek to develop a safe, accessible and connected, environmentally friendly and enjoyable place in which to live, work, and recreate.

Key Terms

A **mode** is a way of doing. In this context, mode refers to the different ways by which people travel to destinations. Driving, walking, cycling and catching public transport are all examples of transportation modes.

Mode share describes the proportion of people using each of the various types of transportation modes.

Mode shift refers to changing mode share by affecting people's choices about how they travel. This is typically achieved by encouraging people to use active and sustainable transport options rather than continue to use private vehicles.

Mobility is the capacity for all people, including children, the elderly, people with prams, people who use wheelchairs and people with disabilities and people without disabilities, to freely move through spaces.

Places are locations with specific combinations of and interactions between land uses, activities people undertake, kerbside environments, building architecture, urban design elements and transport needs.

Movement refers to the passage of people along streets and roads. The *level* of movement is understood in terms of the *number of people* moving, including pedestrians, cyclists, people catching public transit, and those in cars, rather than just the number of vehicles per day.

1.1 Aim and Objectives

Network and infrastructure changes within the Town are necessary to address the key drivers of change. An overall vision for the network was developed through the engagement process and was used to guide the recommendations in this Strategy.

To achieve the goals of the TTPS, the Town will have to change from the status quo, due to the fundamental constraints in the carrying capacity of the network, and in recognition of the increased opportunities for alternative transport. These transport aspects are inextricably linked with the future development of the Town's centres.

A set of strategies have been developed to support this change and shape the direction of how people use transport networks within the Town of Claremont. The strategies are based on:

- The key drivers of change, aim and objectives of the TTPS;
- Community consultation and engagement with stakeholder groups;
- The strategic direction for the Town as expressed in local and state planning documents; and
- Local and international experience and best practice.

In line with the Town of Claremont Strategic Community Plan '*Claremont Ahead' 2021-2031* Vision statement, *"The Town is a progressive, respectful, sustainable local government supporting a connected, flourishing community."* The objectives of the Town of Claremont Transport, Traffic and Parking Strategy are:

- Consider the strategic direction of the Town and provide transport analysis, solutions and implementation measures enabling the Town to achieve its strategic intent.
- Achieve an integrated and effective transport system that services the needs of its residents, businesses and visitors whilst demonstrating capability to respond to dynamic growth and change opportunities.
- Provide appropriate level of transport analysis and detail to support the preparation of the Claremont *Town Centre Activity Centre Plan*.

The recommended actions found in the Action Plan (AP) of the TTPS have been designed to achieve these objectives, and support the vision. Many recommendations are explicit regarding the objectives identified above while other actions relate implicitly to these themes. Additionally, many of the actions contribute to the achievement of multiple objectives.

1.2 Methodology

The methodology used for this strategy generally aligns with the Department of Planning's *Guidelines for Preparations of Integrated Transport Plans*.

Part One "Where are we at?": Report includes outcomes of the data collection and SWOT analysis where the Strengths, Weaknesses, Threats and Opportunities were identified in the context of the existing land use and transport conditions across the Town.

The Summary Matrix from the SWOT analysis can be found in **Appendix B.**

Part Two "Where do we want to be?" focuses on stakeholder engagement to guide the vision and priorities. Relevant stakeholders within the Town were consulted to assess their strategic direction and development intentions. Project stakeholders included State Government agencies and the Town of Claremont Project Team.

The outcomes of the stakeholder engagement can be found in **Appendix C.**

Part Three "How do we get there?" includes forecasting, analysis and this strategy. The TTPS provides parking, transport and policy recommendations as part of the Action Plan (**Appendix A**).

To achieve a coherent direction and achievable outcome, the Strategy is presented as follows:

- Transport, land use and policy context (**Section 2** and **Section 3**)
- Outcomes of Stakeholder consultation (**Section 4**)
- Key drivers of change (**Section 5**)
- Existing and target mode shares (**Section 6**)
- Key focus areas (**Section 7**)

- Parking strategy, assessment and policy (**Section 8**)
- Behaviour change and emerging technologies (**Sections 9** and **10**)
- Performance measurements (**Section 10.3**)
- Funding opportunities (**Section 12**)

1.3 Key Policy Alignment

A number of key statutory and strategic documents were consulted to inform the TTPS. At the local level, the vision and ambitions of the following strategic planning documents are referenced to understand the context of the Town and the values the Town supports. A summary of the contents is provided in **Table 1-1**.

Table 1-1 Summary of Reviewed Planning Documents

Document	Summary of Content
Claremont Ahead Strategic Community Plan 2027	It has five key goals: Leadership & Governance; People; Liveability; Environmental Sustainability; Prosperity. Many of the strategies are implicitly or explicitly supported by the TTPS, including the following: ▪ Promote and support initiatives that improve traffic flow ▪ Provide clean, usable, attractive and accessible streetscapes and public spaces ▪ Support local safety and crime prevention ▪ Take a leadership in the community in environmental sustainability ▪ Plan for the development of attractive and thriving activity nodes to support small local business ▪ Raise the profile of the Claremont Town Centre as a visitor destination
Sustainable Living Action Plan 2018-2020	Identifies five key areas of focus, including transport. Regarding transport, the Town aims to: *Support and encourage more sustainable transport options for getting in and around Claremont.*
Town of Claremont Local Planning Scheme No. 3 (LPS3)	LPS3 prescribes a minimum number of parking bays to be provided by a development. Departure from this minimum requires justification, and is at the discretion of the Town. Only minor variations to the parking provision are generally permitted without invoking cash-in-lieu provisions. The parking rates provided are the same for the whole of the municipal area. This suggests that application of these rates is likely to result in over-supply in dense Activity Centres, and under-provide in residential areas.
State Planning Policy 4.2 Activity Centres for Perth and Peel	This State policy establishes objectives and goals for ongoing development of the area, guidelines for the expected style of built form and an implementation framework for orderly improvements to infrastructure and land over time. The Town Centre is identified as an activity centre under SPP4.2 and establishes a foundation for objectives and goals for ongoing development. One of objectives is to 'maximise access to activity centres by walking, cycling and public transport which reducing private car trips.'
Perth and Peel Transport Plan (Transport @3.5 Million) 2016	This Plan recognises that influencing travel choices is an important tool in managing congestion. Obtaining travel plans is one of a number of strategies that will be employed to ensure transport infrastructure is being used efficiently. Some strategies for influencing travel choices listed within the plan are listed below: **Travel plans** – major commercial and residential developments in and around activity centres will have plans to encourage sustainable travel options and manage traffic; **Parking strategies** – through supply and demand management techniques, strategies will be introduced to dissuade parking and promote public and active travel options; and **Travel Smart and Your Move programs** – will be extended to more workplaces, schools and households to inform people about their travel choices and encourage voluntary changes in travel behaviour.

Additionally, the following documents have been considered:

Table 1-2 Additional Documents Reviewed

Stirling Highway Local Development Plan	Connecting Claremont 2009-2014
Claremont North East Structure Plan	Loch Street Station Precinct Structure Plan
Swanbourne Local Centre Planning Study	Central Metro Perth Sub Regional Planning Strategy
Bike Plan draft as part of the Perth Bike Plan Strategy	Private school traffic and movement studies
Claremont Parking Strategy	State Planning Policy 5.4 - Road and Rail Noise
Town of Claremont Policy Manual	METRONET – Claremont Station Precinct
Development Control Policy 1.6 - Planning to Support Transit Use and Transit Oriented Development	WESROC Transport Study for proposed Congdon Bridge replacement
Development transport studies – Bethesda Hospital North East Precinct transport work undertaken by DevelopmentWA	Transport Modelling Guidelines for Activity Centre Structure Plans

2 Context

Transport systems are crucial in creating connection and supporting opportunities for people to access all aspects of daily life, including work, education, shopping, leisure, healthcare and other services. Efficient, equitable networks support the fair and effective movement of both people and goods. Ensuring that our transport networks support this equitable and efficient mobility means combating a number of challenges, including population growth and congestion pressures. Additionally, there is a growing concern for the environmental costs caused by transport.

In the current context, private vehicles frequently offer the most convenient and attractive way to get around. This is due to historic patterns of car-centric considerations and design. As the world changes, active and sustainable options are increasingly important.

An accessible and connected Town means that people can get around however they choose with minimal barriers, and they are not dependent on a private vehicle to do so.

2.1 About the Town of Claremont

Population and Housing

10,000 people live in the Town

The population is forecast to grow to approximately **14,400** by 2036

The median age of people in the Town is **44 years**, with 23% of residents being people aged **65+**, and with 16% of residents being children aged **0 – 14**.

4,750 dwellings

Average of **2.3** people per household

The Town

1 town centre and **2** local centres

5 schools

18 parks and reserves

Western Australia's **leafiest urban council**

Transport Environment

3 train stations (Swanbourne, Claremont and Showgrounds Stations) within the Town. An additional train station (Loch Street Station) is located outside the eastern boundary.

2,650 Activity Centre car parking spaces, plus residential on-street parking throughout the Town

48km of roads

87km footpaths

Average of **1.8** vehicles per dwelling

Current Mode Share

Across the Town, the following observations have been made about how the community travels:

3% of residents cycle to work

6% of residents walk to work

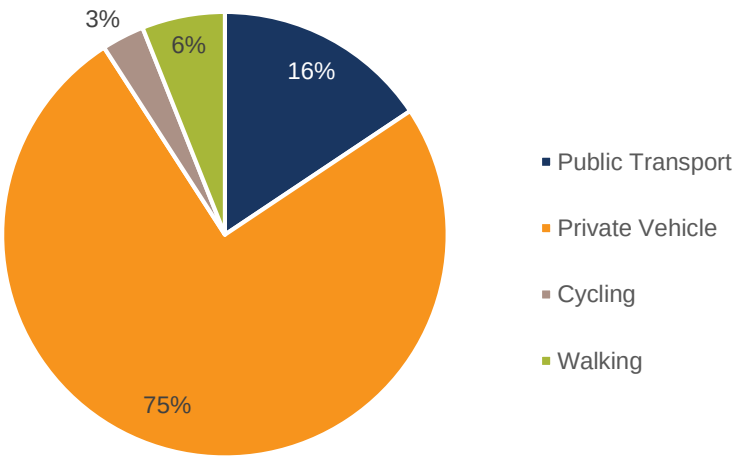
16% of residents get to work using public transit, including buses and trains.

75% of residents use private vehicles to get to work, either as driver or passenger

2.2 How Residents Move Around

As is common throughout the Perth metropolitan area, residents in the Town of Claremont overwhelmingly use a private vehicle to commute to work.

Figure 2-1 Residents' Method of Travel to Work



Source: ABS Census Data 2016

The location of employment for the residents of Claremont was analysed to determine the ease in which travel to work could be moved to non-car modes. As can be seen in **Table 2-1**, the most prevalent work destination is the Perth CBD, which suggests that a significant proportion of trips could be made by public transport, cycling, or a combination of sustainable modes.

In addition, **21%** of residents work within the Town of Claremont. These trips would therefore be under 3km in length, and are ideal for travel by active transport modes, or by public transport where routes align.

Table 2-1 Place of Work for Claremont Residents

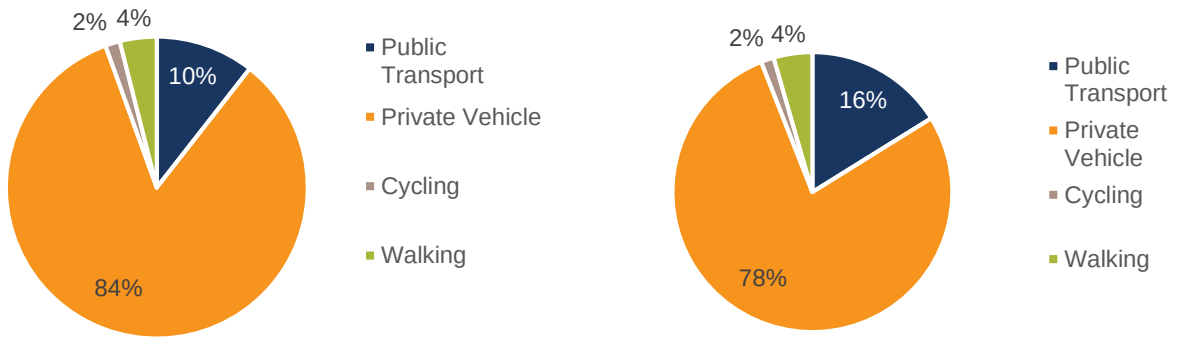
Location	Percentage
Perth City	24%
Claremont	21%
Subiaco	10%
Nedlands	8%
Stirling	5%
Combined Suburbs <2%	32%

Source: ABS Census Data 2016

Across the Claremont LGA, the majority of employees use private vehicles for their commute (**Figure 2-2**). Though there are multiple train stations and high frequency bus services along Stirling Highway to provide coverage, public transport is still a less convenient, less flexible mode than driving.

This is despite the level of congestion along Stirling Highway which significantly increases travel times during peak periods.

Figure 2-2 Mode of Travel to Work – Claremont LGA (left) and Claremont Town Centre (right)



Source: ABS Census Data 2016

2.3 What is the Town's Role in this Plan?

The Town is the key point of contact for residents, schools, community groups, and local businesses. The Town is responsible for balancing the needs of these groups and ensuring that Claremont continues to thrive as a leafy, vibrant and welcoming place.

It has authority over a series of localised infrastructure including local streets, footpaths, shared paths and cycle infrastructure, and street furniture including lighting. The Town also has the capacity to influence transport mode choice by supporting behaviour change programmes.

Visitors generate significant activity in the town centre and at destinations throughout the Town. The needs of visitors to the Town are often different from those of residents and employees. The Town has a role in supporting the visitor experience with both information and infrastructure.

The Town additionally has the capacity to govern parking, including through public parking pricing and residential parking permits, and through Local Planning Scheme requirements for development. Managing parking has been demonstrated to be one of the most effective means of promoting mode shift.

Ultimately, the Town has finite funding with which to effect change, meaning considerations of cost and identifying additional funding mechanisms should be explored where possible. There are also a number of ways in which transport choices can be influenced that do not require large amounts of funding, including amendments to the Town's Local Planning Policies and statutory instruments.

The Town has an important role in Local Planning Policies to state government bodies including Public Transport Authority (PTA), and other bodies that control movement to and through the Town.

2.4 What Role do Others Have?

The Town does not have control over some aspects of the broader transport system, including decisions made by state government bodies such as Main Roads Western Australia (MRWA), PTA and Department of Transport (DoT). The responsibilities of these bodies are summarised below in **Table 2-2**. The Town has an important role in advocacy with these bodies.

Table 2-2 Roles of Others in the Traffic, Transport & Parking Strategy

Department	Responsibilities
MRWA	▪ Management of Primary Distributor roads across the State of Western Australia. In the Town of Claremont, this includes Stirling Highway ▪ Approval is required for traffic signals, signs and lines on all roads
PTA	▪ Train services ▪ Number and frequency of bus routes throughout the Town ▪ Ensuring that bus stops comply with the Disability Standards for Accessible Public Transport, including constructing level concrete hard-stand boarding areas and up to 3m of pathway connecting to existing footpath networks ▪ Supporting the implementation of transit-supportive infrastructure by LGAs, including roadside bus shelters ▪ Work collaboratively with MRWA and local government to introduce bus priority lanes
DoT	▪ Working collaboratively with local government to develop strategic cycling networks for the region ▪ Providing grant funding for implementation of Western Australian Bicycle Network (WABN) routes

While the Town's Local Planning Scheme can have broad influence over acceptable land uses and zoning, the Town does not directly control many elements of private land use, nor does the Town control private market-led development.

2.5 What Role does the Community Have?

To achieve effective outcomes, the community will need to understand and embrace broader strategic goals about sustainability above a desire to maintain the status quo. Each individual must make their own choices about the ways they travel, and the combination of these decisions defines the function of the transport network.

Small changes to travel choices can have big impacts on health and sustainability outcomes: not just environmental sustainability, but on the local economy and infrastructure as well. These changes include replacing short car-trips with active modes and public transit - walking 500m to the local park, taking the bus to the shopping centre, cinema, or to work, or cycling 5 minutes to meet friends for coffee.

This Strategy promotes increased safe and efficient opportunities for the community to use and enjoy active and sustainable transport modes.

3 Activity, Land Use and Transport

This TTPS considers the patterns of growth and land use changes occurring and proposed in surrounding local government authorities as well as the broader impact of metropolitan wide strategic transport planning and major development proposals.

The nature of development across the Claremont LGA is predominantly suburban, with local commercial developments serving the nearby catchment. There are two important exceptions to this: the Claremont Town Centre and the cluster of private schools (Scotch College, MLC, Christ Church Grammar) to the west of it. These serve a regional function, with a catchment that extends well outside the Local Government Boundary.

The primary shopping complex (Claremont Quarter) provides the largest commercial footprint within the Town Centre and is framed by a walkable street and lane network with shop fronts providing quality pedestrian amenity. It includes office/business, residential, service industry, entertainment, recreation, health and welfare as a complement to the shopping and retail.

MLC and Christ Church Grammar are located immediately adjacent to each and immediately accessible from Stirling Highway. This proximity reduces the impact of school traffic on residential communities, but results in a large additional transport task for the strategic network. Scotch College, located on Shenton Road to the north of the Town Centre, has a more immediate effect on the local road network. All three schools have excellent access to rail services from either Claremont or Swanbourne Stations.

The axis running between these schools, along Stirling Road, Stirling Highway and Queenslea Drive operates as the most congested section of the network – and one of the most important for active and sustainable transport.

Recent Development Approvals for all schools have involved the preparation of the Traffic Management and Transport Plan aimed to reduce the amount of school related traffic generation in peak periods and encourage alternative mode share (train and public/private bus services) from outside the locality and pedestrian/cycle access from within the local community.

The growth in residential and employment development across the Perth Metropolitan Area, particularly in Centres along Transit and Activity Corridors, requires the creation of high person-mobility roads. The current allocation of space – dedicating the majority of the road reserve to private vehicles - is the least space efficient option from the perspective of people mobility, while simultaneously reducing the opportunities for pedestrian-scale activation. To support the future development of the Town and its surrounds, fundamental assumptions regarding the allocation of space will need to be challenged.

City-wide strategic planning tends to be about routes and connectivity, ensuring that people can link their homes, schools, employment and recreation by a variety of modes based on their needs, and with sufficient frequency and safety to ensure the viability of these mode choices.

The private car is likely to continue as the primary mode of choice for the foreseeable future, due to its flexibility and on-demand nature. The road network will need to be robust enough to accommodate background and local traffic, without adversely affecting the operation and safety of other modes.

3.1 Development Planning

Development within the Town of Claremont is expected to be concentrated within only a few Centres: Swanbourne Neighbourhood Centre, the Ashton Avenue Neighbourhood Centre, and the Claremont Town Centre. Outside of these Centres, significant infill development is unlikely (other than along Stirling Highway).

As such, this Transport and Parking Strategy focuses on the impacts and needs of these Centres. The mix of land uses within Centres influences trip generation, employment generation, hours of visit, the length of stay, and parking requirements among other issues.

The successful integration of transport modes and land uses requires different types of infrastructure to support local activity and regional mobility. This can create conflicts where a constrained road corridor must cater for a wide range of access and mobility needs.

Therefore, the Town's road corridors have been characterised using two network models: The TransPriority network hierarchy model, and the Link & Place model.

3.2 TransPriority

The Town's competing transport needs have been investigated through the 'TransPriority' framework (based on the Victorian SmartRoads model). In this methodology, the user hierarchy for each road is informed by large-scale land-use planning, within a broad framework.

The fundamental premise of TransPriority is that a road should operate under a hierarchy of use, where infrastructure is provided to support that use. In the context of these high-traffic corridors, the existing priority is for cars – with the limitation that future demand is likely to outstrip the capacity of car-based transport.

The existing TransPriority Map reflects the current infrastructure provision for each mode. This designation is ***relative*** to the general standard provided across the Town and does not presume that the infrastructure is ***sufficient*** to support that mode.

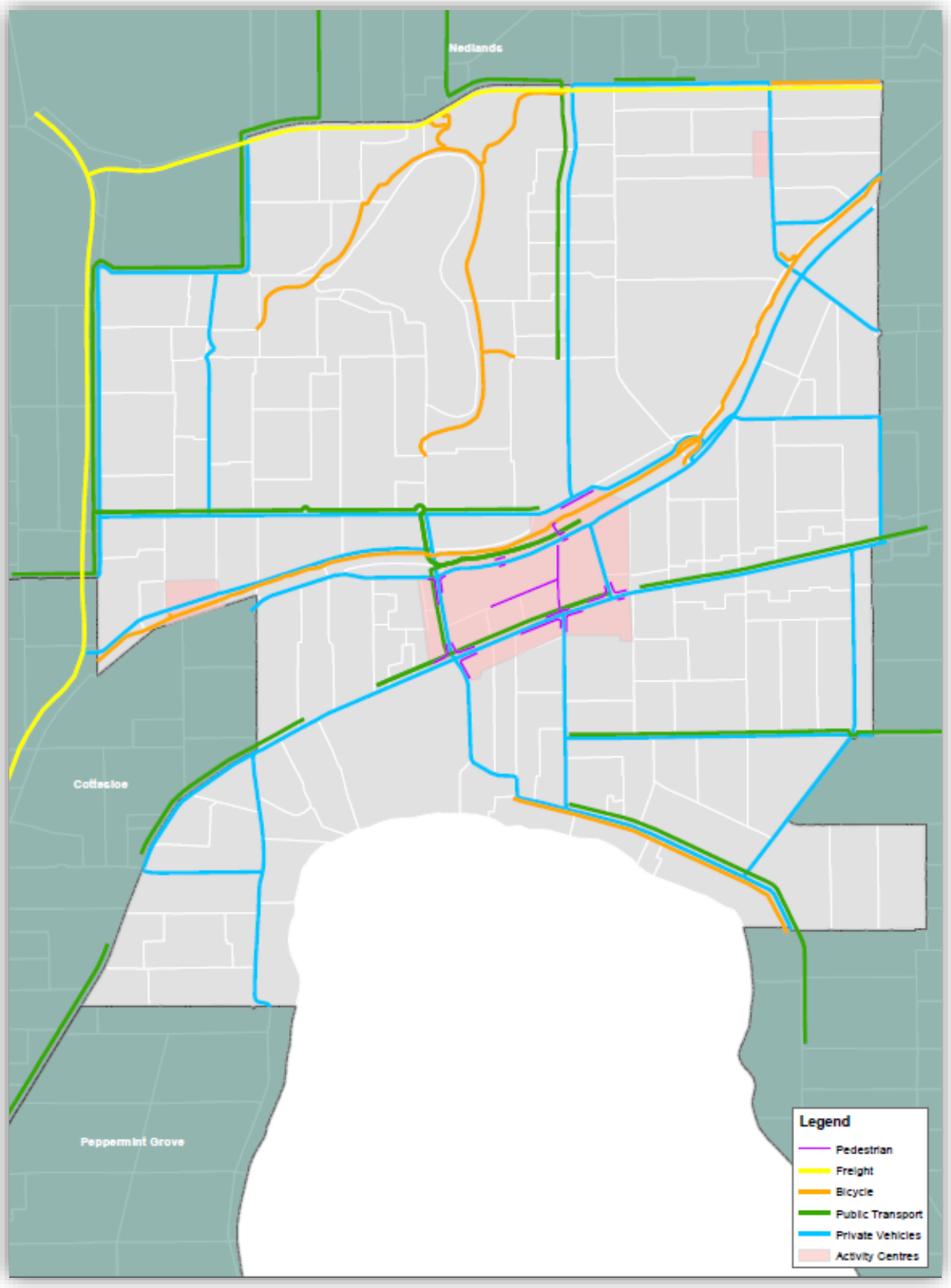
- **Private Vehicles**: have been included in the Existing TransPriority Map where Main Roads WA's *Functional Hierarchy* classification is Local Distributor or higher, and where road function is not otherwise limited.
- **Freight**: has been included in the Existing TransPriority Map for any road with Tandem RAV Classification 1 or higher.
- **Bicycles:** routes have been included in the Existing TransPriority Map when a marked cycle lane, high-quality shared path or other strategic cycling infrastructure is present.

  At any point where bicycles have to merge with vehicle traffic outside of a 30km/hr environment, bicycle priority within the Existing TransPriority Map has been removed.
- **Pedestrians:** have been included in the Existing TransPriority Map only within Activity Centres where pedestrians are provided with wide paths and safe crossing opportunities, consisting of (at a minimum) central medians islands to allow crossing of one lane at a time or signalised crossings. Pedestrian priority measures outside of Centres may be present, but have not been included in this mapping.
- **Public Transport**: priority is shown in the Existing TransPriority Map along strategic Transperth routes. Where bus stops are located within embayments along high traffic corridors, these sections of the route have been removed. Embayments reflect prioritisation of private vehicles over bus transport - as they are intended to facilitated uninterrupted vehicle movement. This is frequently the case along Stirling Highway.

  Note that while the train line is an important transport route to and through the Town, it operates within a dedicated corridor that lies outside the road network, and has not been shown in this mapping.

A future hierarchy must therefore preference mobility for people, not cars, through greatly improved public transport infrastructure. Cycling infrastructure also provides a high capacity option, particularly in peak periods.

Figure 3-1 Existing TransPriority



A general example of a TransPriority hierarchy for streets in the Town might look something like this:

Stirling Highway Peak	Bay View Terrace (Town Centre) Peak
Priority is afforded the below in order of consideration:	
Private vehicles	Pedestrians
Freight (as of right)	Parking
Public transit	Cyclists
Pedestrians	Private vehicles
Cyclists	Service/delivery
There is no priority given for the following:	
Parking	Public transit

3.3 Link and Place

Streets play multiple roles, with roads and streets in the Town having a range of functions for both activity and for movement. Activity is a direct result of land use, with the type and intensity of activity defined by the land use choices within the Precinct or Corridor, and contributing sense of place for particular areas.

In the Link and Place framework, a typology is developed which categorises all streets in the network according to their specific combined place and movement function. The combination of place type and movement scale is expressed in the matrix below (**Figure 3-2**).

Different streets in the Town are intended to support different intensities of activity. Activity may include shopping, dining, lingering, recreating. Activity is linked to the place function of a street, with areas having a high intensity of activity typically being defined as having high place functions in the Link and Place framework.

The Link and Place framework seeks to consider the appropriate forms of transport infrastructure required to support these different typologies.

Figure 3-2 Link and Place Matrix

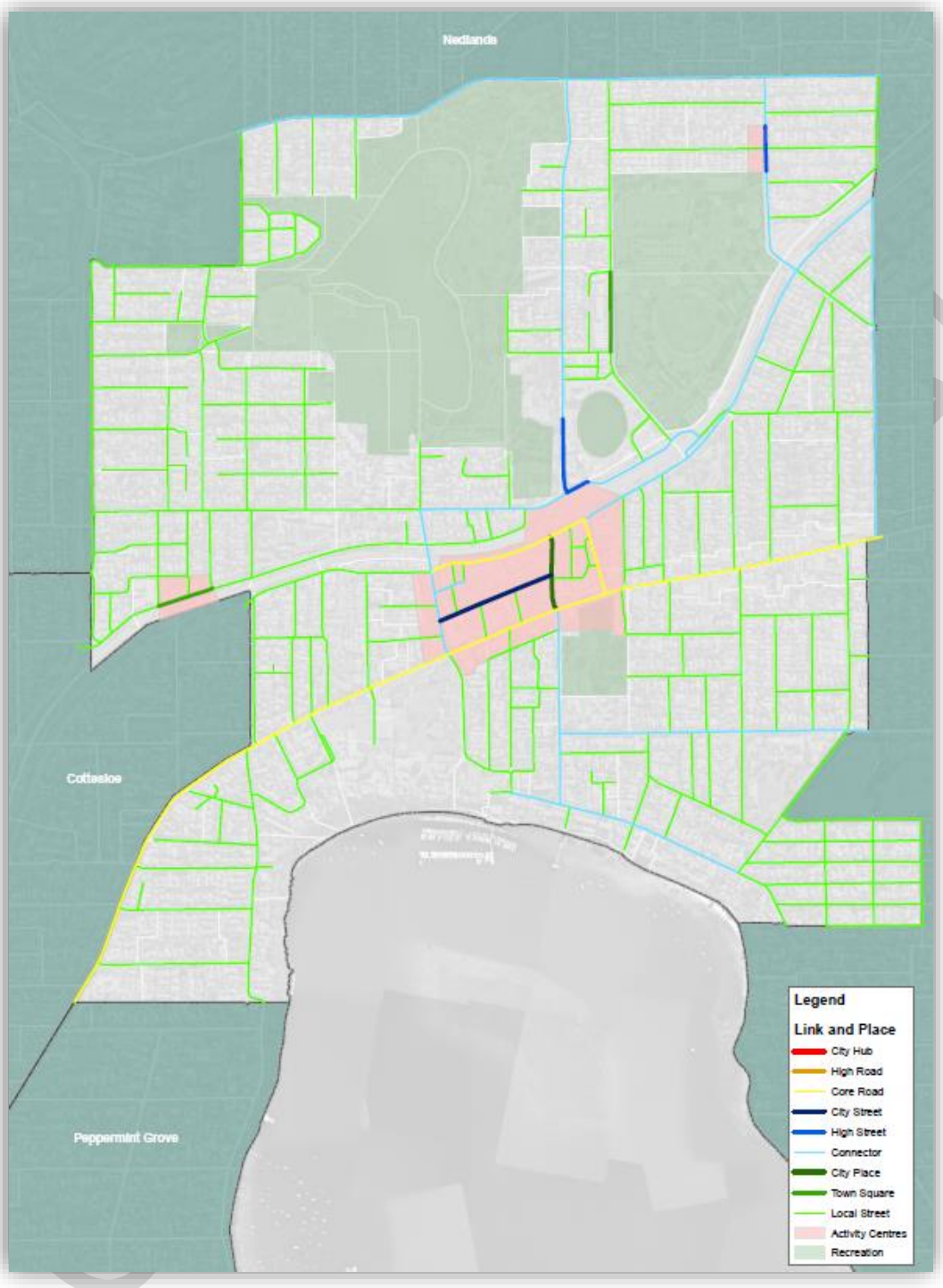
Where activity levels are high (i.e. road has a greater 'place' function), infrastructure is designed to improve pedestrian amenity, street trees, furniture, alfresco dining opportunities, on-street parking etc. The street therefore acts as an extension of the land use. This is typical in town centres, and exemplified by the shared nature of Bay View Terrace.

Conversely, a road that serves primarily to provide mobility would be built to ensure efficient travel for appropriate modes. This might involve bus lanes, access control, bike lanes etc. all of which focus on the movement of people through an area. This is typical of arterial roads ***between*** Activity Centres, including Gugeri Street.

There are many locations which function as activity corridors as well as mobility corridors. Careful consideration is required to ensure that the transport infrastructure is consistent with the desired environment. This may involve construction of high-capacity but slow-speed traffic lanes, well-defined pedestrian crossing points, and deep footpaths/verges to create pedestrian amenity and shade (where street trees are present).

This environment is typical of arterial roads ***through*** activity centres such as Stirling Highway.

Figure 3-3 Link and Place



In each of these instances, it is primarily the land use that defines the requirements for infrastructure. However, this method also allows us to interrogate land use planning; identifying changes that might be required to ensure the corridor performs its necessary function (e.g. relocating highly active land uses away from a traffic-focused mobility corridor).

The resulting Link & Place Map (**Figure 3-3**) represents an understanding of the existing integrated land use/transport system. It is noted that the function described ***may not be desirable*** and may not reflect the future for the corridor or precinct.

3.4 Areas of Conflict

Of particular interest are those streets which perform a significant mobility function, while also being adjacent to high-activity land uses.

These streets include segments of significant north-south and east-west corridors through town centre environments, where high-activity land uses compete with high-volume traffic demands.

Much of the decision-making for transport infrastructure within the Town will be determined by the interplay between transport mobility and activity in these areas of conflict.

The **Claremont Town Centre** is the most critical example of areas with opportunity for conflict. This includes Stirling Highway, Gugeri Street, Stirling Road, Leura Avenue and minor streets within the Centre.

3.5 Parking

Parking is an essential component of both the transport and land use system, and is unique in that behaviour can be influenced directly at the planning and policy stage rather than solely through infrastructure provision.

A location's parking requirements are related to a wide range of characteristics including density, land use and mixture, proximity to alternative transport options and location within the broader land use fabric.

- **Land use** defines the requirement for car parking quantum and location: short stay and on-street parking close to retail precincts, long-stay commuter parking on the periphery of the centres near to employment centres and along regional access routes.
- **Development density and land use mix** determines the viability of internal trips, which are much more likely to occur by active modes – generating activity without the need for parking infrastructure.
- **Accessible, high-frequency public transport** presents an alternative to residents living further afield. Providing viable opportunities to forgo driving to work results in a lower vehicle ownership, which translates into an overall change in travel behaviour.

For this reason, the TTPS considers parking requirements to be different within the Claremont Town Centre than in other development precincts, due to the intensity and mix of land uses, as well as the opportunities for internal trip capture and alternative transport.

4 Stakeholder Consultation

To prepare this Strategy, the Town undertook extensive engagement with the community and various stakeholder groups.

Initial consultation for the development of the TTPS occurred in early 2019. A snapshot of the Town was produced as a reference for community and government stakeholder groups. This snapshot detailed the strengths, weaknesses, opportunities and threats for the Town's transport networks. Comments in response to this document were received both online and during workshops.

Feedback received covered a range of issues and transport modes at a variety of levels, spanning from high-level, regional or district concerns, to fine-grain concerns regarding specific street segments and developments. Stakeholders were primarily contacted by phone and email in the first instance, with in-person meetings arranged where possible.

Table 4-1 Stakeholder List

Stakeholder List
Stakeholder representatives, including:
▪ Main Roads Western Australia (MRWA)
▪ Department of Transport (DOT)
▪ Department of Planning, Lands and Heritage (DPLH)
▪ Public Transport Authority (PTA)
▪ Royal Agricultural Society of WA
▪ Hawaiian Property
▪ Key landowners within the town centre
The following stakeholders provided comment via email or telephone:
▪ Department of Transport
▪ City of Nedlands
▪ Town of Cottesloe
▪ Shire of Peppermint Grove
▪ Bethesda Hospital
▪ St Quentin's Apartments
Additional stakeholders were approached for comment, including:
▪ Scotch College
▪ Methodist Ladies College
▪ Christ Church Grammar School
▪ Claremont Football Club

Stirling Highway was seen as a challenge and an opportunity by government and community stakeholders. The constrained road space was felt to be at capacity and the density uplift was a concern in this regard. Neighbouring LGAs acknowledged it is an on-going cross boundary issue.

The Town of Claremont raised concerns about a range of transport-related issues, including:

> The operation of **critical intersections** and the impact of limited capacity on congestion and delays.

> Timing of future **road widening** along Stirling Highway, and potential **alternative routes** for destination traffic to the Town Centre.

> The need for **parking management of on and off-street parking** with parking systems to assist drivers in finding bays in the Town Centre, and **parking provision** requirements for peripheral Centres.

- **Slower speeds** on residential streets near the Town Centre and a **pedestrian focus** on streets such as St Quentin Avenue was mentioned for the benefit of families, the aging community and to address congestion.

This feedback from the community and stakeholders has been used to define the key drivers of change which necessitate and contextualise the TTPS.

5 Key Drivers of Change

5.1 Congestion

Community and stakeholder engagement revealed a vision for the Town's future transport network and infrastructure that responds to the challenge of promoting mode shift away from private vehicles towards public transport and active modes of transportation. These are ways to address network congestion pressures while promoting health and safety for all users. It is well known that increasing road capacity does not eliminate vehicle congestion with evidence showing it increases the number of cars on the road (generated demand). The most effective way to reduce vehicle congestion is to manage travel demand by encouraging people to change how and when they travel. This is consistent with the proposed form and function of the Stirling Highway corridor, which has been reduced from a future 6-lane road to a 4-lane divided carriageway, with an additional emphasis on pedestrian crossings and localised bus priority at key locations.

Increased residential development within the Town Centre will drive change to sustainably manage and plan the road network to reduce congestion. The approach of the TTPS is to support the mobility of all users without the need to rely on private vehicles. Reducing congestion pressures requires network and infrastructure changes to induce a mode shift away from private vehicle; such as those proposed for the redeveloped Stirling Highway corridor.

Residential streets are places in their own right, while also provide active connection to key community destinations. Support pedestrian amenity along these routes through additional street trees, lighting and street furniture emphasises the role of neighbourhood streets as enjoyable places for people. There is a strong call from the community to reduce the traffic impacts on local streets. These streets are mostly two lane and low speed environments but also circulate traffic around the core Town Centre and at peak times, traffic on these roads is substantially 'clogged.'

Claremont Town Centre supports the liveability, amenity and economic success of the community. By improving pedestrian infrastructure, reinforcing priority for active and sustainable modes and building attractive streetscapes, people are better able to enjoy these places.

5.2 Parking

Vehicular traffic to and from the Claremont Town Centre predominantly uses Stirling Highway and various collector roads and local streets. Commercial and business activity associated with the Town Centre exists on the south side of Stirling Highway, although the Highway forms a barrier to safe and accessible pedestrian movements. Parking remains a concern and the need to manage on and off-street parking efficiently is vital to a successful Town Centre that draws visitors and businesses to the area.

There are opportunities to support effective public parking by using land assets owned by the Town within and at the periphery of the Town Centre. Construction of public parking stations can be supported through the application of cash-in-lieu funds administered under the LPS.

5.3 Population Growth

By 2031 the Town's population is forecast to reach 13,500 residents (14,600 by 2041). Population growth will increase travel demand within the Town and the wider Perth Metropolitan Area. This growth is anticipated to be focused on a few locations, particularly in the Town Centre and the Ashton Avenue Precinct and along Stirling Highway.

This intensification of residential development has many advantages in supporting the local commercial development and the use of public transport, but inevitably results in an increasing need for transport of all types.

Managing additional travel demand associated with land use change and population growth will be a challenge for the Town.

5.4 Infrastructure Projects

The Town's transport environment is changing with significant projects such as the Claremont Station Project. This is an opportunity to re-vitalise the connection between the station and the Town Centre, encourage public transport usage and improve the Town's pedestrian and cycle networks.

Large investments in active and public transport infrastructure can encourage the community to make significantly fewer trips by car, alleviating pressure on the local road network.

Intensification of Activity Centres creates an environment where development can help fund public parking facilities, streetscapes and transport improvements, through a robust cash-in-lieu scheme.

In the long term, upgrade works along Stirling Highway can be used to prioritise bus transport and present a better environment for safe and attractive walking and cycling along this key transport corridor and promote improved pedestrian safety in the Highway crossings.

6 Mode Share Targets

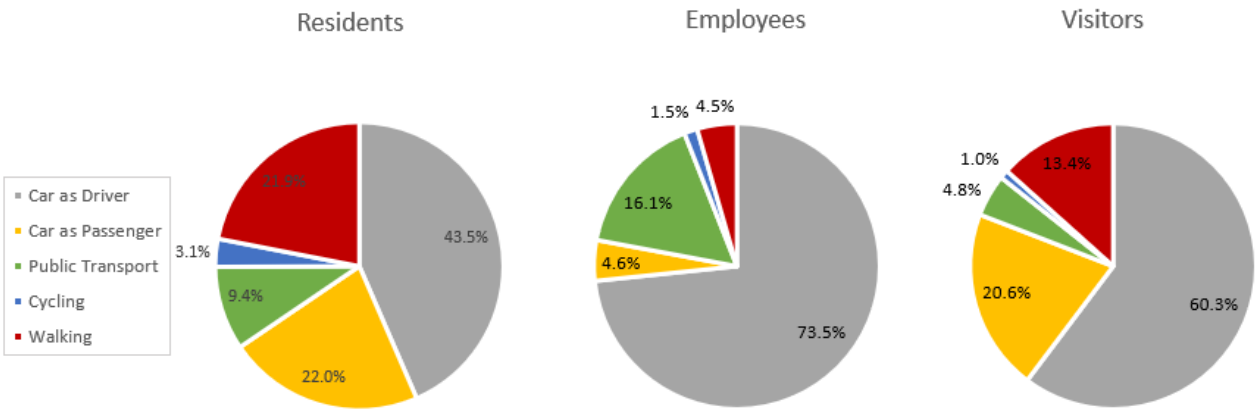
The State Government's *Perth and Peel@3.5million* and the *Central Sub-Regional Planning Framework* identify extensive growth in development and population across the Town of Claremont and throughout the entire region.

This growth will generate additional transport demand that must be assigned to a movement network already approaching capacity. However, there is insufficient remaining road capacity to accommodate the transport needs of the community and regional growth requirements if travel remains in its current form. The current focus on moving cars and trucks in traffic lanes will ultimately result in debilitating congestion if left unchecked.

6.1 How Targets are Set

Mode share data indicates that the private vehicle remains the predominant means of employees accessing Claremont as well as residents accessing their work places. This comprises of residents at **44%** and employees at **74%**. Comparatively, public transport comprises only **9%** for residents and **16%** for employees.

Figure 6-1 Existing Mode Shares – Town of Claremont



Source: ABS Census Data 2016

Data used to develop these pictures of existing town centre mode share and future mode share targets include existing land uses, Master Plan projections, parking surveys, and road capacity information

A number of indicators were used to identify future mode share targets for residents and staff of the Town. These were based on sustainable outcomes and are related to parking, road network capacity, cycling end-of-trip facilities and public transport needs.

To fulfil the requirements of the future mobility task, mode shift is necessary from driving to more 'space efficient' modes: public transport, walking and cycling. Changes will need to be made by residents, employees and visitors and supported through the provision of alternative transport, densification of mixed-use centres and appropriate management of parking.

The Town's local centres and town centre are the places most capable of accommodating these changes, and so a future mode share target has been proposed particularly for the Claremont Town Centre. This mode share is considered to be both feasible and sustainable, taking advantage of parking supply constraints and regional alternative transport provision (improved public transport and high-quality cycling infrastructure) to achieve the Town's objectives.

It is understood that the road network within Claremont has a limited capacity, and that a combination of regional and local development will inevitably increase the traffic within this system. This Strategy has developed specific private vehicle mode share targets that acknowledge the limitations of the road network. These targets consider the capacity limits for peak-hour trips which have been determined through traffic modelling, the mixture and density of development, availability of alternative transport and the surrounding land use context.

Where required, improvements to transport provision have been recommended to support changing behaviour. It is understood that Centres will need to be supported through sustainable transport improvements to ensure sufficient access is provided to achieve their development potential.

6.2 What are the Aspirations of the Plan

Strategic level analysis indicates that future land use and transport changes will result in a general trend moving away from the car. The most significant impact will come from a mode share change from private vehicles to public transport for employees, and by encouraging more local visitors to walk to their destinations. There are also substantial benefits that can be gained as electric bicycles and scooters become more prevalent. These devices provide a viable alternative to both public transport and private vehicle options over a short to moderate distance (<10km)

To mediate the congestion on the road network, it's necessary to reduce the role of the private vehicle in fulfilling the mobility task. This can be done by promoting and investing in sustainable transport modes, in addition to disincentives to private vehicle use. These 'pull' and 'push' factors combine to help achieve the ultimate goal of a more efficient and sustainable transport outcome, as well as improving the Town's amenity and value. The link between infrastructure provision and mode share targets should be consistent and transparent, and should clearly flow into policies that inform the nature of development.

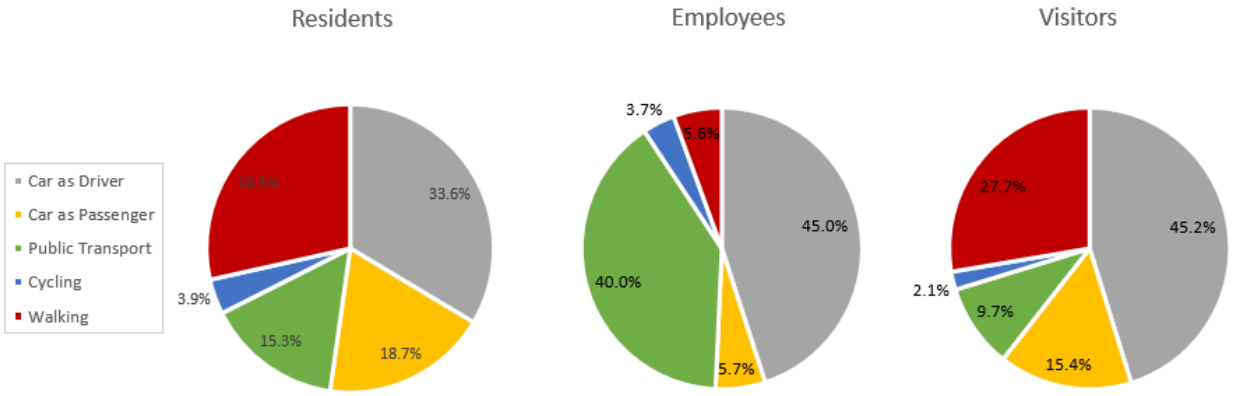
The following mode share targets have been set according to detailed modelling of land use, parking and trip generation, but fundamentally based around a simple concept:

1. Network capacity is limited
2. Employee and visitor car trips can be influenced by parking supply and pricing mechanisms
3. Resident car trips will be restrained by peak period delays
4. Mode shift is only feasible if alternative transport is available.

Therefore, the targets set for employees and visitors reflect ***no net increase in driving trips***, leveraging the increased internal trip capture that results from residential and employee density, as well as considerable mode shift for external trips. This will be supported through the use of attractive cash-in-lieu provisions which allow reallocation of resources to more efficient centrally-managed public parking, and upgrades to infrastructure that promotes sustainable travel.

While parking restrictions are not proposed for residential development, it is likely that the continued congestion along the Stirling Highway corridor, as well as the increased density of development in the Town Centre, will resolve into lower rates of residential parking provision and very low peak period trip generation.

Figure 6-2 Future Mode Share Targets – Claremont Town Centre



As it grows through to the 2031 and 2041 horizons, the Town of Claremont has the potential to become an even more accessible destination; improving environmental, health and economic outcomes for everyone.

7 Key Focus Areas

7.1 Pedestrian Infrastructure

Pedestrian travel is much more localised than other transport modes, but vital for the function of land use and transport systems. Outside of town centres, high quality pedestrian facilities support residential travel to shopping and schools, connection to public transport facilities and recreation. An attractive and safe pedestrian realm results in improved health and social outcomes for residents. Attractive pedestrian environments also improve economic outcomes, attracting more residents and businesses to the area.

Pedestrian activity and connectivity are critical factors in the effectiveness and vitality of activity centres and corridors. For this reason, the pedestrian environment must be carefully considered, particularly along primary pedestrian routes. This includes construction of high-quality paths, shade trees and street furniture to provide amenity. By allocating suitable resources to the pedestrian environment, the use of pedestrian modes will grow, reducing the demand for other modes as well as the requirement for parking.

Parts of the Town Centre have well-developed pedestrian priority, such as Bay View Terrace. This is seen by a slow posted speed limit, traffic calming features including street parking, street furniture and tree plantings.

7.1.1 Community Scorecard

In general, the Community Scorecard performance index provides a reasonable indication of performance. The performance index for the Town with respect to footpaths and cycleways is below industry standard.

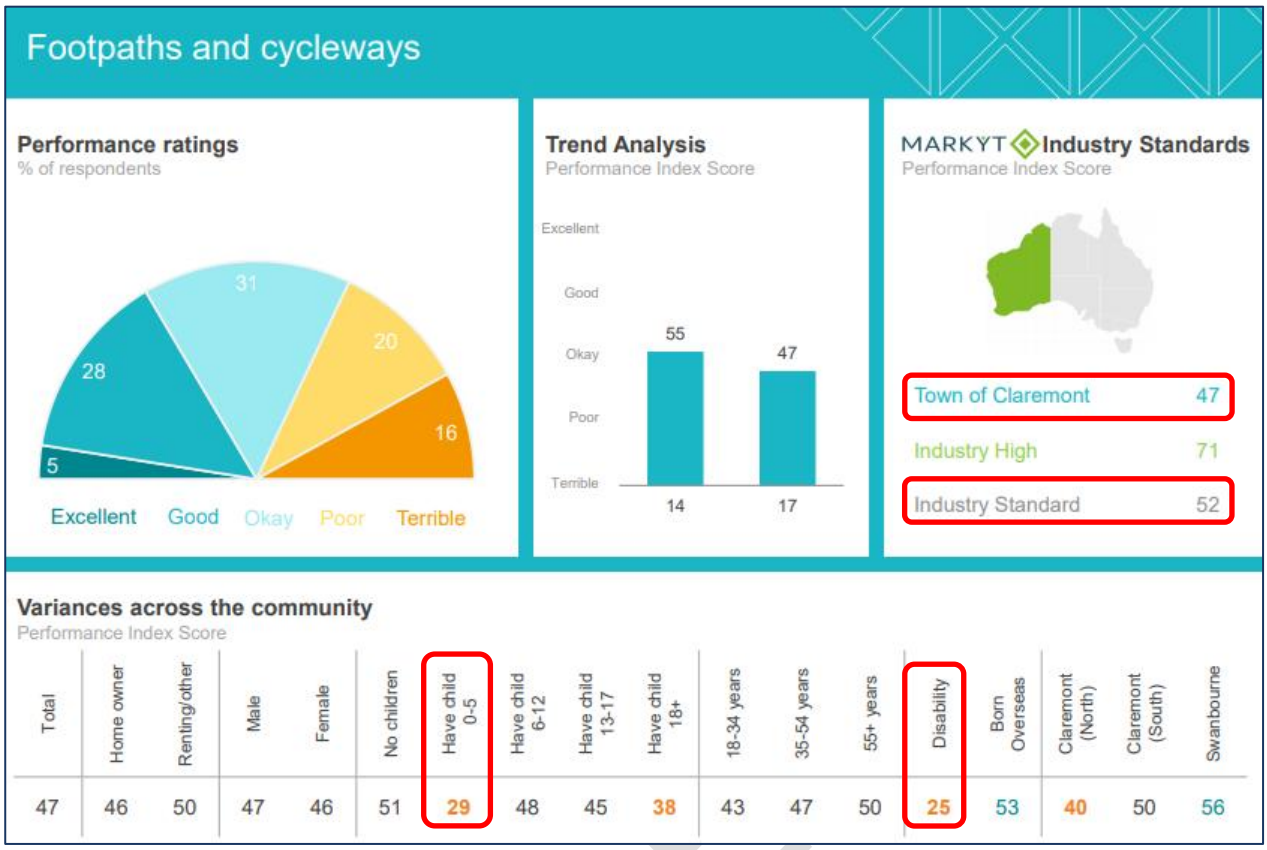
The variance reported in the Community Scorecard for category ‘Footpaths and cycleways’ indicates that people with disabilities, and those with children under 5 (and thus more likely to use prams) are most dissatisfied with the footpath and cycleway conditions (**Figure 7-1**). In general, mobility devices and prams in particular are affected more by path maintenance, location and density of crossing points including mid-block crossing opportunities, as well as higher vulnerability in shared spaces.

Though there is a comprehensive pedestrian network, the quality is of concern to the community. This is being addressed through a targeted upgrade program to replace the old 1.2m wide slabs to 1.5-2.5m wide concrete (3.0m in the Town Centre) paths.

Areas of key pedestrian needs have been identified for the existing network, consisting of:

- within Activity Centres and from peripheral parking to employment destinations;
- along and across Activity Corridors;
- along and across Transit Corridors, and along adjoining minor streets within a 200m walking distance;
- within a 400m walking catchment of schools, shopping precincts and recreation venues, oriented towards the destination; and
- within 400m of a train station or high-priority transit, oriented towards the node.

Figure 7-1 Community Perceptions on Footpath and Cycling Infrastructure



Source: Markyt Community Scorecard

7.1.2 Pedestrian Level of Service

Pedestrian Level of Service (LoS) is a useful measure of the distance pedestrians are willing to walk depending on the type of activity (shopping, commuting, recreation) and the quality of the built environment.

The table below is the serviceability matrix outlining the distance and relevant LoS associated with different types of pedestrian journey. It shows that the greater the environmental control along the path (e.g. shade) the further pedestrians are willing to walk to get to their destination.

This has consequences for all transport modes, because every person starts and ends their journey as a pedestrian. The quality of the pedestrian experience therefore effects mode choice in a huge number of ways, from how far people are willing to park from their destination to whether they will catch public transport.

Different people might be willing to accept lower LoS infrastructure (commuters are willing to walk further than retail customers).

	Distance Pedestrians are Happy to Walk			
Conditions	LoS A	LoS B	LoS C	LoS D
Climate controlled (inc. tree canopy)	400m	800m	1200m	1600m
Covered walkway (e.g. awnings)	250m	400m	500m	750m
Unprotected path	150m	300m	400m	500m
Through car park	100m	200m	300m	400m

Source: Adapted from Smith and Butcher, 1994

For an example; a visitor to the Town might be happy to walk 400m from the Station along a comfortable tree-lined street, but that distance might drop to 100m through a hot, exposed car park.

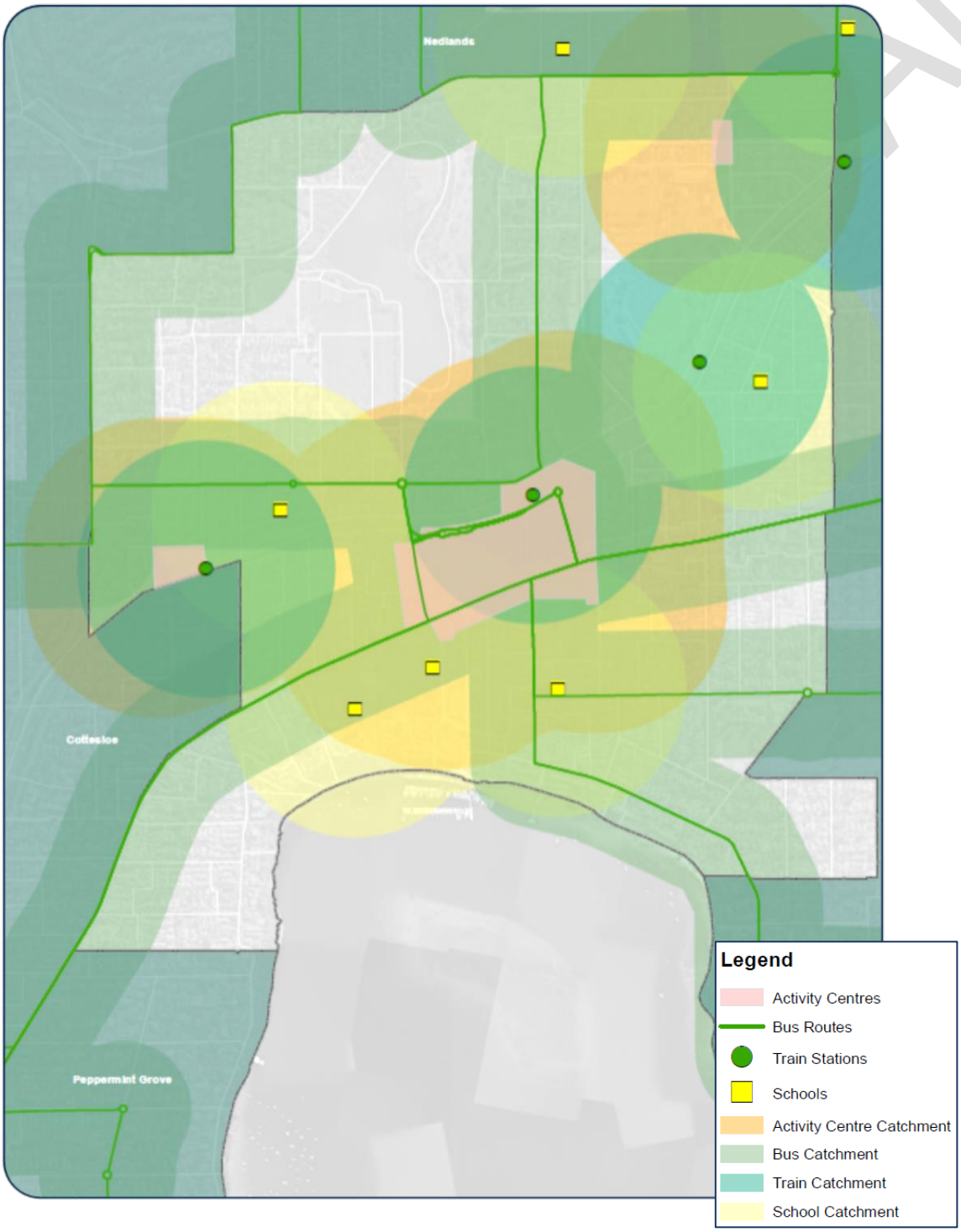
Routes along pedestrian desire lines should correspond with the highest Level of Service possible, particularly with respect to crossing opportunities.

Figure 7-2 shows a nominal pedestrian catchment around schools, train stations, activity centres and bus routes using simple distance metrics (400m to most destinations, 200m to bus routes). Note that some people may not be willing to walk 400m, but others would walk far further – the map below attempts to show areas where pedestrian priority infrastructure would be most needed.

Within the Town Centre pedestrian priority should be extended, including along side streets and lanes. This may include reduced traffic speeds (both design speeds and posted speeds). As development on Stirling Highway moves away from the 'Highway retail' design model there is an opportunity to create active, attractive street-frontages which include features enhancing pedestrian amenity, such as awnings to provide additional shade.

In residential areas, where footpaths have not been constructed, additional street trees can be used as traffic calming devices to ensure slow vehicle speeds and safe on-road walking environments.

Figure 7-2 Pedestrian Catchment Map



7.1.3 Pedestrian Opportunities

There are a number of opportunities to improve the pedestrian environment across the Town. However, these improvements tend to be fine-grained; intimately related to the local activities and adjacent land uses. As such, prioritising particular upgrades requires a holistic understanding of the network.

For this reason, a Pedestrian Plan is recommended, extending the work completed within individual Activity Centres to define a comprehensive pedestrian network across the Town, and clearly expressing priorities for investment related to the quality of existing infrastructure, usage profile, demographics etc.

Some specific recommendations related to pedestrian infrastructure are given below, for consideration:

- Within the Town Centre there is an opportunity to extend pedestrian priority, including along side streets and lanes. This may include reduced traffic speeds (both design speeds and posted speeds). The interventions along Bay View Terrace shows how effective such works can be.
- Providing additional priority at crossings could enhance pedestrian access to Claremont Station. This may include modifying the existing Gugeri Street crossing to incorporate pedestrian detection, which would allow the signal to trigger when it senses a pedestrian waiting at the crossing, or to cancel the 'walk' signal if a pedestrian has already crossed.

Figure 7-3 Pedestrian Crossing to Claremont Station

Source: Google StreetView

- The development of the bus interchange on Gugeri Street provides an opportunity to activate the northern side of the Claremont Quarter shopping centre, creating a better pedestrian environment connecting through to Bay View Terrace.
- As development on Stirling Highway moves away from the 'Highway retail' design model there is an opportunity to create active, attractive street-frontages which include features enhancing pedestrian amenity, such as awnings to provide additional shade.
- In residential areas where footpaths have not been constructed, additional street trees could be used as traffic calming devices to ensure slow vehicle speeds and safe on-road walking environments.

Recommendations

Consider Pedestrian Level of Service in all transport and planning decisions

Extend pedestrian priority within Claremont Town Centre with reduced traffic speeds and additional crossing opportunities

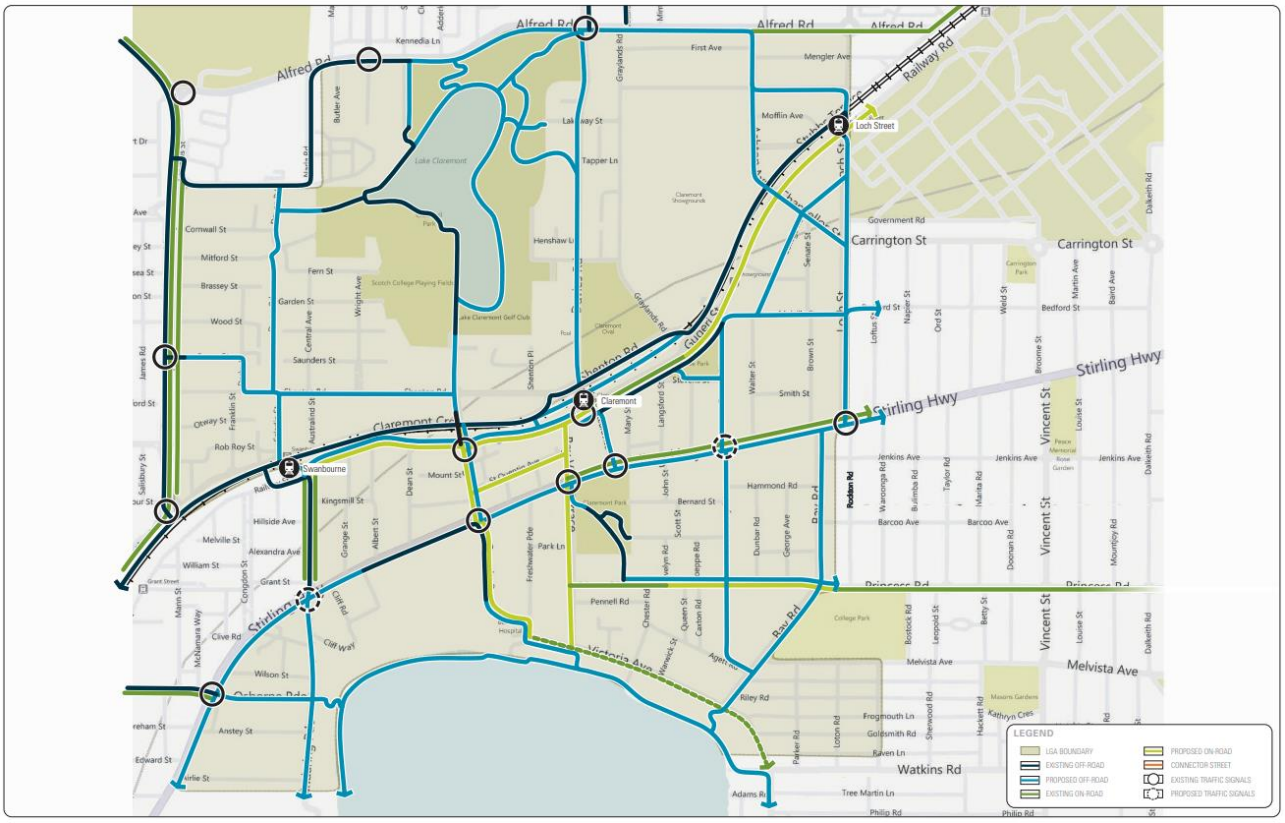
Update Local Planning Policies or Council Policies to support walking environments. For example, LV125 – Footpaths, to include continuous footpath requirements to support safe systems indicating pedestrians have priority

Develop a Pedestrian Plan to progress infrastructure improvements towards a compressive, high-quality, safe pedestrian path network.

7.2 Cycling Infrastructure

The Town of Claremont's most recent strategic cycling document was produced in 2011, superseding a 2004 document that was never formally adopted by Council. The 2011 draft Plan reviewed the extent and sufficiency of bicycle infrastructure and recommended changes based on establishing a cycling network which improved safety, and linked communities and facilities for all types of cyclists (see **Figure 7-4**).

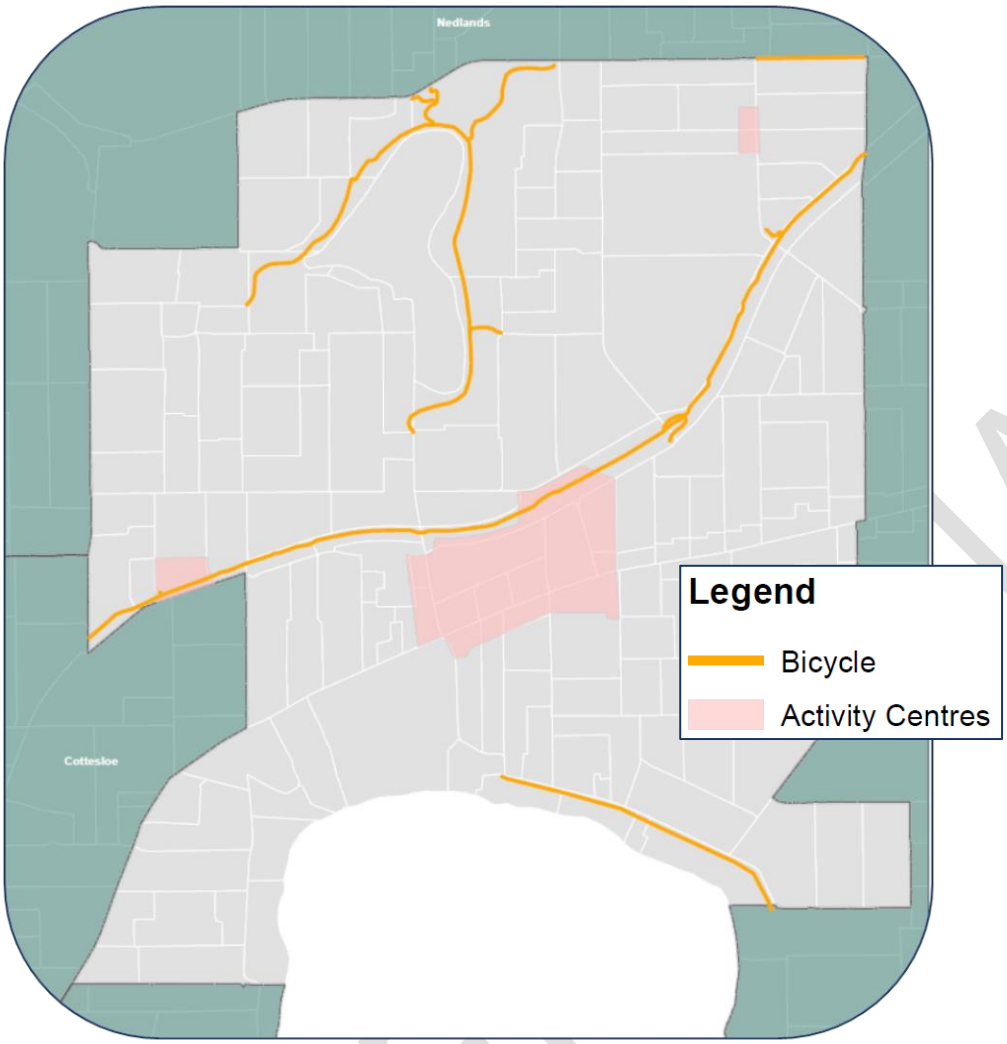
Figure 7-4 Proposed Cycling Network



Source: Claremont Bike Plan 2011

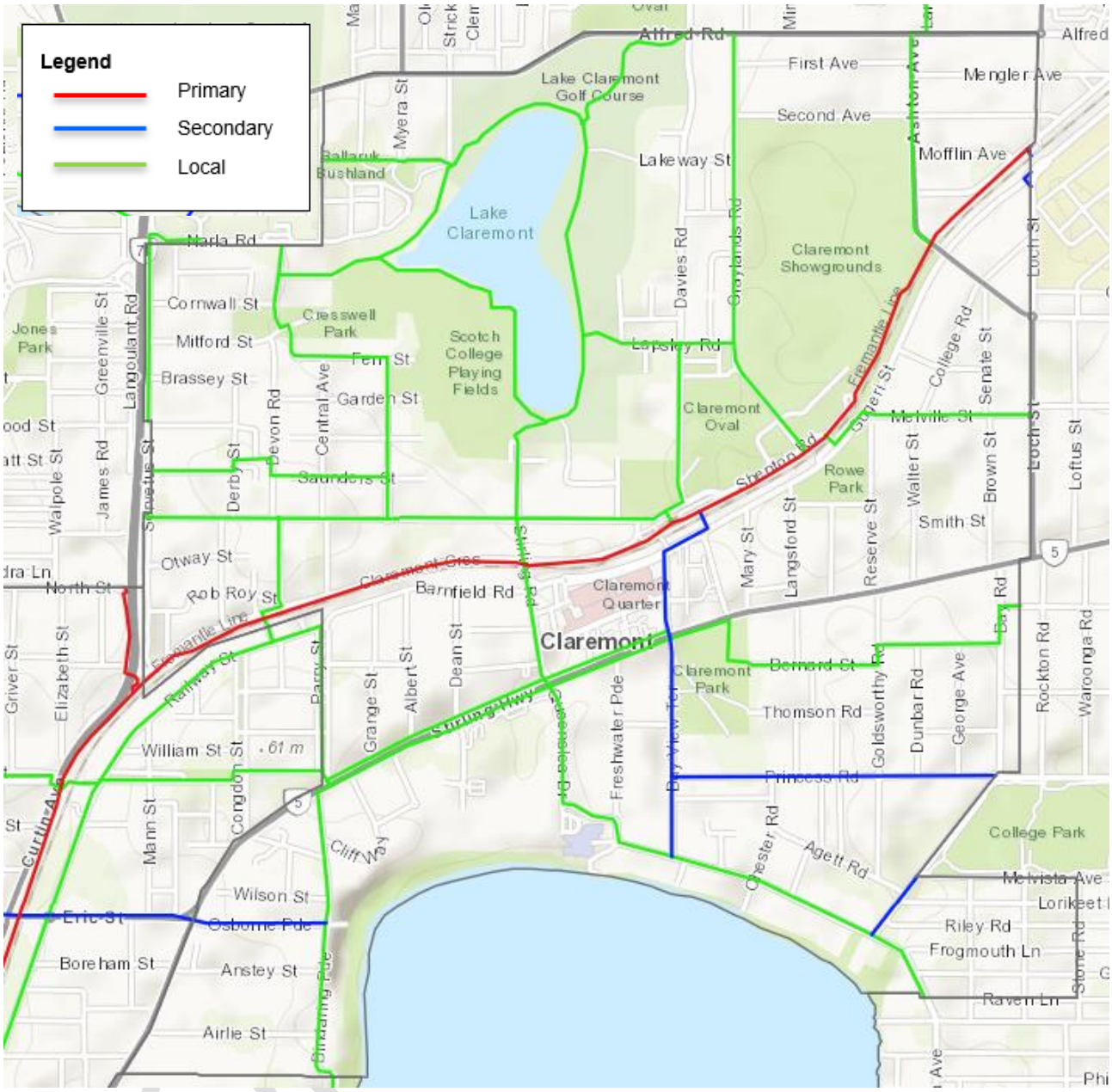
Figure 7-5 shows the status of cycling priority routes as defined by the Existing TransPriority Map. These routes consider high-quality shared paths and significant on-road segregated bike lanes. This assessment identifies substantial gaps in the developed provision of infrastructure for cyclists throughout the Town.

Figure 7-5 Existing Bicycle Priority



In 2021, the Department of Transport released the Long-Term Cycling Network (LTCN), developed in collaboration with 33 local governments. The intent of the LTCN network is to ensure that State and local governments are working towards one continuous cycling network, reducing the strategic burden on local bike plans. The Town's Bike Plan should be reviewed to align works with the identified strategic priorities described in **Figure 7-6**.

Figure 7-6 Long Term Cycling Network



Source: DoT Long-Term Cycling Network

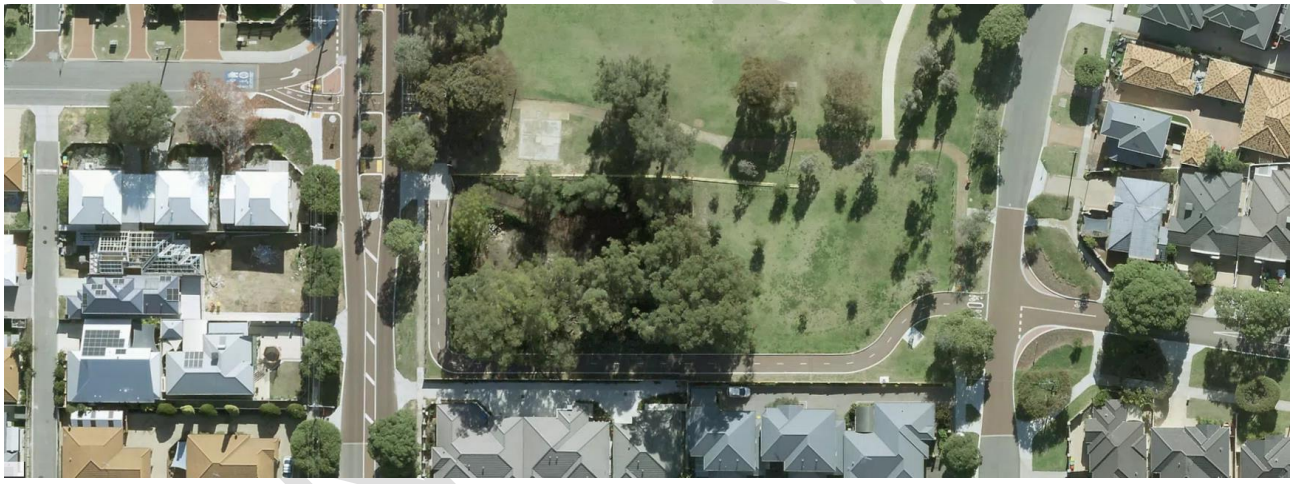
The Principal Shared path functions as a high-quality strategic link between the Perth CBD and Fremantle, but there are no solid links between this path and the Swan River. The designation of Stirling Highway as a Local Route must be recognised as an aspirational plan, requiring extensive upgrades to transform this corridor into a safe and attractive route.

A revision of the Bike Plan should consider the function of the network, and the opportunities for improving cycling mode share. Some specific considerations are provided below:

- Creation of new strategic links to the PSP and other key activity and local centres. This includes external cycling connections outside of the Claremont LGA. The LTCN will provide additional opportunities for local connections, and there may be significant scope to increase the number of commuter cyclists with the development of safe and attractive last mile connections.
- Cycling-specific wayfinding information and signage may be developed to promote cycling access, including distance/journey time information, and graphical representation.
- Expansion of DoT's Safe Active Streets program to support safe cycling on residential streets throughout the Town as part of regular street works or specific road upgrade programs.

- As infrastructure improves so will the viability of public bike (or e-bike) hire schemes. This opportunity may be realised only in partnership with a private firm, but can be supported through allocation of public space and other supportive policies. In particular, there is a long-term opportunity for electric bikes (e-bikes) and scooters to replace private motor vehicle transport. Charging stations for e-bikes may be considered in this context.
- Given the upgrade of rail frequency associated with the Perth Airport rail return link will encourage development of hotel accommodation within the Town Centre, co-location of e-bike facilities for bike hire should be encouraged.
- The Claremont Station Project will upgrade connections through and around the station, improving cycling connectivity in the Town Centre. This includes the recent construction of the Underpass to provide connection to the Principal Shared Path, and DDA compliant access to the Station platform.
- Crossing facilities along the bike network should be audited, focusing on high-traffic crossings. In these locations the upgrade requirements may ultimately reduce traffic capacity (i.e. due to the introduction of a pelican crossing, kerb extensions etc. This impact should be considered in the context of the total movement capacity for the network, the improvements in safety, and the environmental, social, economic and health impacts of active transport.
- Passive wayfinding through design is also a valuable tool to define the high-quality network. This is particularly important where cyclists must be directed to a particular safe crossing point or destination. A good example of this is shown below, **Figure 7-7**, where a relatively complex series of turns is greatly simplified through the use of differential paving in support of signage and linemarking.

Figure 7-7 Example of passive wayfinding – Moorland Safe Active Street, Stirling



Source: Metromaps

There is an opportunity to encouraging cycling through additional behaviour change programs and initiatives. In particular, the DoT Travel Smart initiatives are effective in educating residents about their travel options.

In terms of planning, requiring Travel Plans for developments could allow for larger developments to develop specific and targeted active and sustainable transport solutions including promoting cycling.

Recommendation

Review the Town's Bike Plan to implement the Long-Term Cycling Network's identified strategic priorities with consideration of: appropriate network links to destinations, wayfinding implementation, infrastructure consistent with the current standard, focus on improving network crossings (intersections and safe mid-block), extend existing infrastructure to fill network gaps, ensure connection with transit nodes

Ensure policies support e-bike, standard bike, scooter etc. hire schemes to enhance micro mobility

Require Travel Plans for developments to allow for larger developments to develop specific and targeted active and sustainable transport solutions including promoting cycling

Continue the implementation of the Safe Active Street between UWA and Claremont

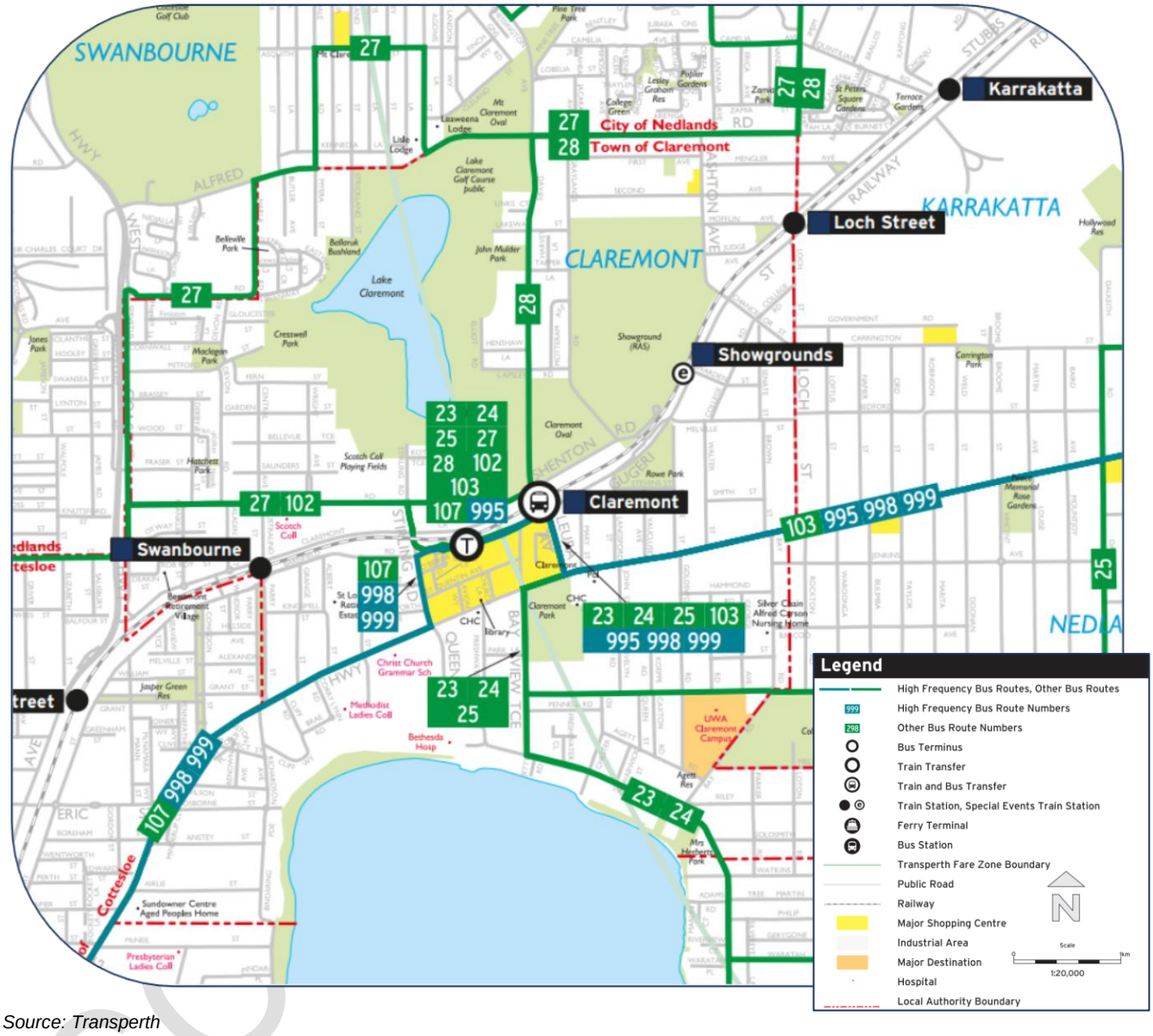
Engage with DoT's Your Move team to develop behavior change programs and initiatives

Develop a marketing campaign//education programme to increase community awareness of existing public transit and walking/cycling options to destinations within the Town.

7.3 Public Transport Infrastructure

The Town is serviced by a range of public transport options including the Perth to Fremantle train line, two high frequency bus routes along Stirling Highway and eight standard bus routes.

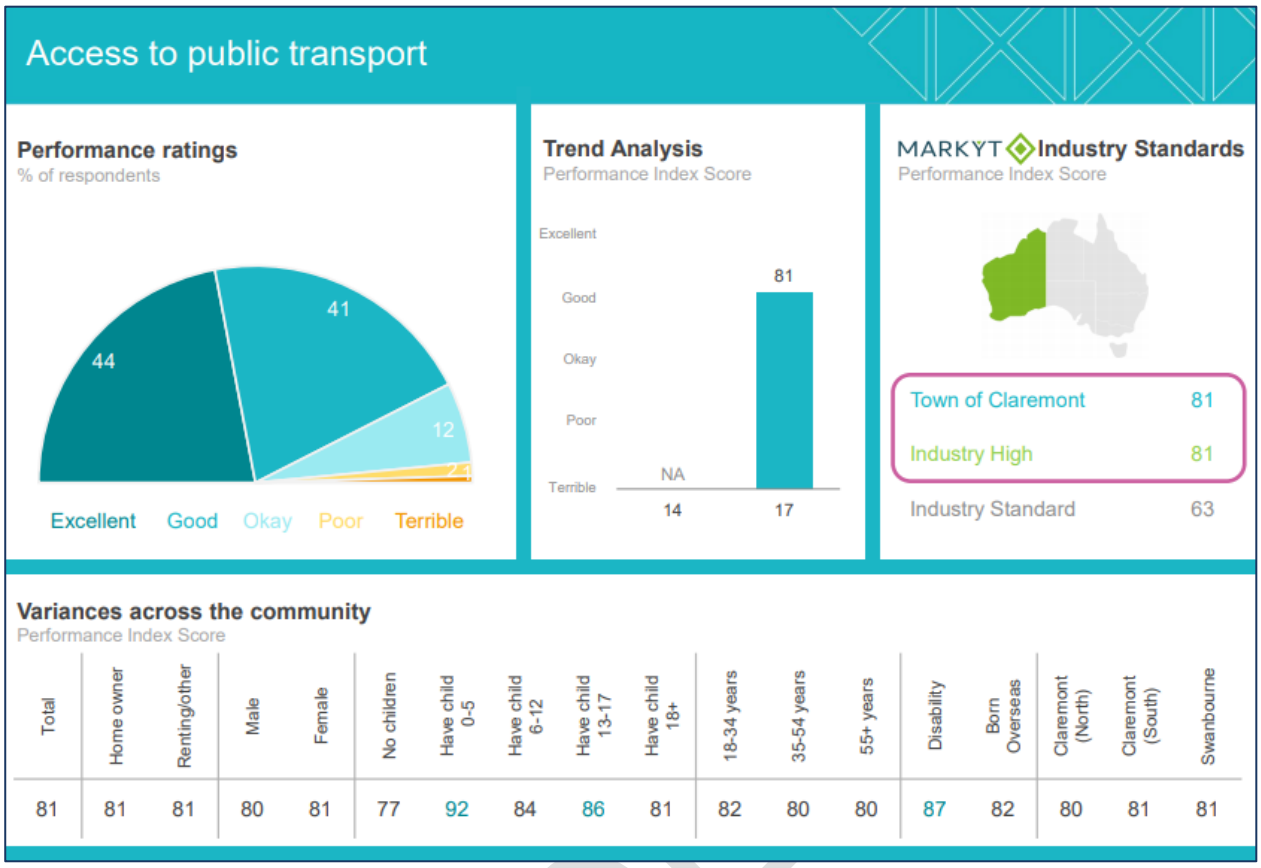
Figure 7-8 Public Transport Authority Service Map



Source: Transperth

A baseline for the subjective performance of public transport in the LGA can be seen in the outcomes of community surveys on access to public transport. The MARKYT Community Scorecard (**Figure 7-9**) for 2019 reports an industry high performance standard of 81 for access to public transport in the Town. Overall, 85% of respondents rated access to public transport within the Town as either 'Excellent' or 'Good'.

Figure 7-9 Community Perceptions of Public Transport

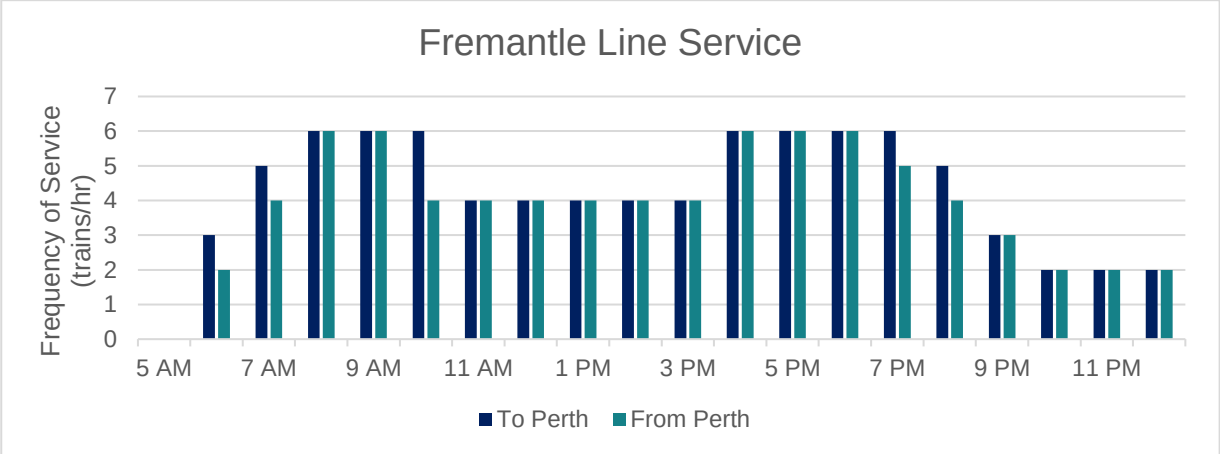


Source: Markyt Community Scorecard

7.3.2 Train Service

The Fremantle line, which connects Fremantle to Perth City, passes through the Town of Claremont, stopping at three stations within the LGA: Swanbourne Station, Claremont Station and Showgrounds Station (special events only). The Loch Street Station is located at the eastern boundary of the Town.

Figure 7-10 Train Service Frequency



Public Transport Authority (PTA) is developing additional infrastructure to support bus interchange opportunities in proximity to Claremont Station.

Claremont Station has been identified as the connection location for the Forrestfield-Airport Link (METRONET project), which will provide an opportunity for increased service frequency between Claremont and Perth Stations (up to 5 additional services per hour during peak periods), as well as direct access to the Perth Airport.

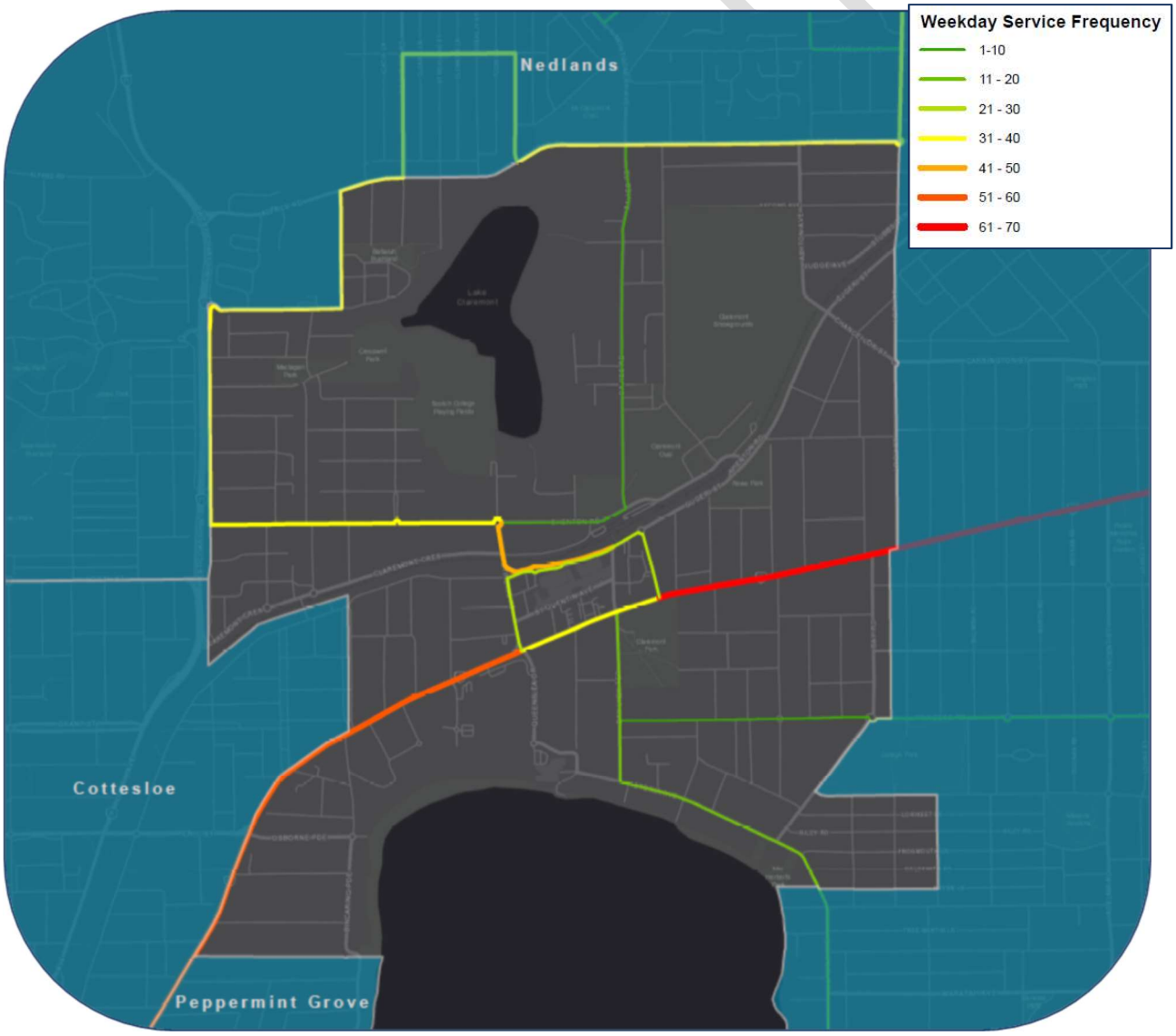
Figure 7-11 Extract from METRONET network map

Source: METRONET

7.3.3 Bus Service

The bus network provides decent coverage across the Town; however, the frequency of services is mixed. The following heat map indicates the frequency of services across a typical weekday, by number of services in peak.

Figure 7-12 Weekday Bus Service Frequency



The purpose of the bus routes within the Town of Claremont is primarily to provide coverage service within the residential catchment, with a particular emphasis on access to the Claremont Town Centre and Claremont Station. While it is noted that some residential communities do not have access to frequent service, the proximity and density of rail stations within the LGA means that effective public transport options are available for the majority of residents.

7.3.4 Bus Infrastructure

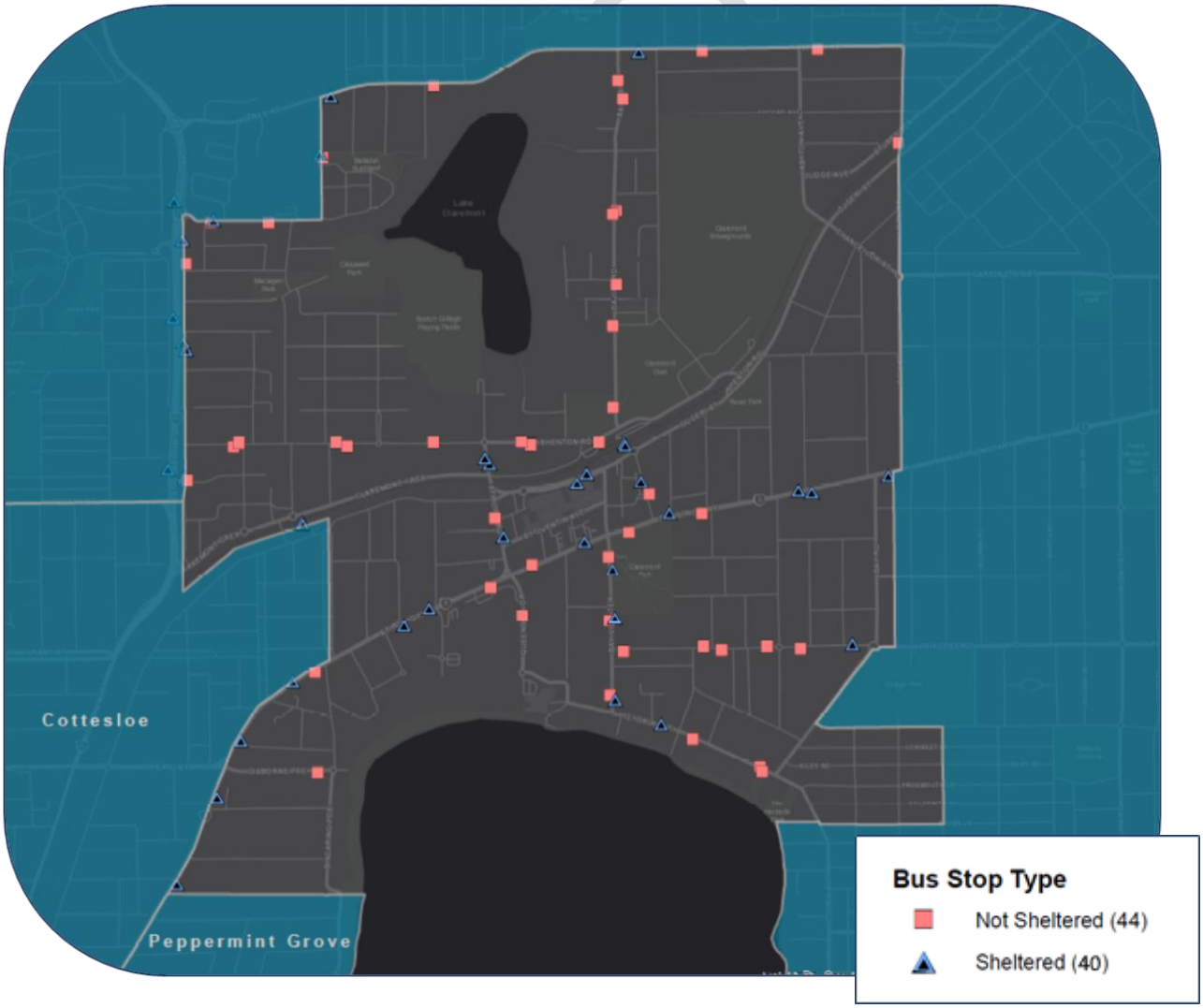
Bus infrastructure includes bus lanes, bus queue jumps, and high-quality stops. There is an opportunity to further emphasise high-capacity transit along Stirling Highway by providing additional priority infrastructure, including bus lanes, bus-sensing traffic signals and enhanced bus shelters.

A dedicated bus lane (westbound) along Stirling Highway terminates within the City of Nedlands, generally aligning with the University of Western Australia campus. Despite the volume of peak period buses along Stirling Highway, there are no bus priority lanes or intersection queue jumps within the Town of Claremont. In order for people to see public transport as a viable option, it must be competitive in time, convenience and perceived cost.

Stirling Highway has been identified as both an 'Urban corridor' and a 'High-frequency public transit corridor' in the *Central sub-regional Planning Framework* for *Perth and Peel @ 3.5 million*. This designation is consistent with the need for upgrades to support much greater access to public transport including dedicated bus priority lanes through the Town of Claremont.

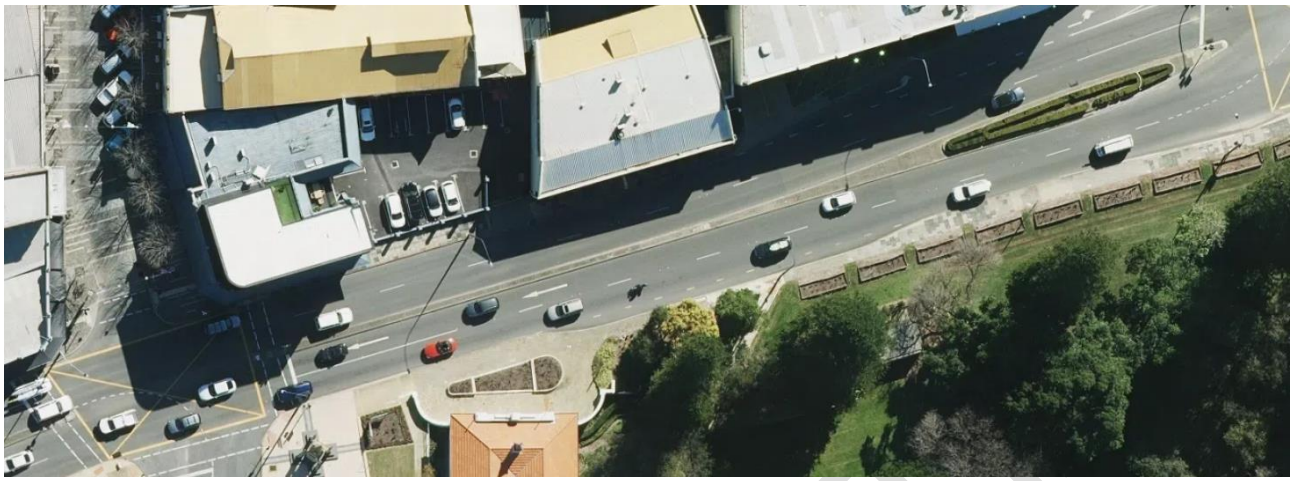
Figure 7-13 shows the location of bus stops in the Town. It is not only important to locate stops in appropriate places, but it is also key to provide bus stops with amenities such as benches and shelter from the weather. The PTA's Bus Shelter Subsidy Program can assist the Town with improvements to bus stops.

Figure 7-13 Bus Priority Infrastructure (Bus Stops)



The existing bus stop located on Stirling highway adjacent to the Town of Claremont administration has been constructed as a partial embayment, approximately 1.2m wide. Buses service this location every 45-60s during the roadway peak periods.

Figure 7-14 Existing bus embayment adjacent to the Town of Claremont offices



Given the location and function of this bus stop, the existing facilities are not considered to be sufficient. Current geometry results in vehicles squeezing between stopped buses and moving traffic, overtaking buses within the kerbside lane and failing to give way to buses entering and leaving the embayment.

This bus stop is proposed to be removed following completion of the new bus interchange on Gugeri Street (see below), with services rerouted as shown in **Figure 7-8**.

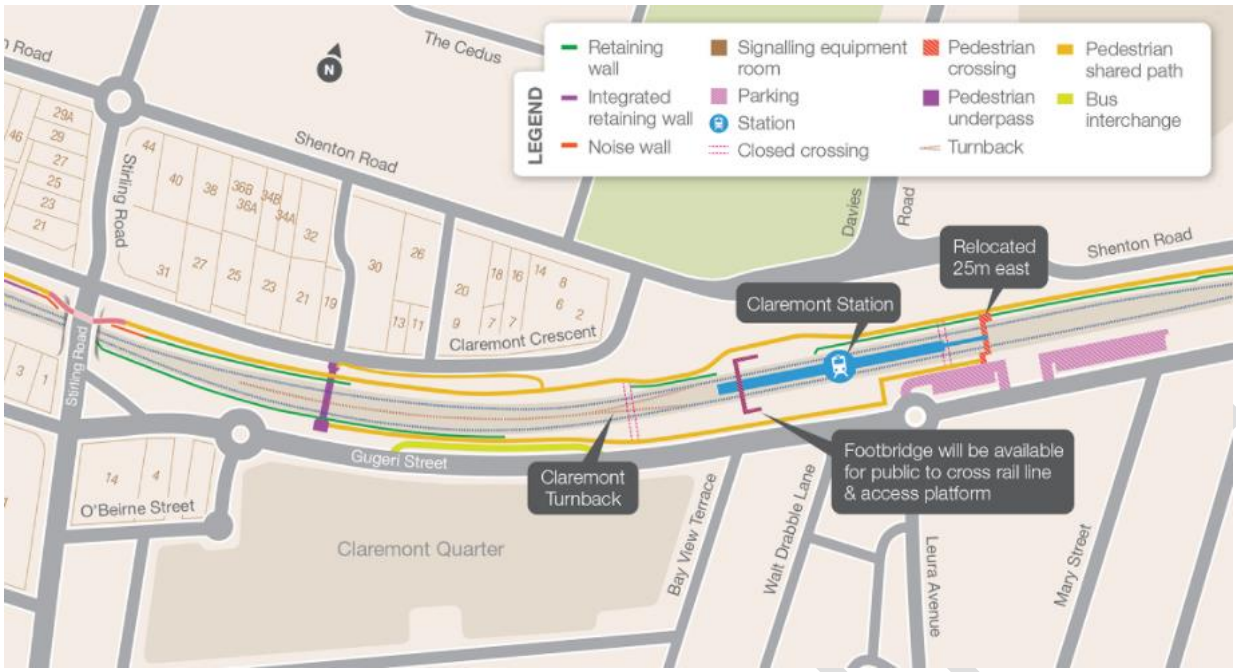
7.3.4.2 Bus / Train Interchange

Opportunities for interchange between bus and train are available via Claremont Station at the Gugeri Street bus station, which serves nine bus Routes including the new high frequency 995 service. This station is currently undergoing a largescale upgrade, including the improvements to bus stop infrastructure (see below, **Figure 7-15**) , layover space and pedestrian connections.

Figure 7-15 Gugeri Street bus interchange

The bus station features easy access by buses via roundabouts at either end, and by pedestrians at the signalised crossing point adjacent to the shopping centre car park entry, as well as the newly constructed underpass to the west of the Station.

Figure 7-16 Claremont Station upgrade project featuring the Gugeri Street bus interchange



Source: METRONET

7.3.4.3 Bus Priority Infrastructure

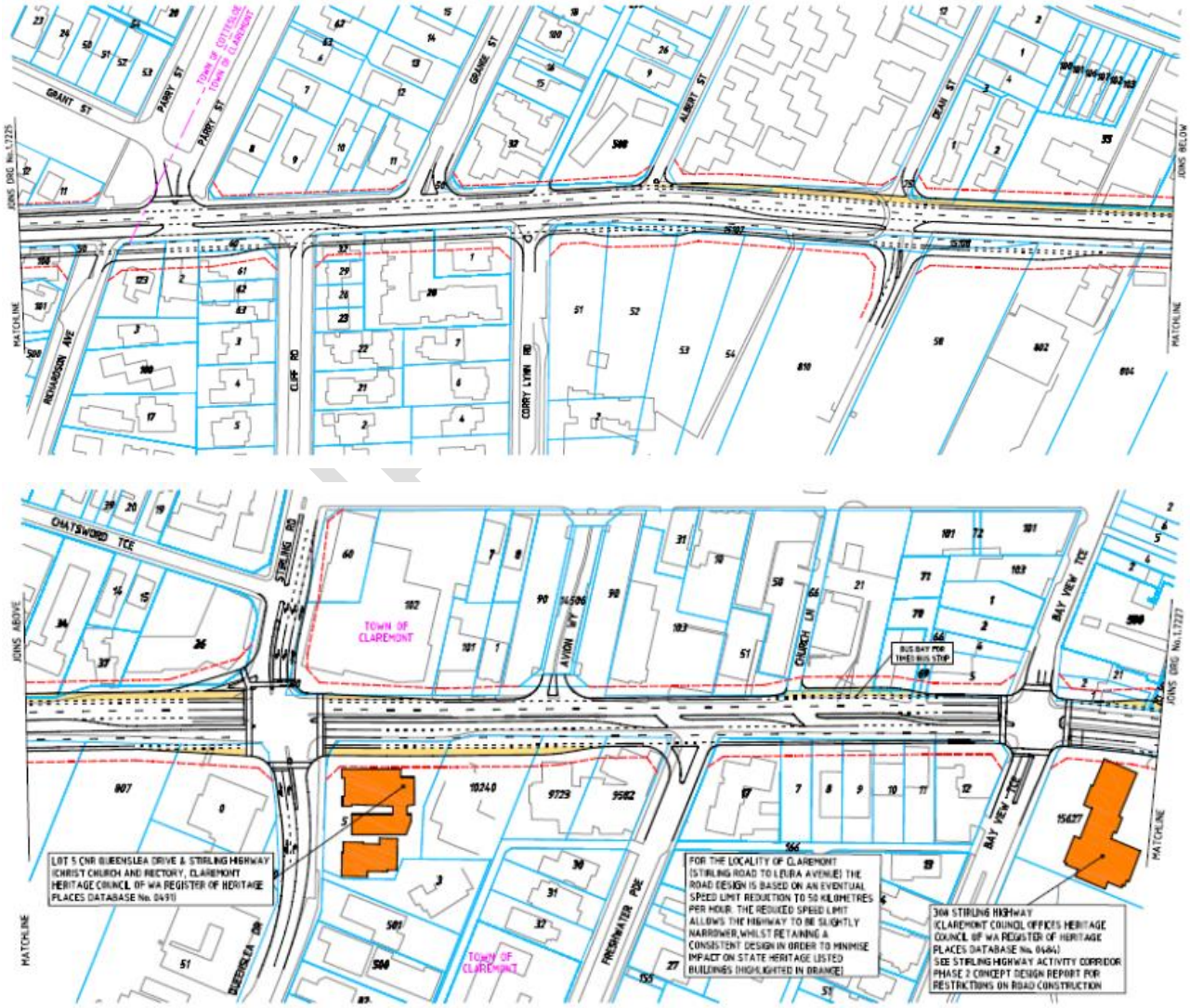
Any improvements along the Stirling Highway corridor must be undertaken in a consistent manner; a limitation that has held up infrastructure upgrades identified in the *Stirling Highway Activity Corridor Study* (SHACS) in 2012 and adopted as an MRS Amendment (1210/41) in 2017.

Bus priority (queue jump lanes) have been identified as part of the SHACS (Stirling Highway Access Corridor Study), for intersection approaches including Eric Street (eastbound, see **Figure 7-17**), Stirling Road (eastbound and westbound, see **Figure 7-18**), Leura Avenue (eastbound and westbound, see **Figure 7-19**), and Loch Street (eastbound and westbound, see **Figure 7-20**).

Figure 7-17 SHACS carriageway design @ Eric Street

Source: Extract from "Planning for Increased Residential Density along Stirling Highway"

Figure 7-18 SHACS carriageway design @ Stirling Road

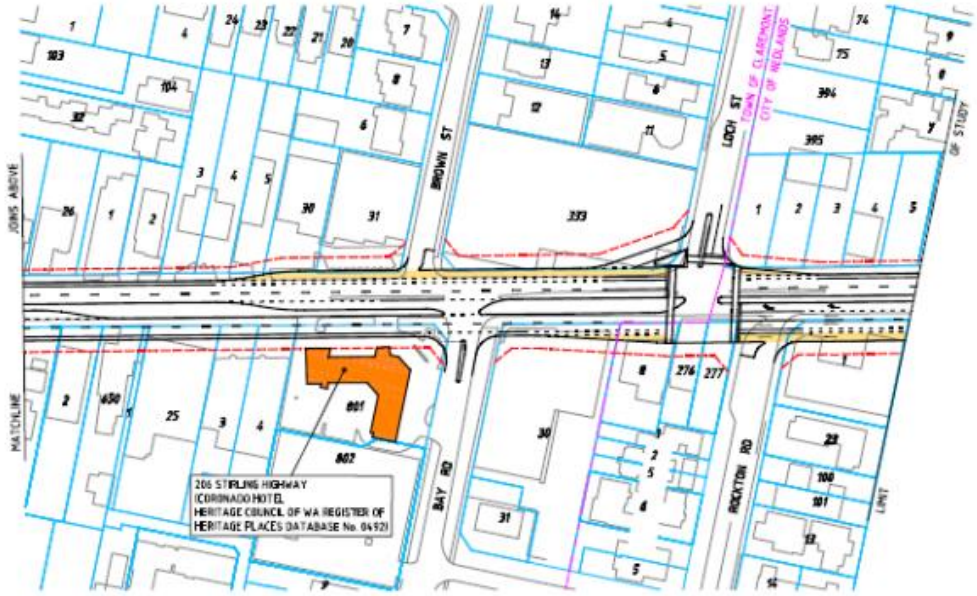


Source: Extract from "Planning for Increased Residential Density along Stirling Highway"

Figure 7-19 SHACS carriageway design @ Leura Avenue

Source: Extract from "Planning for Increased Residential Density along Stirling Highway"

Figure 7-20 SHACS carriageway design @ Loch Street



Source: Extract from "Planning for Increased Residential Density along Stirling Highway"

These upgrades are one component of the long term corridor strategy for Stirling Highway, but could greatly improve travel times for bus transit during peak periods. The substantial disruption to current function and land use along the corridor means that these upgrades are likely to occur only in the long-term, but ultimately could unlock the potential for a significant increase in people-carrying capacity for Stirling Highway.

Recommendations

Investigate PTA's Bus Shelter Subsidy Program for funding to install roadside bus shelters

Advocate for bus priority infrastructure on Stirling Highway in coordination with or preceding SHACS upgrade works

7.3.5 Combined School Bus Service

The western suburbs contain several private schools with overlapping catchments. These schools include Scotch College, Christ Church Grammar and MLC within the Town of Claremont, St Hilda's Anglican Girls' School and Iona Presentation College in the Town of Mosman Park, and Presbyterian Ladies College in Peppermint Grove. These schools are served by a combination of standard PTA Transperth Bus services, deviated services and private school bus services.

The Transperth Route 107 runs between Fremantle Station and Claremont Station, and is supplemented by the Route 702 Special Service bus (a truncated Route 107 service) from Claremont Station to Iona Presentation College Junior School.

Table 7-1 Transperth Routes to School – leaving/arriving Claremont Station

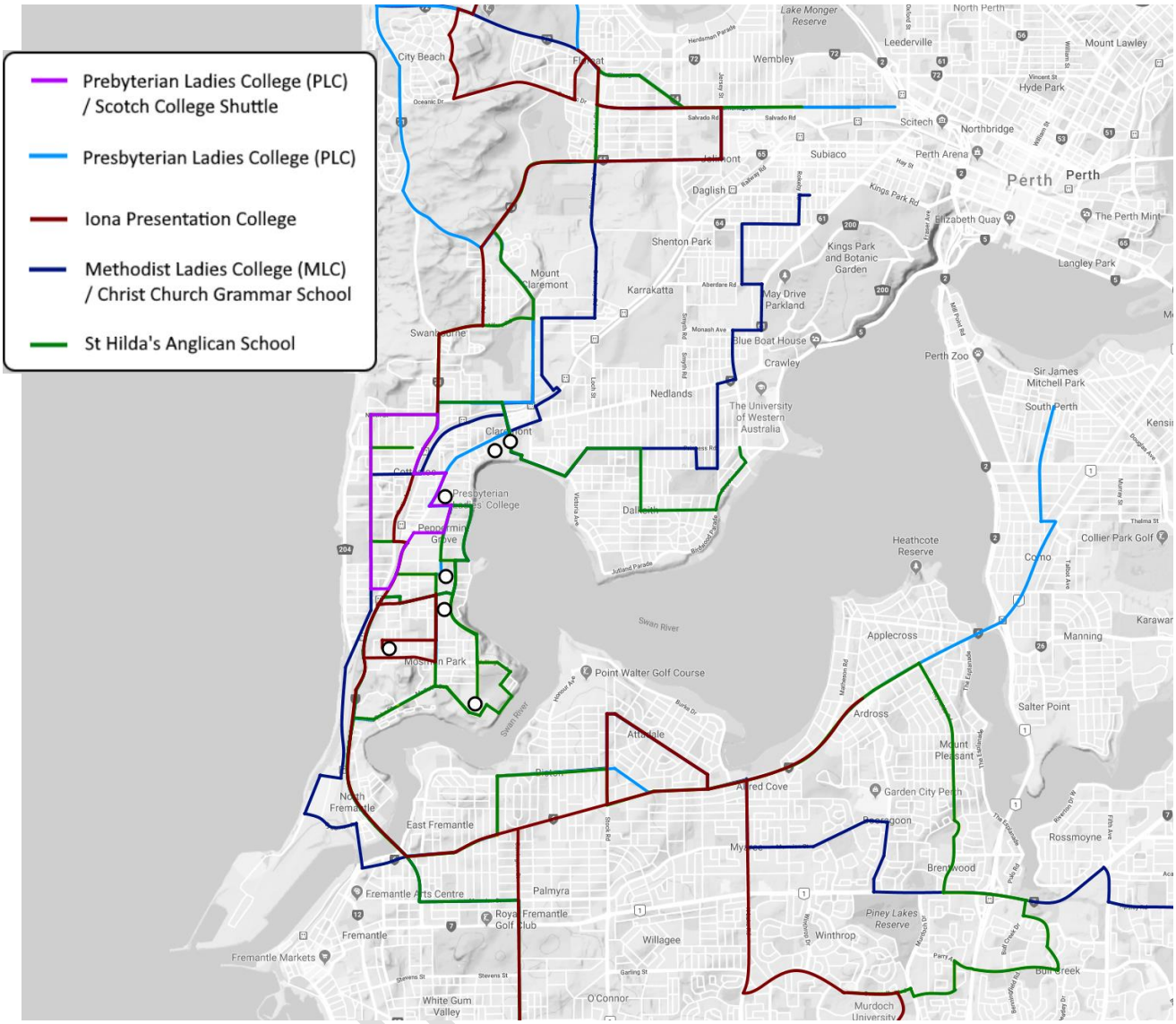
	Southbound	Northbound
Morning	Route 702: 8:13am Route 107: 8:12am, 8:33am	Route 107: 8:10am, 8:45am
Afternoon	Route 107: 3:18pm, 3:43pm, 4:19pm	Route 107: 3:28pm, 4:00pm

However, these services function primarily for long-distance commuting by students interchanging from the Fremantle Line to school, with limited opportunity for them to operate as a collector service.

To supplement these Transperth services, schools operate limited private services collecting students from locations as distant as Karrinyup, West Leederville, Willetton, North Coogee and Subiaco. However, since these buses are particular to an individual school, some of the efficiencies of the service are lost.

This map (**Figure 7-21**) shows the private bus routes operated by each of the schools within the grater Western Suburbs area. While some of these services *are* shared (e.g. PLC/Scotch, MLC/Christ Church), there is also a lot of redundancy.

Figure 7-21 Private Bus Routes for Claremont Schools



One potential improvement would be for schools to combine existing private funding to create more effective services for these long-distance trips, with greater efficiencies and reduced travel times for students. This would be maximised if consolidated stops were provided adjacent to key community destinations (retail/restaurant hubs etc.), to strike a balance between minimising last-mile distance for students and travel time for the service.

In addition, there is an opportunity to expand the local loop service (currently run by PLC) to include connections to Scotch College, MLC and Christ Church (and potentially St Hilda's and Iona). This service would allow a sizeable local catchment of students to access the school via a direct bus, and demand could be sufficient to run multiple closely-spaced service to create some choice for arrival time. The Town would have a role in providing support for this combined service, currently facilitated by Transport Management Plans associated with Development Approvals for Scotch College, MLC and Christ Church Grammar School.

It is understood that the existing routes are related directly to student enrolments and may need to be modified on an annual basis. For this reason, an 'optimal' arrangement has not been recommended. However, experience suggests that the consolidated student catchment would allow for improvements to services while also being more cost-effective.

Recommendation

Lead discussions with private schools to combine their existing private funding to create a more effective service for the long-distance trips. Expand the PLC local loop to include connections to Scotch College, MLC and Christ Church

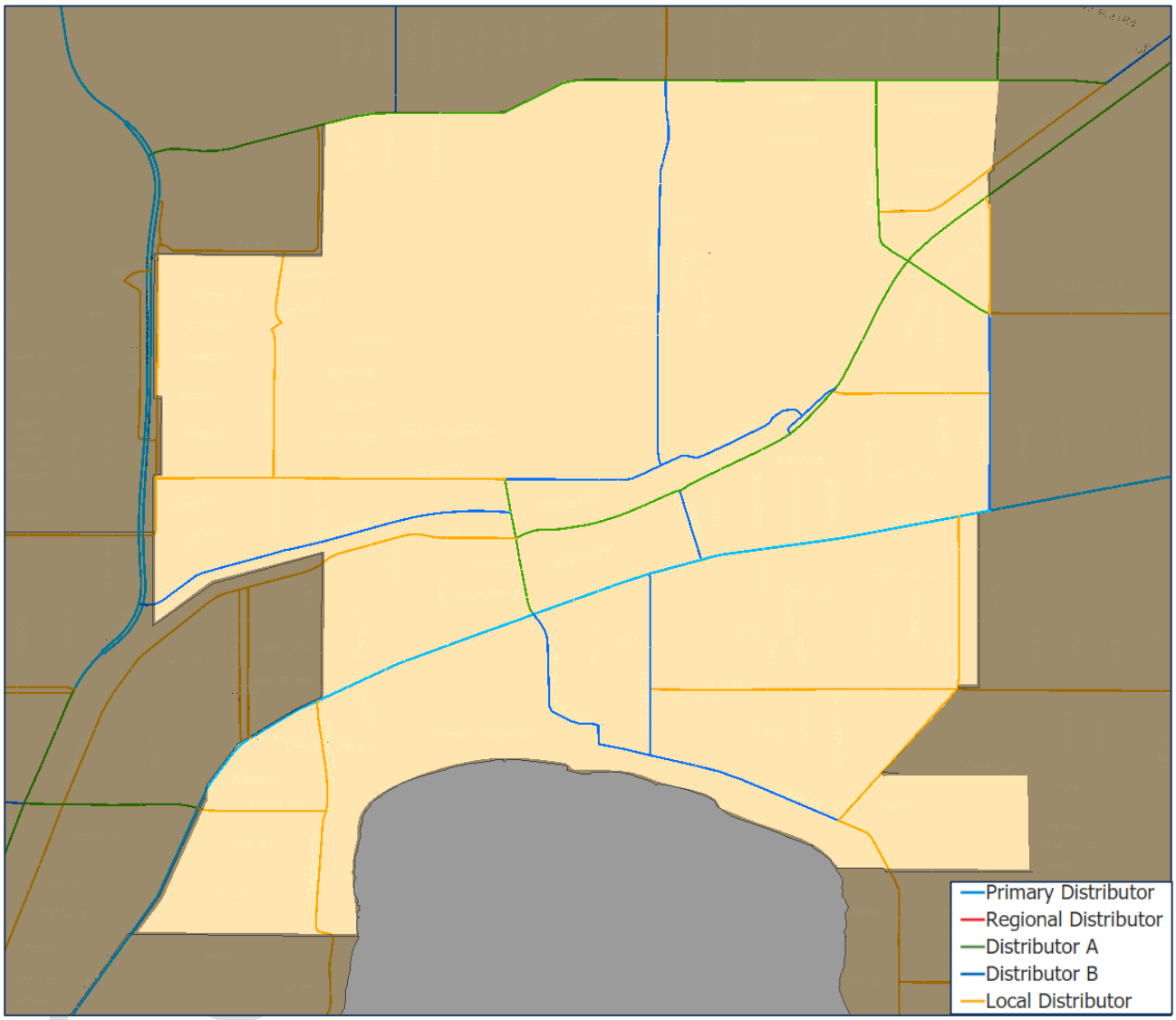
7.4 Private Vehicle Movements

7.4.1 Road Hierarchy

The private vehicle function of the road network is partially defined by its position in the Main Roads Functional Hierarchy (MRFH).

However, the MRFH considers road function only in terms of private vehicle and freight movement.

Figure 7-22 Main Roads WA Road Hierarchy

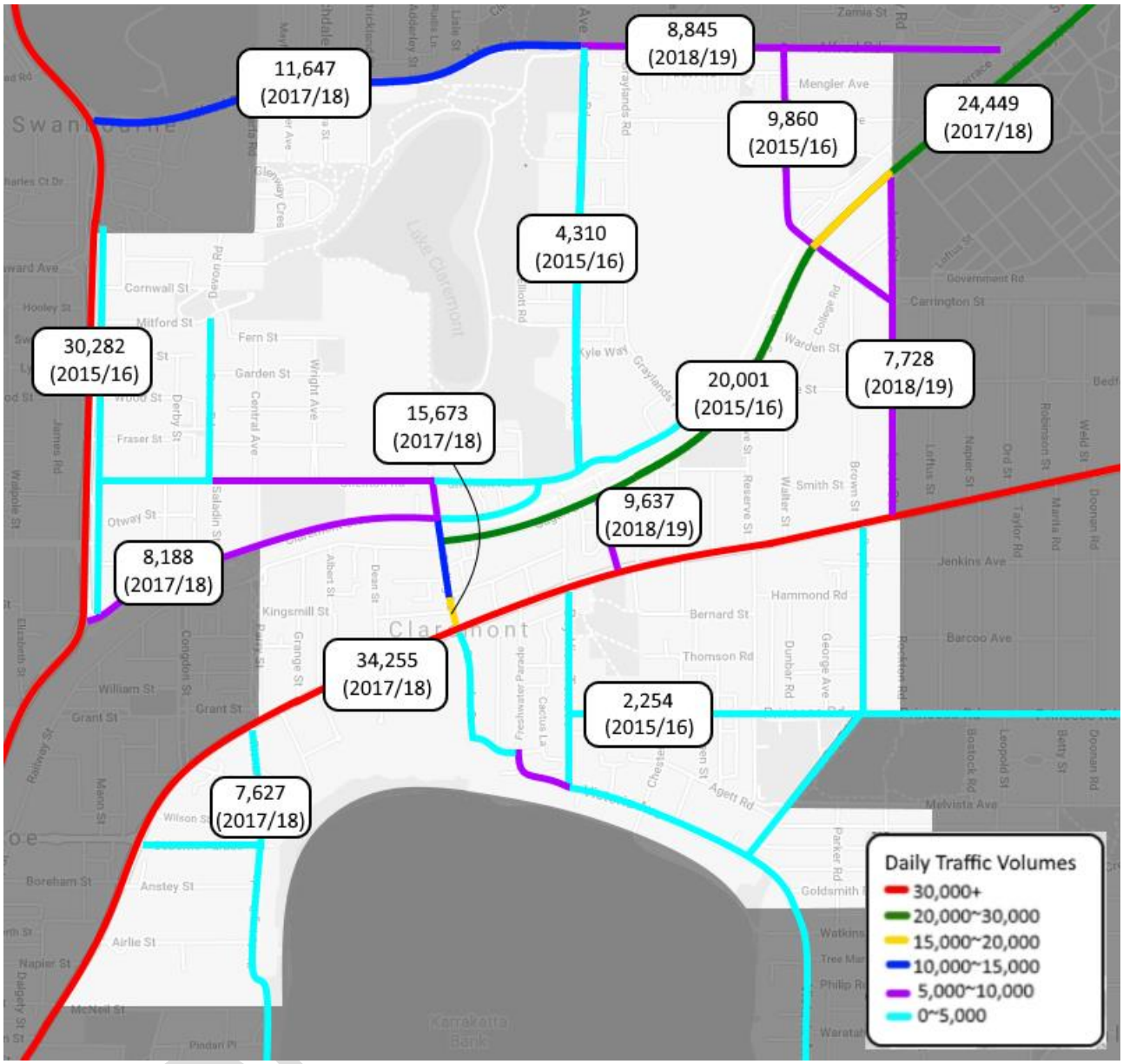


7.4.2 Traffic Volumes

Traffic volumes along key roads throughout the Town are at a level that suggests demand is at or near the practical capacity during peak periods (see **Figure 7-23**). This implies that any future growth in transport demand cannot occur under as 'business as usual' scenario; there is limited road space to support more cars travelling at peak times. Congestion is common along Stirling Highway, with long peak-period delays within the Claremont LGA. This can be attributed to an increasing demand for traffic from outside the LGA boundary passing through the Town, as well as internal traffic generated by residential development.

Stirling Highway is a significant part of the Claremont Road network carrying substantial amount of traffic, to and from the LGA. It also acts as a thoroughfare for a large amount of traffic travelling to neighbouring suburbs. With such a vital role to play in the Town of Claremont's road network, effective and even flow of traffic on Stirling Highway is of the utmost importance.

Figure 7-23 Daily Traffic Volumes

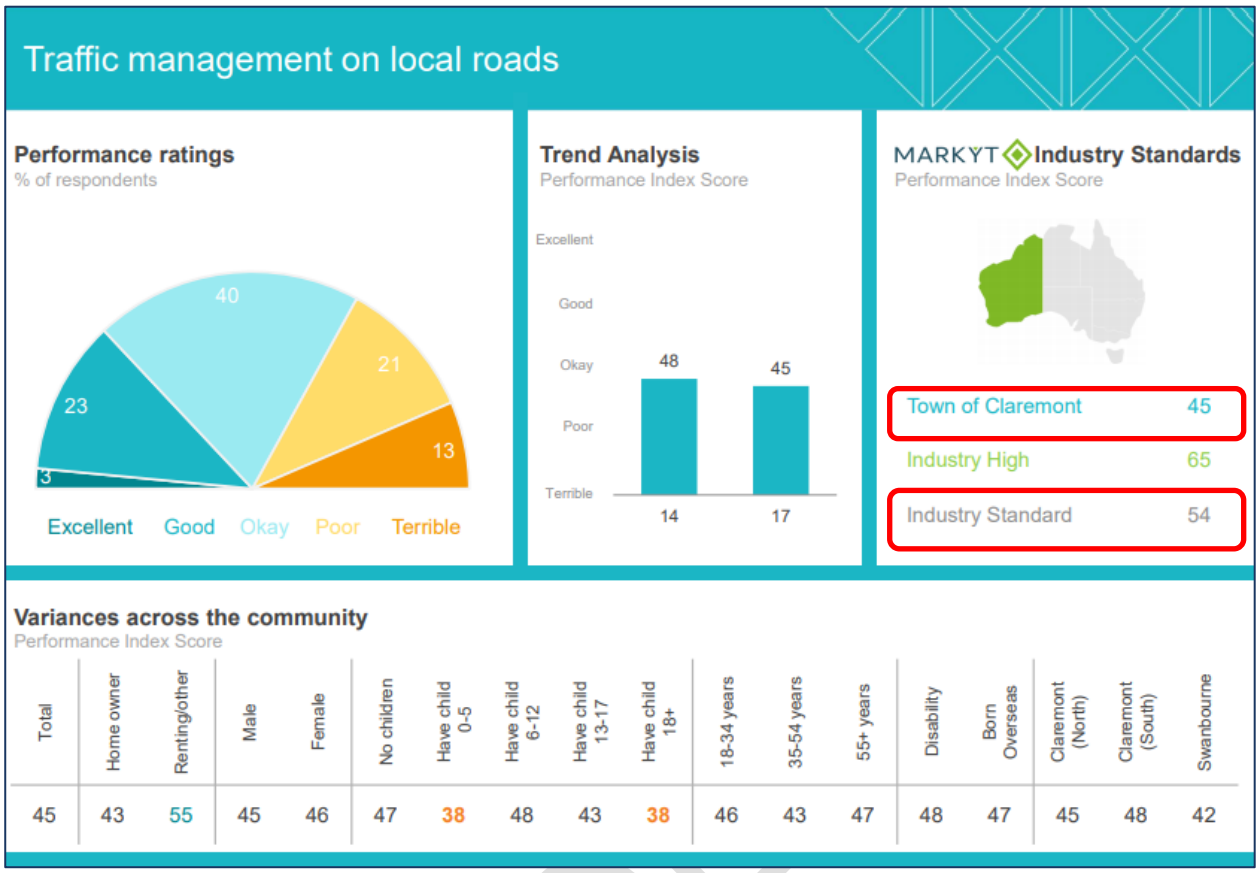


7.4.3 Congestion

Traffic congestion occurs when peak period demand exceeds the carrying capacity of the road. However, for the purpose of strategic decision-making capacity it is generally considered for daily traffic.

A baseline for the subjective performance of traffic management in the LGA can be seen in the outcomes of the most recent community survey on attitudes towards traffic management on local roads (**Figure 7-24**). The performance index provided is lower than the industry standard, which has been developed in consideration of Councils across Australia.

Figure 7-24 Community Perceptions of Traffic Management



Source: Markyt Community Scorecard

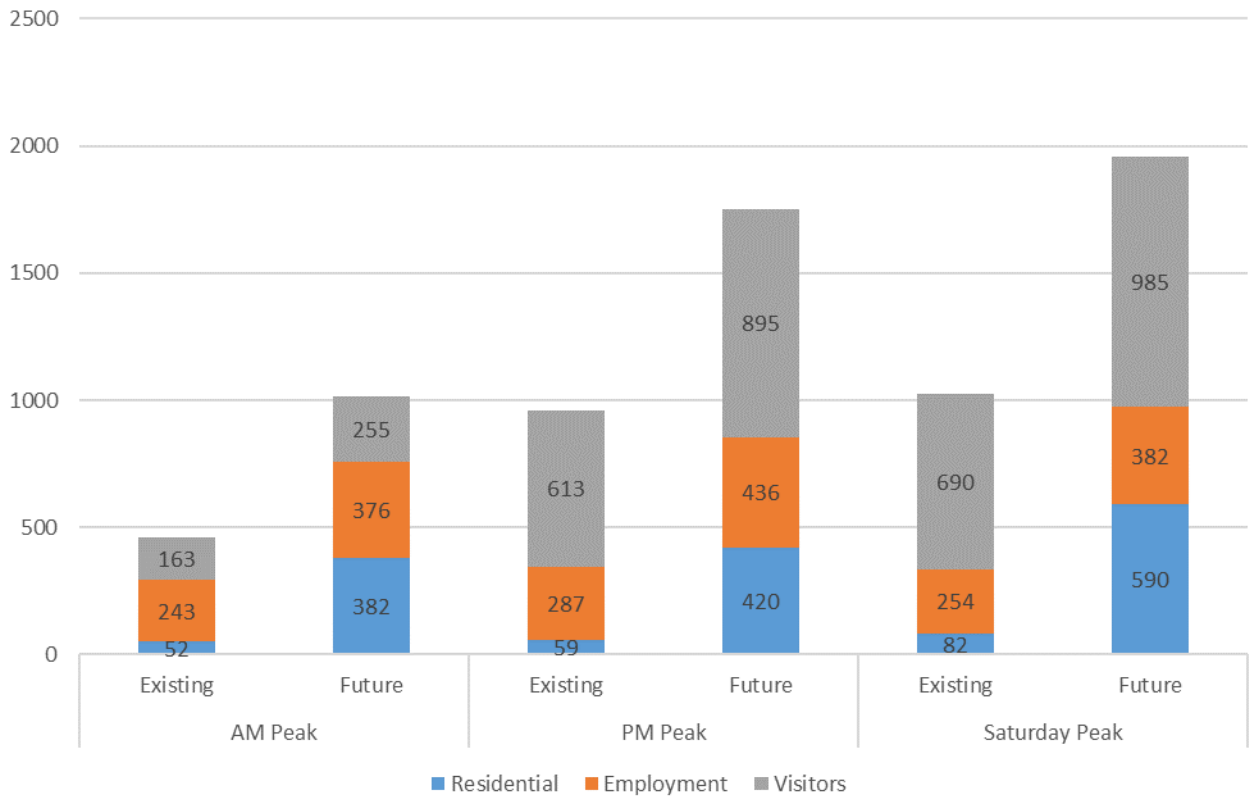
As development continues within the Town, and particularly as a result of the Claremont Town Centre, the pressure on this network will continue to grow. The degree of development growth is clearly shown in the outcomes of Pracsys' *Local Commercial and Activity Centres Strategy* which identifies moderate change for the majority of Centres; but a substantial increase in commercial floor area for the Town Centre itself.

Cardno has used an analysis tool to break up the trip generation for the various PLUC categories to estimate the magnitude and proportional generation for residents, employees and visitors to the Claremont Town Centre, which are the primary constituents of traffic growth within the LGA.

Understanding which users make up the traffic demands during peak periods can help identify solutions to reduce congestion. These include parking supply and demand management techniques, provision of alternative transport and the benefits of dense mixed-use development, all of which reduce the desire for travel by car. Congestion itself is probably the key factor that induces behaviour change – which suggests that we need a degree of congestion to support the Town's sustainability objectives.

The results of peak period user modelling are given below (**Figure 7-25**) for the current and future build-out horizons, without modifying existing behaviour. The results show that while peak period driving trips by residents of the Town Centre itself is currently low, the substantial growth in residential density would have a large effect on congestion. In addition, the proposed development growth within the Centre can be expected to increase peak period traffic by visitors and employees by approximately 50% - note that this already considers the internal trip capture that results from increased residential density

Figure 7-25 Claremont Town Centre - traffic generation by user group (high residential growth scenario)



This modelling follows the typical distribution, with the greatest constituents of traffic summarised roughly as follows (for a typical system):

- **AM Peak**: outbound residential traffic and inbound employees
- **PM Peak**: inbound residential traffic, outbound employees, retail and entertainment visitors
- **Saturday Midday**: inbound and outbound residential movements (non-commuting) and retail/entertainment visitors.

The outcomes suggest that there would be a significant increase in traffic generation as a result of residents within the Town Centre heading out to work, school and other activities during all peak periods. The impact of Town Centre employment and visitation is much less significant.

However, this should be considered in the context of existing network capacity. Stirling Highway is effectively saturated, and while there is still some remaining potential for Town Centre trips to use Gugeri Street and Stirling Road to access the strategic network, this is also limited.

There are actually four constituents of traffic that need to be considered if a sustainable outcome is to be found. Some potential levers for change which can be modified by the Town are also described below:

- **Residential driving**: residents will continue to have excellent access to other forms of transport, and will experience the greatest impact from congestion. As such, they are much more likely to change their

behaviour – including long-term changes in vehicle ownership and use that will reap a number of benefits for the local community.

- **Employee driving**: employee demand is affected by both the impacts of congestion and the supply of long-stay parking. The level of employee parking within the Centre is already very low, and so these trips are subject to price-based demand restraint and congestion effects. The availability of high-quality alternatives to driving via bus or train will also support low trip and parking generation rates for staff.

  Parking stations at the periphery of the Town Centre provide opportunities for drivers to park without contributing to congestion on pedestrian-oriented streets, while also acting as a disincentive to park (due to the additional walking distance).

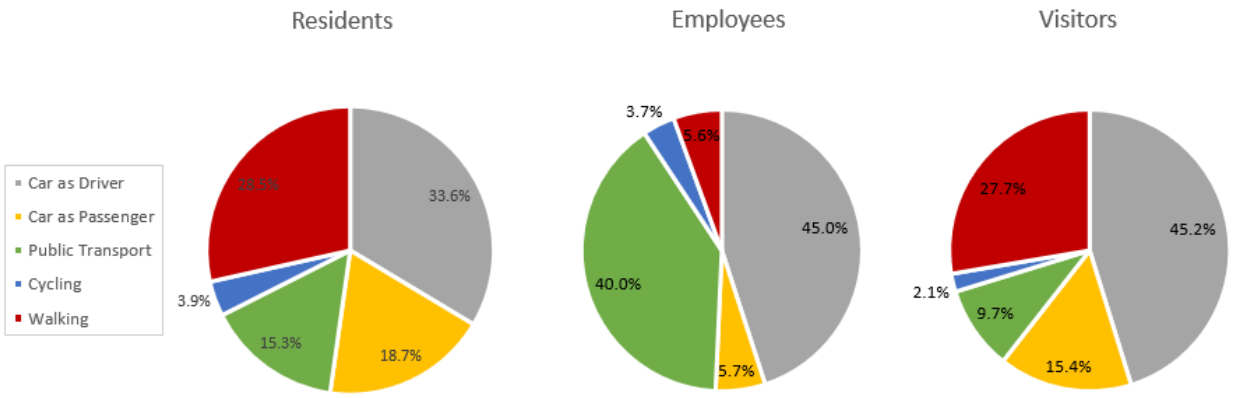
- **Visitor driving**: visitor demand by car is impacted by the availability of short-stay parking (during peak periods only). The actual demand increase for visitor driving is predicted to be relatively small, as a result of the growth in the residential catchment within the Centre itself. This magnitude of change can easily be counteracted with consistent and robust parking pricing, supported by convenient alternative transport, improved rideshare parking and quality end-of-trip facilities (including for e-bikes/e-scooters).

- **Regional traffic**: unaffected by parking supply, but may be redirected to alternative routes or shifted to public transport modes. One of the main deciders for regional traffic choice is journey time. The imposition of residential trips onto the network will ultimately have an impact on these trips, which will then tend to reroute to other routes, times of day or modes.

  Bus-priority measures such as queue jump facilities and bus lanes improve the competitiveness of public transport against driving, and will ultimately contribute to an increased uptake in alterative travel modes.

These results can be translated into policy measures for development of the Activity Centre and surrounds. The mode share target established for each group will also assist in defining the additional requirements for public transport, cycling and other facilities, with all measures consistent with the vision of the Centre and the network.

This understanding of traffic generation has been used to determine the target mode shares described in **Section 6.2** and recreated below.



This sustainable outcome still represents a substantial shift in behaviour by all members of the community. To enable the levels of activity necessary to sustain the economic vitality of the Town Centre requires employee driving to decrease by 40%, and driving by visitors to decrease by 30%. Residents, have more flexibility for their destinations and times of travel, but will still be greatly affected by the impacts of congestion on their transport options.

7.4.4 Speed Limits

The transformation of Bay View Terrace to a shared zone has created a safe and attractive environment for pedestrians and cyclists into and through the heart of the Claremont Town Centre. The catalyst for this change was the reconstruction of the space into a slow-speed streetscape, with a speed limit of 10km/hr. At this speed, driver behaviour changes dramatically; ceding space to crossing pedestrians

There is potential for this type of treatment to be replicated across the Town Centre, reflecting the desired function of these internal streets as pedestrian-friendly, attractive and walkable. By including all internal roads (Bay View Terrace plus St Quentin Avenue, Avion Way, Church lane, Bovell lane, Divers Link and O'Beirne Street), it would solidify the Town Centre as a people-oriented place; where cars are temporary guests.

Current traffic speeds are already relatively low, generally in the range of 25-35km/hr. This could be further reduced using similar techniques employed for Bay View Terrace.

Jurisdictions across the world have adopted a 30km/hr residential speed limit, which allows for integration of mixed-traffic cycling and greatly improved road safety outcomes. The Department of Transport's Safe Active Streets provide one format for restraining, but retrofitting this standard of infrastructure across the road network would be cost prohibitive. Nevertheless, creation of ubiquitous 30km/hr environments (once accepted) would be overwhelmingly positive for residents.

7.4.5 Intersections

As part of this Transport Strategy, Cardno completed a mesoscopic analysis of network capacity across the LGA, to determine the extent to which traffic growth associated with development can be accommodated during peak periods.

Modelling of the existing network indicates that key intersections at Stirling Highway / Queenslea Drive, Stirling Highway / Leura Avenue and Stirling Road / Gugeri Street are currently operating at or close to capacity during peak periods. The following diagrams (**Figure 7-26**) indicate the level of congestion for intersection approaches within the local area.

Note that these delays are based on average operation and do not reflect peak seasons or extraordinary events.

Figure 7-26 Congestion map – Claremont Town Centre

The available capacity at key intersections in the network has been calculated to determine how much additional traffic the system can carry, without upgrades. The following **Table 7-2** summarises the outcomes of this investigation, for the most "critical" locations in the network, from a capacity perspective.

Table 7-2 Remaining intersection capacity

Intersection	Traffic Growth Potential (worst of AM and PM peak hours)
Stirling Highway / Queenslea Drive	0%
Stirling Highway / Leura Ave	0%
Stirling Highway / Bay View Terrace	0%
Stirling Highway / Eric Street / Osborne Parade	0%
Stirling Road / Gugeri Street	20%
Gugeri Street / Leura Ave	10%

For the majority of locations, there is little ability for additional capacity to be unlocked through minor measures. Stirling Highway in particular is constrained in width, with any future improvements focused on opening up public and active transport capabilities, which have a much more space-effective people-carrying capability.

The results of this analysis suggest that any growth in the Town Centre that generates traffic can do so only outside of peak periods, or by displacing existing users. As such, it is likely that the Town Centre redevelopment would be primarily supported through mode shift to alternative transport (bus, train, walk cycle), and accompanied by parking management and pricing to reinforce this behaviour.

Parking restraint can be applied differently to commercial and residential development, with cash-in-lieu provisions available to reduce the parking supply for new commercial development.

Traffic modelling analysis showed that most of the through movements along Stirling Highway were found to be performing adequately. The minor roads at many of these intersections, however suffer from substantial delays across both the AM and PM peak periods. Most notable delays were observed at the intersections of Stirling Highway/Stirling Road/Queenslea Drive and Stirling Highway and Bay View Terrace.

The delays at the Stirling Highway/Stirling Road/Queenslea Drive can be attributed to the presence of the Christ Church Grammar School which can cause substantial delays during morning and afternoon school peaks. While there is some additional impact during the afternoon peak as a result of the adjacent Bethesda Hospital, this constitutes only a minor additional component to delays. Christ Church Grammar School and MLC can also be accessed from Stirling Highway via the priority access opposite Dean Street. This currently has very limited right-turn capacity, resulting in excessive delays during peak periods. The installation of a signalised intersection at this location would provide additional opportunities for controlled access and alleviate congestion at Queenslea Drive.

The delays at the Stirling Highway and Bay View Terrace intersection are predominantly due to the limited green time provided for the Bay View Terrace approach.

Some of the other notable intersections where delays were observed were Stirling Highway/Albert Street and Stirling Highway/Grange Street. Though only a few vehicles utilise Grange Street and Albert Street to exit onto Stirling Highway from MLC, the volumes of traffic along Stirling Highway provides very limited opportunities for vehicles on the minor roads to exit, thus leading to increased delays. Improved conditions within and around MLC / Christ Church Grammar School (potentially including internal access easements to create better opportunities to distribute traffic to the boundary network) would create alternatives to existing uncontrolled movements.

One additional impact that mesoscopic modelling has not captured is the traffic conflicts at the Gugeri Street / Leura Avenue roundabout. In this case, complex driving behaviours related to afternoon school and retail peak periods result in periodic failure of the existing roundabout, despite the apparent available capacity. This is related to the interactions with the pedestrian signal adjacent to the Claremont Station, resulting in vehicles queuing through the roundabout. Improvements to the signal infrastructure, such as smart pedestrian sensors, could reduce this impact. Additional changes in and around the Claremont Station, including the newly-constructed underpass, will also assist traffic movements.

Several network modifications have been discussed with the Town, which could provide alternative routes east-west from the surrounding residential catchment without requiring the use of Stirling Highway/Shenton Road. These changes would provide utility for those residents but are unlikely to substantially improve the operation of the key Stirling Highway Corridor. This is due to the substantial latent demand effects already in place along this primary route – any marginal improvements would be quickly absorbed by induced peak period use. Further discussion of these road upgrades is provided in **Section 7.4.6** below.

Recommendation

Advocate to MRWA to lower residential streets to 30km/hr, using Self Explaining Streets Guidelines, prioritizing key routes to schools.

Review speed limits within the Town Centre to reduce limits to safe speeds for a pedestrian environment

7.4.6 Road and Intersection Review

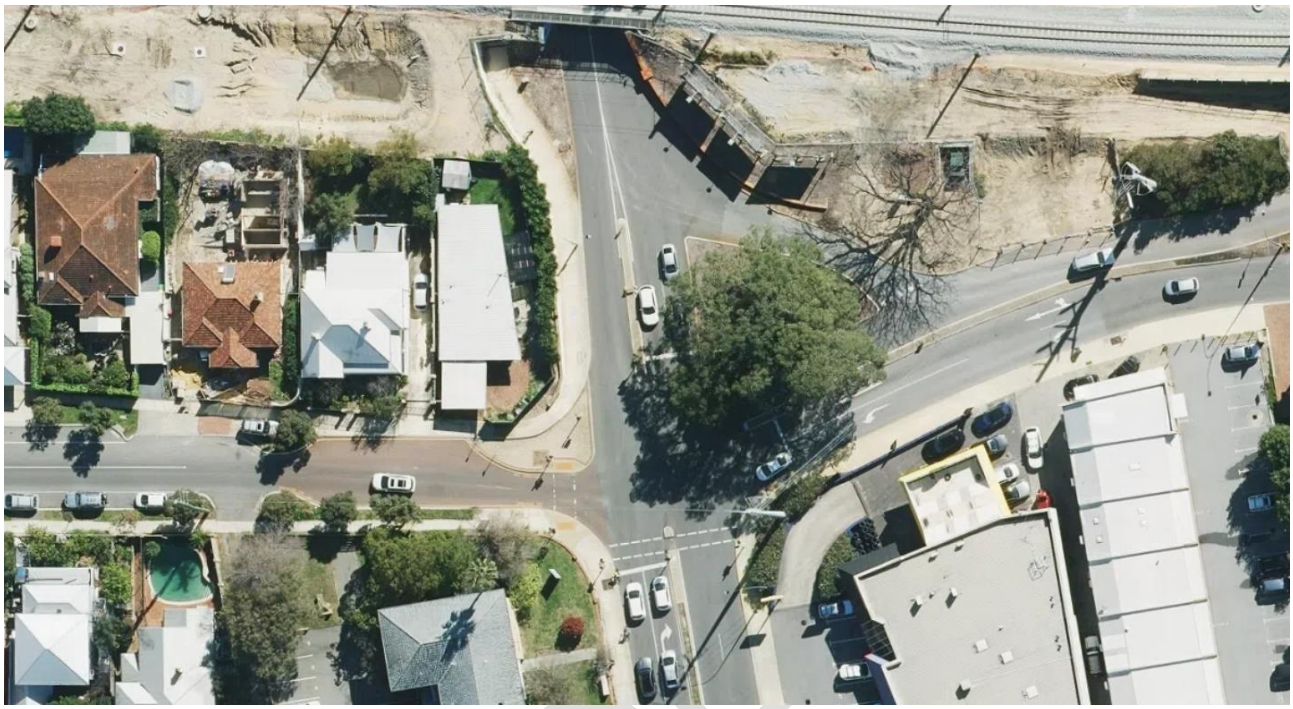
The existing road network is currently operating at (or near to) its practical capacity during peak periods. Preliminary analysis has been completed within the AIMSUN mesoscopic model environment to investigate the impact of intersection treatments on capacity and route selection and to determine what, if any, functional improvements can be made to the network.

Note that this model includes only the network within the Town of Claremont and therefore cannot capture effects that relate to decisions made beyond the LGA.

7.4.6.1 Stirling Road / Barnfield Road

Barnfield Road runs as a continuation of Gugeri Street and Railway Street, to the south and east of the Fremantle train line. Barnfield Road is currently limited to one-way westbound by a partial closure at Stirling Road. This limits its utility as a strategic link to the Claremont Town Centre and beyond.

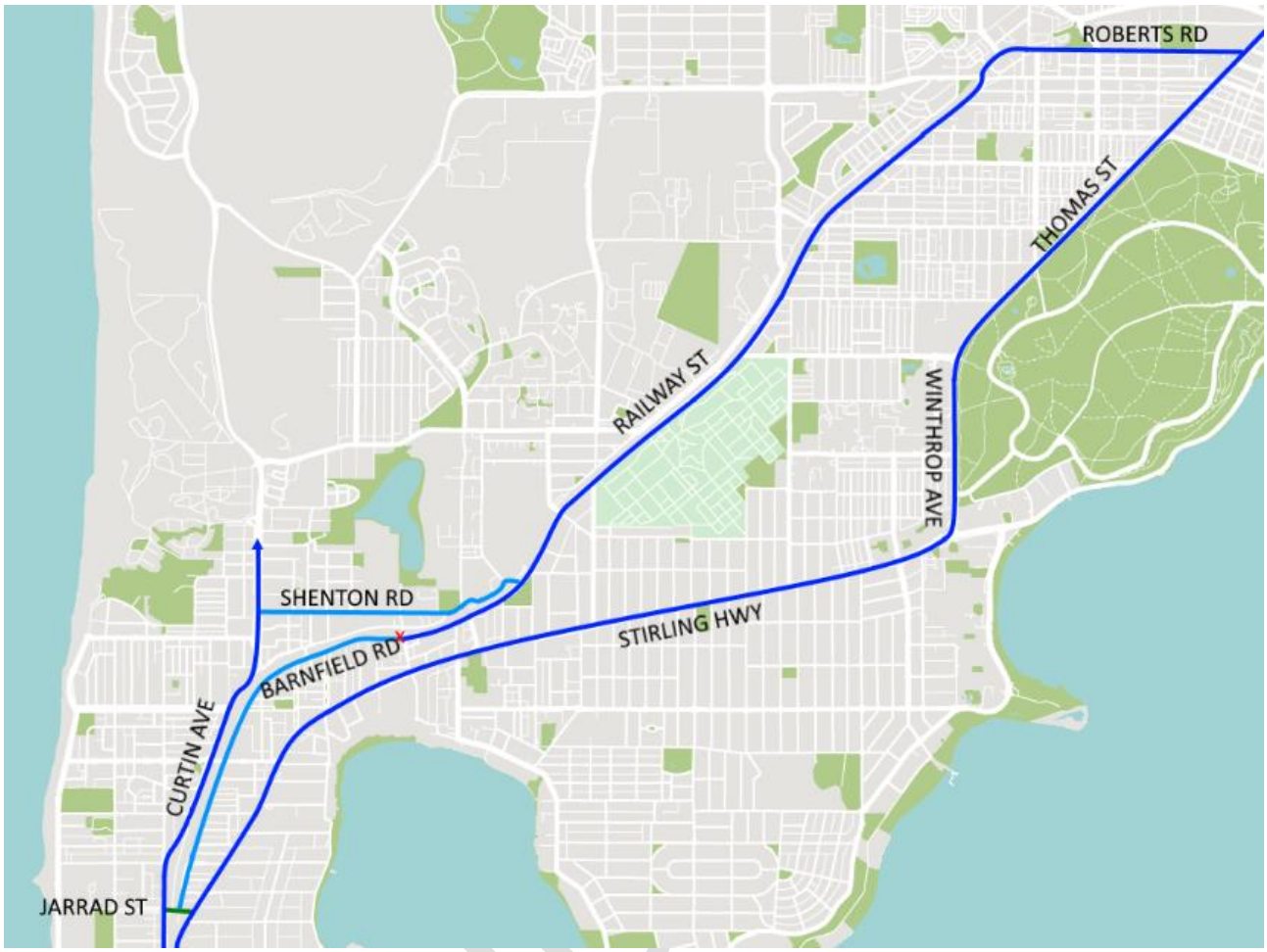
Figure 7-27 Stirling Road / Barnfield Road – signalised intersection



Source: Metro Map

Figure 7-28 illustrates the two nearest alternative routes from Cottesloe through to the Perth CBD. These routes run generally parallel to Barnfield Road through the Town of Claremont.

Figure 7-28 Parallel routes from Cottesloe to the Perth CBD



The impact of the Barnfield Road partial closure is evident in the daily traffic profile, which shows that 10 times as much traffic travels westbound (2700vpd) than eastbound (300vpd). This indicates that Barnfield Road is already used to access destinations outside of the LGA, but only in one direction.

Reversing this flow direction, to prioritise eastbound movements, would provide an alternative route for traffic heading east towards the Perth CBD. This would have a positive effect on existing corridors such as Shenton Road and Claremont Crescent during the morning peak period. However, this would also have a significant negative impact on the Stirling Highway / Stirling Road intersection during the PM peak. Vehicles currently undertaking westbound movements along Barnfield Road would be forced to redistribute to alternative routes, including Shenton Road and Stirling Highway. This would increase the congestion at several critical intersections that are already at capacity during the PM peak period.

If restrictions were to be removed entirely, and traffic allowed to travel in both directions along Barnfield Road from Stirling Road, this would inevitably result in traffic volumes increasing above 5,000vpd. In reality, the likelihood of this change would be a further redistribution of existing two-way traffic volumes to Barnfield Road as a result of its improved legibility and opportunities for controlled access to Stirling Road and Gugeri Street via the existing signalised intersection. The factors influencing these decisions are complex and do not form part of the mesoscopic modelling environment.

Some of this traffic would be attracted to this route as a viable alternative to Stirling Highway through the Claremont Town Centre. This additional traffic would be detrimental to the function of Gugeri Street, impeding the operation of the Claremont Bus Interchange and the legibility of pedestrian links from the Claremont Station through the Town Centre. It is possible that the friction that results from these non-car uses for Gugeri Street could be sufficient to constrain traffic volumes, but the extent of these competing effects are currently unknown.

Modelling runs have been undertaken that include the effect of local rerouting, for traffic already accounted for by the model. The existing traffic is reflected in **Figure 7-29** and can be compared against the scenario with Barnfield Road extended to Stirling Road in both directions (**Figure 7-30**).

Figure 7-29 Local rerouting effects: Barnfield Road one-way westbound (existing scenario) - AM peak (left) and PM peak (right)

Figure 7-30 Local rerouting effects: Barnfield Road two-way (modified scenario) - AM peak (left) and PM peak (right)

These preliminary results show a redirection of local traffic in the order of 150-250 vehicles in the peak hour, which includes traffic previously using Claremont Crescent, Shenton Road and Stirling Highway. The model shows is a substantial increase in traffic volumes heading eastbound along Gugeri Street as a result of this modification (from 364vph to 616vph in the AM peak).

Note that Stirling Highway is entirely capacity constrained during the peak period. Any measure that reroutes traffic from Stirling Highway to an alternative route will simply induce additional traffic (volumes and delays will not actually decrease).

The benefit of converting Barnfield Road to 2-way is generally felt by Shenton Road, which experiences pressures particularly around school peak periods, and at the Congdon Street bridge. The additional capacity made available by the Barnfield Road eastbound lane allows for reduced congestion and improved function along these alternative links.

However, the additional traffic at the Stirling Road / Barnfield Road intersection has a detrimental impact on delays at the signals. Right turning traffic from Barnfield Road into Stirling Road requires that an entire new phase is added, reducing green time for the primary north-south movements. The increased queuing has the potential to interfere with the Stirling Road / Claremont Crescent intersection, and could potentially prejudice a roundabout option for that intersection.

Further detailed analysis is recommended if changes to Barnfield Road are to be pursued, including an assessment of the strategic value of the Railway Street link.

7.4.6.2 Gugeri Street / Shenton Road

This intersection operates as a complex priority intersection related directly to the location of the subway under the Fremantle train line. In addition to forming the junction between two Distributor Roads, it also lies near the intersection of Shenton Road and Graylands Road, which remains an important access street along the western boundary of the Claremont Showgrounds.

The current configuration of the Gugeri Street / Shenton Road intersection consists of a full movements connection to the west of the subway *and* an eastbound merge lane. Sightlines are constrained by the curvature of the road, topography and the subway (**Figure 7-31**).

Figure 7-31 Gugeri Street / Shenton Road – subway and priority intersection

Source: MetroMap

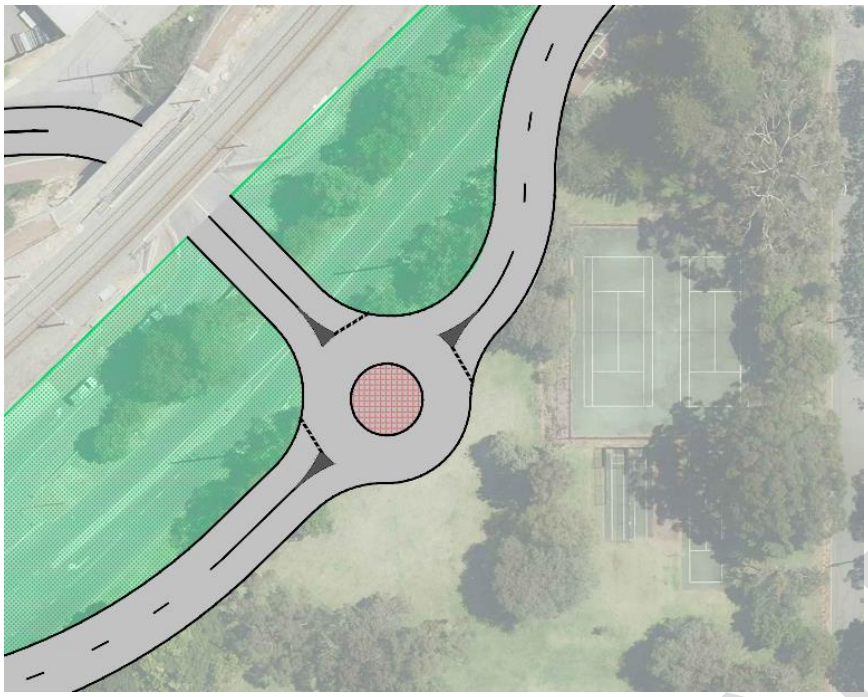
The Town has identified a potential alternative intersection form, which comprises a roundabout intersection for safe and effective movements between these distributor roads. The level difference between the subway and Gugeri Street (see **Figure 7-32**) presents some design challenges.

These can be resolved by extending Shenton Road to allow for acceptable grades between the subway and Gugeri Street, and realigning Gugeri Street to connect at the resulting roundabout intersection. This means that a roundabout at the natural intersection location would require a large deviation of Gugeri Street and a considerable land take from Rowe Park (as shown in **Figure 7-33**).

Figure 7-32 Shenton Road subway – level difference

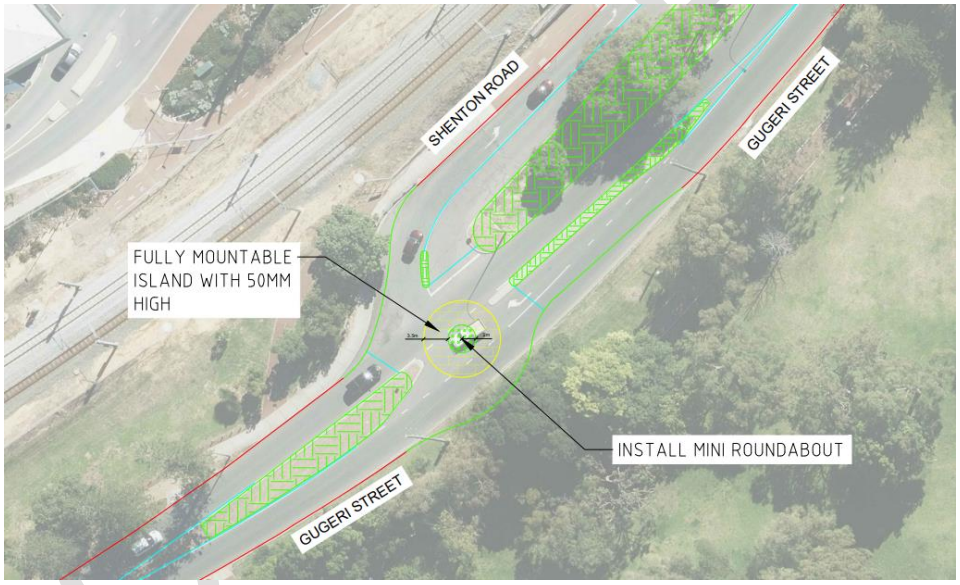
Source: Google StreetView

Figure 7-33 Gugeri Street / Shenton Road – concept roundabout with road realignment



An alternative would be to retain the existing intersection location; converting the priority to a roundabout form. The following **Figure 7-34** describes an approximation of the absolute minimum roundabout geometry.

Figure 7-34 Gugeri Street / Shenton Road – concept roundabout (minimum geometry)



This mini roundabout minimises the encroachment into the southern verge area, reduces the impact on mature trees and supports the existing orientation of Shenton Road which runs parallel to Gugeri Street at this location. Increasing the roundabout diameter to something approaching Main Roads standards for a Distributor A road would again necessitate a substantial land take from Rowe Street, and include deviation of Gugeri Street to provide sufficient deflection.

Despite these difficulties in engineering design, the ultimate redevelopment of the Claremont Showgrounds may result in traffic demands that cannot be accommodated by the existing intersection form. A detailed access and operational assessment will be required to support these works, and to ensure that an appropriate intersection geometry can be created.

7.4.6.3 Graylands Road / Shenton Road

As for the Graylands Road / Shenton Road intersection, this intersection must also deal with the proximity to the subway and the resulting topographical issues. The larger separation from the rail line means that there are more options for intersection upgrades. Such upgrades may be triggered by the redevelopment of the Claremont Showgrounds, which would add a substantial traffic demand to this intersection.

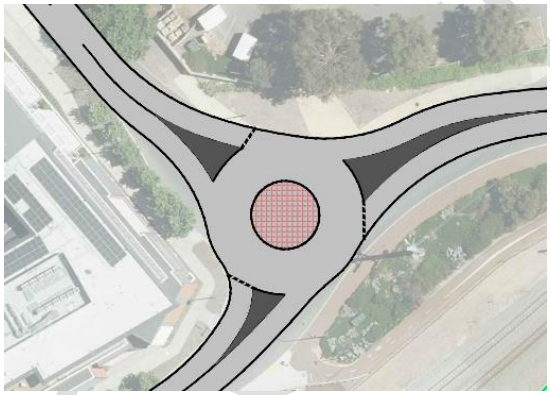
One key engineering constraint is the proximity of this intersection to the high-voltage power which runs to the east of the intersection (**Figure 7-35**).

Figure 7-35 Graylands Road / Shenton Road intersection

Source: Google StreetView

This may be alleviated as a result of the redevelopment of the Claremont Showgrounds, which could support a minor modification to the road alignment, with a roundabout to the north-east of the current intersection (**Figure 7-36**).

Figure 7-36 Shenton Road / Graylands Road – concept roundabout



The ultimate intersection form would be governed by the needs of the network following redevelopment, and therefore could require alternative infrastructure, such as a signalised intersection, depending on the intensity of use and direction of traffic flows.

7.4.6.4 Stirling Highway / Stirling Road

The Stirling Highway / Stirling Road signalised intersection has been identified as one of the most congested in the Town of Claremont, alongside Stirling Highway / Leura Avenue. This intersection (**Figure 7-37**) is busiest at school peak periods, since it provides the primary connection to Christ Church Grammar School from the north and east, and to the full range of private schools via Queenslea Drive from the residential suburbs south of Stirling Highway (Dalkeith and Nedlands).

Figure 7-37 Stirling Highway / Stirling Road – existing scenario

Source: MetroMap

This intersection is heavily constrained by development on all corners. Changes to lane allocation and signal timings have been previously investigated and found to be detrimental to its function.

Changes to the Stirling Highway / Stirling Road intersection have been identified as part of the SHACS, comprising the construction of a shared left-turn pocket and queue jump lane on the eastern approach and a separate bus priority lane on the western approach. This will ultimately increase capacity for through traffic and will contribute to improved function. However, the associated upgrades encroach upon the Christ Church at the south-east corner of the intersection and will therefore require careful engineering and stakeholder engagement before any works are progressed.

7.4.6.5 Stirling Road / Claremont Crescent

This intersection suffers from restricted sightlines for vehicles turning from Claremont Crescent, as a result of the constrained visibility caused by the subway. While the crash history at this intersection suggests that the constraints have not resulted in a dramatic increase in frequency or severity, there is a significant effect on efficiency. Drivers tend to hesitate much longer when turning due to the lack of vision.

The existing layout of this intersection can be seen below, **Figure 7-38**.

Figure 7-38 Stirling Road / Claremont Crescent – existing intersection

Source: MetroMap

This effect is exacerbated by the intersection form at Stirling Road / Barnfield Road – the primary northbound flow direction runs unimpeded, at prevailing speeds of 50-60km/hr. While the signalised intersection creates gaps in traffic which would be highly beneficial to turning vehicles if sightlines were clear, these are difficult to discern. A convex mirror located opposite the Claremont Crescent approach has been installed to improve visibility, but this intervention cannot 'solve' the underlying issue.

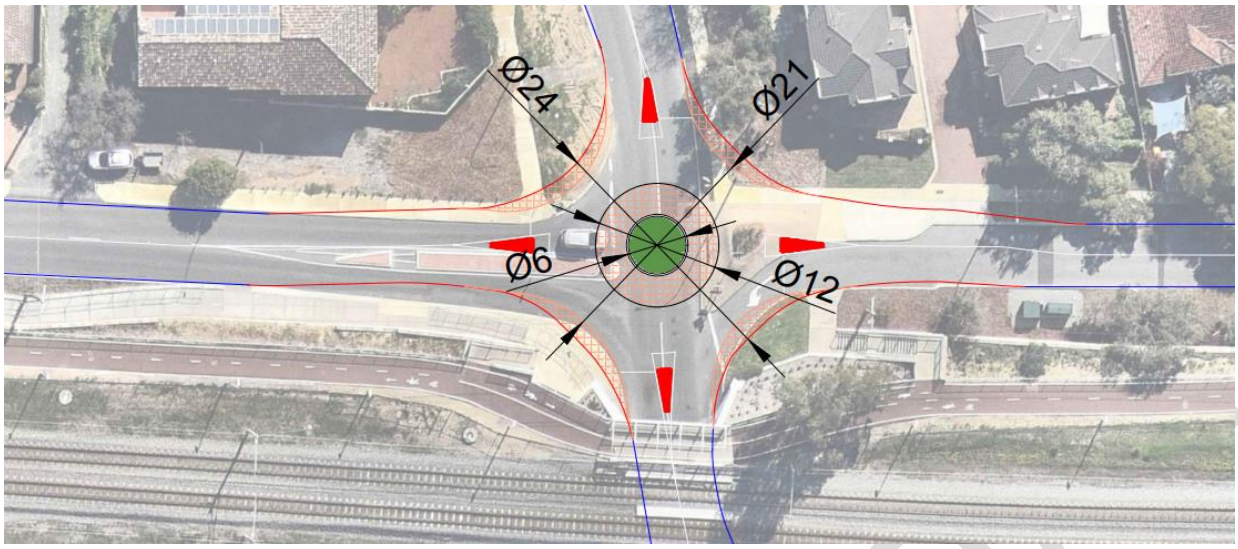
The road reserve width is very narrow in this location, and the bridge structure presents a challenge for an engineered solution.

Two different options for intersection improvements have been considered: a compact roundabout intersection, and a modified 'roundabout' geometry. These options are shown below, **Figure 7-39** and **Figure 7-40**.

The compact roundabout uses tight geometry at the roundabout approach to reduce travelling speeds to 15-20km/hr. This reduces the sightline requirements considerably since approach speeds are so low (in fact, Transport for London guidelines for compact roundabouts explicitly recommend limiting sightlines to maintain slow speeds). Due to the Road Rules that apply to roundabouts, drivers approaching from the west are required to give way to vehicles only if they are in the roundabout, reducing hesitancy and improving traffic flows.

It is understood that Main Roads WA has been working on guidelines for these roundabouts, which are popular across Europe as well as in other Australian cities (Adelaide, Melbourne etc.). It's also similar to the geometry used at the Claremont Crescent / Franklin Street roundabout. Currently, design guidance incorporated into Austroads is vague and difficult to use for this purpose, though they are supported in the text.

Figure 7-39 Stirling Road / Claremont Crescent – compact roundabout



The above geometry retains full access to Claremont Crescent eastbound, restoring a number of turning movements which are currently banned. The utility and impact of this change is discussed further below.

An alternative arrangement for a 'roundabout' form is shown below, **Figure 7-40**. This unconventional roundabout design retains a narrow geometry along the north-south axis to allow it to fit into the road reserve. It also deviates the western approach lane approximately 15m north. This increased separation opens up the sightlines for drivers waiting to turn and thereby improves the efficiency and safety of the intersection.

This design introduces a small degree of deflection along the north-south axis as a consequence of the widened median and the natural curve in the road. Nevertheless, it is unlikely that traffic would be substantially slowed through this intersection. The unusual geometry of the intersection could form an impediment for users approaching from the west, with drivers staying hesitant to turn even when they have priority – essentially seeing the intersection as a priority rather than a roundabout (for which different road rules apply.

Figure 7-40 Stirling Road / Claremont Crescent – modified 'roundabout'

Source: Town of Claremont

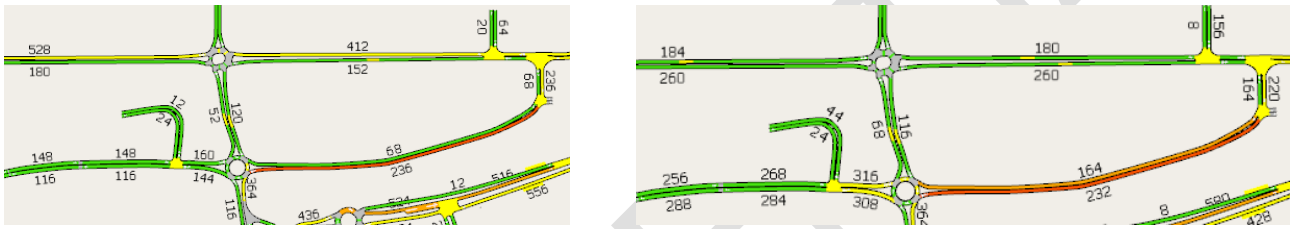
The existing turning restrictions at Claremont Crescent (limiting the eastern leg to left-out only), have several effects:

- They eliminate queuing for right-turn movements eastbound movements which could greatly reduce the ability for vehicles to exit Claremont Crescent (west)
- The eliminate through movements across Stirling Road, which would be unsafe given the volume and speed of cross-traffic and the limited sightlines.
- They limit the traffic volumes along Claremont Crescent and the amenity impacts to residents in this street.

The first two of these effects would be mitigated by either of the two intersection options above. A roundabout is ideal for this purpose. The reduction in traffic along the eastern leg is a consequence of the turning restrictions. The compact roundabout shown in Option 1 above can be restricted to outbound only, but this would retain the through movement towards Swanbourne (the right turn would have little to no utility).

This would form an attractive route option for any traffic heading to Curtin Avenue, and therefore should be considered carefully in this context. Preliminary analysis using the AIMSUN mesoscopic model has been used to estimate the local demand for movements under the compact roundabout option (shown below **Figure 7-41**). These results show a substantial increase in traffic movements, from 40-75vph (outbound only) to 250-400vph (two-way). Extrapolated over an entire day, that potentially represents an increase of 3,000vpd or more.

Figure 7-41 Local rerouting effects: Claremont Crescent full movements roundabout - AM peak (left) and PM peak (right)



In either of the above scenarios, peak period function will degrade severely if queues from the Barnfield Road signals extend through the roundabout. This effect can already be seen at the Leura Avenue / Gugeri Street intersection.

For the above reasons, it is recommended that further investigation of the feasibility and impact of these options be undertaken, considering the trade-offs between sightlines, negotiation speeds and driver perception. This will require a specific design exercise, operating in coordination between the Town and Main Roads WA. The ultimate arrangement would need to comprise a package of works that would include changes at Barnfield Road and Claremont Crescent, and in the context of future growth at Claremont Showgrounds.

7.4.6.6 Avion Way / Stirling Highway

The layout of the internal road network for the Claremont Town Centre is generally as a network of one-way streets, with access to boundary road restricted for operational and safety reasons (**Figure 7-42**). These streets reduce the benefit of driving through the centre and allow for road space to be oriented more towards pedestrians, rather than cars.

Figure 7-42 Vehicle turning restrictions in the Claremont Town Centre

Currently, Avion Way is one of only two internal streets (alongside Church Lane) that permit direct access to Stirling Highway, and the only one that can be accessed from both Bay View Terrace and the Claremont Quarter shopping centre car park (see **Figure 7-43**). Avion Way therefore has an outsized importance for the function of the Town Centre street network.

Figure 7-43 St Quentin Avenue / Avion Way intersection – existing scenario

Source: MetroMap

A number of stakeholder comments questioned the configuration of Avion Way, recommending various modifications to traffic direction or turning movement restrictions. It is also understood that redevelopment of the lots adjacent to Avion Way could impact both traffic volumes and road alignment.

The orientation and function of Avion Way has been considered in this context, as follows:

- Avion Way provides an alternative route for exiting vehicles heading east along Stirling Highway, without requiring vehicles to use the Stirling Highway / Stirling Road intersection.

  The signals at Stirling Road are one of the most congested locations in the local network. By retaining Avion Way as a southbound one-way street, this provides significant benefit to the system.

  Because Avion Way is downstream of the Stirling Road signals, it is afforded additional gaps which increase its capacity. This means that redirection of traffic away from Avion Way (e.g. towards Stirling Road) could exacerbate existing issues in the road network.

- The convergence of St Quentin Avenue eastbound and westbound at Avion Way creates the potential for conflict, but traffic speeds are very low and visibility is good. The intersection of St Quentin Avenue / Avion Way is therefore not considered to be a safety issue.

- The alignment of Avion Way is a consequence of the existing building form. Modifications to this alignment which shift its location to the east or west does not necessarily constitute an issue, though the proximity of this key egress from the Town Centre would need to be considered in the context of the nearby driveway crossovers at Lot 345 and Lot 331 Stirling Highway.

- However, if Avion Way were to be removed entirely, this could induce a number of substantial impacts on the function of the network. Currently Avion Way carries up to 1,800vpd, including 160vph during the afternoon peak.

  Redistributing these trips to the remaining streets would involve either overloading Stirling Road, or modifying the function of St Quentin Avenue to shift trips to Church Lane (Church Lane can currently only accept trips from Bay View Terrace).

  Modifying St Quentin in this manner would increase traffic volumes through the Town Centre, and particularly adjacent to the Claremont Quarter Plaza.

7.4.6.7 Alfred Road / Ashton Avenue

The *Loch Street Station Precinct Structure Plan* identifies an opportunity to construct a roundabout at the intersection of Alfred Road and Ashton Avenue.

Current traffic volumes on these two roads support the function of this intersection treatment. However, it is likely that Alfred Road would be categorised as a Secondary Route under the Long-Term Cycling Network (LTCN), noting that all routes within the City of Nedlands are as-yet unclassified. Ashton Avenue is identified as a Local Route in the LTCN. This suggests that any intersection treatment should be designed with cycling movements in mind.

Roundabouts are not typically designed to support either pedestrian priority nor safe cycling. Main Roads is currently in the process of developing guidelines for small-scale roundabouts that are more suitable for this purpose, consistent with the 'compact' roundabout discussed above in **Section 7.4.6.5**. So long as active transport is one of the key considerations in the design of the intersection, a roundabout would provide a suitable improvement over the existing priority intersection.

7.4.7 Non-Infrastructure Opportunities for Private Vehicle Transport

One opportunity to reduce traffic volumes is through car sharing programs. In combination with low-ownership policies, car sharing schemes have been shown to be extremely effective in providing mobility to residents while heavily reducing kilometres travelled.

These schemes do not necessarily require public funding or support beyond some enabling policies, though provision of on-street parking may be beneficial where cars are shared publicly or across multiple lots. Some consideration for on-street car charging may be needed where car share uses electric vehicles. Where this can be integrated into the verge infrastructure then the Town may consider allowing EV charging on-street, however it should not be permitted to obstruct the pedestrian path or the integrity of cycling infrastructure in any way. It is appropriate for EV charging infrastructure to be provided by a third party under a commercial arrangement, rather than by the Town.

8 Parking

Parking is an effective bridge between land-use and transport mode choice. Parking should be considered as an ecosystem consisting of public and private, on-street and off-street, and considering all of the many needs of the people who use those bays. The optimal parking system would be one where all parking is used efficiently, with the minimum amount of space devoted to parking activities. After all, parking itself only facilitates activity; it does not create any of its own.

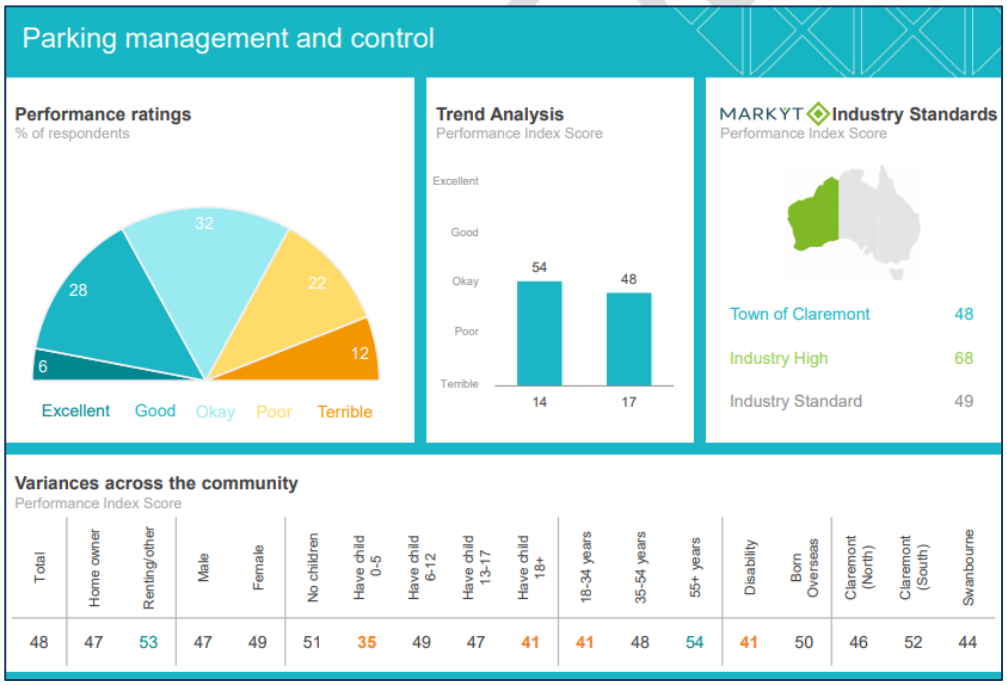
Constraining parking through a Local Planning Policy can be an effective method to apportion road space for particular trip purposes (residents, employees or visitors). This helps to reduce private vehicle trip generation and to create a more sustainable land-use and transport environment. Best-practice provision and management of parking across the various land use categories is discussed in detail in later Sections.

Strategic policy directions made by Local Government can provide a clear, concise and manageable context for decision-making, with a significant effect on mode choice, land development, economic viability and place-making. Parking infrastructure is an essential and inherent component of both the transport and land use system, and is unique in that behaviour can be influenced directly at the planning and policy stage rather than solely through infrastructure provision. In this context, an appropriate supply of quality, well-located car parking is a critical issue for people and businesses.

Land uses define the requirements for car parking quantum and location: short stay and on-street parking close to retail precincts, long-stay commuter parking on the periphery of employment centres and parking facilities for residents.

A baseline for the subjective performance of parking in the Town can be seen in the outcomes of community surveys on parking sufficiency and management (**Figure 8-1**). This metric primarily refers to the availability of parking and the price – where parking is free and ubiquitous, scores will be higher. However, that is not necessarily a useful test to apply to an Activity Centre like Claremont, where demand will always outstrip the supply.

Figure 8-1 Community Perceptions of Parking



8.2 Parking Discussion

8.2.1 Residential Parking

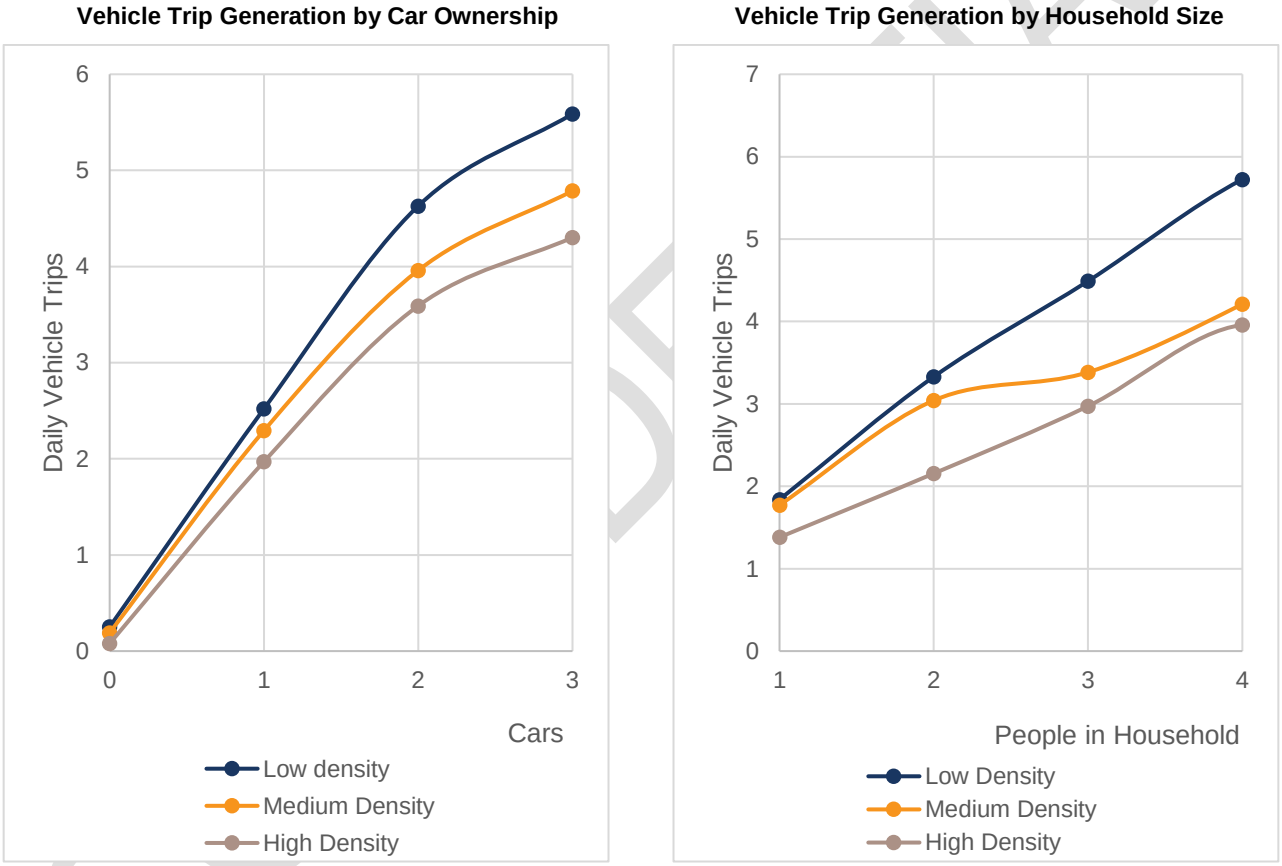
The scale of impact from residential areas is significant, but difficult to manage. Large suburban dwellings often have ample space to support parked cars, in addition to abundant parking along the street-front.

As density intensifies, residential vehicle ownership declines and vehicle trip generation drops. This occurs due to a number of reasons: smaller household sizes, greater accessibility to alternative transport and proximal activity and a reduced reliance on private motor vehicles.

While multiple-unit apartment and townhouse development is expected to primarily occur along corridors and within Centres, the same effects in residential areas promote sustainable transport outcomes.

The type of transport used for various trip purposes varies greatly by availability, proximity to destination and transport opportunities etc. However, there is an obvious relationship between mode share and vehicle ownership.

Figure 8-2 Average Household Vehicle Trip Generation Rates (VISTA)



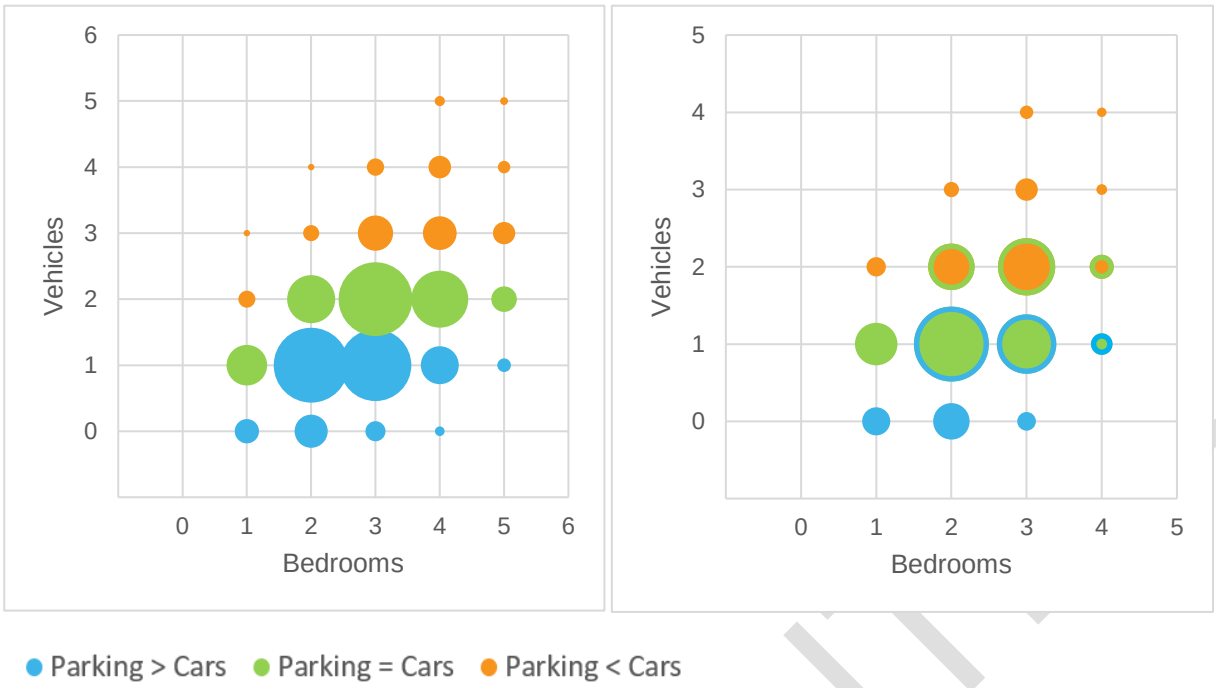
This result cannot be directly applied to individuals, but is indicative of the scale of change across the resident population. This effect somewhat influenced by density, but appears to be largely inelastic - that is, each privately owned car can be expected to create approximately 2-2.5 driving trips per day. The biggest reductions occur when residents choose to forgo owning a car in favour of alternative transport options.

As a matter of policy, it is appropriate that vehicle ownership is limited by residents' capacity for on-site storage. In the current commercial environment, developers continue to construct parking well in-excess of parking demand (see below, **Figure 8-3**). In this case, the primary constraint on vehicle ownership and use is the peak period congestion experienced by residents.

Given the majority of residential growth is expected to be in the form of higher density instead of large detached dwellings, it is expected that vehicle ownership rates and traffic generation rates will be lower than historic values.

While the majority of Claremont residents still have access to a private vehicle, actual household vehicle ownership varies substantially. Data from ABS Census 2016 below shows the relationship between dwelling size and vehicle ownership, with a comparison against R-Codes requirements.

Figure 8-3 Vehicles per bedrooms in detached dwellings (left) and apartments (right)



This review suggests that if all dwellings were constructed strictly according to the R-Codes parking requirements, almost 45% of all detached dwellings (owning 1 car or fewer) and 23% of apartment dwellings would have more parking bays than cars (approximately 1,800 spaces total). While this parking can be repurposed as storage in detached housing, apartment owners are not afforded the same opportunities – this space is generally wasted.

Currently, the desire for residential parking by developers remains high, and generally in excess of R-Codes requirements. However, due to self-selection effects, reduced residential parking in apartment development can be permitted without impacting the overall system, provided the adjacent on-street environment is managed. This is consistent with design guidance provided by R-Codes Volume 2.

8.3 Town of Claremont Parking Policies

The Town of Claremont Policy Manual defines a number of guidelines intended to manage public and private car parking.

Specific policies are in place to manage:

- On-street parking and management (LV131 – Precinct Parking Management)
- Private car parks for public use (LPP205 – Public Parking)
- Residential parking permits (LV132 – Parking Permits)

These policies are in line with best-practice, but function as procedural rather than strategic guidelines.

The Town of Claremont's Local Planning Scheme No. 3 (LPS3) prescribes a minimum number of parking bays to be provided by a development. Departure from this minimum requires justification, and is at the discretion of the Town. Variation to the parking provision is generally permitted without invoking cash-in-lieu provisions (up to 35% according to various location and alternative transport characteristics).

As with other heritage centres, historic parking supply is limited due to the period of development where car ownership was low. Provisions are included in LPS3 to recognise existing parking constraints, requiring additional parking to be provided only where expansion or intensification of development is proposed. This allows for change-of-use without imposing an infeasible burden of parking infrastructure.

It is noted that DPLH is currently undertaking work to standardise parking rates across Metropolitan LGAs. It is understood that the Town will be ultimately need to review the parking requirements stipulated in LPS3 and prepare a Parking Strategy that recognises its individual parking needs in the context of this guidance.

Further discussion of various aspects of parking policy is provided in the following Sections.

8.3.1 Residential Parking Permits

Where apartment buildings and townhouses are constructed with a reduced parking supply, this can result in residents owning more cars than parking spaces. Residents in detached housing also may repurpose garage space as storage or as another living area. A residential parking permit scheme allows residents to own and keep additional vehicles on the street, rather than on their own property. This shifts the burden of cost from the owner to the Town. The Town of Claremont has designated certain residential streets as 2P, with exceptions for residents displaying permits.

The Town currently allows an occupier:

- two free residential parking permits per single house or residential unit;
- valid for 3 years; and
- no permit for multiple dwellings of 12 or more.

Generally, residential parking permits are considered appropriate where on-site parking supply is low, such as in Heritage Areas / Streets where dwellings were constructed without parking, and where adjacent land uses are likely to consume the on-street bays used by these residents. But, residential parking permit schemes are expensive to maintain, and are generally not priced at a level commensurate with their value.

The following should be considered when evaluating the residential parking permit scheme:

- Residents parking their vehicles on-street do so either because the number of vehicles owned is greater than on-site car parking, or that parking has been appropriated for other uses (a home gym, extra bedroom/workroom, additional storage etc.).
- Therefore, if used, that resident receives a financial benefit proportional to the value of the land or construction cost of the parking space (a secure garage may cost $30,000-40,000 to construct, and provides an equivalent value). As such, an on-street parking bay represents a benefit to the vehicle owner of approximately $1,500-2,000 p.a.

An annual parking permit fee functions as a price signal to residents. It allows vehicle owners to adequately account for the cost of parking infrastructure and consider storage as part of the real cost of ownership. Where residents have insufficient parking, this permit scheme provides an opportunity to shift the burden of storage onto the Town, but provides funds for the maintenance of that infrastructure at an equivalent market rate.

This form of management has some intrinsic advantages:

- It allows the underlying parking restrictions to support the desirable use of on-street parking;
- Reduces the probability of selling parking permits to visitors/employees in the area;
- The pricing regime can be introduced progressively over time; and
- It retains equity for all residents, existing and future.

It is expected that any form of on-street parking permit model would involve a relatively low introductory price, with gradual increases over time to manage uptake and on-street usage. If on-street parking in residential areas is provided to support residential visitation and service/delivery, then the existing oversupply of such parking becomes even more clear.

Recommendations

Price the parking permits at a rate consistent with the opportunity cost of parking infrastructure, with a transition period to support behaviour change by residents. Concessions for Heritage Areas should be considered.

Provide a set amount of visitor permits per household annually

8.3.2 Non-Residential Parking Rates

8.3.2.1 Office / Business

Office development can be differentiated by location, with areas closer to public transport needing less parking. A standard development occupancy rate of 1 worker / 25sq.m GFA can be used for comparison. Unconstrained office demand is generally considered to be approximately 1 space / 40sq.m GFA (*ITE Parking Generation 4th Edition*).

Based on the average attendance rate by workers within an office development, this supply is usually sufficient to allow a car-as-driver mode share of approximately 75-80%. A similar assumption is used in the analysis below.

The LPS3 rates reflect a supply of on-site parking as follows:

Office/Business Land Uses	Parking Rate	Parking Spaces per Employee	Supported Mode Share %	Current Mode Share %
Claremont (moderate 15% concession)	1/35sq.m GFA	0.71	89%	73%
Claremont (maximum 35% concession)	1/46sq.m GFA	0.54	68%	73%
Outside Claremont Town Centre	1/30sq.m GFA	0.83	100%	85%

This analysis indicates that the statutory parking provision is likely to exceed current demand outside of the Claremont Town Centre unless the maximum concession is provided.

However, the constrained development environment, particularly within the Town Centre, means that there are internal pressures to reduce on-site parking (high costs of land and construction, heritage issues and access constraints). This makes cash-in-lieu provisions more attractive for development. The Town's strong cash-in-lieu policy can therefore support lower parking supply in private ownership while contributing to the construction of community assets.

For office development, the actual provision of parking is predominantly a commercial decision – based at least in part on the availability of public transport alternatives for staff. There will be an ongoing need for the Town to provide long-stay public parking within walking distance of the Town Centre, with cash-in-lieu funding applied to construction of parking facilities as well as towards improving accessibility by other means.

8.3.2.2 Shop / Supermarket

The parking demand associated with retail development is highly variable, and related not only to the type and scale of the retail offering, but also the density of residential/business surrounding it.

In the absence of this information, *ITE's Parking Generation* guide projects demand for large-scale retail centres is approximately 4 spaces/100sq.m, of which approximately 15-20% is used by employees. In contrast, RTA *Guidelines for Traffic Generating Development* recommends 5.5 - 8 spaces / 100sq.m.

LPS3 provides two rates: for 'Shop (Intermediate)'and 'Local Centre Zone' at 6 spaces / 100sq.m GFA, and 'Shop (Small)' which allows "requirements to be determined by Council". This appears to suggest that the statutory parking provision is likely to exceed current demand, even in the Claremont Town Centre. It is noted that provisions in the TPS allow for this requirement to be varied, but the standards for discretion do not provide a sufficiently strong framework to support consistently good practice.

In particular, opportunities for parking concessions are not specifically related to an understanding of parking demand, and so reflect neither local density nor diversity, the availability of public parking or opportunities for shared or reciprocal parking.

8.3.2.3 Restaurant/F&B

The parking demand rate for restaurants as defined in LPS3 (1 space per 4 seats) is likely to be *less* than the unconstrained demand for parking. However, this peak parking demand is generally outside of business hours (evenings and weekends). Customers can therefore utilise on-street and off-street public parking that would otherwise be consumed by employees.

Where dense restaurant/entertainment and residential development are in close proximity, some conflicts may occur; particularly where residents rely on on-street parking for private vehicle storage.

In general, the provision rates identified in the LPS3 appear sufficient in this context.

LPS3 has specific provisions for parking related to a 'small bar'. Within the Town Centre, this requires a minimum of 1 space per 16 patrons, presumably recognising the availability of publicly accessible parking during the evening.

In other locations (Highway Zone and Local Centre Zone) there is the opportunity to utilise nearby private parking and on-street public spaces to supplement on-site supply, where a parking study can demonstrate other demands will not compete for these spaces.

8.3.2.4 Medical

The parking requirement for medical facilities is highly dependent on the nature of the service provided.

- Medical Clinics generate a greater number of patients and require a higher parking rate.
- Specialist Centres have a greater proportion of non-practitioner staff, but fewer patients.
- Hospitals with overnight stay generate additional demand by visitors.

These services may be provided in stand-alone facilities or combined on a single site. As such, the parking needs of a medical land use does not easily fit within a simple rate calculation, and should be supported in every instance with a site-specific Parking Study.

The LPS3 requirement for 'Consulting Room' parking is a rate of 1 space per employee, plus additional parking for visitors/patients at 1 space per 30sq.m. However, the parking needs of a medical use do not easily fit within a simple floor area calculation, and the number of employees is an operational decision that may not be known at the time of construction.

Ideally, the parking requirements for an individual development should be supported in every instance with a site-specific parking demand and supply management assessment.

Alternatively, a rate related to the number of 'consulting rooms' allows for variation in the size and function of the facility while providing some statutory guidance for development. A representative minimum parking requirement of 3 spaces per consulting room or hospital bed would better reflect demand.

8.3.2.5 Other Land Uses

While it is tempting for Council to determine parking requirements for the widest range of land uses, the reality is that the associated rates are rarely evidence-based. Instead, parking requirements have usually been informed by a patchwork of sources, including:

- Parking surveys completed in the USA and Sydney, some as long ago as the 1970's.
- Results of an investigation for a single development application that then become the standard for all subsequent developments.
- Requirements applied by a neighbouring Council which may be perceived to be attractive to users and as such, are adopted more broadly without proper analysis.
- An evolution from previous requirements, adjusted incrementally to reflect changing attitudes to the local parking supply.

This suggests that a fine-grained parking table provides less utility to the Town than a clause requiring a site-specific Parking Management Plan, provided a reasonable metric can be established to determine an appropriate parking supply.

The opportunities to consolidate and centralise parking within commercial centres is discussed in **Section 8.5.7**.

8.3.3 Shared and Reciprocal Parking

Shared parking is parking that is used by 2 or more uses, instead of restricting parking to the exclusive use of a single land use. The more exclusive the parking is, the less effective it becomes for the system as a whole. Shared parking takes advantage of the fact that most parking bays are only used part-time by a particular group, and many parking facilities have a significant proportion of unused bays, with utilisation patterns that follow predictable daily, weekly and annual cycles.

Efficient sharing of bays can allow parking requirements to be reduced significantly. Partial sharing occurs when arrangements are made by one facility to use another's parking facilities at certain times. For example, an office block would use parking spaces by day while restaurant users, or residents in the same building, are more likely to require bays in the evening.

Improving the use of under-utilised off-street parking can be achieved by allowing public use outside of peak operating hours, supported by clear signage, access and parking guidance.

LPS3 has provisions for shared parking which allow for reduced supply rates under a formal Reciprocal Parking Agreement. This form of parking management mechanism relieves pressure on commercial tenants and the Town to provide additional parking.

Recommendations

Liaise with local business owners to promote the shared use of car parks, using up to date parking survey data to help identify suitable locations

A Reciprocal Parking Agreement uses a formal legal document to permit parking on third-party private land, for a fee or otherwise. This may be used to reduce the burden of providing parking by a proposed development, without the need to invoke cash-in-lieu provisions. Since these Agreements must be maintained on Titles, they involve administration from Local Government. They are also inherently less efficient than the provision of public parking.

The degree of reciprocal parking occurring depends on the types of land use in the vicinity and the time of day. The most important component to determine the rates of reciprocal parking is the proximity of the land use pairs and their peak times of operation. As most developments within activity centres are generally located within acceptable walking distances, by accommodating reciprocal parking a lower total parking supply is likely to be required to satisfy demand for parking.

Recent changes to Strata Title regulations allow for better use of reciprocal parking, by allowing for partial ownership of a car parking area without discrete designation of individual parking bays. This effectively 'decouples' parking supply from land use, allowing a development's parking to be supplied off-site.

Recommendations

Support increased uptake of Reciprocal Parking Agreements for new developments

8.3.4 Unbundled/Decoupled Parking

The *Community Titles Act (2020*) supports a wide range of new delivery options for publicly accessible parking, allowing for partial ownership of parking within a lot or even on an adjacent lot. This flexibility has the potential to allow a robust parking system to be developed without the need for cash-in-lieu or developer contributions. The provision of publicly accessible parking could, through these means, be led entirely by developers.

The cost of parking for residential and commercial units is usually passed on to the occupants indirectly through the rent or purchase price (bundled) rather than through a separate transaction. This means that tenants or owners are not able to purchase additional parking if required or given the opportunity to save money by reducing their parking demand.

The unbundling of parking can be introduced in several different ways:

- Facility managers can unbundle parking when renting building space;
- Developers can make some or all parking optional when selling buildings;
- Renters can be offered a discount on their rent for not using some or all of their allocated parking spaces; and
- Parking costs can be listed as a separate line item in the lease agreement to show tenants the cost and enable them to negotiate reductions.

Providing tenants or owners with the opportunity of unbundled parking is also likely to create a market for available parking spaces and increase the efficiency of privately-owned parking supplies. It should be noted that if an unbundled parking policy is introduced, it is important to consider the cost of alternative parking in the nearby area. If there is a supply of free or low-cost parking nearby, there may be an incentive for tenants or owners to find other places to park their cars to avoid the parking charge, potentially resulting in spill over effects.

This form of parking can be beneficial in areas where the Town does not have sufficient access to land holdings to provide the full complement of public parking, as would be required under traditional cash-in-lieu schemes.

Unbundled and decoupled parking is novel in the Western Australian context, and so it is recommended that the Town develop a framework policy to outline the benefits, and the conditions under which the Town would approve of its use.

Recommendation

Establish a policy for unbundled and decoupled parking, potentially including guidelines and incentives in support of efficient supply when preparing the Parking Strategy as required by WAPC/DPLH.

8.3.5 Parking Concessions

LPS3 prescribes a minimum number of parking bays to be provided by a development. Departure from this minimum requires justification, and is at the discretion of the Town. Only minor variation to the parking provision is generally permitted without invoking cash-in-lieu provisions.

Table 8-1 Car Parking Concessions

Maximum Concession	Performance Criteria
5%	The proposed development is within 400m of a rail station and customers/staff are likely to use the train to access the development.
5%	The proposed development is within 100m of a stop on a high frequency bus route and customers/staff are likely to use the bus to access the development.
5%	The proposed development is within 400m of a public car park.
5%	The proposed development provides 10 bicycles bays or more and where 'end-of-trip facilities' are provided as recommended under a Local Planning Policy adopted under the provisions of the Scheme and customers/staff are likely to use bicycles to access the development.
5%	The proposed development is located within Town Centre or Local Centre zone and provides a public benefit, compliments the character of the zone and does not adversely impact the amenity of the locality.
5%	Where the building/place is listed on the Town's Heritage List, Municipal Inventory or the State Register of Heritage Places (subject to the building or place being conserved to the satisfaction of Council).
5%	The proposed development contains parking controls which monitor and control use through boom-gates (or similar) and ticket issuing machines.

While the parking rates provided are the same for the whole of the municipal area, these concessions are not universally applicable and accordingly, appropriate concessions vary from site to site.

The Town's Planning Scheme No 3 Text also sets out guidelines for the reduction of parking ratios for retail uses where parking is constructed to a higher standard than the minimum AS2890.1: Off-Street Parking requirements. This mechanism allows developers to support better quality access and circulation while maintaining policy compliance.

Application for these concessions, as well as the parking requirement for unusual land uses or calculation of mixed use benefits should be captured by the developer in a formal application, via the mechanism of a Parking Needs Assessment and Green Travel Plan. Concessions (without cash-in-lieu payment) may be approved where the applicant can clearly demonstrate that the parking requirement exceeds the likely generation of the development. Should the Town approve a concession because it is technically justifiable, the Town may still allow developers to use the cash-in-lieu program to further reduce the amount of parking required on-site.

Additional concessions may be warranted where constraints such as heritage development or other such matters limit the capacity for on-site parking.

8.3.6 Parking Needs Assessment and Green Travel Plan

A Parking Needs Assessment aims to determine the appropriate **supply** for parking, and the associated policy and management strategies to mitigate impacts of parking network.

A Green Travel Plan (GTP) provides an evidence base to the Town that the **demand** for parking is managed and that transport infrastructure is in place to support the changing needs of employees / visitors to the development. The purpose of a GTP is to encourage employees within an organisation to make greater use of alternative transport modes, and to justify a reduced parking supply. The metrics embedded within the

GTP for provision of transport infrastructure (bicycle end-of-trip, EV charging, car parking etc) should relate to the Town's local mode share targets, wherever available.

These documents are similar to the Traffic Management and Transport Plans current required by the Town for private school development.

As a case example, the WA Department of Transport *Parking Guidelines for Large Shopping Centres* provides guidelines around reduction of parking spaces for this specific land use. The benefits of management of parking supply and demand include:

- Lower parking provision costs through more efficient use of parking bays;
- Reputation gains for greater accessibility and lower congestion in the surrounding road network;
- Better relationship with surrounding residents and businesses; and
- Better public transport services resulting from increased patronage and reduced on road congestion.

The parking needs of many development types are difficult to determine based on land use alone. A Parking Needs Assessment and Green Travel Plan can assist the Town to determine the requirements for parking and the extent to which the public parking system should support development.

In addition, wherever developers propose to seek parking concessions, a Parking Needs Assessment and Green Travel Plan should be required to justify the variation.

Recommendations

Investigate and consider inclusion of a Parking Needs Assessment and Green Travel Plan in the Parking Strategy required to be prepared by the WAPC / DPLH

8.3.7 Cost of Providing Parking

The costs to provide parking are related both to the actual construction cost, and the opportunity cost of not providing more productive land uses.

On-street parking leverages the space available in the public road reserve to reduce the land requirement. However, this parking effectively increases the road reserve width at the expense of additional street trees, landscaping, pedestrian and cycling infrastructure or development.

Off-street parking is less space-efficient due to the need to provide access and circulation. Where this parking is provided in multi-deck facilities, the space per bay increases due to ramping and supporting infrastructure (lifts, stairs, etc.), but the overall land requirement decreases. Conversely, multi-deck parking attracts a high construction cost per bay.

The total construction cost of parking can vary widely, but benchmarking against recent capital works suggests that parking infrastructure is likely to cost in the order of:

- $5,000 - $8,000 per bay if constructed at-grade (noting that there is an additional opportunity cost for the land consumed)
- $30,000 - $50,000 if built in an undercroft or above-ground decked structure; and
- $50,000 - $80,000 when constructed as basement parking (cost greatly depends on the number of basement floors and local site conditions).

These costs can be considered in the context of the Town's cash-in-lieu contribution rate (see below, **Section 8.3.8**)

8.3.8 Cash-in-Lieu

Cash-in-lieu of parking can provide an attractive alternative to developers with regard to parking requirements. This arrangement can also benefit the wider community through the supply of publicly and equitably managed parking for the use of high-value or highest-need parkers, and by reducing the intensity of parking and traffic within the Town Centre core.

Factors to be addressed by staff and Council in considering entering into a cash-in-lieu arrangement include, but are not limited to, the following:

- Consistency with the objectives of the Local Planning Scheme
- Requirements/concerns of commenting agencies
- Consistency with the objectives of the Parking Strategy

- Whether there is an identified local government interest in providing public parking facilities in the immediate area
- Availability of suitable land for the construction of a public car park
- The timing for the delivery of the public parking facilities and the adequacy of alternatives to on-site parking until public parking facilities are delivered
- Whether on-site parking deficiencies would result in a hardship for the site or surrounding area
- Ability of the site to accommodate the proposed development, based on the available supply of parking
- The number of spaces proposed to be considered for payment-in-lieu.

The Town's cash-in-lieu policy contains a number of best-practice elements that align with the DPLH *Manner and Form – Payment in Lieu of Parking* guidelines.

In particular, LPS3 Clause 33 permits the use of cash-in-lieu funding to be used not just for the construction and management of parking, but also non-parking improvements that can reduce the need for such parking. This includes public transport, active transport and streetscape improvements.

The DPLH *Manner and Form – Payment in Lieu of Parking* identifies a maximum lump sum calculation method for cash-in-lieu contributions of *[infrastructure cost (per m2) x 30m2 x parking shortfall x 50%],* where 30m2 represents the industry standard requirement for an efficient multi-deck car park.

Within this calculation is a 50% discount to be applied to the contribution rate. This discount reflects a number of effects, as follows:

- Provides a financial incentive for developers to contribute to the creation of strategically located public parking facilities
- Reduces the impact of extensive basement parking excavation in the Town Centre, thereby reducing construction timelines
- Recognises that parking spaces are not allocated to specific users on a reserved basis, although the general supply will be available to meet demand
- Recognises that the contributor will not have an ownership interest in the public parking facilities
- Recognises that the parking may not be as conveniently located to a specific development compared to on-site or other nearby parking facilities
- Provides capacity for more efficient provision of parking by reducing the extent of costly and poorly utilized basement parking construction.
- Recognises that all or a portion of the parking may not be constructed at the same time as the development
- Recognises that the Town will be able to recover some of the costs through user fees
- Recognises that the developer/owner will not have any control over parking fees and use regulations.

The Town's *Local Planning Policy 205 – Public Parking* is consistent with this method, allowing for a 50% concession where development is related to a 'preferred use' and located within the Town Centre. It is noted that this concession rate is applied to a nominated cost of $30,000 per bay, for construction of decked parking facilities on publicly owned land (for a total cash-in-lieu contribution of $15,000 per bay).

This difference represents an ongoing cost that the Town will need to consider in the context of fee for service payment mechanisms.

The success of cash-in-lieu parking arrangements can be substantially compromised if the Town approves parking concessions in order to relieve owners from their obligation to provide car parking according to the zoning requirements.

The decision to accept cash-in-lieu should remain at the discretion of the Town and not become an automatic right. This will allow the Town to ensure that if it accepts cash-in-lieu payments there is a reasonable expectation that municipal parking is already available to serve the development, that the Town will be able to provide a supply increase in the short term, or that improvements to alternative transport and amenity can offset the parking needs by supporting induced mode shift.

Due to the lack of available land, it is unlikely that cash-in-lieu would be applicable for Highway development or within the Ashton Avenue Precinct. There are potential opportunities for enhanced public parking funded through cash-in-lieu provisions within the Claremont Town Centre and Swanbourne Precincts.

It is also necessary to ensure that planning for the provision of future parking structures is transparent and that contributors to the cash-in-lieu fund are given clear indication as to what their payments are funding. This will ensure that developers continue to see benefits in contributing towards public parking, over the intrinsic advantages visible on-site.

Recommendations

Review the costing mechanism for cash-in-lieu on a periodic basis, to ensure that it adequately captures the Town's financial burden for the provision of parking.

Continue to support and incentivize cash-in-lieu as a key mechanism for funding public parking and local transport improvements.

8.3.9 Hypothecation of Parking Revenue

Given the highly car-dependent nature of cities, and the current deficiencies in alternative transport networks, car parking remains a primary factor in determining economic viability. However, parking infrastructure has an enormous cost; not just the direct expenditure on construction and maintenance, but also the opportunity costs in land, streetscape amenity, development density and proximity.

Paid parking fees are an effective measure for managing parking by increasing the efficient use of a shared resource. The revenue obtained from this form of parking management is, by definition, used to offset the cost of enforcement and installation. Beyond this maintenance cost, paid parking revenues may be 'hypothecated' to improvements in transport and local streetscapes.

This provides direct benefit to the community and additional value over and above the impacts of managed parking alone. International examples show that where revenue is hypothecated to local improvements, patronage of these businesses and land values increase markedly.

Some of the hypothecated funds from paid parking revenues should be allocated to improvements to the associated car parking, including high-cost improvements such as lighting. Maintaining a high level of presentation for fee-paying public car parks also helps to justify the paid parking regime.

Paid parking can therefore be an effective measure to support safe, attractive streetscapes and car parking areas, for the benefit of the local community. Application of this type of measure has been shown to ultimately *increase* the revenues to local businesses as a result of two related effects:

- Better availability of parking for customers as employees relocate to less desirable bays
- Better streetscape environments increasing the attractiveness of the Precinct to visitors

It is important to ensure that parking prices are maintained only at the level required to support efficient use. Where supply is greater than demand, the appropriate price may well be zero.

Recommendation

Consider include parking fees in the Parking Reserve Fund as opposed to the current free parking and infringement strategy - these can then be used to directly benefit the local community, including improvements to streetscapes and active transport accessibility.

8.4 Commercial Parking in Activity Centres

The Town's control over the supply of parking (through statutory policy and public parking) can be used to constrain certain types of parking to influence travel behaviour. Also parking policies imposed on business employees, visitors and residents can be used to reduce traffic generation, and maintain effective road corridors. Any substantial road upgrade or Centre plan creates the opportunity to modify the parking supply and management regime.

The demand for parking is related to the type, location, and density of development, summarised generally as follows:

- **Employee parking**: demand is related to the provision of alternative transport modes.

  Employee behaviour is often very elastic: constraining parking can have a big impact on private vehicle mode shares.

- **Residential parking:** demand is related to vehicle ownership, the provision of alternative transport modes, and to the density and quality of retail, employment, and entertainment destinations within walking distance.

  Due to self-selection, reducing on-site parking supply has a direct impact on residential vehicle ownership and private vehicle trip generation.

- **Restaurant/Entertainment Visitor parking:** demand is related to the density and mix of development, and particularly the proximity of residents and employment, not so much on public transport provision. However, the introduction of ride sharing/hailing services has had a demonstrable effect on travel behaviour for a wide range of land uses, particularly where alcohol is consumed.

- **Commuter parking**: demand is related to external factors – the frequency of train service, quality of station amenity, congestion and parking fees at destination.

Supply constraints within a Station's walkable catchment are highly impactful, since commuters have flexibility to park elsewhere along the train line. Experience suggests that even at high-demand stations, parking is generally limited to a 400m catchment.

The existing supply of parking and land use profile for the local Town Centres, including Claremont, has been characterised using a data collection based on aerial imagery and street-level interrogation.

Cardno's Parking Demand Model has been applied to three development precincts to calculate the existing and future theoretical parking demand. This calculation considers includes both the Centre itself and the surrounding land uses within a reasonable walking catchment (nominally 400m from the centroid of the area).

Figure 8-4 Parking Demand and Supply in Centres

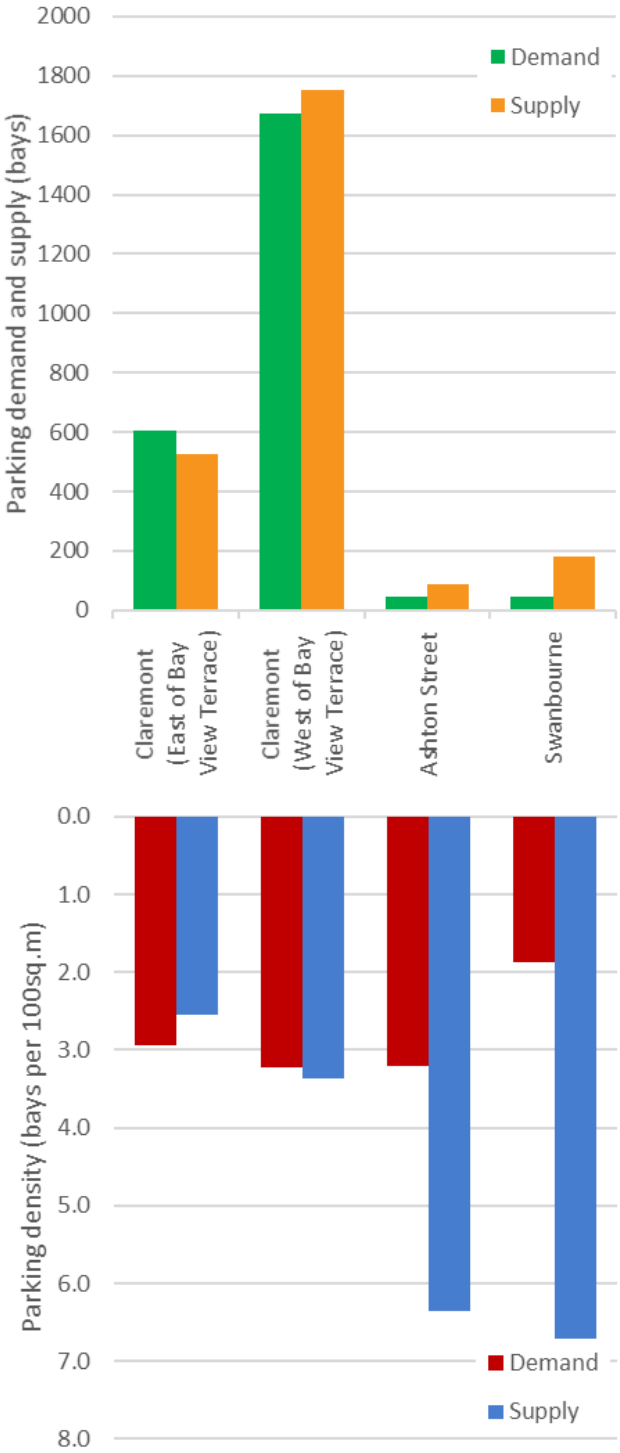


Figure 8-4 provides an overview of the parking demand and supply rates for each Centre. This describes the absolute supply of parking bays within the Local Centre boundary (including on-street and off-street supply), as well as the parking supply ratio (bays per 100sq.m gross floor area).

The overall demand varies considerably between Centres, but the rate is very similar, at approximately 3.0 spaces per 100sq.m.

The Swanbourne Activity Centre has a lower demand rate due to the type and amount of retail development in the Precinct, and the extent of residential development in the immediate vicinity.

The Ashton Avenue and Swanbourne Neighbourhood Centres rely primarily on street parking and, because of the low intensity of these Centres, appear to have ample supply. Further development within these areas will ultimately take up the public parking provision.

Analysis suggests that demand for free parking in the Claremont Town Centre exceeds supply. However, the extent of paid parking in Claremont, the excellent accessibility by bus and train, in addition to the growing local residential catchment, mitigates the impacts of parking limitations in this Centre.

The Parking Demand Model gives a theoretical assessment of parking demand for each Centre based on the land uses with its boundary, the density of residential development within a reasonable walking catchment (approximately 400m), and certain characteristics of the internal parking supply.

The results are shown as a parking demand profile across the day – the number of bays occupied between 6am and midnight. For the purpose of this assessment, all residents are assumed to park on their property. For this reason, residential parking is split into two: Occupied bays and Vacant bays. This simplifies the calculations, but tends to under-estimate the requirement for on-street parking. This should be considered when comparing the supply of public parking to the calculated demand in the following section. The model also allows for the fact that some parking isn't available to all users. In particular, employees usually have access to off-street parking that is exclusively for their use.

The following is a characterisation of each Centre, identifying current land uses and the results of parking demand and supply assessment.

8.4.2 Ashton Avenue Local Centre

The Ashton Avenue Neighbourhood Centre is a small-scale retail centre in a significant growth area. While it is theoretically within the walking catchment of the Loch Street Station 500m away, realistically it serves the local residential neighbourhood.

As such, a substantial component of customer demand is likely to walk into the Centre, while employees drive and park at the rear of the lots.

Short-stay visitor parking demand is accommodated on-street along Ashton Avenue and Second Avenue. This short-stay parking supply is considered to be sufficient to accommodate demand, due to the small scale of the centre land uses.

Figure 8-5 Ashton Avenue Local Centre

Table 8-2 Ashton Avenue Land Use Mix

Town Centre	
Shopping/Retail	1,700 m^2
Restaurant	25 seats
Health/Fitness	250 m^2
Parking	
Off-Street Supply	55 spaces
On-Street Supply	35 spaces
Peak Non-Residential Parking Demand	45 spaces
Surrounds (400m)	
Detached Housing	560 dwellings

Figure 8-6 Ashton Avenue Parking Profiles

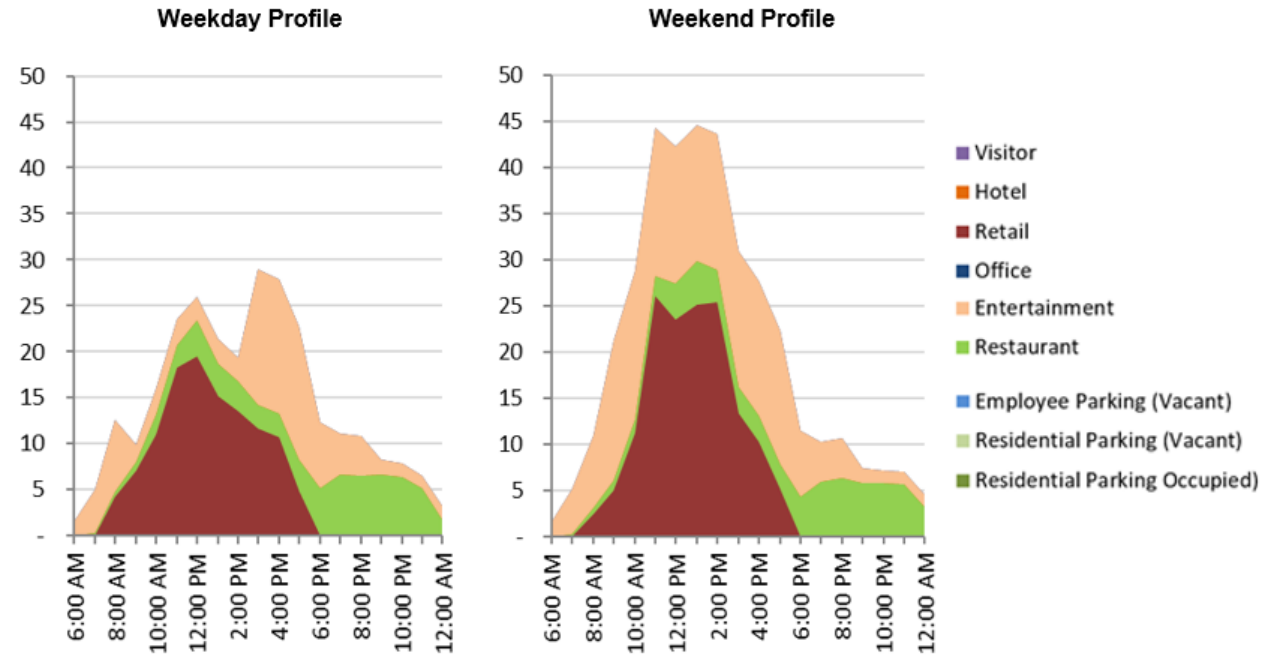
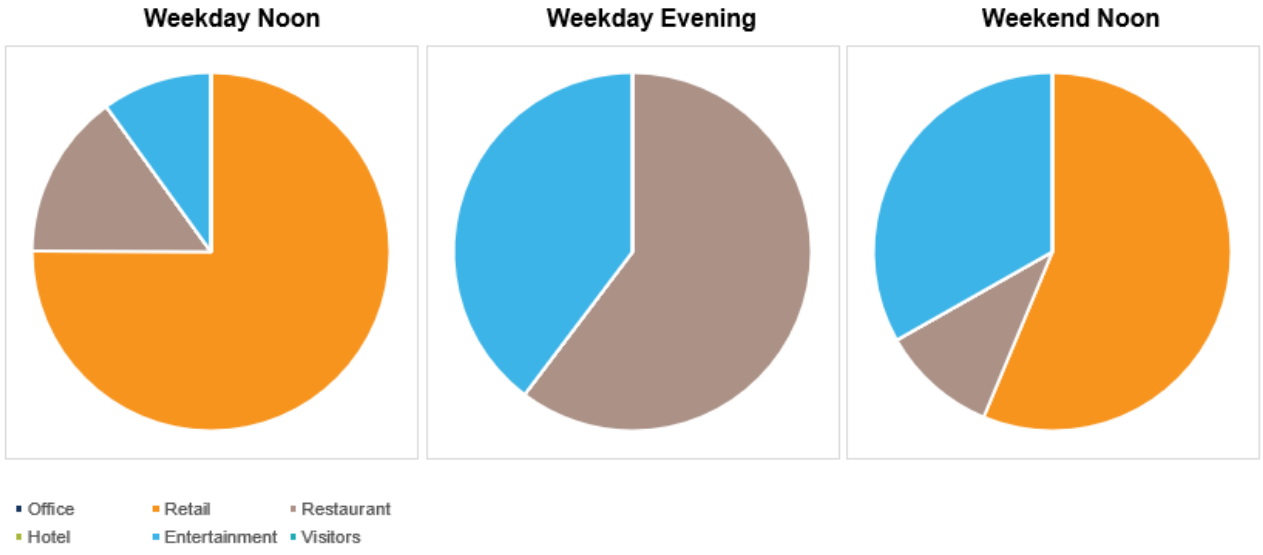


Figure 8-7 Ashton Avenue Peak Parking Demand



A Local Development Plan will be required for the Ashton Avenue Commercial Precinct to ensure shared access from an easement or local street. This will allow for consolidated car parking at the rear of the commercial buildings and provide a more pedestrian friendly environment along the street frontage.

The *Loch Street Station Precinct Structure Plan* provides for redevelopment of commercial space within the Local Centre zone through mixed use residential development. On-street parking supplies will support the ongoing needs of visitors, but additional parking will be required on-site to accommodate demand growth.

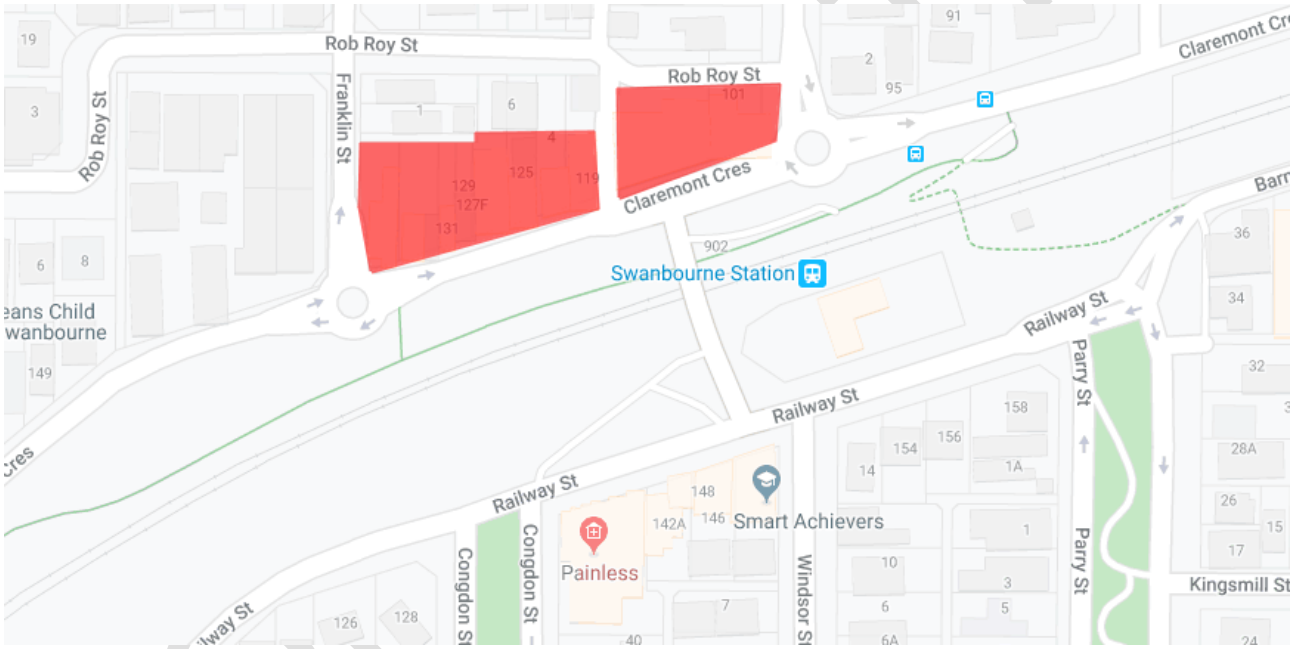
8.4.3 Swanbourne Local Centre

The Swanbourne Neighbourhood Centre is a local commercial/retail precinct located immediately adjacent to the Swanbourne Station. The internal land uses, which include primarily shopping retail and restaurants, serve as local amenity to a relatively wide catchment.

The parking supply on the northern side of Swanbourne is reasonably generous, with short-stay 90-degree parking and parallel parking along Claremont Crescent supplying convenient shopper parking, in addition to the small private car park on Rob Roy Street.

Long-stay employee parking is supplied at the rear of individual lots, and in on-street parking along neighbourhood streets. While there may be sufficient on-site car parking to accommodate employees, it does not operate efficiently or with sufficient flexibility to be useable by everyone.

Figure 8-8 Swanbourne Local Centre



It is understood that the Town has undertaken a Planning Study in consultation with a group of landowners who are currently working with the Town to prepare a Local Development Plan (LDP). This LSP will be formally lodged with the Town following commencement of the appropriate WAPC process.

Previous parking assessments have also been completed that attempt to allocate public parking to individual sites within the centre to inform equitable distribution of existing parking supplies and to improve the activation of the Centre.

Main Roads has confirmed that the Congdon Road Bridge will be reconstructed in its present location with the same basic design attributes. Local business groups have expressed a concern that redistribution of traffic to the east as the primary route desire line could significantly increase traffic flow and congestion along the key retail strip. The reconstruction of the existing bridge could be used to reorient traffic to reduce the extent of through-traffic and improve the local environment for pedestrian use, increasing the attraction of the Precinct and increasing economic activity.

Table 8-3 Swanbourne Land Use Mix

Town Centre	
Shopping/Retail	1,700 m^2
Office/Commercial	370 m^2
Restaurant	75 seats
Parking	
Off-Street Supply	80 spaces
On-Street Supply	95 spaces
Peak Non-Residential Parking Demand	45 spaces
Surrounds (400m)	
Detached Housing	390 dwellings
Retirement Units	50 dwellings

Figure 8-9 Swanbourne Parking Supply Requirement

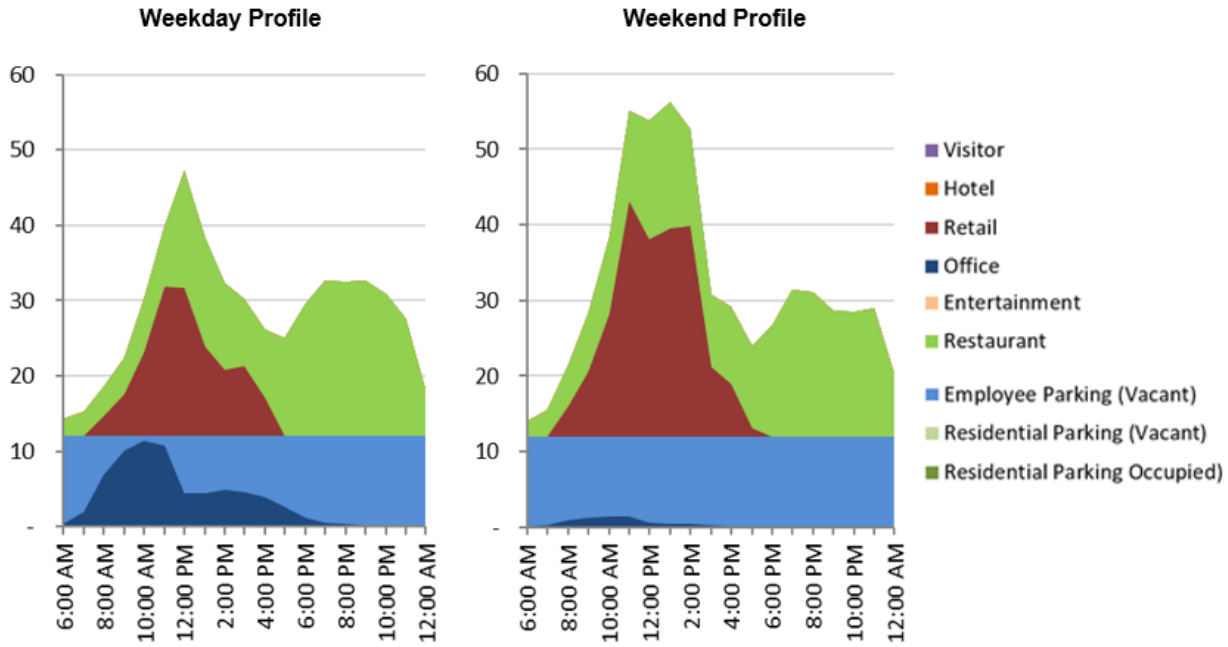
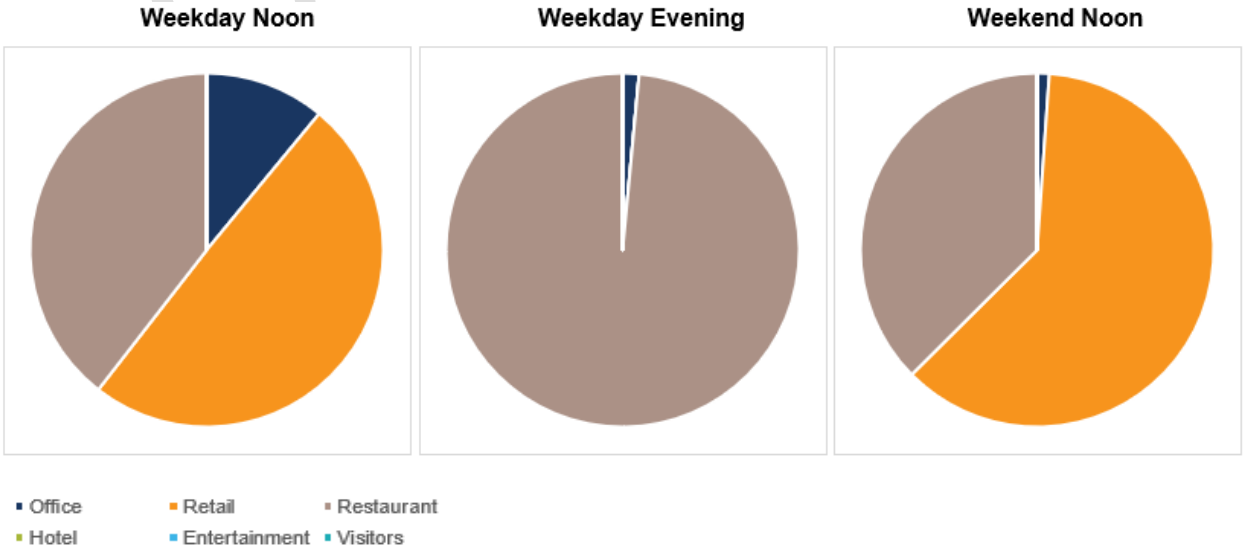


Figure 8-10 Swanbourne Peak Parking Demand



In order to optimise future on-site non-residential parking availability, a Local Development Plan should specify the particulars of vehicle access across multiple properties. The public parking provision is generally sufficient for the demand and timing restrictions (15min to 1P) on-street, 3P in the off-street car park adjacent to Swanbourne Station. This ensures availability for local shoppers and restaurant customers.

There is an inherent conflict between the parking requirements of staff and those of commuters accessing the Station. This is currently resolved through 'reserved parking', which is generally an inefficient and inflexible option. In the current environment, where employee density is low, this impact is not too significant but may be partially resolved over time through designation of a specific 'staff parking' area, located on-site and shared between the landowners. This will require a Reciprocal Agreement between these properties for access and parking.

Recommendation

To maximise the efficiency of scarce parking resources, parking should be shared as much as possible, and supported by reciprocal agreements.

8.4.4 Claremont Town Centre

Parking requirements are different within the Claremont Town Centre than in other development precincts due to the intensity and mix of land uses and the opportunities for internal trip capture and alternative transport. Claremont Town Centre is defined as a Secondary Centre under the provisions of *State Planning Policy 4.2*; and is the largest retail/commercial destination in the Western Suburbs. As such it is a regional attraction for both visitors and employment, with a high demand for car parking.

The location of Claremont along the Fremantle Train Line creates the capacity for public transport journey to work mode shares for employees. This is supported by relatively scarce long-stay parking which makes driving a less attractive option. The impact of this is a 65% higher sustainable transport mode share for employees working in the Claremont Town Centre, as compared to employees across the rest of the Claremont LGA.

Parking in Claremont is primarily supplied in a few large publicly accessible car parks; Claremont Quarter, adjacent to Leura Avenue and the areas along Stirling Highway (Times Square, Typika etc.). These car parks are intended for use by visitors, with some flexibility to allow for long-stay parking by employees (tenant parking at Times Square and paid parking beyond 3P at Claremont Quarter). Beyond this, only small areas of employee parking are easily accessible, consisting of allocation of individual bays to retail tenants (e.g. Divers Link).

On-street parking facilities are in high demand and are well-placed to serve short-stay trip purposes. However, the extent of on-street parking is limited – restricted to only a few streets (Bay View Terrace, Avion Way, Bovell Lane and St Quentin Avenue). Due to the relatively low supply, and the configurations of the road network within Claremont, the use of these car parking bays appears to be opportunistic (drivers park here when one is available en-route to their chosen destination car park.

Paid parking is not currently used as a demand-management tool. Instead, parking duration restrictions are employed to limit the supply to specific trip types.

Figure 8-11 Claremont Town Centre

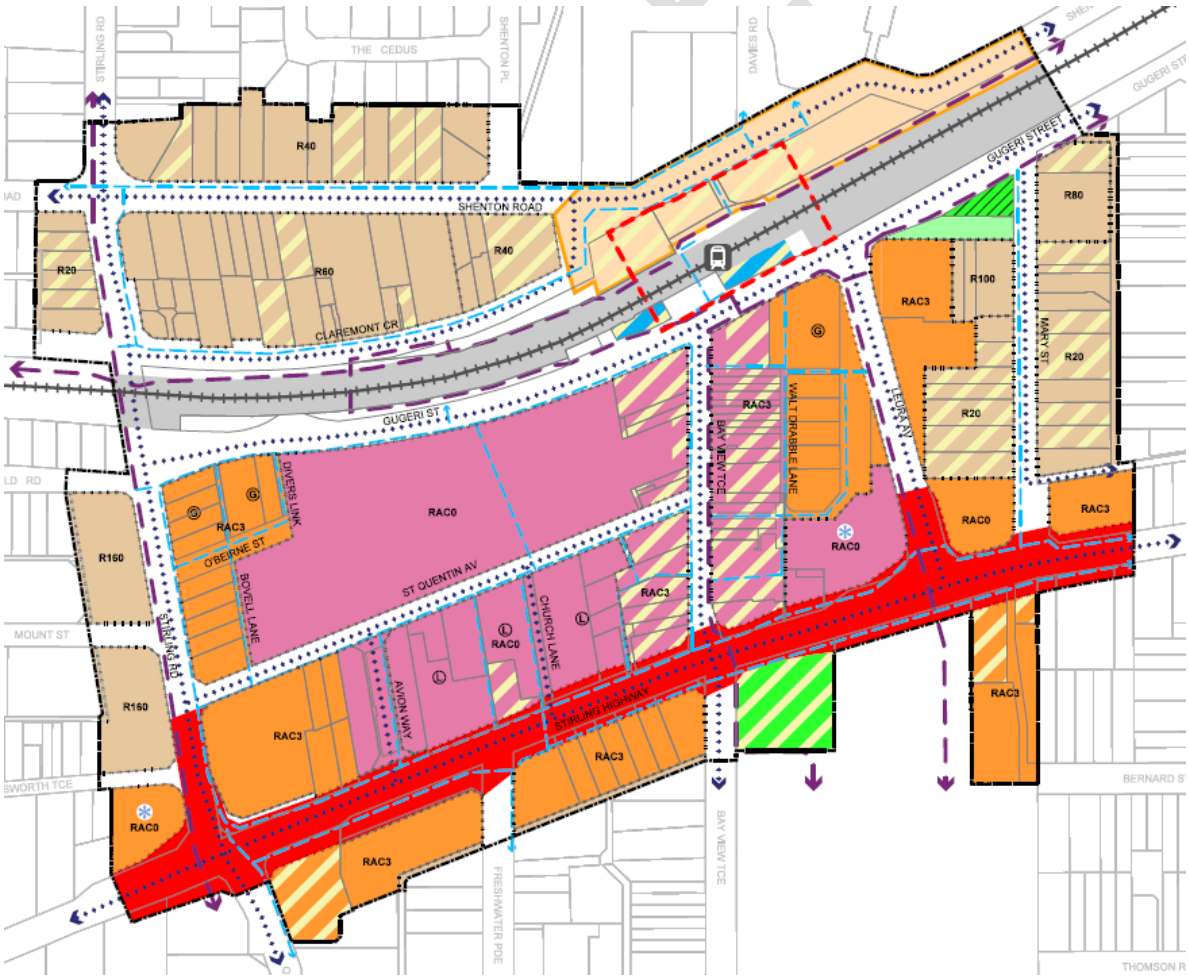
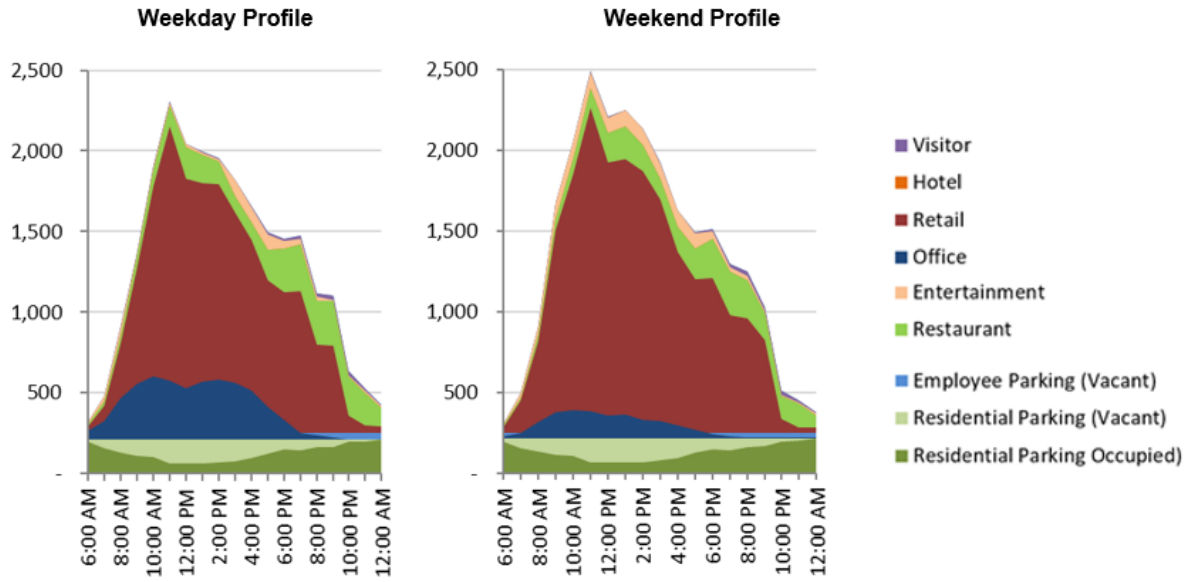


Table 8-4 Existing Claremont Land Use Mix

Town Centre	
Shopping/Retail	52,600 m^2
Office/Commercial	7,900 m^2
Medical/Clinic	3,600 m^2
Health/Fitness	1,650 m^2
Restaurant/Bar	1,000 seats
Attached Housing	145 dwellings
Parking	
Off-Street Supply	2,500 spaces
On-Street Supply	220 spaces
Peak Non-Residential Parking Demand	2,700 spaces
Surrounds (400m)	
Detached Housing	510 dwellings
Attached Housing	740 dwellings

The internal mixed-use synergies between various land uses, and the impacts of internal trip containment (reciprocal parking) between local residents and employees and other key destinations in the Town Centre has been considered as part of the parking demand assessment.

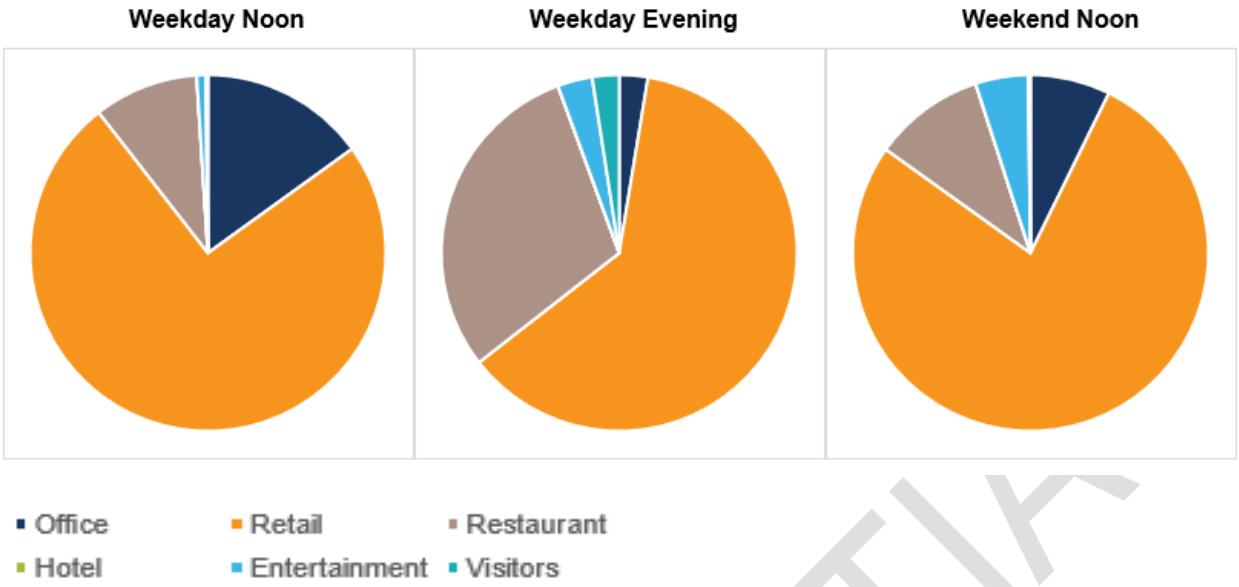
Figure 8-12 Claremont Parking Profiles



An analysis of the existing parking demand is shown above for the existing Centre uses. This model describes an estimated 2000-2200 vehicles parking within the Town Centre, with a strong 10am-midday peak during both the weekday and weekend. This demand aligns very well with the assessed parking supply.

Three key peak periods have been isolated for specific analysis (note that 'office' development captures medical clinics and other uses that are still busy on the weekend).

Figure 8-13 Claremont Town Centre Peak Parking Demand



The majority of parked vehicles are related to retail destinations, with a relatively small component of office/commercial demand. This suggests that the majority of parking demand would be short-stay visitor parking, rather than all-day employee parking. The calculated proportions of employees and visitors is provided below **Figure 8-14** for each hour of the day.

Figure 8-14 Claremont Town Centre – Calculated proportion of employees and visitors

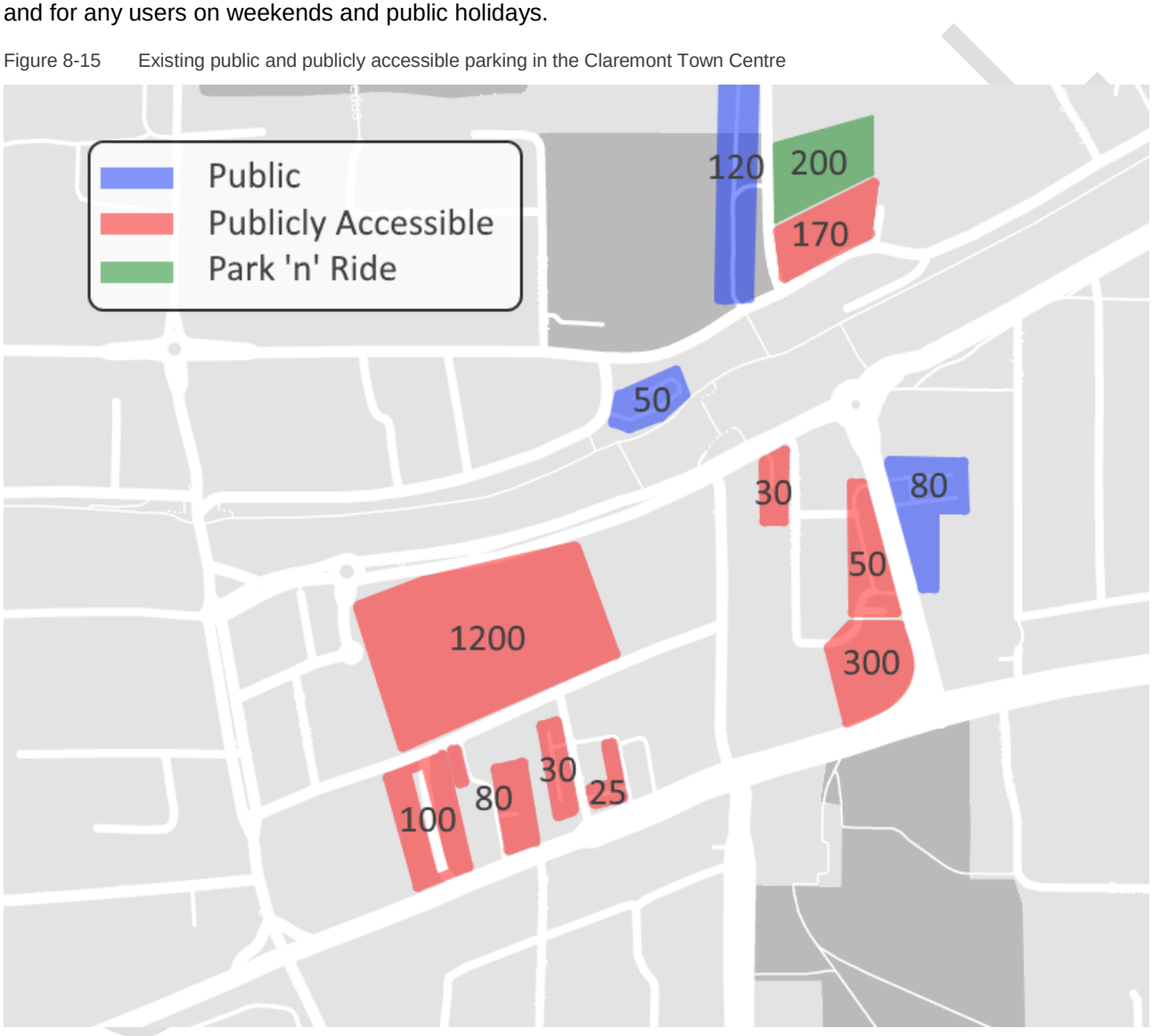
8.4.4.2 Publicly Accessible Parking

In addition to the on-street parking provided along Bay View Terrace, St Quentin Avenue and the access streets at the periphery of the Town Centre, there are several public and publicly accessible car parks.

In this case, 'public' car parks are those provided by Local Government without usage restrictions (though timing restrictions or paid parking could apply). 'Publicly accessible' parking is similar, but provided by individual development, for a similar use. This definition excludes parking that is designated only for use by customers or employees of an individual business.

A map of existing public and publicly accessible parking is provided below, **Figure 8-15**. This shows that there are approximately 2,000 bays located within or adjacent to the Town Centre that are restricted based solely on time. In addition, the PTA park 'n' ride parking is available to commuters Monday through Friday, and for any users on weekends and public holidays.

Figure 8-15 Existing public and publicly accessible parking in the Claremont Town Centre



8.4.5 Future Claremont Town Centre

The Claremont Town Centre is expected to grow significantly, including development of between 600 and 1200 residential dwellings and supporting commercial development to fulfil the retail/employment needs for the catchment.

These growth scenarios have been determined by Pracsys *Local Commercial and Activity Centres Strategy (LCACS)*, with a summary replicated below (**Table 8-5**). For the purpose of parking and trip generation assessment, the wider residential catchment growth identified in the LCACS has been assumed to be linearly related to Town Centre residential development.

Table 8-5 Predicted future floorspace requirements – Claremont Town Centre at 2041

Land Use	Low growth (+600 dwellings)	High growth (+1,200 dwellings)
	Floorspace increase (sq.m)	Floorspace increase (sq.m)
Shop/Retail	16,392	18,754
Café/Restaurant	2,699	3,092
Entertainment/Recreation	3,292	3,771
Office/Business	7,303	8,367
Health/Welfare	2,039	2,336
Service Industry	1,436	1,645
Other Retail	1,742	1,996

These basic categories have been synthesized with the land use survey categories and applied to the existing yield to project the future parking demand. Based on this analysis, commercial growth within the Claremont Town Centre could increase by between 45% and 51% over the next 20 years. However, parking demands for each of these constituent groups have different intensities and different peak times of day.

8.4.5.2 Parking demand growth assessment

The results of parking demand calculation, including these time-of-day effects and the benefits of internal trip catchment (which results from the increased resident and employee density in Claremont) is shown below, **Figure 8-16** and **Figure 8-17**. This initial assessment assumes business-as-usual travel mode choices for all external trips and no change in residential vehicle ownership rates.

Figure 8-16 Claremont Parking Profiles: business as usual – low scenario

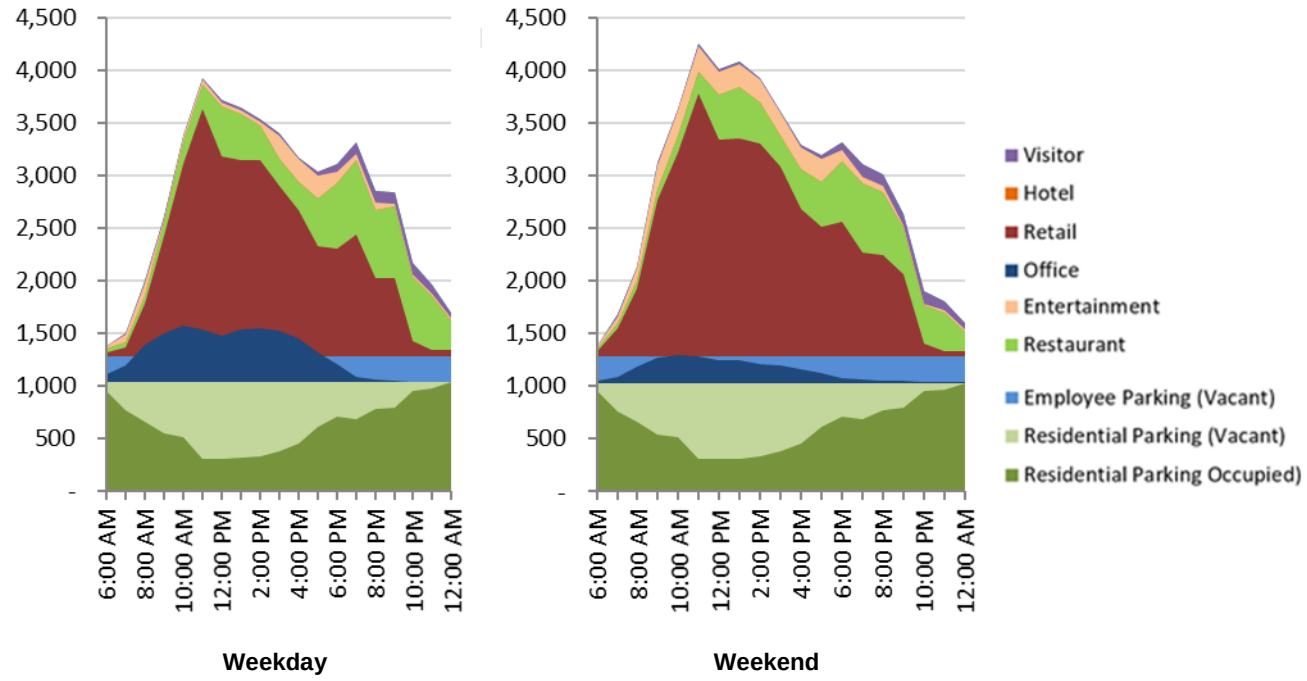
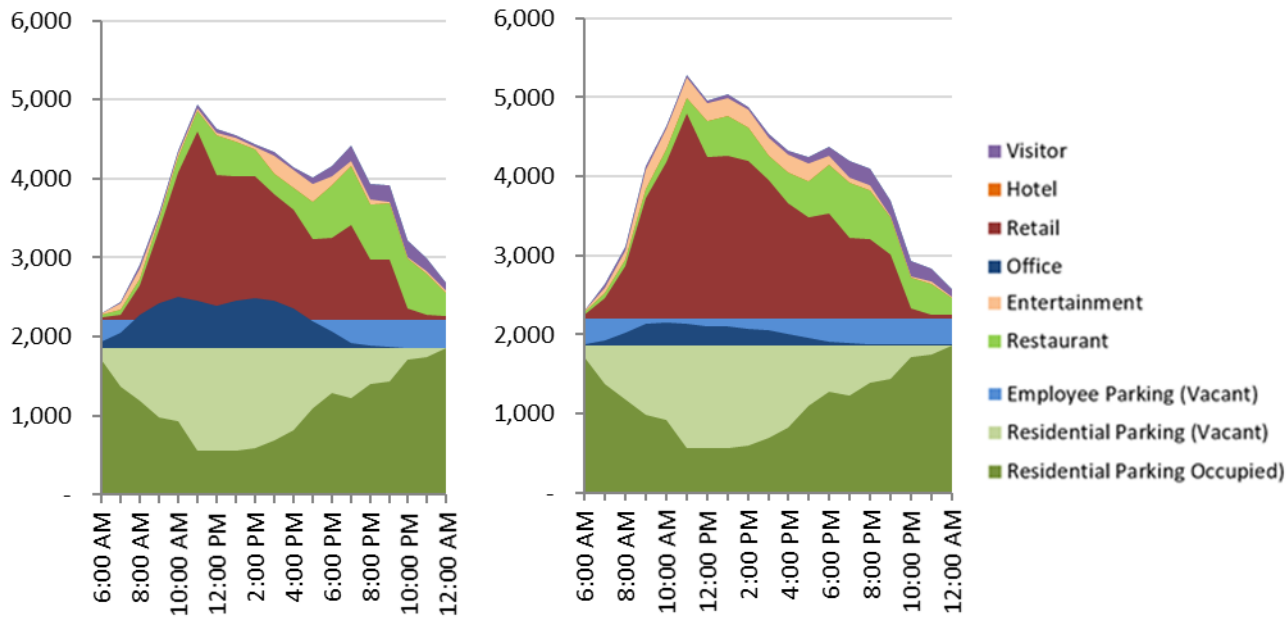


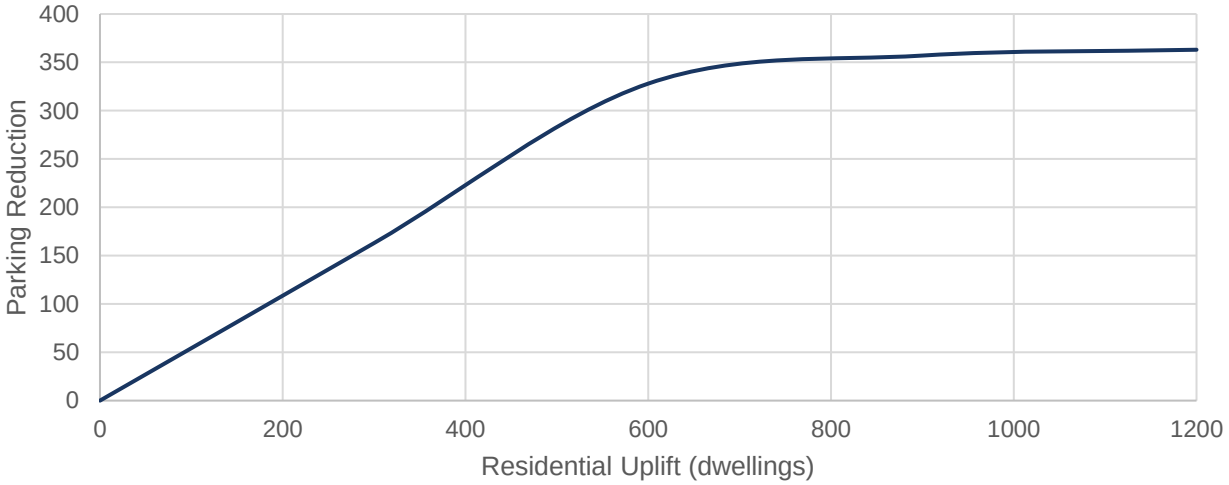
Figure 8-17 Claremont Parking Profiles: business as usual – high scenario



Weekday **Weekend**

Modelling these changes results in an increase in commercial parking demand within the Centre (based on current behaviour) of between 900 and 1,150 spaces, but this number is quite sensitive to residential development since the degree of internal reciprocity relates to the density of residents within the walkable catchment.

The extent of local residential uplift has been determined by residential yield analysis completed by the Town, which assumes between 600 and 1,200 new dwellings in the Town Centre. This residential development reduces the parking requirement within the Centre by up to 360 spaces. However, this benefit is not linear. At some point, the demand for services generated by residents cannot be fulfilled by the local offer and so they must look for opportunities (retail, F&B, etc.) elsewhere.



For the combination of LCACS commercial growth and residential redevelopment (low scenario) modelled for the Town Centre, the tipping point is at approximately 600 additional dwellings, with further development having less benefit from a parking / internal trip catchment perspective.

The ultimate impact of this combined commercial / residential development strategy is an internal commercial trip containment of between 28% (low scenario) and 32% (high scenario), as calculated by the parking model.

8.4.5.3 Impact of network capacity constraints

As discussed in **Section 7.4.3**, there is not sufficient capacity in the boundary road network to accommodate the traffic generation of either future development scenario. This limits the opportunities for people to access the Town Centre by car, reducing the utility of parking.

To support a sustainable transport scenario, it is recommended that the future provision of parking within the Town Centre be constrained to reflect the network capacity. The detailed analysis of peak period trip generation has identified a mode shift requirement by trip purpose equivalent to a 30% reduction in driving by visitors and a 34% reduction in driving by employees.

The effect of this reduction on parking requirements has been calculated through the parking demand model, to establish an ideal parking supply for the Town Centre.

The following model outputs describe the demand for parking across the day by the constituent land uses, with a sizeable change in as a result of the constrained network and induce mode shift (**Figure 8-18** and **Figure 8-19**).

Figure 8-18 Claremont Parking Profiles: constrained network – low scenario

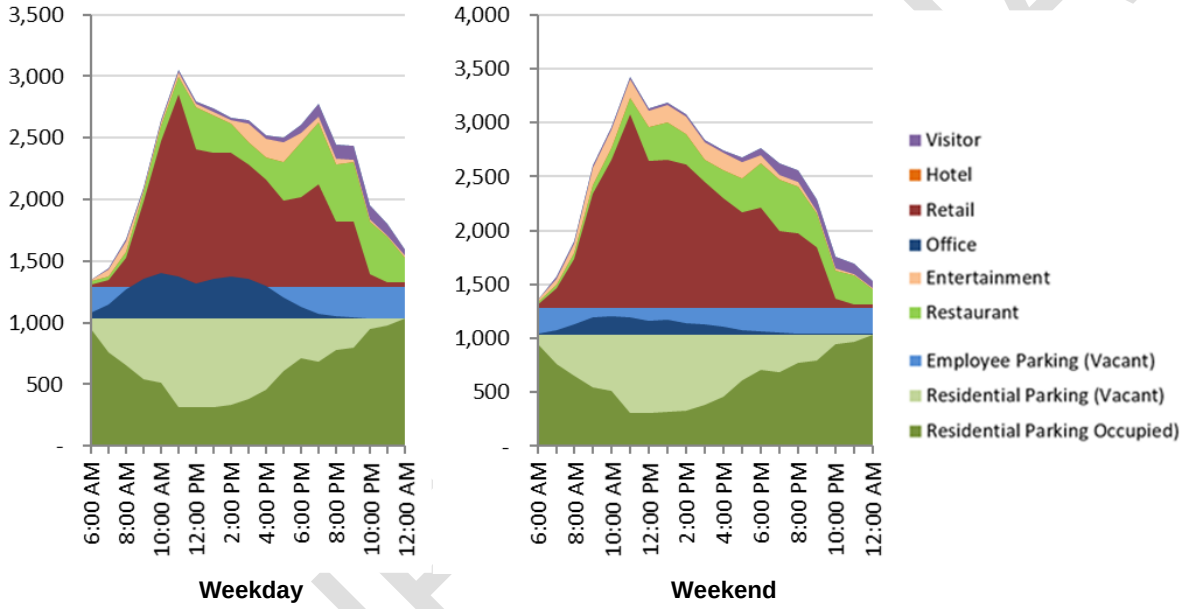
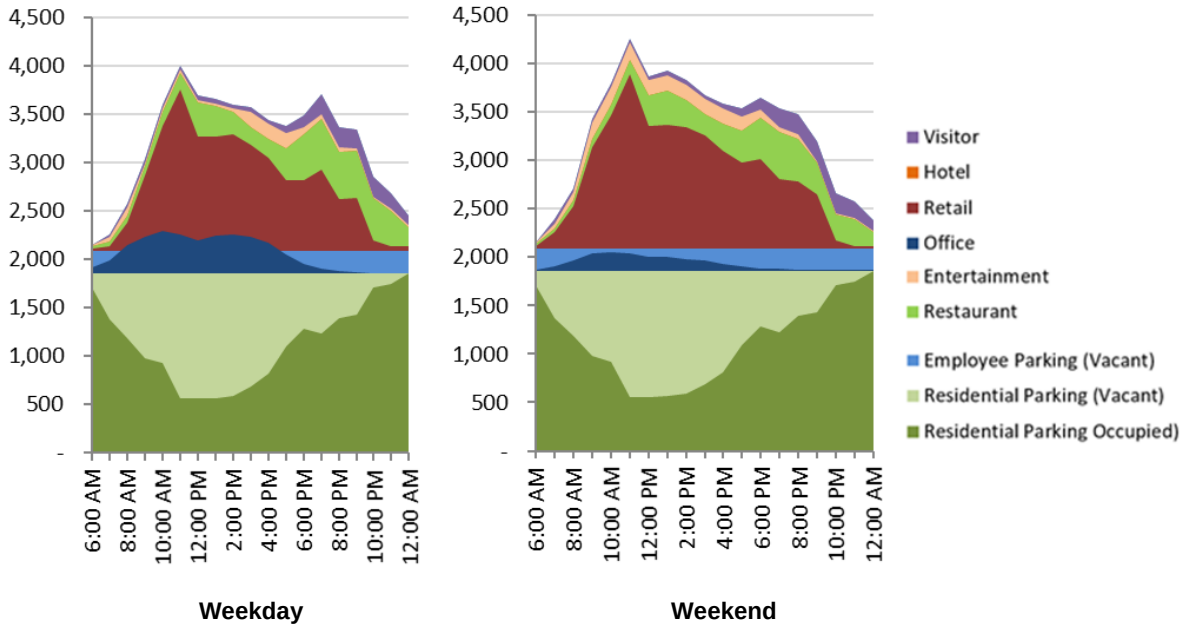


Figure 8-19 Claremont Parking Profiles: constrained network – high scenario



These results indicate that despite a substantial growth in development yield, a sustainable commercial parking scenario would generate approximately the same demand as the existing Town Centre.

To achieve this outcome will require a number of changes to the provision and funding of parking, in addition to alternative transport modes.

Recommendation

Develop a Parking Strategy to identify and prioritise potential sites for the construction of parking to serve commercial centres

Consider public locations for EV charging stations, with likely requirement for additional baseload power

8.4.5.4 Potential consolidated parking sites

The redevelopment of the Town Centre will inevitably include construction of new private car parking. Ideally this parking will be made available to the widest catchment of user groups, to maximise its utility. As such, construction of consolidated pubic and publicly accessible parking provides considerable benefit to the Town Centre. In addition, where parking is available in distinct, easily identifiable destinations, this improves legibility for visitors by giving them a distinct destination.

This also supports a 'park once' environment, where multi-purpose trips can be accomplished without requiring the use of multiple car journeys. The Claremont Town Centre, with its walkable central core and active retail/restaurant precinct, is ideally suited to this function.

Several sites have been investigated for suitability in the Town Centre, to determine where public parking could be reasonably by located. There are a number of factors that should be considered in this assessment:

- Proximity to activity
- Vehicular access and safety
- Pedestrian legibility
- Topography and lot geometry

Together these factors contribute to the viability of an individual site.

Four potential public car park opportunities are discussed in this Section, as follows:

- Redevelopment of the existing Leura Avenue public car park
- Redevelopment of the existing Davies Road public car park
- Redevelopment of the existing Council Administration Building car park at308 Stirling Highway
- Construction of a new public car park at the Claremont Showgrounds

These potential locations are shown in **Figure 8-20** below. It is noted that all of these locations lie on the eastern side of the Town Centre. Based on the form of development and the Town's holdings, there do not appear to be any clear opportunities for public parking in the western portion of the Town Centre. However, this is mitigated by the substantial parking supply at Claremont Quarter, which functions as publicly accessible parking for all user groups, including employees (under their paid parking regime).

The impact of consolidated parking on the boundary road network will depend somewhat on the type of parking that is provided: employee parking will tend to be associated with traffic during the roadway peak periods, which will affect Stirling Highway in particular. Short-stay visitor parking in this location would generate a higher number of vehicle trips, but distributed over a longer period of the day.

However, it is important to note that the total supply of parking across the Town Centre is expected to remain largely the same as it is currently, just relocated to a more consolidated location. As such, while peak period movements need to be considered, the overall impact on the network will not be large.

Figure 8-20 Locations of potential future public parking

Leura Ave

- **Vehicular Access**: This car park is located along the eastern edge of the Town Centre, with direct access from Leura Avenue. This location limits the penetration of vehicles into the active precincts, but would result in additional traffic at the Gugeri Street / Leura Avenue and Stirling Highway / Leura Avenue intersections.

  The geometry of the lot includes an extension to a southern egress point which could form a valuable separated queuing space for entry/egress, eliminating the potential for overspill onto Leura Ave. Minor changes to the road cross-section would support channelized turns into the site.

- **Pedestrian Access:** This location is close to existing access through to Bayview Terrace (via the Post Office lane and Maude Jackson Lane). This corridor could be strengthened further, creating an attractive link for connection between parking and activity.

  The pedestrian facilities for crossing Leura Ave are not well developed. Pedestrians must either cross without priority at the Gugeri Street roundabout, or travel south to the Leura Avenue signals. In the future, redevelopment of the lots on the west side of Leura Ave could present an opportunity for a direct connection over the road, though this opportunity is reduced by the presence of water utilities.

- **Topography and Environment:** the site is generally flat, but is currently occupied by a number of mature trees. These trees provide shade for the existing car park use.

- **Geometry:** the existing car park is approximately 52m x 30m, which is sufficient to provide parking at approximately 48 bays per level using a simple ramped-floor system. Under the identified height limits from the Town's yield assessment, this would be sufficient to provide a bit less than 200 bays. The existing at-grade car park already provides approximately 80 bays, which suggests that the total increase in supply would only be around 100 bays (less if the street frontage were to be sleeved by active uses).

Figure 8-21 Leura Ave Car Park

Based on the above, there are opportunities to provide additional public parking on the Leura Avenue site within the existing Lot envelope. However, the incremental increase in parking is relatively low, particularly if the structure is to be sleeved. Additional supply could be provided, but at the cost of residential amenity for the adjacent lots, or the construction requirements of basement parking.

Davies Rd

- **Vehicular Access**: This car park is located north of the Town Centre, adjacent to the Claremont Oval Precinct, with access available from Shenton Road and Davies Road. This location is north of the train line, which limits its utility for vehicles approaching from Stirling Highway – such trips would need to use Stirling Road or a circuitous route along Melville Street and Gugeri Street.

  It does support access from the catchment to the north, eliminating the need for vehicular access into the Town Centre from this direction.

Figure 8-22 Davies Road Car Park

- **Pedestrian Access:** This location is immediately adjacent to the controlled pedestrian crossing at the Shenton Road / Davies Road signalised intersection, with direct access through the Claremont Station to the Town Centre.

  These pedestrian facilities will be improved further as a result of METRONET upgrades, which include the pedestrian underpass to the west of the Station.

  Because of the quality of the pedestrian environment, this car park would provide value for either employees or short-stay visitation. If intended for visitors, it would need to be accompanied by improved wayfinding to maximise its use. This would also continue to support the needs of the adjacent recreational uses: Claremont Aquatic Centre and Lawn Tennis Club.

- **Topography and Environment:** The site is set 1-2m higher than the adjacent tennis club and golf course, creating a range of constructability issues. It is also surrounded by mature trees which provide shade for the existing car park use.

  Geometry: the existing car park is only wide enough for a single aisle, at 22m wide. This makes ramping for multi-deck structures complex and costly. The natural fall of the road does present a potential opportunity for a two-level structure, with access to the second level from Shenton Road at-grade, ramping down at the northern end to Davies Road to an undercroft level, with access to Davies Road mid-block. This arrangement could accommodate approximately 200 vehicles within the existing car park footprint, an increase of 80 bays.

  Adding a full basement level or additional levels above would require additional ramping and would complicate access. The result could potentially accommodate up to 300 vehicles total (an additional 180 bays), but at the consequence of a reduction in parking efficiency (and hence an increase in cost per bay) which would reduce the feasibility of the project substantially.

Showgrounds

- **Vehicular Access**: This car park would be located north-east of the Town Centre, on the Claremont Showgrounds site, most likely with access from Graylands Road.

  This location is north of the train line, which limits its utility for vehicles approaching from Stirling Highway. It is also 800m from the Town Centre core, making it too far for visitor use. As such, any potential value for the Claremont Town Centre would be as employee parking.

  Of course, the car park would also have a direct relationship to the redeveloped Showgrounds. The intensive trip generation by employees and other users at this location could place additional pressure on the Graylands Road / Shenton Road intersection – the extent of this effect is unknown and should be considered in the context of the overall Showgrounds development. Ultimately, upgrades to this intersection, such as the roundabout discussed in **Section 7.4.6**, or a signalised intersection may be required.

- **Pedestrian Access:** At 800m, the walking distance to the Claremont Town Centre is at the edge of what would be considered feasible for this purpose. To mitigate the distance, improvements to the pedestrian route would be needed, including better quality crossing points and shade.

- **Geometry:** the size of the Showgrounds site allows for a parking structure of any size, allowing for an efficient car park suited to use both as public car parking and for the needs of the redevelopment area.

  Any such structure would be feasible only as a public-private partnership, since the market rate for all-day employee parking would not recoup the cost of construction through fees alone. Contributions from cash-in-lieu, in addition to parking fees, would be necessary to make this infrastructure economically viable.

Council Administration Building

- **Vehicular Access**: This car park would be located at the south-east edge of the Town Centre, at the location of the existing public car park adjacent to the Town of Claremont Administration building. Access would be available from Bay View Terrace.

  Because this is south of Stirling Highway, it has a reduced impact on Town Centre traffic, beyond the direct effect on the function of the signalised intersection at Stirling Highway.

- **Pedestrian Access:** The pedestrian connection between this location and the Claremont Town Centre is very good, facilitated by the signalised intersection immediately adjacent.

- **Geometry:** the footprint of the existing car park is approximately 50m x 34m, and already designed as an efficient rectangular layout suitable for approximately 50 bays per level. However, the requirements for access and ramping suggest that expanding the car park envelope would be beneficial to maintain that efficiency. There is ample space available to the south and particularly to the east, gained by encroaching into the park.

Figure 8-23 Council Admin Car Park

Private Opportunities

There are other potential locations for public parking within existing private lots, which could be pursued by developers. Given the lack of options available for the Town, these efforts should be encouraged through available planning concessions.

As redevelopment continues, and parking becomes more scarce (relative to demand), the price of parking will increase. This creates potential opportunities for third-party private provision of parking, embedded within development in the form of basement or podium-level parking.

Recommendation:

Support the provision of public car parking through planning concessions.

8.5 Parking Management

8.5.1 Parking Intervention Framework

This framework has been adapted from work undertaken for the South Perth Parking Strategy (2016) and describes at what demand point certain interventions should take place. This information has been supplemented by complementary actions that should take place simultaneously to these interventions being carried out.

The stages of this framework are:

a. Existing parking should be used as efficiently as possible through education and user information where alternative parking facilities are available and compliance is an issue.

b. Existing restrictions should be adhered to and enforced as appropriate.

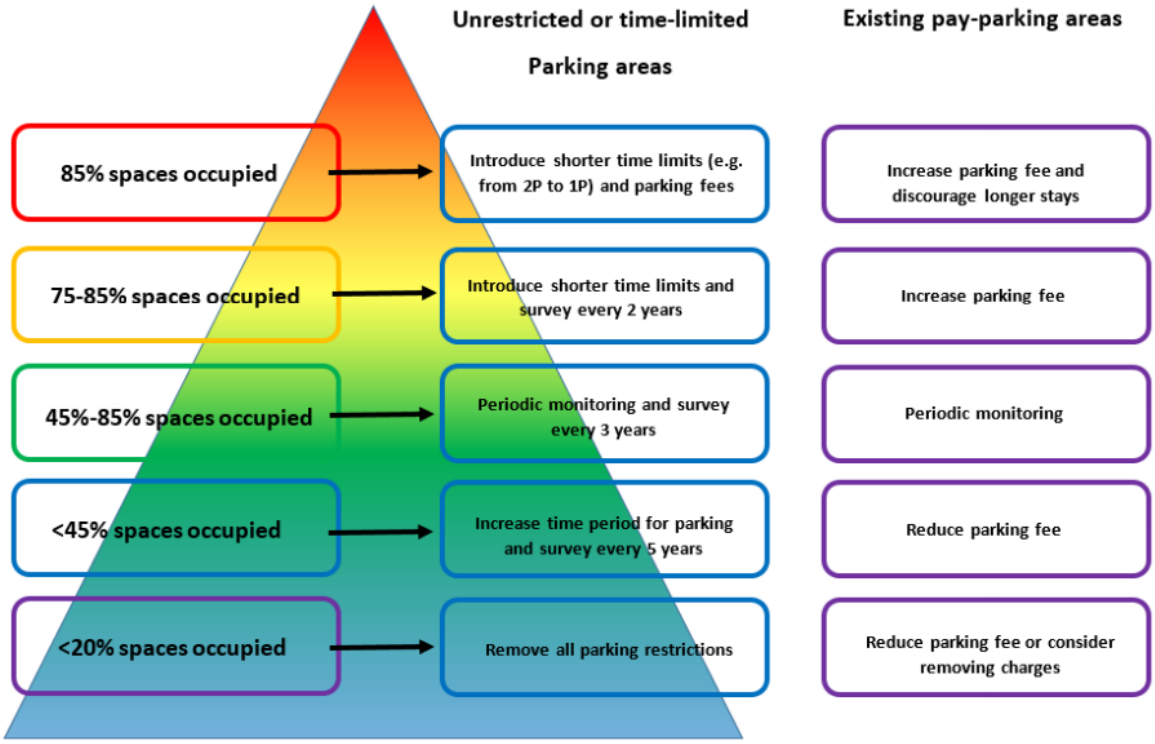
c. Additional restrictions should be considered where parking compliance remains an issue, and should be accompanied by additional educational campaigns.

d. Further enforcement is carried out and infringements issued if necessary to reinforce restrictions and encourage compliance.

e. Paid parking should be introduced alongside further educational campaigns if the above interventions have not been successful. This is particularly appropriate if there are no alternative parking locations in the vicinity for people to use.

In order to identify the trigger points as described in **Figure 8-24**, the Town should undertake regular parking occupancy surveys to understand the nature of parking demand in popular locations.

Figure 8-24 Parking Intervention Framework



Source: South Perth Parking Strategy (2016)

Recommendation

Undertake parking occupancy surveys every 2 years to assess parking demand in popular locations

8.5.2 Time and Duration Restrictions

Limiting parking by duration and time of day can be effective in achieving the appropriate use of specific locations. If parking is intended for shopping then a shorter duration can be applied, but if it is for employees then a longer duration is needed. Examples of a simplified parking hierarchy by time is:

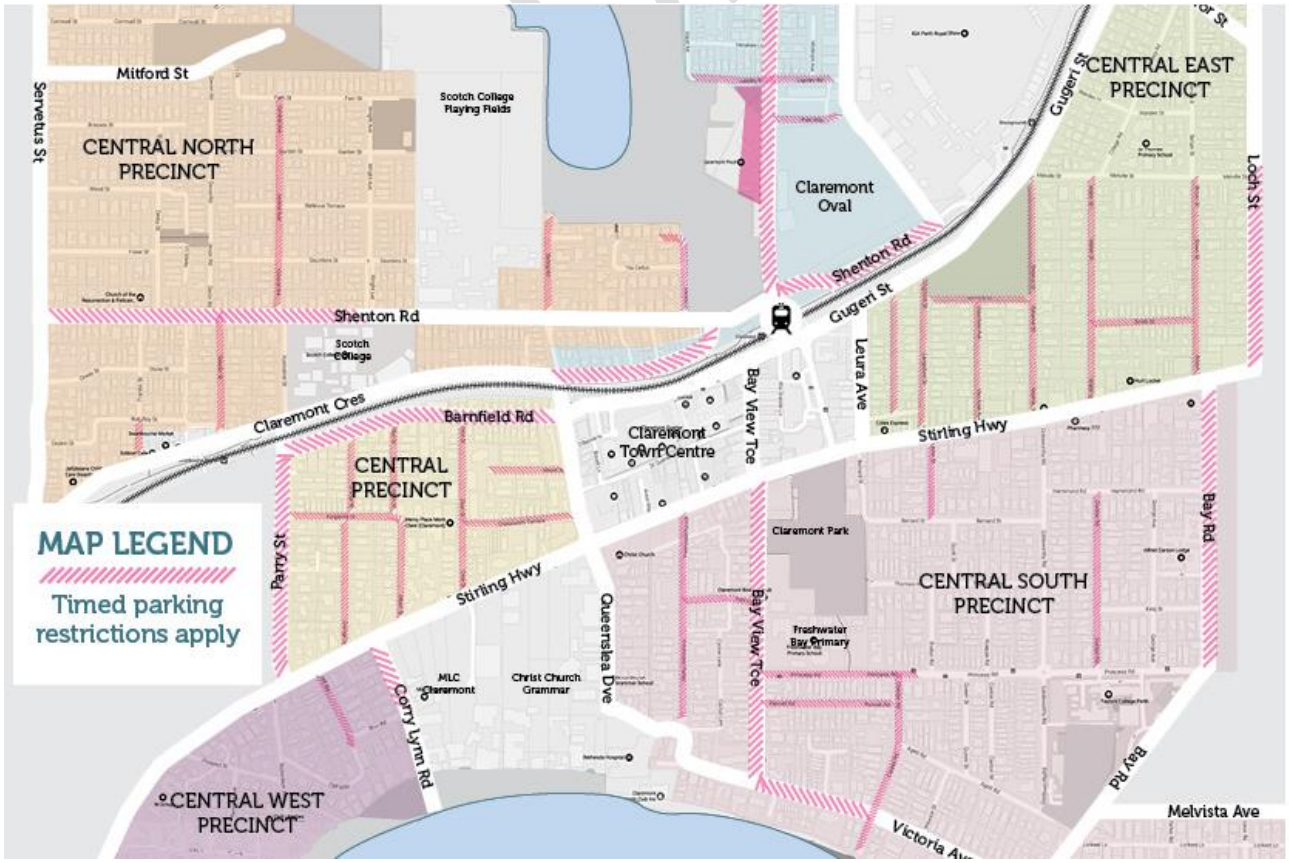
- **Short-stay parking** (up to 2 hours) is provided for shopping areas and medical and professional suites
- **Medium-term parking** (between 2 and 4 hours) is provided for district centre parking, sports facilities, entertainment centres, hotels and motels
- **Long-stay parking** (4 – 24 hours) is provided to cater for tenants, employees, contractors and other drivers

The management of parking through time restrictions is designed to restrict the supply of parking available to certain groups. The following principles apply to the implementation of time restrictions for free parking:

- There should be consistency within the duration restrictions used in the area, to improve understanding. (i.e. all parking along both sides of the street);
- 2P is recommended for shopping high streets where paid parking is not suitable. Shorter durations can be used in support of specific uses; however, enforcement is more difficult in the absence of parking technology;
- Longer durations such as 3P are suitable for the fringes of activity centres; and
- Timed restrictions beyond 3 hours should be avoided, as they are difficult to enforce and compliance tends to be low.

The current locations where timed parking restrictions apply are shown in Figure 8-25 below. These timing restrictions tend to relate to areas where commercial and residential demand overlap, and are designed to limit the impact of commuter and employee parking on local residential amenity. In these areas, residents have the opportunity to apply for free permits to exempt their vehicles from timing restrictions. A discussion of an alternative residential permit system is discussed further in **Section 8.3.1**.

Figure 8-25 Town of Claremont Timed Parking Restrictions



Source: Town of Claremont Precinct Parking Brochure

Limiting duration restrictions and/or paid parking to daylight hours limits the potential impact on residents and visitors. This is particularly important in areas where there is a mixture of residential density and retail commercial use.

8.5.3 Wayfinding and Signage

Wayfinding is a system of signs and directories that can efficiently guide people to car parking areas and the effectiveness of parking is greatly improved through supplying better information to users. It is particularly useful where large areas of public parking are situated in areas that may not be immediately obvious to visitors.

This information is typically provided in a range of media, including maps, mobile applications, static and dynamic signage and prominent parking information.

In locations where parking is hidden from view, information regarding its location, access route, price and availability allows drivers to better choose the best spot for their needs.

A coherent signage strategy is therefore recommended across the Town, identifying off-street car parking supplies and significant on-street parking. This may be implemented in stages:

- **Stage 1**: Static wayfinding signage displaying only route/location and supply numbers, design of signage consistent for on-street and off-street.
- **Stage 2**: Dynamic signage which leverages real-time information from 'pods' or entry sensors to inform drivers of parking spaces available (including price where applicable).
- **Stage 3**: Mobile application directing drivers to specific locations based on price, availability, location and duration information.

More high-tech wayfinding can be provided but dynamic signage and mobile applications both require a great deal of infrastructure and it is arguable whether demand warrants the investment in such infrastructure at present, as they need a density of real-time data to function. However, the collection of this data is consistent with the concept of Demand Responsive Pricing, which creates an environment for highly efficient parking function and should be considered for the future as demand dictates.

A coherent wayfinding system can be a cost-effective means of reducing searching time for bays and the unnecessary circulation of cars. Predictable, consistent and authoritative public information builds confidence in the information provided. A lack of wayfinding signage may result in congestion in certain areas while parking is available nearly.

Recommendations

Review existing parking wayfinding and signage facilities

Implement a consistent Parking Wayfinding and Signage Strategy, which features customer led information including walking distances and times to various nearby destinations

Assess when dynamic signage might be appropriate using parking survey data as a way of identifying where high occupancy may be reduced by better information regarding suitable alternative parking locations

Direct some parking related funds towards wayfinding infrastructure

8.5.4 Pedestrian Access

It is important that any car parking facilities, particularly those that are located in areas with low pedestrian flows, such as behind or under buildings, are designed with safety in mind and passively surveyed. Car parks should be secure, with good lighting and CCTV coverage, and pedestrian links between the car parks and destinations continuous and well signed.

Legible pedestrian access, which is also safe by being well-lit, with smooth paths and sheltered from weather) contributes to increasing the range of parking facilities that can serve an area.

Recommendation

Review the pedestrian connections between activity centres and parking locations to ensure they are safe and welcoming

8.5.5 Parking in Educational Areas

School parking is generally provided in a combination of on-street and off-street facilities, used in different ways and each important for appropriate function.

Generally, parent pick-up/drop-off parking is limited to very short duration – in the order of 90 seconds. This means that an appropriate kiss 'n' drive facility, located in adjacent on-street parking along the school frontage can function effectively with relatively few bays. Note that these bays are generally only suitable for anti-clockwise approach and departure routes.

Management of kiss 'n' drive parking by the school may be necessary to ensure its continued utility. There is a tendency for parents to arrive early for afternoon pick-up, to ensure they get an optimal parking position. This ultimately reduces the efficiency of the parking bays, resulting in a cascade of parents arriving earlier and earlier. This can be mitigated by education: reminding parents to arrive ***after*** school finishes. This can be reinforced through periodic active management by staff (moving stationary cars on prior to school close), as necessary. Consideration should be given to the effects of pick-up/drop-off and overspill parking into surrounding streets and the associated road safety implications.

Issues with parking around educational establishments are centered on the parking behaviours of parents at drop off and pick up times and the safety issues that result from inconsiderate and illegitimate parking. Parking around primary schools is generally more problematic than at high schools, due to the concentration of parking along a small frontage, and the higher proportion of students requiring parental transport, although there are peaks and troughs in terms of the number of complaints received and infringements issued.

These issues are problematic for residents living near schools, with relation to property access, verge and footpath parking, and visual obstructions with regard to road safety. In order to reduce congestion from school trips, recommendations for improvements to school pick up/drop off and consolidating private school bus services are recommended. This could include combined private bus routes or a shared local circle route, which connects key venues in the district (e.g. Claremont Town Centre) with school destinations.

8.5.6 School Pick-Up/Drop Off

Schools experience very short periods of intense movement activity during the morning and afternoon peaks. This generates an intense parking and traffic demand related to parent pick-up and drop-off.

There are differences in behaviour between the morning and afternoon, effects related to student's age, and catchment variance, all of which will influence the requirements for vehicular access.

Afternoon pick-up is generally worse than the morning drop-off. This is due to the increased dwell time of parents arriving early and waiting; as compared with drop-off behaviour which exhibits very rapid turnover.

Well-managed drop-off points can assist in minimising the impacts of school traffic on the surrounding network as well as improve safety outcomes. Some characteristics of effective school drop-off facilities include:

- **Designate parking areas**: on-street parking bays are best used for 'kiss and drop' facilities. These can be indicated by clear a 'No Parking' restriction during school zone periods (8am-9:30am and 2:30pm-4:00pm) coupled with 'Kiss and Ride' line marking.
  - Off-street parking may be restricted to 15min for all bays intended for student pick-up/drop-off except those allocated for Early Learning.
- **Make signage clear**: identify vehicle parking and dedicated 'kiss and drop' areas through coherent plate signage and linemarking.
- **Enforcement**: Signage is only effective when adequately enforced. Liaise with school staff to support on-site management and undertake periodic, targeted compliance checks by Local Government Rangers.
- **Education**: parking and driving are part of a wider discussion regarding transport choices to school. The Department of Transport can support schools to induce more students to travel on foot, by bike and by

public transport. There are benefits to health and well-being, the environment and to traffic and parking congestion.

The Town can have a role in promoting the DoT's 'Your Move' program, and by providing supporting infrastructure or policy to assist in the transition to more sustainable outcomes.

Some examples of school drop-off improvements in the Town include:

Table 8-6 Examples of School Drop-Off Improvements

School	Suggested School Drop Off Improvements
Methodist Ladies College	Corry Lynn Road: remove bypass lane and further embay parallel parking, replace existing perpendicular bays with embayed parallel parking closer to Stirling Highway, modify to 'No Parking' or '5 min' during school times, and add 'kiss and ride' line marking.
Scotch College (Senior Campus)	Australind Street (southbound): modify restrictions to 'No Parking' or '5 min' parking during school times, ass 'kiss and ride' line marking south of car park driveway crossover, relocate student parking to alternative location (on-site or off-site)
Scotch College (Junior Campus)	Wright Avenue: Improvements to Wright Avenue signage and line marking to positively identify drop-off zones and 'No Stopping' zones.
Freshwater Primary School	Princess Road: On-street and informal off-street parking is incompatible with existing 'bike lanes.' Clarity is needed along this corridor.
	Bay View Terrace: On-street parking along both sides likely to be sufficient even where it is not optimal. Operation may be improved by modifying parking restrictions (west side, Park Lane to Princess Road) to 'No Parking' or '5 min' during school times, and 'kiss and ride' line marking.
Swanbourne Primary School	Narla Road: Replicate 'Set Down' area in the embayments east of the school entrance.

Where parking overspill into the surrounding streets is pervasive or where safety along the school frontage roads is compromised, the Town can also consider restricting access during peak school periods. These so-called 'School Streets' have been implemented in international trials, including most recently in Leeds, and involve placing physical barriers on key frontage streets to prevent parking. This reduces the utility of driving to school (and hence the number of vehicle trips taken), as parents and students must still walk a portion of the journey, while also creating a safe zone near the school to support walking and cycling. This form of intervention is particularly beneficial near public primary schools, where catchment size is small.

Recommendation

Implement specific school drop-off improvements

Provide on-street kiss 'n' drive facilities. These can be designated as 5min or 'No Parking' Zones while School Zones are operating and identified by 'Kiss and Drive' linemarking

Support and incentivise site-specific parking and access studies at public education facilities, designed to minimise the risks and improve the function at peak pick-up/drop off times. Require similar studies to be undertaken as part of any private school expansion

Undertake a trial across several schools to determine the efficacy and appropriateness of a 'School Streets' parking exclusion zone on safety and mode share. Partner with DoT 'Your Move' team to establish metrics and methods for evaluation

Assist schools to prepare wayfinding guidance for parents and visitors

Lead discussions with private schools to combine their existing private funding to create a more effective service for the long-distance trips. Expand the PLC local loop to include connections to Scotch College, MLC and Christ Church

8.5.7 Specialised Parking Rates

LPS3 prescribes a minimum number of parking bays to be provided by a development. Departure from this minimum requires justification, and is at the discretion of the Town. Only minor variation to the parking provision is generally permitted without invoking cash-in-lieu provisions.

The parking rates provided are the same for the whole of the municipal area. This suggests that application of these rates is likely to result in over-supply in dense Activity Centres, and under-provide in residential areas.

8.5.7.1 ACROD

It is recommended in the short term to promote ACROD parking rates above the stipulated rate given in the Building Code Australia (BCA). This reflects the growing mobility of people with disabilities and is consistent with the increasing uptake in ACROD permits in the Perth metropolitan region. Notwithstanding any provision in the BCA or AS2890, it is recommended that parking spaces for people with disabilities are to comprise 2-3% of the total number of parking spaces in non-residential development, with a higher provision rate required for car parks serving health facilities or which provide specific services for aged persons and people with disabilities.

ACROD bays must be:

- Of an appropriate size;
- Located close to the facility
- Connected directly to the facility by unobstructed paths with dropped kerbs, appropriate widths and shelters where necessary;
- Enforced to ensure availability for legitimate users - illegal use of ACROD bays on public roads or the Town's Parking Stations should result in infringements being issued;
- Angled parking as a preference to parallel parking spaces where possible to enhance safety and accessibility;
- Restricted by time as per adjacent parking spaces at the location (although vehicles may remain in on-street bays for double the posted time as per the Road Traffic Act); and
- Considered only in commercial and mixed-use areas. As a general rule ACROD parking will not be provided in residential areas.

Recommendations

Ensure that developers are aware of the availability of match funding for ACROD bays to be upgraded or retro-fitted

Review ACROD parking throughout the Town and prepare a program of works to update bays as needed

8.5.7.2 Motorcycles

Currently the Town does not provide a requirement for the provision of motorcycle parking. It is not clear yet whether any provision has been rolled out across the Town's parking facilities.

Review of ABS Census (2016) data shows that motorcycles and scooters are used very rarely for journey-to-work trips (less than 10 total trips). However, the size of the motorcycle fleet is approximately 5% of all vehicles across Australia.

This suggests that there may be a large differential between commuter use of motorbikes and recreational/utility use. With respect to parking supply, this implies that motorbike/scooter parking needs may be different for land uses which are heavily dominated by employees (e.g. office) or visitors (e.g. retail), which would be reflected in different parking rates for these two categories of use.

The provision of motorcycle/scooter parking is of benefit primarily to the business, not necessarily to the vehicle owner. Motorcycles and scooters may park in standard bays, but this tends to be a poor use of space. Provision of motorbike/scooter parking in excess of the statutory requirements is unlikely to reduce car parking demand at a strategic level. In addition, current trends in both consumer choice and sustainable transport planning are towards electric bikes and scooters, as opposed to motorised transport.

This suggests that modifications to bike parking may better support the needs of the employees and visitors, in preference to motorcycle/scooter bays, and that a provision for motorcycle parking of 1% of bays would be sufficient to accommodate demand.

Recommendation

Provide guidance within Local Policy related to motorbikes and scooters, with an indicative supply rate of 1% of standard car bays. Motorcycle/scooter bays are not considered adequate for 1:1 replacement of car bays for the purpose of parking compliance.

8.5.7.3 Bicycles

Local Planning Policy 127 Bicycle Parking and Facilities includes provisions for bicycle parking and end of trip facilities. All shops are encouraged to provide 1 space per 400m² of GFA for employees and 1 space per 200-400m² GFA for visitors. All other uses are 1 space per 400m² of GFA with no visitor parking requirements.

A bicycle supply rate should be based on an understood mode share objective. This may vary for different land uses, and between visitors and employees, but it should be clear and ideally linked to the Town's sustainability objectives and strategies. The mode share targets identified in **Section 6.2** include a future cycling mode share of between 2% and 4% by trip purpose.

Applying a 5% mode share to benchmarked employee and customer land use occupancy rates results in the following **Table 8-7**.

Table 8-7 Example of bicycle parking rates

Land Use Category	Employee Bicycle Parking	Visitor Bicycle Parking
Retail	1 per 2000sq.m (employee)	1 per 500sq.m (visitor)
Showroom	1 per 4000sq.m (employee)	1 per 1,000sq.m (visitor)
Office	1 per 500sq.m (employee)	1 per 2000sq.m (visitor)
Medical Centre	1 per 16 practitioners (employee)	1 per 6 practitioners (visitor)
Restaurant/Cafe	1 per 160 people (employee)	1 per 40 people (visitor)

In all cases, these rates are lower than the current recommended provision under *LPP 127.* While there is value in some degree of over-provision, to account for fluctuations in demand, the difference between the recommended supply and physical requirements can be very large. Even in the case of 'office' uses, average employee density is only around 1 per 25sqm. If 5% of these employees ride to work, then the minimum bike parking provision should be 1 per 500sq.m; all other uses have a lower employee density and less demand for bike parking.

Public bicycle parking is important to ensure that activity centres are accessible by active modes. In this instance, a demand-driven response is recommended. Wherever bike parking demands exceed the number of racks, expand the provision by installing new ones.

For any given development, a minimum of two bicycle parking spaces should be provided for visitor parking, in the form of u-rails in close proximity to entryways and with adequate passive surveillance. This may be provided in the public realm at the discretion of the Town.

Recommendations

Determine a target cycling mode share and use this to define bicycle parking supply and end-of-trip rates

Establish a program for progressive installation of bike racks in public spaces

High quality end of trip facilities at businesses is the most effective way to change employee mode of travel to work. Research undertaken within the Perth Parking Management Area identified that the use of bicycle parking is related more to the *quality* of the infrastructure than the *quantity*. As such, it is recommended that reductions in car parking should not be considered on the basis of a bicycle parking over-supply *unless* it is accompanied by high-quality end-of-trip amenities (drying room, towel service, showers, lockers etc.).

The end-of-trip minimums defined in the Town's policy are considered to be sufficient for showers, however lockers should be provided at a rate of **2** lockers per employee bicycle parking bay. This accounts for other types of active transport, and for more flexibility of use.

Recommendation

Adopt the above rates table as an interim bicycle parking requirement

Retain the Town's current minimum requirement for showers, but increase the lockers to 2 per employee bike parking space

8.5.7.4 Loading and commercial parking

Business owners and delivery drivers often have issues with being unable to receive deliveries or deliver goods to businesses due to the lack of loading bays or zones. For new developments, the likely requirement for deliveries in new commercial developments should be considered and where appropriate, enabled through an increase in on-street loading zone areas, particularly in 'main street' precincts where demand for parking is high, and where small office/retail development is located.

Loading bays/zones should be flexible/shared where possible between businesses, and have time restrictions (usually 15 minutes), and designed to accommodate larger and heavier vehicles as appropriate. Loading zones should be avoided in angle parking bays to prevent larger vehicles overhanging into the carriageway.

Loading and commercial spaces should be available to the general public after hours and on weekends. There is no need to preclude the use of these spaces outside of commercial hours.

Where specific spaces are set aside for special users, there are diverse opinions on whether to charge these parkers for parking if they are in a charge parking area. Many councils charge all parkers on the basis of the user pay principle, added to which there is a premium for these drivers having the convenience of a well-located parking space. Other councils provide this parking at a discounted fee or provide the first 15 minutes free of charge.

Recommendation

Amend policies to allow the general public to use loading and commercial spaces after hours and on weekends

8.5.8 Kerbside Parking Hierarchy

Creating a hierarchy for parking on-street allows for the scarce resource of kerbside space to be allocated for different uses according to a specific understanding of need. This hierarchy can be determined to any level of detail, and include a diversity of uses: bus stops, loading bays, disabled parking and the whole gamut of trip purposes.

An on-street parking hierarchy is recommended that incorporates a number of different aspects related to the needs of adjacent land uses and the context of the broader transport and parking system. Application of this hierarchy as a matter of policy would require supporting information, necessary to characterise the street environment on a Precinct-, street- or block-scale level.

Support Economic Growth

The hierarchy should support local business and economic activity. This includes ensuring adequate provision (both in quantity and location) of loading areas to service the needs of local businesses. On street parking supply and duration should support local businesses, including an appropriate mix of:

- Free very-short (15 min or less) parking for quick trips (post offices, convenience stores, ATM etc.)
- Short-stay parking to encourage optimal turnover of customers, and
- Long-stay parking on the fringe to support longer stay users (where required).

Boost sustainable transport use and urban amenity improvements

The hierarchy can reinforce non-car modes by retaining priority for sustainable transport provision. That is:

- Develop and improve walking and cycling networks to enhance safety and access to and from public transport facilities, surrounding land uses, on and off-street bicycle parking facilities;
- Ensure public transport infrastructure provision (stops, zones, etc.) is adequate for the street function and type; and
- Encourage place making and urban amenity improvements to activity centres.

Provide the right parking management methods in the right location

As noted above, different uses require different supporting parking management types, and this is related not only to the specific land uses and their needs, but also to the provision of alternative transport options and nearby off-street parking supplies. Where the parking management matches the needs of adjacent land

uses, compliance rates will remain high – however a mismatch between demand and parking provision will result in reduced compliance and a need for constant active enforcement.

Consolidate and simplify parking management operations

Categorising uses broadly, and applying consistent management practices, greatly simplifies the parking system from a user perspective, and creates a more legible system overall. This can be further enhanced through simple pictographic signage which clearly denotes parking function.

The City of Perth *On-Street Parking Policy* is an exemplar for clear, consistent information in this regard. It recommends standardised hours of operation, establishes a general hierarchy for kerbside parking, and uniquely, establishes priority for parking position along a standard road section (extracted below).

Table 8-8 City of Perth locations for parking along a road section

Start of road section	Mid-block	End of road section
Loading bays Universal access (UA) bays (1 UA/ACROD bay per 50) Bus bays (first 25m)	Private car bays Motorcycle bays ACROD bays (min. 1 bay per street block)	Loading bays Universal access (UA) bays (1 UA/ACROD bay per 50) Taxi rank Bus bays (end 25m)

Source: City of Perth On-Street Parking Policy, Table E3

Develop user priorities to guide allocation of kerbside use for a number of street types

Based on strategic planning, consultation and best practice, user priorities should be developed to help guide the parking allocation. This can be achieved by first understanding the user types/considerations and requirements associated with each user type.

Following on from understanding the user types and associated parking needs, a range of street types can be developed, with an individual user hierarchy determined for each street type.

Recommendation

Establish an on-street parking policy that includes positional and management recommendations

8.5.9 Paid Parking

The primary role of parking pricing is as a strong tool to manage local demand.

Priced parking:

- Makes the most convenient spaces available for higher value trips (delivery/service vehicles and shoppers) and encourages longer term parkers to use less convenient spaces;
- Ensures a parking space is always available, increasing user convenience and reducing cruising for parking by increasing turnover;
- Reduces the total vehicle travel and therefore traffic congestions, roadway costs, accidents, energy consumption and pollution emissions;
- Generates revenue to ensure that drivers help finance local road and parking facilities; and
- Increases fairness – non-users are no longer paying for parking facilities they do not use.

Parking pricing levels should ideally be set such that demand peaks at approximately 85-90% occupancy. Best-practice implementation involves ‘demand-responsive’ pricing, which increases or reduces fees based on occupancy. This can involve different fees at different times of day, or different days of the week, and include a mechanism to modify prices on a periodical basis to maximise the utility of the parking.

Based on this methodology, it is understood that the ‘correct’ price for parking in a location may be zero, if supply exceeds peak-period demand.

Parking through the majority of the LGA is still operating well under a duration-restriction system. However, the scarcity of parking supply in the Town Centre, and the fact that privately-owned parking is already priced (Avion Way and Claremont Quarter), suggests that a fee payment system should be put in place.

Recommendation

Introduce paid parking into the Claremont Town Centre, with a management regime that reflects the intended function of parking zones.

8.5.10 Demand Responsive Pricing

Parking prices are an effective tool to manage the demand for parking. Incorporating demand responsive pricing into the Town's fee structure will enable staff to adjust on-street parking fees to reflect the balance of supply and demand. This will allow fees to be increased or reduced based on occupancy levels.

The application of appropriate paid parking can cause various transportation system changes such as reduced vehicle ownership, mode shifts, destination shifts, parking location changes, trip schedule changes, and shorter stop duration.

Paid parking is recommended for locations with high demand and where a higher turnover is preferred. Demand responsive pricing requires management of parking occupancy rates to determine if the fee is appropriate. An appropriate rate will have approximately 85-90% occupancy and may vary at different times of day or different days of the week.

The recommended approach to setting on-street pricing is to use occupancy targeting with price adjustments (demand responsive). It is generally agreed that the price elasticity of vehicle trips with respect to parking prices typically equates to a 10% increase in parking fees will reduce vehicle trips by 1-3% (Litman 2020).

In order to avoid parking supply flooding residential streets, it is important to complement the implementation of fee parking locations with time restricted parking in surrounding areas.

It is also important to implement good user information that indicates parking locations and prices to allow drives to choose between more convenient but costly parking or cheaper parking a short distance away.

Recommendations

Incorporate paid parking and a demand responsive pricing mechanism into the Town's Policy Manual to modify prices on a periodical basis.

User information (signs, maps and brochures) that indicate parking location and price

8.6 Communication Strategy

The broader environmental, economic and social impacts of parking are rarely understood or appreciated by motorists. The clamour for 'more parking' has been allowed to develop without any communication of its negative effects and growing unsustainability. An improved and ongoing campaign of communication on the unsustainability of current parking practices and on the benefits of parking management is required.

Everyone who drives a car is a stakeholder. An education program needs to be aimed at all stakeholders including planners, developers, designers, retailers, tenants, elected officials and council officers, business and community groups, schools, residents, visitors, commuters, and the general public.

It is recommended that education on the need for and benefits of managing parking demand should be available and regularly communicated in the Town's publications. As a minimum, it should deal with the following issues:

- Drivers cannot expect unlimited parking close to their destination
- Unlimited supply has environmental, social and economic drawbacks
- The principle of user pay as free parking has a high direct and indirect cost
- Need for sustainability planning
- The provision of long-term employee parking away from the inner core of high activity centres
- Benefits of improved compliance
- Options for reinvestment of income from parking services and cash-in-lieu into improving transport infrastructure

Recommendations

Clear information on parking management changes directed at the community and planners/developers/designers

Update current website information on parking to include detailed information about all public parking facilities, fees, hours of operation and time restrictions

Develop a wayfinding and parking signage package to assist drivers in locating parking (public and private)

8.7 Enforcement and Compliance Techniques

To maintain an appropriate parking system requires a high level of compliance, and in turn, a degree of enforcement sufficient to ensure it. This level of enforcement is key, because the prevalence of illegitimate parking is related primarily to the frequency of infringement, not the size of the fine.

There are many different ways to monitor parking compliance, corresponding to the technology available and the form of parking management.

Where restrictions are imposed by signage only, parking officers monitoring parking using the Walk and Chalk method are required to visit every parking space twice, and this is made more complicated in areas with multiple time restrictions. This method is time-intensive and somewhat ineffective, putting additional pressure on Ranger resources.

Measures that improve the efficiency of parking enforcement, to allow officers to cover more area and patrol more frequently, are extremely beneficial to monitoring and enforcement.

The revenue from infringements should contribute firstly to the management and maintenance of the parking system, and any excess revenue transferred into a separate parking fund, to be used as expenditure on improvements towards car parking, public transport, pedestrian access, cycle facilities and infrastructure, especially where these will reduce the demand for parking.

9 Behaviour Change

A Behaviour Change system is embodied by policies and programs that aim to create a sustainable transport system. This primarily involves efforts to shift individual's travel mode away from private vehicles and onto alternative transport. These programs operate in different ways to influence individual decision-making with respect to mode choice, destination, frequency of travel etc.

9.1 Information

Effective decisions can only be made when all options are clearly understood. As such, many behaviour change programs focus on providing comprehensive information on the availability of services for each of the transport modes.

The Department of Transport's 'Your Move' program is a best-practice example of this form of information. It provides aggregated information for public transport, walking and cycling routes, as well as offering personalised one-on-one information to businesses schools and even individual households (for specific studies such as Cockburn and Wanneroo).

In addition to route option information, explicit discussion of the benefits (or costs) associated with the various transport modes can be used to affect choice (e.g. vehicle ownership and parking infrastructure costs, pollution and other environmental impacts, and the health benefits of active transport modes).

9.2 Infrastructure

Mode shift to alternative transport modes is only possible where alternative infrastructure is available. As such, the provision of bus and train service, paths and cycle ways is a prerequisite of any Travel Demand Management regime.

Public transport is at its most effective when it functions as a 'turn up and go' service. The threshold for effective public transport changes by location, but is generally associated with headways of 10 minutes or less. Where bus routes share a corridor, this can create the environment for attractive public transport use even where individual routes are relatively infrequent.

Pedestrian and cycling paths define areas of effective active transport, with the specific infrastructure treatment or streetscape environment relevant to the type of experience and target activity. However, it is the transitions and crossing points that really define the path network. An inhospitable environment with difficult or unsafe crossing points will result in very low levels of active transport.

9.3 Supply Constraints

Just as the provision of sustainable transport is a necessary component of mode shift, supply constraint of private vehicle-supporting infrastructure is fundamental to the equation. In particular, congestion and parking availability are two of the main causes of mode shift.

Alternative modes are *almost never* competitive with private vehicle transport in free-flow conditions, but become more attractive as the effects of congestion increase, or where parking is hard to find or located further from destinations. Congestion is therefore a *necessary* component of the transport system, in that it makes more sustainable, healthier and less impactful transport modes viable for a range of journey types.

Parking restrictions are one of the few aspects of the transport network that can be specified by Local Government at the planning and policy stages. Through its various functions, Local Government has purview over the supply of private parking (through its TPS) and public parking (supply and management). An abundant supply of parking located immediately adjacent to destinations makes driving the de facto mode choice for the vast majority of trips. Once parking is restricted, people are more likely to consider other modes or destinations.

9.4 Economic Impacts:

One of the simplest and most effective ways to affect mode choice is through direct cost. Traditionally this has been through the introduction of paid parking into high-demand zones. The cost of parking is a primary determinant of where people are willing to park, and for how long. Careful application of paid parking management can be used to improve the efficiency of parking in a given area, but should be combined with parking supply restrictions (where abundant parking is provided, the only reasonable price per bay is $0).

9.5 Recommendations for Behaviour Change Programs

Not all trips are viable for all modes, and so travel demand management methods may be used to specifically support certain kinds of behaviour change (a shift away from driving to work, an increase in local walking trips to a Neighbourhood Centre). Effective behaviour change therefore requires an understanding of how incentives affect mode choice, for the various different destinations and journey types.

The following are some examples of non-infrastructure measures that could be employed to support behaviour change, with application to specific types of trip.

9.5.1 Activity Centre Parking Supply Management

SPP4.2 and the corresponding Draft Activity Centres Parking Policy recommends the use of parking caps to determine the level of activity that can be sustained within a given Centre. The concept of parking caps can be applied with reference to the economic development potential of a Centre, provided decision-makers have a detailed understanding of how Town Centre parking and lands uses interact.

Combining economic needs assessment with a detailed parking model can be used to identify a sustainable parking supply play and demand management framework for Activity Centre development, the ongoing need for public parking, reasonable mode share targets and infrastructure delivery requirements, as well as assisting in determining a realistic internal employment catchment.

Recommendation

Utilise parking pricing and cash-in-lieu mechanisms to limit parking supply in the Claremont Town Centre. This may ultimately transition into a de facto parking cap as development proceeds.

9.5.2 Congestion Pricing

Under some predictions for the future, autonomous vehicles and/or Mobility as a Service (MaaS) may obsolete the current demand management mechanisms associated with parking pricing and supply restriction, as vehicles can drive to a remote location once passengers are delivered. In addition, some of the congestion-based disincentives for private vehicle travel are likely to be diluted if drivers become passengers, with access to additional leisure activities while travelling. These effects could have wide-ranging impacts on residential location, increasing commuting times and intensifying peak travel.

To offset these negative effects, road pricing becomes an increasing necessity, including possibly both cordon charges and distance-based taxation, potentially varying across the day. Any such initiative would be introduced at State Government level, but will absolutely require representation from Local Governments to identify the potential impacts at the local and precinct levels.

Any road-pricing program is only likely to happen in the long-term, but can be expected within the 30-year horizon.

Recommendation

Collaborate with State Government to define the potential of, and issues with, congestion pricing models.

9.5.3 Transport Application

Despite the efforts of the Department of Transport's 'Your Move' program, the wider Perth population still does not adequately understand the real financial and time costs of their transport choices. An app which combines traditional behaviour change information on provision, route and duration with the financial costs of these choices across a year would be of great benefit to improve the awareness of households.

The app could allow households to input their primary and occasional travel demands, number of vehicles etc. and then investigate the impact of mode shift on time and cost of individual trips, as well as reducing the number of vehicles. It is important to base this on real costs with a transparent breakdown of the elements. The app could be expanded to suggest respondents reduce their travel distance (by moving house or workplace), change their mode, reduce the number of vehicles in the household etc.

Recommendation

A partnership across several Local Governments, Department of Transport and (possibly the RAC) to develop an application where residents and employees can assess the cost of transport alternatives.

9.5.4 E-bike opportunities

One of the primary (non-infrastructure) barriers to cycling is the initial requirements for fitness. E-bikes provide a cost-effective solution to overcome this hurdle, and while they still rely on an effective cycling network, dramatically lower the barrier to entry for new cyclists.

The rapid take-up of e-bikes for commuting and recreation among all age brackets has the potential to create a substantial shift in mode choice. This is particularly important for tourists who are unfamiliar with the network, and who have opportunities to visit the Town without using a car. The tourist demographic is expected to increase substantially as a result of the future airport link to Claremont Station, providing opportunities for hotel developments with direct connection to the Airport.

Promotion of e-bikes alongside cycling infrastructure to create high-quality, attractive routes to the beach and the Perth CBD, would help support economic growth without the corresponding congestion costs.

Support for e-bike purchase by Town employees, and publication of information to local residents and businesses, could spur similar initiatives across the LGA.

Recommendation

Consider introducing e-bikes as a trial for Local Government Employees, along with purchase or salary package options to promote their ongoing use.

9.5.5 Green Travel Plans

Green travel plans have been included as a mandatory requirement for development applications in the UK for quite some time. Currently, green travel plans are largely used to obtain concessions on parking and trip generation assumptions from State or Local Governments, or to fulfil the requirements of Green Star applications.

Unfortunately, there is often a disconnect between the goals of the green travel plan and the Traffic Impact Assessment, at least outside of Activity Centre Structure Plans. That is, the improvements in accessibility and mode shift targets do not tend to translate into reduced road infrastructure or parking requirements. This may be due to the Development Application and approval process in which conditions are generally built such that they can be signed off at construction. Conditions therefore reference creation of a “plan”, but the actions contained in this plan are rarely reviewed or monitored. This diminishes Government trust in implementation and shifts the conversation to the provision of infrastructure by developers, rather than modifying activity.

To improve the uptake and integration of green travel plans into the provision of infrastructure, and to show the value of travel plans in reducing financial costs for businesses, it would be valuable to create a package of guidance material, aimed across all sectors, to improve the uptake of travel plans at development and occupation stages, and to mandate the inclusion of Green Travel Plans with Development Applications.

The documents would use TravelSmart information to outline the benefits to employees and visitors, but would go further into the financial benefits to businesses and developers, reinforced by reasonable concessions which could be granted by the Town based on various travel demand management measures.

Ideally, any Green Travel Plan policy would reference mode share targets determined on a Precinct basis by the Town. This would mean that all development applications would be working under to a common transport goal.

Recommendation

Define a policy for Green Travel Plans related to the transport goals of the Town and mandate inclusion of Green Travel Planning with Development Applications.

10 Emerging Technologies

10.1 Electric Vehicles

Electric vehicle (EV) technology substitutes electrical charging for petroleum-based fuels. This technology is generally mature and is already commercially available. EVs are currently cost-prohibitive but widespread cost reductions and increased uptake is expected to be precipitated by European Union legislation designed to support EVs and reduce emissions, to take effect in 2030.

Electric vehicle demand is expected to rise substantially, particularly in response to these international emissions policies. Facilities for electric vehicle charging will need to become ubiquitous to support that growth, including within private development. Recent cost reductions in charging infrastructure improve the viability for provision, but intense demand may overwhelm the local grid.

Figure 10-1 Electric Vehicle Parking Bay

EV charging stations come in two primary forms, slow-charge and fast-charge:

> Slow-charge options require only access to the electrical grid, with charging units dispensing power slowly over many hours. This form of charging is predominantly used in employee and residential applications, but is expected to provide the majority of EV power.

Recommendations:

Introduce development requirements to ensure all high-density residential development has access to EV charging bays for new applications. This need only include providing conduit to allow residents to reticulate power to individual bays, and to ensure transformers are appropriately sized to accept a reasonable off-peak load.

Introduce development requirements to ensure slow-charge EV charging points are provided for a percentage of long-stay employee parking (~10%, increasing as demand rises)

> Fast-charge options allow for full recharge of EVs within a 30-60 minute period and are appropriate in public and visitor parking bays. These charging stations are substantially more expensive and require access to high-voltage power infrastructure. As such, they would be employed on a fee-payment basis, with access to these bays restricted exclusively to EVs. As EVs achieve a greater degree of market penetration, demand will grow for additional EV charging bays.

Recommendation

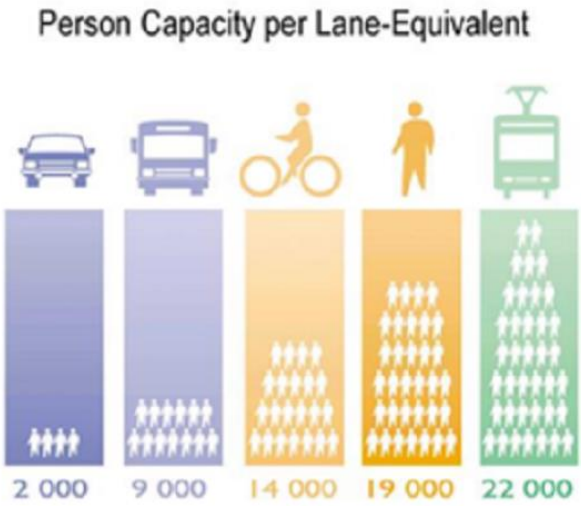
Consider public locations for EV charging stations, with likely requirement for additional baseload power

10.2 Electric Bikes and Cargo Bikes

E-bikes can reduce barriers to cycling and thereby facilitate increased uptake of sustainable transport. They can achieve this by allowing for reduced transport times and increased ease of journey when compared to traditional bicycles. Essentially, e-bikes allow for extended distance range and for quicker journey times for trips made by thee bikes.

Cycling is an efficient mode of transport in terms of space required vs capacity, particularly when compared to private vehicles. **Figure 10-2** below indicates the movement capacity of a traffic lane in terms of people per hour by a variety of modes, demonstrating the movement efficiency gains which may be facilitated by greater uptake of bicycles and e-bikes.

Figure 10-2 Person Capacity per Lane



(Source: UITP)

Enabling the uptake of e-bikes may therefore help reduce emissions and congestion pressures. One way to foster the uptake of e-bikes is through the introduction of charging facilities at key nodes throughout the Town. Key areas include activity centres and mixed use areas, and employment centres.

While the Town does not necessarily have a specific role in the development of private bike-share services using e-bikes, there may be a role for the Town in supporting and advocating for community interests including supporting private e-bike share schemes.

E-bikes and in particular e-cargo bikes may assist in reducing traffic generated by delivery and loading/unloading from constrained activity centres. Parking for loading activities may be reallocated to the periphery of such centres, with cargo bikes used as alternatives. E-cargo bikes in particular may assist small, local deliveries as well as allowing greater convenience for private trips, such as replacing private vehicle trips to the supermarket.

Figure 10-3 Electric Cargo Bike

10.3 Connected and Automated Vehicles

Connected and automated vehicle technology has the capacity to have a range of impacts across a variety of transport modes and land uses.

Autonomous vehicles are not a singular device, and may be entirely driverless or highly automated, or have capacity for both. SAE International provides a definition for six (6) levels of automation, ranging from full human control (non-autonomous) to fully self-driving.

Connected vehicles allow vehicles to communicate with each other and with external factors and may be either fully or autonomous or retain varied degrees of driver control.

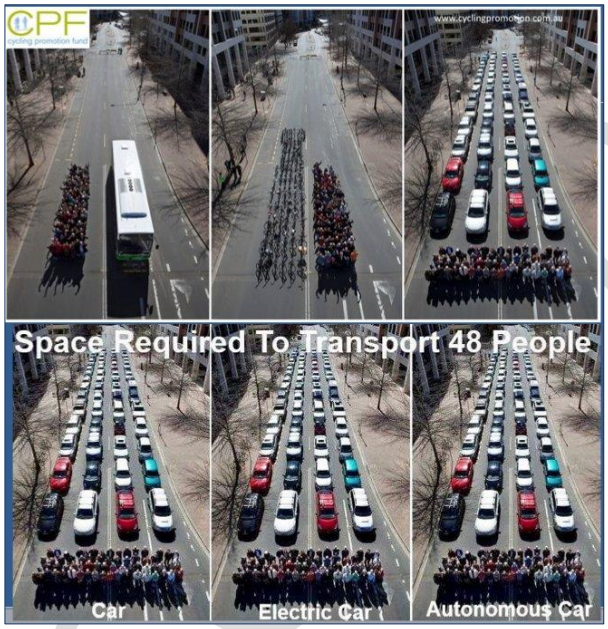
The degree of automation, ownership environment, and manner of rollout will each have impact on the transport environment, and the ambiguity around the likely future scenario presents a complex challenge for all levels of Government.

10.3.1 Congestion

The extent of congestion precipitated by AVs is largely dependent on the ownership models that develop: autonomous vehicles may maintain, reduce, or exacerbate congestion pressures within the Town's road network.

In an ownership paradigm where autonomous vehicles are privately owned and used in the same way as existing private cars, there would be no functional impact on traffic volumes from the introduction of autonomous vehicles.

Figure 3-1 Ownership Environments and Congestion



It has been argued that AV/CV technology will allow vehicles to travel closer together, effectively increasing the carrying capacity of a road and reducing congestion.

However, greater accessibility of technology coupled with reduced costs and anticipated increases in population are all likely to contribute to worsening congestion. This is expected to manifest in several ways:

> People who currently do not drive for a variety of reasons would be able to use AV technology for individual use rather than alternative modes. This has a positive effect of increasing accessibility for young and old people, as well as people with disabilities. However, it would also inevitably cannibalise public transport to some extent.

> Uncontrolled, private AV is likely to be easy and convenient in ways that other transport modes (particularly public transport) are not. However, in terms of efficient road use and carrying capacity, private AV does not provide an effective alternative to high capacity public transit systems.

Figure 10-4 Connected Vehicles

> It has been suggested that a portion of the 'time cost' for travel will be avoided by AV, since the journey can be spent productively and functionally. This may mean people are less hesitant to change behaviour and transport mode based on the effects of congestion, and may increase the distance and time drivers are willing to travel.

> Unoccupied cars returning to their home point rather than parking at their destination will cause vehicles to be on road at times where they currently are stationary. Since the owner does not directly experience any consequences from this there is no incentive for them to change their behaviour.

To influence the form of ownership and usage of AVs, environment road pricing is likely to be necessary. This will need to be implemented at a State Government level.

10.3.2 Automated Transit

For public transport, autonomous transit modes have the potential to reduce operational costs for transit providers, as well as reducing costs for patrons, in additional to providing increased reliability and efficiency.

Small shuttle-like automated services are likely to be implemented in the nearer term, with trials occurring throughout the State including by RAC in South Perth. Shuttles may offer an effective first and last mile service, providing access between residential areas and high frequency, high capacity transit services without necessarily contributing to further congestion. Comments received in community consultation indicated a desire for on-demand services of this type.

Automated transit options may allow for more frequent services with a lower cost for provision. High-frequency, low-cost transit services are more convenient and are therefore more likely to encourage uptake in use of transit service.

10.3.3 Car Parking Demand

Car parking currently serves as an effective lever in managing congestion and mode share. The need for car parking is expected to diminish, with Autonomous Vehicles being returned to origin or continually circulating.

There is a high potential for autonomous vehicles (AVs), shared transport and Mobility-as-a-Service (MaaS) technologies to substantially disrupt the way parking is used. The timeframes for this likely future are not yet resolved, but they may be well within the lifetime of the developments and parking structures we build today.

The expected result of the uptake of AVs and MaaS is a significant decline in demand for parking, particularly within the Town Centre. Where this parking is provided in private facilities, that represents an ongoing cost to residents and business in the form of higher leasing rates and ownership costs.

This may include requiring a proportion of parking to be 'convertible' to other, more productive, uses. This requires careful consideration at the design stage to increase floor-ceiling heights, provide conduits for future services, check column locations, consider future opportunities for natural light, etc. However, this conversion is not effective in basement parking, and is best employed for podium parking. That means that parking policies will need to be related to design guidelines to establish an appropriate built form that can undergo conversion if required.

Alternatively, parking can be located off-site, either in public facilities funded through developer contributions or cash-in-lieu, or in private facilities with ownership unbundled from the associated development. This form of parking has the advantage that it can accommodate ongoing future growth as demand declines, or be demolished to make way for new development.

Other impacts likely to be experienced within the streetscape include increased demand for pick-up/drop-off and loading facilities. Coupled with a decline in on-street parking demand this may result in more space

becoming available for public amenities (parks, paths, trees and lighting). Alternatively, this may free up space for cycling and public transport infrastructure.

The important part of considering these impacts is that policies need to be put in place now, so that development is robust to the future impacts of technological change.

Ultimately, any rollout of AV/CV that involves reduction in traditional private vehicle ownership and situations in which vehicles do not need to park would be expected to reduce demand for car parking of all kinds, including commuter parking, residential parking, and short term parking, spanning both on-street and off-street arrangements.

Reduced demand for parking indicates a necessity for parking arrangements to be easily adaptive to new contexts.

Recommendation:

Consider changes to parking policies that allow for off-site communal parking (decoupled and unbundled from development). Alternatively, include development requirements for car parking which support adaptive reuse of parking levels for future development.

10.4 Car and Bike Sharing

In recent years there has been a notable shift away from traditional ownership models, towards sharing and on-demand services. These two changes both have similar impacts in a variety of ways.

Car sharing includes traditional daily rental, by-the-hour services (such as GoGet) and one-way car sharing (carpool). Changing consumer preferences provide for an increased focus on access rather than ownership. Before AV is fully integrated across the transportation system at all levels, car-sharing supports behaviour change. While there is currently no operator in Western Australia, should they be introduced the Town can support car-sharing through the designation of specific bays of on-street parking and/or in public parking lots for this purpose.

Typically, by-the-hour car-share services require the vehicle to be returned to its point of origin. Current investigations towards one-way car sharing suggests a station-based approach.

Emerging technology provides the opportunity for bike and scooter sharing platforms to thrive. These platforms allow for one-way travel. Dockless systems (virtual docks) provide convenience for users. However, freedom and use is restricted by the legislative environment which requires riders to wear helmets.

Figure 10-5 Obike in Melbourne

The City of Vincent currently provides bike share in a library-style system.

Recommendation:

Assist and support the installation of bike docks within Activity Centres. These may be located in existing car parking bays or in communal areas

11 Performance Measurements

In order to measure the success and progress of the Strategy, it is important to maintain a set of key indicators. These allow measurement against agreed outcomes and a consistent approach to report back on progress to decision makers, stakeholders and the community. The indicators only measure what the Town can control or the effects of changes made to the network.

Key measurements for the Town in understanding its performance include:

- Progress of the Town against the objectives and sub-objectives included in the Strategy, as well as actions within the supporting Plans
- Cycling participation by residents (community survey)
- Walking, cycling and public transport journey to work mode shares (ABS Census data)
- Journey times and delays for select corridors (travel time surveys)
- Traffic peak spreading/distribution for select corridors (link count surveys)
- Access to public transport opportunities (public transport accessibility mapping).
- Upgrades to bus shelters (percentage of shelters that meet a given standard)
- Trees planted (number of trees or canopy cover %)
- Public EV charging (number of stations)
- Number of events held (e.g. Play Streets etc.)
- Parking effectiveness (vehicle turn-over rates, occupancy rates and infringement rates)
- Business satisfaction with parking (business survey)
- Perceptions of public transport (community survey)
- Easy access for pedestrians in activity centres,
- Access for pedestrians in residential areas and around schools
- Access and inclusion for people all ages and abilities
- Intersection upgrade projects that prioritise active transportation (value of capital works)
- Path construction metrics (total length of shared and dedicated walking/cycling paths)

The existing value for these metrics will need be gathered to establish a baseline for comparison. The capture and evaluation of key performance indicators will be its own ongoing project over the lifetime of the TTPS.

12 Funding

Implementing a diverse range of transport infrastructure generally requires significant funding commitments. Ultimately funding is limited, and there are a number of alternative funding sources that may be identified and embraced in the implementation of any action.

The Town of Claremont has a key role in supporting the development of a sustainable, safe, efficient and effective transport network through investment in high-quality infrastructure and targeted improvements in key Centres, along Stirling Highway and in neighbourhoods.

The cost of a full implementation of this Strategy is considered to be beyond the existing funding available from the Town alone. However, the primary function of Local Government is not merely to provide funding, but to determine and direct development of transport infrastructure that best supports community needs.

Infrastructure funding may in fact be derived from a range of sources. For example:

- Projects aligning with State or Federal Government priorities attract their own **budget allocation**, in particular in the context of road capacity or safety upgrades, the provision of public transport or the construction of strategic cycling facilities.
- Alternatively, **grant funding** can assist the Town to fast-track construction of transport improvements. Potential grant sources include:
    - Department of Transport WA *Bicycle Network Grants*
    - PTA *Bus Shelter Subsidy Program*
    - Road Safety Commission *Project Grants*
    - Australian Federal Government *Stronger Communities Program* or *Built Environment and Prevention Research Scheme*
- Local improvements to streetscapes or the construction of public facilities, including public parking, are ideally suited to funding via **developer contributions or cash-in-lieu provisions**.
- **Paid parking and parking permit revenue** naturally pays for the installation and maintenance of parking infrastructure, but is ideally allocated to funding local improvements within individual parking precincts. This can include everything from road network and footpath upgrades to landscaping and canopy treatments, providing direct benefit to the areas affected by the scheme.

13 Conclusion and Recommendations

Through stakeholder and community engagement, a number of key drivers of change have been identified, supporting the provision of a people focused transport network which emphasises the role of active and sustainable transport options. Changing how the community travels is considered to be necessary for the Town to move forward.

Using Link and Place as an analytic tool, the Town has been understood in terms of its place needs and people movement capacity. In some areas, the conclusions and recommendations drawn from identifying street types using Link and Place are simple, and relate to promoting of quiet residential streets (local streets) as quiet and safe places for people to be and to play. In other places, the relationship between place and movement is more complex.

Much of the decision-making for transport infrastructure within the Town will be determined by the interplay between transport mobility and activity in these areas of conflict. Together with the established user hierarchy, the function of roads as places is to be considered in actions across the network.

The recommended actions aim to connect residents, businesses and visitors through improved accessibility, as well as meet the Town's *Sustainable Living Action Plan's* aim for Transport:

> *Support and encourage more sustainable transport options for getting in and around Claremont.*

The following recommendations have been made throughout the Strategy:

- **Pedestrian Recommendations**
  - Consider Pedestrian Level of Service in all transport and planning decisions.
  - Extend pedestrian priority within the Claremont Town Centre, including reduced traffic speeds and additional crossing opportunities.
  - Update Local Planning Policies or Council Policies to support walking environments.
  - Develop a Pedestrian Plan to progress infrastructure improvements towards a compressive, high-quality, safe pedestrian path network.
  - Review the pedestrian connections between activity centres and parking locations to ensure they are safe and welcoming.
- **Cycling Recommendations**
  - Review the Town's Bike Plan to implement the Long-Term Cycling Network's identified strategic priorities with consideration of:
    - appropriate network links to destinations
    - wayfinding implementation
    - infrastructure consistent with the current standard
    - focusing on improving network crossings (intersections and safe mid-block)
    - extending existing infrastructure to fill network gaps
    - ensuring connections with transit nodes.
  - Ensure policies support e-bike, standard bike, scooter etc. hire schemes to enhance micro mobility.
  - Consider introducing e-bikes as a trial for Local Government Employees, along with purchase or salary package options to promote their ongoing use.
  - Assist and support the installation of bike docks within Activity Centres. These may be located in existing car parking bays or in communal areas.
  - Determine a target cycling mode share and use this to define bicycle parking supply and end-of-trip rates.
  - Establish a program for progressive installation of bike racks in public spaces.
  - Adopt the proposed rates table as an interim bicycle parking requirement.
  - Retain the Town's current minimum requirement for showers, but increase the lockers to 2 per employee bike parking space.
  - Require Travel Plans for developments to allow for larger developments to develop specific and targeted active and sustainable transport solutions including promoting cycling.
  - Continue the implementation of the Safe Active Street between UWA and Claremont.
  - Engage with DoT's Your Move team to develop behaviour change programs and initiatives.
  - Develop a marketing campaign//education programme to increase community awareness of existing public transit and walking/cycling options to destinations within the Town.
- **Public Transport Recommendations**
  - Investigate PTA's Bus Shelter Subsidy Program for funding to install roadside bus shelters.
  - Advocate for bus priority infrastructure on Stirling Highway in coordination with or preceding SHACS upgrade works.
  - Lead discussions with private schools to combine their existing private funding to create a more effective service for the long-distance trips.
  - Expand the PLC local loop to include connections to Scotch College, MLC and Christ Church.
- **Road Network Recommendations**

- Advocate to MRWA to lower residential streets to 30km/hr, using Self Explaining Streets Guidelines, prioritizing key routes to schools.
- Review speed limits within the Town Centre to reduce limits to safe speeds for a pedestrian environment.
- Further investigate intersection upgrades at identified critical locations:
  - Stirling Highway
  - Gugeri Street / Stirling Road / Barnfield Road
  - Stirling Road / Claremont Crescent
  - Gugeri Street / Shenton Road
  - Graylands Road / Shenton Road
  - Avion Way / Stirling Highway
  - Alfred Road / Ashton Avenue

> **School-related Recommendations**

- Implement specific school drop-off improvements.
- Provide on-street kiss ‘n’ drive facilities. These can be designated as 5min or ‘No Parking’ Zones while School Zones are operating and identified by ‘Kiss and Drive’ line marking.
- Support and incentivise site-specific parking and access studies at public education facilities, designed to minimise the risks and improve the function at peak pick-up/drop off times. Require similar studies to be undertaken as part of any private school expansion.
- Undertake a trial across several schools to determine the efficacy and appropriateness of a ‘School Streets’ parking exclusion zone on safety and mode share. Partner with DoT ‘Your Move’ team to establish metrics and methods for evaluation.
- Assist schools to prepare wayfinding guidance for parents and visitors.
- Lead discussions with private schools to combine their existing private funding to create a more effective service for the long-distance trips. Expand the PLC local loop to include connections to Scotch College, MLC and Christ Church.

> **Other Recommendations**

- Collaborate with State Government to define the potential of, and issues with, congestion pricing models.
- A partnership across several Local Governments, Department of Transport and (possibly the RAC) to develop an application where residents and employees can assess the cost of transport alternatives.
- Define a policy for Green Travel Plans related to the transport goals of the Town and mandate inclusion of Green Travel Planning with Development Applications.
- Introduce development requirements to ensure all high-density residential development has access to EV charging bays for new applications. This need only include providing conduit to allow residents to reticulate power to individual bays, and to ensure transformers are appropriately sized to accept a reasonable off-peak load.
- Introduce development requirements to ensure slow-charge EV charging points are provided for a percentage of long-stay employee parking (~10%, increasing as demand rises).
- Consider public locations for EV charging stations, with likely requirement for additional baseload power.

> **Parking Recommendations**

- Price residential parking permits at a rate consistent with the opportunity cost of parking infrastructure, with a transition period to support behaviour change by residents. Concessions for Heritage Areas should be considered. Provide a set amount of visitor permits per household annually.
- Liaise with local business owners to promote the shared use of car parks, using up to date parking survey data to help identify suitable locations. Support increased uptake of this arrangement with new developments.
- Consider changes to parking policies that allow for off-site communal parking (decoupled and unbundled from development). Alternatively, include development requirements for car parking which support adaptive reuse of parking levels for future development.
- Establish a policy for unbundled and decoupled parking, potentially including guidelines and incentives in support of efficient supply when preparing the Parking Strategy as required by WAPC/DPLH.
- Investigate and consider inclusion of a Parking Needs Assessment and Green Travel Plan in the Parking Strategy required to be prepared by the WAPC / DPLH.
- Develop a Parking Strategy to identify and prioritise potential sites for the construction of parking to serve the Town Centre.
- Utilise parking pricing and cash-in-lieu mechanisms to limit parking supply in the Claremont Town Centre, with a management regime that reflects the intended function of parking zones. This may ultimately transition into a de facto parking cap as development proceeds.
- Review the costing mechanism for cash-in-lieu on a periodic basis, to ensure that it adequately captures the Town's financial burden for the provision of parking.
- Continue to support and incentivize cash-in-lieu as a key mechanism for funding public parking and local transport improvements, including through planning concessions in the Town Centre.
- Consider including parking fees in the Parking Reserve Fund; as opposed to the current free parking and infringement strategy
- To maximise the efficiency of scarce parking resources, parking in Local Centres should be shared as much as possible, and supported by reciprocal agreements.
- Consider public locations for EV charging stations, with likely requirement for additional baseload power.
- Undertake parking occupancy surveys every 2 years to assess parking demand in popular locations.
- Establish an on-street parking policy that includes positional and management recommendations.
- Prepare clear information on parking management changes directed at the community and planners/developers/designers.
- Update current website information on parking to include detailed information about all public parking facilities, fees, hours of operation and time restrictions.
- Develop a wayfinding and parking signage package to assist drivers in locating parking (public and private).

> **Specialised Parking Recommendations**

- Ensure that developers are aware of the availability of matched funding for ACROD bays to be upgraded or retro-fitted.
- Review ACROD parking throughout the Town and prepare a program of works to update bays as needed.
- Provide guidance within Local Policy related to motorbikes and scooters, with an indicative supply rate of 1% of standard car bays. Motorcycle/scooter bays are not considered adequate for 1:1 replacement of car bays for the purpose of parking compliance.
- Amend policies to allow the general public to use loading and commercial spaces after hours and on weekends.

> **Wayfinding and Signage Recommendations**

- Review existing parking wayfinding and signage facilities.

- Implement a consistent Parking Wayfinding and Signage Strategy, which features customer led information including walking distances and times to various nearby destinations.
- Assess when dynamic signage might be appropriate using parking survey data as a way of identifying where high occupancy may be reduced by better information regarding suitable alternative parking locations.
- Direct some parking related funds towards wayfinding infrastructure.

APPENDIX A

ACTION PLAN

An Action Plan has been developed to address the key focus areas from the analysis, research and community engagement outcomes. The plan contains six focus areas of transport priorities being pedestrians, cycling, private vehicles, public transport, parking in educational areas and parking.

The actions include timeframes and priorities required to enable successful completion of each action within the TTPS. This Action Plan is organised according to the aims and strategies identified in the TTPS. There are a number of actions which support multiple strategies and aims, either explicitly or implicitly. The preceding recommendations have been compiled into an Action Plan. Each recommendation has been categorised according to two metrics:

- Priority (Low Priority, Medium Priority and High Priority) – related to the importance of this measure in ensuring a sustainable parking system; and
- Timeframe (Short Term, Medium Term and Long Term) – related to the urgency of implementation. For this purpose, timeframes are defined to be
  - Short < 5 years
  - Medium 5-10 years
  - Long >10 years
- Town's Role
- Cost

It is intended that progress in delivering the Strategy will be regularly reviewed by the Town and updates made accordingly. A complete refresh of the Strategy would only be expected every ten years or so.

The role of Council is defined as:

- Provider – Directly delivering services
- Funder – Funding other organisations to deliver services
- Regulator – Regulating some public activities through legislation (for example By-laws)
- Partner – Forming partnerships and strategic alliances with other parties in the interests of the community
- Facilitator – Assisting others to be involved in activities by bringing groups and interested parties together
- Advocate – Promoting the interests of the community to others (decision makers and influencers)

APPENDIX

B

SWOT ANALYSIS SUMMARY

APPENDIX

C

STAKEHOLDER ENGAGEMENT