Parking policy and rate review: Camperdown, Leichhardt and Taverners Hill

Parramatta Road Corridor Urban Transformation Strategy

80018116

Prepared for

Department of Planning, Industry & Environment and Inner West Council

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Introduction

This Report details a Parking Strategy for Parramatta Road, as part of the PRCUTS project. The study area considered in this Strategy includes the core precincts of Taverners Hill, Leichhardt and Camperdown, as well as land uses immediately adjacent to the Parramatta Road corridor.

1.1 PRCUTS parking principles

PRCUTS proposed the following hierarchy of parking strategies:

1. Minimise parking
2. Minimise underground parking
3. Unbundle parking from dwelling and building ownership
4. Share parking
5. Decouple parking

The Department of Planning, Industry and Environment (DPIE) and Inner-West Council (IWC) have expanded on the Parking Principles which form the basis of this Parking Recommendations Report to include:

- Parking provision should be minimised to encourage the use of sustainable transport, except for where it is required to achieve equity of mobility.
- Parking is provided off-street as much as possible to dedicate more space for walking. Parking provision should be consolidated, and driveways minimised, to reduce the impact on the streetscape.
- Freight and land use servicing must be provided to support the growth of the corridor.
- Co-ordinate the management of all forms of parking in the public and private domains.

1.2 Study objectives

The scope of this study is to:

- Recommend parking policies and rate requirements which align with the overall vision and objectives outlined in the IWC Precincts Transport Study and validate how these support the PRCUTS vision and principles.
- Describe the link between recommendations and their reliance on other transport initiatives including active and public transport modes.
- Compare the advantages and disadvantages of existing and recommended parking controls.
- Outline sustainability and urban benefits of restricted parking.
- Provide specific recommendations for:
  - Physical/ geometric and economic considerations of car parking;
  - Dual occupancies and townhouses;
  - Residential flat buildings and shop top housing; and
  - Out of centre commercial uses.

1.3 PRCUTS parking rate recommendations

PRCUTS defines the location of Camperdown, Leichhardt and Taverners Hill as “Category 1” parking locations. These rates are reproduced from the strategy in **Table 1-1**. These rates are lower than existing DCP rates in each respective location.

The PRCUTS proposed residential and business rates are maximums. The strategy indicates the provision of car share spaces, unbundled parking and decoupled + unbundled parking will result in a reduction in maximum parking provision.

Table 1-1 PRCUTS proposed maximum parking rates

Proposed parking provisions and policies							
Residential (max spaces per dwelling):					**Business land uses max (1 space per G.F.A):**		
Studio	1-bed	2-bed	3-bed	Visitor	Commercial	Retail	Industrial
0	0.3	0.7	1	0	150	100	150
Car share spaces:							
Residential Car Share Rate/ dwellings				Car share rate to reduce car parking provision			
1 per 20 dwellings				1 in lieu of 5 parking spaces.			
Unbundled parking:							
Maximum parking rate reduction of 20%							
Decoupled, unbundled parking:							
Maximum parking rate reduction of 40%							
Minimum bicycle parking rates:							
Resident		*Commercial*		*Retail*		*Industrial*	
Resident	Visitor	Employee	Visitor	Employee	Visitor		
1 per dwelling	1 per 10 dwellings	1 per 150sq.m	1 per 400sq.m	1 per 250sq.m	2 spaces + 1 per 100sq.m	1 per 10 staff.	
End of trip facilities:							
Personal lockers		*Showers and Change cubicles*					
		Up to 10 bicycle spaces		11 – 20 bicycle spaces		Each 20 additional bicycle spaces over 20.	
1 per space		1* (assumed rate)		2* (assumed rate)		2	

This report considers the PRCUTS planning principles and proposed rates and considers this with a strategic understanding of existing travel patterns and the practical application of policies and parking rates.

Summary of recommendations

The recommendations provided within this report are summarised as follows:

Driveway recommendation:

A maximum of one driveway per site or two one-way pairs in special circumstances.

Parking space adaptability recommendations:

- Prepare design guidelines that include development requirements for car parking which supports adaptive reuse of parking areas for future development.
- Consider changes to parking policies that allow for off-site communal parking (unbundled from development).

Car share recommendations:

Assist and support the location of car share spaces adjacent to dense residential development. Encourage on-site car share for residential and business developments, particularly where parking construction costs would impose high costs on tenants and reduce affordability.

Electric vehicle recommendations:

- As the EV fleet grows, market forces will govern the installation of EV charging units. Policy measures including community title for parking facilities, unbundled and decoupled supplies can be used to provide flexibility for developers and residents, and thereby reduce the opportunity cost of installation.
- Electric vehicle charging points should be provided in off-street locations in the same way petrol stations are off-street for a range of safety and amenity reasons.
- Introduce development requirements to ensure all high-density residential development has access to EV charging bays for new applications. This should include provision of conduit to allow residents to reticulate power to individual bays, and to ensure electrical infrastructure is sized to support a charging demand.
- 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).
- Introduce development requirements to ensure future ability to supply EV charging points at a minimum of 50% of total bays.
- Policy support for conversion of public off-street parking spaces to EV fast-charging, through an expedited approval process.

Bicycle recommendation:

Given the current journey-to-work cycling mode share of less than one per cent, and with the assumption that increasing bicycle mode is consistent with Council objectives**, a minimum bicycle parking rate to satisfy 2.5 per cent of employee mode share**, plus additional spaces for visitors/ customers. This creates capacity for additional bicycle mode share.

Bicycle parking demand should be monitored in the locality and Council should host find or request a new bike parking space on their website.

Motorcycle recommendation:

Motorcycle parking should be provided for at a minimum of 1 space per 1,500sq.m of employment land use, with a minimum of one space where on-site parking is provided.

Servicing, delivery and loading recommendation:

Site loading and servicing facilities are provided on site, appropriate to the size and scale of the development.

Residential parking recommendations:

The PRCUTS residential parking rates represent a significant reduction in on-site parking, compared with existing ownership behaviour. It is recommended that these rates be employed only where effective parking management mechanisms are in place for surrounding public parking provision.

The alternative maximum parking rates are considered feasible for implementation without substantial interventions, while still representing a substantial downward pressure on private parking supply.

Land use	Bedrooms	Alternative maximum parking rates (consistent with existing transport environment)	PRCUTS maximum rate recommendations
House/ Townhouse	1	1.0 per townhouse	0.3
	2	1.0 per townhouse	0.7
	3+	1.0 per townhouse	1
Apartment	0	0.15	0
	1	0.5	0.3
	2	1.0	0.7
	3+	1.2	1
	Visitor	0.1 space per dwelling, unless this can be provided on-street.	0

Residential parking permits recommendation:

Expand the residential permit scheme and price permits at a rate consistent with the opportunity cost of parking infrastructure, with a transition period to support behaviour change by residents.

(Key) Non-residential land use parking recommendation:

The PRCUTS recommended parking rates are considered to be appropriate under the future public transport provisions identified in the PRCUTS Plan. A series of alternative parking rates has been identified which would be sustainable even without significant capital works upgrades of public transport.

. Land use	Alternative maximum parking rates (consistent with existing transport environment)	PRCUTS maximum parking rate recommendations
Student housing/ Boarding house	0.15 space per dwelling	No recommendation
Health/ Medical centre	2 spaces per consulting room	No recommendation
Hospital	3 spaces per bed	No recommendation
Commercial/ office	1 space per 100 sq.m. (1.00 spaces/ 100sq.m) of floor area	1 per 150sq.m (0.67 space/ 100sq.m)
Retail/ shop	1 space per 50sq.m (2 spaces/ 100sq.m) of floor area.	1 per 100sq.m.
Restaurant	1 space per 50sq.m (2 spaces/ 100sq.m) of floor area	1 per 100sq.m.
Bulky goods	1 per 100sq. Must include an off-street loading zone for customers.	No recommendation
Industrial	1 per 150sq.m (0.67 space/ 100sq.m)	1 per 150sq.m (0.67 space/ 100sq.m)
Out of centre uses along the Parramatta Road corridor	General rate (Not a maximum): 1 space per 40 square metres (2.5 per 100 square metres)	Differentiated by suburb only.

Existing land use

PRCUTS Camperdown, Leichhardt and Taverners Hill each are unique in terms of land use, demographics and transport opportunities. These differences will need to be examined to identify any need for differences in the parking policies, rates and mechanisms imposed on development to ensure that Council's Objectives can be realised across these locations.

To provide context for the parking requirements across each precinct, the existing land uses and parking facilities have been characterised as follows.

3.1.1 Parramatta Road corridor

Between the designated Precincts, Parramatta Road operates as a frontage for a wide variety of highway retail, specialty and restaurant businesses. Very little parking is associated with these land uses, which rely heavily on nearby on-street parking and some small rear-loaded private car parks.

3.1.2 Camperdown

The Camperdown Precinct is divided by the major road corridor of Parramatta Road, and extends a significant distance east-west from the outskirts of the University of Sydney (UoS).

There is a mixture of office, restaurant, retail and residential uses within the Precinct, somewhat localised within individual sub-precincts. Against this background is the impact of the UoS campus, with its own parking demand that extends across the study area.

3.1.3 Leichhardt

Leichhardt is the retail and civic centre for the Inner-West Council. While it has few office developments beyond the Council itself, it acts as a key destination for a large catchment of residents in the surrounding suburbs.

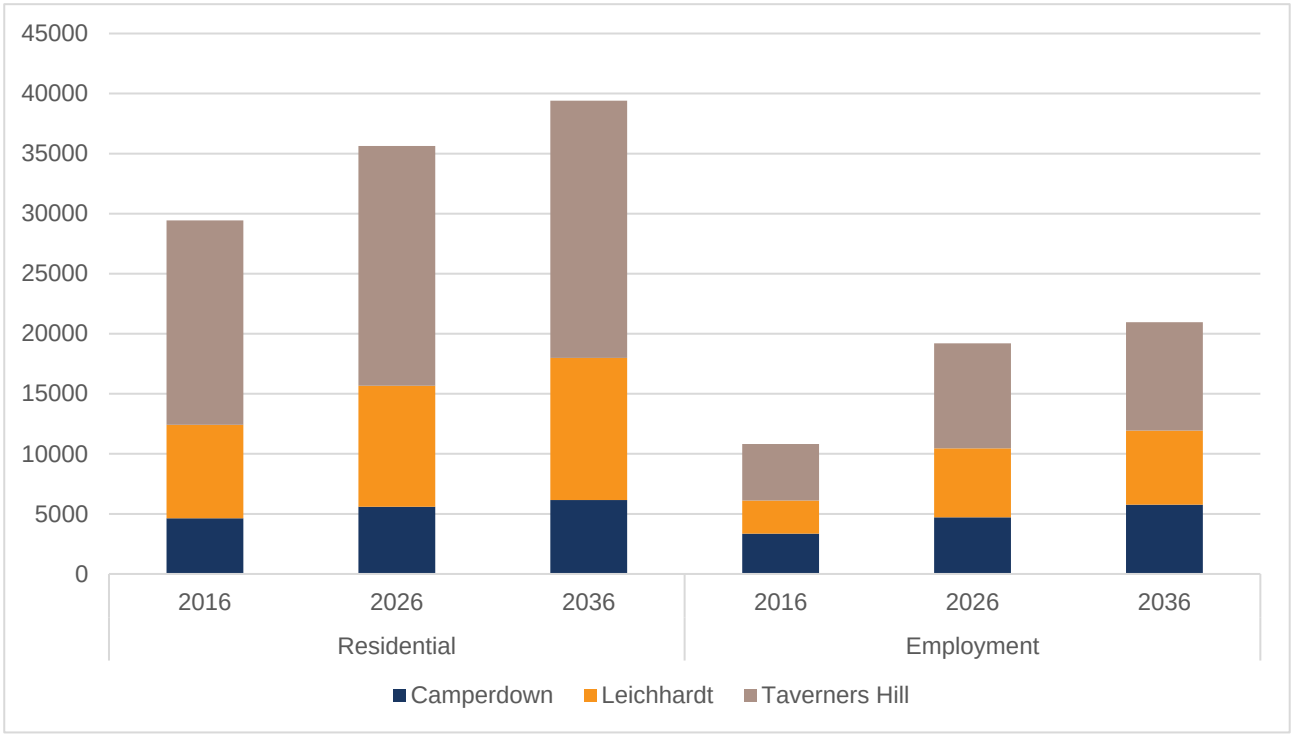
3.1.4 Taverners Hill

The Taverners Hill Precinct currently comprises a commercial precinct with a high density of showrooms and bulky goods stores, surrounded by medium-density housing. It is therefore a key origin and destination for commuter trips, but likely has little self-containment apart from retail trips to Marketplace Leichhardt at the northern edge of the study area.

Population forecast

Within the Inner West PRCUTS areas, there is a forecast of an additional 10,000 residents and 10,000 workers in the period 2016 – 2036. The breakdown is shown in **Figure 4-1**.

Figure 4-1 Residential and employment forecast



Data source: PRCUTS land use review, SGS, 31/05/2021

Built environment considerations

5.1 Urban form

Car parking impacts urban landscapes through the space they take up, which otherwise could be used for productive purposes, local amenity (street trees, public open space, landscaping etc.). The impervious form of parking effects stormwater runoff, increases the volume pollutants entering waterways and exacerbates urban heat island effects.

The impact of parking is greatest where it is constructed in at-grade facilities, which artificially increase the distance between activities; reducing the viability of walking and reinforcing the need for access by private car. This in turn can reduce the demand for public transport, preventing service improvements in the future.

The substantial cost of parking also influences urban form, by making some mid-scale development unviable, the result can be either an under-development of key lots or an incentive to maximise density to recoup the financial cost of parking provision.

5.2 Crossovers (driveways)

Where parking is provided on-site, it requires access via one or more crossovers. The density of these crossovers has an overall impact on the function and safety of the road network, as well as on the amenity of residents and visitors. Key impacts of crossovers are outlined in **Table 5-1**.

Table 5-1 Impacts of crossovers

Category	Driveway considerations	Benefit of reduced driveways
Pedestrian	Driveways operate across pedestrian priority zones and in all cases, pedestrians retain priority over vehicles crossing a path. Conflicts between pedestrians and cars are common, and these are exacerbated by sightline obstructions such as walls and trees. Cars parking in driveways often encroach on pedestrian paths, reducing amenity and impeding accessible travel.	Improve pedestrian safety through reduced path conflict points.
Vegetation	Reduction in nature areas for plantings.	Increased opportunity for vegetation and trees, including urban cooling, improvement to pedestrian amenity and
On-street parking	Sterilises other kerbside uses.	Opportunity to use kerbside for parking and other uses.
Road safety	Each location is a conflict point with a variance in geometry and sightlines.	Improved predictability of road environment and rationalise driveways to safer areas.

Recommendation:

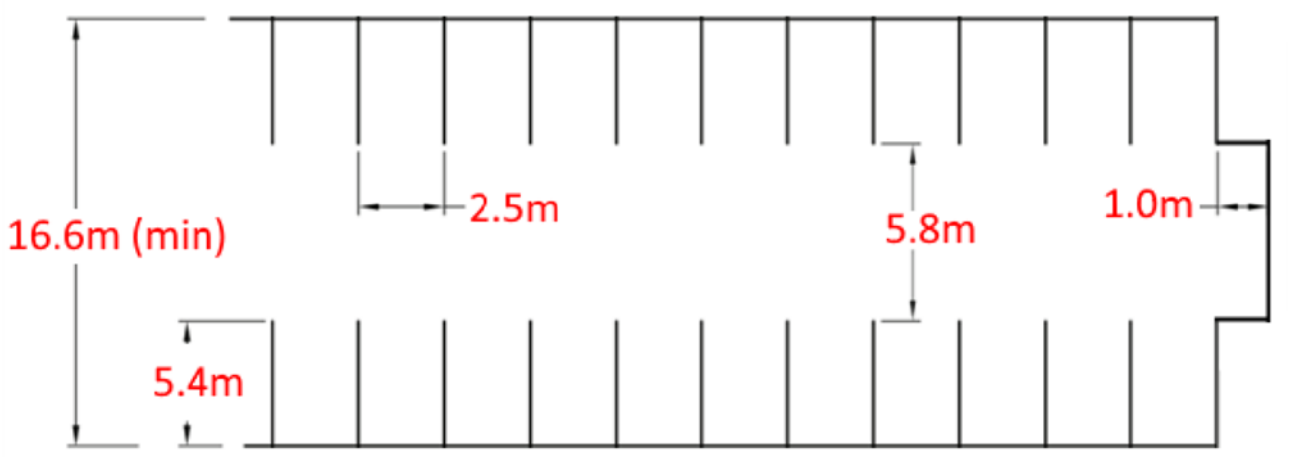
Sites should have a maximum of one crossover where on-site parking is provided, or a maximum of two if each driveway is one-way. I.e. a hotel porte cochere.

5.3 Geometric design – Australian Standards

The ideal car park geometry (minimum dimensions) is wholly determined by the requirements of Australian Standards. Efficient parking design has perpendicular parking on both sides of the access aisle.

The minimum dimensions for an efficient office or residential car park, where every space is allocated to an individual vehicle, shown in **Figure 5-1** (adapted from AS2890.1 Figure 2.4). This is sufficient only where parking is provided in a single parking level, as there is no space for ramping.

Figure 5-1 Typical efficient car parking layout.



This design gives a minimum floorplate dimension of 16.6m, below which parking cannot be supplied in an efficient manner. For example, a single-sided aisle requires approximately 40% more area per bay, with an equivalent cost increase.

This effect is largely governed by the requirement for an access aisle. Arrangements which use the frontage road to provide access to public on-street parking require significantly less space, which makes this an attractive option where only a few parking spaces are required.

The spaces are enough to fit a range of common vehicles outlined in **Table 5-2**, noting larger vehicle may require more than one-movement to enter and exit a space.

Table 5-2 Popular vehicles dimensions - millimetres

Vehicle class	Example make and model 2021	Length	Width	Height
Australian Standard car space for office and residential	User class 2	**5400**	**2500**	**2200 minimum**
Light Car	MG 3	4055	1729	1504
Small Car	Toyota Corolla Hatch	4375	1790	1435
Mid-SUV	Toyota RAV4	4615	1865	1690
Large SUV	Toyota Kluger	4966	1930	1755
Large passenger van	Kia Carnival	5155	1995	1775
Utility	Toyota HiLux Double Cab Pick-up	5350	1935	1700

Source: www.toyota.com.au, www.kia.com.au and www.mgmotor.com.au

Table 5-2 shows a 5.4 metre long x 2.5 metre wide x 2.2 metre high car parking space is large enough to accommodate a range of popular large vehicles noting that an incentive remains for smaller vehicles which will be easier to park due to their smaller dimensions.

5.4 Multi-level structures

5.4.1 Columns

Structure is often built over the top of the parking, the layout of any development located over parking is driven to a large extent by the requirements of AS2890.1. The aisle widths and parking modules dictate column spacing, while the above-ground structure determines the size of those columns.

Good design places the columns outside of the parking modules, increasing the floorplate requirements.

5.4.2 Ramping

Spiral and scissor ramps are the most common configurations, and provide a good benchmark for standard geometric requirements. These are discussed as follows:

Split-level internal spiral (ramped floor)

This has the following key requirements:

> The isle to back onto itself to construct the spiral; and

> Enough length and therefore space to achieve the required level difference.

The ramp grade is set by the maximum slope of the parking spaces, and therefore limited to a grade of 1:16. If floor-to-floor height is set at 3 metres, then a total ramp length of 48 metres (using both aisles) is necessary. Adding in the end aisle creates the following minimal envelopes:

> 29m x 37m for 38 bays;

> 34m x 37m for 48 bays;

> 29m x 49m for 48 bays; and

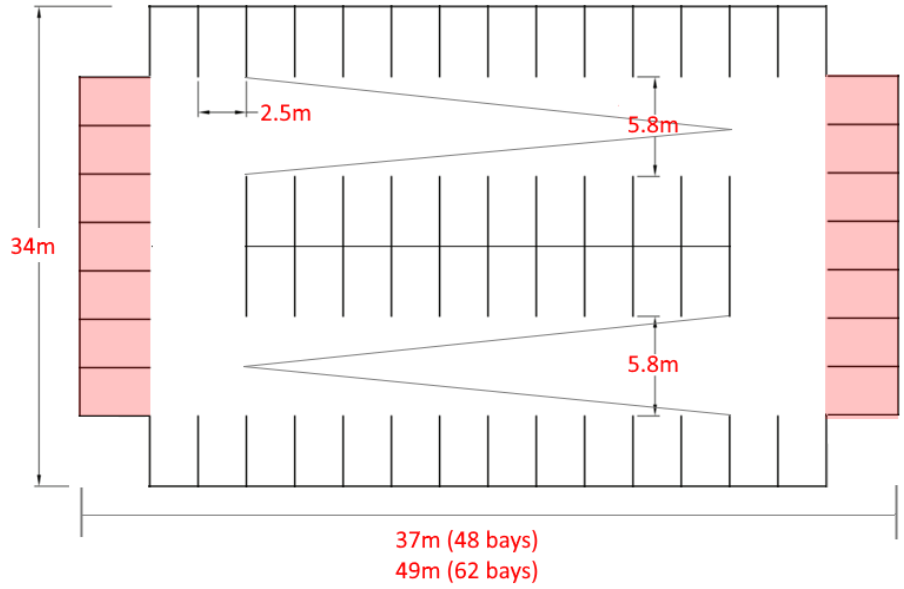
> 34m x 49m for 62 bays.

The access ramping, fire stairs, lifts etc. reduce the efficiency of this arrangement, but on average, an internal spiral geometry can provide parking at a ***theoretical limit of about 30 square metres per bay***.

The lack of a flat floor precludes future adaptation to other land uses. This form of parking is therefore more appropriate for basement parking, where conversion opportunities are limited.

An indicative layout plan is shown in **Figure 5-2**.

Figure 5-2 Indicative spiral ramp multi-level car park layout



5.4.3 Scissor ramp

Scissor ramps can be used either in a split-floor arrangement or a full-floorplate flat deck, with examples show in **Figure 5-3** and **Figure 5-4**. The floor-to-floor heights define the geometry of the floor plates, since the minimum ramp length is set by Australian Standards at 9 metres (1.5 metre half-floor level change) or 16.5 metres (3 metre full-floor level change).

Figure 5-3 Half level floors and ramps

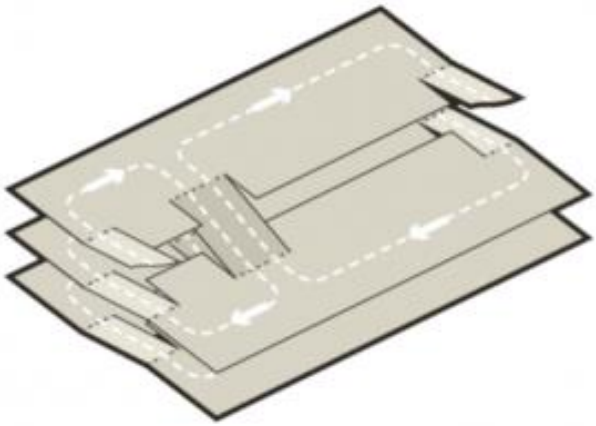
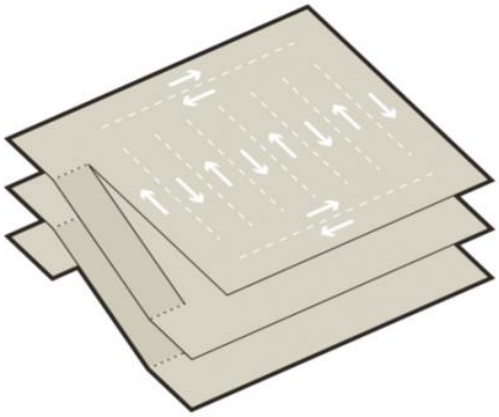


Figure 5-4 Full level floor and ramps



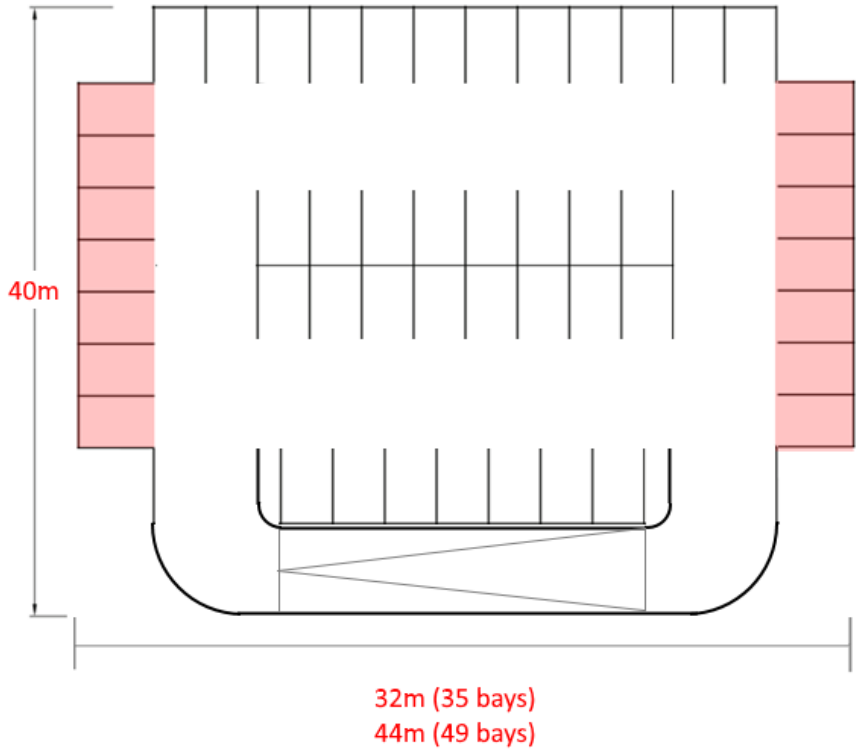
Source: https://www.steelconstruction.info/Car_parks#Circulation_design, viewed 03/03/2021

A theoretical construction of a minimum efficient envelope for a flat floorplate uses a ramp parallel to the circulating aisles and creates the following options:

- 35m x 32m for 23 bays;
- 40m x 32m for 35 bays;
- 35m x 44m for 37 bays; and
- 40m x 44m for 49 bays.

The requirements for up and down circulation ramps further reduce the efficiency of these car parks, but provide opportunities for flat floors and better constructability. An indicative layout is shown in **Figure 5-5**.

Figure 5-5 Indicative scissor ramp car park layout



If geometric and financial effects are considered to be a key determinant of parking provision, then the following can be recommended:

Recommendation:

- A lot that is less than 16.6m wide in its narrowest dimension cannot provide efficient single-level car parking
- A lot that is less than 29m in its narrowest dimension cannot provide efficient multi-deck car parking
- Where on-site parking is provided, it should be as efficient as possible and limited to 1 or 2 levels only.

5.5 On-site parking

The available space for parking is governed by a number of planning restrictions that define its form:

- **At grade parking** consumes land area that would otherwise be available for development.
- **Podium (or undercroft) parking** is limited by setback and landscaping requirements, which reduces the extent of the site that can be used for parking.
- **Sleeved parking** (behind habitable land uses) further reduces the available parking space due to the need for active frontages.
- **Basement parking** may be constructed up to the boundary on all sides, but this limits the opportunity for deep soil planting. In the NSW context the envelope is generally restricted to the building footprint.

These limitations should be considered along with the density of development proposed, to determine whether on-site parking can be supplied in a cost-effective manner.

There is an important relationship between the intensity of development and the form of parking constructed. These parameters may differ according to the design guidelines for an individual location or Precinct. The variability in requirements around development site coverage, setbacks, landscaping and deep soil planting, etc. as well as the different forms that parking can take suggest that a fixed maximum rate for parking is difficult to determine.

The following discussion illustrates some of the geometric issues associated with parking construction, and provides recommendations for parking limits based on these geometric constraints.

5.5.1 Basement parking

Basement parking is often selected due to the minimal impact that it has on land use and urban structure. By placing parking underneath productive land uses, the at-grade 'footprint' is almost eliminated.

Basement parking is ideally accessed from a minor road to mitigate the impacts of queuing on corridor function and to reduce the potential for conflict with pedestrians along the active frontage.

Due to the desire for basement parking to be located below grade, the building design must be compromised to create a portal for the access ramp. AS2890.1 requires that the first six metres of the car park access be a maximum grade of 1:20, increasing the total ramp length to at least 21 metres before the first basement level. This limits the applicability of basement parking to locations where a long approach ramp can be constructed.

An estimate of construction costs for basement parking was undertaken by ptc[1]. in 2017 across Australia. They found a construction cost range of $1,150 - $1,900 per square metre. This equates to $35,000 - $55,000 construction cost for every basement car space built.

5.5.2 Above ground/ podium level parking

Stand-alone parking structures operate as single-use spaces, though there is potential for ground-floor activation, with car parking levels above. This form of parking supply is highly flexible, and has the most utility for public parking, catering for a wide array of businesses within walking distance.

The management of dedicated above-ground parking can also be highly reactive.

Parking duration and fee structure can be used to support specific trip purposes, and modified to maintain very efficient operation. The ability for these car parks to accept a wide variety of users means that they can

[1] https://www.ptcconsultants.co/construction-costs-car-parks-2017/

adapt to the surrounding changes in activity and, if they are no longer viable, be demolished or readapted for more productive uses.

Podium parking places the parking structure behind frontage uses, retaining pedestrian-scale activity at ground-floor level, and elevating the primary development uses (residential, office etc). In these installations, ground floor uses may be as sparse as a lift lobby, or might include retail/ restaurant spaces.

The additional levels of podium parking increase reduces the development potential due to height restrictions.

Podium parking has the most potential for adaptation to productive land uses, and so policy measures that support this conversion can assist in improving the resilience of a Precinct.

Above-ground parking construction costs are generally lower than basement parking, The ptc. review of above-ground multi-deck car park costs showed a range of $800 - $1,200 per square metre. This calculates to about $25,000 - $35,000 per parking space.

5.5.3 Car stackers

Car stackers use mechanical systems to reduce the space required to store cars. An indicative schematic is shown in **Figure 5-6**.

Depending on the technology used, this method can be much more efficient than standard multi-level parking structures. This efficiency is achieved by eliminating parking aisles and reducing floor-to-ceiling heights.

Car stackers tend to operate as follows: a driver enters the portal and stops on a platform, then leaves the vehicle while the car stacker 'parks' the car in a vacant space.

Due to the reduced space requirements, car stackers can be used on sites that cannot provide efficient parking, particularly where the lots are narrow or otherwise geometrically constrained.

There are a number of factors that require consideration before selecting car stackers, including:

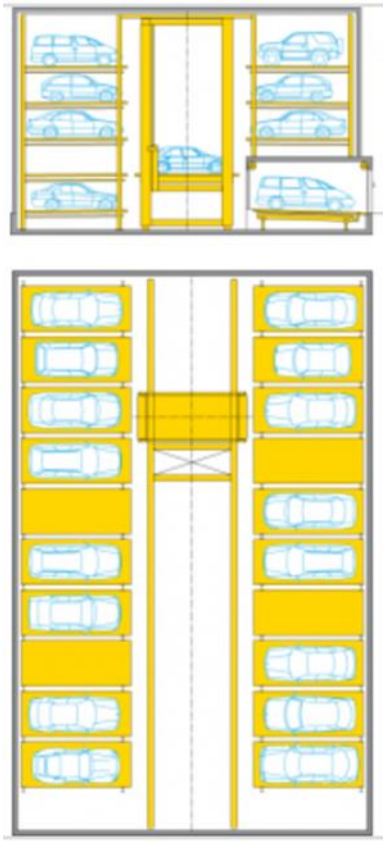
- **Maintenance**: There is an ongoing maintenance requirement for the stacker machinery. Because every installation is proprietary, this adds risk to the development.
- **Breakdown**: In the event that the stacker system fails, vehicles will be effectively 'trapped' either inside or outside of the car park.
- **Vehicle Size**: The majority of car stackers are designed to suit a given vehicle size, they can be configured to allow a certain quantum of tall vehicles (SUVs and 4x4s), but may not accept long vehicles.

The restrictions are not markedly different from standard car parks, which have restrictions on vehicle height and length, but the parameters are generally more restrictive.

- **Queuing**: The cycle time for a stacker system is slow, in the order of 45-90 seconds for a typical car storing/ retrieval, and this increases with the size of the system. This translates into long wait times during peak periods, and queues of vehicles particularly during inbound peaks.

  Car stackers are therefore used primarily for low-intensity functions (residential use).
- **Familiarity**: The operation of these systems may not be intuitive for new users. Unfamiliarity increases cycle times and exacerbates queuing issues.
- **Space adaptability**: Due to the unusual geometry of the stacker envelope, the space is virtually useless for anything else. Car stackers therefore create a legacy issue when the system comes to the end of its useful life, or if parking demand declines.

Figure 5-6 Car stacker schematic



Source: worhr.com.au, viewed 27/02/2021

Despite some issues, car stackers may present the best option for on-site car parking where lot geometry does not support efficient car parking. Car stackers installations should be accompanied by supportive documentation that details any limitations on vehicle use, how spaces will be allocated, the operational framework, queuing projections and mitigation measures.

5.6 Off-site parking

5.6.1 Public parking

The most common alternative to on-site parking is parking in the public realm, either in large-scale off-street car parks or on-street parking.

This allows the supply and demand to be managed (mostly by Council) through a combination of duration restrictions and pricing.

It is important that where parking concessions apply, transparent and equitable governance is applied to manage supply and community critique.

5.6.2 Reciprocal parking

A reciprocal parking Agreement is a formal legal document to permit parking on third-party private land. This ***usage agreement*** may be used to reduce the burden of providing parking by a proposed development. These agreements are maintained on Titles, with administration from Council.

The degree of reciprocal parking occurring depends on the type 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. Reciprocal parking generally results in lower total parking supply required to satisfy demand.

The feasibility and function of a reciprocal parking proposal should be assessed on the same basis as for mixed-use development under a shared parking system. Shared parking supply is discussed in **Section 10.3**.

5.6.3 Unbundled parking

Unbundled parking differs from reciprocal parking in that it represents a change in ***ownership*** instead of ***use.*** It is a process by which tenants can choose whether or not to rent/ purchase parking with their unit. The unbundling of parking can be introduced in several different ways:

- Site managers can unbundle parking when renting building space (i.e. rent or sell parking facilities separately);
- 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 for unbundled parking is also likely to create a market for available parking spaces. The market is limited to spaces within a reasonable walking distance between car parking space and destination (residence or employment).

If an unbundled parking policy is introduced, it is important to consider the cost of alternative parking in the nearby area. Where there is a supply of free or low-cost parking nearby, this creates an incentive for tenants or owners to preference these spaces, resulting in spill-over effects and diluting the market.

The elements required for unbundled parking to be feasible include:

- A consistent and longer term market demand and willingness to pay for car parking that cannot be supplied nearby in another location;
- A comprehensive management scheme of all other nearby publicly accessible parking facilities within a convenient walking distance. This should consider the trade-offs between walking distance and price to rent a parking space;
- Investors willing to adopt the risk and dedicate effort into such a facility and/ or a property willing to supply and manage a supply.

Anecdotal evidence suggests this already happens to some degree in dense Sydney zones, where residents will lease car parking spaces through online classifieds or third party managers.

5.6.4 Decoupled Parking

In addition to unbundling parking from land uses parking can also be located off-site, either in public facilities funded through developer contributions or cash-in-lieu, or in private facilities with ownership decoupled 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. One of the key advantages of decoupled parking is that it reduces the risk of under-supply, since excess parking can be leased or sold to a wider catchment as required. This also establishes a local market rate for parking that reflects the relative scarcity of supply.

One particular location where this would be beneficial is Camperdown, which has a unique mix of student accommodation, as well as dense residential, education and commercial uses. Decoupled parking mechanisms can be used in this environment to support residential developments with zero on-site bays, as well as fluctuating demand.

Supportive zoning regulations and policy frameworks are necessary to provide comfort to developers that consolidated private parking schemes will not form an impediment to Precinct planning. Permitting decoupled parking within dense residential and commercial zones reduces the need for Council provision of parking infrastructure.

Recommendation:

- Consider development of a parking policy that supports off-site communal parking (decoupled and unbundled from development) under the Community Titles Act.
- Investigate the opportunities and appropriate planning mechanisms for implementation within Camperdown.

Technology

Technology change is already impacting a wide variety of different modes, including private vehicles, public transport, and cycling. Future changes in transport technology are likely to have an ever-increasing impact on travel behaviour. Specific emerging technologies in transport include autonomous and connected vehicles, electrified transport, car and bike sharing, ride sourcing, and mobility-as-a-service.

These technologies will have a range of different effects on transport networks and development planning, and ability to achieve desired mode share targets, as well as Council's ability to achieve other related environmental, social and economic goals. Depending on the manner in which the technology enters the market, uptake of new technologies in the transportation space may impact congestion in either positive or negative ways.

Upcoming and recent transport technology is anticipated to lower private vehicle trips and parking demand in cities. Some key considerations are outlined as follows:

- **Mobility as a Service (MaaS)** provides the means to integrate all potential transport options to travel. i.e. this may compare the time and cost between a bike share, ride share, public transport, car share or a combination.
- **Bike sharing** allows people to located and use a bike for shorter trips. This service can help to reduce vehicle trips.
- **Ride hailing services** like taxis, do not use traditional destination parking, and so this change in travel behaviour may reduce the need for a range of private parking supplies. However, there is a corresponding cost in the requirement for public and private waiting bays, as well as high turn-over pick-up/drop-off parking.
- **Car sharing** allows multiple people to share vehicles and can reduce the overall demand of car parking, particularly in managed parking environments. This is discussed more in **Section 6.2**.
- **Connected and autonomous technology** (still being developed). This has the potential to reduce parking demand and allow efficient use and sharing of the vehicle fleet. The full effects are yet to be

determined and is dependent on pricing and policy measures that will impact travel choice. There is a risk that people may choose to use an autonomous vehicle instead of mass public transport resulting in road network congestion.

6.1 Parking space adaptability

Due to the expected downward demands for car parking through technology and declining car ownership rates, it is recommended to plan and construct car parking space that can be adapted in the future for other uses.

Recommendations:

- Prepare design guidelines that include development requirements for car parking which supports adaptive reuse of parking areas for future development.
- Consider changes to parking policies that allow for off-site communal parking (decoupled and unbundled from development).

6.2 Car share

Car sharing includes traditional daily rental, by-the-hour services (such as GoGet) and one-way car sharing (carpool). Changing consumer preferences provides for an increased focus on travel objectives rather than vehicle ownership.

In Australia, research has indicated that between 11 and 65 per cent of car share members reduce their car ownership. While this is a wide variance and has been determined from a range of circumstances, a typical industry benchmark is that for every 20 members, 10 cars can be replaced with a single share-car. This represents a reduction in parking supply of approximately 40 to 45 per cent.

Evidence from commercial car-share systems in Australia and overseas suggest that where car-share services are embedded within a development (i.e. for the benefit of residents, employees or institutions), this can result in a significant reduction in parking requirements.

Recommendation:

(Infrastructure) Assist and support the location of car share spaces adjacent to dense residential development. Encourage on-site car share for residential and business developments, particularly where parking construction costs would impose high costs on tenants and reduce affordability.

6.3 Electric vehicles

Electric vehicles provide the opportunity to reduce the environment impacts of vehicle trips. They still present all other private vehicle car trip issues (traffic generation, occupy space) have on the transport network. In coming years, parking demand is expected to be dominated by electric vehicles, and this should be supported in appreciation that some trips are most appropriately served in private vehicles than other modes. The following is recommended to support electric vehicle adoption:

Electric vehicle recommendations:

- As the EV fleet grows, market forces will govern the installation of EV charging units. Policy measures including community title for parking facilities, unbundled and decoupled supplies can be used to provide flexibility for developers and residents, and thereby reduce the opportunity cost of installation.
- Electric vehicle charging points should be provided in off-street locations in the same way petrol stations are off-street for a range of safety and amenity reasons.
- Introduce development requirements to ensure all high-density residential development has access to EV charging bays for new applications. This should include provision of conduit to allow residents to reticulate power to individual bays, and to ensure electrical infrastructure is sized to support a charging demand.
- 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).

- Introduce development requirements to ensure future ability to supply EV charging points for every parking bay. This ensures maximum flexibility to accommodate the future EV fleet.
- Policy support for conversion of public off-street parking spaces to EV fast-charging, through an expedited approval process.

Traffic impacts

While parking itself does not generate vehicle traffic, a constrained parking environment (where supply is less than demand) will result in a change in travel behaviour. This is caused by the increased costs (both financial and time) imposed on the parking component of the trip.

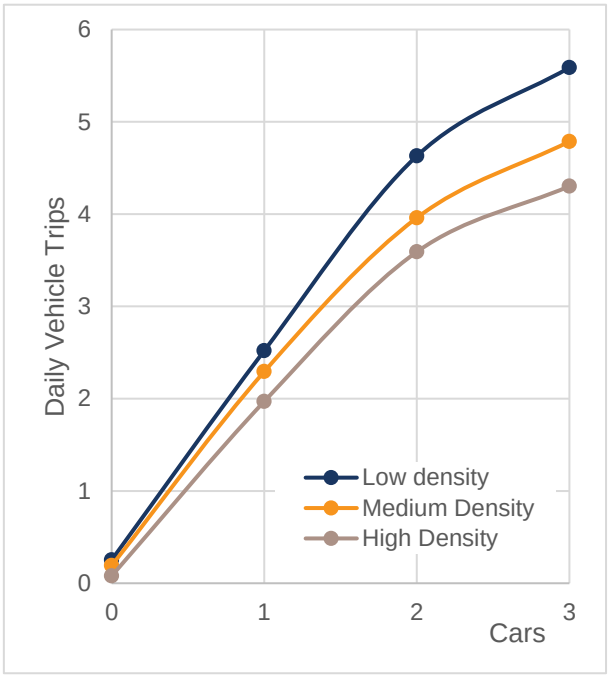
Various trip types interact with the road network and parking supply in different ways. For the purpose of this discussion, consider the following peak periods along Paramatta Road:

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

Across all of these periods, there is another key demographic of demand: Regional traffic, which is unrelated to any of the land uses within the Study Area but will be affected by decisions made in the surrounds.

Each of the components of the parking system (residential, employee and visitor parking) can be adjusted as necessary to mitigate the impacts of congestion caused by development. This can be translated into policy and management measures within each Precinct and surrounds.

Figure 7-1 Vehicle Trip Generation Per Household



Source: Victorian Integrated Survey of Travel and Activity

- **Residential traffic (Origin in the Precinct)**: traffic impact decreases significantly when vehicle ownership is constrained by maximum parking limits. A household with 2 cars generates approximately 80% more vehicle trips than a 1-car household (and zero car households generate few, if any vehicle trips). This is shown indicatively in **Figure 7-1**.
- **Employee traffic (Destination in the Precinct)**: traffic is generated proportional to the supply of long-stay parking.

  Employees tend to have the best opportunities to access high-frequency public transport. In addition, employee parking is one of the least productive land uses, as these vehicles essentially lie idle through the entire activity peak. Restricting employee parking is a direct way of reducing car-as-driver mode share for this trip purpose. This includes both statutory supply maximums applied to key development areas and active management of public parking to limit long-stay use.
- **Visitor traffic**: traffic is generated proportional to the availability of short-stay parking *during peak period.*

  Retail, restaurant and entertainment activity is important for the function of the Precinct. Visitors tend to park for a short period of time and hence these parking bays are usually the most valuable for the Precinct. Public parking remains the most effective way of fulfilling visitor parking demands, due to the efficiency increases that are unlocked through shared use of a common resource.
- **Regional traffic**: unaffected by parking supply, but may be redirected to alternative routes or shifted to public transport modes if congestion is high

The parking ecosystem

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 those 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.

An effective parking system must therefore consider the impacts of parking policies on behaviour, and whether there is sufficient capacity across all parking facilities and alternative transport to fulfil the mobility needs of a location's employees, residents and visitors.

- **Private parking supply**: when parking is provided primarily on individual lots, the financial burden of constructing and maintaining that facility is borne by the owners, tenants and customers. This is not necessarily equitable, as that cost may be passed onto users who don't drive.

  Private parking is also inherently inefficient, in that it can only be used by a select group of people (usually, the employees, residents or customers of that development).

- **Public parking** has the intrinsic advantage that it can be accessed by the greatest number of users, and is therefore a more efficient method of delivery. In addition, public parking can be priced to reflect the demand and to induce behaviour change in high-demand areas to alternative locations, or alternative transport modes.

When Council sets high ***minimum*** parking rates, this can impose a financial burden on private development, raising the cost of construction – which must be then passed onto tenants and customers in the form of higher prices.

If Council sets very low ***maximum*** parking rates, this shifts the burden of delivering parking to Council. This can be beneficial, where the public supply is effectively managed and priced in a manner that is responsive to demand. But where parking is provided free of charge or significantly below 'fair value', the use of public parking represents a significant subsidy to car owners, and to the detriment of people using other transport modes.

Setting parking rates

The 2016 Ashfield, 2011 Marrickville and 2013 Leichhardt DCPs provide developers with an indication of the required parking bays to be included in all types of development across the LGA. These rates are given as a flat rate (Ashfield DCP), as target rates (Marrickville DCP) and as banded rates (Leichhardt DCP).

The Marrickville DCP provides guidance on how variations can be accepted. The use of target rates in this area, rather than minimum or maximum rates, establishes a 'deemed to comply' value for development. For this type of rate, strategic intent of the target is explained within the DCP. The Leichhardt DCP rates are more flexible, allowing developers to choose the appropriate supply of parking within a band acceptable to Council.

Council's updated DCP parking rates should be designed so that all types of development meet strategic planning objectives. It is challenging to determine rates that will suit all land uses and changing needs, and other forms of parking requirements may be better suited to support Council's strategic planning needs. The different types of parking rate types are discussed in **Table 9-1**.

Table 9-1 Off-street parking requirement types

Parking requirement type	Detail
Minimum parking rates	Minimum rates are used to ensure that developments provide more than zero parking spaces. The lack of an upper limit ensures that developers may increase supply but cannot reduce without a concession from Council. Minimum rates can be used to prevent overspill of parking into on-street spaces, and tend to be used in suburban areas where public parking is limited. ***Reduced minimums*** accept that a given overspill will be accommodated in public parking. This creates opportunities for improved efficiency and management control (pricing and duration restrictions), as well as reducing the economic burden on development, all of which can be beneficial to the local community. Historically, most minimum parking rates are set ***above*** the natural demand – i.e. more parking bays than developers want to build.
Maximum parking rates	Maximum rates are used to ensure that parking is not oversupplied, and are usually enforced in centres where traffic congestion is an issue and alternative public and active transport modes are highly accessible. This form of rates control leaves the decisions regarding on-site supply to developers and businesses. It acknowledges that developers may not provide parking spaces on-site, and so is usually accompanied by a fixed contributions scheme related to intensity of development. Most maximum parking rates are set below the natural demand – i.e. fewer bays may be constructed than developers want on-site.
Banded parking rates	Banded parking rates, set a lower and upper limit, provide developers with a range of acceptable parking ratios. They are generally used when developers are encouraged to make their own decisions on parking supply, no provision of parking. This type of rate is generally used when there is a lack of sufficient on-street public parking controls. By setting both maximum and minimum rates, banded rates allow developers an opportunity to interrogate their needs and select the parking supply that suits market demands.
Target parking rates	The 2011 Marrickville DCP utilises target parking rates, which provide no explicit flexibility to developers in determining parking supply. The application of discretionary policies effectively enables modifications to these rates based on a number of factors. In application, target parking rates function like banded rates, but with an opaque range for appropriate supply. This reduces certainty for developers and represents a potential barrier to sustainable development.
Parking caps	Parking caps are used when traffic congestion or other constraints in CBD areas require restrictions on a local area basis. This form of parking restriction is usually applied to a dense city centre precinct, and applied as an area rate (i.e. parking spaces per hectare).
Hybrid caps	Hybrid caps are used when a combination of these restrictions are necessary to support Council's strategic objectives. *For example: The City of Stirling in Western Australia requires commercial parking (independent of category) within the Mirrabooka City precinct to between 2 and 4 spaces per 100m^2, up to plot ratio 1.0. Beyond this density, parking is limited to 200-400 spaces per hectare.*

Parking requirement type	Detail
	This gives developers the ability to choose a rate that suits their business, but maintains a long-term cap on parking supply (and trip generation) through to the development horizon.

Parking rate concessions

DCP controls in the Marrickville DCP (2011) list a range of potential factors that may be considered for the purpose of evaluating a proposal for reduced parking supply. These include:

1. **Shared Parking**: “Peak parking and traffic activity occurs during periods where surrounding parking demand is lowest”.
2. **Geometric Constraints:** “Existing site and building constraints make provision of car parking impractical”.
3. **Transit Accessibility**: “Located adjacent to high-frequency public transport services and/or urban services”.
4. **Demand Reduction:** “Includes management regimes to minimise car use, such as workplace travel plans or on-site carshare schemes”, “Development targeted to demographic sector with low car use/ ownership”.
5. **Public Benefit:** “Provides a business or social service that benefits the local community and contributes to the vitality of the area”, “Parking for the development is consistent with the aims and objectives of this section of MDCP 2011.”
6. **Safety:** “Safety of motorists, pedestrians and cyclists is unduly compromised by provision of parking.
7. **Heritage:** “Development contributes to heritage conservation of the building and setting”.

Some key considerations are identified and discussed, including:

- **Demographics**: Age and household characteristics (students, older people, families etc.);
- **Accessibility**: Proximity to public transport nodes, frequency of public transport, quality and connectivity of pedestrian/ cycling infrastructure;
- **Land use**: Residential and employment density, mixed use activity; and
- **Parking availability**: Off-site public supply, unbundling options, car share etc.

10.1 Availability and accessibility of public parking

Developers should demonstrate the expected parking demand generated by a site. This can be used to determine the level of parking to be provided on-site or if the local parking supply can accommodate the demand. The developer should provide a contribution to the difference of its on-site provision and maximum demand.

10.2 Accessibility of alternative transport

Probable mode of site demand is driven by employees and visitors.

- Parking demand at **employee**-driven land uses is influenced by proximity to public transport and provision of quality end-of-trip facilities. Examples of employee-generated car parking land uses are offices and hospitals, and visitor-generated car parking are medical centres, restaurants, shops and places of assembly.
- Parking demand at **visitor**-driven land uses is influenced by location within a dense urban community and opportunities for on-site mixed-use synergy.

Adjustment factors that can be considered for probable transport mode of users are described in **Table 10-1**.

Where these factors account for the proximity of public transport, an accessibility map indicating the location of high-frequency and high-capacity public transport nodes can assist Council to determine appropriate locations where rate concessions could apply. This would require expansion and review of the Marrickville Parking Areas map to include all of Inner West and PRCUTS.

Table 10-1 Adjustment factors for probable transport mode of users

Category	Criteria for reduction factors	
	Employee-generated parking demand	**Visitor-generated parking demand**
Public Transport	The development is located within 800 metres of rail station.	No reduction for this component of land use
	The development is located within 400 metres of a high-frequency bus route (i.e. average headway less than 15 minutes)	No reduction for this component of land use
	The development is located within 200 metres of a collector bus route (i.e. any bus route regardless of frequency)	No reduction for this component of land use
Bicycle Parking	Bicycle parking provided in excess of 2x statutory requirements AND high-quality end-of-trip infrastructure provided including showers, lockers and secure parking.	No reduction for this component of land use
Location	No reduction for this component of land use.	The development is located within a Town Centre
Composition	The development proposes a mix of residential and commercial uses, provided at least 50% of the total plot ratio is residential.	
	The development proposes a mix of land uses which would be able to share on-site parking. The extent of parking reduction to be determined through a Parking Demand Assessment and in agreement with Council.	

10.3 Shared parking supply

Shared parking is parking that is used by two or more uses.

If a development consists of multiple land uses where peak demands occur at different times of day, on-site parking can be shared between land uses. This type of parking arrangement is appropriate only for situations where peak demand differs between the constituent land uses. Representative land pairs which can leverage this effect include:

> Residential Visitor Parking and Commercial/ Office; and

> Office/ Entertainment or Office/ Restaurant.

The ability to share parking is related to the types of land uses proposed and how their peak hours of operation differ.

Where this parking is at one location, internal parking management methods can be used to ensure maximum efficiency, while reducing the number of parking spaces.

Where parking spaces are delegated to specific users the supply is less effective. 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.

A method for evaluating the opportunity for shared parking uses a Peak Parking Demand table submitted by the Applicant, as part of a Parking Management Plan (exampled shown in **Table 10-2**), which provides enough evidence to Council to show that demand will not unreasonably coincide.

Table 10-2 Example shared parking peak demand table

Development type	Development users	Shared parking demand assessment				Unshared assessment (peak demand per land use)
		Morning	Midday	Afternoon	Evening	
E.g Office/ Restaurant in Town centre	Office Staff	150	150	150	0	160
	Office Visitors	10	10	10	0	
	Restaurant Staff	5	10	10	20	120
	Restaurant Customers	25	50	20	100	
	Total	**190**	**220**	**190**	**120**	**280**

Note: This assessment supports a peak parking demand of 220 spaces, instead of the 280 spaces that would be required if evaluated separately.

Any application for parking supply reduction based on internal shared parking arrangements should be justified through a Parking Assessment.

10.4 Cash-in-lieu of parking

Cash-in-lieu of parking is a policy mechanism by which developers give Council cash instead of providing car parking This is accompanied by a fee sufficient to offset the impact of this parking, either through the provision of public car parking, or improvements to alternative transport.

Cash-in-lieu payments can be an attractive alternative for developers when construction of parking on-site is very challenging and they specifically wish to have a provision associated with their development. It 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.

Current DCP documentation does not have any capacity to allow developers to voluntarily increase their contribution to offset higher impacts. The current provisions allow Council to either require a given private parking supply, or to waive that requirement, creating equity issues.

The success of cash-in-lieu parking arrangements is compromised if Council approves parking concessions in order to relieve developers from any obligation to provide car parking. Concessions should only be approved where the applicant can clearly demonstrate that the parking requirement is excessive.

If Council approves a concession because it is technically justifiable, the applicant should still have the ability to use the cash-in-lieu program to further reduce the amount of parking required on-site.

The cash-in-lieu amount should be set at a discount to the actual cost of providing the parking to:

- Provide a financial incentive for developers to contribute to the creation of strategically located public parking facilities;
- Recognise that Council will be able to recover some of the costs through user fees;
- Recognise that parking spaces are not allocated to specific users on a reserved basis, although the general supply will be available to meet demand;
- Recognise that the contributor will not have an ownership interest in the public parking facilities;
- Recognise that the parking may not be as conveniently located to a specific development compared to on site or other nearby parking facilities;
- Recognise that all or a portion of the parking may not be constructed at the same time as the development, and
- Recognise that the developer/ owner will not have any control over parking fees and use regulations.

The decision to accept cash-in-lieu should remain at the discretion of Council and not become an automatic right. This will allow Council 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;
- Council will be able to provide a supply increase in the short term; or
- That alternative transport options can be used instead.

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. This usually involves the establishment of a site-specific car parking infrastructure fund, into which cash-in-lieu payments are directed, and out of which the planning, upgrading and management of car parking facilities is funded.

A broader delivery model allows cash-in-lieu funds to be used to support sustainable public infrastructure, including upgrades to pedestrian, cycling and public transport facilities, can support a more flexible use of cash-in-lieu.

Regardless of the mechanism for funding - either through developer contributions, parking fees and fines or other public monies - it is important that the revenues and costs from parking-related activities be accounted for centrally. This allows for reasonable modifications to the management structure, pricing regimes, infrastructure and maintenance, enforcement and compliance activities to be resolved in a transparent system with full accounting of the costs and benefits provided. This will form the foundation for assessment of the requirements for cash-in-lieu payments by developers as well as determining and varying parking restrictions and pricing schemes based upon location, time of day and seasonal factors.

Accounting for all financial aspects of parking will enable a much greater appreciation for the real costs of providing this service.

10.4.1 Off-site parking

Cash-in-lieu is primarily used as a mechanism for funding off-site public parking, where construction of parking supply within a development is partly or wholly infeasible. This requires Council to deliver parking within relatively close proximity and inside a given timeframe. For these reasons, it may not be possible or appropriate for Council to accept cash-in-lieu funds, where planning is not sufficiently progressed to identify a suitable location for public parking.

Nevertheless, there can be significant benefit to both the developer and Precinct function where parking is provided in consolidated public facilities. A mechanism that allows developers to contribute towards a communal off-site parking structure in-lieu of on-site provision is therefore recommended.

Currently, zoning limitations can affect the opportunities for consolidated off-site car parking, particularly in areas abutting residential zones. Changes to zoning restrictions would be necessary to allow developers to construct nearby off-site parking structures, in lieu of on-site facilities. Ideally, these structures form part of large-scale Precinct redevelopment planning, with coordination between several developers. Because this requires co-ordination between multiple developers, potentially over an extended timeframe, off-site car parking is often only feasible where a large site area is being redeveloped.

An alternative market-led structure is possible if parking requirements are set at a low maximum rate, or abolished altogether. In this case, where parking demand significantly exceeds private supply, there is the potential for a standalone car park to be developed by a commercial third-party.

To progress the construction of off-site communal parking, Council intervention may be required (see further discussion in Section 5.6.4). This method of delivery uses essentially the same structure as cash-in-lieu, but on a completely voluntary basis. That is, developers contribute towards off-site parking infrastructure to be delivered by Council based on an understanding of their own individual needs, and (preferably) at a reduced cost compared to on-site delivery.

Any and all parking rate concessions should be assessed and justified on a case by case basis.

Bicycle, motorcycle and site servicing recommendations

11.1 Bicycles

The presence of cycling routes alone is not enough to secure modal shift from private vehicles. In order for cycling to be a viable mode of transport to an increased number of people, routes must be safe, separated from vehicles and pedestrians and be accessible for everyone. High quality end-of-trip facilities and wayfinding must also be provided.

A minimum of one bicycle parking space should be provided for each new land use dwelling/ business. Best practice bicycle parking supplies enough spaces to cater for the target cycling mode share across all development sites.

Current bicycle mode share indicates this represents a low percentage approximately 1 -2 per cent of all trips and 1 per cent of journey to work trips.

Bicycle parking for businesses should be linked to mode share targets. As an example, based on a general land use assumption of 20sq.m of floor space per employee (e.g. office commercial) and a maximum attendance of approximately 80 per cent of employees are on-site at any time, there would be approximately 1 employee per 25sq.m of employment land use.

The bicycle parking space requirement would be calculated by the greater of ***100/(Mode share target percent/ assumed sq.m area per on-site employee)*** or one.

Based on the relationship between mode share target and spaces per unit of floor area indicative percentages and floor areas per one space is shown in **Table 11-1:**

Table 11-1 Mode share space relationship of one on-site employee per 25sq.m of floor area

Bicycle mode share target percent	1	2	2.5	5	10	15	20	25
Square metres of floor area per 1 bicycle space	2,500	1,250	**1,000**	500	250	167	125	100

Similar to public vehicle parking provisions, publicly accessible and conspicuous facilities provides an opportunity to use and share visitor parking more effectively. Bicycle parking opportunities should be provided in the public domain as part of public space improvement projects and can also be provided by adapting car spaces to bicycle parking spaces in locations where there is sufficient demand or evidence of ad hoc bicycle parking.

The City of Sydney provides a web portal to find or request new bicycle parking.
https://www.cityofsydney.nsw.gov.au/transport-parking/request-new-bike-parking-space-or-find-existing

Recommendation:

- Given the current journey-to-work cycling mode share of less than one per cent, and with the assumption that increasing bicycle mode is consistent with Council objectives**, a minimum bicycle parking rate to satisfy 2.5 per cent of employee mode share**, plus additional spaces for visitors/ customers. This creates capacity for additional bicycle mode share.
- Bicycle parking demand should be monitored in the locality and Council should host request a new bike parking space on their website.

11.1.2 End of trip facilities

End of trip facilities (EOTF) will typically be required to accommodate long-stay trips for land uses such as offices. EOTF should include change rooms, showers and lockers to store clothing and towels. These facilities can be integrated with toilets and for use of all employees on-site. Recommendations for the provision of EOTF are outlined in **Table 11-2**.

Table 11-2 Recommendations for provision of EOTF

No. showers	No. change rooms	No. lockers
One shower per 5 employee bicycle parking spaces	One change room per shower	Two lockers per employee bicycle parking space

Note: where more than one shower or change room is required, separate male and female facilities must be provided

11.2 Motorbike/ scooter

Census data indicates motorcycles represent approximately five per cent of the vehicle fleet in Australia, however within the PRCUTS IWC, motorcycle JTW represents around 1 – 1.5 per cent of mode share.

Recommendation:

Motorcycle parking be provided at 1 space per 1,500sq.m of floor area, with a minimum of one space where on-site parking is provided.

11.3 Servicing, delivery and loading

The provision of on-site service/ delivery and loading is generally related to the scale of development, the intensity of use and the availability of public on-street facilities. The likely requirement for deliveries in new commercial developments should be considered and enabled where appropriate through an increase in on-street **loading zone** areas, particularly in 'main street' precincts where demand for parking is high, and where smaller office/ retail development is located. **Loading bays/ zones** should be flexible/ shared where possible between businesses, and have timed restrictions (usually 15 minutes), and designed to accommodate larger and heavier vehicles as appropriate.

Car parks designed to accommodate these vehicles must have shallower ramps, higher ceilings and wider circulation aisles.

Due to these additional geometric requirements, it is recommended servicing and waste collection occurs at ground level, unless the lot dimensions can support the needs of the design vehicle of site topography optimises another arrangement.

Recommendation:

Site loading and servicing facilities should be provided on site, appropriate to the size and scale of the development.

Residential land use car parking recommendations

12.1 Residential vehicle ownership and parking demand

ABS 2016 Census data for Inner West Council found there were:

- 1.21 vehicles per household (on average);
- 11,931 households which own zero vehicles;
- 33,604 households which own one vehicle; and
- 1,165 households which own more than four vehicles.

Household vehicle ownership varies substantially. In particular, the proximity of the University of Sydney (UoS) influences the demographics of households in the area, with a higher proportion of students living in apartment dwellings without cars.

Data from ABS Census 2016 has been used to show the relationship between dwelling size and vehicle ownership, for two housing types: single unit dwellings/ townhouse and apartment dwellings, and for the suburbs of Leichhardt (**Figure 12-1** and **Table 12-1**) and Camperdown (**Figure 12-2** and **Table 12-2**).

Figure 12-1 Leichhardt suburb household characteristics – bedrooms vs vehicle ownership

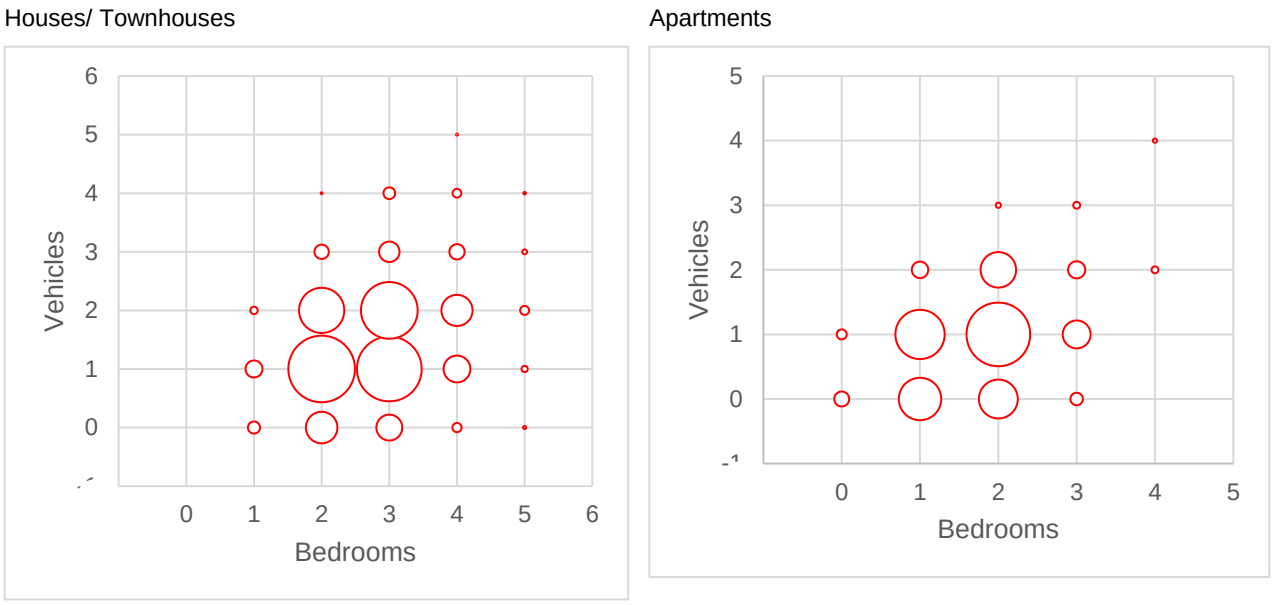


Table 12-1 Leichhardt suburb household characteristics – dwelling type vs vehicle ownership

	Separate House	Terrace/Townhouse		Apartment		
Cars	-	1 Storey	2+ Storeys	2 Storeys	3 Storeys	4+ Storeys
0	179	142	103	119	84	124
1	883	619	491	217	190	207
2	644	370	318	72	50	52
3	100	52	58	10	5	0
4	28	8	23	3	0	0
5	3	0	0	0	0	0
Total Cars	**2,598**	**1,547**	**1,393**	**403**	**305**	**311**
Dwellings	1,837	1,191	993	421	329	383
Avg. Cars	1.41	1.30	1.40	0.96	0.93	0.81
	1.41	**1.35**		**0.90**		

Figure 12-2 Camperdown suburb household characteristics – bedrooms vs vehicle ownership

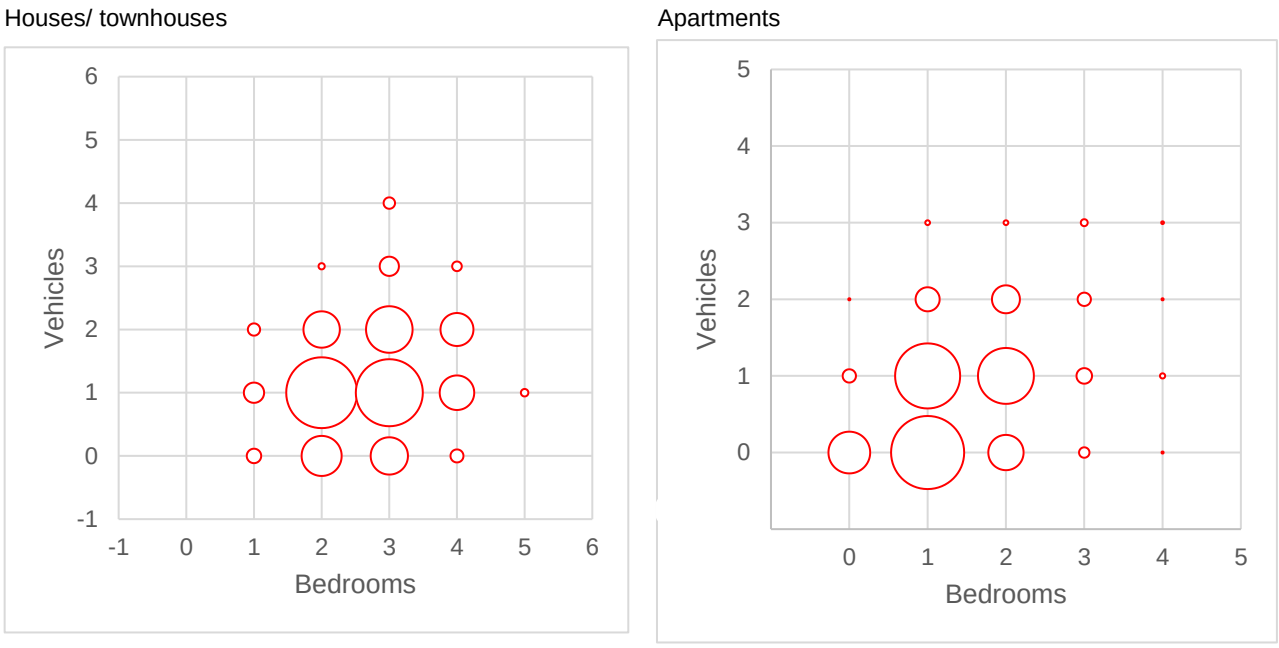


Table 12-2 Camperdown suburb household characteristics – dwelling type vs vehicle ownership

	Separate House	Terrace/Townhouse		Apartment		
Cars	-	1 Storey	2+ Storeys	2 Storeys	3 Storeys	4+ Storeys
0	7	72	89	71	147	1370
1	48	252	241	26	276	1122
2	20	98	124	9	68	229
3	0	12	22	0	3	19
4	0	0	4	0	0	6
5	0	0	0	0	0	0
Total Cars	88	484	571	44	421	1661
Dwellings	75	434	480	106	494	2,746
Avg. Cars	1.17	1.12	1.19	0.42	0.85	0.60
	1.17	**1.15**		**0.64**		

As this Census data figure shows, vehicle ownership differs significantly between house/ townhouse and apartment dwellings. This is reflected in the difference in recommended parking maximums shown below (**Table 12-3**).

Townhouse developments tend to be subdivided into strata lots which include on-site parking – this means that parking requirements must generally be in whole numbers, rather than fractions, to match the physical form of delivery.

The recommended PRCUTS parking rates (**Table 12-3**) for residential land uses have been assessed against current behaviour and future transport opportunities. This comparison shows that the PRCUTS *maximum* parking rates tend to be 30-50% less than the current *average* for the area. Nevertheless, they can be considered achievable provided substantial improvements to the public transport environment eventuate (as envisaged by the PRCUTS plan).

A series of recommended parking rates have been provided which considers existing and future transport opportunities, as well as existing parking requirements. To this end, where current Council requirements are below identified parking generation, the *lower* of the Marrickville and Leichhardt DCP rates has been applied. The intent of this is to ensure that the process of parking restraint continues into the future.

However, the significant reduction of on-site parking supply implied by the PRCUTS rates needs to be supported through consistent parking management processes in the adjacent public network. In particular,

managed on-street parking with a robust permit system that disincentivises the use of on-street parking in residential zones. Without this additional form of management, it is considered likely that residents will continue to own cars well in excess of private supply, shifting the burden of storage onto Council (see below, **Section 12.4**).

An alternative set of rates has also been provided, which reflect a set of sustainable rates consistent with existing transport opportunities. These rates could be employed irrespective of the capital works detailed in the PRCUTS plan and are designed to incentivise developers to use more efficient methods of parking allocation within development, while simultaneously providing downward pressure on vehicle ownership in dense residential areas.

Table 12-3 Bedrooms, DCP parking rate, cars owned and recommendations

Bedrooms	DCP rate	Average cars owned	PRCUTS maximum recommended rate	Alternative maximum parking rates (consistent with 2021 transport environment)
Leichhardt/ Taverners Hill				
House/ Townhouse				
1	0 – 2.0	0.83	0.3	1.0 per townhouse
2		1.20	0.7	1.0 per townhouse
3+		1.45	1	1.0 per townhouse
Apartment/ Shop top Housing				
0	0 - 0.5	0.33	0	0.15
1	0.33 – 0.5	0.67	0.3	0.5
2	0.5 – 1.0	0.98	0.7	1.0
3+	1.0 – 1.2	1.31	1	1.2
Visitor		-	0	0.1 space per dwelling, unless this can be provided on-street.
Camperdown				
House/ Townhouse				
1	1.0	0.93	0.3	1.0 per townhouse
2		0.98	0.7	1.0 per townhouse
3+		1.24	1	1.0 per townhouse
Apartment/ Shop top Housing				
0	0.2 - 0.6	0.12	0	0.15
1	0.4 – 0.8	0.55	0.3	0.5
2	0.8 – 1.2	0.93	0.7	1.0
3+	1.1 - 1.2	1.32	1	1.2
Visitor		-	0	0.1 space per dwelling, unless this can be provided on-street.

12.2 Student housing/ Boarding house

Student and boarding houses are generally managed residences with occupants typically having low rates of car ownership. It is recommended a maximum car parking rate of **0.15 per dwelling be provided**, subject to on-site management of parking.

It is noted that due to the delivery model for student accommodation, developers are likely to provide parking in line with their expectations of demand – in contrast to many other forms of multi-unit residential development.

12.3 Dual occupancy residences

The form of dual occupancy dwellings is consistent with that of single unit development and should therefore be subject to the same parking rate applied to house/townhouse above.

12.4 Resident parking permits – model scheme

Inner West Council operates a number of residential parking permit schemes to allow limited on-street vehicle storage by residents. The cost of these permits is set at a rate sufficient only to recoup the cost of administration, with a small factor applied where multiple permits are sought. This cost is nominal (free for the first permit and $50 -$100 for the second permit); which is significantly less than the value of those spaces.

These permit schemes signal an acceptability for eligible households to own two cars, irrespective of the number of parking spaces available.

This creates inequity in the system – functionally identical households, with the same needs and characteristics may be disadvantaged due to the age of their building.

In general, the uptake of a residential permit system is primarily dependent on the fee charged, and the supply of on-site parking available.

This results in the following behaviour:

- Residents parking their vehicles on-street do so either because the number of vehicles owned is greater than on-site car parking, access to their on-site parking is less convenient or that parking has been appropriated for other uses (a home gym, extra bedroom/ workroom, additional storage etc.).
- A permit user 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 approx. $1,500-$2,000 p.a. Recent investigations into the cost of on-site parking confirm that this figure is consistent across all the areas where studies have been completed, which includes cities across the Netherlands, San Francisco in California, and Darebin in Victoria.

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 Council, but provides funds for the maintenance of that infrastructure at an equivalent market rate. Users may choose to retain their vehicles wholly on-site and reconsider the need for vehicles that do not fit on-site.

This form of management has the following advantages:

- It allows the parking restrictions to support the desirable use of on-street parking;
- The pricing regime can be ramped up to market rates over time;
- The price can signal that it would be cheaper to use other forms of transport such as car share; 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 demand.

Recommendation:

(Policy) (In order to implement PRCUTS recommended parking rates) Expand the residential permit scheme and price permits at a rate consistent with the opportunity cost of parking infrastructure, with a transition period to support behaviour change by residents.

There is an opportunity to incentivise low-emissions vehicles through the residential parking permit scheme. This type of concession is used some European jurisdictions (for example, the cost of a residential parking permit in Copenhagen ranges between AUD45 p.a. for an electric vehicle, up to AUD850 p.a., based on its fuel-efficiency).

Recommendation:

Provide concessions for the cost of a residential parking permit based on emissions.

Non-residential land use car parking recommendations

13.1 Journey to Work travel behaviour

Census 2016 data from the Australian Bureau of Statistics is used to estimate employee mode choice to places of work in the study precincts and shown as percentages in **Table 13-1**.

Table 13-1 Journey to Work mode share by precinct

Suburb	Public transport	Car (passenger)	Walk	Bike	Motorbike/ Scooter	Other, not stated, truck
Taverners Hill	18%	71% (4%)	5%	1%	1%	1%
Leichhardt	23%	62% (4%)	9%	1%	1%	1%
Camperdown	20%	63% (4%)	9%	3%	2%	2%
Average	**20%**	**66% (4%)**	**7%**	**2%**	**1%**	**2%**

Source: Census, Australian Bureau of Statistics, 2016

Note: 13.5% of employees either did not work, or worked from home on the day of the Census – and therefore generated no journey-to-work trips.

13.2 Office

The current office parking rates applied through the Marrickville DCP (MDCP) and Leichhardt DCP (LDCP) are shown in **Table 13-2** to provide context for parking sufficiency in each Precinct and to establish an indicative parking rate.

Table 13-2 DCP office/ business land use parking rates vs. mode share accommodation

Office/ Business Land Uses	MDCP (Area 1) LDCP (Office min)	MDCP (Area 2) LDCP (Office max)	MDCP (Area 3) LDCP (Business Premises max)	Suburban demand
Parking rate (1 per X square metre)	100	80	60	40
Parking rate (spaces per 100 square metres GFA)	1	1.25	1.67	2.5
Assumed Employee occupancy rate (workers per 100square metres)	4	4	4	4
Parking spaces per employee	0.25	0.31	0.42	0.63
Office attendance	80%	80%	80%	80%
Supported driver mode share percentage	31%	39%	52%	78%

Comparing these results to the mode share percentages in each of the precincts, shows the following requirements if on-site parking supply were to match existing journey to work behaviour.

- Taverners Hill: one space per 44 square metres (2.27 spaces/ 100 square metres); and
- Leichhardt/ Camperdown: one space per 50 square metres (two spaces/ 100 square metres).

Where on-site parking is supplied at less than this rate, there would be existing overspill into the surrounding public and shared parking. The benefit for undersupplying parking is to influence the travel behaviour of staff, and to reduce the cost of new development.

Interrogation of existing journey-to-work by public transport has been used as an indication of the effect of public transport accessibility in the Study Area. In this case, public transport mode share ranges from 18% (Taverners Hill) to 23% (Leichhardt). Given that the primary public transport within the Study area is bus transit along Paramatta Road, the observed variations in travel behaviour appear to be aligned more with work type (office/commercial showroom/retail etc.) and employee catchment than accessibility measures.

Future developments in high-quality public transport are likely to increase the propensity for employees to travel by such modes, and this would be reflected in a reduction in the maximum parking rate in the locations affected. The significant improvement in public transport services envisioned by PRCUTS could support the recommendation of 1 space per 150sq.m, when realised.

This parking rate can work as a maximum, without a minimum, where the surrounding catchment of publicly accessible parking is appropriately managed and enforced through parking duration restrictions and paid parking. An alternative rate has also been derived, which is considered achievable in the short term, prior to the significant corridor improvements identified in the PRCUTS plan. This maximum rate is set at approximately 50 per cent of existing demand,. This comparison is outlined in **Table 13-3**.

Table 13-3 Existing and recommended office premise parking rate

Office premises	Marrickville DCP			Leichhardt DCP		PRCUTS recommendation	Alternative maximum parking rates (consistent with existing transport environment)
	Area 1	Area 2	Area 3	Min	Max		
Parking rate	1 per 100sq.m	1 per 80sq.m	1 per 60sq.m	1 per 100sq.m	1 per 80sq.m	1 per 150sq.m	**1 per 100sq.m (max)**
Spaces per 100sq.m	1	1.25	1.67	1	1.25	0.67	**1.00 (max)**

13.3 Retail

PRCUTS recommends 1 space per 100sq.m. Analysis of parking demand generation rates for retail precincts has consistently shown a parking rate of approximately one space per 40 - 50 square metres, declining further where adjacent residential and employment densities are high.

Recommendation:

Retail parking be permitted at a **maximum rate** of **1 space per 50 square metres** which is consistent with the Leichhardt DCP.

This enables retail businesses the opportunity to capture demand on-site, where development intensity is high and the provision of public parking would be insufficient to accommodate demand. It is likely that small-scale developments will provide less parking, relying instead on adjacent on-street supplies.

13.4 Restaurant

In the absence of a specified rate for restaurant land uses in PRCUTS, it is assumed the retail rate of 1 space per 100 square metres applies.

The parking rate for restaurants as defined in the Marrickville DCP and Leichhardt DCP varies between 1 per 50 square metres and 1 per 100 square metres, depending upon location. While the demand for parking by restaurant customers is generally much higher than this, peak demand tends to occur in the evening and can generally be supported by parking opportunities in surrounding streets.

As such, it is appropriate that the maximum requirement be set at less than the anticipated demand. However, a maximum rate of 1 space per 100 square metres may leave some locations unable to provide sufficient service for customers, particularly where adjacent on-street parking is restricted.

Recommendation:

A recommended parking **maximum rate** of **1 space per 50 square metres** is recommended across all locations.

13.5 Health / Medical Centres

The Marrickville DCP considers medical centres as part of the ‘Office’ category, with a corresponding rate that range from 1 space per 60 square metres to 1 space per 100 square metres by location. The Leichhardt DCP applies a parking requirement of between 0.66 and 2 spaces per consulting room.

The parking needs for medical uses are highly dependent on the nature of the service provided:

- Medical Clinics (e.g. a walk-in GP clinic) generate a greater number of patients and require a higher visitor parking rate;
- Specialist Centres have a greater proportion of non-practitioner staff, but fewer patients; and
- Hospitals with overnight stay generate additional demand by visitors, and a higher proportion of staff members per 'bed'.

These services may be provided in stand-alone facilities or combined on a single site (for more detailed discussion of reciprocal and decoupled parking, see Sections 5.6.2 and 5.6.4). Parking generation is also poorly correlated to floor area, with a wide variation in different configurations and intensities by purpose. Instead, a relationship between 'beds' or 'consulting rooms' and parking is more indicative of baseline demand. Some DCPs specify a parking rate per 'practitioner' but this can be difficult to quantify at the Development Application stage, and may change without any internal modifications.

Proximity of the development to high-density employment or residential nodes can reduce the parking requirement for visitors, but there is only a weak relationship between public transport accessibility and mode share – this reflects the demographic of patients and the fact that patients are often infirm or ill.

13.5.1 Medical Clinics and Specialist Centres

Research into parking demand rates suggests a baseline metric for parking demand at GP clinics is in the order of 5 spaces per consulting room. This rate would be applicable for a site with only a low-density residential walking catchment, poor access to public transport, and limited to no adjacent public parking. As such, it is likely that any destination within the Study Area would be able to achieve a substantially lower trip generation rate than this baseline.

Interrogating current journey-to-work mode shares for medical centres and hospitals in the Inner West shows only a minor variation from baseline rates, see below:

Table 13-4 Journey to Work car-as-driver mode share (all employment vs medical/hospital)

Suburb	Car-as-Driver
Taverners Hill	71%
Leichhardt	62%
Camperdown	63%
Hospitals (Inner West)	76%
Medical and Other Health (Inner West)	69%

This would suggest that the *employee* component of trip generation could operate at the roughly equivalent of the recommended office rate, at least for medical centres (see Section 13.5.2 below for discussion of hospital generation). While the requirements for staffing do vary, a ratio of simultaneous occupancy of around 1 to 1.5 staff per consulting room appears to be representative.

Additional parking provision is necessary to accommodate patients, which accounts for approximately 2/3 of the unconstrained parking demand. This comprises up to 2-3 patients for each consulting room during the highest peak periods (medical centres), but only 1-2 patients per consulting room for specialist clinics, due to the lack of walk-ins and more rigid scheduling requirements.

Based on the above, a representative parking rate for medical centres would be 0.5 spaces per consulting room (staff), plus 1.5 spaces per consulting room (patients).

Patient parking supply could be reduced for specialist clinics to 1 space per consulting room (patients), considering the following:

- Specialists are often on-call or attending a primary hospital where they have admitting rights – this increases their need to have access to a private vehicle (staff parking needs increase), but reduces the numbers of patients on-site at any one time.

Recommendation:

On balance, this would likely result in a similar recommended parking rate for medical centres and specialist clinics, with a maximum rate of **2 spaces per consulting room**.

13.5.2 Hospitals

Hospital sites are complex workplaces with a large number of different activities operating on 24/7 basis. Standard industry metrics put hospital parking requirements at between 3 and 5 spaces per 'bed'. This variation reflects the wide range of services that can be incorporated into the hospital structure, not all of which are aligned directly with patient care (research, diagnostics, administration etc.).

One key constraint for hospital developments is the impacts of shift start and finish times on the availability of public transport alternatives to driving. Review of hospital rostering data suggests that 30-40% of tertiary hospital staff either arrive or depart outside of core hours (i.e. arriving before 7am, or departing after 7pm). This, combined with the requirements for shift overlap, puts pressure on the on-site parking during the critical noon-3pm period.

One illustrative example for the impacts of parking restraint on behaviour is the QEII Medical Centre campus in Perth, WA. This site substantially reduced parking for staff in 2009, and over the period of 3 years, transitioned from a 75% staff car-as-driver mode share to 43% car-as-driver mode share. This mode shift requires a combination of high-quality, high-frequency direct public transport which operates from 6:30am, and a detailed parking management and allocation model for staff.

Patient/visitor parking demand across multiple hospital sites is approximately 1 space per 1.5-2 beds; which appears to be consistent across multiple locations. Parking demand is higher for some specialities (e.g. children's hospitals, day surgery) where visitors are more likely to stay throughout the day.

Given the above, and assuming a maximum parking requirement is to be used for hospital sites, based on the number of 'beds' within the campus, it is not recommended for the rate to be reduced below 3 spaces per bed. In addition, it is recommended that there be some mechanism, likely through a Parking Assessment, for a hospital redevelopment to capture the additional need for parking associated with on-site research, clinics and ancillary facilities.

Recommendation:

Hospital must prepare include a parking assessment as part of a develop application. This can be included in a transport assessment report.

The unique requirements for hospital uses suggest a maximum parking rate of **3 spaces per bed**.

13.6 Serviced apartment/ hotel

The parking demand for hotels is related to staff and guest requirements, which vary significantly depending upon the location and type of facility. Current parking requirements recognise that the majority of guests do not require access to a car, and therefore the majority of parking is used by staff.

However, staffing levels can fluctuate greatly, and may not be fully determined at the development application stage. Using the average worker proportions indicated in ITE documentation as a benchmark would suggest approximately 1 worker per 4-6 rooms. However, most of those employees would have access to alternative transport. Only early morning, evening and night-staff would require parking for safety and security reasons. Application of standard employee occupancy profiles would suggest that the total parking requirement for employees would be in the order of 1 space per 10 rooms, plus approximately 1 space per 4 rooms for guests.

Recommendation:

Consideration of the needs of guests and employees to service rooms that would require parking for shift work results in a recommendation of **1 space per three rooms**.

13.7 Out of centre uses along the Paramatta Road corridor

Parking maximums are not recommended due to the reduced opportunity of sharing off-street facilities and a general preference by users for on-street parking due to convenience and legibility where available.

The nature of corridor development is that land uses can be expected to change frequently over the lifetime of the building structure. Establishing a single target parking provision allows for simplified change-of-use as appropriate for the needs of the community.

The chosen target rate is consistent with an average mixed-use provision consisting of multiple different land use types.

Recommendation:

A general rate of **1 space per 40 square metres** (2.5 per 100 square metres) is recommended for all out of centre non-residential land uses.

13.8 Summary of non-residential land use recommendations

Table 13-5 outlines the PRCUTS recommendations which are only recommended with an appropriate public parking management scheme and recommendation for immediate implementation.

Table 13-5 Key non-residential land uses

Land use	Rate application	DCP rate (per 100sq.m)	PRCUTS recommendation maximum rates (per 100sq.m)*	Alternative maximum parking rates (consistent with existing transport environment) (per 100sq.m)
Leichhardt DCP (Taverners Hill, Leichhardt and some parts of Camperdown)				
Office/ Business	Minimum	1 per 100sq.m (1)	1 per 150sq.m (0.67)	1 per 100 sq.m (1.)
Office	Maximum	1 per 80sq.m (1.25)		
Business	Maximum	1 per 60sq.m (1.67)	-	
Health/ Medical centre	Minimum	2 spaces per 3 consulting rooms	-	2 spaces per consulting room
Health/ Medical centre	Maximum	2 spaces per consulting room	-	
Retail/ Shop	General	1 per 50sq.m (2)	1 per 100sq.m (1)	1 per 50sq.m (2)
Restaurant	Minimum	1 per 80sq.m (1.25)	-	1 per 50sq.m (2)
Restaurant	Maximum	1 per 50sq.m (2)	-	

Land use	Rate application	DCP rate (per 100sq.m)	PRCUTS recommendation maximum rates (per 100sq.m)*	Alternative maximum parking rates (consistent with existing transport environment) (per 100sq.m)
Bulky goods premises	Minimum	1 per 125sq.m (0.8)	-	1 per 100sq.m (1)
Bulky goods premises	Maximum	1 per 100sq.m (1)	-	
Industry	Minimum	1 per 250sq.m (0.4)	1 per 150sq.m (0.67)	1 per 150sq.m (0.67)
Industry	Maximum	1 per 150sq.m (0.67)		
Marrickville DCP (Parts of Camperdown south of Parramatta Road)				
Office (Area 1)	Minimum	1 per 100sq.m (1)	1 per 150sq.m (0.67)	1 per 80sq.m (1.25)
Office (Area 2)	Middle	1 per 80sq.m (1.25)		
Office (Area 3)	Maximum	1 per 60sq.m (1.67)		
Health consulting rooms/ medical centre	As per office	As per Office/ business without banded rates based on floor area.	--	2 spaces per consulting room
Retail/ Shop	As per office	As per Office rates applicable up to 500sq.m	1 per 100sq.m (1)	1 per 50sq.m (2)
Restaurant (Area 1)	Minimum	1 per 100sq.m (1)	-	1 per 50sq.m (2)
Restaurant (Area 2)	Middle	1 per 80sq.m (1.25)		
Restaurant (Area 3)	Maximum	1 per 50sq.m (2)		
Bulky goods premises (Area 1)	Minimum	1 per 150sq.m (0.67)	-	1 per 100sq.m (1)
Bulky goods premises (Area 2)	Middle	1 per 125sq.m (0.8)		
Bulky goods premises (Area 3)	Maximum	1 per 100sq.m (1)		
Industry (Area 1)	Minimum	1 per 300sq.m (0.33)	1 per 150sq.m (0.67)	1 per 150sq.m (0.67)
Industry (Area 2)	Middle	1 per 250sq.m (0.4)		
Industry (Area 3)	Maximum	1 per 200sq.m (0.5)		
Out of centre uses along the Paramatta Road corridor				
All non-residential land uses	General	-	Refer to specific land uses	1 per 40sq.m general rate (2.5)