

# An analysis of the spatial distribution of parking supply policy and demand

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## Abstract

Parking policy often focuses on limited parts of an urban area, in particular the central city and areas of high retail and employment activity. Parking pricing and supply policies however, have a considerable impact on the transport and land use system within the entire urban region. Transport and land use planners focus on parking as a trip end or as a need to provide parking to service a land use, respectively. Rarely do they look at spatially integrating parking, land use and transport policy. Parking however influences the spatial distribution of transport use and the viability of developments. This paper documents the spatial distribution of parking policy and demand for parking in Melbourne in order to obtain an indication of the spatial variations and how they may influence urban travel patterns..

## 1. Introduction

Parking policy relates to the management of the price, supply and location of parking to enhance the urban environment. Parking pricing and supply policy often relates to the central city and areas of high levels of employment and retail activity. However the supply of parking influences all locations in a city. The spatial distribution of the supply and demand for parking needs to be understood. This paper investigates this variation for Melbourne, Australia.

The paper looks at the spatial distribution of the supply of and demand for parking in three parts. The first examines and analyses the existing parking rates provided across metropolitan Melbourne. It focuses primarily on the two land-uses of 'shop' and 'office' since these cover a large proportion of parking supply. It will cover the Metropolitan Planning Scheme and variations to this scheme. The second section looks at the implementation of the policy in a number of areas. This is carried out to obtain some idea of how the parking rates and the final supply of parking are correlated. The final section looks at the distribution of parking demand across Melbourne. This overview points to variations in parking demand across the urban area and the relationship to parking policy. The paper closes with some suggestion for further research.

## 2. The Planning Scheme in Melbourne

The Victorian Planning Scheme (2009) was developed in order to provide a consistent planning basis across all of Victoria. Within the Planning Scheme, Clause 52.06 governs the parking standards in terms of rates, dimensions and related considerations. Specifically, Clause 52.06's purpose is to ensure that car parking facilities are provided in accordance

with the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local policies such as a Local Parking Precinct Plan (Melbourne 2030, 2000). Clause 52.06 aims to ensure that the design and location of car parking areas:

- Do not adversely affect the amenity of the locality, in particular the amenity of pedestrians and other road users;
- Achieves a high standard of urban design;
- Creates a safe environment for users, particularly at night;
- Enables easy and efficient use;
- Protects the role and function of nearby roads; and
- Facilitates the use of public transport and the movement and delivery of goods.

Generally speaking, new developments must provide parking based on Clause 52.06-5. Table 1 below provides some of the standardized land uses that have a predetermined parking standard as set out in the Victorian Planning Scheme (2009). The parking rates specified in the Scheme is that required for development. This is usually interpreted as a minimum parking rate but strictly speaking the provision of a higher or lower parking rate should be considered by the appropriate planning authority. Rarely do developers in the inner suburb provide more parking that that required by the Scheme due to the cost of providing a parking space. In outer suburbs where the cost of land is lower some developers may exceed that required by the Scheme.

**Table 1 – Victorian Car Parking Requirements, Clause 52.06 Victorian Planning Scheme (2009)**

Land Use	Car Space Measure	Parking Rate
Shop, other than specified in this table	Car spaces to each 100m <sup>2</sup> of leasable floor area	8
Office other than specified in this table	Car spaces to each 100 m <sup>2</sup> of net floor area	3.5
Restaurant	Car spaces to each seat available to the public	0.6
Hotel or Tavern	Car spaces to each 100 m <sup>2</sup> of bar floor area available to the public	60
	Car spaces to each 100 m <sup>2</sup> of lounge floor area available to the public	30
Post Office	Car spaces to each 100 m <sup>2</sup> of net floor area	3.5
Medical or Veterinary Centre	Car spaces to each practitioner	5
Convenience shop if leasable floor area is greater than 80m <sup>2</sup>	Car spaces to each premises	10
Sale yard	Percentage of site area to be set aside for car spaces and access lanes, but not driveways	10
Motor Repairs	Percentage of site area to be set aside for car spaces and access lanes, but not driveways	10

When a dispensation from the Planning Scheme is sought, Clause 52.06-1 provides a number of decision guidelines, which provide guidance in ascertaining a reduced parking provision. In order for the development to gain a reduction or complete waiver in the car parking requirement, one, or a number of the decision guidelines must be explained and adhered to. When deciding on the amount of parking to be provided the Victorian Planning Scheme (2009) suggests that the following factors should be considered;

- Any relevant Parking Precinct Plan (PPP),
- The availability of car-parking in the locality;
- The availability of public transport in the locality;
- Any reduction in car parking demand due to the sharing of car spaces by multiple uses, either because of variation of car parking demand over time or because of efficiencies gained from the consolidation of shared car parking spaces;
- Any car parking deficiency or surplus associated with the existing use of the land; any credit which should be allowed for a car parking demand deemed to have been provided in association with a use which existed before the change of parking requirement;
- local traffic management;
- Local amenity including pedestrian amenity;
- An empirical assessment of car parking demand, and Any other relevant considerations.

Developers, who require traffic impact reports to be submitted to local governments in order to gain a permit, often sub-contract out the task to traffic engineering company. Traffic engineers analyse the parking, along with other traffic and transport related aspects within the area and specific to the development site, to try and achieve a parking dispensation or complete waiver for their respective client. The application involves submitting a report to council as well as advertising the proposed development to the local community, including directly notifying people in the area that may be directly affected by the development. A report is submitted to council at the Town Planning Stage. Council's traffic department examines this report and a decision is made. The development, based on parking maybe accepted, declined or accepted subject to specific conditions. If any party objects to the decision made by Council in regard to granting a permit for a proposed development, they can appeal the decision to the Victorian Civil and Administrative Tribunal (V.C.A.T.). The decision to grant a permit for a proposed development will be determined in the VCAT if one of the following appeals is made;

- In the matter of an application for review against Local Council's failure to make a decision regarding a proposed development;
- In the matter of an application for review against Local Council's conditions associated with granting a planning permit regarding a proposed development;
- In the matter of an application for review against Local Council's decision to refuse to grant a planning permit regarding a proposed development; and
- In the matter of an application for review against Local Council's decision to grant a planning permit regarding a proposed development.

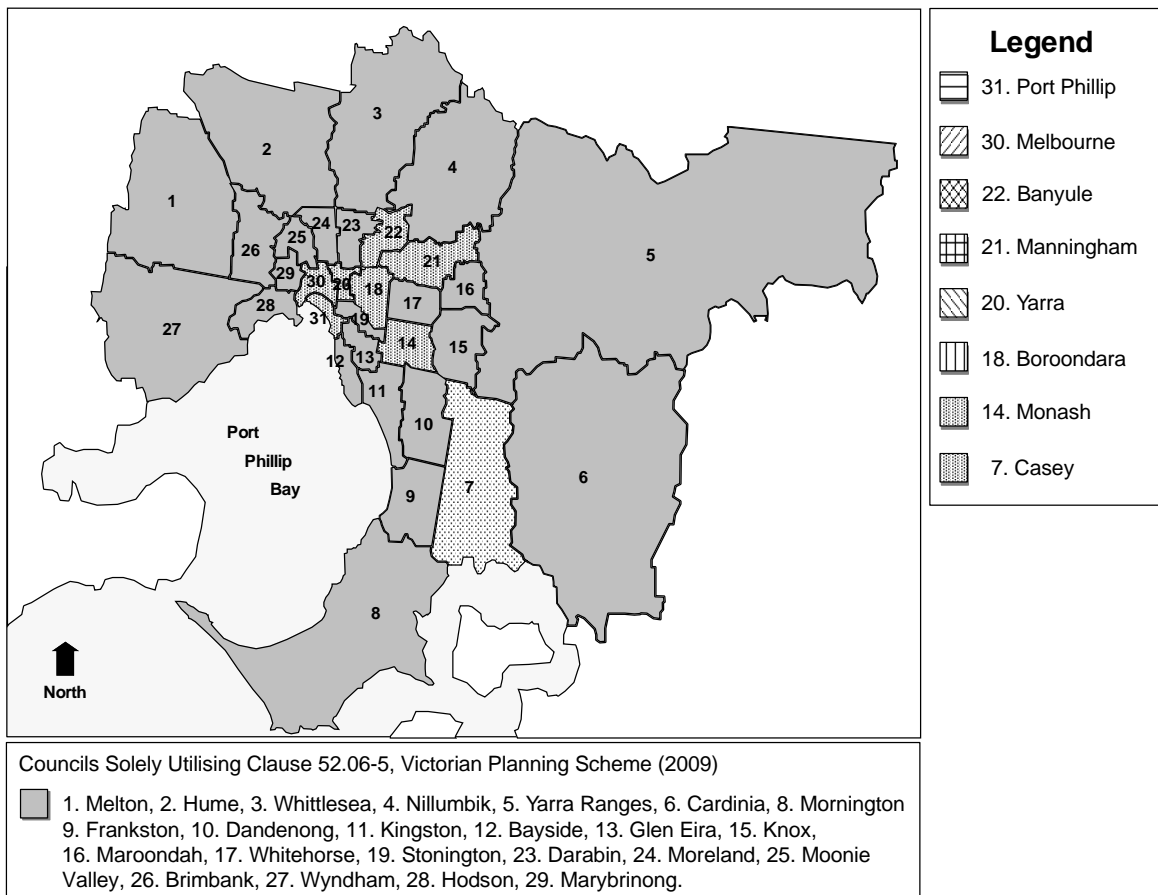
In regards to parking, Clause 52.06 of the Victorian Planning Scheme (2009) governs the typical rates required for different land uses. This document is the principal document that governs required parking rates throughout metropolitan Melbourne. The rates within this document are used by council to assess the parking requirement of individual developments. This governs, unless council has developed an alternate set of rates based on extensive research, throughout the entire municipality or within a certain precinct. This is particularly relevant within inner city municipalities and activity centres.

Many municipalities across Metropolitan Melbourne have their own governing parking rates, whether it be Schedule Clause 52.06-6 to Clause 52.06, an individual Clause within the

Municipalities Planning Scheme that differs to the general Victorian Scheme or a Planning Document produced by council. All these documents provide alternate rates to the Victorian Planning Scheme’s (2009) Clause 52.06.

The metropolitan Melbourne Municipalities that are solely governed by Clause 52.06 and have no other parking policy documents or Schedule 52.06-6 are shown on Figure 1. There are 24 councils that use the Scheme as the basis for specifying parking requirements. There are 32 Municipalities in Melbourne.

Within metropolitan Melbourne, there are currently 8 Local Government areas that incorporate alternate parking rates to those specified within Clause 52.06 of the Victorian Planning Scheme (2009) (See Figure 1). These rates are provided in the form of a Schedule to Clause 52.06-6, Clause 22.03, a Town Planning Policy or some form of alternate Parking Management Plan. Those councils that formally differ from the Schedule 52.06-06 are Banyule, Manningham and Melbourne. Clause 22.03 also allows for variations in parking supply. Boorondara utilises this clause. Further Councils that have developed a parking policy plan of their own are Monash, Casey, Port Phillip and Yarra. The location of these municipalities is shown in Figure 1.



**Figure 1: Local Governments that differ from general parking requirements.**

Within the eight municipalities with alternate rates to the Victorian Planning Schemes’ (2009) standard of 8.0 spaces per 100 m<sup>2</sup> of leasable floor area for ‘shop’ and 3.5 spaces per 100 m<sup>2</sup> of net floor area for ‘office’ there are a further 21 sub-regions that have specialised parking rates. The rates vary across Melbourne, with the lowest rate being 0.5 spaces per 100 m<sup>2</sup> of leasable floor area in the Capital City Zone, within the City of Melbourne.

The spatial distribution of parking rates is shown in Figures 2 and 3. It can be seen that the rate reductions are more common in the inner to middle city with the consequent provision of more parking in outer suburban areas. The impact of this on decentralisation of cities was explored by Young and Currie (2006).

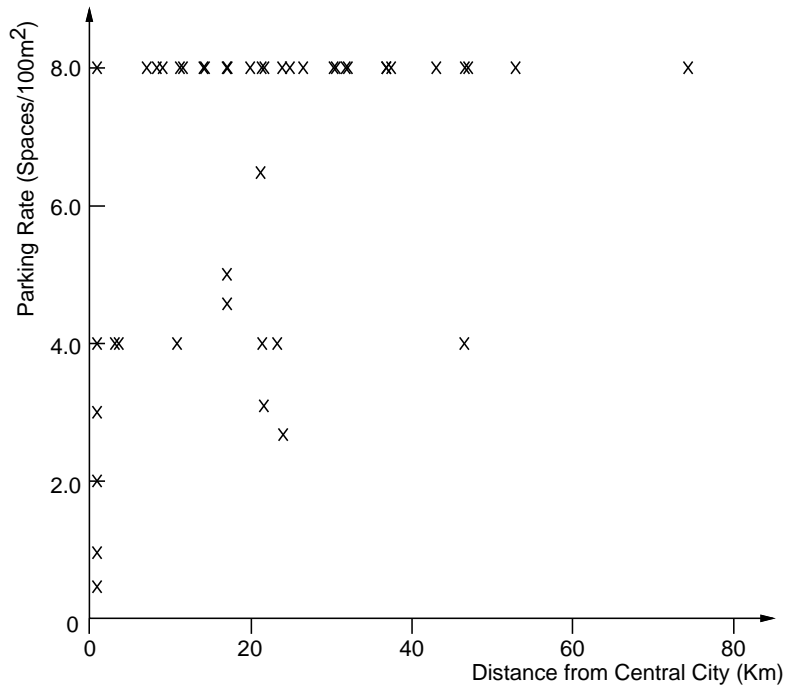


Figure 2: Parking rates for shopping

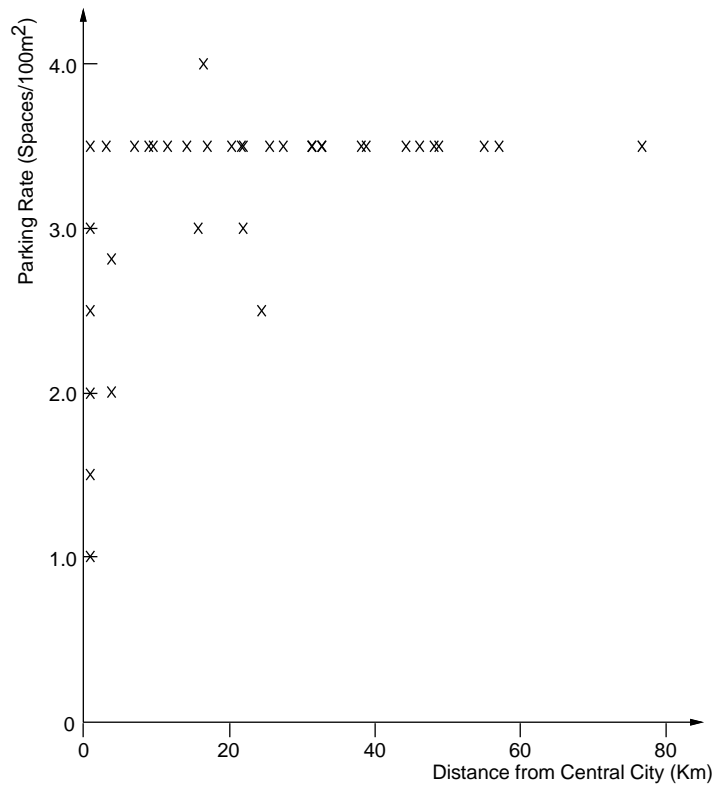


Figure 3: Parking rates for office

### 3. Measured parking provision

In the previous section, parking rates from the Victorian Planning Scheme (2009) and alternate documents or Clauses have been introduced. There is a need to compare the statutory requirement with what is actually provided. In a lot of cases, developments are granted a reduction or complete waiver of on-site parking provision. This is especially evident in areas with large amounts of existing parking and in areas of high public transport accessibility. There is for this reason a need to identify what parking provisions are actually provided in a pre-determined precinct in order to gauge if the amount of parking matches the land-use in the area. To gain some indication of the implementation of parking rates two areas in Melbourne were studied. These are the Central Activity District of Maroondah Council (Zone 16, Figure 1) and retail parking in the City of Knox (Zone 15, Figure 1).

Table 2 shows the observed parking supplied in the Ringwood Central Activity District (CAD) and the discrepancy with the statutory requirement. The Ringwood CAD contains a large number of retail and commercial outlets in the form of shopping centres and strip shopping centres along major and council arterial roads. Figure 4 shows the breakdown of the precincts used in the study of the Ringwood CAD. They include:

- **North-West Precinct** – Incorporates the land-uses along Ringwood Street, Nelson Street, Bond Street, Charter Street and New Street;
- **Eastland Precinct** – The major shopping complex in the eastern suburbs, with over 200 outlets and many major retailers;
- **Ringwood Square Precinct** – Includes a range of outlets including a number of major retailers. Also includes the now decommissioned Ringwood Market, which is being redeveloped;
- **Maroondah Highway Precinct** – All the land uses along the Maroondah Highway corridor, including those that may not have direct access or frontage, however are within close proximity; and
- **Ringwood Station Precinct** – Incorporates the station and the related car-parking.

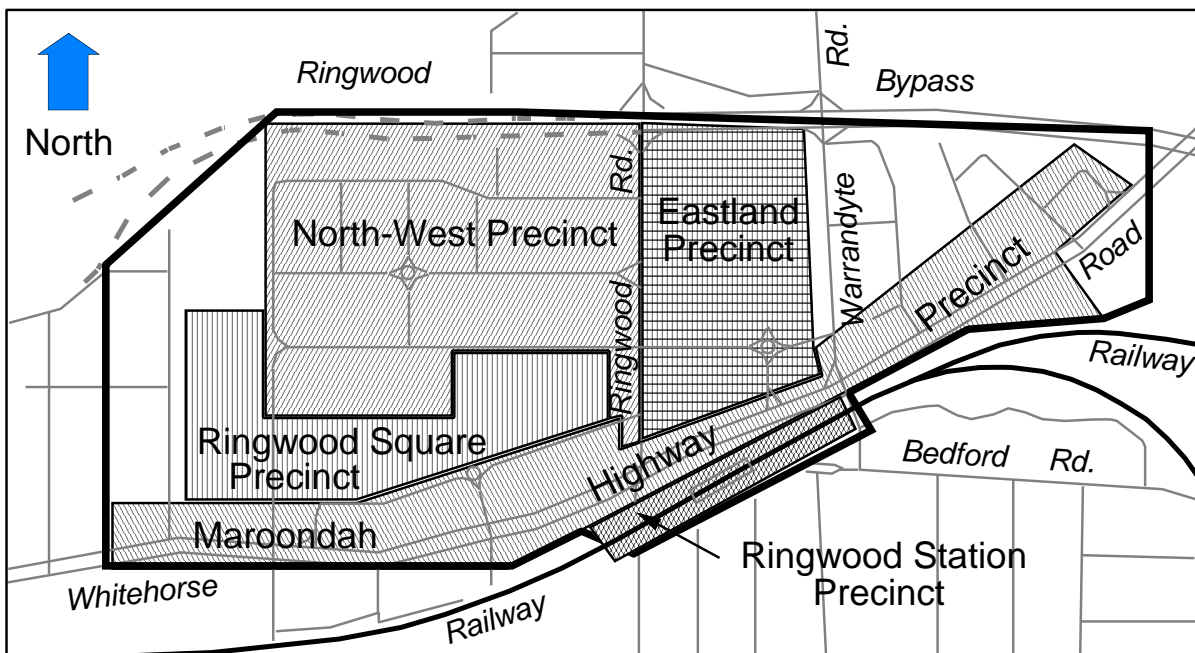


Figure 4 – Five Precincts of Ringwood Activity District

Table 2 shows the parking requirements and the actual parking for each of the zones in the Ringwood activity centre. The total short fall of 6,286 spaces (42% of the Victorian parking Scheme (2009) requirement) is likely to be due to the reduction or complete waiver of parking often granted to developers, by council. The high level of public transport accessibility and the number of public carparks in the area often means that developers are not required to provide parking on-site.

**Table 2: Parking requirement and actual parking provided in Ringwood CAD.**

Shopping Precinct in Ringwood CAD	Off-street parking provided	Spaces required by the Victorian parking Scheme (2009)	Percentage difference _ (- is below requirement)
Eastland	4,700 spaces <sup>1</sup>	5,673 spaces	-17.2%
Ringwood Square	1,056 spaces	1,365 spaces	-22.6%
Maroondah Highway	1,770 spaces	6,379 spaces	-72.3%
North Western	765 spaces	1,401 spaces	-45.4%
Ringwood Railway	241 spaces	-	-
<b>TOTAL</b>	<b>8,532 spaces</b>	<b>14,818 spaces</b>	<b>-42.4%</b>

<sup>1</sup> Number of parking spaces in Eastland parking facilities is approximately 4,700

A second study of parking requirements and provision was carried out in the City of Knox. Table 3 shows that the parking provided were lower than the statutory requirement. This was most marked in the newest and largest shopping complex in the area, Knox City. It can be seen that the parking provided is considerably less than those prescribed by The Victorian Planning Scheme (2009).

**Table 3: Parking Supply and Requirements for Shopping in the City of Knox**

Shopping centres	Off-street parking provided	Spaces required by the Victorian parking Scheme (2009)	Percentage difference (- is below requirement)
Shopping Centres between 1000 m <sup>2</sup> and 10,000 m <sup>2</sup>	3,005 spaces	3,647 spaces	-17.6%
Bayswater Shopping Centre	1,020 spaces	1,429 spaces	-28.6%
Boronia Shopping Centre	1,893 spaces	2,466 spaces	-23.6%
Knox City	6324 spaces	11,551 spaces	-45.3%
Mountain Gate Shopping Centre	727 spaces	924 spaces	-21.3%
Stud Park Shopping Centre	1,509 spaces	2,161 spaces	-30.2%
<b>TOTAL</b>	<b>14,478 spaces</b>	<b>22,178 spaces</b>	<b>-34.7%</b>

This reduction in the rates of parking provided can result from many reasons. Local governments may wish to reduce the supply of car parking to encourage other modes of transport. Developers may not wish to pay the high cost of constructing above and below ground parking and hence trade-off transport improvements in the area with a lower supply of parking. The demand for shopping parking may also have changed as the result of longer

shopping hours during the week and on weekends. As discussed above the planning process determine the final amount of parking supplied.

The Melbourne Government has acknowledged that the rates provided in Clause 52.06 of the Victorian Planning Scheme (2009), which were produced in the 1970's on the basis of limited parking studies and may not reflect the current parking demand in areas across metropolitan Melbourne for a range of specified land-uses, particularly 'shop' and 'office'. Table 4 shows some proposed changes to Clause 52.06 with Shop and Office use highlighted. Comparison of Table 4, Figures 2 and Figure 3 show the new rates are considerably lower than the previous ones.

**Table 4 – Proposed Planning Scheme 52.06 Carparking Requirements**

Land Use	Standard Rate	Activity Centre Rate	Carparking Measure
<i>Shop other than listed in this table</i>	4	3.5	to each 100 m <sup>2</sup> of leasable floor area
Postal Agency	4	3.5	to each 100 m <sup>2</sup> of leasable floor area
Supermarket	5	5	to each 100 m <sup>2</sup> of leasable floor area
Market	8	3.5	to each 100 m <sup>2</sup> of leasable floor area
Food and drink premises other than listed in this table	4	3.5	to each 100 m <sup>2</sup> of leasable floor area
Convenience shop if the leasable floor area exceeds 80sq m	10		To each premises
		3.5	to each 100 m <sup>2</sup> of leasable floor area
Restaurant	0.4		To each patron permitted
		3.5	to each 100 m <sup>2</sup> of leasable floor area
Convenience Restaurant	0.4		To each patron permitted
		3.5	to each 100 m <sup>2</sup> of leasable floor area
Hotel	0.4		To each patron permitted
		3.5	to each 100 m <sup>2</sup> of leasable floor area
<i>Office, other than listed in this table</i>	3.5	3	To each 100 m <sup>2</sup> of net floor area
Dwelling	1	1	to each one or two bedroom dwelling, plus
	2	1	to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms), plus
	1	0	for visitors to every five dwellings for developments of five or more dwellings

An alternate approach to parking provision, in residential parking is being trialed in the City of Melbourne (2009). It relates to maximum parking rates. Planning scheme amendment C133, which applies to Carlton, Southbank and parts of North Melbourne, West Melbourne and East Melbourne, allows the provision of zero on-site car parking spaces and places a discretionary limit of one car parking space per dwelling for developments over four storeys.



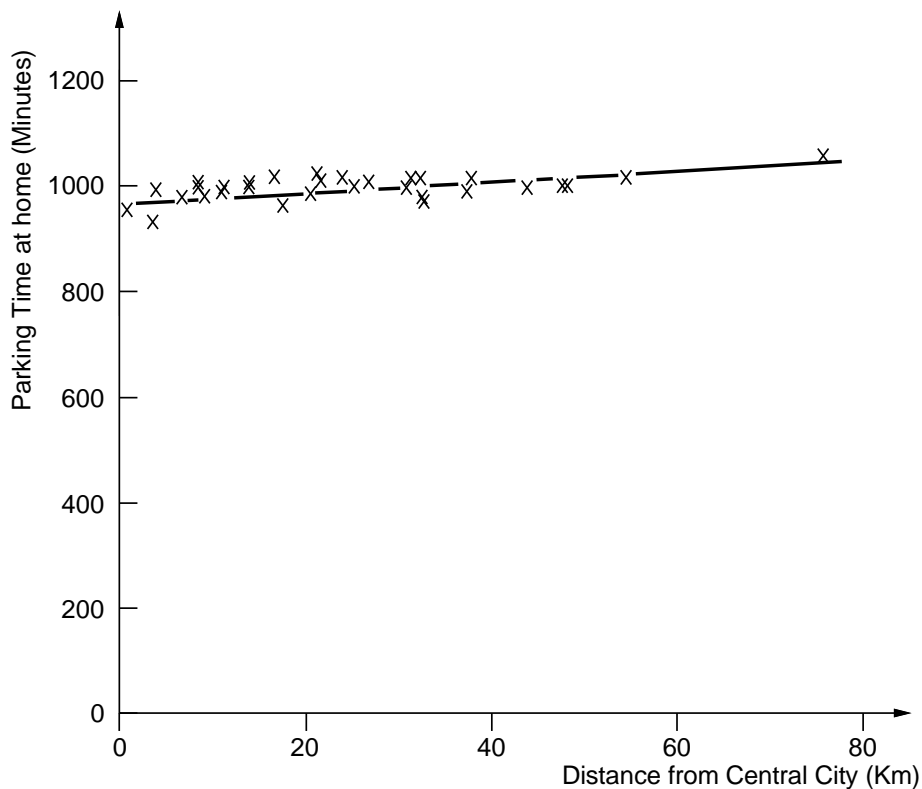
It also provides a strategic basis for assessing requests for reductions in required car parking for developments under four storeys.

### 4. Parking demand

The previous sections have outlined the parking supply policy and the implementation of that policy. This section investigates the distribution of parking demand in Melbourne. The data used in this section was collected by the Department of Transport in Victoria and is called the VISTA-07 (2008) data base.

VISTA-07 (2008) indicates that the average vehicle spends about 71 minutes travelling each day. It is parked on average 351 minutes per day during this travel. The remainder the day, 1018 minutes, it is parking at its home residence. These are relatively 4.9%, 24.4% and 70.7% of the day. On average, vehicles are parked 95.1% of the day.

Figure 5 shows the average time parked in a local government area while at home across the urban area. Table 5 shows the relationship between these variables. It can be seen that there is a slight increase in time vehicles are parking at home as one moves from the central city but this change is not great and the average parking time at home is relatively evenly distributed across the metropolitan area.

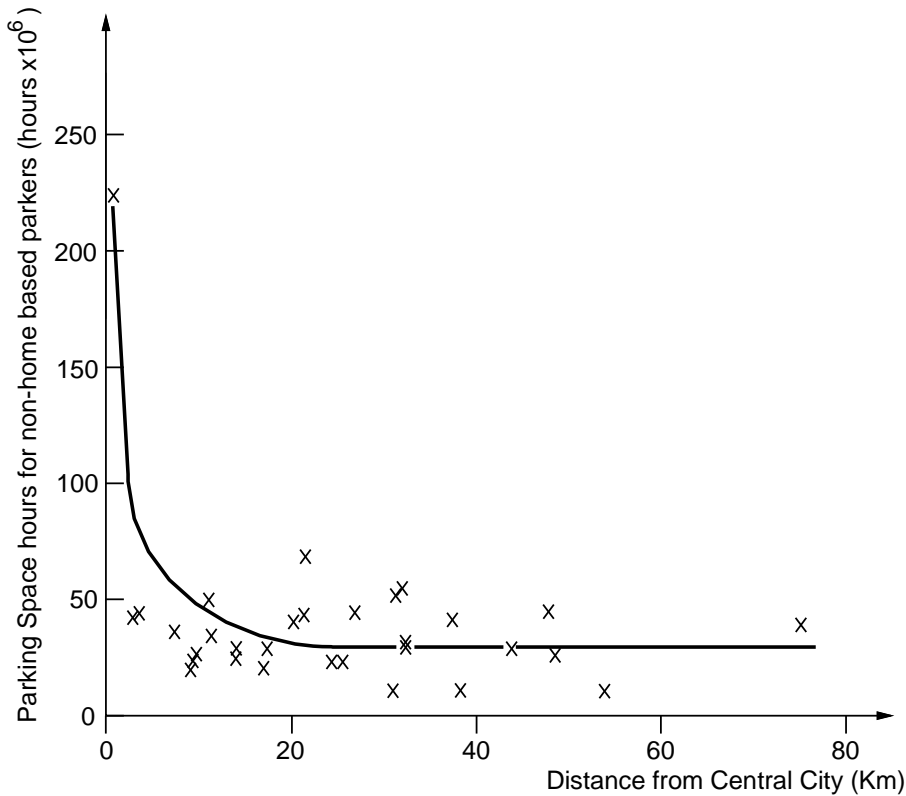


**Figure 5: Average time parked at home by vehicles in each Local Government Area in Melbourne**

**Table 5: Relationship between parking demand and distance from the central city**

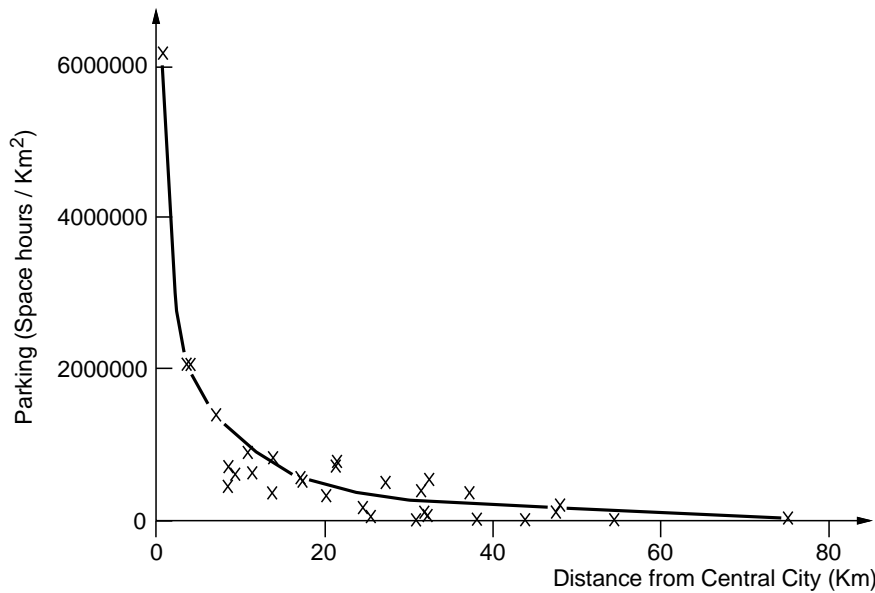
Dependent Variable	Independent Variable	Relationship	R <sup>2</sup>	Significance of relationship
Parking time at home (Minutes)	Distance from the central city	967.0 + 1.0 (Distance from the central city)	0.455	0.01% level
Log (Parking space hours in each local government) (Space Hours)	Log (Distance from central city)	8.2 – 0.51 Log(Distance from central city)	0.682	0.01% level
Log (Parking space hours per area of each local government) (Space Hours / km <sup>2</sup> )	Log (Distance from central city)	6.8 – 1.0 Log (Distance from central city)	0.758	0.01% level
Parking space hours per job (Space hours / job)	Distance from Central city	757.3 + 2.8 (Distance from central city)	0.200	0.20% level

The average number of space hours parking in each of the local governments in Melbourne for non-home activities are shown in Figure 6 and Table 5. It is clear that the largest parking demand is in the central city but there is no real trend in the other local government areas.



**Figure 6: Average number of space hours parked in each Local Government in Melbourne**

The average space hours per square kilometre in each local government area is provided in Figure 7 and Table 5. It can be seen that there is a progressive decrease as the distance from the central city increases. This indicates the parking demand per unit area is lower in the outer suburbs.



**Figure 7: Average number of space hours per square kilometre in each Local Government in Melbourne**

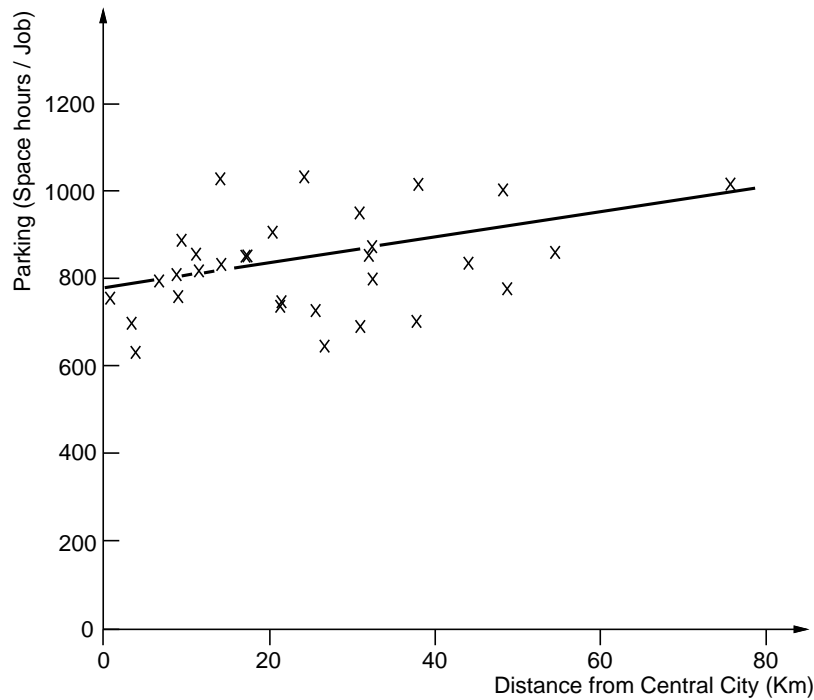
The average space hour per job in each local government is presented in Figure 8 and Table 5. It shows that there is a slight increase in parking demand per job as the distance from the central city increases. This is expected given the guidelines used in the Victorian Parking Scheme (2009), lower levels of public transport provision and the land available for parking provision is greater.

The previous discussion has shown the spatial distribution of parking supply and demand. These both relate directly to the spatial distribution of travel and land-use utilisation. More specific impacts on travel are illustrated in Figure 9, where the number of parking events that is, trip ends, per job are shown. An increase in parking events and trips with distance from the central city is evident.

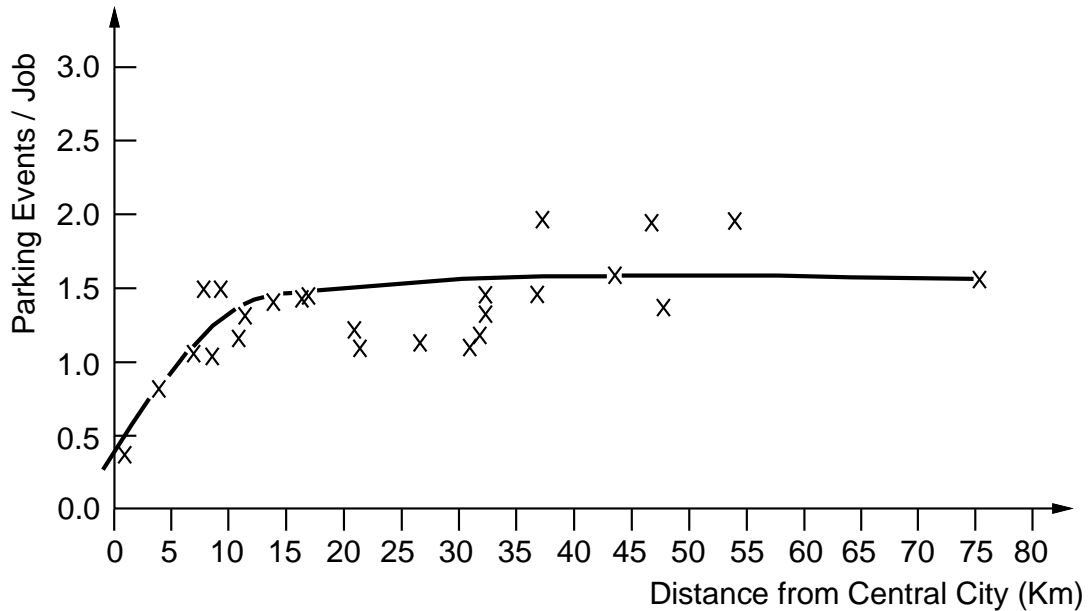
## 5. Conclusion

This paper has looked at three different perspective of parking in Melbourne. It points to the need to consider parking at a metropolitan level, rather than focusing parking policy in particular regions.

The initial investigation covered the accepted parking rates for the two land-uses of ‘shop’ and ‘office’ across the municipalities of metropolitan Melbourne. The majority of municipalities are governed by Clause 52.06 of the Planning Scheme with further rates and definitions provided within Clause 52.06-6 and Clause 22.03. Aside from specific Clause’ within the Planning Scheme’s, some municipalities have produced rates within Town Planning Policies or specific Car Parking Guides.



**Figure 8: Average number of space hours of parking per job in each local government in Melbourne**



**Figure 9: Average parking events per job for each local government in Melbourne**

The two analysed land-uses of 'shop' and 'office' had varying rates across Melbourne. Comparatively however, the land-use 'shop' varied the most, between 0.5 spaces per 100 m<sup>2</sup> of leasable floor area to 8.0 spaces per 100 m<sup>2</sup> of leasable floor area. The minimum of 0.5 spaces per 100 m<sup>2</sup> of leasable floor area was observed in the Capital City Zone. The average was in the range of 3.0-4.0 spaces per 100 m<sup>2</sup> of leasable floor area. Office varied slightly between 1.5 to 3.5 spaces per 100 m<sup>2</sup> of net floor area.

The second aspect of the parking cycle studied within this paper was the relationship between the statutory requirement and what is actually provided. Studies of the Ringwood Central Activity District and City of Knox found that there is a large discrepancy between the statutory requirement and what is provided in the area. This is expected to be the case due to the reduction or complete waiver of parking often granted to developers, by council in regions like this. The high level of public transport accessibility and the number of public car-parks in the area often means that developers are not required to provide parking on-site.

The rates provided in Clause 52.06 have been acknowledged by the Victorian Government to be outdated and based on limited parking survey data at the date of inception. For this reason Clause 52.06 is being redrafted and will provide rates more suitable to today's transport and parking climate. As well as this, the recognition of Activity Centres has been acknowledged in the re-draft with different rates for areas zoned Activity Centres and for the remaining area of the municipality.

The third aspect reviewed was the distribution of parking demand. It showed that parking at home was relatively evenly distributed across the urban area. Parking demand for non-home activities was related to the size of the area concerned and amount of activities in the area measured by the number of jobs. The parking demand per level of activity as measured by the number of jobs increased slightly as the distance from the central city increased.

This study has shown the general trends in parking supply policy and parking demand in Melbourne. There is a need to further this study in order to gain a deeper understanding of the relationship between parking, transport and land use policy. An initial study should attempt to quantify the actual supply of parking in all local governments in Melbourne and relate these to the spatial demand for parking. In order to obtain a holistic view of parking policy in Melbourne the spatial distribution of parking pricing and location policy also requires study. Finally, the main point of this paper was to open up debate on the need to look at parking policy over entire urban areas not to just focus on part of the city, like the central city. Melbourne is well placed to undertake such a study. However, other cities should also be studied in such a manner so that the generality of the findings can be confirmed.

## 6. References

- Victorian Planning Scheme (2009)*. Department of Planning and Community Development, Victorian Government, viewed on 30/3/09 <http://www.dse.vic.gov.au/PlanningSchemes/>
- Young, W. and Currie, G. (2006). "Parking and urban development", in Proceedings of the 22<sup>nd</sup> ARRB Conference – Research Into Practice, Canberra, 29 Oct-2 Nov 2006, ARRB Vermont South VIC, pp. 1-12.
- Melbourne 2030 (2009) Victorian Government, viewed 21st July 2009, <http://www.dse.vic.gov.au/melbourne2030online/>
- Melbourne City Council (2009), Viewed 18<sup>th</sup> August 2010 <http://www.melbourne.vic.gov.au/BuildingandPlanning/Planning/planningschemeamendments/Pages/AmendmentC133.aspx>
- VISTA-07 (2008). Victorian Integrated Survey of Travel and Activity 2007". Victorian Government, Melbourne Australia.