

Rhodes Precinct Parking Rates – DRAFT FOR CONSULTATION

Date:	24 April 2023	Jacobs Group (Australia) Pty Ltd.
Project name:	Rhodes East	Level 7, 177 Pacific Highway
Project no:	IA197700	North Sydney, NSW 2060
Attention:	Eva Stanbury, Amanda Harvey	PO Box 632
Company:	Department of Planning and Environment	North Sydney, NSW 2059
Prepared by:	Katie Pearce/Miliss Mansour	Australia
Document no:	Rhodes East Review of Parking Rates	https://www.jacobs.com/
Revision no:	Final	

1.1 Background

This technical memorandum examines a proposal from property development and construction company Meriton to allow an increase in the provision of on-site parking for its new residential developments in Rhodes East.

Parking rates set for Rhodes Precinct were included in the City of Canada Bay Local Environment Plan (LEP) as part of implementation of the Rhodes Place Strategy. The new parking rates mirror recent work undertaken for Rhodes East by Jacobs which examined the traffic and transport needs for Rhodes East; an area that is planned to ultimately accommodate over 4,200 new dwellings capped at 70% pending further arterial road upgrades (see previous study below for details).

Meriton is seeking to lift the LEP parking rates for all bedroom types, particularly the larger 3 and 4 bedroom units which it states are increasingly in demand due to new market trends.

The proposal by Meriton is accompanied by a parking report prepared by TTPP which examined parking and travel demand at apartments within walking distance of Rhodes station. It covered 10 residential apartment sites and surrounding streets with trip generation surveys undertaken during AM and PM weekday peaks.

1.2 Previous study

As part of the planning process to rezone land in Rhodes for higher density residential, Jacobs prepared a Traffic and Transport Report in 2021 which recommended transport initiatives to support the DPE rezoning in consultation with City of Canada Bay and TfNSW. The study included assessment of the road network including development of a traffic model to assess the impact of additional development quantum on the surrounding transport network and where necessary identify improvement measures to maintain acceptable network performance.

The report identified existing and future year transport constraints in Rhodes. It identified Concord Road, the main access route, to be constrained by its capacity to accommodate additional demand for travel. Using traffic modelling, it identified that 70% of the full development quantum can be accommodated at a serviceable level with a combination of small scale network improvements and travel demand measures. The 2036 Project Case did not operate at a suitable level with the full development quantum without further network upgrades including a possible grade separation of the intersection of Concord Road/Homebush Bay Drive. The study did not seek to identify what these road improvements may include and instead recommended that 70% of the total development quantum be developed first with the remaining 30% and its associated road network improvements to be identified in future.

For residential, which is the predominant land use in Rhodes, the trip generation rates were estimated from first principles using personal trip rates based on target mode share and compared against vehicle trip rates specified in the RTA guidelines¹ Guide to Traffic Generating Development (discussed later in this report).

A vehicle trip generation of 0.22 per residential unit corresponding with 44% aspirational private vehicle modal split was adopted. This trip rate was used in traffic simulations to identify the required road improvements associated with traffic generated by the developments in Rhodes.

The report recommended maximum parking rates as a policy tool to manage travel demand and dependence on private vehicles taking into account the proximity to the nearby public transport services that the area enjoys. Parking rates for the residential development type are shown in Table 1.

Table 1 : Proposed maximum parking rates by category and development

Land Use	LEP Maximum Parking Rates
Residential	0.1 spaces per studio dwelling
	0.3 spaces per 1 bedroom dwelling
	0.7 spaces per 2 bedroom dwelling
	1 space per 3 or more bedroom dwelling
	1 visitor parking per 20 dwellings

These rates were not derived as part the traffic assessment and are independent of traffic modelling and the trip generation rate that was adopted to determine the network improvements. Other than the implicit assumption that high on-site parking supply would result in higher trip generation and greater network impacts, there is no direct relationship between these parking rates and the adopted trip generation rate.

Intuitively it can be understood that a provision of no parking spaces would result in zero private car trips, compared to 1 car space which would result in some car trips and thus a relationship between car parking and trip generation is clearly present. However, the extent of this relationship is not fully quantifiable nor linear. For example, whilst an increase in car parking at the scale of 0-1 spaces per household would have an impact, there isn't a strong body of evidence to suggest that trips rise in proportion to additional car spaces above one space per dwelling. There is a point at which demand for travel remains fully realised even where additional car spaces are available but not used. There is insufficient data available to be able to predict the incremental change in trip generation of households in response to changes in number of parking spaces.

The adopted parking strategy is one of a suite of travel demand management measures considered as part of the Rhodes Place Strategy. The objectives for Rhodes were:

- 1) Create a local street network that is designed for people first and vehicles second.
- 2) Prioritise active and public transport, and demand management measures to support sustainable travel behaviour and encourage reduced car use.
- 3) Provide a diversity of land uses with walkable access to a variety of services and facilities to discourage unnecessary car trips.
- 4) Establish the Rhodes peninsula as part of Sydney's connected network of jobs and recreation taking advantage of its central location within the Olympic Peninsula.

Of the related principles identified and most relevant to this technical note relates to Objective 2 intended to 'Provide a policy framework that supports sustainable travel behaviour (such as parking rates, behavioural programs, travel plans)'.

¹ TDT2013-04a, using high density average from St Leonards, Chatswood and Strathfield (similar average 2 bedrooms)

2.1 TTPP Report

The TTPP report presents the result of trip generation surveys at 10 residential developments along with their characteristics such as number of units, bedrooms, and parking spaces to determine average vehicle trip generation rates to make the case for increasing the parking rates from the levels in the LEP. Based on analysis of the survey results, it concluded that:

- A large portion of residents living in Rhodes use public transport on weekdays even if they own a car and are provided with a car space,
- Residents' choice to use public transport is driven by the convenience of using public transport and ease of access to Rhodes train station, not whether they own a car
- There is no uplift in average traffic generation at the sites that were surveyed despite these developments providing more parking than what would be permitted using LEP rates (Table 2)

Table 2: Traffic Generation Rate Per Number of Unit

Site*	Apartment*	No. of Units*	Car spaces Provided*	Ratio Car spaces/unit	AM Peak*	PM Peak*	Car spaces (LEP rates)	Ratio LEP spaces/unit
1	Vantage North	263	289	1.1	0.19	0.22	195	0.67
2	Reflections Rhodes	94	101	1.07	0.30	0.22	72	0.77
3	Sienna by the Bay	319	388	1.22	0.21	0.23	234	0.73
4	Elinya	101	118	1.17	0.24	0.28	74	0.73
5	Amarco	222	272	1.23	0.27	0.20	164	0.74
6	6-12 Jean Wailles Ave	175	193	1.1	0.19	0.20	128	0.73
7	Vantage South	266	284	1.07	0.18	0.18	193	0.73
8	Village Quay	288	380	1.32	0.16	0.20	188	0.65
9	Walker St Stg 2A & 3A	759	789	1.04	0.14	0.16	432	0.57
10	Rhodes Central Stg 1 & 2	554	582	1.05	0.15	0.17	433	0.78
	Average (10 sites)	3041	3396	1.12	0.20	0.21	2113	0.69

*Data from TTPP Report

- In the developments surveyed, during the weekday peaks, average peak hour trip rates are generally in line with those modelled in the acceptable operational scenario produced by Jacobs despite parking rates being substantially higher than the LEP rates
- The TTPP report includes a comparison of trip generation rates from selected sources that shows that during the weekday peaks trip rates are generally in line with rate adopted for the Rhodes East Traffic and Transport report despite the higher parking provision of the sites that were surveyed.

Table 3: Comparison of trip generation rates from different sources

Source	Trip Generation Rate (per unit)	
	AM Peak Hour	PM Peak Hour
TTPP driveway counts and on- street parking occupancy	0.20	0.21
PwC Rhodes West Travel Survey and Trip Generation (driveway counts only)	0.13	0.16
Rhodes Traffic and Transport report (Jacobs, Sept 2021)	0.22	0.22
MS TDT 2013/04a (Sydney Average)	0.19	0.15
RMS TDT 2013/04a (Chatswood Site Only)	0.14	0.12

Source: Table 4.3 TTPP Trip Generation and Parking Provision Report, Nov 2022

In light of their assessment, the following car parking rates have been proposed by Meriton:

Table 4: Proposed changes to parking rates

Dwelling	Meriton Proposed Rates	LEP Maximum Rate
Studio	-	0.1
One bedroom	1	0.3
Two bedrooms	1-1.2	0.7
Three bedrooms	1.5-2	1
Four bedrooms	2	1
Visitor	1 per 7 units	1 per 20 units

2.2 Review of TTPP Report

The following comments are provided in relation to the report's findings:

- i. Average peak hour trip generation rates of the surveyed sites are in line with Rhodes Traffic and Transport report despite the sites having 60% more on-site parking than permitted under the LEP.
- ii. The parking rates proposed by Meriton are above the rates that were applied to the surveyed sites. It is unclear how this would impact the trip generation rate and whether it would result in an increase as equivalent evidence and analysis for sites with the proposed rate are not given in the TTPP report.
- iii. The report does not test any development with the proposed (LEP) parking rates. It is not possible to ascertain how this would affect the trip generation and whether a decrease in car trip trips below that adopted would occur using LEP parking rates.
- iv. The report considers the trip generation of the sites in the AM and PM peak periods only. There is no evidence to confirm that similar or lower trip generation occurs during weekend when car utilisation is expected to be higher due to preponderance of personal and leisure trips. The TTPP report recognises that residents are more likely to use their cars on the weekend.
- v. The two data sets used (sites 1-6 and the supplementary PWC data sites 7-10) show different average trip rates. Whilst inclusion of the secondary dataset improves the analysis due to the increased number of data points, their inclusion result in lowering of both average and mean trip generation rates.

Table 5: Variance in trip generation rates at TTPP surveyed sites

Trip Generation per Unit (Table 4.2 of TTPP Report)	AM		PM	
	Sites 1-6	Sites 7-10	Sites 1-6	Sites 7-10
Average	0.23	0.16	0.23	0.18
Median	0.23	0.16	0.22	0.18

The report suggests that the difference may be due to the closer location of sites 7-10 to the train station (which results in a shorter walking distance to access public transport). Analysis of differences between the sites suggest other contributing factors that may explain variation in the trip generation rates between sites:

- i. The developments with higher unit volumes tend to see lower trip generation rates. Conversely, developments with lower unit volumes see higher trip generation ratios. It is likely that developments with higher unit volumes are also closer to public transport and retail facilities so enjoy shorter walking distances.
- ii. Mixed land-uses such as retail are provided onsite at several of the higher unit volume sites resulting in a decrease in retail and leisure trips as residents are able to undertake these trips on foot as opposed to having to drive to one or more other locations.

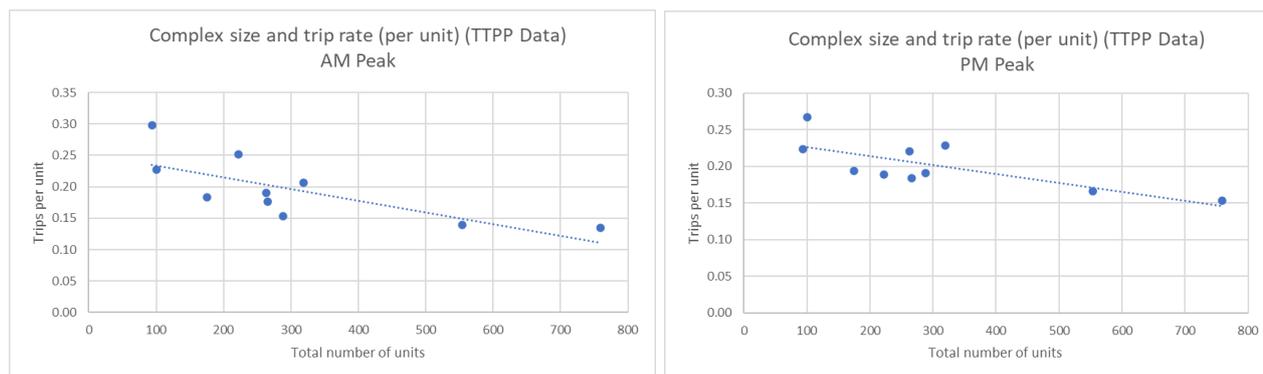


Figure 1: Complex size and trip rate (TTPP data)

3.1.1 Impact of on-site parking provision

Trip generation rates per unit vary between 0.07² (Guide to Traffic Generation of Developments Site 3) and 0.30 (TTPP site 2) in the AM peak. The variation in trip generation across the sites is large, including some sites with trip rates that are significantly higher than the 0.22 vehicle trips/unit adopted for assessment of road network in Rhodes and some with trip rates at or below 0.22. Due to the wide range, there is a risk associated with drawing conclusions from average trip rates to support a particular car parking rate.

For the sites that were surveyed in Rhodes, there is no strong evidence to show that the rate of parking provision directly influences their trip generation rate. For example, the sites with higher spaces per unit do not necessarily exhibit higher trip generation compared to sites with lower ratio of spaces per unit. Whilst this is evident from the data, due to the majority of the apartments surveyed having parking provision rates of at least 1 car per unit it is not possible to ascertain if at lower rates that some relationship would not emerge - particularly where rates per unit are below one and therefore some residents would be precluded from owning a private car entirely with the expectation that this would result in a reduction in average trip rates.

² Note that several of the GTGD sites are very small and as such present less reliable trip rates than larger sites with a higher number of dwellings and trips.

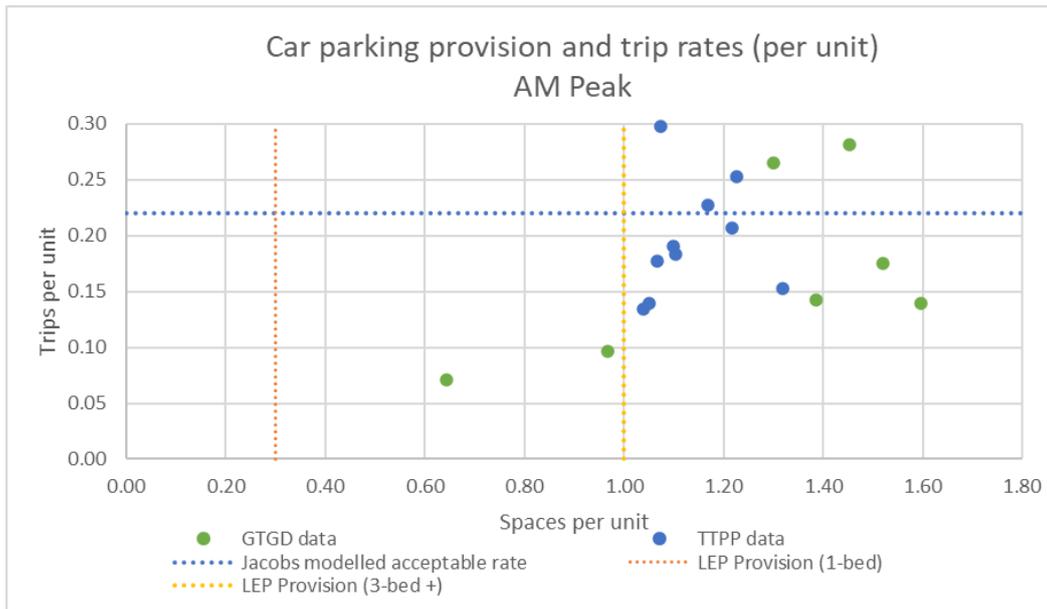


Figure 2: Car parking provision and trip rates

3.2 Weekday Peak and Weekend Travel Patterns

Whilst the TTPP report provides a detailed analysis of weekday peak hour trip generation and travel behaviours, it does not consider weekend travel patterns when there is a greater propensity to use private vehicle for leisure and other discretionary trips.

Trip Generation

Data on weekend travel behaviour is generally sparse with limited data available for detailed assessment. The majority of travel models include only weekday travel behaviour with the commuter peak periods generally accepted as design hours for network assessment and sizing. As a result, travel data is commonly collected to support analysis of weekday commuter peak hour traffic.

Notwithstanding the above and for the purpose of undertaking a preliminary analysis, travel data from the 2013 Guide to Traffic Generating Developments Updated Traffic Surveys and the Brisbane Open Data source³ were used to compare the trip generation of weekday and weekend (Saturday) of high-density residential developments. Figure 3 shows the peak hour and daily trip generation of a number of residential developments. Whilst several sites show higher peak hour and daily trip generation during the weekend than in the weekday peak, there is no clear pattern to support a conclusion as each site is different in terms of its size, location and attributes that influence travel behaviour.

³ <https://www.data.qld.gov.au/dataset/traffic-generation-data-2006-2019>

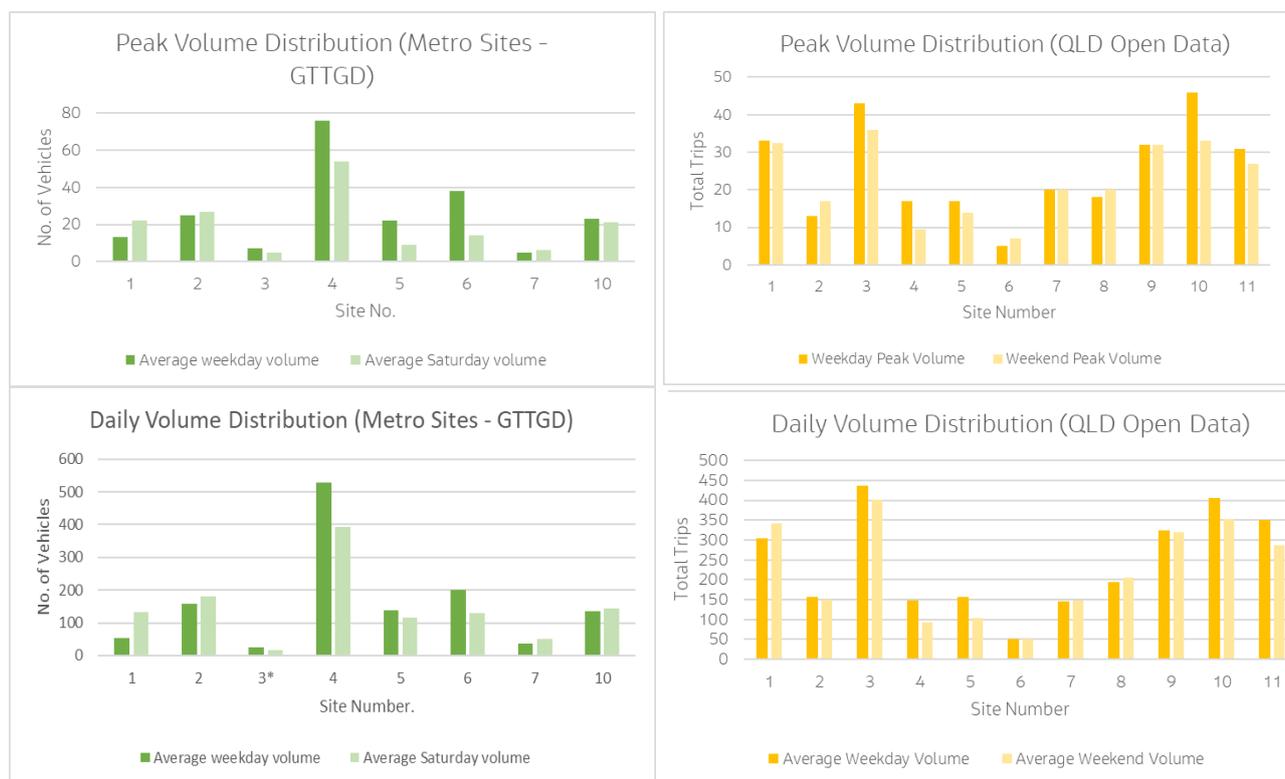


Figure 3: Weekday and Weekend traffic volumes (Guide to Traffic Generating Developments and QLD Open Data)

Road Network

To understand the potential impact of possible higher weekend trip generation on the road network, average weekday and weekend traffic profiles for Concord Road are shown in Figure 4⁴. Flows were also compared for seasonality and annual changes (Appendix B and Appendix C respectively) and at other nearby locations external to the area where counts are available (Appendix D).

It can be seen that higher average daily flows are experienced on Concord Road on Saturdays compared to weekdays. A plot of hourly flows for an average weekday and Saturday shows a slightly higher maximum hourly flow on Saturday compared to the weekday average. The weekday traffic profile shows two distinct peak periods with AM peak commencing at 7am and evening peaking at 5pm. Saturday exhibits a peaking of traffic commencing at 9am but continuing unabated throughout the day until 6pm.

On the basis of comparison between weekday and weekend trip rates and traffic volumes on Concord Road, it can be seen that a Saturday trip generation rate that equals or is higher than the identified weekday rate may potentially result in a worse network outcome than the weekday peak hours. The scale of the impact would be dependent on how much higher the trip generation rates are and whether the identified network improvements would be sufficient to accommodate higher level of traffic demand and avoid deterioration in traffic conditions on Saturdays.

⁴ Raw data downloaded for week of 2/5/22 – 8/5/22 from: <https://roads-waterways.transport.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html/?z=15&q=Homebush%20Bay%20Drive,%20Rhodes%20NSW,%20Australia&lat=-33.82475247247905&lon=151.09134161102705&id=29005&tb=1&lg=1&di=1&df=3&hv=0&yr=2023&to=0map/index.html/?z=15&q=Homebush%20Bay%20Drive,%20Rhodes%20NSW,%20Australia&lat=-33.82475247247905&lon=151.09134161102705&id=29005&tb=1&lg=1&di=1&df=3&hv=0&yr=2023&to=0>

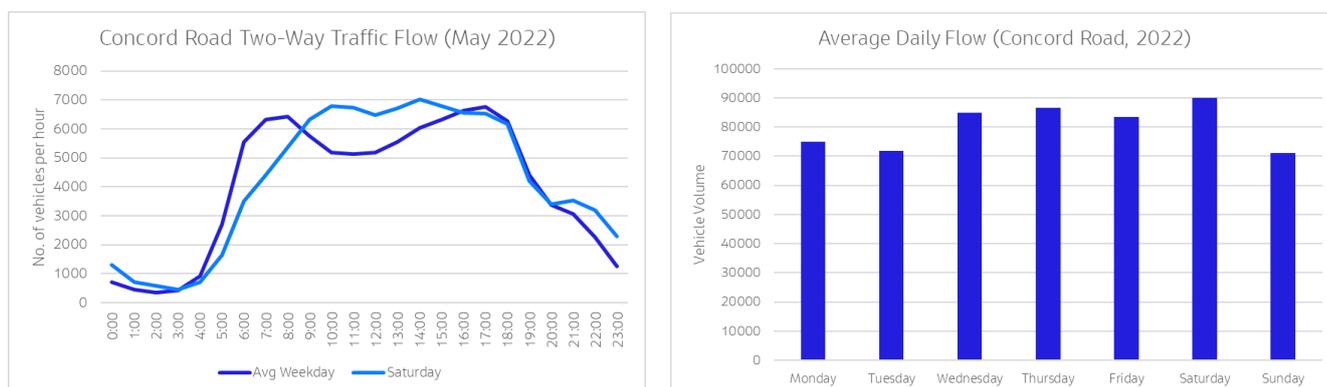


Figure 4: Traffic volumes on Concorde Road

3.3 Redistribution of apartment mix and parking distribution

The proposal by Meriton suggests a change in market preference for type of apartments particularly a greater preference for 3- and 4-bedroom apartments. An increase in the number of larger units results in reduction in the number of smaller units with a subsequent redistribution of parking spaces. It is assumed that the overall number of parking spaces remains approximately equal. This would effectively result in a higher ‘bedrooms per unit’ rate.

Figure 6 shows the relationship between housing mix (bedrooms per unit) and trip generation rates. Due to limited observed data, the spread of average bedrooms per unit is limited with only a few data points outside of the 1.9-2.3 range. It is therefore difficult to assess the impact of a significant shift toward very high or very low bedroom mix. Notwithstanding this limitation, the data suggests that for bedroom densities of between 1.9-2.3 bedrooms per unit, trip generation is not driven by the number of bedrooms.

The surveyed data also shows that larger developments (those with a higher net number of units) produce a higher number of total trips (Figure 5). This is intuitive – reflecting that larger developments house more people and therefore generate higher travel demand across all modes.

3.4 Options for parking reallocation

In view of data from the surveys in Rhodes East and findings regarding their trip generation rates, this section considers options to raise the parking rates for Rhodes East. Each option is considered on the basis of its merits and evidence of relevant data based on existing studies to support the expected outcome.

3.4.1 Option 1 - Allocation based on total Gross Floor Area

As data suggests that the volume of trips generated is linked to the size of the development i.e. total GFA of the development, it may be feasible to allocate parking spaces based on GFA rather than unit make-up as presently is the norm thus giving developers flexibility to respond to market demands and provide a higher number of larger units that include more parking spaces. This means that if a higher number of larger units with higher average GFA per unit are built, there would be a corresponding net reduction in the number of other types of units that can be built as the total GFA is kept fixed and less GFA would be remaining. Considering that trip generation is calculated based on number of units, standard traffic engineering processes would generally predict that a reduction in the total number of units within a building should result with a corresponding decrease in the trip generation of the site. Note that the initial number of trips generated by a development based on scale and typology would then be subject to refinement, for example to reflect the network impacts of the total trips generated.

The approach offers flexibility to provide larger units and allocate parking spaces based on their size without impacting on the trip generation of the overall development. This approach is used for commercial developments but to date has not been implemented for residential uses in Sydney.

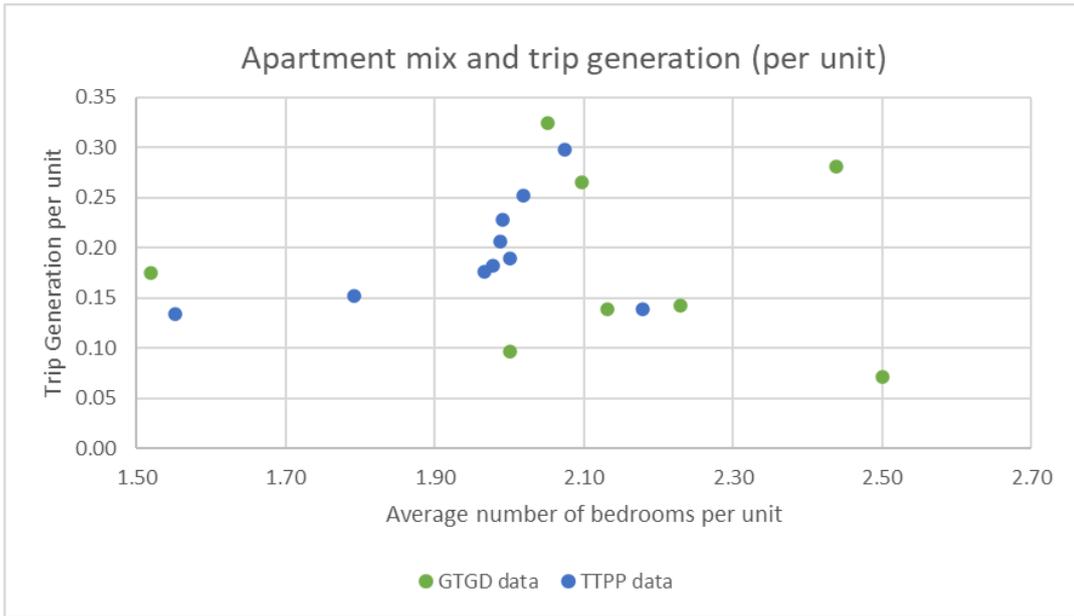


Figure 6: Apartment mix and trip generation rate (AM Peak)

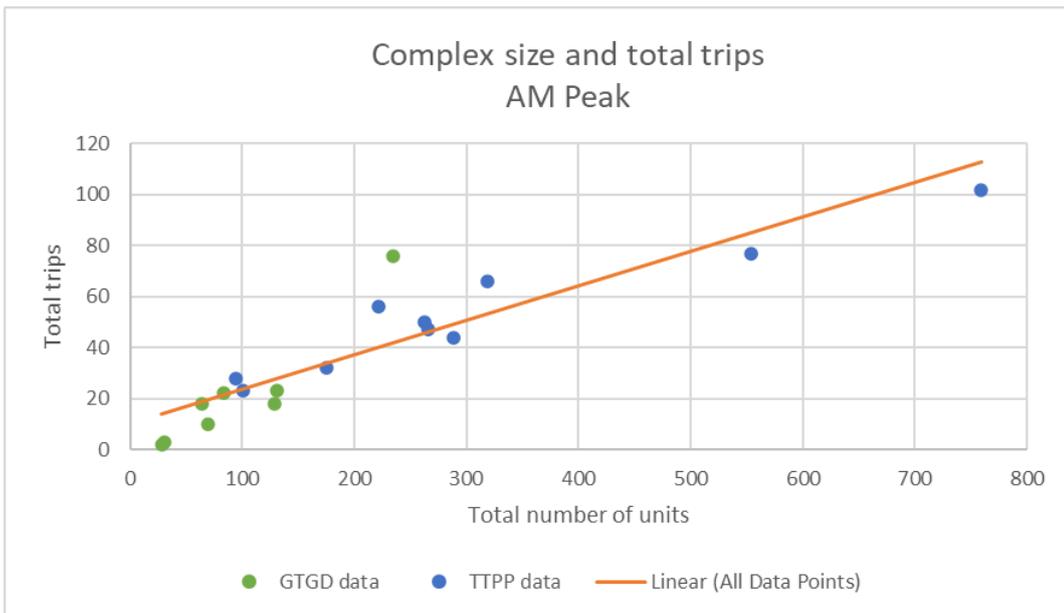


Figure 5: Complex size and total trips (AM Peak)

3.4.2 Option 2- Adoption of alternative parking rates

TTPP’s report suggests that the provision of LEP parking rates are lower than what is required to ensure that trip generation does not exceed the 0.22 rate used for traffic modelling and network capacity analysis. However, the rates proposed by Meriton have not been tested and lack a clear evidence base to support the change.

A review of alternative parking rates implemented across a variety of DCPs and LEPs in Sydney demonstrates that in many cases the evidence base or underlying transport guidance used to determine the parking rates is not provided or is unclear. The main guidance available is the Guide to Traffic Generating Developments

(GTGD) referenced earlier in this report. The Guide suggests that parking for Metropolitan Sub-Regional Centres should be allocated as follows:

- 1 Bedroom Apartments: 0.6 spaces per dwelling
- 2 Bedroom Apartments: 0.9 spaces per dwelling
- 3 Bedroom Apartments: 1.4 spaces per dwelling
- 1 visitors space per 5-7 dwellings. Noting that this could be reduced if the development is close to public transport provision.

This guidance has also been adopted in the latest Apartment Design Guide (ADG) and by a number of councils in Sydney.

It is anticipated that, should the GTGD/ADG guidance to be adopted for Rhodes, the number of trips generated by the development would remain below the 0.22 weekday trip rate which was used in the acceptable weekday operational modelling scenario for Rhodes. This is on the basis that the GTGD/ADG rates would likely result in an overall average parking rate similar to that seen at the sites which were analysed based on data from sites that were surveyed in Rhodes. The analysed sites showed an acceptable average weekday trip generation rate in line with the modelled values when ratio of parking spaces provided to number of units is about 1.12 (excluding visitor parking).

For studio apartments (not currently covered by the guide) the choice between a studio and 1 bedroom unit is likely to be driven by affordability rather than a real difference between type, number of occupants and travel characteristics across the two unit types. Should the GTGD/ADG rates be adopted, it is reasonable to propose that the same parking rate be applied across 1-bedroom and studio apartments.

Similarly, for the household profile of buyers of 4-bedroom apartments, which Meriton consider to be in demand due to new market trends and preference for larger units, it is likely that their characteristics are would be to some extent similar to buyers of 3-bedroom apartments however there is limited to no local data available to understand the difference in household occupancy and characteristics between 4 -bedroom and 3 -bedroom apartments. It is conceivable that 4 -bedroom apartments may have slightly higher occupancy rate due to their larger size hence more people per unit. Should the GTGD/ADG rates be adopted, it is proposed that the same or slightly higher parking rate be applied for 4-bedroom apartments compared to 3 -bedroom apartments to account for any perceived differences

As the developments in Rhodes to which these rates will apply generally have good access to public transport, it is proposed that a maximum visitor rate of 1 parking space per 7 dwellings be adopted. For larger apartment buildings with higher number of units, the number of visitor spaces would be more substantial allowing cross utilisation of the spaces as not all units are likely to have visitors at the same time. The traffic impact of visitors is likely to be higher during weekday off-peak and weekends and almost insignificant in weekday peak hours.

3.4.3 Unbundling

The Jacobs report and the Future Transport Strategy with which it aligns both recognise that unbundling parking, that is making the purchase of a parking space separate from the purchase of an apartment, is likely to improve the utilisation of provided parking spaces as they will only be purchased by people who intend to own and use a car.

Whilst the above is a desirable outcome in terms of more efficient utilisation of provided parking supply, a perverse outcome of unbundling parking spaces may be higher trip generation rate. This is because there would be a more efficient distribution and utilisation of car parking spaces compared to a scenario where spaces are allocated to individual units and can stay empty if owner either has no car or one car with 2 or more spaces allocated. This is on the assumption that the total number of parking spaces would remain the same across a bundled and unbundled scenario.

The City of Canada Bay Development Control Plan (DCP) currently encourages decoupling to reduce total onsite car spaces where possible across its local government area. For Rhodes Precinct, the DCP calls for all residential car parking to be decoupled though separate titles. This is so that car space ownership can be transferred within the precinct.

4.1 Conclusion

The parking rates proposed as part of Rhodes East Traffic and Transport study were derived from the City of Canada Bay LEP (and associated DCP) and are reflection of the objectives and planning principles identified to support non-vehicle modes of transport through demand management measures such as car parking controls.

Meriton’s proposal involves an across the board increase in parking rates for all bedroom types to levels that are not supported by the data and assessment provided in TTPP report. However, their investigation is able to support a case to increase the parking rates to above those currently adopted in the LEP. The provided information using surveys of sites within Rhodes East are able to demonstrate that an increase in the car spaces to /unit ratio of 1.12 i.e. 112% (excluding visitor parking) is unlikely to result in a corresponding increase in trip generation during the weekday peak above the rate that was adopted for identification of road network improvements in Rhodes East. Thus, an increase in parking rates of the magnitude identified in this report using the Guide to Traffic Generating Developments which would result in parking spaces to unit ratio slightly lower than 1.12 is unlikely to contradict the planning principles on which the Rhodes Precinct Traffic and Transport Strategy has been developed.

The availability of observed data for sites with similar average parking rates (and trip rates generally in line with the modelled value) provides a level of confidence that the GTGD rates can be adopted without causing additional network demand in the weekday peak.

As described earlier, rates for studio and 4-bedroom apartments based on the GTGD/ADG rates are also included. A comparison of the LEP, TTPP proposed and GTGD/ADG rates is given in Table 6.

Table 6: Comparison of current and proposed rates

Apartment Type	Canada Bay LEP Rates	Meriton Proposed Rates	Recommended based on GTGD/ADG Rates
Studio	0.1	N/A	0.6*
1-bedroom	0.3	1	0.6
2-bedroom	0.7	1	0.9
3-bedroom	1	2	1.4
4-bedroom	1*	2	1.4**
Visitors Parking	1 space per 20 dwellings	1 space per 7 dwellings	1 space per 7 dwellings***

* Rates given as 3 bedrooms or more under the City of Canada Bay LEP

**rates not included in GTGD/ADG guidance for studio or 4-bedroom dwelling types

***from range given in GTGD/ADG guidance

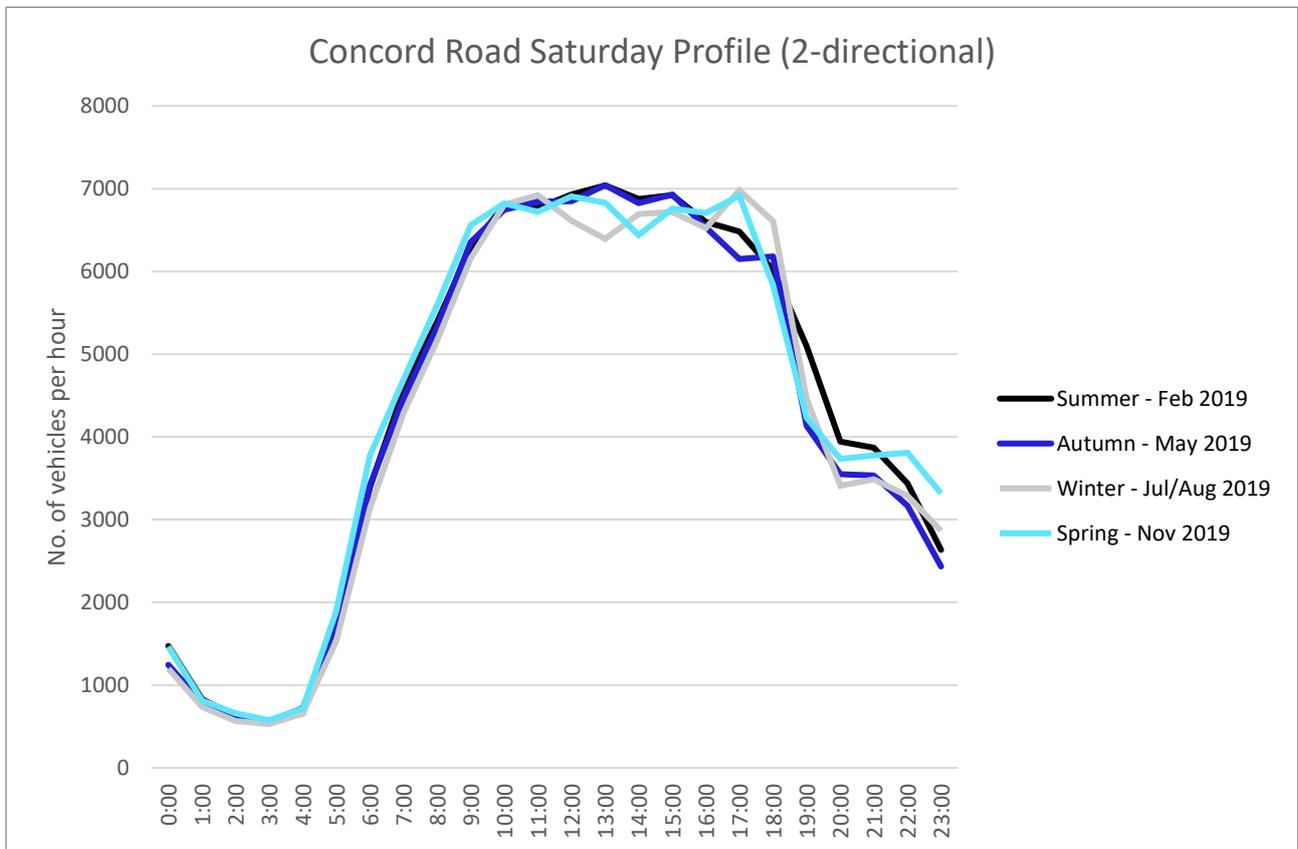
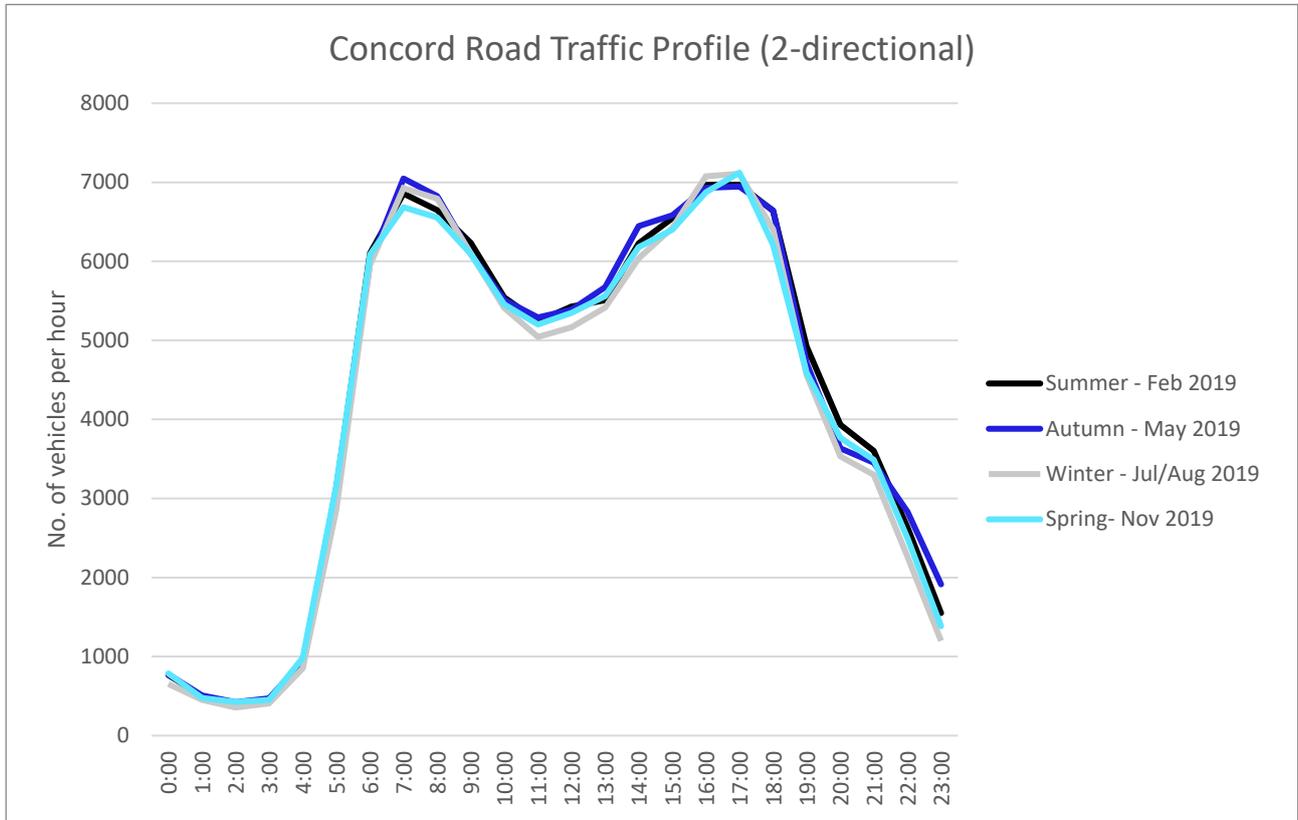
Further flexibility could be provided through unbundling or decoupling of parking spaces from apartments. This will offer developers opportunities to better respond to market demand.

The TTPP report does not present any evidence relating to weekend trip generation rate or the impacts of weekend traffic (if any) on the road network and whether the improvements identified as part of Rhodes East Traffic and Transport would be sufficient to accommodate any increase. Investigation of limited sites and available data presented in this technical note shows that daily and peak Saturday trip generation rates can be higher than weekday trip generation rates with potential for greater network impact.

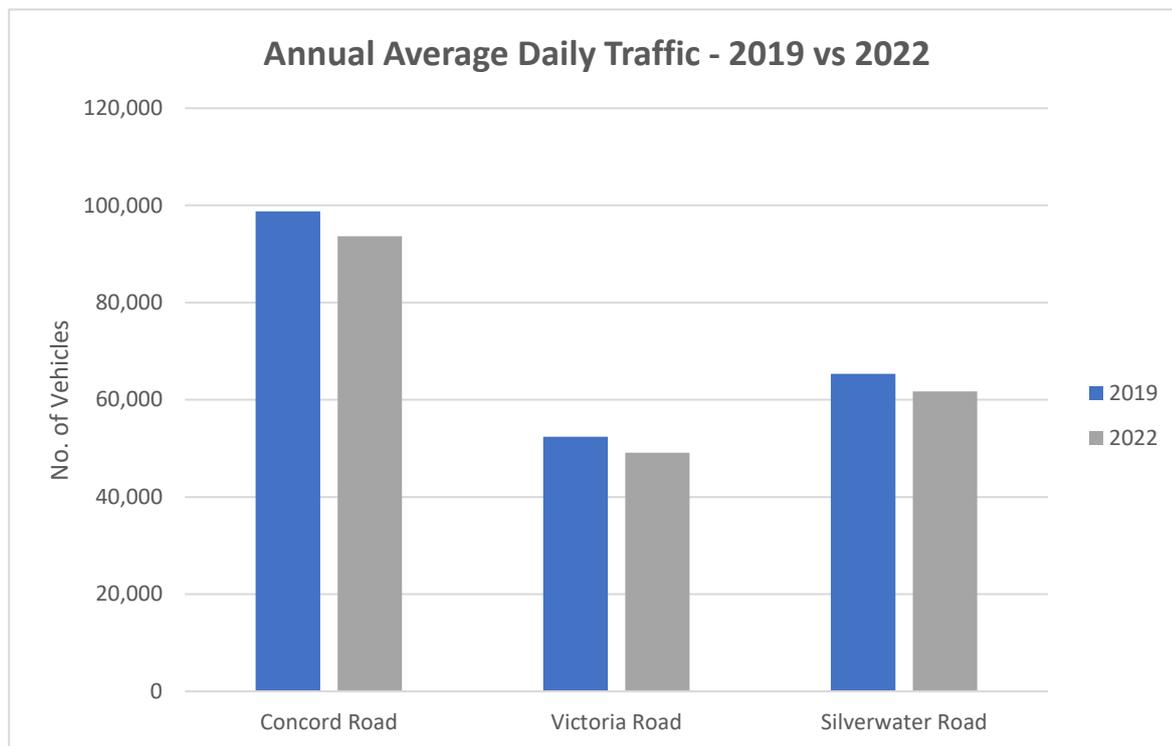
Appendix A. Brisbane Open Data Counts

Site ID	Year	Number of bedrooms	Average Weekday Volume	Average Weekend Volume	Weekday Peak Volume	Weekend Peak Volume
1	2008	192	304	342	33	32.5
2	2010	82	157	151	13	17
3	2010	423	437	402	43	36
4	2010	108	148	93	17	9.5
5	2010	52	157	104	17	14
6	2010	54	51	52	5	7
7	2017	148	146	149	20	20
8	2017	118	194	205	18	20
9	2017	200	325	320	32	32
10	2017	263	407	353	46	33
11	2017	107	350	286	31	27

Appendix B. Seasonal Traffic Variations: Concord Road



Appendix C. Annual variation in traffic flow



Appendix D. Additional count locations

