

Technical Memorandum

Title	Junee Correction Centre Traffic Study Park Lane – Site Access Intersection Analysis		
Client	Department of Justice	Project No	495416
Date	7 November 2016	Status	Final
Author	James Douglas	Discipline	Traffic and Transport
Reviewer	Andy Johnston	Office	Brisbane

Introduction

Cardno (QLD) Pty Ltd (Cardno) has been commissioned by the Department of Justice to provide traffic consultancy services for the Junee Correctional Facility Correctional Centre Increase Program. The expansion of the centre will see an increase in staff from 277 to 378 (as per information supplied by the Department of Justice via email dated 28 September 2016). The expansion will increase inmate capacity from 853 beds to 1333 beds (approximately a 56% increase in capacity) (as per information supplied by Phillips Smith Conwell via email dated 20 September 2016). This technical memorandum outlines the results of the traffic assessment conducted on the Park Lane – Site Access' intersection.

Site Overview and Proposed Development

The Junee Correctional Centre is approximately 2.5 kilometres from the township of Junee, New South Wales. The centre is in a rural context, with farming and agriculture being the dominant neighbouring land uses. The centre currently has an 853-bed capacity and employs 277 staff. The site location context is illustrated in Figure 1 below.

Figure 1 Site Location



Access to the site is only available from Park Lane (Figure 2). Park Lane can be analysed in two distinct sections. Park Lane to the east of the site access is a two-lane sealed road with a posted speed limit of 80km/h, decreasing to 50km/h approaching Junee. To the west of the site access, Park Lane has approximately 50 metres of sealed road before becoming an unsealed and undivided rural road. Park Lane to the west of the site access then continues to the west and south to meet the Olympic Highway at a priority controlled unsealed intersection.

An expansion is proposed which will increase the capacity of the centre from 853 beds to 1333 beds and increase staff from 277 to 378. The expansion provides additional capacity for housing inmates resulting in additional related vehicle movements such as staff access, inmate transfers, visitors, legal advice, deliveries and maintenance. Key to the traffic assessment is the performance of the intersection under these intensified vehicle movements.

Figure 2 Site Overview



Review of Existing Situation

This section outlines the current operating context of the centre. Key elements of the operation pertaining particularly to traffic and transport include:

- > The centre currently has a 853-bed capacity
- > The centre currently has 277 staff
- > Visiting hours are generally on weekends, however remand inmates have visiting hours between 8:30am and 11:30am on Fridays
- > There are three shifts for staff, beginning at 6:30am, 8:00am and 6:30pm
- > There are approximately 30 service vehicle trips during the week
- > There are broken 10-15 inmate escort vehicles per week.

Staff

Exact figures for the number of staff working each day was not supplied, however it can be assumed that not all 277 staff employed would work at the same time (due to rostered days off, sick leave etc). However of the total staff working each day, the proportion of staff working is broken down in Table 2.

Table 2 Number of Staff commencing each shift

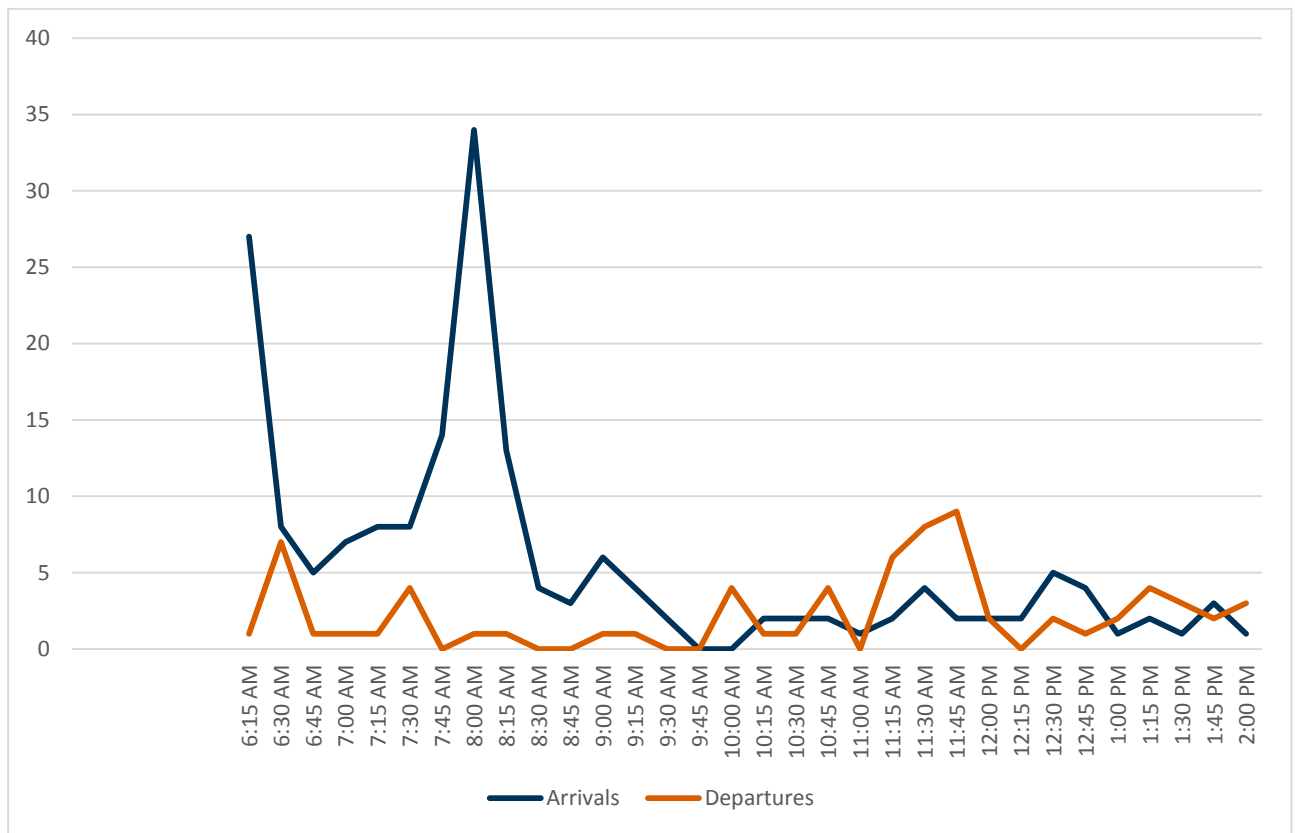
Shift Start time	Proportion of Staff
6:30am	32%
8:00am	63%
6:30pm	5%

Site Inspection and Data Collection

A site inspection was undertaken on Friday 30 September 2016 from 6am to 2pm. During this inspection, video cameras were set up to capture vehicle movements in all directions from Park Lane and the Site Access. Counts were specifically conducted on a Friday to coincide with staff shift change overs, regular deliveries and remand inmate visitation hours to capture the busiest period for traffic at the intersection. This footage was then analysed to calculate traffic counts for all movements in 15 minute periods across a single day.

Figure 3 shows the arrivals and departures from the centre over the data collection period. The peak arrival movements from Park Lane to the site occurred in the 15 minute period ending 8:00am, however a significant peak was also recorded in the 15 minute period ending 6:15am. The peak hour for movements was calculated to be the hour ending 8:15am. Peak departures (from the site to Park Lane) occurred in the 15 minute period ending 11:45am.

Figure 3 Park Lane - Site Access Traffic Analysis: Arrivals and Departures



These peaks coincide with user behaviour at the site. The peaks in the 15 minute periods ending 6:15am and 8:00am correlate to staff shift start times and remand inmate visitation hours. Furthermore, the peak departure movements (the 15 minute period ending 11:45am) from the site correlates with the end of visitation hours.

Figure 4 graphs all movements at the intersection across the day, compared to those centre related and non-centre related trips (through trips). Figure 4 shows that the vast majority of movements at the intersection are centre related, with only minimal through trips.

Figure 4 All intersection movements versus Junee Correctional Centre movements

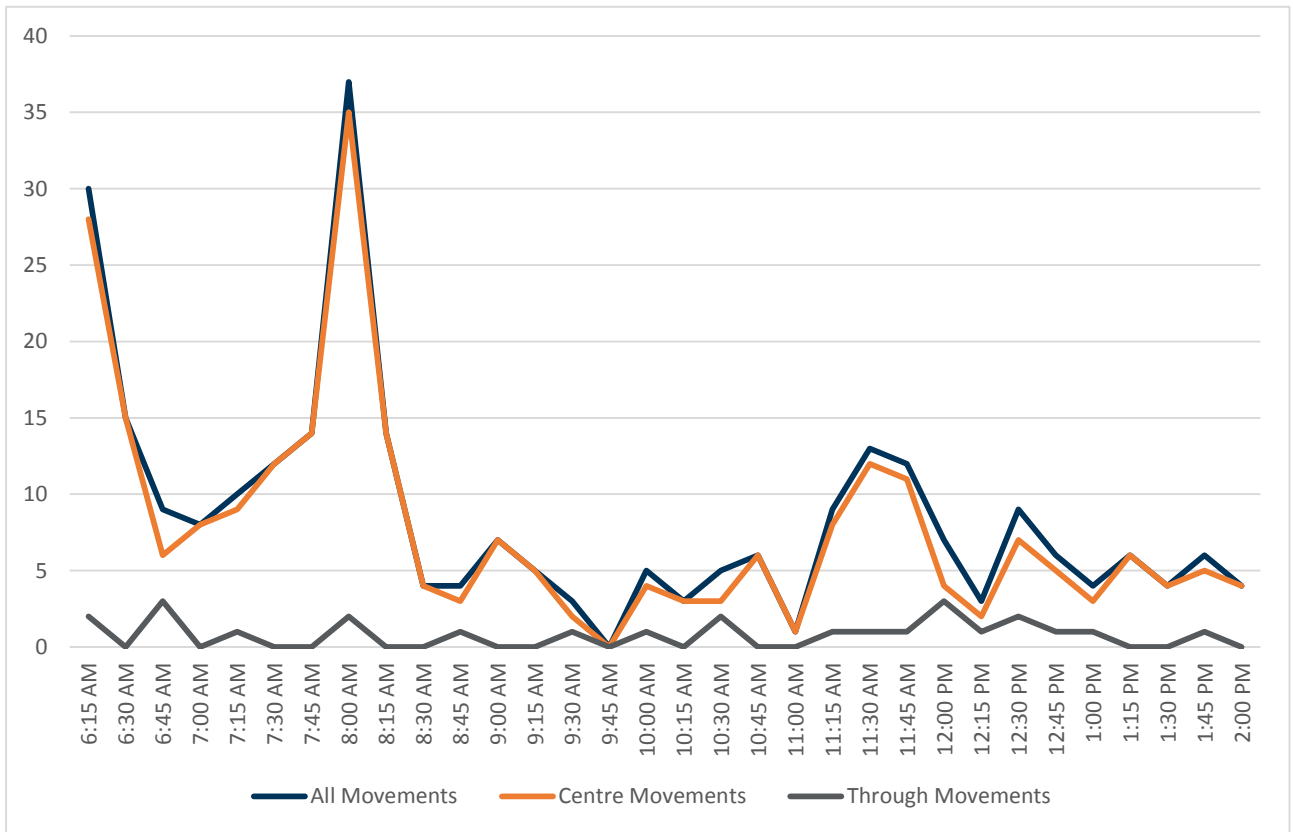


Figure 5 illustrates the current peak hour volumes as analysed. These have been used in the SIDRA assessment of the intersection performance.

Figure 5 Current peak hour volumes

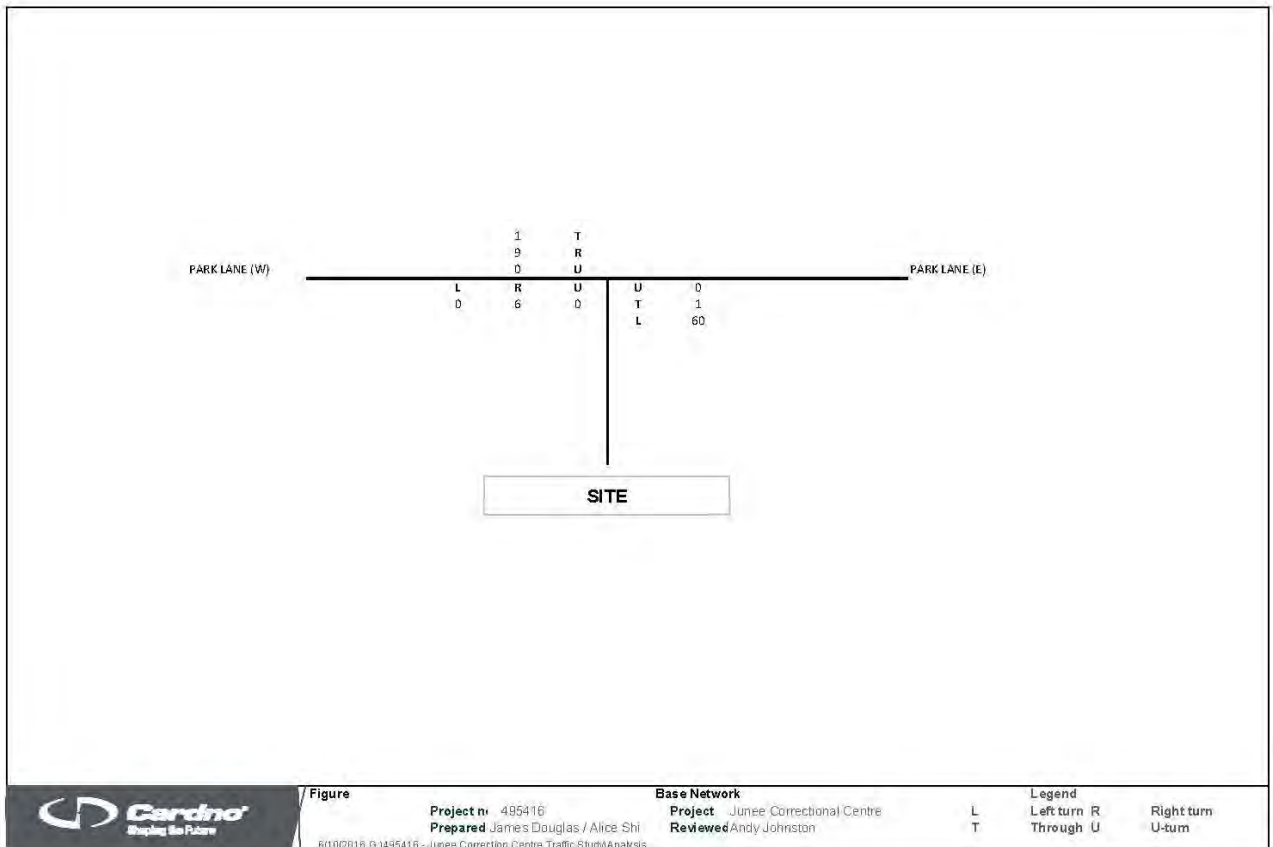


Figure 6 shows the distribution of movements in either direction along Park Lane as calculated from the measured volumes. This shows that the vast majority of movements distribute to the east towards the Junee township.

Figure 6 Distribution of Junee Correctional Centre Traffic



The data in Figure 5 was used to perform a SIDRA analysis on the background performance of the intersection, the results of which are presented in Table 1. This analysis suggests that the intersection is currently performing in an acceptable manner with a minimal calculated degree of saturation, very short delay times and nominal queuing lengths.

Figure 7 Park Lane – Site Access intersection as modelled in SIDRA

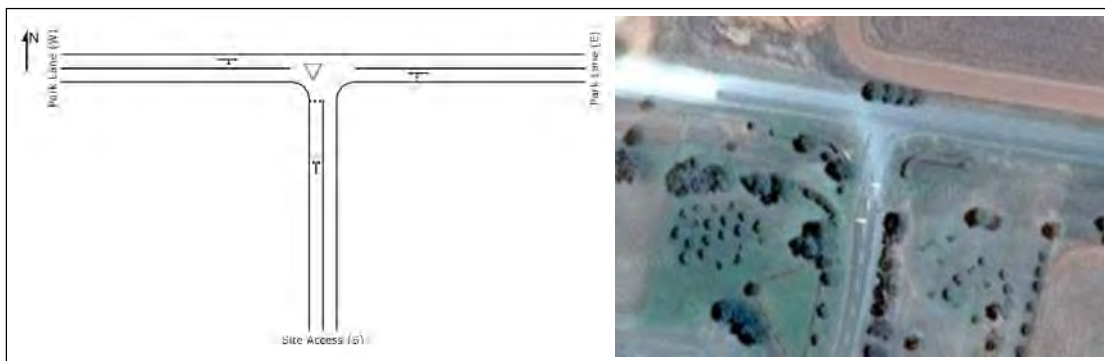


Table 1 Summary of SIDRA analysis of background traffic scenario

Scenario	AM Peak		
	DOS	Delay	95 th ile Queue
2016 Background	0.035 v/c	5.5 seconds	0.2 metres

Impact of Expansion

To conduct analysis on the intersection performance post expansion of the centre, a number of assumptions were made regarding the proportion of staff working each shift, the projected traffic behaviour and forecast growth.

Assumptions

The following assumptions were made in the traffic analysis:

- > **Background Traffic Growth:** It was assumed that through moving traffic (that is, vehicles moving along Park Lane which do not originate from or terminate at the Junee Corrections Centre) would be subject to traffic growth due to the rural nature of the road and it not being a major thoroughfare for through traffic. Therefore a growth factor was not applied to these movements in the analysis.
- > **Development Traffic Increase:** Based on the supplied information that staff numbers are currently 277 and would expand to 378. It is reasonable to assume that traffic volumes would increase in line with an increase in staff, given these are the major contributor to traffic movements. Therefore an expansion factor of 1.36 (277 existing/378 proposed =increase factor of 1.36) was applied to centre-related traffic movements on the road network.
- > **Service Vehicles:** It was assumed that based on the 480 inmate increase (56% increase on existing capacity) the daily volume of additional heavy vehicles (for example, for goods delivery and maintenance) would be nominal and did not require specific analysis.
- > **Assessment Period:** Traffic assessment has been restricted to the period observed with our traffic surveys. However, this occurs during the morning peak period and is during either the arrival or departure of each of the three shift periods and a visiting period. Therefore, it is reasonable to assume that this assessment catches the significant traffic generation periods at the site.

Figure 8 illustrates the existing arrival departure profile between 6am and 2pm and compares this to the assumed arrival/departure profile once the expansion has occurred. This shows that the maximum hourly traffic generation for the Centre increases from 75 vehicles to 102 vehicles.

Figure 8 Current arrival departure volumes compared to future arrival departure volumes

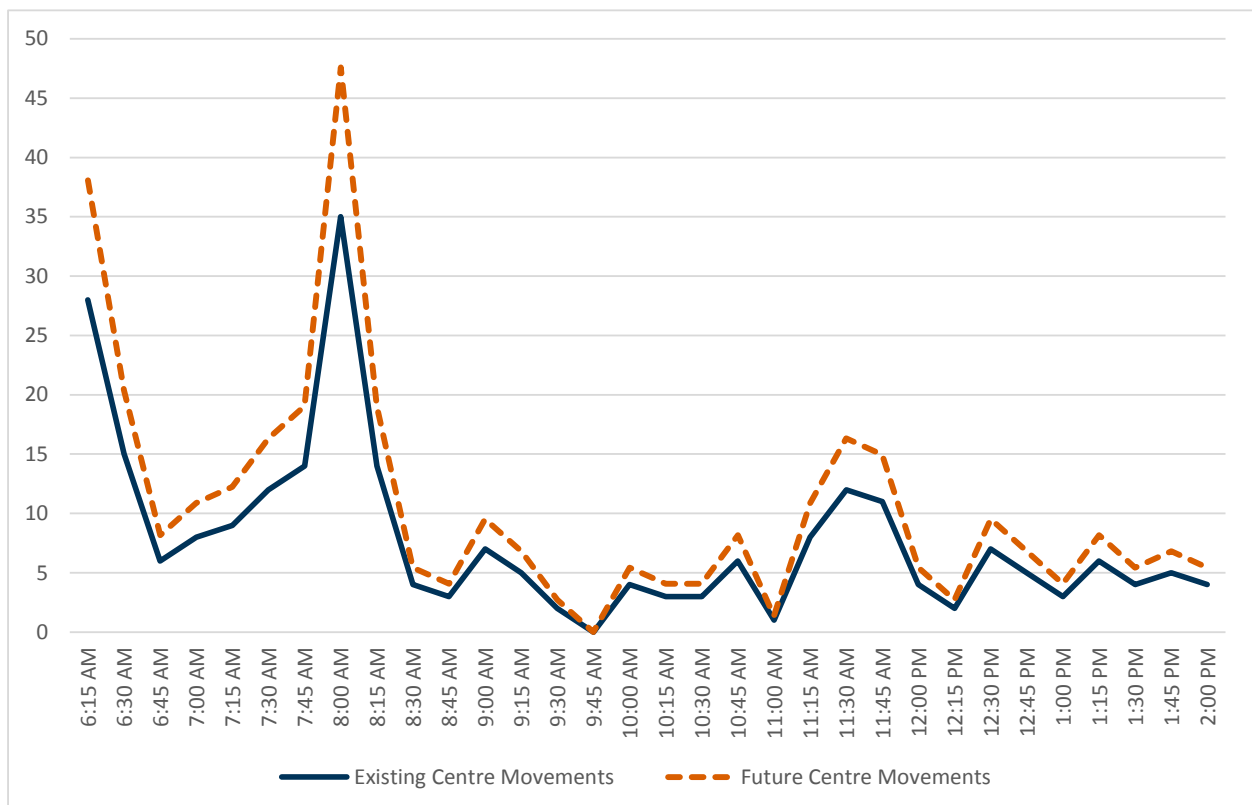


Table 2 shows the predicted peak hour traffic volumes at the Park Lane/Site Access intersection these have been utilised in the assessment of the access intersection.

Table 2 Existing and Future Volumes at Park Lane – Site Access intersection

Time Period	Existing Volumes	Future Volumes
7:30am	12	16
7:45am	14	19
8:00am	35	48
8:15am	14	19
Total	75	102

Growth factor of 1.36 applied

Visitor Generation

Cardno acknowledges that the proposed Correctional Centre expansion is likely to generate additional visitor trips to and from the site as a result of the increased inmate capacity. The surveyed traffic generation profile included in Figure 8 however identifies the surrounding road network peak is heavily dictated by the changeover of staff during the AM period, where a significant spike in traffic movements occurred at the Park Lane / Site Access intersection occurred at approximately 8:00am.

It is our understanding that the visiting hours of the facility occur between 8:30am and 3:30pm, shortly after the peak generation period caused by the staff shift changes. Additional interrogation of the arrival and departure profile indicates that the number of trips made by visitors (during the hours outlined above) are significantly less than the movements observed at the shift changeover, and are not expected to significantly impact the operation of the external network.

Post Expansion Intersection Performance

The peak hour of traffic movements from the captured data was used to model the expected volume of vehicles post centre expansion. A growth factor of 1.36 was applied to the volumes of vehicles analysed at each movement of the intersection. The intersection performance under these projected volumes was analysed in SIDRA. The summary results from this analysis are included in Table 3. The analysis suggests that the intersection will perform in an acceptable manner despite the increase in traffic volume as a result of the centre expansion. The results indicated a minimal degree of saturation, very short delay times and nominal queuing lengths.

Figure 9 shows the projected peak hour volumes used for the SIDRA analysis. These volumes were calculated by applying the growth factor to the measured volumes as outlined above.

Figure 9 Projected peak hour volumes

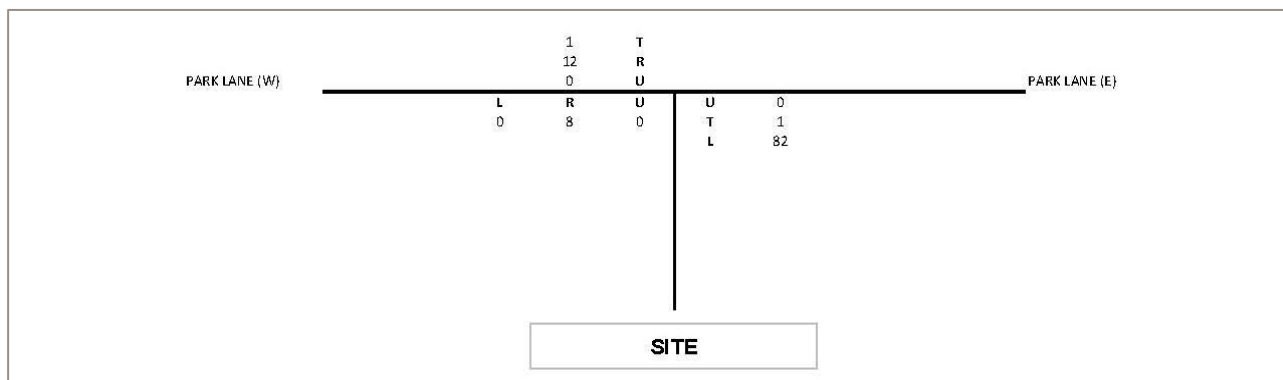


Figure 10 Park Lane – Site Access intersection as modelled in SIDRA



Table 3 Summary of SIDRA analysis of post expansion traffic scenario

Scenario	AM Peak		
	DOS	Delay	95 th ile Queue
Post Expansion	0.047 v/c	5.5 seconds	0.3 metres

Construction Traffic

Given the Preliminary nature of this application, it is not yet possible to provide a detailed outline of how construction traffic and vehicles will be managed on site. This is likely to be provided as part of a future Construction Management Plan, at the detailed design and/or operational works stage.

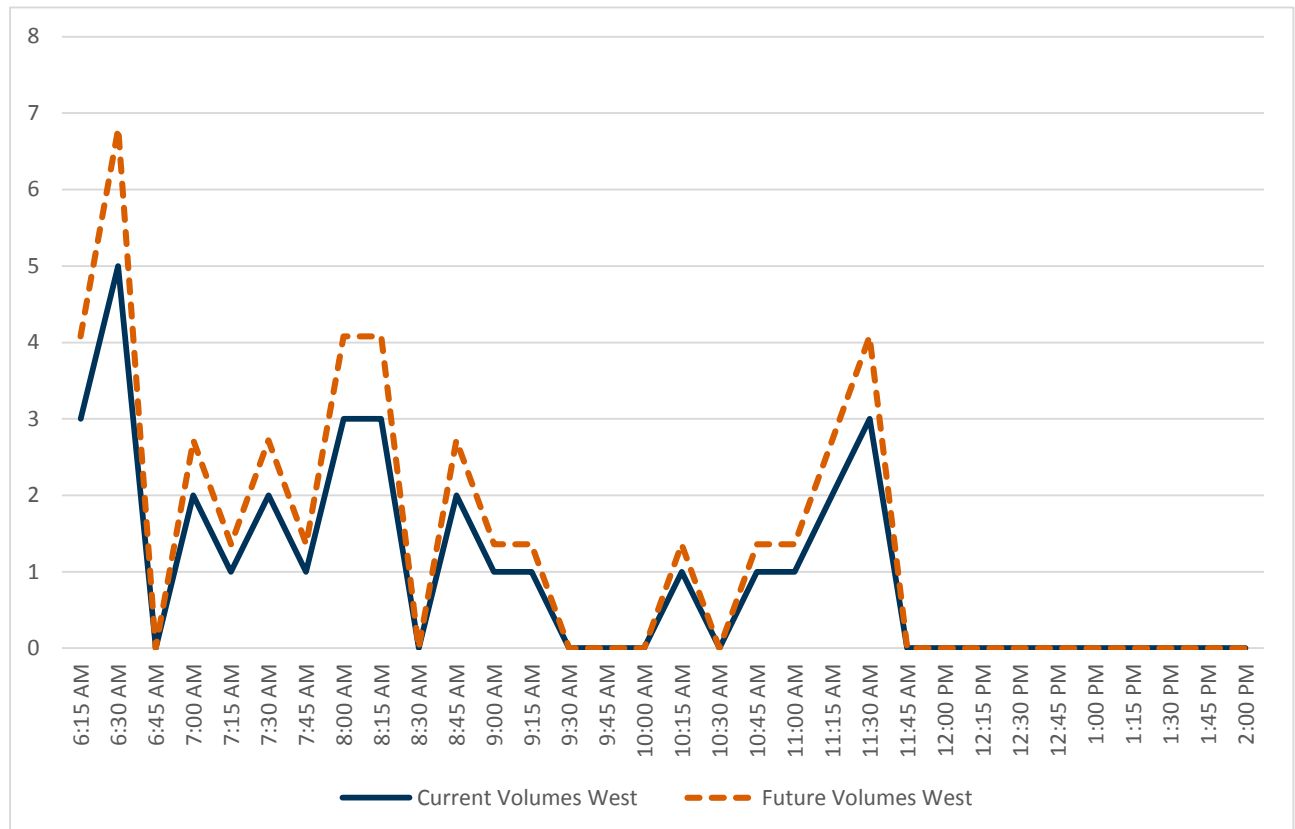
Nevertheless, it is anticipated that construction plant and heavy vehicles are likely to be accommodated on-site and with no impact to on-street arrangements.

The impact of construction traffic on the local road network is unlikely to result in detrimental impacts to operation given the low background traffic volumes observed in the traffic studies. One key element will be ensuring that the routing of construction traffic will avoid the unsealed section of Park Lane to reduce pavement impact. However, as outlined above, the construction methodology will have to be examined in further detail at a later stage.

Assessment of Park Lane West

A specific element of the traffic assessment is the analysis of the capacity of the currently unsealed section of Park Lane to the west of the site access. An assessment is required to analyse whether the unsealed section will be able to cope with a potential increase in volumes as a result of the Junee Correctional Centre expansion. Figure 11 illustrates that there will only be a nominal increase in vehicle volumes west along Park Lane as a result of the centre expansion. The increase in volume at the peak hour will be from 9 to 12 movements. Generally accepted traffic engineering principles assume that the peak hour movements multiplied by 10 will approximately equal the daily vehicle volumes. Therefore the approximate daily volumes distributed west along park lane would increase from 90 to 120 vehicles, which is unlikely to be significant enough to warrant an upgrade of the currently unsealed road.

Figure 11 Comparison of current volumes distributed west to future volumes distributed west



Conclusions

Cardno has undertaken an assessment of the traffic impact of Junee Correctional Facility in its existing operation and with its future expansion. This assessment was formed by information provided by the Department of Justice and by data collected during a site inspection. The following conclusions have been drawn from the assessment:

- > Current traffic volumes at the access to the correctional facility are low and the access intersection operates well within acceptable operational limits.
- > The vast majority of traffic travelling to and from the Correctional Facility distributed to the east towards Junee. This results in limited impact on the unsealed road to the west of the site.
- > Interrogation of the arrival and departure profile indicates that the number of trips made by visitors (during the hours of 8:30am and 3:30pm) are significantly less than the movements observed during the staff shift changeover, and are not expected to significantly impact the operation of the external network.

It is considered that the impact of the expansion of the Junee Correctional Facility does not adversely impact on the external road network.