

Lachlan Health Service Redevelopment Parkes Hospital Transport Impact Assessment

transportation planning, design and delivery



## Lachlan Health Service Redevelopment

## Parkes Hospital

## Transport Impact Assessment

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## Executive Summary

### Summary of Existing Assets

The existing Parkes Hospital is located within the northern section of the town centre with access primarily via Rawson Street to the east and Coleman Road to the south. Ainsworth Street bounds the site to the north with access provided to loading areas and specific uses. Coleman Road provides access to the main on-site car park and the emergency department with Rose Street providing access to the old maternity ward adjacent to the southern boundary. The main car park is used as a dedicated helipad (as required) and in such circumstances, the car park is required to be fully vacated by all vehicles.

The surrounding intersections are all priority controlled and site observations indicate that they do not currently experience queuing or delay due to their residential surrounds.

On-street parking demand is relatively low though some demand occurs within Coleman Road and Ainsworth Road primarily during the peak Monday midday period when staffing levels are at their highest. The on-site car park also experiences moderate to high parking demand.

A review of bus network in the vicinity of the site shows that the west town loop service stops at the Coleman Road bus stop three times a day. There are limited pedestrian and cyclist facilities in the vicinity of the hospital.

### Site Selection and Stakeholder Consultation

A new site has been selected for the construction of the new Parkes Hospital following an options assessment of alternative site locations. This has largely been driven by existing site constraints including steep grades, site accessibility and existing ageing infrastructure. The benefits of the new site include a reasonably level parcel of Greenfield land with capacity for expansion, proximity to the Newell Highway and Forbes (for easy access), Council commitment to the Southern Ring Road and safe traffic related access.

Given that the new site is located on the southern side of the railway line; concern has been raised in relation to the potential impacts associated with train frequency and impacts to emergency response times. Consultation and investigation of railway related activity concluded that although there is potential for a minor impact, this could be mitigated by the use of CCTV and hospital radio/ telephone contact. Overall, assuming that there is up to seven emergency presentations a day, an ambulance would have a 5% to 10% chance of being affected by an activated level crossing based on an average of one activation every 50 minutes for a duration of 2 minutes 30 seconds.

Parkes Shire Council is committed to the construction of the adjacent one kilometre long portion of the Southern Ring Road to ultimately link the Newell Highway, south of Parkes with the Orange Road, east of Parkes. This section will connect the Newell Highway with Fisher Street/ Back Yamma Road, with the proposed new hospital being the catalyst for its construction.

Council has identified several benefits of the Southern Ring Road including avoiding duplicate new site accesses and/ or crossovers to/ from the Newell Highway, direct and convenient access to the east and west to/ from the town centre and providing an alternative traffic route through and around the town centre capable of providing for all heavy vehicles. Ongoing consultation with Council has resulted in a design for the Southern Ring Road (prepared by GHD), including the proposed new hospital access intersection and potential shared bicycle and pedestrian



path. Traffic modelling confirms that the proposed intersections along the Southern Ring Road would operate at a good level of service.

### Schematic Design Assessment

The schematic design for the redevelopment of Parkes Hospital generally proposes a new build of all hospital facilities on the new site, accessed via the proposed Southern Ring Road south of Parkes town centre.

The Southern Ring Road and new site access road would be a priority controlled intersection with appropriate turning bays and treatments to allow for turning vehicle capacity and safety. The internal road network and intersections would allow for good delineation of uses, control of vehicle movements and future capacity; strengthened by appropriate wayfinding.

All car parking and Emergency Department/ service areas would be provided on-site, with public car parking and a drop-off/ pick-up area adjacent to the main building. Staff/ fleet vehicle/ loan return parking and loading/ service areas (designed for access by up to 12.5m Heavy Rigid Vehicles) are generally located in the south-west corner of the site. Emergency vehicles (with capacity for 3 vehicles) are accommodated within a dedicated emergency vehicle area in the north-east corner of the site, adjacent to the helipad.

The proposed new hospital would provide a minimum of 140 on-site parking spaces, generally with the following breakdown:

- 90 public car parking spaces (including 4 disabled spaces)
- 2 drop-off/ pick-up spaces
- 1 shuttle bus drop-off/ pick-up space
- 4 dedicated spaces for loan equipment return
- 3 dedicated spaces for visiting practitioners
- 26 separated/ marked staff spaces
- 14 secure fleet vehicle spaces.

Assuming a similar turnover of on-site car spaces as the existing Parkes Hospital and allowing for minor expansion of on-site services/ facilities, the estimated traffic generation for any peak hour is anticipated to be up to 80 vehicle trips per hour.

The design would allow for effective internal wayfinding signage while the proposed on-site public car park would allow users convenient access to all on-site facilities. Pedestrian and/or shared paths would connect car parking areas with the hospital building and the Southern Ring Road (and potential shared path). Signage would be simple and easy to interpret and would theoretically include directional signs along the new site access road at the main internal intersection.

Public transport provisions are provided by way of a dedicated set-down/ pick-up space adjacent to the main entry to the new main building.

The proposed construction of the new Parkes Hospital would likely involve a staged approach, from excavation through to construction and fit-out. Council, in conjunction with RMS will have constructed the Southern Ring Road prior to commencement of works, with all site access to be via the new access road connecting directly with the ring road. All construction vehicle parking will occur on-site with no requirement for on-street works zones. Trucks will travel to/from the site via the Newell Highway and the Southern Ring Road, an RMS designated heavy vehicle route. Being a new hospital site, construction activities would not impact existing Parkes Hospital operations.



## Table of Contents

1.	Intro	oduction	1
	1.1	Background	1
	1.2	Purpose of this Report	1
	1.3	References	2
2.	Exis	ting Conditions	3
	2.1	Site Overview	3
3.	Sch	ematic Design Assessment	6
	3.1	Overview	6
	3.2	Southern Ring Road	8
	3.3	Railway Operations	9
	3.4	Stakeholder Consultation	11
	3.5	Hospital Inpatient Beds	11
	3.6	New Hospital Site Access	11
	3.7	Car Parking and Service Vehicles	12
4.	Sust	ainable Transport Infrastructure	16
	4.1	Public Transport	16
	4.2	Walking and Cycling Network	16
5.	Traf	fic Impact Assessment	17
	5.1	Traffic Generation	17
	5.2	Distribution and Assignment	17
	5.3	Intersection Operation	18
	5.4	Traffic Impact	19
6.	Cor	nstruction Traffic and Pedestrian Management	20
	6.1	Overview	20
	6.2	Construction Traffic	20
	6.3	Traffic and Parking Effects	21
7.	Cor	nclusion	22

#### Appendices

- A: Parkes Council Traffic Data
- B: Parkes Railway Assessment
- C: Southern Ring Road Concept Plans
- D: SIDRA INTERSECTION Modelling Results

#### Figures

Figure 2.1: Existing Parkes Hospital and Its Environs



Table of Contents

Figure 2.2:	Coleman Road (looking south)	4
Figure 2.3:	Coleman Road (looking north)	4
Figure 2.4:	Rose Street (looking east)	4
Figure 2.5:	Ainsworth Street (looking east)	4
Figure 3.1:	New Parkes Hospital Site and its Environs	7
Figure 3.2:	Proposed New Parkes Hospital Site Layout	8
Figure 3.3:	Southern Ring Road/ Hospital Access - Road Layout (indicative)	9
Figure 3.4:	Parkes Level Rail Crossings	10

#### Tables

Table 1.1:	Director General's Requirements (DGR's)	2
Table 2.1:	Parkes Bus Services	5
Table 5.1:	SIDRA INTERSECTION Level of Service Criteria	19
Table 5.2:	Existing Operating Conditions	19



# 1. Introduction

## 1.1 Background

The objectives of the Lachlan Health Services Project, which includes the new build of Parkes Hospital, is to provide contemporary healthcare facilities suited to the current and future needs of the catchment population, and to provide capacity to support the agreed scope of clinical care in an environment that facilitates the delivery of contemporary health services.

Facility function should allow efficient bed utilisation and staffing to better meet the current and future needs of Parkes and the surrounding community.

The scope of the Parkes Hospital project is summarised as follows:

- Early Works including site preparation and bulk earthworks.
- Construction of a new two-storey approximately 9,000m<sup>2</sup> hospital building, including:
  - 28-bed inpatient unit
  - Birthing unit
  - Emergency Department
  - Community and Ambulatory Care zone, including 6 chemotherapy chairs and 3 dental chairs
  - Clinical Support Services, including Pharmacy, Pathology Laboratory and Medical Imaging
  - Non-clinical support services, including a Linen Distribution Centre for the district.
- Construction of single storey (approx. 120sqm) short-stay staff accommodation building.
- Access roads and circulation.
- On-grade car-parking for a minimum of 140 vehicles.
- Landscaping.
- Associated site infrastructure works.

Health Infrastructure (HI) has engaged GTA Consultants to provide input into the design process and undertake a transport impact assessment for the planning of the Lachlan Health Service redevelopment.

## 1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport conditions in the vicinity of a new Parkes Hospital and provides strategic design advice for the current schematic design to ensure a suitable traffic and transport network. This includes consideration for the following:

- i existing traffic and parking conditions surrounding the site
- ii provision of adequate parking supply to meet future demands
- iii traffic generation of future demands
- iv site accessibility
- v service vehicle requirements
- vi pedestrian and bicycle considerations
- vii an identification of the transport related constraints and opportunities.

This study also considers a number of the Director General's Requirements (DGR's) as part of the Environmental Impact Statement (EIS) for the proposed redevelopment. The DGR's were issued

# by the NSW Government Department of Planning and Infrastructure (DoPI) for the redevelopment of Parkes Hospital (SSD 13\_6107) on 21 November 2013, as detailed in Table 1.1.

Table 1.1: Director General's Requirements (DGR's)

Project Phase	DGR Description	<b>Relevant Section</b>
	Detail existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access.	Section 2.1, Section 4
	Estimate the total daily and peak hour trips generated by the proposed development, including accurate details of the current and future daily vehicle movements and assess the impacts of the traffic generated on the road network, in particular on Newell Highway, including intersection capacity and any potential need for upgrading or road works (if required), having regard to local planning controls.	Section 3.2, Section 5
5. Transport and	Detail the proposed access arrangements at all stages of operation, including access for ambulances, emergency vehicles, service vehicles, and compliance with the relevant Australian standards.	Section 3.6
Accessibility	Detail the parking provisions, including the number of car parking spaces, and compliance with the relevant Australian standards and parking codes.	Section 3.7
	Demonstrate how users of the development will be able to make travel choices that support sustainable travel.	Section 2.1, Section 4
	Describe measures to be implemented to promote sustainable means of transport including public transport usage and pedestrian and bicycle linkages in addition to addressing the potential for implementing a location specific sustainable travel plan.	Section 4
	Detail any measures, including augmentation requirements and intersection upgrade treatments, to mitigate any associated pedestrian, cycle or traffic impacts.	Section 3
6. Transport and Accessibility (Construction)	Detail access arrangements at all stages of construction and measures to mitigate any associated pedestrian, cycleway or traffic impacts.	Section 6

## 1.3 References

In preparing this report, reference has been made to the following:

- several inspections of the site and its surrounds
- Parkes Shire Council Car Parking Code, Development Control Plan (DCP), 1998
- Parkes Shire Council Local Environmental Plan (LEP), 2012
- Australian Standard, Parking Facilities, Part 1: Off-Street Car Parking AS 2890.1:2004
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicle Facilities AS 2890.2:2002
- Australian Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS 2890.6:2009
- traffic and parking sample surveys undertaken by GTA Consultants as referenced in the context of this report
- Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (2002)
- Parkes District Hospital Site Condition Assessment, Hyder Consulting, 12 November 2012
- plans for the proposed development prepared by Rice Daubney, Drawing Number DA2\_1000[A], dated 14 October 2013
- other documents and data as referenced in this report.



# 2. Existing Conditions

## 2.1 Site Overview

The existing Parkes Hospital site is located at 18 Coleman Street, Parkes in rural New South Wales. The site covers an area of approximately 4,850m<sup>2</sup>, half of which is dominated by steep terrain to the west of the on-site structure and left vacant. The hospital has a frontage of approximately 240m to Rose Street, 215m to Coleman Road and 260m to Ainsworth Street. The site currently has a land use classification as General Residential and is occupied by Parkes Health Services.

The surrounding properties predominantly include residential uses with the location of the subject site and its surrounding environs shown in Figure 2.1.



Figure 2.1: Existing Parkes Hospital and Its Environs

(Reproduced with permission from Google Maps)

Coleman Road provides access to the hospital and surrounding land uses, including the Community Centre on the north-east corner of the property. On-street parallel parking is generally permitted with low to medium demand during the busiest weekday (Monday), which increases to high demand as vehicles are moved from the on-site car park in the event that the helipad (located in the car park) is required for use as the dedicated landing area.

Coleman Road is shown in Figure 2.2 and Figure 2.3 with Rose Street and Ainsworth Street also illustrated.



Figure 2.2: Coleman Road (looking south)

Figure 2.4: Rose Street (looking east)



Figure 2.3: Coleman Road (looking north)



Figure 2.5: Ainsworth Street (looking east)



GTA Consultants completed sample traffic and parking surveys at the time of the site visits (18 March 2013 and 30 April 2013) during the midday to afternoon peak period.

On the basis of the above assessment, it is clear that the intersections of Rose Street/Coleman Road and Coleman Road/Ainsworth Street currently operate well with minimal queues and delays on all approaches.

### 2.1.1 Car Parking

Car parking demand, both on-street and on-site, together with traffic generation are key components in understanding not only existing demand but also gauging future demand profiles both during construction and post-construction. In this regard, GTA Consultants notes the following:

- The existing on-site at-grade car park (access via Coleman Road) provides parking for 70-75 vehicles. Demand peaked at approximately 50-55 vehicles (70-75% occupancy).
- The old maternity at-grade car park (access via Rose Street) provides parking for approximately 35 vehicles. Demand peaked at approximately 10 vehicles (30% occupancy).
- Various locations for informal/ service vehicles with less than 10 vehicles parked on-site (along Ainsworth Road accesses along the northern boundary of the hospital).



- On-street parking demand is low:
  - Coleman Street (east of the hospital) approximately 5 vehicles
  - Ainsworth road (north of the hospital) approximately 10 vehicles.
- The on-site car park is typically utilised for staff, patient and visitor parking, however is evacuated should a helicopter require to land within the car park at any time as a result of an emergency and/ or patient transfer.

Overall, the existing Parkes Hospital has a peak parking demand of 80-85 vehicles (both on-street and off-street) with up to 30% of this demand associated with staff activity.

#### 2.1.2 Pedestrians and Cyclists

A shared path runs south from the main building to the south-eastern corner of the property, linking with Coleman Road and Rose Street. There are no on or off-street cycling facilities within the vicinity of the site.

#### 2.1.3 Public Transport

A review of bus network in the vicinity of the site shows that there are four bus services operating hourly locally within the Parkes area, and six bus services which connect Parkes with nearby townships such as Cootamundra, Dubbo, Parkes, Orange, Grenfell and Cudal on a daily basis. There is one interstate bus services which service Parkes, operating between Melbourne and Brisbane. These are detailed in Table 2.1.

Route Number/Operator	To/From	Frequency			
Western Road Liners	L				
551	Town Centre to East Parkes	3 services daily			
552	Town Centre to South Parkes	3 services daily			
553	Town Centre to West Parkes (via existing hospital site)	3 services daily			
554	Town Centre to North Parkes	3 services daily			
Long Distance Coaches					
CountryLink	Cootamundra to Dubbo via Grenfell	Once daily (Mon/Wed/Sat)			
519	Orange to Parkes via Cudal	Once daily (Mon/Wed/Fri)			
520	Parkes to Orange via Cudal	Once daily			
521	Orange to Parkes via Manildra	Once daily (Tue/Thu/Sat/Sun)			
522	Parkes to Orange via Manildra	One daily (Mon/Wed/Fri)			
523	Parkes to Condobolin via Bogan Gate	One daily (Mon/Wed/Fri)			
524	Condobolin to Parkes via Bogan Gate	One daily (Mon/Wed/Fri)			
571	Lithgow to Parkes via Bathurst and Orange	Once daily (Sun-Fri)			
572	Lithgow to Parkes via Orange and Bathurst	Once daily (Mon-Sat)			
792	Dubbo to Cootamundra via Grenfell	Once daily (Tue/Thu/Sun)			
GX340	Melbourne to Brisbane	Once daily (Wed-Fri)			

Table 2.1: Parkes Bus Services



## 3. Schematic Design Assessment

## 3.1 Overview

Given the existing site constraints, specifically the steep grades, site accessibility and existing infrastructure, a new site has been selected for the construction of the new Parkes Hospital. This site presents several benefits including though not necessarily limited to the following:

- A large, reasonably level parcel of Greenfield land with capacity for a hospital and all associated services, including capacity for expansion of other medical/ health related facilities in the future.
- Location adjacent to the Newell Highway, south of Parkes town centre with easy access from all directions, particularly as it relates to Forbes Hospital and the sharing of Lachlan Health Services resources.
- Council's early and ongoing commitment to construction of the Southern Ring Road, particularly construction of the section adjacent to the proposed hospital site (Newell Highway to Fisher Street/ Back Yamma Road), with the hospital access to link directly to the new road.
- A new build site will allow the hospital to operate without disruption with a dedicated and separate helipad allowing for helicopter access, largely removed from residential properties.
- Although the site is located on the southern side of town and south of the railway line (approximately 85% of Parkes population resides on the north), there are four available rail crossings that limit the impacts/ delays for emergency services and visitors/ patients/ staff.

The location of the new hospital site is shown in Figure 3.1.





Figure 3.1: New Parkes Hospital Site and its Environs

The new build includes all services provided by the existing hospital, including inpatient unit, maternity ward, emergency department, administration and conference facilities and various day services and maintenance rooms within the main building. A helipad will also be located in the north-east section of the site, with staff accommodation south-west of the main building. The centrally located pedestrian access corridor is aligned in a north-south direction effectively linking with the secondary east-west corridors and designed to allow for improved internal access, combining the main hospital functional areas.

An internal road network, with associated wayfinding signage will manage and control on-site vehicles and effectively separate all on-site uses. All service vehicles will be directed west to the loading facilities in the south-west corner. Emergency/ patient transport vehicles will be directed east to the dedicated emergency department in the north-east corner.

All car parking will be provided on-site within the main public car park and a drop-off/ pick-up area immediately north of the main building. This area would also provide capacity for a dedicated shuttle bus space (10m-12m long Toyota Coaster or similar, circa 20 seats). Staff/ fleet vehicle parking and service vehicle facilities will be located in the south-west corner of the building.

A shared path would also link the main entrance with the on-site car park and through to the Southern Ring Road. This would accommodate both pedestrian and cyclist needs and ties in well with Council's intention to expand their shared path network.

Basemap source: Rice Daubney

The proposed new Parkes Hospital layout and site access arrangements are illustrated in Figure 3.2.



Figure 3.2: Proposed New Parkes Hospital Site Layout

Image Source: Rice Daubney

## 3.2 Southern Ring Road

The east-west aligned Southern Ring Road will link the Newell Highway with Fisher Street/ Back Yamma Road (and eventually beyond) over Crown land north of the site. All vehicular access to the new hospital will be via a north-south aligned site access road, with direct access via the Southern Ring Road.

Parkes Shire Council has completed a study to justify the need for the proposed Southern Ring Road in Parkes. The study examined the likely traffic movements as a result of the ring road with regard to existing and future traffic movements on the Newell Highway and through the Parkes town centre. The results of this study indicate that:

- approximately 430 vehicles are expected to travel east, and 460 vehicles travel west along the Southern Ring Road on an average day
- approximately 20% of these would be heavy vehicles
- average peak hour to daily traffic proportion on the Newell Highway is 8-9%.

Considering the results of the study, it is estimated that 40 to 60 vehicles will travel in each direction along the Southern Ring Road during an average peak hour. In addition, the new Parkes Hospital is expected to generate up to 80 vehicle movements during the peak hour.

In order to confirm the intersection functionality, SIDRA Intersection has been used to model the future traffic along the ring road and accessing the hospital. Figure 3.3 shows the likely intersection layout of the Southern Ring Road and hospital access road.



Council is also proposing to expand the local pedestrian and cycling network to include a shared path along the east side of the Newell Highway, north of the proposed new hospital site. This path would link in with new facilities north of the Southern Ring Road while also linking with a dedicated shared path to/ from the hospital, east of the main access road. The broad intention of the shared path is to link several land uses including the hospital and existing and future residential areas both to the north and north-east.

The shared path would require appropriate facilities where it intersects with the Southern Ring Road. This may include a defined pedestrian refuge delineated by raised medians however will depend on the final alignment and configuration of the new road.



Figure 3.3: Southern Ring Road/ Hospital Access - Road Layout (indicative)

The SIDRA assessment indicates the intersection will operate at a Level of Service A during peak hours, with negligible queuing for all turning movements.

The intersection of the Newell Highway and the Southern Ring Road will be designed to safely accommodate the anticipated traffic volumes including all turning movements as estimated in Parkes Shire Council's study. Traffic generated by the new Parkes Hospital is not expected to adversely impact the operation of this intersection.

Council's study and associated traffic data overview are included in Appendix A.

## 3.3 Railway Operations

GTA Consultants completed an assessment of the potential impacts associated with a new hospital being located on the site, on the southern side of Parkes and south of the main railway line. This was required mainly as a result of concerns relating to the rail crossings and emergency services response times.

The location and type of rail level crossings within Parkes and in the vicinity of the new hospital site are shown in Figure 3.4.



Figure 3.4: Parkes Level Rail Crossings

Basemap source: Transport for New South Wales

Several factors were included in this assessment with stakeholder consultation a key element. Overall, the outcomes included the following, with the memorandum included in Appendix B.

- Activation data provided by John Holland Rail for the Newell Highway level crossing indicates that between 3 February 2013 and 8 June 2013 (18 weeks), the duration of activation ranged from approximately one second to 48 minutes.
- There is an average of 28 trains per day passing through the Newell Highway level crossing, or approximately one every 50 minutes.
- There are four level crossings all within three to six minutes of the new hospital site.
- The distance between the level crossings ranges from 500 metres to 1.5km, with the distance between the furthest level crossings being approximately 3.5km.
- Activations occur on average, every 50 minutes for a duration of 2 minutes 30 seconds.
- The peak hour on the peak day has four trains passing through and occurs twice (3:00pm-4:00pm and 9:00pm-10:00pm). This represents one train every 15 minutes.
- Assuming that there is up to seven presentations a day, an ambulance would have a 5% to 10% chance of being affected by an activated level crossing.

There are several mitigation measures available for implementation, including CCTV and hospital radio/ phone contact and, when combined with ambulances having sufficient opportunity to take a different route prior to departing, reduce the likelihood of impacts to ambulances associated with the Parkes railway crossing.



## 3.4 Stakeholder Consultation

Parkes Shire Council has been engaged in consultation with Health Infrastructure, GTA Consultants and the broader project team with respect to the site given the construction of the Southern Ring Road to ultimately link the Newell Highway, south of Parkes with the Orange Road, east of Parkes.

As discussed, Council is committed to the construction of the one kilometre long portion of the Southern Ring Road which will connect the Newell Highway with Back Yamma Road.

Council originally identified<sup>1</sup> several benefits of such an arrangement, including the following:

- It would make the subject site more viable to build a new hospital on than redeveloping the existing hospital site.
- It would avoid duplicate Newell Highway access points, i.e. one to the new hospital site and one to the future Southern Ring Road. This also obviously avoids duplicate costs.
- The road would provide more direct access to the new hospital from east Parkes, particularly the East Street and Nash Street Rail crossings.
- The road would provide better access to the Orange Road when transporting patients to Orange Base Hospital or the airport.
- The road will provide a practical alternate route for heavy vehicles when Clarinda Street East is blocked, thereby replacing Woodward Street from that role.

Further consultation has also been completed with Roads and Maritime Services (RMS) to gain inprinciple agreement for the Southern Ring Road, including details relating to the intersection design at the Newell Highway, including road widths, intersection treatments, acceleration lanes and turn bays. Concept design plans prepared by GHD are included in Appendix C.

## 3.5 Hospital Inpatient Beds

The schematic design includes provision of 30 inpatient beds. These would be located within the IPU (28 beds) and birthing unit (2 beds) in the eastern section of the new hospital, with direct pedestrian access via the main entry and north-south corridor.

### 3.6 New Hospital Site Access

Access to a new hospital on the site would generally be set out as follows:

- car park circulation aisles would be configured to provide direct and convenient access to the public car park north of the hospital, with general hospital visitors directed to parking bays via the central driveway
- centrally located porte cochere area adjacent to the main entry foyer to accommodate disable parking, set-down/ pick-up operations and shuttle bus parking area
- staff vehicles and service vehicles directed along the north-western circulation road to the south-west corner of the site
- staff access via a dedicated staff entry to administration/ offices area at the western end of the building

<sup>1 (</sup>GM) Parkes Hospital site options and southern ring road implications, Parkes Shire Council



- service vehicles accommodated adjacent to the staff parking in the south-west corner of the site
- pedestrian links for convenient access to on-site facilities and to/ from the Southern Ring Road
- primary pedestrian access via the centrally located main entry foyer to provide convenient at-grade access
- emergency vehicles directed along dedicated access road east of the port cochere to the emergency department
- helipad located in the north-east corner of the site.

New intersection layouts will be required for the intersection of the Newell Highway/ Southern Ring Road and the Southern Ring Road/ new site access road (see Figure 3.3). The intersection will be designed utilising a layout which provides for appropriate sight distances in each direction while accommodating the needs of all users by way of two eastbound through lanes. It is understood that Council and RMS have been in consultation to allow this area to be located in a low speed 50 km/h environment.

The proposed access arrangements are subject to final detailed design. Vehicular access has been designed to provide unobstructed and separate access for a variety of users including emergency vehicles, service vehicles, staff and the general public.

Expansion zones have been planned to the west and south of the main building as well as to the north-east for the emergency department. These zones will cater for future expansion of the hospital building, if required.

## 3.7 Car Parking and Service Vehicles

The proposed new hospital would provide a minimum of 140 on-site parking spaces, generally with the following breakdown:

- 90 public car parking spaces (including 4 disabled spaces)
- 2 drop-off/ pick-up spaces
- 1 shuttle bus drop-off/ pick-up space
- 4 dedicated spaces for loan equipment return
- 3 dedicated spaces for visiting practitioners
- 26 separated/ marked staff spaces
- 14 secure fleet vehicle spaces.

All car parking would be wholly contained on-site (as no adjacent on-street parking will be possible) and would cater for anticipated future car parking demand (not including any hospital expansion). Marked motorcycle spaces may also be considered as part of the proposed new hospital and could number up to 5 spaces.

It is noted that the current proposal is for 149 on-site spaces, which meets the minimum parking requirement.

The proposed parking strategy effectively provides for the expected existing and future on-site parking demand, while improving the quality and spatial distribution of on-site parking facilities, compared with the existing hospital site.

All on-site car parking would need to be provided in accordance with the relevant Australian Standards as follows:



- patient/ visitor spaces 2.6m wide by 5.4m long with 6.2m aisles
- staff spaces (if dedicated and separated) 2.4m wide by 5.4m long with 5.8m-6.2m aisles
- disabled parking spaces 2.4m wide with adjacent 2.4m shared area (with bollard) and
   6.2m wide aisles
- emergency vehicle area to be designed in accordance with Ambulance Service of NSW design guidelines including canopy height, stretcher area and turning circles (design based on a 7.02m long bariatric ambulance)
- loading areas designed for specific vehicle sizes required by the hospital (up to 12.5m large rigid vehicles) including height clearances (min. 3.5m-4.5m) and manoeuvring area.

#### 3.7.1 Car Parking Requirements

The car parking requirements for different development types are set out in Parkes Shire Council Car Parking Code (Draft Development Control Plan, 1998) as 4 spaces per 100 m<sup>2</sup> GFA for 'Extended hour medical centres', and recommends that comparisons to similar developments be made for 'professional consulting rooms'. The nearby Forbes Shire Council Draft Development Control Plan (DCP) 2012 recommends 1 space per 3 beds for 'Hospitals or Similar Institutions' which results in the requirement of approximately 10 car parking spaces.

The Guide to Traffic Generating Developments (RMS, 2002) may also be considered for the provision of car parking. The Guide does not provide rates for public hospitals and as such, a review of the car parking requirements for private hospitals indicates that the peak parking accumulation (PPA) may be estimated according to number of beds and average staff per weekday shift (ASDS).

In the absence of known ASDS numbers, the following may be used:

• PPA= -26.52 + 1.81B, where B is the number of beds.

Application of the RMS formula results in the requirement for 28 off-street car parking spaces to accommodate a total of 30 proposed inpatient beds. However, given that there are a number of day procedures and non-bed related services to be operation within the hospital, additional parking would be required to accommodate such uses (staff and visitors/ patients). In addition, visiting medical or specialty services would also require approximately 3 car spaces.

Due to the absence of available local on-street parking and the limitations with the Southern Ring Road, it is necessary for all car parking demand be catered for on-site.

It is recognised that the provision of a minimum of 140 on-site car parking spaces would adequately cater for the new hospital. It is noted that anticipated future growth within Parkes Shire would also represent a small background increase in demand for hospital services.

### 3.7.2 Empirical Assessment of Car Parking Demand

A review of empirical data for both large hospitals (more than 70 beds) and small hospitals (less than 70 beds) indicates that the recommended hospital parking rates vary between 1.68 spaces/ bed and 1.55 spaces/ bed. Application of each rate results in the requirement to provide between 47 and 51 off-street car spaces for the proposed new hospital.

#### 3.7.3 Staffing Levels

Parking requirements can also be estimated based on the relationship between current and future staffing levels. Preliminary information relating to full-time equivalent (FTE) staffing levels



issued by Rice Daubney (14/03/13) indicates there is currently 125 FTE staff. For the purposes of this assessment, the current staffing levels have been assumed to remain the same under a future hospital layout.

The existing ratio of off-street parking to FTE staff is approximately 2 spaces per 3 staff which results in a parking requirement of 80 parking spaces.

On-site observations and car parking surveys indicate that the peak staff parking demand occurs between 10:00am and 1:00pm on a typical weekday (Monday being a peak day). It is likely that this utilisation will continue under a future new hospital given that the majority of staff are likely to work during typical weekday hours (between approximately 7:00am and 5:00pm). As such, it is assumed that minor staff shift changes would not impact on the car parking requirement.

It is noted that there is approximately 6 dedicated fleet vehicle spaces at the existing Parkes Hospital for use by hospital fleet vehicle only.

### 3.7.4 Disabled Parking

The disabled car parking provision requirements for different development types are set out in the Building Code of Australia, 2012. A review of the car parking requirement rates for hospitals indicates that the new Parkes Hospital development would require a minimum of approximately 3-4 disabled spaces. These spaces are provided within a short distance and adjacent to the main entry.

### 3.7.5 Adequacy of On-Site Parking Supply

Based on the above and GTA Consultants empirical assessment of car parking demand, the new hospital should provide a minimum of 140 car parking spaces. This is satisfied through the provision as detailed in Section 3.7.

### 3.7.6 On-Street Parking

No on-street parking is proposed or available in the vicinity of the new site and all car parking will be catered for within the proposed on-site car parking arrangements.

### 3.7.7 Wayfinding

The schematic design would allow for effective internal wayfinding signage while the proposed on-site public car park would allow users convenient access to all on-site facilities. Signage would be simple and easy to interpret and would theoretically include directional signs along the site access road at the main internal intersection, as follows:

- staff/ fleet vehicles and all service vehicles to turn right
- general public parking to turn left and/ or continue straight (repeater signs would also direct vehicles thereafter)
- emergency vehicles to continue straight (repeater sign at the port cochere entry)
- shuttle buses, disabled parking and drop-off/ pick-up to continue straight to access the porte cochere (repeater sign at the port cochere entry)
- signage would also indicate restricted access for service vehicles/ staff/ fleet vehicles etc.

Wayfinding signage would also be located in the vicinity of the new main hospital entry indicating the closest hospital services.



A theoretical external road wayfinding signage strategy may include but not necessarily be limited to the following:

- signage on the Newell Highway at the Southern Ring Road to direct visitors to the proposed new hospital, including emergency facilities
- signage on Fisher Street and Back Yamma Road to direct visitors to the proposed new hospital, including emergency facilities
- additional signage, as required on Clarinda Street at East Street and Grenfell Street at the Newell Highway.

Further wayfinding would likely be required within Parkes town centre, particularly where regional roads intersect with the Newell Highway.

### 3.7.8 Car Parking Layout Review

The car park layout would be reviewed during detailed design against the requirements of the Australian Standard for Off Street Car Parking (AS2890.1:2004 and AS2890.6:2009). This assessment would include a review of the following:

- bay and aisle width
- adjacent structures
- turnaround facilities
- circulation roads and any ramps/ grades
- set-down/ pick-up areas (including shuttle buses)
- parking for persons with disabilities
- any such motorcycle parking.



## 4. Sustainable Transport Infrastructure

GTA Consultants recognises that there is potential for sustainable transport infrastructure and utilisation of public transport including the consideration of the following:

- bicycle facilities including end of trip facilities for hospital staff and visitors
- walking and cycling network, internal and external to the site (links to existing and proposed facilities)
- local bus services linking the site with Parkes Town Centre and surrounding local and regional areas
- expansion of the local bus network and increase in frequency of services.

### 4.1 Public Transport

Western Road Liners currently provide four bus services within and around Parkes, with a dedicated southern service extending to Medlyn Street and Baker Street. Western Road Liners are a private community bus service, catering for the local community and generally provide services which stop on demand. There is potential for the southern Parkes bus service to be rerouted and/ or extended along the Newell Highway to service the new hospital site.

It is however understood that the existing services are relatively under-utilised and any changes need to be considered in-light of programs to improve usage rates. Improvements to the bus network including increasing the number of accessible routes could potentially increase the number of staff and visitors who travel by bus. Further, a Green Travel Plan generally aimed to promote the use of public transport services may ultimately lead to a further expansion of existing services.

## 4.2 Walking and Cycling Network

The Newell Highway provides the only formal pedestrian facility external to the new hospital site and in the vicinity. A 1.2m to 2.0m wide pedestrian path runs along the eastern side of the Newell Highway north of the site, south of Baker Street.

As discussed, Council is committed to construction of the Southern Ring Road and incorporating shared path facilities into this design to link with the existing infrastructure to the north. This combined with possible future residential expansion and the broader site masterplan make the formalisation and expansion of such facilities more attractive and cost effective.

In addition, a shared path linking the new hospital site with any such expanded facilities would provide a direct and safe link from the external road network to the hospital entries.

Additional facilities may also include but not necessarily be limited to the following:

- pedestrian refuge and associated linemarking on the Southern Ring Road to provide safe crossing facilities for those using any such shared path
- lighting and active/ passive surveillance for personal security within on-site car parks
- line marking and signage on internal pavements to indicate areas of high pedestrian activity
- 10km/h speed limits to ensure pedestrian safety.

Given the proposed on-site services, end-of-trip facilities would be of benefit to staff and visitors alike. Such facilities would be best located close to the main hospital entry.



## 5. Traffic Impact Assessment

## 5.1 Traffic Generation

### 5.1.1 Design Rates

For private hospitals, the *Guide to Traffic Generating Developments* (RMS, 2002) recommends the following trip generation rates based on the number of beds only, when the average number of staff per weekday shift is unknown:

- Peak Vehicle Trips (PVT) = -22.07 + 1.04B
- Morning Vehicle Trips (MVT) = -14.41 + 0.57B
- Evening Vehicle Trips (EVT) = -11.96 + 0.69B.

where 'B' represents the number of beds proposed and 'ASDS' is the average staff per day shift.

The trip generation rates were developed using survey data collected by the RMS in 1994 from 19 private hospitals across the Sydney region. The hospitals surveyed had between 30 to 99 beds and an average day shift workforce of between 10 and 102 employees.

Of the 19 hospitals surveyed, the majority recorded their respective daily traffic peak (or PVT) between 3:00pm and 4:00pm. This time period generally coincided with a staff shift change at the surveyed hospitals and would coincide with the start of the on-road peak in the vicinity of the site.

It should also be noted that of the 19 hospitals surveyed, an average of 87.4% of people travelling to each hospital did so by private car and the mode share attributed to car-based trips ranged from 67.3% to 98.2%. Average vehicle occupancy was 1.3 persons per vehicle.

Application of the RMS rates to the proposed new hospital development assuming 30 beds would generate the following:

- 9 vehicle trips during the afternoon peak hour
- 3 vehicle trips during the morning peak hour
- 9 vehicle trips during the evening peak hour.

#### 5.1.2 Generation Summary

Based on the above information, and assuming a similar turnover of on-site car spaces as the existing Parkes Hospital and allowing for minor expansion of on-site services/facilities, the estimated weekday peak hour traffic generation is anticipated to be up to 80 vehicle trips per hour.

This traffic generation does not formally include traffic associated with the proposed staff accommodation, however given that staff using this facility would typically remain on-site during a typical working day, it is anticipated that the traffic generation associated with this facility would generate minimal vehicle trips, particularly during peak periods. As such, this traffic generation would have negligible impact on the overall site traffic generation.

## 5.2 Distribution and Assignment

As discussed in Section 3, GTA has completed intersection modelling and impact assessment where the Southern Ring Road would intersect with the Newell Highway and the Hospital access



based on the traffic data and indicative layouts provided by Council as part of their Southern Ring Road study.

In order to present a conservative approach, the modelling is based on the peak hour during the peak survey day (Friday 4:00pm-5:00pm, 873 vehicles two-way along the Newell Highway) as was provided in an earlier assessment completed by Council, included in Appendix A.

The directional distribution and assignment of traffic generated by the proposed hospital will be influenced by a number of factors, including the:

- i configuration of the arterial road network in the immediate vicinity of the site
- ii existing operation of intersections providing access between the local and arterial road network
- iii distribution of households in the vicinity of the site
- iv likely distribution of staff and visitor residences in relation to the site
- v configuration of access points to the site.

For the purpose of the assessment, traffic data, distributions and indicative layouts based on discussions with Council have been used for the assessment. The assumed distributions include:

- Newell Hwy traffic assumed to be 50:50 directional split north: south
- Hospital assumed to generate 80 vehicles per hour (two-way) with 50:50 split in: out
- Southern Ring Road and Hospital access 60% to/ from the west, 40% to/ from the east.
- Newell Hwy and Southern Ring Road directional splits 80% to/ from the south, 20% to/ from the north
- All road layouts, lane dimensions and turn bay lengths have been measured according to indicative layout plans provided by Council (shown in Appendix C).

Indicative intersection layouts and associated distribution of traffic are shown in the modelling outputs included in Appendix D of this report.

### 5.3 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION<sup>2</sup>, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the RTA, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 5.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

<sup>&</sup>lt;sup>2</sup> Program used under license from Akcelik & Associates Pty Ltd.

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign		
A	Less than 14	Good operation	Good operation		
В	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity		
С	29 to 42	Satisfactory	Satisfactory, but accident study required		
D	43 to 56	Near capacity	Near capacity, accident study required		
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode		
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required		

 Table 5.1:
 SIDRA INTERSECTION Level of Service Criteria

Table 5.2 presents a summary of the existing operation of the intersections, with full results presented in Appendix D of this report.

Intersection Peak		Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
		Hospital Access Road (South)	0.032	6.6	0.6	А
Southern Ring Road/ Hospital Access	4:00 – 5:00 pm	Southern Ring Road (East)	0.031	0.031 2.3		А
		Southern Ring Road (West)	0.032	2.3	0.5	А
		Newell Highway (South)	0.266	1.2	2.2	А
Newell Highway/ Southern Ring Road	4:00 – 5:00 pm	Southern Ring Road (East)	0.083	12.0	2.2	В
		Newell Highway (North)	0.266	0.5	0.7	A

 Table 5.2:
 Existing Operating Conditions

On the basis of the above assessment, it is clear that the intersection of Newell Highway and the Southern Ring Road, as well as the intersection of the Southern Ring Road and Hospital Access Road will operate well with minimal queues and delays on all approaches. The assumed location and length of each Southern Ring Road turn bay on approach to each intersection is appropriate with no impact on each as a result of the adjacent intersections.

## 5.4 Traffic Impact

Against existing traffic volumes in the vicinity of the site, the additional traffic generated by the proposed Parkes Hospital could not be expected to compromise the safety or function of the surrounding road network, including the intersection of the Newell Highway and Southern Ring Road.



# 6. Construction Traffic and Pedestrian Management

## 6.1 Overview

The proposed construction of the new Parkes Hospital would likely involve a staged approach, from excavation through to construction and fit-out. It is understood that Council, in conjunction with RMS will have constructed the Southern Ring Road prior to commencement of works, with all site access to be via the access road connecting directly with the Southern Ring Road<sup>3</sup>.

The overall principles of traffic management during the construction activity include:

- no loss of on-street parking with all worker parking to be provided on-site
- maintain access to/ from adjacent properties
- restrict construction vehicle movements to designated routes to/ from the site
- manage and control construction vehicle activity in the vicinity of the site
- construction activity to be carried out in accordance with approved hours of works.

### 6.1.1 On-Street Works Zone

It is assumed that construction vehicles will be accommodated on-site. As such, works zones would not be required. If necessary, approval for works zones would be sought through Council.

### 6.1.2 Hours of Operation

It is recommended that construction hours of operation are chosen in consultation with Parkes Shire Council and in accordance with the NSW Environment Protection Authority (EPA). As such, the following construction hours are recommended, until further correspondence with Council:

- Monday to Friday 7:00am and 6:00pm
- Saturday 7:00am and 4:00pm
- Sunday no work.

Any work outside the approved construction hours would be subject to specific prior approval from Council.

## 6.2 Construction Traffic

During excavation works, it is assumed that vehicles up to a 19m truck and dog would be used. During construction and fit-out, it is assumed that construction vehicles would include 12.5m long large rigid vehicles and 19m articulated vehicles.

It is understood that construction workers are likely to travel to/ from the site by private vehicle and will utilise the informal though defined on-site parking areas.

<sup>&</sup>lt;sup>3</sup> Health Infrastructure, Council and RMS consultation to confirm details relating to access road construction extents and apportioned costs



### 6.2.1 Truck Routes

Trucks would travel to/from the new hospital site via the Newell Highway and the Southern Ring Road, an RMS designated heavy vehicle route. Construction vehicles would be accommodated within the boundaries of the site at all times. Construction traffic would not be permitted to queue or park within the streets of the surrounding area.

Truck movements will be restricted to designated truck routes and confined to the main road network as much as practicable.

Traffic Control Plans would need to be developed for the construction site access point and include management of adjacent vehicle and pedestrian flow (if any). Detailed information for work site operations is contained in the *Traffic Control at Work Sites* manual (RMS, 2010). In addition, it is also noted that qualified site personnel will be required to manage and control the movement of vehicles at the site access.

## 6.3 Traffic and Parking Effects

Given the infrequent heavy vehicle movements associated with the construction works, the overall impact on the surrounding transport network or emergency vehicle activity in the vicinity of the site is expected to be negligible.



# 7. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

- i Parkes Hospital provides medical services to the surrounding local and regional areas as part of the Lachlan Health Service.
- ii The existing hospital site is accessible by a small number of relatively infrequent public transport services however the majority of staff and visitors currently arrive by car.
- iii The construction of a new hospital on a 'Greenfield' site south of Parkes town centre has been chosen as the preferred way forward.
- iv An assessment of the potential impacts associated with a new hospital being located on the southern side of Parkes and south of the main railway line has been completed with recommendations made to mitigate these impacts.
- Council, in consultation with RMS is committed to the construction of the one kilometre long portion of the Southern Ring Road to ultimately link the Newell Highway, south of Parkes with the Orange Road, east of Parkes.
- vi Council determined that the Southern Ring Road would carry approximately 900 vehicles per day and up to 60 vehicles per hour during any peak, excluding any new hospital traffic.
- vii All vehicles would access the new hospital site via the proposed Southern Ring Road which will provide a link between the Newell Highway and Back Yamma Road/ Fisher Street.
- viii The proposed new hospital layout is capable of providing all parking on-site with a minimum supply of 140 car parking spaces. There is additional capacity to accommodate all service vehicles and emergency vehicles in dedicated and separated areas.
- ix Vehicular access to a new hospital has been designed to provide unobstructed and separate access for all users including emergency vehicles and staff via the main internal intersection.
- x A dedicated car and shuttle bus drop-off/ pick-up area would improve amenity and provide good public transport accessibility of benefit to the community.
- xi Weekday peak hour traffic generation is anticipated to be up to 80 vehicle trips per hour. This assumes a similar turnover of on-site car parking as the existing hospital and allows for minor expansion services/facilities.
- xii There is adequate capacity in the surrounding road network to cater for the traffic generated by the new hospital. The proposed site access intersection and future Newell Highway/ Southern Ring Road intersection would each operate at a good level of service with all the turn bays having no impact on the operation of each intersection.
- xiii A construction management plan should be prepared for the proposed new hospital prior to commencement of work however no adverse impacts on the surrounding transport network or emergency vehicle activity are anticipated.

Appendix A



# Appendix A



Parkes Council Traffic Data



# Parkes Shire Council FILE NOTE

Officer: Nathan Koenig
Date: 12<sup>th</sup> September 2013
Subject: Traffic Estimation for Southern Ring Road Stage 1

Preliminary research and traffic estimations have been undertaken to assist in the design of intersection layouts and pavement works for the planning of the Southern Ring Road Project - Stage 1.

It is estimated that, upon completion of the road through to MR61E and granting access to HML B-Double vehicles, initial ADT will be on average 900 axle pairs/day, of which 20% will be heavy vehicles, with an assumed 2-3% growth rate annually. For Stage 1, with no direct access through to MR61E, this figure Could be as low as 300 axle pairs/day.

Rapid growth of the hospital precinct, Parkes Airport, Parkes Industiral Estate of HUB developments will render this estimation obsolete.

#### **Background**

The Southern Ring Road will provide a new road to move freight more efficiently by extending access to high productivity vehicles from the Newell Highway and National Logistics Hub eastward to Sydney and to the major grain receival centre at Mugincoble. It would provide very real and significant benefits to the agricultural sector through enabling road train access to the grain receival centre, enhancing the efficient, cost effective removal of grain from farms. It will remove heavy vehicles from the Parkes retail district, significantly improving local access, amenity and safety.

Initial discussions have been undertaken with Rhys Hazell of GTA consultants in regards to traffic generation by the new Parkes Hospital and proposed traffic load on the first and second stages of the Parkes Southern Ring Road. It was identified that through traffic estimations will assist in the design and configuration of the hospital access road as well as determining the scope of intersection works at the Newell Highway.

Traffic figures will be required at the submission of WAD documents to the RMS for approval to construct this major intersection. Traffic loads, heavy vehicle estimates and projected growth rates will also be used to determine pavement design to meet Council's and RMS asset requirements.

#### **Research and Data**

Existing traffic data sources were identified from three sources; RMS traffic count data on the Newell Highway from 2006 and 2012 (Bogan St), Council traffic data collected over the past 5 years at various location on distributor roads north/south and east/west of Parkes and also usage rates of Parkes airport passengers travelling from south of Parkes (e.g. Forbes)

Council's traffic counts were from: -Newell Hwy South -Newell Hwy North -MR61W (Condobolin Road) -Brolgan Road -Renshaw McGirr Way -MR61 E (Henry Parkes Way) - east of airport -Eugowra Rd

### **Assumptions**

1. Traffic data from last few years generally sufficient for current estimates

2. Heavy vehicle percentage will be generally higher than Newell Highway, say 20% to highway's 15%

3. Traffic Data collected represents typical traffic volumes for those times across different locations around Parkes

4. Traffic entering Parkes along the Newell from the south, not existing to the north, is twice as likely to travel east as it is to travel west.

5. heavy traffic is expected to grow at a similar rate as the agricultural and mining industry in the area at 3%

6. The significant regional catchment of Parkes Airport extends mostly to the south and west. Orange and Dubbo dominate east and north of Parkes regionally. This means that traffic to and from the airport not originating in Parkes is likely to come from the Newell south and return the same route (possibly twice per flight if the air passanger is dropped of and picked up from the airport).

7.Renshaw McGirr and Eugowra Road can be considered "east bound" from Parkes in addition to MR61E

8. Brolgan Road can be considered "west bound" from Parkes in addition to MR61W

Brolgan Road and Condobolin Road were combined for a West figure, Renshaw McGirr Way, Eugowra Road and Orange Road combined to yield an East figure leaving counts for the Newell to make up an idealised compass. Traffic Counts in terms of axle-pair ADT were plotted on this compass.

Short Street, which currently acts as the urban connection between the Newell Highway and MR61E currently caters for a 7-day ADT of 3,832 axle pairs. This figure includes local traffic.



Redistributing the inbound and outbound traffic across the arms of this figure based on the above assumptions results in the following figure.



It is therefore estimated that, on the completion of the Southern Ring Road through to Eugowra Road/MR61E, the ADT will be approximately 900 axle pairs/day with an assumed heavy vehicle component of 20%.

**Disclaimer:** this is a very rough estimation based on a number of unverified assumptions. A "reality check" on this figure against other distributor roads in the shire together with the current traffic levels of Short St give a decent amount of confidence in utilising this figure for design purposes. Expert traffic assessment should be sought before using this figure for benefit-cost ratio calculations, release to the media or final documents are tendered to the RMS for approval.

### Nathan Koenig MANAGER DESIGN & TRAFFIC

	class 1	2	3	4	5	6	7	8	9	10	11	12	
mon	7428	314	450	49	5	16	35	29	146	236	3	0	
tues	7831	300	407	56	10	17	29	35	233	544	5	0	
wed	7962	296	483	74	13	19	39	32	247	499	3	0	
thur	8315	284	494	45	19	10	43	24	205	484	4	0	
fri	8758	349	504	48	9	20	25	23	158	312	0	0	
sat	6955	278	250	33	7	9	19	10	140	320	1	0	
sun	5457	273	251	54	3	7	15	15	131	316	2	0	
													total
entire week	7529	299	406	51	9	14	29	24	180	387	3	0	8932
(vehicles)	84.3%	3.3%	4.5%	0.6%	0.1%	0.2%	0.3%	0.3%	2.0%	4.3%	0.0%	0.0%	100.0%
weekdays	8059	309	468	54	11	16	34	29	198	415	3	0	9596
(vehicles)	84.0%	3.2%	4.9%	0.6%	0.1%	0.2%	0.4%	0.3%	2.1%	4.3%	0.0%	0.0%	100.0%
weekend	6206	276	251	44	5	8	17	13	136	318	2	0	7273
(vehicles)	85.3%	3.8%	3.4%	0.6%	0.1%	0.1%	0.2%	0.2%	1.9%	4.4%	0.0%	0.0%	100.0%
ADT factor	1	1	1.1	1.6	2	1.6	2.1	2.6	2.3	3.3	4	5.7	
entire week ADT	7529	299	446	82	19	22	62	62	414	1278	10	0	10224

% light / heavy - based on vehicles, not ADTs% light87.6%

% heavy 12.4%

### <u>HW17 Newell Highway – Bogan Street, Parkes</u> <u>Weekly Vehicle Counts (Virtual Week)</u>

Datasets:	
Site:	[125168N] NEWELL HWY 110m NOF CECILE ST OR SOF DALTON ST <50>
Direction:	1 - North bound, A hit first. Lane: 1 3 - South bound, A hit first. Lane: 1
Survey Duration:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)
Profile:	
Filter time:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 200 km/h.
Direction:	North, South (bound)
Separation:	All - (Headway)
Scheme:	Vehicle classification (AustRoads94)

Metric (meter, kilometer, m/s, km/h, kg, tonne)

Vehicles = 159481 / 159746 (99.83%)

Units: In profile:

T110 Wed Thu Fri Mon Sat Sun Averages 1 - 5 1 - 7 Hour 69.0 0000-0100 50.5 37.0 94.7 | 54.7 23.3 57.5 55.3 44.6 0100-0200 25.0 42.0 23.5 53.5 33.3 43.0 50.7 | 34.4 38.6 33.7 0200-0300 14.0 42.5 24.5 31.0 49.0 59.0 | 28.3 36.8 0300-0400 22.3 45.5 41.5 41.5 33.7 58.3 44.7 | 35.4 40.8 0400-0500 31.3 57.0 49.0 49.0 42.7 57.0 46.0 | 44.3 46.7 138.5 0500-0600 93.3 143.5 128.5 124.0 76.7 69.3 | 122.8 106.2 276.5 249.0 0600-0700 203.3 279.0 273.5 150.3 83.7 | 251.3 206.5 0700-0800 362.7 483.0 425.0 447.0 382.3 244.0 193.3 | 412.1 347.6 0800-0900 599.3 680.5< 655.0 673.5 664.7 419.3 289.7 | 650.8 552.1 0900-1000 599.0 648.0 672.5< 706.5< 680.3< 581.7 397.3 | 657.7< 601.6 1000-1100 611.0 630.0 631.0 657.0 669.3 713.3 513.3 | 639.8 630.9 623.0 644.2 1100-1200 622.3< 626.5 681.7 654.7 801.3< 541.3< 652.8< 1200-1300 682.7 699.0 730.0 765.0 768.3 754.7< 559.0< 731.2 707.7< 774.3 686.0 680.5 694.5 741.0 555.3 | 719.5 1300-1400 608.0 676.0 487.0 1400-1500 684.0 688.0 693.7 774.0 534.7 532.3 | 662.2 621.5 1500-1600 692.5 745.5 748.5 759.7 817.3 508.0 504.3 | 758.7 674.5 792.3< 493.0 1600-1700 749.0< 765.0 807.5< 873.0< 491.7 | 803.3< 699.6 776.0< 767.3 1700-1800 722.5 769.5 784.3 514.0 451.3 | 765.9 671.5 538.0 577.3 1800-1900 432.5 528.0 511.5 405.3 334.3 | 524.2 472.7 1900-2000 281.5 295.0 329.0 340.7 366.0 272.7 239.0 | 327.6 303.7 2000-2100 189.0 204.0 233.5 231.7 252.0 205.7 171.3 | 225.3 213.1 2100-2200 174.0 166.5 176.5 177.7 192.0 161.3 106.0 | 178.6 163.6 119.1 2200-2300 129.0 93.5 94.7 151.0 143.7 72.3 | 115.4 123.5 2300-2400 81.5 64.0 77.0 79.3 88.3 108.3 42.3 | 79.0 77.8 Totals 0700-1900 7246.5 7942.5 7959.5 8222.7 8420.0 6577.3 5363.3 | 7969.5 7308 6 8094.3 9479.0 8952.2 8887.0 8972.0 9249.2 7367.3 5963.3 | 0600-2200 8195.4 9044.5 9423.2 9718.3 7619.3 0600-0000 9172.5 6078.0 | 9150.3 8304.8 8388.6 0000-0000 8514.2 9432.5 9500.0 9795.7 10022.7 7958.7 6442.3 | 9460.1 8712.4 1100 0800 0900 0900 0900 1100 AM Peak 1100 622.3 680.5 672.5 706.5 680.3 801.3 541.3 1600 1700 1600 1600 1600 1200 1200 PM Peak 749.0 776.0 807.5 792.3 873.0 754.7 559.0 |

## HW17 Newell Highway – Bogan Street, Parkes Daily Classes

Datasets:	
Site:	[125168N] NEWELL HWY 110m N OF CECILE ST OR S OF DALTON ST <50>
Direction:	1 - North bound, A hit first. Lane: 1 3 - South bound, A hit first. Lane: 1
Survey Duration:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class/Speed/Count)
Profile:	
Filter time:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012
Filter time: Included classes:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Filter time: Included classes: Speed range:	<b>11:03 Thursday, 2 August 2012 =&gt; 14:13 Monday, 20 August 2012</b> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 10 - 200 km/h.
Filter time: Included classes: Speed range: Direction:	<b>11:03 Thursday, 2 August 2012 =&gt; 14:13 Monday, 20 August 2012</b> 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 10 - 200 km/h. North, South (bound)
Filter time: Included classes: Speed range: Direction: Separation:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 10 - 200 km/h. North, South (bound) All - (Headway)
Filter time: Included classes: Speed range: Direction: Separation: Scheme:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 10 - 200 km/h. North, South (bound) All - (Headway) Vehicle classification (AustRoads94)
Filter time: Included classes: Speed range: Direction: Separation: Scheme: Units:	11:03 Thursday, 2 August 2012 => 14:13 Monday, 20 August 2012 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 10 - 200 km/h. North, South (bound) All - (Headway) Vehicle classification (AustRoads94) Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Monday, 6 August 2012

-	1	2	3	4	5	6	7	8	9	10	11	12	Total
Mon	7428	314	450	49	5	16	35	29	146	236	3	0	8711
(%)	85.3	3.6	5.2	0.6	0.1	0.2	0.4	0.3	1.7	2.7	0.0	0.0	
Tue	7831	300	407	56	10	17	29	35	233	544	5	0	9467
(%)	82.7	3.2	4.3	0.6	0.1	0.2	0.3	0.4	2.5	5.7	0.1	0.0	
Wed	7962	296	483	74	13	19	39	32	247	499	3	0	9667
(%)	82.4	3.1	5.0	0.8	0.1	0.2	0.4	0.3	2.6	5.2	0.0	0.0	
Thu	8315	284	494	45	19	10	43	24	205	484	4	0	9927
(%)	83.8	2.9	5.0	0.5	0.2	0.1	0.4	0.2	2.1	4.9	0.0	0.0	
Fri	8758	349	504	48	9	20	25	23	158	312	0	0	10206
(%)	85.8	3.4	4.9	0.5	0.1	0.2	0.2	0.2	1.5	3.1	0.0	0.0	
Sat	6955	278	250	33	7	9	19	10	140	320	1	0	8022
(%)	86.7	3.5	3.1	0.4	0.1	0.1	0.2	0.1	1.7	4.0	0.0	0.0	
Sun	5457	273	251	54	3	7	15	15	131	316	2	0	6524
(%)	83.6	4.2	3.8	0.8	0.0	0.1	0.2	0.2	2.0	4.8	0.0	0.0	
Avera	ge daily	volum	e										
Entire	e week												
( %)	7529	299	405	51	9	14	29	24	180	387	2	0	8931
(5)	04.3	3.3	4.5	0.0	0.1	0.2	0.3	0.5	2.0	4.3	0.0	0.0	
Weekda	ays	200	4.67		1 1	1.0	2.4	2.0	107	41 F	2	0	0505
(응)	8058 84.0	308	467	54 0.6	0.1	0.2	34 0.4	28 0.3	2.1	415	0.0	0.0	9595
( • )													
Weekeı	nd 6206	275	250	43	5	8	17	12	135	318	1	0	7273
(%)	85.3	3.8	3.4	0.6	0.1	0.1	0.2	0.2	1.9	4.4	0.0	0.0	, 2, 5

	class 1	2	3	4	5	6	7	8	9	10	11	12	
mon	7638	265	456	153	18	24	40	33	236	142	5	0	
tues	7424	250	472	262	29	24	39	50	445	336	5	0	
wed	7570	215	491	215	24	20	32	25	430	314	8	0	
thur	8033	237	641	205	21	25	40	33	447	356	6	0	
fri	8549	224	629	164	13	24	28	29	294	204	3	0	
sat	7462	231	338	102	18	18	24	27	337	256	5	0	
sun	5079	232	232	92	16	8	16	20	297	236	5	0	
													total
entire week	7394	236	466	170	20	20	31	31	355	263	5	0	8992
(vehicles)	82.2%	2.6%	5.2%	1.9%	0.2%	0.2%	0.3%	0.3%	3.9%	2.9%	0.1%	0.0%	100.0%
weekdays	7843	238	538	200	21	23	36	34	370	270	5	0	9579
(vehicles)	81.9%	2.5%	5.6%	2.1%	0.2%	0.2%	0.4%	0.4%	3.9%	2.8%	0.1%	0.0%	100.0%
weekend	6271	232	285	97	17	13	20	24	317	246	5	0	7526
(vehicles)	83.3%	3.1%	3.8%	1.3%	0.2%	0.2%	0.3%	0.3%	4.2%	3.3%	0.1%	0.0%	100.0%
ADT factor	1	1	1.1	1.6	2	1.6	2.1	2.6	2.3	3.3	4	5.7	
entire week ADT	7394	236	512	273	40	33	66	81	817	869	21	0	10341

% light / heavy - based on vehicles, not ADTs

% light 84.8% % heavy 15.2%

## H17 Newell Highway RLX south Parkes Weekly Vehicle Counts (Virtual Week)

<u>Datasets:</u> Site: Direction: Survey Duration: Algorithm: Data type:	[Site 1S], [Site 1N] At rail crossing near BP 24 hour. 3 - South bound, A hit first., Lane: 0, 1 - North bound, A hit first., Lane: 0 08:54 Monday, 28 August 2006 => 13:37 Monday, 4 September 2006 Factory default Axle sensors - Paired (Class, Speed, Count)
Profile:	
Filter time:	08:46 Monday, 28 August 2006 => 13:37 Monday, 4 September 2006
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 160 km/h.
Direction:	North, South (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	64277 Vehicles

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Average 1 - 5	s 1 - 7
Hour									
0000-0100	38.0	43.0	58.0	57.0	43.0	56.0	98.0	47.8	56.1
0100-0200	21.0	28.0	45.0	52.0	29.0	47.0	36.0	35.0	36.9
0200-0300	21.0	33.0	37.0	28.0	18.0	28.0	34.0	27.4	28.4
0300-0400	23.0	27.0	33.0	36.0	33.0	46.0	45.0	30.4	34.7
0400-0500	35.0	37.0	45.0	52.0	41.0	58.0	45.0	42.0	44.7
0500-0600	73.0	97.0	112.0	113.0	119.0	70.0	58.0	102.8	91.7
0600-0700	221.0	217.0	254.0	237.0	231.0	171.0	123.0	232.0	207.7
0700-0800	373.0	377.0	413.0	417.0	367.0	256.0	158.0	389.4	337.3
0800-0900	328.0	723.0	800.0<	734.0	661.0	502.0	258.0	649.2	572.3
0900-1000	355.0	727.0	768.0	774.0<	758.0<	766.0	449.0	676.4	656.7
1000-1100	631.0	767.0<	668.0	752.0	635.0	848.0<	503.0	690.6<	686.3<
1100-1200	635.0<	713.0	667.0	743.0	679.0	805.0	534.0<	687.4	682.3
1200-1300	724.0	904.0<	735.0	808.0	715.0	744.0<	495.0<	777.2<	732.1<
1300-1400	667.0	671.0	687.0	739.0	718.0	518.0	493.0	696.4	641.9
1400-1500	705.0	593.0	680.0	773.0	748.0	513.0	437.0	699.8	635.6
1500-1600	763.0<	519.0	808.0<	882.0<	818.0<	515.0	467.0	758.0	681.7
1600-1700	753.0	575.0	671.0	800.0	758.0	463.0	472.0	711.4	641.7
1700-1800	740.0	508.0	697.0	754.0	780.0	440.0	421.0	695.8	620.0
1800-1900	472.0	449.0	461.0	507.0	514.0	396.0	335.0	480.6	447.7
1900-2000	279.0	233.0	284.0	322.0	350.0	245.0	251.0	293.6	280.6
2000-2100	183.0	289.0	254.0	207.0	255.0	170.0	165.0	237.6	217.6
2100-2200	134.0	244.0	296.0	161.0	188.0	141.0	110.0	204.6	182.0
2200-2300	109.0	156.0	226.0	106.0	153.0	154.0	90.0	150.0	142.0
2300-2400	58.0	86.0	95.0	90.0	108.0	100.0	37.0	87.4	82.0
Totals _							 		
0700-1900	7147.0	7526.0	8055.0	8683.0	8151.0	6766.0	5022.0	7912.4	7335.7
0600-2200	7964.0	8509.0	9143.0	9610.0	9175.0	7493.0	5671.0	8880.2	8223.6
0600-0000	8131.0	8751.0	9464.0	9806.0	9436.0	7747.0	5798.0	9117.6	8447.6
0000-0000	8342.0	9016.0	9794.0	10144.0	9719.0	8052.0	6114.0	9403.0	8740.1
AM Peak	1100	1000	0800	0900	0900	1000	1100		
	635.0	767.0	800.0	774.0	758.0	848.0	534.0		
PM Peak	1500	1200	1500	1500	1500	1200	1200		
	763.0	904.0	808.0	882.0	818.0	744.0	495.0		

## HW17 Newell Highway – RLX at Hartigan Avenue, Parkes Daily Classes

Datasets:	
Site:	[Site 1S] At rail crossing near BP 24 hour.
Direction:	3 - South bound, A hit first., Lane: 0
Survey Duration:	08:54 Monday, 28 August 2006 => 14:17 Tuesday, 12 September 2006
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)
Site:	[Site 1N] At rail crossing near BP 24 hour.
Direction:	1 - North bound, A hit first., Lane: 0
Profile:	
Filter time:	08:46 Monday, 28 August 2006 => 14:17 Tuesday, 12 September 2006
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	10 - 180 km/h.
Direction:	North, South (bound)
Separation:	All - (Headway)
Name:	Factory default profile
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	136798 Vehicles

Monday,	4 Sep	tember	2006										
	1	2	3	4	5	6	7	8	9	10	11	12	Total
Mon	7638	265	456	153	18	24	40	33	236	142	5	0	9010
(%)	84.8	2.9	5.1	1.7	0.2	0.3	0.4	0.4	2.6	1.6	0.1	0.0	
Tue	7424	250	472	262	29	24	39	50	445	336	5	0	9336
(%)	79.5	2.7	5.1	2.8	0.3	0.3	0.4	0.5	4.8	3.6	0.1	0.0	
Wed	7570	215	491	215	24	20	32	25	430	314	8	1	9345
(응)	81.0	2.3	5.3	2.3	0.3	0.2	0.3	0.3	4.6	3.4	0.1	0.0	
Thu	8033	237	641	205	21	25	40	33	447	356	6	0	10044
(%)	80.0	2.4	6.4	2.0	0.2	0.2	0.4	0.3	4.5	3.5	0.1	0.0	
Fri	8549	224	629	164	13	24	28	29	294	204	3	0	10161
(%)	84.1	2.2	6.2	1.6	0.1	0.2	0.3	0.3	2.9	2.0	0.0	0.0	
Sat	7462	231	338	102	18	18	24	27	337	256	5	0	8818
(%)	84.6	2.6	3.8	1.2	0.2	0.2	0.3	0.3	3.8	2.9	0.1	0.0	
Sun	5079	232	232	92	16	8	16	20	297	236	5	0	6233
(응)	81.5	3.7	3.7	1.5	0.3	0.1	0.3	0.3	4.8	3.8	0.1	0.0	
Average	daily	volum	e										
Entire	week												
(0)	7392	236	465	170	19	20	31	30	354	262	5	0	8992
(%)	82.2	2.6	5.2	1.9	0.2	0.2	0.3	0.3	3.9	2.9	0.1	0.0	
Weekday	s												
(0)	7842	238	537	199	20	23	35	33	370	269	5	0	9578
(3)	81.9	2.5	5.0	2.1	0.2	0.2	0.4	0.3	3.9	2.8	0.1	0.0	
Weekend	6070	0.01	0.05		1.5	1.0			01.0	0.45	-	0	
(0)	6270	231	285	97	17	13	20	23	316	245	5	0	7525
(る)	రు.ు	3.1	వ.ర	⊥.3	0.2	0.2	0.3	0.3	4.2	3.3	0.1	0.0	

## Austroads94

Austroads94 replaced NAASRA in Australia in 1994. It is an improved system using information from the spacings of the first three axles, the total number of axles and the number of axle groups. There are 13 classes.

Level 1	Lev	el 2	Level 3	sijiA	1.1	Austroads		
Length	Axles and	d Groups	Vehicle Type			Classification		
Туре	Axles Groups		Description	Cla	SS	Parameters	<b>Dominant Vehicle</b>	
				Light V	ehicles		,	
Short up to 5.5m	2 1 or 2		Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc.	SV	1	d(1) <= 3.2m and axles = 2		
	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc.	SVT	2	groups = 3, $d(1) \ge 2.1m, d(1) \le 3.2m,$ $d(2) \ge 2.1m$ and axles = 3,4,5	æ	
				Heavy V	lehicles			
Medium 5.5m to 14.5m	2	2	Two Axle Truck or Bus	TB2	3	d(1) > 3.2m and axles = 2	62	
	3	2	Three Axle Truck or Bus	TB3	4	axles = 3 and groups = 2		
	> 3	2	Four Axle Truck	T4	5	axles $> 3$ and groups = 2		
·	3	3	Three Axle Articulated Three axle articulated vehicle or Rigid vehicle and trailer	ART3	6	d(1) > 3.2m, axles = 3 and groups = 3	<b>H</b>	
Long	4	> 2	Four Axle Articulated Four axle articulated vehicle or Rigid vehicle and trailer	ART4	7	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 4 and groups > 2		
19.0m	5	>2	Five Axle Articulated Five axle articulated vehicle or Rigid vehicle and trailer	ART5	8	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 5 and groups > 2		
	>= 6	>2	Six Axle Articulated Six (or more) axle articulated vehicle or Rigid vehicle and trailer	ART6	9	axles = 6 and groups > 2 or axles > 6 and groups = 3		
Medium Combination	> 6	4	B Double B Double or Heavy truck and trailer	BD	10	groups = $4$ and axles > $6$		
17.5m to 36.5m	> 6	5 or 6	Double Road Train Double road train or Heavy truck and two trailers	DRT	11	groups = 5 or 6 and axles > 6	5-50-500 -50 -500	
Long Combination Over 33.0m	> 6	>6	Triple Road Train Triple road train or Heavy truck with three trailers	TRT	12	groups > 6 and axles > 6	E	
· · · · · · · · · · · · · · · · · · ·		1		Ungroupe	ed Classes			
			Unclassifiable Vehicle		13			
			Unclassifiable Axle Event	· · · · ·	0			

Group: Axle group, where adjacent axles are less than 2.1m apart

Groups: Number of axle groups

Axles: Number of axles (maximum axle spacing of 10.0m)

d(1): Distance between first and second axle

d(2): Distance between second and third axle

- \$2?

24

Appendix B



# Appendix B

Parkes Railway Assessment





# MEMORANDUM

RE:	LACHLAN HEALTH SERVICES – PARKES ALTERNATIVE SITE ASSESSMENT – RAILWAY OPERATIONS IMPACTS
PAGE 1 OF	5
OUR REF:	13S90021000
DATE:	28 June 2013
FROM:	Rhys Hazell
CC:	Brett Maynard
TO:	Emma Jowsey – TSA Management

#### Background

Health Infrastructure and TSA Management commissioned GTA Consultants (GTA) in June 2013 to investigate the constraints presented by the Parkes railway line with respect to an alternative Parkes Hospital site. At the time of writing the preferred site, known as Crown-2 and located east of the Newell Highway north of Henderson Street was the only alternative site located south of the railway line.

Train activity for both commercial and agricultural purposes presents delay for road users however this review is concerned mostly with the potential impacts associated with emergency services and the resultant response times, and ultimately community health.

Access to the alternative site is proposed via the intended Southern Ring Road, the segmented construction of which will be funded and prioritised by Council, in consultation with Roads and Maritime Services to ensure adequate access arrangements and intersection layouts. The Southern Ring Road will travel in an east-west direction north of the alternative Parkes Hospital site and intersect with the Newell Highway in the west and Fischer Street/ Back Yamma Road in the east at priority controlled intersections.

#### Travel Times

Given GTA's involvement with the broader Lachlan Health Service project for the redevelopment of Parkes District Hospital, it is understood that up to 90% of the Parkes population resides north of the railway line. This assessment focuses on impacts to emergency services given that the impacts to non-emergency patients, visitors and staff are thought to be relatively low and manageable.

There are four available level crossings within Parkes, with a travel time assessment of these level crossings from an alternative hospital located on Crown-2 land included in Table 1.





Takes Level Clossings									
Location	Travel Distance	Travel Time							
Newell Highway (central)	1.3km	3 minutes							
East Street (eastside)	1.8km	4 minutes							
London Road (westside)	2.1km	5 minutes							
Nash Street (eastside)	2.9km	6 minutes							

#### Table 1: Parkes Level Crossings

Table 1 illustrates that travel times for each Parkes level crossing are similar however the Newell Highway presents the preferred route and ensures the fastest emergency response times. Alternatively, and depending on the emergency destination, East Street also presents a convenient and viable route with London Street; located to the west considered an appropriate route should the preferred routes be temporarily unavailable.

#### Overview and Consultation

GTA Consultants has undertaken extensive consultation with various stakeholders to understand rail operations in regional western NSW, specifically Parkes. The Train Transit Team within the Australian Rail Track Corporation Ltd (ARTC) has provided broad level timetable information, with John Holland Rail responsible for the management and control of the Parkes level crossings.

Initial feedback included the following:

- train frequencies vary seasonally and day-to-day and are dependent on several factors including scheduling and farming activity
- train lengths typically vary between 300m and 1,500m and can reach up to 1,800m
- trains generally travel at 35-45km/h
- train breakdowns and vandalism can result in delays in excess of 20 minutes.

Equally, Parkes Hospital Emergency Department (ED) information relating to presentations by emergency vehicles was obtained to understand the potential implications to emergency responses.

#### **Railway Operations**

Activation data provided by John Holland Rail for the Newell Highway level crossing indicates that between 3 February 2013 and 8 June 2013 (18 weeks), the duration of activation ranged from approximately one second to 48 minutes. The data provided included the dates, time of day and activation duration.

Subsequent feedback from John Holland Rail indicates that the minimum duration of activation; that is, the time from when the boom gates commence closing to when the boom gates are completely open following a train passing through the level crossing is a minimum of 30 seconds. This would likely be a locomotive with no trailing carriages. Activations of less than 30 seconds are understood to be likely a result of unforeseen events, including power spikes, heavy vehicles tripping activation and technical faults.

Similarly, shunting of eastbound trains at the Parkes stabling yards can result in the activation of the level crossing for significant durations. A review of the data indicates that in the 18 weeks to 8 June 2013 there were six activations greater than 20 minutes duration. These represent approximately 0.2% of total activations, and as such, have been considered as rare events.

Based on the above, all activations of less than 30 seconds, and those greater than 20 minutes have been removed to better represent typical activations and thus the likely delays to vehicles as a result of trains travelling through Parkes.



Data analysis reveals several key factors with respect to the Newell Highway level crossing, including a summary of what an average week represents, as illustrated in Figure 1.



Figure 1: Newell Highway Average Week Train Frequency

Figure 1 indicates that there is an average of 28 trains per day passing through the Newell Highway level crossing, or approximately one every 50 minutes. Tuesday experiences the highest frequency with 34 per day, or one every 43 minutes.

The peak day was also on a Tuesday (19/02/13) with 57 trains in total, or one every 25 minutes.

An assessment of the hourly train frequency during the average day is presented in Figure 2.



Figure 2: Newell Highway Average Day Train Frequency

Figure 2 illustrates that there are 1 to 2 train movements at the Newell Highway level crossing in any given hour, peaking at 1.6, or approximately one every 37 minutes. The peak hour on the



peak day has four trains passing through and occurs twice (3:00-4:00pm and 9:00pm-10:00pm). This represents one train every 15 minutes

Figure 3 presents a summary of the delays vehicles experienced at the Newell Highway level crossing on the average day.



Figure 3: Newell Highway Average Day Duration of Activation

Figure 3 indicates an average activation duration for the 18 weeks to 8 June 2013 of 2 minutes 23 seconds. In addition, there is a 1% chance of an activation of more than 10 minutes and a 10% chance of an activation of more than 5 minutes.

#### Ambulance NSW

Information provided by TSA Management regarding presentations at Parkes Hospital ED indicates that in 2012 there were 11,150 presentations at ED (Triage 1-5), 1,274 of which arrived by ambulance and 9,876 by private car.

Of these, 26 were Triage 1 (most critical condition) presentations, 22 of which arrived by ambulance and 4 by private car. There were 678 Triage 2 (very unwell) presentations, 203 of which arrived by ambulance and 475 by private car.

The 1,274 Triage 1 and Triage 2 presentations that arrived by ambulance represents approximately 3.5 presentations a day.

#### Potential Implications

For the purposes of assessing the implications of a railway crossing activation on an ambulance, the following information has been used, noting that the data has been rounded to present an accurate overview:

- activations occur on average, every 50 minutes for a duration of 2 minutes 30 seconds
- assumed that there is up to seven presentations a day as this accounts for fluctuations and peak periods, broken down as follows:
  - one presentation between 12:00am and 6:00am
  - two presentations each during the remaining periods, that is 6:00am-12:00pm, 12:00pm-6:00pm and 6:00pm to 12:00pm.



Based on the above, there is potential for one presentation to the ED every three hours during peak periods. In this three hour period, there is also potential for 3.6 level crossing activations, equating to a combined duration of nine minutes over the period.

Therefore, given a scenario where there is an emergency call out on the northern side of the railway line (assuming an ambulance station on Crown-2); an ambulance would have a 5% to 10% chance of being affected by an activated level crossing.

#### Conclusion

There are two key factors that reduce the likelihood that an ambulance would be affected by an activated level crossing during an emergency call out. These are:

- the availability of four level crossings all within three to six minutes of the alternative hospital located on Crown-2 land
- the distance between the level crossings ranging from 500 metres to 1.5km, with the distance between the furthest level crossings being approximately 3.5km.

With the implementation of the following measures, an emergency vehicle would have sufficient opportunity to take a different route prior to departing, given the likelihood that the preferred level crossing is activated on arrival:

- implementation of CCTV footage under instruction from John Holland Rail, either through existing feeds or new feeds
- radio contact with the John Holland Rail control centre.

I trust this provides the information you require. Naturally, should you have any questions or require any further information, please do not hesitate to contact me on (02) 8448 1800.

Yours sincerely

#### GTA CONSULTANTS

Rhys Hazell Senior Project Manager

Appendix C



# Appendix C

Southern Ring Road Concept Plans



				Designer M. YATES
SCALE 1:500 AT ORIGINAL SIZE	72 Mr. Namara Street Orange NSW 2800 Australia PO Box 950 Orange NSW 2800	Conditions of Use. This document may only be used by GHD's client (and any other person who GHD has agreed can use this document)	Drafting Check Approved (Project Director) Date	Design Check





Plot Date: 24 January 2014 - 2:20 PM Plotted By: Martin Yates

Cad File No: G:\21\22901\CADD\Drawings\21-22901-SK022-23.dwg



Plot Date: 24 January 2014 - 2:22 PM Plotted By: Martin Yates

Cad File No: G:\21\22901\CADD\Drawings\21-22901-SK022-23.dwg



Appendix D



# Appendix D

SIDRA INTERSECTION Modelling Results









## **MOVEMENT SUMMARY**

13S9002200 - Lachlan Health Redevelopment Parkes Hospital Schematic Design Newell Highway / Southern Ring Road (Proposed) Weekday Peak Hour Giveway / Yield (Two-Way)

Movem	Movement Performance - Vehicles										
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: N	lewell ⊦	lighway - S									
2	Т	460	19.9	0.266	0.0	Х	Х	Х	Х	0.00	59.9
3	R	51	14.6	0.075	12.1	LOS A	0.3	2.2	0.54	0.78	45.5
Approac	:h	511	19.4	0.266	1.2	NA	0.3	2.2	0.05	0.08	58.1
East: So	outhern	Ring Road - E									
4	L	36	11.8	0.021	7.9	Х	Х	Х	Х	0.60	49.8
6	R	27	7.7	0.083	17.3	LOS B	0.3	2.2	0.64	0.88	40.8
Approac	h	63	10.0	0.083	12.0	LOS A	0.3	2.2	0.28	0.72	45.5
North: N	lewell H	lighway - N									
7	L	32	6.7	0.024	8.0	LOS A	0.1	0.7	0.14	0.56	49.0
8	Т	460	19.9	0.266	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	:h	492	19.1	0.266	0.5	NA	0.1	0.7	0.01	0.04	59.1
All Vehic	les	1065	18.7	0.266	1.5	NA	0.3	2.2	0.05	0.10	57.6

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Processed: Thursday, 30 January 2014 9:19:23 AM SIDRA INTERSECTION 5.1.13.2093 Project: P:\13S9000-9099\13S9002200 - Lachlan Health Redevelopment - Schematic Design\Modelling \140129sid-13S9002200 Parkes Hospital Access, Newell Hwy and Ring Road.sip 8000056, GTA CONSULTANTS, ENTERPRISE





Hospital Access Road - S



## **MOVEMENT SUMMARY**

13S9002200 Lachlan Health Service Redevelopment Parkes Hospital Schematic Design Southern Ring Road / Hospital Acess (Proposed) Weekday Peak Hour Giveway / Yield (Two-Way)

Movem	Movement Performance - Vehicles										
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Hospital Access Road - S											
1	L	25	4.2	0.032	6.1	LOS A	0.1	0.6	0.13	0.55	37.3
3	R	17	6.3	0.023	7.4	LOS A	0.1	0.6	0.30	0.59	36.7
Approac	h	42	5.0	0.032	6.6	LOS A	0.1	0.6	0.20	0.57	37.0
East: So	uthern I	Ring Road - E									
4	L	17	6.3	0.031	7.3	LOS A	0.0	0.0	0.00	0.99	48.7
5	Т	38	13.9	0.031	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approac	h	55	11.5	0.031	2.3	NA	0.0	0.0	0.00	0.30	56.2
West: So	outhern	Ring Road - W	1								
11	Т	57	14.8	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	25	4.2	0.021	7.6	LOS A	0.1	0.5	0.14	0.60	47.9
Approac	h	82	11.5	0.032	2.3	NA	0.1	0.5	0.04	0.18	55.9
All Vehic	les	179	10.0	0.032	3.3	NA	0.1	0.6	0.07	0.31	49.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

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