

## 6 Parking Provision

The proposed parking provision has been established following an extensive study of the Hospital undertaken by PTC, including travel mode surveys, traffic surveys and parking occupancy surveys. In summary, the study concluded that the hospital has a current parking demand for 2,239 parking spaces, while the Hospital Campus accommodates 1,106 spaces and a further 848 spaces are located within the Hospital Precinct (i.e. within 500 metres of the Hospital Campus). The remaining demand for 285 spaces is accommodated in areas outside of the Hospital Precinct.

### 6.1 Current Parking Demand

In order to identify the patterns of parking activity in proximity to Gosford Hospital, PTC undertook a detailed hourly occupancy survey of all Hospital parking supply on site for a full week (Monday 8th April 2013 – Friday 12th April 2013, approximately 7am – 6pm).

#### 6.1.1 Staff Parking – On-Campus

Staff parking is located throughout the Hospital Precinct. Peak occupancy occurred at approximately 1pm - 2pm on each day when parking is effectively at 100% occupancy. Table 5 presents the hourly staff occupancy showing the greatest volume of inbound staff movement occurring during the AM Peak between 7am and 8am. During the PM Peak, the largest outbound staff movement occurred between 3pm and 4pm, which coincides with the shift changeover. Peak occupancy each day is highlighted in yellow.

	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
<b>Monday</b>	55.22%	77.80%	81.02%	80.65%	85.58%	87.29%	92.98%	92.41%	87.86%	65.09%	30.55%
<b>Tuesday</b>	46.49%	75.33%	79.70%	81.02%	86.72%	87.67%	95.26%	93.74%	83.78%	81.76%	77.03%
<b>Wednesday</b>	36.24%	76.85%	80.46%	81.02%	85.96%	94.12%	96.20%	94.31%	88.61%	58.25%	36.81%
<b>Thursday</b>	34.35%	81.97%	87.67%	86.91%	85.20%	90.70%	93.36%	94.69%	86.34%	67.93%	26.76%
<b>Friday</b>	33.97%	68.88%	74.95%	76.85%	77.04%	80.65%	85.77%	86.15%	79.51%	48.39%	31.12%

Table 5 - Summary of Staff Peak Occupancy (%)

#### 6.1.2 Public Parking – On-Campus

Public parking comprises car parks primarily for outpatients and patient visitors, although these car parks are also used by other visitors to the Hospital (e.g. those attending meetings and conferences etc.).

Public parking at the Hospital is dispersed across a number of car parks, although the primary location is the existing multi-storey car park (Levels 1 – 4) which provides approximately 80% of the total public parking supply within the Hospital Campus. A summary of the hourly occupancy rates (%) is shown in Table 6.

	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
<b>Monday</b>	33.98%	81.49%	94.20%	95.30%	95.58%	91.71%	89.78%	91.71%	91.44%	80.11%	57.18%
<b>Tuesday</b>	31.49%	63.81%	95.86%	99.17%	100%	96.13%	91.16%	95.03%	91.99%	83.15%	68.51%
<b>Wednesday</b>	30.39%	67.40%	91.99%	96.69%	97.24%	97.51%	99.45%	100%	96.69%	83.15%	63.26%
<b>Thursday</b>	38.67%	54.42%	90.33%	97.51%	98.90%	97.24%	85.08%	95.30%	88.67%	76.80%	64.09%
<b>Friday</b>	29.01%	51.93%	76.52%	85.36%	95.86%	90.06%	83.15%	84.25%	79.56%	67.40%	56.08%

Table 6 - Summary of Public Peak Occupancy (%)

## 6.2 Proposed Parking Provision

Typically, parking demand is estimated based on published data, e.g. the applicable Planning Policies, the RMS Guide to Traffic Generating Developments or by collecting data from a similar facility. The RMS Guide does not present any parking demand data associated with public hospitals (only Private Hospitals and Medical Centres are included). In the case of Gosford Hospital, the most effective method for projecting the future parking demand is to collect data from the existing facility and then apply those findings to the proposed redevelopment on a pro-rata basis, according to expected increases in the number of beds, Full Time Equivalent (FTE) staff and other relevant demand drivers.

In this regard, the data collected from the existing Hospital provides the basis for the future parking demand associated with the proposed Hospital Redevelopment and the HWP as summarised in Table 7. The primary parking demand occurs between the hours of 9:00 to 17:00, and we have adopted parking space turnover as a means of generating the average demand relating to patients and visitors (staff have a turnover of 1 as they park all day). Peak demand occurs during the afternoon shift change (1500 – 16:00), therefore both the dayshift and a proportion of the afternoon shift staff are included in the calculation.

User Group	Add. persons per day	Mode Share (Car Use)	Car Occupancy	Turnover	Spaces Required
Staff (Day shift)	155	93%	1.11	1.00	130
Staff (Afternoon shift changeover)	25 <sup>2</sup>	93%	1.11	1.00	20
Visiting Medical Officers	39	100%	1.00	3.00	13
Outpatients	301	62%	1.00	2.52	74
Visitors to Inpatients <sup>3</sup>	105	76%	1.69	2.52	19
Emergency Department Presentations <sup>4</sup>	31	31%	1.00	2.52	8
Education and Training	11	93%	1.11	1.00	9
Students	36	45%	1.11	1.00	14
Volunteers	10	93%	1.11	1.00	8
Fleet Vehicles	40	100%	1.00		40
Private Consultant Staff	2	93%	1.11	1.00	2
Private Consultant Patients	6	62%	1.00	2.52	2
Retail Staff	5	93%	1.11	1.00	4
<b>Total</b>					<b>343 Spaces</b>

Table 7 - Additional Future Parking Demand

Based on the existing mode share and travel characteristics of the existing Hospital, the proposed Hospital Redevelopment will generate an additional peak demand of 343 parking spaces.

<sup>2</sup> There will be 74 additional afternoon shift although only one third arrive during the shift change period.

<sup>3</sup> There will be 150 additional visitors per day, but only 105 between 9:00 and 17:00.

<sup>4</sup> There will be 51 additional emergency personnel although only 31 between 900 and 17:00.

It is also important to note that the Hospital Redevelopment and the associated road closure and truncations will result in the displacement of 262 parking spaces, which will also be accommodated within the proposed multi-storey car park.

HI has advised that the HWP buildings are proposed to be accommodated as follows:

- 4,000m<sup>2</sup> GFA for displaced or existing Gosford Hospital staff / services and Community Health,
- 2,000m<sup>2</sup> GFA for other LHD service providers, staff patients and visitors being relocated
- 7,500m<sup>2</sup> GFA for future LHD, health related and Government administration staff / services. (Should demand require building to be constructed at a later time)

The parking demand associated with the HWP has been established with reference to Clause 8.6 of Gosford LEP 2014, which states:

### 8.6 Car parking

*(1) Development consent must not be granted for development on land in Zone B3 Commercial Core or Zone B4 Mixed Use that involves the erection of a new building or an alteration or addition to an existing building that increases the gross floor area of the building unless:*

*(a) at least one car parking space is provided for every 75 square metres of the gross floor area of the building that is to be used for commercial activities, and*

*(b) at least one car parking space is provided for every 40 square metres of the gross floor area of the building that is to be used for the purpose of retail premises.*

Parking Demand	Type	LEP Parking Rate	Total spaces	Rational
<b>Future LHD, health related and Government administration staff / services. (Should demand require building to be constructed at a later time)</b> (7,500m <sup>2</sup> GFA)	Staff	1 space per 75m <sup>2</sup>	100	The proposed office area will involve a new parking demand and therefore the parking provision has been established by application of the LEP parking rates.
<b>Health Related Services including LHD and Community Health</b> (6,000m <sup>2</sup> GFA)	Staff	N/A	55	The LHD and Community Health services will comprise a re-location of an existing facility already within the Campus that will be lost as part of the proposed Hospital Redevelopment. Therefore parking demand has already been accounted for. The proposal for 55 additional parking spaces is to accommodate other health and health related staff, patients and visitors.
<b>Retail Development</b> (396 m <sup>2</sup> GFA)	Staff	1 space per 40m <sup>2</sup>	10	It is assumed the form of development at this location would be for general shops spread across a 396m <sup>2</sup> retail zone provided on the rooftop level of the multi-storey car park.
	Visitor	N/A	0	
<b>Total</b>			<b>155</b>	

Table 8 - Parking Provision Assessment for the Office Buildings

In accordance with this requirement, 155 parking spaces will be provided within the multi-storey car park in addition to the Hospital Redevelopment demand and the displacement of existing spaces. The proposed parking provision is summarised in Table 9.

Use	Parking Requirement
Hospital Redevelopment – Additional Demand	343 spaces
Hospital Redevelopment – Displaced Parking	262 spaces
HWP Administrative Buildings	155 spaces
HWP Retail	10 spaces
<b>Total Required</b>	<b>770 spaces</b>

Table 9 - Parking Requirements

In accordance with this demand projection, the proposed multi-storey car park will accommodate 803 spaces. The provision of 33 spaces over the peak demand will also ensure that all drop-off activity can be accommodated within the car park, in addition to the external drop-off spaces adjacent to the proposed entrance lobby.

The Hospital Redevelopment involves the decommissioning of the Helipad which is likely to yield a small number of additional parking spaces within the Hospital Campus.

## 7 Impact of Proposed Development

In relation to the traffic assessment, the Project is slightly unusual in that the Hospital Redevelopment represents the key driver of traffic activity (number of staff, beds, visitors etc.) however the projected traffic activity (and the activity associated with displaced parking) will occur at the proposed multi-storey car park location.

As described in Section 6, the number of parking spaces to be provided in the new multi-storey car park was determined through assessment of the parking demand generated by the existing Hospital and the projected growth, which in turn forms the basis for the traffic generation of the development.

It should be noted that the displacement of parking from within the Campus will have the effect of reducing traffic activity in those areas and this has been factored into the traffic assessment and network modelling.

### 7.1 Modal Split

Multiple transport modes are available to Hospital attendees (staff, outpatients and visitors), including road, bus, rail and active transport.

Gosford Railway Station is located approximately 500 metres from the Hospital Campus, with two free shuttle buses providing services between the station and the Hospital. However, the convenience of rail as a mode share will also depend on the connections at the other end of the person's journey e.g. the proximity of stations to the person's residence, provision of parking at those stations (i.e. commuter style, long stay parking), and/or bus routes linking their residence to the railway stations.

The survey performed by PTC as part of the Parking Demand Study captured 1,581 respondents consisting of:

- 47% (539 respondents) Hospital Staff
- 53% (608 respondents) Public, in the following groups:
  - 35% (209 respondents) were outpatients
  - 63% (385 respondents) were visitors
  - 2% (14 respondents) were contractors

The split in the number of users accessing the Hospital by different transport modes is summarised in Table 10. The data indicates that the car is by far the most popular form of access to the Hospital by all users.

Mode of Transport	Staff	Outpatients	Visitors
Car	95%	80%	83%
(Car Passenger)	9%	-	-
Public Transport – bus, train	2.6%	15%	12%
Taxi	0%	5%	5%
Walk	1.2%	0%	0%
Bicycle	1.2%	0%	0%

Table 10 - Mode of transport access to the Hospital (%) by user group

## 7.2 Traffic Generation

In a similar regard to the projected parking provision, the traffic activity associated with a future use can be determined through reference to published data, or data collected at a similar facility. In relation to the proposed Hospital Redevelopment the existing Hospital provides a suitable basis for the projection of future traffic volumes.

By way of reference, we have also applied the method and formulae presented in the RMS Guide to Traffic Generating Developments, although it is noted that this applies to Private Hospitals and Medical Centres.

The travel characteristics associated with the Hospital and various user groups was collected during the Parking Study. This was used to establish the peak parking demand, which in turn provides the basis of the traffic activity. The existing multi-storey car park includes access control equipment, which records arrival and departure data. This data has been used to determine the arrival rate during the morning peak period and the departure rate during the evening peak period. This has then been applied to the proposed Hospital Redevelopment, based on the number of beds, the number of staff and the number of outpatients and visitors. The displacement of existing car parking is also included within the projected volumes, as this will occur to/from the proposed multi-storey car park. These volumes have been removed from the existing locations within the future traffic modelling scenarios (i.e. not net gain/loss, but a redistribution of trips).

The method for calculating the traffic generation of the Hospital Redevelopment in accordance with the RMS Guide to Traffic Generating Developments, is expressed as the following formulae:

- PVT =  $-14.69 + 0.69 B + 0.31 ASDS$
- MVT =  $-10.21 + 0.47 B + 0.06 ASDS$
- EVT =  $-2.84 + 0.25 B + 0.40 ASDS$

Where PVT = Peak Vehicle Trips (typically 15:00-16:00), MVT = Morning Vehicle Trips and EVT = Evening Vehicle Trips.

Where ASDS = Average Staff Day Shift

Where B = Overnight Beds

Application of these formulae to the proposed Hospital Redevelopment indicates the following projected traffic activity.

- PVT =  $-14.69 + (0.69 \times 153) + (0.31 \times 158)$  = 91 + 49 = **140 Vehicle Trips**
- MVT =  $-10.21 + (0.47 \times 153) + (0.06 \times 158)$  = 62 + 10 = **72 Vehicle Trips**
- EVT =  $-2.84 + (0.25 \times 153) + (0.40 \times 74)$  = 35 + 30 = **65 Vehicle Trips**

By comparison, an analysis of the traffic activity has been undertaken based on the data collected from the existing hospital, which has been applied to the Hospital Redevelopment. This takes into account the modal split, the car occupancy rates and the arrival and departure times of staff, outpatients and visitors. The findings of this method are:

- PVT = **140 Vehicle Trips**
- MVT = **99 Vehicle Trips**
- EVT = **68 Vehicle Trips**

For the purposes of providing a robust assessment, the method based on the existing hospital data was adopted within the modelling, as it indicates a slightly higher traffic generation during the morning and evening peaks.

The traffic activity associated with the HWP has been calculated on the basis of an office development with reference to the traffic generation rates for office use presented in the RMS Guide to Traffic Generating Developments. It should be noted that of the proposed 14,850m<sup>2</sup> GFA within the HWP, 6,000m<sup>2</sup> will accommodate facilities associated with existing Hospital and therefore will not generate additional traffic activity. In this regard, the rates presented in the RMS Guide update (TD/2013/04) have been applied to the remaining 8,850m<sup>2</sup> GFA.

The update to the RMS Guide presents the following traffic generation rates applicable to the office component:

- Daily vehicle trips = 11 per 100 m<sup>2</sup> gross floor area
- Morning peak hour vehicle trips = 1.6 per 100 m<sup>2</sup> gross floor area.
- Evening peak hour vehicle trips = 1.2 per 100 m<sup>2</sup> gross floor area.

Application of these rates to the proposed office area of 8,850m<sup>2</sup> equates to 142 trips during the morning peak and 106 trips during the evening peak. Typically the evening peak hour associated with office uses occurs sometime between 17:00 and 19:00 depending on local conditions. However, in order to provide a robust assessment these peak traffic volumes have been added to the local road network peak (determined in the traffic surveys) and the Hospital Peak which occurs during the afternoon. Therefore the accumulation of trips comprises the local school traffic, the afternoon staff shift change as well as the peak office departure activity. The traffic volume data is summarised in Table 11.

Existing Parking Location	Post-Development Parking Location	MVT Trips	PVT Trips
Existing multi-Storey car park (Level 1-4 Public)	Beane Street West multi-storey car park via Showground Road	107 (in) 0 (out)	0 (in) 39 (out)
Emergency car park Holden Street	Beane Street West multi-storey car park via Showground Road	17 (in) 17 (out)	19 (in) 19 (out)
Staff car park (corner of Holden Street / Ward Street) via Holden Street	Staff car park via Ward Street	18 (in) 0 (out)	0 (in) 14 (out)
On-street parking, Hospital Rd	Beane Street West multi-storey car park via Showground Road	3 (in) 0 (out)	0 (in) 1 (out)
Additional demand due to hospital Redevelopment	Beane Street West multi-storey car park via Showground Road	83 (in) 16 (out)	39 (in) 101 (out)
Additional demand due to the Health and Wellbeing Precinct	Beane Street West multi-storey car park via Holden Street	127 (in) 14(out)	11 (in) 96 (out)
<b>Total (Showground Road Entry/Exit)</b>		<b>228 (in)</b> <b>33 (out)</b>	<b>58 (in)</b> <b>174 (out)</b>
<b>Total (Holden Street Entry/Exit)</b>		<b>127 (in)</b>	<b>11 (in)</b>

Table 11 - Projected Traffic Generation

### 7.3 Background Traffic

To assess the impact of background traffic growth on the surrounding road network, an annual growth rate of 2.0% to 2019 and 2027 has been applied to the modelling, as required by the SEARs.

A scenario adopting a 1.0% growth rate has also been undertaken as this represents the growth in the 5 year (2009-2014) historical Average Annual Daily Traffic (AADT) volumes referenced from two RMS permanent count stations located approximately 2km from the Hospital.

### 7.4 Traffic Modelling Scenarios

In order to assess the potential traffic impact associated with the Project and the impacts of background traffic growth, a number of modelling scenarios have been developed and modelled by Jacob. The assessment scenarios are summarised in the following table:

Scenario	Year	Network description
<b>S1</b>	2015	As existing – do nothing
<b>S2A</b>	2019	As existing – do nothing – 1% Growth
<b>S2B</b>	2019	As existing – do nothing – 2% Growth
<b>S3A</b>	2027	As existing – do nothing – 1% Growth
<b>S3B</b>	2027	As existing – do nothing – 2% Growth
<b>S4</b>	2015	Future network + 2015 base demand + 2027 post development
<b>S5A</b>	2019	Future network + 2019 base demand (1%) + 2019 post development
<b>S5B</b>	2019	Future network + 2019 base demand (2%) + 2019 post development
<b>S6A</b>	2027	Future network + 2027 base demand (1%) + 2027 post development
<b>S6B</b>	2027	Future network + 2027 base demand (2%) + 2027 post development
<b>S7B</b>	2027	Future network + upgrade 1 + S6A demand
<b>S8B</b>	2027	Future network + upgrade 2 + S6A demand

Table 12 - Traffic Modelling Scenarios

The above scenarios were developed in consultation between HI, PTC and Jacobs to ensure that modelling identifies all likely impacts resulting from the increase and redistribution of traffic activity around the Hospital Precinct as a consequence of the Project.

### 7.5 Traffic Modelling Results

The results of the traffic modelling are presented in Section 7 of the Jacobs Traffic Modelling Report and are summarised in the following Tables 12 (AM peak) and 13 (PM peak):

ID	Intersection	Existing Network					Future Network + Post Development				
		2015	2019		2027		2015	2019		2027	
		S1	S2A	S2B	S3A	S3B	S4	S5A	S5B	S6A	S6B
01	Racecourse Road / Beane Street West	A	A	A	A	A	A	A	A	A	A
02	Racecourse Road / Hospital Road	A	A	A	A	A	A	A	A	A	B
03	Beane Street West / Hospital Road	A	A	A	A	A	A	A	A	A	A
04	Cape Street North / Sinclair Street	A	A	A	A	A	A	A	A	A	A
05	Racecourse Road / Holden Street	A	A	A	A	A	A	A	A	A	A
06	Holden Street / Beane Street West	A	A	A	A	A	A	A	A	A	A
07	Cape Street North / Ward Street	A	A	A	A	A	A	A	A	A	A
08	Ward Street / Holden Street	A	A	A	A	A	A	A	A	A	A
09	Holden Street / Faunce Street West	A	A	A	A	A	A	A	A	A	A
10	Racecourse Road / Showground Road	B	B	C	C	F	B	B	B	D	E
11	Racecourse Road / Pacific Highway	C	C	C	C	D	C	C	C	C	F
12	Showground Road / Beane Street West	A	A	A	A	A	A	A	A	A	A
13	Showground Road / Faunce Street West	A	A	A	A	A	A	A	A	A	A
14	Racecourse Road Pedestrian Crossing	A	A	A	A	A	A	A	A	A	A

Table 13 - AM Peak Intersection Level of Service Summary

ID	Intersection	Existing Network					Future Network + Post Development				
		2015	2019		2027		2015	2019		2027	
		S1	S2A	S2B	S3A	S3B	S4	S5A	S5B	S6A	S6B
01	Racecourse Road / Beane Street West	B	B	B	B	D	A	A	A	A	A
02	Racecourse Road / Hospital Road	A	A	A	A	B	B	B	B	B	B
03	Beane Street West / Hospital Road	A	A	A	A	A	A	A	A	A	A
04	Cape Street North / Sinclair Street	A	A	A	A	A	A	A	A	A	A
05	Racecourse Road / Holden Street	C	C	C	C	D	A	A	A	A	A
06	Holden Street / Beane Street West	A	A	A	A	A	A	A	A	A	A
07	Cape Street North / Ward Street	A	A	A	A	A	A	A	A	A	A
08	Ward Street / Holden Street	A	A	A	A	A	A	A	A	A	A
09	Holden Street / Faunce Street West	A	A	A	A	A	A	A	A	A	A
10	Racecourse Road / Showground Road	D	D	E	F	F	D	D	E	F	F
11	Racecourse Road / Pacific Highway	C	C	C	C	D	C	C	C	C	F
12	Showground Road / Beane Street West	A	A	A	A	A	A	A	A	A	A
13	Showground Road / Faunce Street West	A	A	A	A	A	A	A	A	A	A
14	Racecourse Road Pedestrian Crossing	A	A	A	A	A	A	A	A	A	A

Table 14 - Afternoon Peak Intersection Level of Service Summary

## 7.6 Improvements to Site Access and Circulation, and Other Traffic Management Measures

Typically, the traffic impact associated with a development is measured against existing road conditions and, if a negative impact is likely, road or intersection works may be required to counter this impact, i.e. to retain the current road conditions following the completion of the development.

The Project is somewhat unusual in that the construction period and the incremental operational ramp of use of the Hospital Redevelopment means that the total traffic activity will not occur until 2027. In order to assess the sole impact associated with the project, Scenario 4 comprises the total project traffic activity (and redistribution) and road closure and truncations, superimposed on to the existing (2015) traffic volumes. This scenario demonstrates that the road network would continue to operate within capacity following the completion of the hospital, if background growth is not included. Scenario 2B confirms that the background growth (at 2%) is sufficient to cause failures at key intersections during 2019, prior to the planned construction completion of the Project.

The construction of the Project will take place from 2016 to early 2019, which will be followed by hospital refurbishment works until mid 2019. The new and refurbished parts of the Hospital will be operational from mid 2019 with activity increasing up to 90% usage in 2021. While the Hospital Redevelopment will be completed in 2019, areas within the building will remain vacant until the demand for services requires the fit-out and use of these areas. The final 10% of activity will take place, increasing between 2021 and 2027.

The period of 12 years between 2015 and 2027 will allow the background traffic volumes to grow to the extent that key intersections serving the hospital will not be able to accommodate the traffic demands under the current arrangements. This means that while the Project will contribute to a minor increase in traffic activity, the majority of new trips on the network between 2015 and 2027 will be generated by background growth.

In this regard it is important to ascertain the proportion of the impact generated by the Project and how this relates to the mitigating measures required to maintain the current road operation. The following section describes the impacts at each intersection and the potential improvements that would be required to maintain the current operation of the road network.

Details of the intersection upgrade options are also presented in Section 8 of the Jacobs Traffic Modelling Report.

### 7.6.1 Known Pinch-points

It is noted that there are two primary pinch-points within the road network, being located at the Etna Street Railway Bridge and the Donnison Street Railway Bridge.

The Etna Street Bridge accommodates one lane in each direction and connects between Showground Road and the Pacific Highway / Mann Street. The proximity of these two intersections (120 metres) means that any queuing beyond this length influences the operation of the opposing intersection. This situation is further exacerbated as the Showground Road / Racecourse Road intersection comprises a roundabout, and therefore there is no opportunity to coordinate the two intersections.

The Donnison Street Bridge accommodates one lane in each direction and is located immediately adjacent to the Donnison Street / Showground Road intersection. This intersection comprises a roundabout having a very limited geometry (a single circulation lane and a diameter of 20 metres) which is subject to high traffic demand during the peak periods.

Given the scale and complexity associated with the resolution of these pinch-points, the adjacent railway bridges and the regional role of the intersections, it is essential that a **multi-agency approach** be adopted to ensure that all stakeholders (RMS, Gosford City Council, Railcorp and Central Coast Regional Development Corporation (CCRDC) and HI) benefit fully from the upgrades and that long-term solutions can be applied.

### 7.6.2 Showground Road / Racecourse Road

The intersection of Showground Road and Racecourse Road is subject to delays during the peak periods, which will be exacerbated by the background traffic growth. Under the 2% growth scenario (no Hospital Redevelopment) the intersection fails to accommodate the traffic demand in 2019.

The intersection is currently operating with a Level of Service C, which is reasonable for a town centre intersection during the peak periods, although the Degree of Saturation is over 90%. Typically this indicates that the intersection is able to manage the demand in favourable conditions, however any slight increase in traffic activity or interruption to traffic flow results in extended delays and a poor performance. This is evident in the modelling results which indicate a Level of Service F in all future scenarios.

The operation of the intersection prompted a study undertaken for Council in 2009, which presented options for upgrading the intersection, including the provision of grade separation. The road network model indicates that upgrading the intersection to include additional lanes approaching the existing roundabout, or conversion to traffic signal controls with four lanes on each approach will be sufficient, although this may require road corridor widening and potentially widening of the Etna Street railway bridge. The conversion to traffic signal controls at Racecourse Road / Showground Road would also enable coordination with the Pacific Highway / Mann Street traffic signals at intersection of the eastern side of the bridge, improving the overall operation of these two intersections.

Given the current Degree of Saturation, it is evident that the intersection upgrades will be required in coming years regardless of the Hospital Redevelopment and HWP, and that the additional traffic activity associated with the Project will have very limited impact on the intersection and known pinch points.

### **7.6.3 Racecourse Road / Pacific Highway**

The road network modelling results indicate that this intersection will operate at Level of Service D in 2027 under the 2% growth scenario and that this will increase to Level of Service F following completion of the Hospital project.

Again, the provision of traffic signal controls at the Showground Road / Racecourse Road intersection would enable the coordination of the intersections, which would likely improve the performance of this intersection as queuing on the western departure (the Etna Street Bridge) would be better managed.

### **7.6.4 Racecourse Road / Central Coast Highway**

The intersection of Racecourse Road and the Central Coast Highway has been modelled by Northern Traffic Planning & Engineering using SIDRA as it is isolated from the Hospital Precinct and the influence of the network model. The results indicate that the intersection will fail to accommodate the background demand in 2027 adopting the 2% growth scenario. RMS has published details of a proposed upgrade, which improves the performance in the short-term, however the modelling indicates that extensive queuing (up to 1,002 metres on the western approach) will occur in 2027, without the Hospital Redevelopment and HWP. A copy of Northern Traffic Planning & Engineering report is contained as Attachment 3.

### **7.6.5 Hospital Road / Racecourse Road**

In conjunction with the Hospital Redevelopment project, Hospital Road will be subject to a mid-block truncation, therefore the northern section serving the existing multi-storey car park will be converted to accommodate two-way traffic flow. The network model indicates that the intersection will perform within capacity by adopting the existing lane arrangement on Racecourse Road. The existing carriageway width of Racecourse Road, and the placement of No Stopping parking controls means that vehicles travelling along Racecourse Road are able to pass on the left side of any vehicles waiting to turn right into Hospital Road (a typical AUR intersection arrangement). This means that a pseudo right turn lane is currently provided, however, formalising this arrangement through line marking and signage (i.e. a CHR arrangement) will improve the safety and performance of the intersection.

### **7.6.6 Showground Road / Donnison Street**

This intersection is currently operating at Level of Service C during the morning peak period due to the limited geometry of the roundabout and the reasonably high demand on the Pacific Highway route. The intersection is also operating a high degree of saturation (0.874), meaning that any slight increase in traffic volumes has an exponential impact on the operation and delays. The intersection performs at a Level of Service F during 2019 based on 2% background growth and prior to the opening of the Hospital Redevelopment and HWP.

Given the limited available road reserve at the intersection, enlargement of the roundabout is not feasible and would not provide the most beneficial solution. Therefore it is recommended that this intersection should be upgraded to include traffic signal controls. An assessment of traffic signals has been undertaken within SIDRA, which indicates that a Level of Service of B can be achieved with a reduced Degree of Saturation of 0.878. This requires the provision of a dedicated right turn lane on the southern approach and a dedicated left turn lane on the eastern approach (the railway bridge).

## 7.7 Summary of Required Road Improvements

It is apparent that there are parts of the road network in the vicinity of the Hospital that are currently unable to accommodate current traffic demands, and that works will be required to accommodate future background growth regardless of the Hospital Redevelopment and HWP. The following table presents a summary of the intersections requiring upgrades, and the role of the applicant in those works.

Intersection	Works Required	HI	Others
<b>Etna Street Railway Bridge</b>	Widened to accommodate four (4) lanes		✓
<b>Showground Road / Racecourse Road</b>	<p><u>Option 1</u> Retain the Roundabout control Provide 1 shared left/through lane on the east approach. Provide 1 dedicated right turn lane on the east approach Provide 2 circulating lanes through the roundabout for westbound traffic.</p> <p><u>Option 2</u> Convert the existing roundabout to a signalised intersection, with: Dedicated right-turn lane and 20m left-turn bay on Racecourse Road (westbound) Additional through lane and 40m right-turn bay on Racecourse Road (eastbound) 20m right-turn bay on Showground Road (southbound) Signalised pedestrian crossings on all approaches Remove midblock pedestrian crossings on Racecourse Road at Gosford High School</p>		✓
<b>Racecourse Road / Pacific Highway / Mann Street</b>	<p><u>Option 1</u> Retain the full length left/through lane on the west approach Extend the existing short through/right lane to become a full length lane</p> <p><u>Option 2</u> Retain the full length left/through lane on the west approach Extend the existing short through/right lane to become a full length lane</p>		✓
<b>Racecourse Road / Central Coast Highway</b>	Additional left turn slip lanes into and out of Racecourse Road. Additional Bus Priority lane on the eastbound approach.		Already designed and costed by RMS
<b>Hospital Road / Racecourse Road</b>	Upgrade to a formal CHR type intersection through line marking and signage.	✓	
<b>Showground Road / HWP Car Park Entry</b>	Construct a formal CHR type intersection through line marking and signage.	✓	

<b>Showground Road / Donnison Street†</b>	Upgrade to Traffic Signal control with 2 lanes on each approach, plus departure lanes. Land currently outside the road reserve will be required.		✓
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† Potentially requires the widening of the Donnison Street Railway Bridge

### 7.8 Impact of Construction Traffic during Construction Stages

An outline Construction Traffic Management Plan (TMP) for the HWP is included within the SSDA, EIS, Appendix 25 – Preliminary Construction Management Plan. This plan identifies potential road network and parking impacts during construction and how these impacts will be mitigated. It is proposed that the CTMP will be developed further following the engagement of Project contractor(s), whereby accurate construction traffic and parking demands and impact mitigation strategies will be developed and implemented.

### 7.9 Bus Routes and Bus Stops

The truncation of Holden Street will have an impact on two public bus routes (Hospital Route 70 and suburban Route 41) and the free LHD shuttle bus between the Gosford Railway Station and the Hospital. These bus routes will need to be rerouted and bus stops relocated, and given the HWP will create a new Hospital entry Node on Showground Road, this location would be suitable for relocated public bus stop, and free LHD shuttle bus stop.

Following an assessment the location of existing bus stops and key access points into the Hospital, the following diagrams identify the existing and proposed potential locations of the bus routes and bus stops.

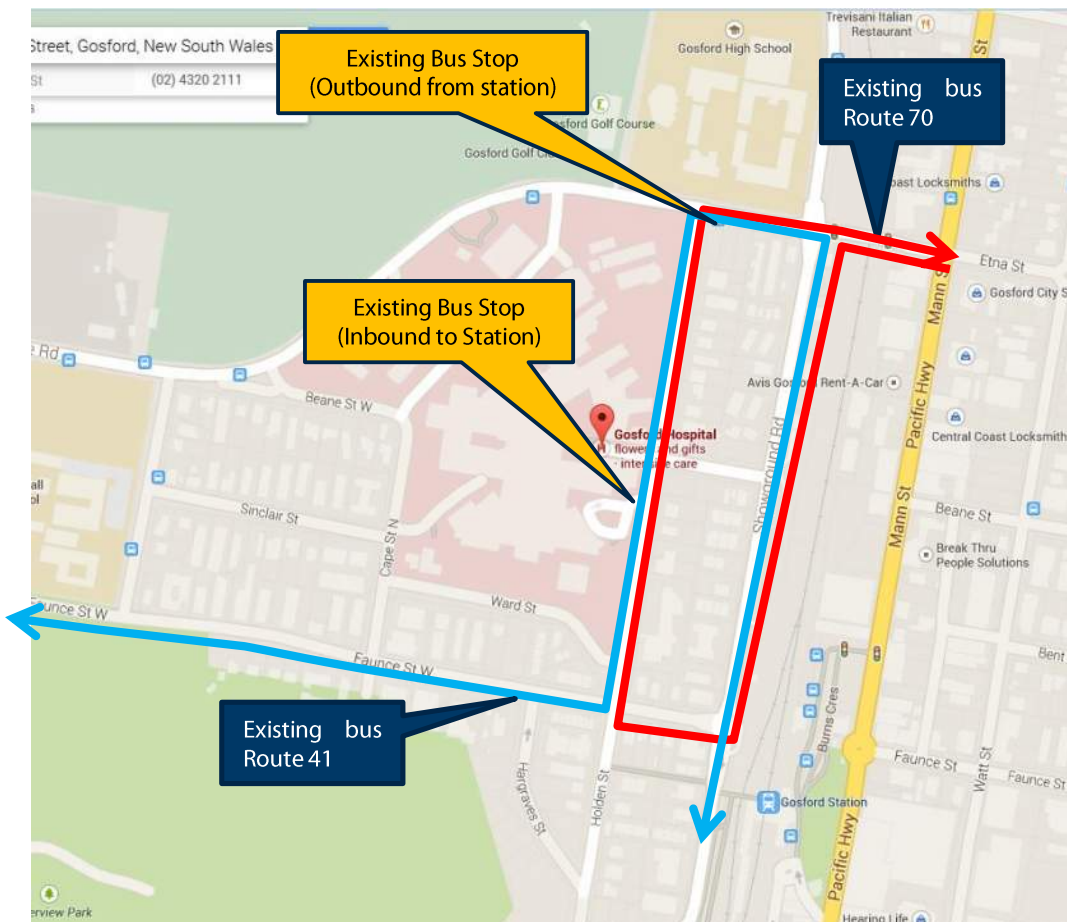


Figure 21 - Existing Bus Routes and Bus Stops Surrounding Gosford Hospital

The location of the future Bus Stop on Showground Road (Figure 22) will be subject to agreement with Gosford City Council and the bus operators, and will also be subject to coordination with the civil engineering design associated with the proposed car park entry and exit arrangement (i.e. integration with the proposed right turn lane etc.).

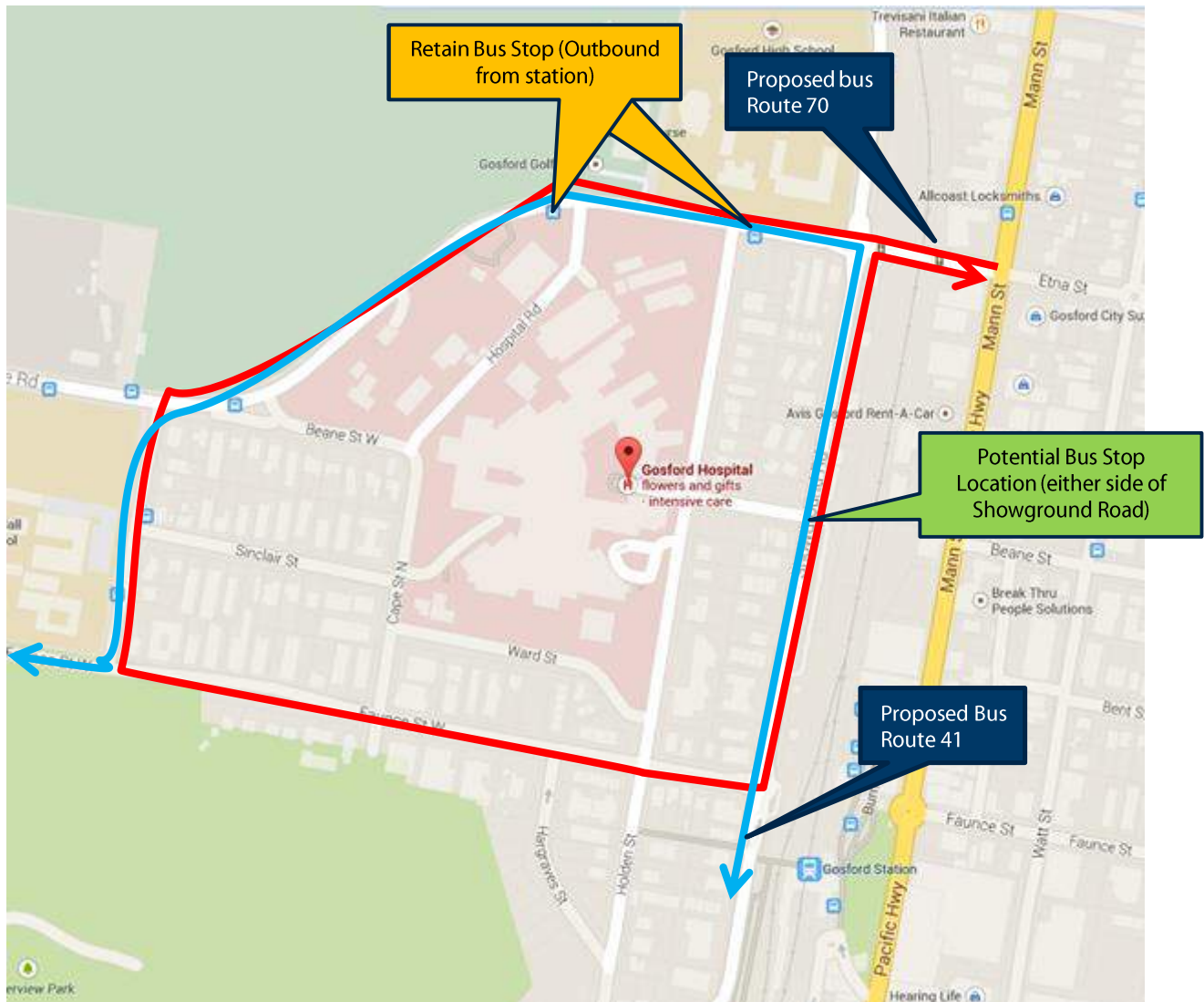


Figure 22 - Potential Bus Routes and Bus Stops

In terms of the impact of increased use of public transport, it is evident from the staff, outpatient and visitor surveys that the use of public transport represents a small proportion of trips and that there is adequate capacity in the network to accommodate a growth in activity and this should be encouraged as part of the development, as described in the next section.

### 7.10 Changes to Travel Mode

The proposed Hospital Redevelopment, HWP (with End of Trip Facility, and lifts) and improved pedestrianisation of Holden Street and Showground Road (between the Gosford Railway Station and the HWP) provides opportunities to improve the travel mode split by encouraging the use of public transport, walking and cycling. The Project includes new lifts serving between Showground Road and Holden Street levels, an accessible covered walkway from the HWP to the Hospital main entry on Level 4, and

improvements to the footpath connection and streetscape upgrades from Gosford Railway Station along the eastern verge of Showground Road, including a new pedestrian crossing.

The PTC Parking Demand Study identified the current use of public transport through surveys of staff, outpatients and visitors. The key findings of the surveys were that the relatively low use of public transport is due to a disconnect between the Hospital and the Gosford Railway Station, patrons were less likely to use public transport if more than one mode is required, and staff shift change times did not often match convenient public transport times. The recording of these issues provides a useful basis to establish improvements and ways to change the mode share away from car usage.

Each of these issues can be addressed through physical works, changes to public transport services and the establishment of a Work Travel Plan by the LHD and future occupants of the HWP.

### **7.11 State Plan Targets and Measures to Increase Sustainable Transport**

The State Plan targets are described in the Central Coast Regional Action Plan (RAP) published by the NSW Government. In relation to transport targets, the RAP lists the following five goals:

- NSW 2021 Goal 7 – Reduce travel times
- NSW 2021 Goal 8 – Grow patronage on public transport by making it a more attractive choice
- NSW 2021 Goal 10 – Improve road safety
- NSW 2021 Goal 19 – Invest in critical infrastructure

Goal 7 - The reduction of travel times goes to the issue of road capacity and the ability to efficiently move vehicles around the region. The traffic analysis presented in this Assessment indicates that the proposed Hospital Redevelopment will not determinately impact on the operation of the local or regional road network while road improvement works have been identified, which are related and unrelated to the Project, which will improve / maintain current levels of service within the local road network.

Goal 8 - The Project includes a number of physical features that will assist to encourage use of public transport, including:

- Proposed lifts connecting between Showground Road and the HWP Plaza (Holden Street level),
- Footpath and streetscape upgrades between the Railway Station and the new Hospital entrance on Showground Road including the provision of a pedestrian refuge island,
- Truncation of Holden Street to accommodate a pedestrianised zone connecting with the HWP,
- Closure of the existing vehicle access to the Hospital at Beane Street West from Holden Street or Showground Road. This will allow for a dedicated, accessible, covered walkway to be constructed between the existing hospital entrance and the proposed lifts within the HWP plaza,
- Provision of an End-of-Trip facility within the HWP.
- Increased parking enforcement across all parking areas within the Hospital, and
- Incentivise carpooling for Hospital workers, and a driver buddy programme.

The uptake of carpooling and other modes of transport such as cycling and park and ride, relies on the promotion of these forms of sustainable transport at the Hospital, via the website and other means.

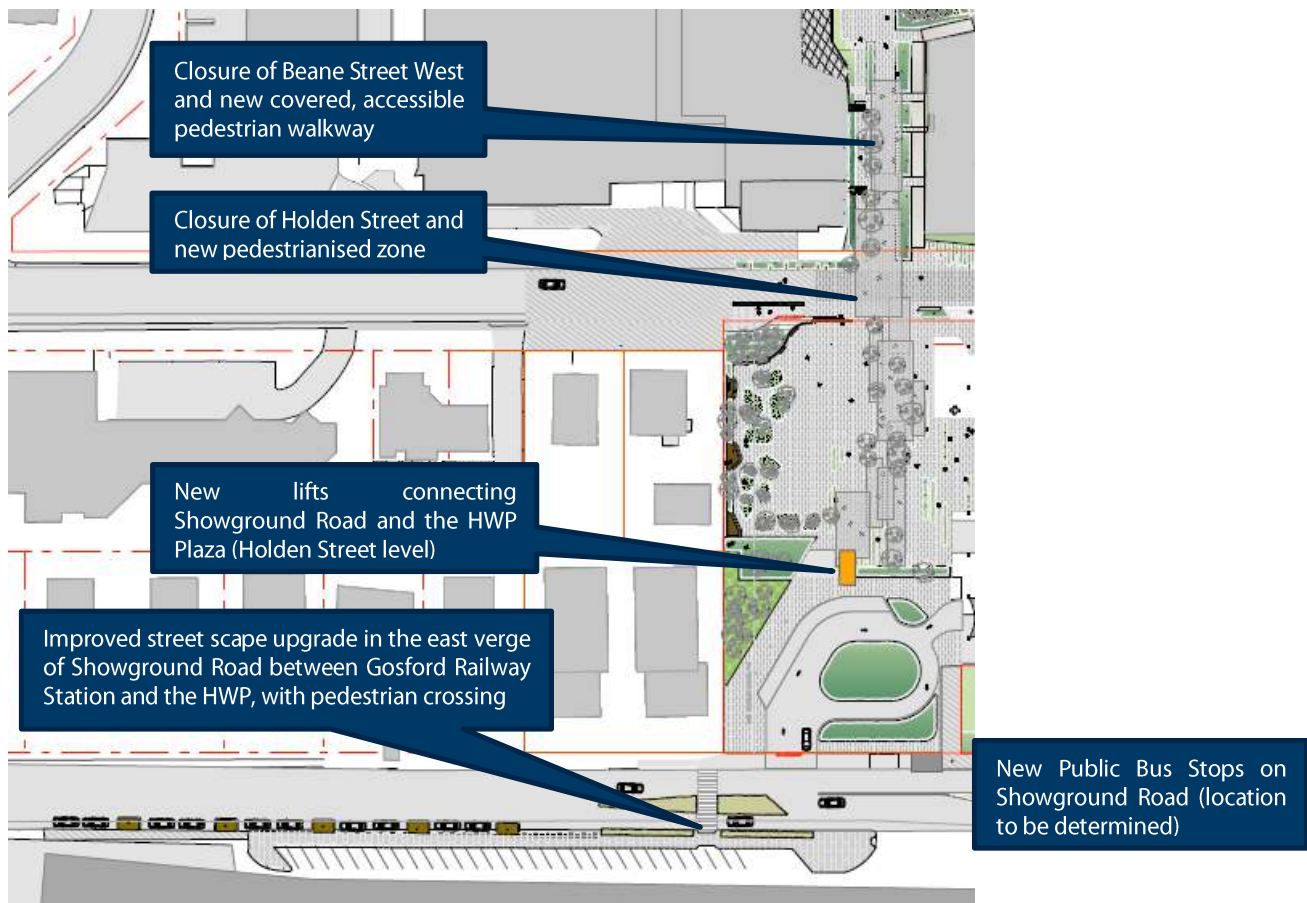


Figure 23 - Physical Measures to Improve Sustainable Transport

Goal 10 - The Project includes local road safety by providing an extensive pedestrianised area on Holden Street specifically to improve the pedestrian connection between the proposed car park, Showground Road, the Railway Station and the Hospital entrance. Other improvements include new pedestrian facilities on Showground Road and the formalising of the Hospital Road and Racecourse Road intersection.

Goal 19 – The Project involves an extensive investment in critical health infrastructure and services as well as road upgrades, pedestrian improvements and a new car park which will facilitate the commencement of the HWP identified within the Gosford City Centre Masterplan.

### 7.12 Sustainable Transport Initiatives Underway

As initial steps in promoting more sustainable transport options within the Hospital, the Project includes the following:

- Increasing bike racks in key areas around the Hospital, and the provision of an End-of-Trip facility within the HWP for those travelling by bicycle or on foot.
- Providing and formalising a pedestrianized gateway link from Showground Road to activate the road frontage and provide a safer route of access for pedestrians between the Gosford Railway Station and the HWP.

### 7.13 Workplace Transport Plans

The core principle in reducing the demand for car parking spaces (specifically for Hospital Staff) is to introduce and promote “Healthy Transport Plans”.

The availability of the rail, bus, cycle and pedestrian network near the Hospital Precinct combined with a proportion of staff living within relatively close proximity to the Precinct clearly highlights the possibility of introducing a robust and sustainable travel plan. Travel plans should aim to:

- Encourage staff, patients and visitors to use more sustainable travel options to get to Hospitals;
- Encourage staff to adopt healthy transport choices such as walking and cycling where this is a realistic option;
- Explore car parking needs with Public Transport providers, which may include consideration of park and ride schemes;
- Pursue opportunities for sharing vehicles or transport not only for staff but to explore innovative solutions to minimise journeys;
- Consider journey management and distance covered;
- Ensure that the Hospital’s actions in respect to transport do not have an adverse impact upon the environment and consequently the health of the population which we serve. There is a requirement to balance the needs of patients, visitors and staff against ensuring protection of the environment for which we all have a responsibility; and,
- Encourage health, health related and government occupants of the HWP to develop and implement sustainable travel plans for their staff, patients and visitors.

Furthermore, there are other methods of shifting the number of staff accessing work by incentivising and increasing the use of carpooling, cycling, park and ride. However these forms of transport need to be supported by an incentivised system to make these forms of access more desirable than driving.

## 8 Conclusion

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This Traffic and Accessibility Assessment has determined that the proposed additional beds, patients, staff and visitors to the Gosford Hospital as a consequence of the Project (including 13,500 m<sup>2</sup> of administration accommodation in the HWP) will generate additional parking demand and vehicle trips, which have been included within road network modelling.

The Hospital Redevelopment's new Hospital Wing will result in the removal of existing car parking areas resulting in the redistribution of some existing traffic activity, and this has also been included within the road network modelling.

The road network modelling results confirm that the road network surrounding the Hospital is currently operating within capacity and would continue to do so following the completion of the Hospital Redevelopment and the HWP having no regard for background traffic growth. All of the priority controlled intersections within the Hospital Precinct will continue to operate at a Level of Service A with minimal delays and therefore no upgrade works are required.

There are two key pinch-points on the road network in the vicinity of the Hospital comprising the Etna Street railway bridge (and neighbouring intersections) and the Donnison Street railway bridge (and neighbouring intersection).

The road network model confirms that the intersection of Showground Road and Racecourse Road will fail to accommodate the background traffic demand by 2019 (prior to the completion of the proposed Hospital Redevelopment and HWP) and will require upgrading in order to restore the current Level of Service. The section of Etna Street between Showground Road and the Pacific Highway will need to be widened to accommodate four lanes. The intersection of Etna Street and the Pacific Highway will require additional lanes on two approaches in order to maintain the current Level of Service. The subject project will contribute only a minor impact on these intersections and the upgrade works will be required regardless of the Project. In this regard a **'whole of Government'** approach is recommended in order to facilitate the upgrade works.

The intersection of Showground Road and Donnison Street is currently operating at Level of Service F with extensive delays on the southern and eastern approaches. Given the limited available road reserve, it is recommended that this intersection be upgraded to incorporate traffic signal controls. As these works are required at present to accommodate current traffic demands (i.e. not related the Hospital Redevelopment and HWP project) and will involve road widening across the adjacent railway bridge it is recommended that a **'whole of Government'** approach is adopted in order to facilitate the upgrade works.

In terms of the overall road upgrades, the Hospital results in the need for the following road improvements disregarding the long-term background traffic growth, which requires the more extensive upgrades described above:

- Hospital Road and Racecourse Road – Formalisation of channelised intersection,
- Holden Street – Creation of a Private Road with midblock truncation and pedestrianised area, and
- Showground Road – Formalised car park access / egress and pedestrian upgrades, including a new crossing.

The proposed HWP will increase the accessibility of the Hospital for sustainable forms of transport in that the relocated main entrance reduces the distance to Gosford Railway Station and improves the vertical transport through the provision of new lifts.

The inclusion of footpath and streetscape upgrades from Gosford Railway Station to the HWP and a pedestrian crossing within Showground Road will also assist in promoting rail as a tangible alternative to car usage for both staff, patients and visitors to the Hospital and the HWP.

The HWP also includes the provision of End-of-Trip facilities for cyclists and other forms of active transport, which is not currently catered for within the Hospital and will promote bicycle and walking as alternatives to the car.

## 9 References

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- Roads and Traffic Authority (RTA), 2002, Guide to Traffic Generating Developments (Edition 2),
- Standards Australia, 2004, Australian Standard 2890.1 – Parking facilities: Part 1 – Off Street Parking,
- Standards Australia, 2002, Australian Standard 2890.2 – Parking facilities: Part 2 – Off Street Commercial Facilities,
- Jacobs, 2015, Architect’s Design Statement for Gosford Hospital Redevelopment and Health and Wellbeing Precinct.

## Attachment 1 - Traffic Modelling Report (Jacobs)

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