

Dubbo Base Hospital Redevelopment Stage 1 & 2 State Significant Development DA

TRAFFIC IMPACT
ASSESSMENT

Prepared for
Department of Planning and
Infrastructure
August 2012



Document Information

Prepared for	Department of Planning and Infrastructure
Project Name	Dubbo Base Hospital Redevelopment Stage 1 & 2 State Significant Development DA Traffic Study
File Reference	Traffic Impact Assessment
Job Reference	CES01234
Date	August 2012

Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
1	11/01/12	Kasun Wijayaratna Larissa Miller	KW LM	Kieron Hendicott	KH
2	12/07/12	Kasun Wijayaratna Larissa Miller	KW LM	Devinda Kumarasinghe	DK
3	20/07/12	Kasun Wijayaratna Larissa Miller	KW LM	Devinda Kumarasinghe	DK
4	24/07/12	Kasun Wijayaratna Larissa Miller	KW LM	Devinda Kumarasinghe	DK
5	24/08/12	Kasun Wijayaratna Larissa Miller	KW LM	Devinda Kumarasinghe	DK

Table of Contents

1	INTRODUCTION	6
1.1	SCOPE OF WORKS	6
1.2	REFERENCE DOCUMENTS	6
1.3	Stakeholder Consultation	7
1.3.1	Dubbo City Council	7
1.3.2	Roads and Maritime Services	7
1.3.3	Transport for NSW	7
2	EXISTING TRANSPORT SITUATION	8
2.1	SITE LOCATION & ACCESS	8
2.2	SURROUNDING ROAD NETWORK	9
2.2.1	Classification Criteria	9
2.2.2	Road Sections	9
2.2.3	Intersections	10
2.2.4	General vehicle access	11
2.2.5	Emergency vehicle access	11
2.2.6	Service vehicle access	11
2.3	EXISTING TRAFFIC CONDITIONS	11
2.3.1	Traffic Surveys	11
2.3.2	Intersection Performance	11
2.3.3	Mode of Travel	13
2.4	PARKING AND ACCESS ARRANGEMENTS	14
2.4.1	On-site parking locations and capacity	14
2.4.2	Parking levels	15
2.4.3	Parking occupancy	16
2.4.4	Off-site parking	17
2.5	PUBLIC TRANSPORT PROVISION	17
2.5.1	Passenger Rail	17
2.5.2	Coach services	20
2.5.3	Freight	20
2.5.4	Bus	20
2.5.5	Community Transport Facilities	22
2.5.6	Taxi Services	22
2.5.7	Future Public Transport Provision	22
2.6	CYCLE & PEDESTRIAN ACCESSIBILITY	23
2.6.1	Existing pedestrian facilities	23
2.6.2	Planned/recommended upgrades and improvements	24
2.6.3	Existing Cycle Facilities	26
3	PROPOSED REDEVELOPMENT	29
3.1	REDEVELOPMENT DETAILS	29
4	DEVELOPMENT ACCESS	31
4.1	PEDESTRIANS AND CYCLIST ACCESS	31

4.1.1	Internal Access	31
4.1.2	External Access	31
4.1.3	Bicycle Parking	31
4.2	PUBLIC TRANSPORT ACCESS	32
4.3	VEHICLE ACCESS	32
5	TRAFFIC ASSESSMENT	33
5.1	TRAFFIC GENERATION	33
5.2	TRIP DISTRIBUTION	33
5.3	FUTURE INTERSECTION PERFORMANCE	34
6	PARKING REQUIREMENTS	35
6.1	PARKING PROVISION	35
6.2	PARKING REQUIREMENTS	35
6.2.1	Future Parking Recommendation	36
7	CONCLUSIONS & RECOMMENDATIONS	37

List of Tables

Table 2.1	Intersection Level of Service	12
Table 2.2	Intersection Average Delay (AVD)	12
Table 2.3	SIDRA Results for the Intersection of Golden Highway/Myall Street	13
Table 2.4	SIDRA Results for the Intersection of Golden Highway/White Street/Hospital Access	13
Table 2.5	Frequency of passenger rail services to Dubbo East Junction	16
Table 2.6	Frequency of coach services to Dubbo East Junction	20
Table 2.7	Bus routes and services to Dubbo Base Hospital	20
Table 4.1	Bicycle Parking Requirements	32
Table 6.1	Parking Provision Assessment	36

List of Figures

Figure 2.1	Site Location	8
Figure 2.2	Golden Highway (Cobbora Road)/Myall Street Intersection Layout	10
Figure 2.3	Golden Highway (Cobbora Road)/White Street/Hospital Access Intersection Layout	10
Figure 2.4	Journey to Work modeshare, travelling to Dubbo	14
Figure 2.5	Journey to Work modeshare, travelling from Dubbo	14
Figure 2.6	Parking usage by time of day	15
Figure 2.7	Ambulatory Care Patient by day of week	15
Figure 2.8	Countrylink services to Dubbo	17
Figure 2.9	Dubbo railway lines	18
Figure 2.10	Dubbo bus routes and stop locations	20

Figure 2.11	Golden Highway approach to roundabout	23
Figure 2.12	Pedestrian footpaths on approach to Dubbo Base Hospital	24
Figure 2.13	Dubbo cycle ways, on and off road	26
Figure 3.1	Proposed Redevelopment of Dubbo Base Hospital SSD	28

1 INTRODUCTION

Cardno was commissioned by NSW Health Infrastructure to conduct a traffic study regarding the proposed redevelopment of Dubbo Base Hospital (DBH). The proposed development is considered an essential investment to the district to enhance the services offered to the local community. The traffic impact of works which was subject to a separate approval has already been undertaken as part of a campus wide upgrade of parking facilities. The following report covers the traffic related issues in relation to the State Significant Development (SSD) Development Assessment (DA).

1.1 SCOPE OF WORKS

The objective of this report is to provide a Traffic Impact Assessment to support the State Significant Development (SSD) Development Assessment.

This report evaluates the current traffic and transport conditions including the road network, traffic conditions, parking, access and public and active transport. In addition the study discusses the proposed redevelopment and addresses the adequacy of access, making recommendations to support public transport and pedestrian/cyclist facilities as well as external and internal access to the hospital redevelopment.

The relevant Director General Requirements are noted below and have been addressed as part of this assessment:

Provide a Traffic and Car Parking Impact Study considering cumulative traffic generation associated with the range of events and functions at the hospital including:

- *Accurate details of existing daily vehicle movements and additional traffic generated by the development. This shall include details of the origin-destination of traffic, vehicle types, volumes and times of peak travel of all vehicles during construction and operation phases of the development;*
- *Assessment of the impacts traffic generated by the development on the local and state road network, including any impact on pedestrians, cyclists, public transport services, and intersections such as the roundabout fronting the site on Cobbora Road and Myall Street;*
- *Consideration of the need for upgrading or road improvements including any temporary or staged treatments and other measures;*
- *Analyse the car parking requirements for the existing uses on site and proposed development including access and internal traffic movements;*
- *Details of the internal road layout including parking facilities and associated infrastructure;*
- *Consideration of the potential reopening of the Myall Street railway crossing and impacts on amenity, access and on-street parking;*
- *Consideration of the potential for vehicle/pedestrian/cycle linkages with other institutions in the Health Precinct together with the Central Business District.*

1.2 REFERENCE DOCUMENTS

The following documents have been reviewed as part of this study:

- > Australian Standard 2890.1:2004 Off Street Car Parking.
- > Australian Standard 2890.2:2002 Off Street Commercial Vehicle Facilities.
- > AUSTROADS Parts 5, 6, 13, 14.
- > NSW RTA Guide to Traffic Generating Developments (2002).
- > State Infrastructure Strategy 2006.
- > Dubbo Local Environmental Plan 2011
- > Orana Regional Plan 2011 – 2021.
- > Dubbo City Council Strategic Plan 2011 – 2031.
- > A 2020 Vision for the City Of Dubbo.
- > Dubbo 2036 Community Strategic Plan.
- > Dubbo City Council Open Space Masterplan.

- > Footpaths and Cycleways Function Plan 2011/2012.
- > Design Guidelines for Hospitals and Day Procedure Centres: Traffic and Car Parking, Department of Health Services, Victoria.
- > DCC Development Control Plan G3.1 - Designing for Access and Mobility
- > DCC Development Policy Code 1 - General Development Standards & Policies.
- > DCC Development Policy Code 3: Standards for Off-Street Parking of Motor Vehicles: Hospitals.
- > Guide to Traffic Generating Developments v2.2: Recommended Parking Rate for Private Hospitals, RTA.
- > Dubbo Base Hospital Preliminary Schematic Design/Concept Design Report.
- > Dubbo City Planning and Transportation Strategy 2036, November 2009, Stapleton Transportation and Planning.
- > Dubbo Base Hospital Master Plan – Traffic Advice, Hyder Consulting, November 2010.
- > DCC Urban Development Strategy Institutional Areas Development Strategy 1997.
- > Planning Guidelines for Walking and Cycling.
- > NSW Bicycle Guidelines.

1.3 Stakeholder Consultation

The following stakeholder consultation was undertaken to inform the development of the Traffic Impact Assessment.

1.3.1 Dubbo City Council

Cardno attended a meeting held at Dubbo City Council (DCC) on 16 December 2011 with representatives from DCC's Planning, Engineering and Traffic teams to discuss the proposed redevelopment.

Cardno also separately met with DCC's Traffic Engineer to discuss Council's future plans for roads, parking and upgrades to pedestrian and cycle ways as well as the traffic and parking implications of the hospital development. Discussions at this meeting and follow up email communication were considered in the development of the Traffic Impact Assessment.

1.3.2 Roads and Maritime Services (RMS)

Cardno has liaised with RMS through the preparation of this application and Cardno has provided RMS with the preliminary transport assessment. A copy of the preliminary Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report was provided to RMS on 6th July 2012 for their comment and consultation. The request for comments was followed up on 23rd July 2012 alongside the submission of the preliminary State Significant Development Traffic Impact Assessment. Formal comments have yet to be received.

1.3.3 Transport for NSW (TfNSW)

Similarly to the approach take with RMS, Cardno has provided TfNSW with a preliminary copy of the transport assessment for review prior to lodgement of the SSD. The dates for provision of the reports and follow up are the same as that noted above for RMS. TfNSW have acknowledged receipt of the reports and that a preliminary review has been undertaken. Formal comments have yet to be received.

2 EXISTING TRANSPORT SITUATION

2.1 SITE LOCATION & ACCESS

The existing DBH location is outlined in red on Figure 2.1 below. The DBH lies in the North East sector of Dubbo, east of the Newell Highway and north of the Golden Highway. The Coonamble railway line acts as the western boundary for the Hospital with limited railway crossings. It is bounded by the Dubbo Private Hospital and Charles Sturt University Dubbo Campus to the north, the Western Institute of TAFE – Dubbo College to the south and Lourdes Hospital to the east; all of which contribute to the Dubbo Institutional Precinct outlined in Dubbo City Council's *Urban Development Strategy – Institutional Areas Development Strategy (1997)*.

Figure 2.1 Site Location



2.2 SURROUNDING ROAD NETWORK

2.2.1 Classification Criteria

It is usual to classify roads according to a road hierarchy in order to determine their functional role within the road network. Changes to traffic flows on the roads can then be assessed within the context of the road hierarchy. Roads are classified according to the role they fulfil, as well as the volume and type of traffic they should appropriately carry. Typically, the following guidelines for the functional classification of roads apply:

- > **Arterial Road** - typically a main road carrying over 15,000 vehicles per day (vpd) and fulfilling a role as a major inter-regional link (over 1,500 vehicles per hour (vph)).
- > **Sub-arterial Road** - defined as secondary inter-regional links, typically carrying volumes between 5,000 and 20,000 vpd (500 to 2,000 vph).
- > **Collector Road** - provides a link between local roads and regional roads, typically carrying between 2,000 and 10,000 vpd (250 to 1,000 vph). At volumes greater than 5,000 vpd, residential amenity begins to decline noticeably.
- > **Local Road** - provides access to individual allotments, carrying low volumes, typically less than 2,000 vehicles per day (250 vph).

2.2.2 Road Sections

The following road sections within close vicinity of the site are considered likely to interact with access and function of the DBH re-development.

The Golden Highway

The Golden Highway (Cobbora Road) is a State Highway that runs from Dubbo towards Newcastle and enables road transport to the Hunter Region to bypass travelling over the Blue Mountains. A section of the Golden Highway between Leonard Street and Fitzroy Street, south of DBH operates as a Sub-Arterial Road with a speed limit of 60 km/hr, otherwise the highway operates as a rural arterial road. The road connects with Myall Street at a roundabout which also provides the main access to the hospital.

Myall Street

Myall Street runs east from Brisbane Street to Peachville Road providing access to residential zones throughout north eastern Dubbo as well as the Dubbo Health precinct. Currently there is no railway crossing for the Coonamble Railway line, thus providing a discontinuity near White Street and reducing the volume of traffic surrounding the hospital. In addition the discontinuity of the road makes Myall Street the main access road for Dubbo Base Hospital. Myall Street is a Sub-Arterial road east of the intersection with the Golden Highway (Cobbora Road) with a speed limit of 50km/hr.

White Street

White Street provides another connection to Myall Street near the Coonamble Railway line. This access to Myall Street is intended to be an alternative to the Golden Highway access distributing the traffic to and from the Hospital. White Street is a local street with a speed limit of 50km/hr and currently experiences low levels of traffic based on site investigations.

Muller Street and River Street

Muller Street and River Street are local roads which are the north-west boundaries of the site. They provide access for the residential and industrial areas on the eastern side of the railway line to the hospital facilities. Muller Street provides direct access to the Dubbo Nursing Home. River Street leads to Moran Drive which provides access to Dubbo Private Hospital and rear access to Dubbo Base Hospital (in the past this area has been gated). There are railway level crossings present on both roads and during redevelopment, consideration of safety implications of additional traffic using these links is essential.

2.2.3 Intersections

The following intersections are located within the vicinity of the site have the potential to interact with the development of Dubbo Base Hospital.

Golden Highway (Cobbora Road) /Myall Street

The Golden Highway (Cobbora Road)/Myall Street intersection is a four-way, two lane circulating roundabout with the configuration presented in Figure 2.2. Myall Street and The Golden Highway are not perpendicular to one another and meet at an acute angle. Pedestrian crossing facilities are provided on each approach approximately 30-50m from the control point on each approach.

Figure 2.2 Golden Highway (Cobbora Road)/Myall Street Intersection Layout



Golden Highway (Cobbora Road)/White Street/Hospital Access

The Golden Highway/White Street/Hospital Access intersection is a staggered priority intersection. There is a right turn bay into White Street from the western leg of the Golden Highway which extends back through railway crossing, as shown in Figure 2.3. Note that White Street is configured with left in/left out access only.

Figure 2.3 Golden Highway (Cobbora Road)/White Street/Hospital Access Intersection Layout



2.2.4 General vehicle access

Currently a majority of visitors to the hospital access the site via the Golden Highway/Myall Street roundabout entrance. Access is also possible on the northern boundaries using Muller Street and River Street linking the adjacent residential and industrial areas.

2.2.5 Emergency vehicle access

Emergency vehicles currently access the site via the Golden Highway / Myall Street roundabout entrance, the Emergency Department is well-located just 100 metres from this entrance. As the Emergency Department is located close to the main public entrance and car park, there is the potential for ambulances to experience delays caused by other site traffic at peak times. This was not, however, observed during site visits and is not reflected in the results of the operational assessment in Tables 2.3 and 2.4 below.

2.2.6 Service vehicle access

Service vehicles access the site via a loop road that connects to the western end of Myall Street, south of the site. The loop road allows service vehicles to avoid any potential conflicts with the Emergency Department, main public entrance and the major public car park.

2.3 EXISTING TRAFFIC CONDITIONS

An assessment of the existing traffic conditions along the major roads and intersections near the development site has been made using previous studies undertaken and site investigations. Traffic surveys were conducted to obtain the data required to assess the existing situation of the roads.

2.3.1 Traffic Surveys

Traffic surveys (Intersection Counts and Parking Surveys) were conducted by SkyHigh Traffic consultants on the 15th of December 2011 in the AM peak [07:00-09:00] and PM peak [16:00-18:00] and 17th of December [11:00-13:00].

Data collected from the traffic surveys included the following:

- > Turning volumes and operation of the intersections below.
 - Golden Highway (Cobbora Road)/Myall Street.
 - Golden Highway (Cobbora Road)/White Street/Hospital Access.
 - Muller Street Access to Dubbo Base Hospital.
 - River Street Access to Dubbo Base Hospital.
- > Existing traffic generation of the site.
- > Understanding of the distribution of traffic within the study area.

2.3.2 Intersection Performance

The existing operation of the surveyed intersections was assessed using the SIDRA 5.1 software package to determine the degree of saturation (DoS), average delay (AVD) in seconds and level of service (LoS) at each intersection.

The key indicator of intersection performance is LoS, where results are placed on a continuum from 'A' to 'F', as summarised in Table 2.1.

Table 2.1 Intersection Level of Service

LoS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction control
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but accident study required
D	Operating near capacity	Near capacity & accident study required
E	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode

The AVD provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route).

For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for LoS assessment should be the movement with the highest AVD.

Table 2.2 Intersection Average Delay (AVD)

LoS	AVD per Vehicles (seconds/vehicle)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	>70

The DoS is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DoS approaches 1.0. It is common practice to ensure DoS is less than 0.9. DoS up to 0.8 generally represents satisfactory intersection operation; when DoS exceeds 0.9 the junction is considered to be approaching capacity, queues usually occur and mitigation may be required.

The existing intersection performance across the AM, Midday and PM Peak periods are presented in Table 2.3 and Table 2.4 for the Golden Highway/Myall Street Intersection and the Golden Highway/White Street intersection respectively. Full SIDRA movement summaries are contained in the REF Traffic Impact Assessment Report.

Golden Highway (Cobbora Road)/Myall Street

The results of the SIDRA assessment of the Golden Highway (Cobbora Road)/Myall Street intersection present the following;

- > The intersection performs satisfactorily with LoS of A and delay values lower than 13 seconds across all peak periods assessed.
- > The maximum queue experienced across all peak periods occurs on Myall Street (East), during the AM Peak Period with a queue extending 19.2m (approximately 3-4 cars) from the intersection highlighting the concerns presented by Council regarding queuing along Myall Street. However this level of queuing is considered acceptable and the functioning of the intersection will not be impacted under the existing circumstances

Table 2.3 SIDRA Results for the Intersection of Golden Highway/Myall Street

Golden Highway/Myall Street					
Time Period	DoS	AVD (s)	LoS	Queue Length (m)	Worst Movement
AM Peak	0.186	12.7	A	5.4	Myall Street (East) - Right
PM Peak	0.156	11.8	A	5.0	Myall Street (West) - Right
Saturday Midday Peak	0.023	12.0	A	0.6	Myall Street (East) - Right

Golden Highway (Cobbora Road)/White Street/Hospital Access

The results of the SIDRA assessment of the Golden Highway (Cobbora Road)/White Street intersection present the following, noting that these results do not affect the hospital approach;

- > The intersection performs satisfactorily with the LoS of D or better during all peak periods. However the LoS of D during the AM Peak period provides an indication that the intersection is approaching capacity and future development may cause failure of the intersection.
- > Currently a two-way volume in excess of 1400 vehicles per hour is experienced along the Golden Highway thus making it difficult for movements from the minor road onto the highway. This is evident with left turn and right turn movements out of White Street (South) being the worst movements across all three peak periods.
- > The maximum queue on the western leg of the Golden Highway is 16.5m (approximately 3 cars) occurring during the AM Peak. The distance between the railway crossing and the intersection is approximately 20m. It is noted that the turn bay extends west of the intersection for another 40m which allows sufficient storage for additional vehicles and as a result should not impact the performance of the intersection.

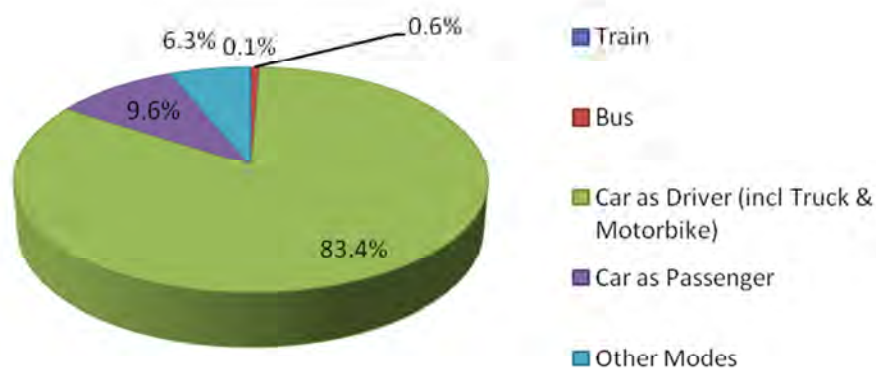
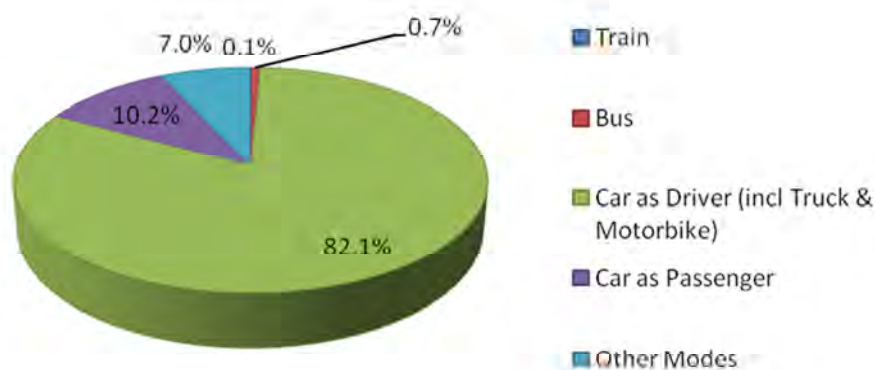
Table 2.4 SIDRA Results for the Intersection of Golden Highway/White Street/Hospital Access

Golden Highway/White Street/Hospital Access					
Time Period	DoS	AVD (s)	LoS	Queue Length (m)	Worst Movement
AM Peak	0.700	52.8	D	27.2	White Street (South) - Left
PM Peak	0.024	34.0	C	0.6	White Street (South) - Right
Saturday Midday Peak	0.056	26.0	B	1.5	White Street (South) - Right

2.3.3 Mode of Travel

The 2006 Census data for Journey to Work (JTW) data in the Dubbo area has been analysed to identify trends in the transport use. The JTW data shown in Figure 2.4 indicates that 93% of workers travelling to Dubbo used either a car or truck, as either the driver or a passenger to arrive at their destination. The remaining 7% used either public transport or active transport to get to work. The statistics for workers travelling from Dubbo indicate a similar trend and is presented in Figure 2.5.

In summary, the JTW data has indicated that majority of people use private vehicles to travel to and from Dubbo and the use of public and active transport is limited. It is also important to note that the primary catchment area for DBH is Dubbo City. However DBH also services surrounding regional and remote areas which include 12 other Local Government Area (LGAs), Bogan, Bourke, Brewarrina, Cobar, Coonamble, Gilgandra, Mid-Western Regional, Narromine, Walgett, Warren, Warrumbungle and Wellington. In total DBH serves a catchment of 140,000 people and accordingly increases the likelihood of car travel from remote locations to the hospital for patients and visitors.

Figure 2.4 Journey to Work modeshare, travelling to Dubbo**Figure 2.5 Journey to Work modeshare, travelling from Dubbo**

2.4 PARKING AND ACCESS ARRANGEMENTS

2.4.1 On-site parking locations and capacity

A comprehensive review of the car park zone locations and parking capacity at each zone prior to the car park upgrade works has been presented in the Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report. This section of the report provides a summary.

Hospital staff and visitors use a number of formal, informal and temporary car parks located in and adjacent to the existing hospital site. The key parking zones include:

- > **Main car park:** Located on the eastern side of the site. This car park includes disabled spaces. As part of the upgrade of car parking facilities the main car park has now been expanded to provide 289 spaces. This was an increase of 48 spaces from the 241 informal / ad hoc spaces (235 main car park and 6 adjacent to the oncology building) that existed prior to the upgrade.
- > **Myall Street:** Adjacent to the hospital site's southern end, unrestricted on-street parking provided by Dubbo City Council (approximately 100 spaces).

- > Short-stay car parks: There are a number of small short-stay car spaces located throughout the hospital site in proximity to different specialist services.
- > Temporary car parking: Occurring on the site's Loop Road, this informal and temporary car park is being used during the construction of the adjacent Sub-acute Mental Health facility.

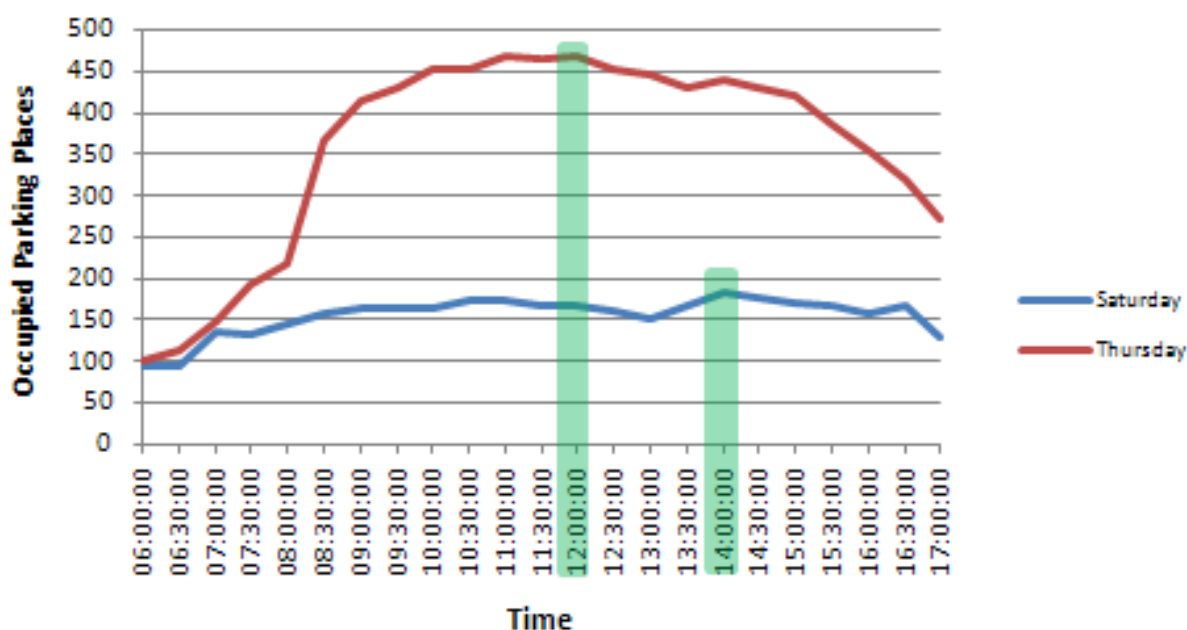
2.4.2 Parking levels

2.4.2.1 Parking surveys

Parking surveys were conducted by SkyHigh Traffic consultants on Thursday 15 and Saturday 17 December 2011 between 06:00 and 17:00 to understand the hospital's parking inventory and occupancy prior to the upgrade of parking facilities. Analysis of the DBH parking survey results found that:

- > Parking levels at DBH reached maximum occupancy between 11:00am and 12:00pm on the Thursday surveyed and between 1:30pm and 2:30pm on the Saturday surveyed, see Figure 2.6 for the parking levels across each surveyed day.
- > There is a considerable reduction in the level of occupancy during the weekend with over two and a half times the peak level of occupancy occurring during the weekday as compared to the weekend (468 places occupied on Thursday compared to 168 places occupied on Saturday).
- > During the Thursday surveyed a sharp incline in occupancy occurs, by approximately 150 additional parking spaces being occupied in 7:30am and 8:30am time period. This contrasts with the Saturday data where occupancy levels remain relatively stable throughout the day. The difference is expected given the likelihood of more employees attending the work at the hospital on the weekday increasing the demand for parking.

Figure 2.6 Parking usage by time of day



2.4.2.2 Staff feedback

Staff at DBH have raised the issue of the car park capacity, stating that they have experienced difficulty in finding car parking spaces on site

2.4.2.3 Influencing factors

A number of factors have an influencing effect on the levels of parking by day and time period.

Staff levels

A much higher number of staff travel to Dubbo Base Hospital on weekdays versus weekends. 80% more general staff travel to the site on weekdays compared to Saturdays and Sundays and 38% more support services staff do the same. This significant difference drives the difference in parking levels between the surveyed days.

Visiting hours

General visiting hours are between 12:00-14:30 and 15:30-20:00, contributing to parking demand during these periods.

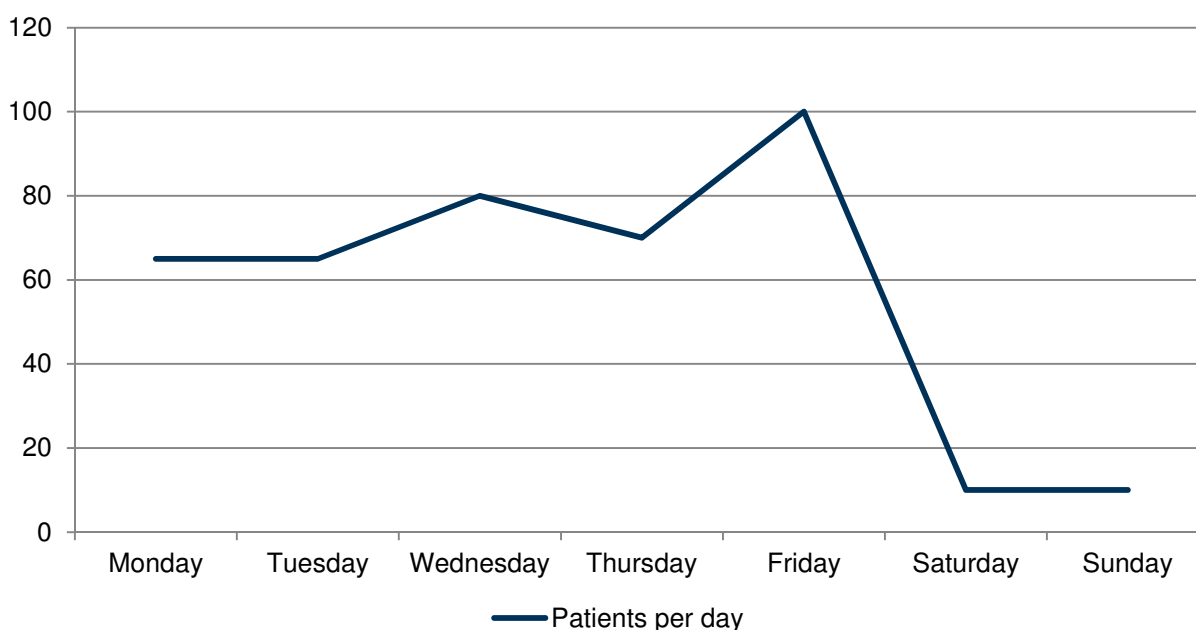
Shift changeover

Support Services and Nurses represent a large proportion of staff on site, around 40%, and both functions undergo shift changeover at around the same time each day. Support Services changeover at 14:30 and Nurses at 15:30. With commencing staff arriving for their shifts and finishing staff yet to leave, the changeover period will contribute to the parking levels at these times.

Ambulatory care

Many of the ambulatory care services provided at DBH are not offered every day, with potential to contribute to fluctuations in the parking levels by day of week. The number of ambulatory patients attending DBH throughout the week is provided in Figure 2.7.

Figure 2.7 Ambulatory care patient by day of week



2.4.3 Parking occupancy

The DBH parking surveys also recorded the parking occupancy of each parking zone at 30 minute intervals through each survey day as detailed in the Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report. On the Thursday, the main car park, Oncology, Myall Street, Front of House and pathology had high levels of parking occupancy while only the Front of House zone achieved above 90% occupancy during a couple of periods on the Saturday.

When assessed in relation to the hospital's staff and bed numbers, parking occupancy data assists with the calculation of future parking demand related to the DBH redevelopment.

2.4.4 Off-site parking

Dubbo City Council provides a number of free, off street public car parks, some with time restrictions. Car parks are located throughout the CBD and accommodate over 700 spaces.

Locations of Council's public car parks include:

- > Bligh Street (to the west of the Dubbo CBD). Approx 80 spaces.
- > Holls Avenue (within the Dubbo CBD). Approx 100 spaces.
- > Talbragar Street (to the north of the Dubbo CBD). Approx 60 spaces.
- > Church Street (within the Dubbo CBD). Approx 55 spaces.

Dubbo City Council is investigating the conversion of the Bligh Street carpark into a multi-level public carpark. The site has a pedestrian linkage already in place through to Macquarie Street in the CBD. The medium-term proposal to build a multi-level car park (ground level plus two more) on the site would occur when sufficient funds had been accumulated from a Section 94 Plan adopted for that purpose.

The Dubbo CBD is over 1.8km from Dubbo Base Hospital, well outside of the acceptable walking catchment of 400 metres.

2.5 PUBLIC TRANSPORT PROVISION

Dubbo Base Hospital has limited public transport options for staff and visitors. As Dubbo Base Hospital services a large regional catchment for health services, around 60% of patients are from outside of Dubbo, which increases their reliance on private vehicle. This is recognised in the Orana Regional Plan 2011-2021 which states,

“Public transport services are minimal or non-existent for residents of many of the small urban centres across the Orana region. This is particularly a problem for youth and aged sectors of the population who depend on public transport to access health and cultural services in larger regional centres that are not available in their town” *Orana Regional Plan 2011 – 2021*

2.5.1 Passenger Rail

Dubbo is serviced by the Countrylink Western train line, connecting Dubbo with eastern destinations and the Sydney CBD. Dubbo is the last railway station on the northern leg of the Western line, services to towns further north and west are continued by coach, see Figure 2.8, The Western Line rail service is illustrated in a wide yellow line, complemented by the Western Line coach services in thin yellow lines.

The Western Line is located to the south of Dubbo Base Hospital and does not intersect with the hospital site as shown in Figure 2.9. It is a single-track line with four at-grade crossings in Dubbo.

Only one train service connects Sydney to Dubbo daily; indicated in Table 2.5. The infrequency of services is a disincentive to travel by rail for hospital appointments and visitation. Infrastructure constraints, including the single track are impediments to any increase in service frequency. At-grade road crossings are also considered an impediment to increasing service frequency due to the additional delays caused to road traffic.

Table 2.5 Frequency of passenger rail services to Dubbo East Junction

Train Service	Frequency	Destinations
Sydney to Dubbo	Once daily	Dubbo East Junction railway station

The railway station is adjacent to the Dubbo CBD and accessed via Talbragar Street. Dubbo Base Hospital is located approximately 1400 metres from the train station via Talbragar Street and the Golden Highway. See **Figure 2.9** for the railway station location in relation to the hospital.

Dubbo East Junction Railway Station is the only train station in Dubbo and is the termination of passenger train services from Sydney on this section of the western line. A small car park is provided off Talbragar Street for Countrylink passengers.

Regional train travellers need to catch either a local bus or a taxi to access the Dubbo Base Hospital.

Figure 2.8 Countrylink services to Dubbo

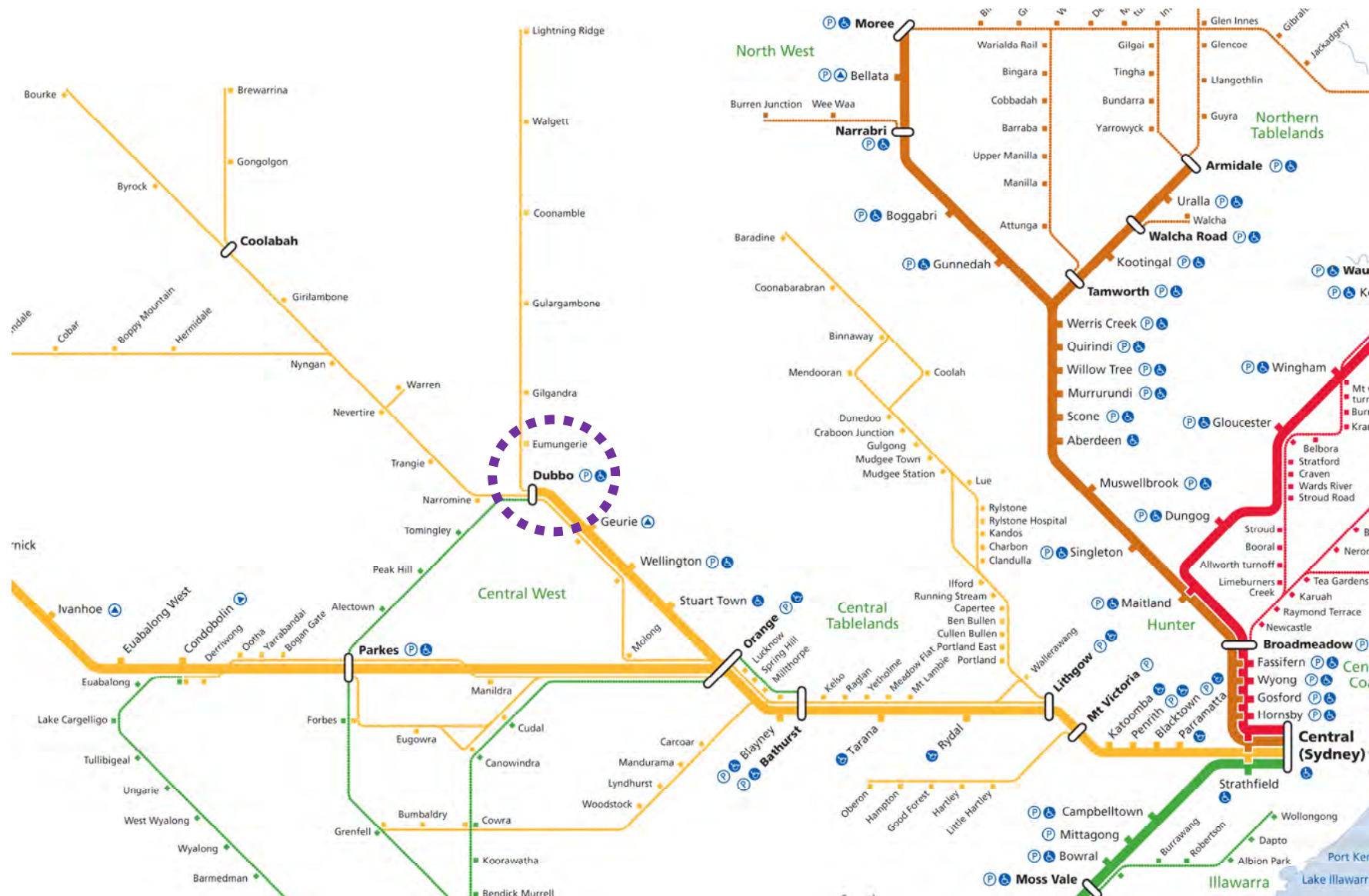
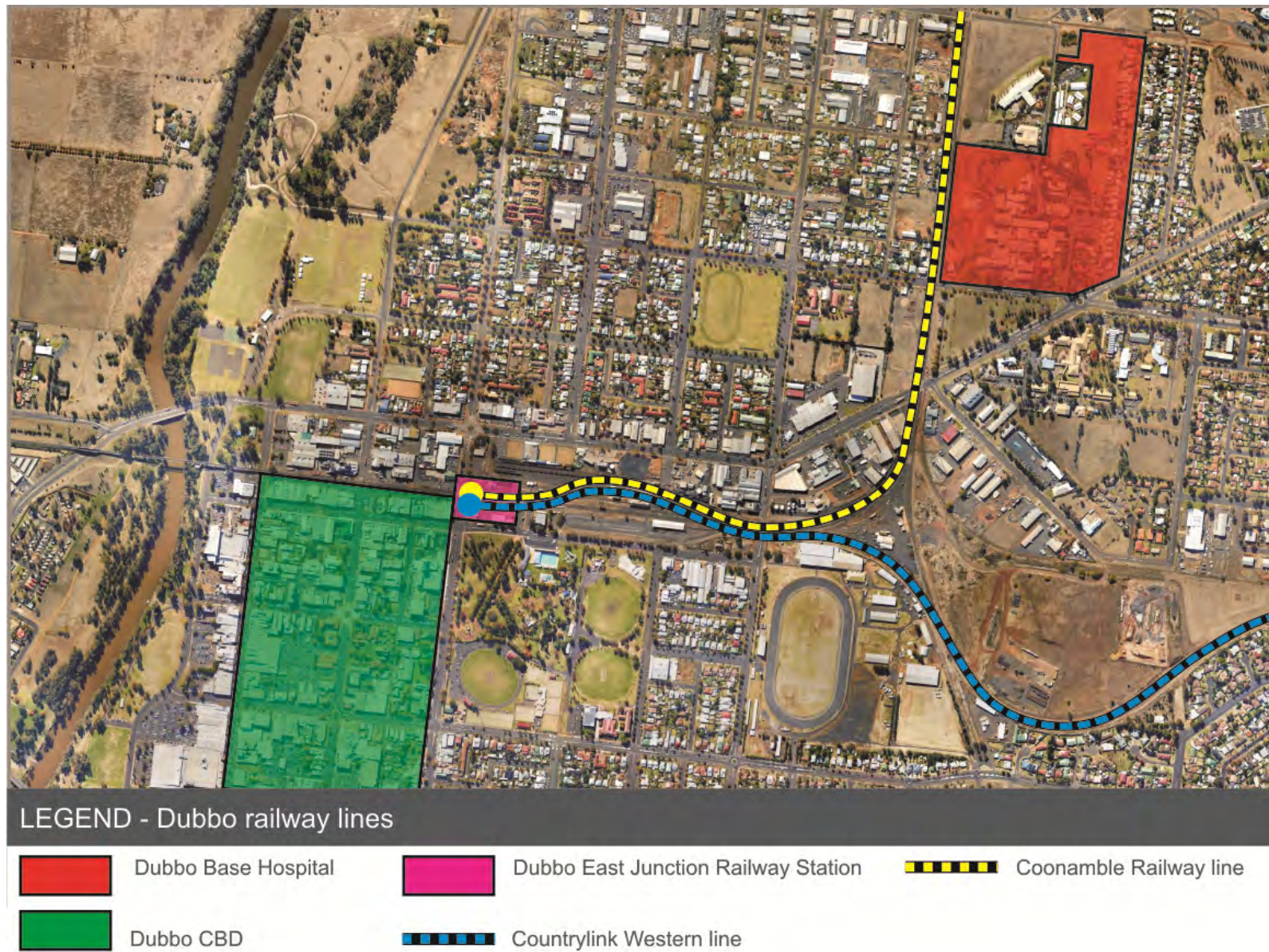


Figure 2.9 Dubbo railway lines



2.5.2 Coach services

Outlying regional centres connect to the Western Line train service at the Dubbo East Junction rail terminus via coach services originating from Bourke, Brewarrina, Lightning Ridge, Parkes and Broken Hill as shown in Figure 2.8.

Regional coach travellers need to catch either a local bus or a taxi to access the Dubbo Base Hospital.

Table 2.6 Frequency of coach services to Dubbo East Junction

Coach Service	Frequency	Destinations
Nyngan to Dubbo	Once daily (arrive 13:25)	Dubbo East Junction railway station
Broken Hill to Dubbo	Once daily	Dubbo East Junction railway station
Lighting Ridge to Dubbo	Once daily	Dubbo East Junction railway station
Brewarrina to Dubbo	Once daily on Mon/Wed/Fri/Sat	Dubbo East Junction railway station
Bourke to Dubbo	Once daily on Mon/Wed/Fri/Sat	Dubbo East Junction railway station

2.5.3 Freight

The hospital site's western boundary adjoins the Coonamble railway line which does not carry passenger traffic, shown on Figure 2.9 in yellow. There are four level crossings of the Coonamble railway line leading to the Dubbo Base Hospital:

- > Golden Highway – level crossing controlled by boom gates and flashing lights
- > Myall Street – pedestrian/cyclist only crossing
- > Muller Street – level crossing, controlled by stop sign, only road access to adjacent aged care facility.
- > River Street – level crossing, controlled by boom gates and flashing lights

The Coonamble Railway Line ends at the Dubbo East Junction railway station.

2.5.4 Bus

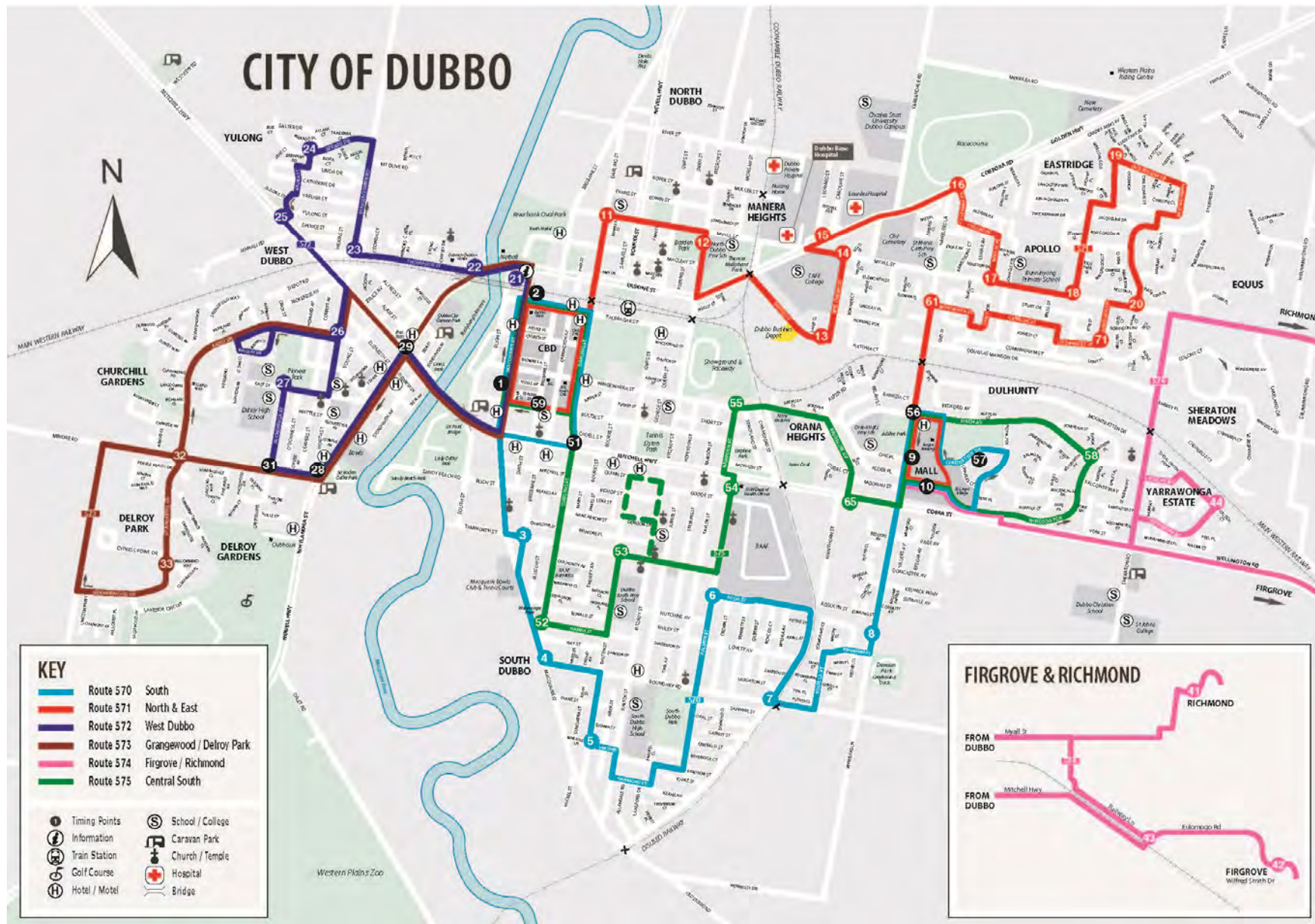
Dubbo's local bus network, Dubbo Buslines, is the only public transport option for travelling within Dubbo. Only Route 571 services the Dubbo Base Hospital with the service frequencies presented in Table 2.7.

Table 2.7 Bus routes and services to Dubbo Base Hospital

Route #	Bus stop within 400 metres	Frequency	Origin/destination
571	Golden Highway west bound (sheltered)	M-F: 7:56am 9:41am 9:56am 11:11am 11:41am 12:56am 2:11am 4:38am 5:45am Sat: 10:02am 11:51am 2:21am Sun: nil	Dubbo CBD/Orana Mall
571	Golden Highway east bound	M-F: 7:42am, 9:10am, 10:17am, 11:32am, 12:17am, 1:32pm, 2:47pm, 4:47, 5:22pm Sat: 8:47am, 10:37am, 11:57am Sun: nil	Orana Mall/Dubbo CBD

Bus services on route 571 are infrequent and are not direct from the Dubbo CBD or Orana Mall, The service originating from Orana Mall is particularly indirect and may be a disincentive for travel to the hospital by bus. All other bus routes servicing other areas of Dubbo originate or finish at either Dubbo CBD or Orana Mall as well, allowing interchange between the bus services. All Dubbo bus routes and bus stop locations are shown on Figure 2.10; Route 571 which services DBH is shown in red.

Figure 2.10 Dubbo bus routes and stop locations



The two bus stops servicing the hospital on either side of the Golden Highway west of the roundabout both provide seating and shelter for bus travellers. There is however poor provision of signage and information; there are no signs indicating that the shelter is a bus stop and there is no timetable or route information provided at either bus stop.

There are no pedestrian crossings or pathways linking the bus stops to the hospital, bus travellers need to cross two or three roads including the internal site road to reach the hospital's visitor entrance. The pedestrian crossings on the internal road are not convenient for bus travellers, located too far into the site.

2.5.5 Community Transport Facilities

A number of specialist transport services operate in Dubbo and between the hospital catchment towns and Dubbo to support people travelling to seek health assistance.

- > Dubbo Community Transport Scheme focuses on the needs of aged people with disabilities, their carers and the isolated people.
- > A Regional Care Service Car operates from the towns of Gilgandra, Narromine and Wellington into Dubbo, for specialist treatment, health and medical care and a car service is also available to Orange for medical appointments only.
- > A scheme run by the Indigenous Coordination Centre, the Police Citizens Youth Club, Dubbo Radio Cabs and Dubbo City Council provides subsidised taxi vouchers to Dubbo youth aged 12 to 17 years to help them access education, work, recreation and other destinations.
- > The Chronic Care for Aboriginal People Program provides health related transport to enhance existing services for Aboriginal people with or at risk of chronic disease.

Source: Dubbo Base Hospital Business Case and Implementation Plan

2.5.6 Taxi Services

Dubbo is serviced by Dubbo Radio Cabs Co-op. While there are no dedicated taxi facilities on-site, taxis can currently drop patients and visitors at the hospital's main entrance off Myall Street.

2.5.7 Future Public Transport Provision

A number of the recent strategic planning documents focused on Dubbo's future growth acknowledge public transport needs:

- > The Dubbo City Council's Strategic Plan 2011-2031 states that Council will continue to liaise with operators to ensure that a public transport system is available that facilitates the mobility of residents and visitors to the City. Special attention has been given in recent times to ensuring that public transport facilities meet Disability Discrimination Act guidelines.
- > The draft Dubbo 2036 Community Strategic Plan Strategy, Section 3.1.15 proposes that the public transport system should facilitate the mobility of residents and visitors to the City and meet the requirements of the Disability Discrimination Act.
- > A 2020 Vision for the City of Dubbo, Section 7.1 Inform the Community on Passenger Transport – The infrastructure exists in the form of train (XPT) from Sydney and Countrylink Bus that links regional towns to Dubbo as well as Air Travel (Performance Indicators: Information on available transport published on Dubbo City Council website on a regular basis).
- > Transport for NSW (TfNSW) is the state government agency responsible for all NSW bus operators and networks. At present, the TfNSW bus planning guidelines do not include rural/western NSW.

While the above strategic plans provide broad objectives of public transport improvements, there are no confirmed plans for upgrades and improvements to the existing train, coach or bus services for Dubbo.

2.6 CYCLE & PEDESTRIAN ACCESSIBILITY

Due to the nature and often distant origin of visitors to the hospital, vehicles remain the primary mode of transport for accessing the campus. Some pedestrian facilities are currently provided for those staff, patients and visitors who access the hospital on foot.

2.6.1 Existing pedestrian facilities

2.6.1.1 Internal

The hospital site has a disconnected arrangement of footpaths, ramps and walkways providing access within and between hospital buildings. Two pedestrian crossings provide access from the main car park to the main hospital building and the visitor entrance. Pedestrian facilities are particularly poor on the western side of the site with no footpath provided on either side of the loop road. A pedestrian crossing on the western side of the site crosses the loop road but connects only with a grass lawn.

2.6.1.2 External

Pedestrian footpaths provided on approach to Dubbo Base Hospital are provided in Figure 2.12.

The Golden Highway/Myall Street roundabout provides pedestrian refuge islands at each of the four approaches to the roundabout and the following footpath facilities connect to the hospital site via the roundabout:

- > Myall Street West: Footpath on northern side of the road. Poor visibility
- > Myall Street East: Footpath on southern side of road. Good visibility by both vehicles and pedestrians. The pedestrian refuge island links with the Myall Street footpath that enters the hospital site.
- > Golden Highway West: Footpath on both sides of the road. There is poor visibility of pedestrians by vehicles heading eastward, vehicle/pedestrian vision is blocked by trees, see Figure 2.11.
- > Golden Highway East: Separate footpath commences around 250 metres to the east of the roundabout on the northern side only. While there is no footpath on approach to the roundabout, a side road, Cobbora Road, provides safer access for pedestrians and cyclists. Good visibility by both vehicles and pedestrians.

Figure 2.11 Golden Highway approach to roundabout

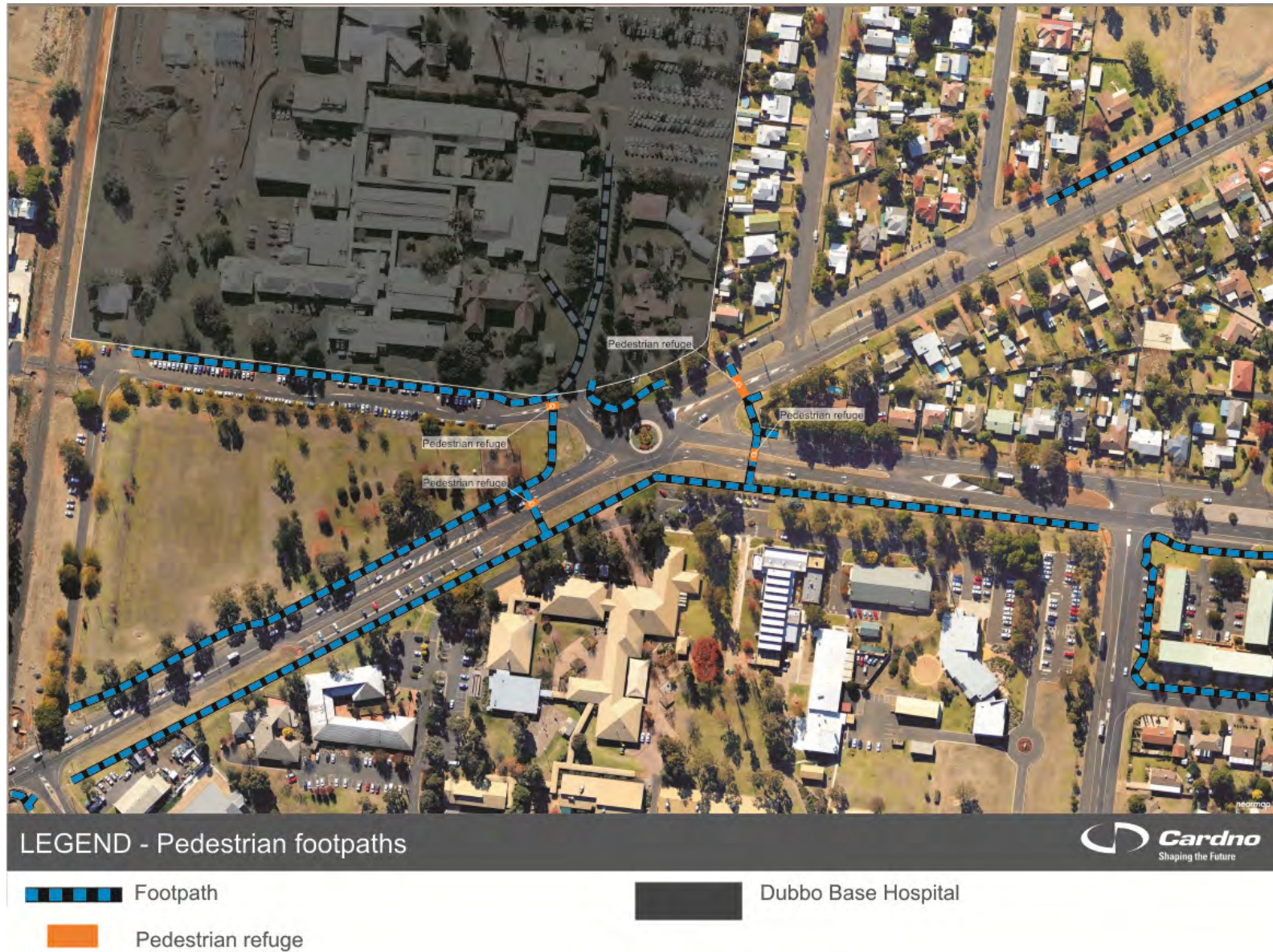


2.6.2 Planned/recommended upgrades and improvements

DCC's Footpaths and Cycleways Function Plan 2011/2012 refers to a 2006 Pedestrian Access Mobility Plan (PAMP) which identifies six Key Result Areas (KRA) to facilitate pedestrian movements. Although the PAMP is not accessible through the DCC website, the KRA actions are listed in the Footpaths and Cycleways Function Plan 2011/2012. KRA 6 addresses pedestrian safety near hospitals and recommends an all-weather footpath for:

- > Cobbora Road (north side) Yarrandale Road to Lourdes Hospital entrance.
- > Cobbora Road (north side) Lourdes Hospital to Base Hospital – partially completed.

Figure 2.12 Pedestrian footpaths on approach to Dubbo Base Hospital



2.6.3 Existing Cycle Facilities

2.6.3.1 Cycle routes

The site is accessible by cyclist using a combination of shared off-street footpaths and on road facilities. Dubbo City Council's cycleways map is provided in Figure 2.13 outlines the following cycleways to access Dubbo Base Hospital:

Travelling from the south

Unmarked road shoulder facility, shared with stationary vehicles, commencing at corner of Wheelers Lane and Boundary Street and continuing until the corner of Wheelers Lane and the Mitchell Highway where bicycle lane adjacent to kerbside parking commences the roundabout at the intersection of Wheelers Lane and Myall Street. The last leg of the cycle trip is an off-road shared footpath facility between Welchman Street and the Golden Highway approaching the Golden Highway/Myall Street roundabout.

Travelling from the east

Off-road shared path commencing to the south of the Sheraton Road and Mitchell Highway intersection. The off-road facility ends just past the intersection and the cycle route continues as unmarked mixed traffic until Myall Road. The last leg of the cycle trip is an off-road shared footpath facility between Welchman Street and the Golden Highway.

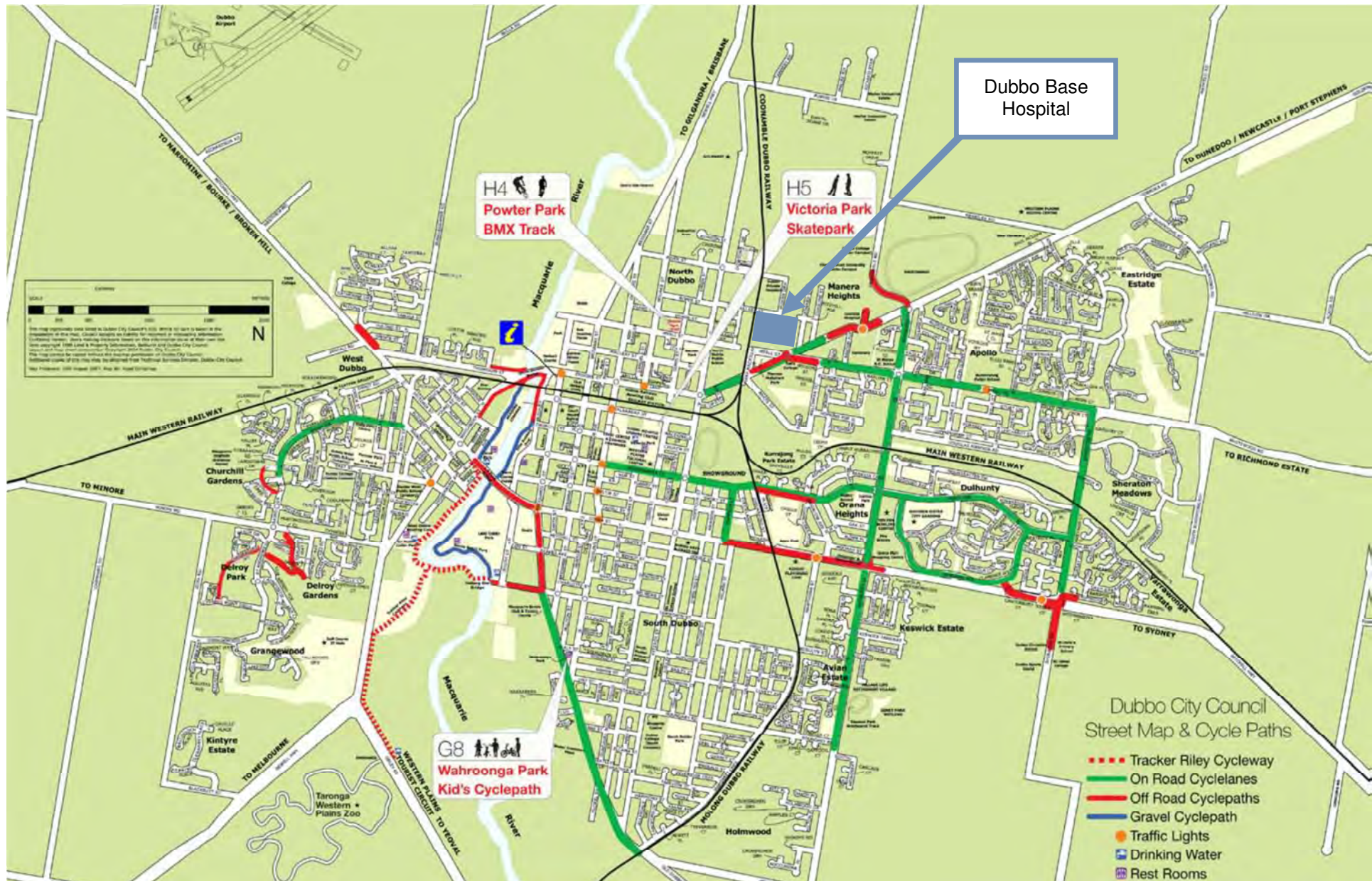
Travelling from the north

There are limited facilities for cyclists travelling from the north of the site. The cycling facilities only begin close to the site; the cycle route commences as an off-road shared path on Yarrandale Road in the approach to the Golden Highway and Yarrandale Road roundabout, undergoes a short length of unmarked on-road mixed traffic before the off-road share path recommences. The final component of the cycle route to reach the hospital is in the road shoulder of Golden Highway on approach to the roundabout.

Travelling from the west

There are no identified cycling facilities for cyclists travelling to the site from the Dubbo CBD. The on and off road footpaths nominated by Council to the west of the site are to the west and the south of the CBD and cyclists would need to navigate the Dubbo CBD and Newell Highway traffic to reach the hospital or take a long and undefined route through quieter streets.

Figure 2.13 Dubbo cycle ways, on and off road



2.6.3.2 On-site cycling facilities

A rack with storage for five bicycles is located close to the main public entrance to the hospital.

2.6.3.3 Off-site cycling storage

Bike storage lockers are available at two sites in Dubbo. A bank of four lockers is situated at Macquarie Regional Library while eight lockers have been constructed at the Church St carpark (behind Myer). Bikes can either be stored on a casual or long-term basis and the storage area is large enough to fit a bicycle and rider accessories.

3 PROPOSED REDEVELOPMENT

3.1 REDEVELOPMENT DETAILS

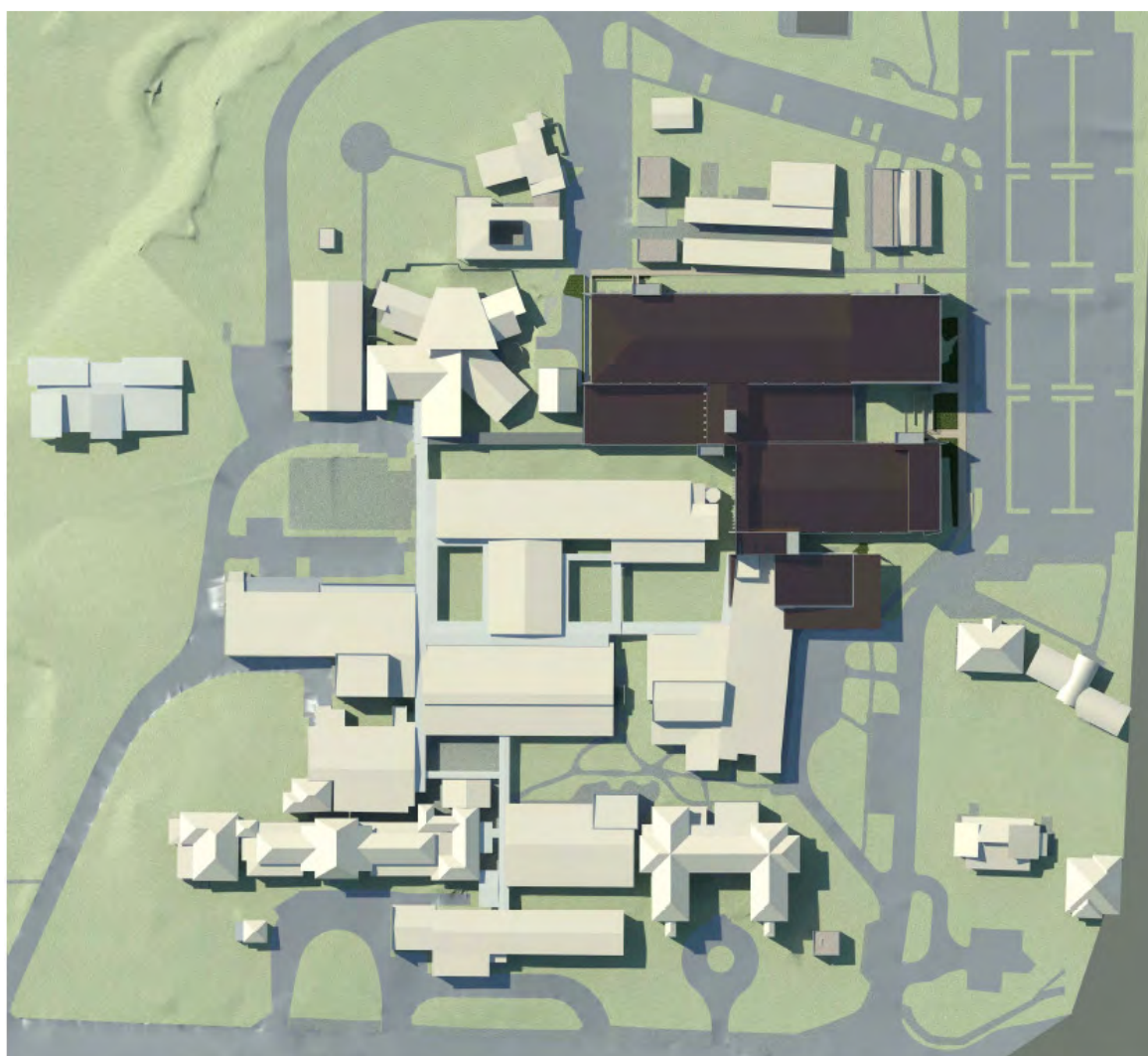
The scope of works for the Dubbo Base Hospital State Significant Development (SSD) is as follows:

- > Bulk excavation.
- > Construction of a new 1 and 2 storey building to accommodate a new Maternity unit, Operating Theatre suite, Central Sterilising Department and Day Surgery Unit with future flexibility to expand to a 3 storey building.
- > Refurbishment of existing Admissions/Outpatients and Medical records building to accommodate a new front of house area.
- > Refurbishment of existing Theatres building to accommodate an expanded Renal Dialysis Unit.
- > Demolition of the existing Maternity building and construction of new car parking spaces on the footprint of the existing Maternity building.
- > Provision of new landscaping to Renal outlook.

The works will result in the provision of an additional 19 bed and 46 staff.

Stages 1 & 2 of the proposed redevelopment of Dubbo Base Hospital are presented in **Figure 3.1**.

Figure 3.1 Proposed Redevelopment of Dubbo Base Hospital State Significant Development



As part of the campus wide services and infrastructure upgrade strategy the following works have already been undertaken:

- > Demolition of various structures including the existing Nurses Accommodation and Boiler House Buildings.
- > Construction of a new electrical substation building (including switchboard and generators) and relocation of existing padmount substations.
- > Upgrades and expansion of the existing car park.
- > Termination and relocation of existing hydraulic, water, sewer, stormwater, gas and electrical infrastructure services across the site.
- > Relocation of sheds to accommodate a new link road and construction access road in the northern part of the site.
- > Construction of a new building for ICT (Information and Communication Technology) infrastructure.
- > Minor reconfiguration of the Hospital's main entry and front house areas.
- > Provision of new landscaping.

The above works were required to formalise existing informal / ad hoc parking arrangements, meet existing demand and cater for the future programmed works (Stages 1 & 2) for the Hospital. As part of the Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report an assessment of the adequacy of the parking provision has already been made with respect to the redevelopment. Also, related to this, an increase in traffic will occur, and the impacts of this have also been considered.

4 DEVELOPMENT ACCESS

4.1 PEDESTRIANS AND CYCLIST ACCESS

4.1.1 Internal Access

The masterplan outlines significantly improved internal pedestrian site connections commencing in Stage 3 including a key pedestrian link through the middle of the campus, accessible by the public.

Pedestrian Link: The masterplan Stage 3 proposes a wide pedestrian link beginning at the Myall Street/Golden Highway roundabout at the southern end of the site and continuing north-west through the length of the site. This main connection links the following proposed buildings:

- > Teaching/training.
- > External teaching/training.
- > Main entry/emergency department/Administration/imaging.
- > Maternity/Renal dialysis.
- > Ambulatory care/medical inpatients unit.
- > Paediatrics/surgical inpatients.
- > Ambulatory care/breast screen.
- > Staff amenities.

Pedestrian crossings: There are four pedestrian crossings nominated:

- > McGuinn Street 1: Linking accommodation at the south-east end of the site to the main pedestrian link via a footpath.
- > McGuinn Street 2: Linking the public carpark to the main pedestrian link via a publically accessible footpath and courtyard.
- > McGuinn Street 3: Linking the accommodation and the north-east end of the site to the northern end of the main pedestrian link via a foot path.
- > Car park road: At the point where the staff carpark road crosses the main pedestrian link to give pedestrians the right of way.

There is the opportunity to allow cyclists to share the pedestrian link on the Golden Highway or providing a cycle lane as part of the McGuinn Street redevelopment will allow cyclists to reach their destination quickly and directly.

4.1.2 External Access

There are no new additional external pedestrian links proposed as part of the current masterplan. While Dubbo City Council has developed a number of strategic plans and action plans that identify and prioritise needed pedestrian and cycle improvements, there is only one additional direct linkage to the hospital site:

- > 2006 PAMP K.R.A. 6 recommended that an all-weather footpath is needed in Cobbora Road (north side) Lourdes Hospital to Base Hospital. It has been partially completed.

Footpath upgrading: Council requires the upgrading of footpaths fronting all new developments requiring development approval as outlined in Development Policy Code 1 - General Development Standards & Policies.

4.1.3 Bicycle Parking

Although the current demand for bicycle storage is low, prominent and accessible bicycle storage should be included in key site areas:

- > Secure bicycle racks in convenient locations for visitors and staff
- > Shower facilities and change room lockers for bicycle gear

Dubbo City Council requires that developments such as education establishments, shopping centres, offices and other workplaces and transport interchange points within the City of Dubbo are to be provided with

bicycle parking facilities generally in accordance with the standards contained in Australian Standard – Parking Facilities Part 3 - AS 2890.3 - 1993 Bicycle Parking Facilities.

The NSW Planning Guidelines for Walking and Cycling provides guidelines for the provision of bicycle parking at hospitals.

- > Long-term use (staff): 5–10% of staff numbers or 10–15% of number of beds³
- > Short-term use (visitors) 5–10% of number of staff.

Table 4.1 below applies these bicycle rates to the planned number of staff for Stages 1 & 2 of the hospital redevelopment. Currently a rack with storage for 5 bicycles is located close to the main public entrance to the hospital. Therefore, the provision of bicycle parking in accordance with the above guidelines represents a very large increase from current provisions (+1160% to meet minimum requirements and +2320% to meet maximum requirements).

Table 4.1 Bicycle Parking Requirements

Redevelopment Stage	Parking need	Bicycle Parking Rate	Max no. of staff on site at one time	Min. bicycle spaces required	Max. bicycle spaces required
Stages 1 & 2	Long term parking for staff	5–10% of staff numbers or 10–15% of number of beds	582	29	58
	Short term parking for visitors	5–10% of number of staff	582	29	58
Total				58	116

4.2 PUBLIC TRANSPORT ACCESS

Without significant improvements to the Dubbo bus network including an increase in the number of services; it is unlikely that public transport patronage will increase substantially.

While the public transport infrastructure is located external to the hospital site, improving the infrastructure and information for services could encourage staff, patients and visitors to travel by bus. The following public transport infrastructure improvements, in conjunction with an upgrade to the Dubbo bus network (currently not planned), could assist in consideration of public transport as a viable travel option:

- > A shared taxi/pick up and drop off zone located close to the main public entrance.
- > Bus and taxi information displayed prominently in key hospital buildings where high public usage occurs including contact numbers for bus and taxi services.
- > A plan of the site including important buildings, taxi ranks as well as security information.
- > Upgrading of bus stop as part of maintenance/review works on Golden Highway (such as Disability Discrimination Act compliance and timetable/map provision).
- > Provision of sufficient lighting and level footpath connection between the hospital and bus stops on Golden Highway.

4.3 VEHICLE ACCESS

The vehicle access arrangements to/from the site remain the same as current.

5 TRAFFIC ASSESSMENT

A comprehensive traffic assessment of the redevelopment was conducted for the development of DBH. This has been presented in the Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report. This section of the report provides a summary of the findings from the assessment.

5.1 TRAFFIC GENERATION

Traffic generation is generally dependent on land use and size of the redevelopment and estimated based on traffic survey of similar sites and comparison with published guidelines and generation rates for similar land uses.

The Roads and Traffic Authority Guide to Traffic Generating Development (2002) provides formulae to calculate the traffic generation for a Private Hospital based on the number of beds (B) and if available the average number of staff per weekday shift (ASDS). The Institute of Transportation Engineers (ITE) Trip Generations Handbook, 8th Edition (2008), also identifies a traffic generation rate of **1.5 trips per bed** for a General Hospital based on surveys conducted at specific sites.

Traffic surveys of similar sites and the site itself can provide information regarding actual trip generation rates that relate to local conditions. The future traffic generation can be derived by considering the number of vehicles entering and exiting the site from the two accesses to and from the site via Myall Street and White Street.

Trip generation rates for the AM and PM peak periods (1.699 trips/bed and 1.495 trips/bed respectively) were identified and are consistent with the peak trip generation rate of 1.5 trips/bed detailed by the ITE Trip Generation Handbook. Accordingly the site specific generation rates derived from the traffic surveys were used for the estimation of future traffic generated.

Stage 1 development of the hospital involves the introduction of **19 beds** which is expected to result in the following additional traffic being generated by the hospital;

- > AM Peak (8:00AM to 9:00AM) trip Generation = 32 trips
- > PM Peak (4:30PM to 5:30PM) trip Generation = 28 trips
- > Saturday Midday Peak (11:00AM – 12:00PM) trip Generation = 13 trips

The Masterplan indicates that the total redevelopment will result in the introduction of **50 beds** which is expected to result in the following additional traffic being generated by the hospital;

- > AM Peak (8:00AM to 9:00AM) trip Generation = 85 trips
- > PM Peak (4:30PM to 5:30PM) trip Generation = 75 trips
- > Saturday Midday Peak (11:00AM – 12:00PM) trip Generation = 35 trips

5.2 TRIP DISTRIBUTION

Trip distribution analysis is the process by which trips generated by a development are distributed to and from the adjacent road network. For the hospital, the trip distribution has been based on the traffic surveys which identify how and where vehicles are coming and going from.

The traffic surveys indicate the following existing access distributions into and out of the hospital:

- > The majority of traffic generated by the hospital utilises the Myall Street access with 76% of traffic using it during the AM Peak period, 86% during the PM Peak period and 90% during the Saturday Midday Peak Period
- > The entering/exiting distribution for the Myall Street access to the hospital is as follows for each peak period;
 - AM Peak Period: Entering = 77%, Exiting = 23%
 - PM Peak Period: Entering = 33%, Exiting = 67%
 - Saturday Midday Peak Period: Entering = 40%, Exiting = 60%

- > The entering/exiting distribution for the White Street access to the hospital is as follows for each peak period;
 - AM Peak Period: Entering = 97%, Exiting = 3%
 - PM Peak Period: Entering = 98%, Exiting = 2%
 - Saturday Midday Peak Period: Entering = 93%, Exiting = 7%

Consistent with the planned redevelopment, it is assumed that this distribution will be maintained into the future with Myall Street still being the predominant form of access to and from the hospital. Accordingly the above in/out splits were used to distribute future development traffic into the network.

5.3 FUTURE INTERSECTION PERFORMANCE

The performance of the study area intersections were assessed considering the following scenarios:

- > 2013 No Development Scenario.
- > 2013 With Development Scenario.
- > 2023 No Development Scenario.
- > 2023 With Stage 1 and 2 Development Scenario.
- > 2023 With Full Development Scenario.

The results indicated that all intersections perform at LoS D or better with the exception for the Golden Highway/White Street/Hospital Access intersection during the AM Peak Period which experiences LoS E and LoS F (for full development scenario) on the White Street (S) approach. Note however, that the left in/left out access movement to the Hospital records acceptable levels of performance irrespective of this.

6 PARKING REQUIREMENTS

A comprehensive parking assessment of the redevelopment was conducted for the development of DBH. This has been presented in the Dubbo Base Hospital Redevelopment Review of Environmental Factors (REF) Traffic Impact Assessment Report. This section of the report provides a summary of the findings from the assessment.

6.1 PARKING PROVISION

As part of the campus wide services and infrastructure upgrade strategy the main car park has been upgraded and expanded to provide a total of 289 spaces. This represented an increase of 48 spaces from the previous 241 spaces (235 in main car park and 6 adjacent to the existing oncology building).

6.2 PARKING REQUIREMENTS

Hospitals need to provide a range of general and specialised car parking for staff, patients and visitors. In addition, the following categories of car park requirements need specific attention:

- > Parking spaces for persons with disability permits: Location and number. These spaces should be allocated close or adjacent to main patient building entrances and exits as well as near appropriate pedestrian infrastructure.
- > Short stay spaces (less than fifteen minutes): Acting as pick and drop off areas outside key building entrances.
- > Emergency vehicles and ambulances.
- > Visiting medical officers on call.
- > Nursing staff, particularly early & late shifts.
- > Patient access for scheduled appointments & treatments.
- > Public emergency access.
- > Public visitor access.

The parking requirement for the DBH redevelopment was determined by considering the following sources of information:

- > **Other studies of Regional Hospital parking.**
 - Orange Health Campus, where the hospital provided almost 10% above the forecasted demand
 - Wagga Wagga Base Hospital, where the hospital redevelopment catered for 91% of the predicted demand.
- > **Policies and Guidelines providing parking rates.**
 - The Department of Human Services, Victoria: “Design Guidelines for Hospitals and day procedure centres: traffic and car parking”
 - Dubbo City Council, LEP: “Policy code: standards for off-street parking of motor vehicles: hospitals”
 - RTA: “Guide to traffic generating developments v2.2 recommended parking rate for private hospitals”
 - These sources provided varied additional parking demands from 16 spaces required to 48 spaces required taking into consideration the additional 19 beds at the completion of Stages 1 and 2 of the development.
 - The variability in the required parking numbers calculated indicated that a specific assessment using survey data was undertaken to form an accurate figure for the future parking demands
- > **Survey Data.**
 - A relationship between the level of staff, number of beds and the parking occupancy was determined by conducting statistical analysis of data provided by Dubbo Base Hospital Parking Review as well as information provided for future programmed works and the Dubbo Base Hospital Funding Report. An expression for peak parking demand was determined using regression analysis and this was used to predict the future levels of parking

6.2.1 Future Parking Recommendation

Table 6.1 presents the parking requirements when comparing the DCC LEP and the parking model developed by survey data provided.

Table 6.1 Parking Provision Assessment

Approach	Parking Spaces
Previous Supply of Informal / Ad Hoc Parking (main car park and oncology area)	241
Parking supply provided as part of upgrade already completed	289
Additional spaces required according to DCC LEP	48
Additional spaces required according to Survey Data Parking Demand Model	61
Net increase already provided	48

The provision of 289 car parking spaces meets the requirements set out in the DCC LEP indicating that there is sufficient provision of parking spaces to cater for the completion of Stage 1 and 2 redevelopment of DBH. As well as satisfying Dubbo City Council requirements the quantum provided is close to accommodating the worst case demand model outlined above.

7 CONCLUSIONS & RECOMMENDATIONS

- > The redevelopment will involve the addition of 19 beds and 46 staff which will generate a maximum of 32 vehicles during the AM peak period.
- > All intersections perform satisfactorily with acceptable levels of service when considering the impact of hospital traffic only.
- > The proximity of the Golden Highway (Cobbora Road)/White Street/ Hospital Access intersection to the railway level crossing raises safety concerns as the right turn bay from the Golden Highway to White Street extends through the crossing. This is an existing constraint and the introduction of hospital traffic does not increase the likelihood of this occurring.
- > The majority of staff, patients and visitors will travel to the hospital using private vehicles. A majority of patients live outside of the Dubbo urban area.
- > The parking levels already provided as part of the campus wide upgrade of parking facilities satisfies the parking demand created by the additional beds and staff present at the completion of the programmed redevelopment works (Stage 1 and 2).
- > Car parks have been designed to Australian standards.
- > The main mode of transport utilised throughout Dubbo are private vehicles with over 92% of people using a car/truck to travel to work.
- > Public transport services are poor, both the inter-town services which run once daily and the local Dubbo bus network which is infrequent, indirect and requires interchange for travellers from Dubbo's southern and western suburbs.