TRAFFIC & PARKING ASSESSMENT

TERTIARY EDUCATION CENTRE

LOTS 3 & 4 DP 11221
85 – 87 HILL STREET, MUSWELLBROOK

PREPARED FOR: MUSWELLBROOK SHIRE COUNCIL

MARCH 2014

14/016

TRAFFIC & PARKING ASSESSMENT
MUSWELLBROOK SHIRE COUNCIL

LOTS 3 & 4 DP11221
85 – 87 HILL STREET, MUSWELLBROOK
TERTIARY EDUCATION CENTRE

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QUALITY ASSURANCE

This document has been prepared, checked and released in accordance with the Quality Control Standards established by Intersect Traffic Pty Ltd.

Issue	Date	Description	By
A	18/02/14	Draft	JG
B	13/03/14	Edit	TB
C	15/03/14	Final Proof	JG
D	17/03/14	Approved	JG
E	20/03/14	Client Amendment	JG

This document has been authorised by

Date 20th March 2014

EXECUTIVE SUMMARY

Intersect Traffic Pty Ltd was engaged by Muswellbrook Shire Council to prepare a traffic and parking assessment for a proposed tertiary education centre on Lots 3 & 4 DP 11221 85 - 87 Hill Street, Muswellbrook. The tertiary education centre will be used by both NSW TAFE and the University of Southern Queensland and will accommodate approximately 100 students and staff during peak teaching times. The tertiary education centre will only be used for teaching purposes on weekdays between 8 am and 9.30 pm (Monday to Thursday) and 8 am and 4.30 pm (Fridays).

The proposal involves the demolition of the existing building on the site which houses the visitor information centre and use of part of the existing car parking area at the rear of the site containing approximately 16 car spaces. The existing car park between the visitor information centre and the adjoining Loxton House will also be removed resulting in the loss of an additional 10 car parking spaces used by the businesses leasing space within Loxton House. No additional car parking is proposed with staff and students of the tertiary education centre likely to use the existing public car parking areas owned by Muswellbrook Shire Council behind and adjacent to the site as well as available on-street parking convenient to the site in Hill Street. However with amendments to the line marking an additional 3 car spaces will be provided with the remaining car park area. i.e. total loss of car parking on the site is 23 spaces. The concept development plans are shown in ***Appendix 1.***

This report has addressed the impact any additional traffic generated by the development has on the local road network capacity as well as addressing the provisions of on-site parking and access within Muswellbrook Council's DCP as applicable to the development. This is particularly relevant given the development does not provide any on-site car parking but relies on the availability of adjoining public and on-street car parking to meet its peak parking demand. The report has concluded the following:

- The proposed development is likely to generate an additional 27 vtph during peak traffic periods.

- Both Bridge Street (SH9) and Hill Street have significant spare two way mid-block capacity to cater for additional traffic generated by the proposal without adversely impacting on current levels of service (LOS) experienced by motorists on these roads;
- Sidra analysis of the Bridge Street (SH9) / Hill Street give way controlled cross intersection indicates the additional traffic generated by the proposal does not adversely impact on the operation of this intersection which continues to operate satisfactorily post development and with at least 10 years background traffic growth.
- An assessment of the car parking provisions of the Muswellbrook DCP *Chapter 16 – Car parking and access* indicates the proposal is required to provide an additional 23 on-site car parking spaces.
- The proposal does not provide any additional on-site car parking therefore an on-site car parking deficiency results when assessed against the Muswellbrook DCP.
- It is considered that the provision of additional on-site car parking is not required as there is suitable and available long term public car parking in close vicinity to the site. A parking survey has indicated that the existing public car parking area at the rear of the site is currently under-utilised and even with the loss of 23 car parking spaces as a result of construction of this development would still have sufficient spare capacity to cater for the peak parking demand generated by the development and other land uses in the vicinity of the site.
- The existing CBD loop bus service provided by Osborne Bus Services is considered adequate for this development and there would be no requirement for additional or changed services as well as additional public transport infrastructure.
- Existing pedestrian facilities in the area are considered satisfactory for the proposed development ensuring as safe as possible passage for pedestrian traffic to and from the development.
- Apart from the provision of bicycle racks within the development there would appear little nexus to require the provision of additional on or off road cycle infrastructure in the vicinity of the site.

Having carried out this traffic and parking assessment it is recommended that the development can be supported from a traffic impact perspective as, subject to Council's support of a variation to its DCP on-site car parking provisions, it will not adversely impact on the local and state road network and complies with all relevant Muswellbrook Council, Australian Standard and RMS requirements.

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PHOTOGRAPHS

Vehicular access to the site is currently provided from Hill Street however this will be removed as part of the development proposal. Adjoining the site to the west is a constructed formal public car parking area owned and maintained by Muswellbrook Shire Council. Vehicular access to the car park is constructed as a combined entry / exit driveway 6 metres wide.

The car parking area interconnects with other public and private car parking areas behind the Muswellbrook Library and private commercial developments south of the site. Motorists are able to drive through the car parking areas from Hill Street to Brook Street south of the site beside the Brook Street Plaza complex. As Council is about to purchase the Brook Street Plaza this area of car parking would be available for use by the tertiary education centre as public car parking. These public parking areas are shown in ***Figure 2.***

However, the extent of existing public car parking likely to be utilised by staff and students of the tertiary centre is probably limited to the car parking areas immediately behind the site, the Muswellbrook Library and the balance of public land through to the Brook Street Plaza due to the convenience of accessing the new building. It was observed during a site inspection on Thursday 27th February 2014 that there are currently around 126 car parking spaces in this area including the Loxton House car parking. With the proposed development this will be reduced to a total of 103 car parking spaces. ***Photographs 1, 2, 3 & 4*** show existing buildings and car parking areas conveniently located to the development site.

Figure 2 – Public car parking areas in vicinity of the site.

Photograph 1 – Existing Visitor Information Centre on site.

Photograph 2 - Existing public car parking area adjacent to site.

Photograph 3 – Muswellbrook Library and rear car park.

Photograph 4 – Public car park to south of Muswellbrook Library.

3. EXISTING ROAD NETWORK

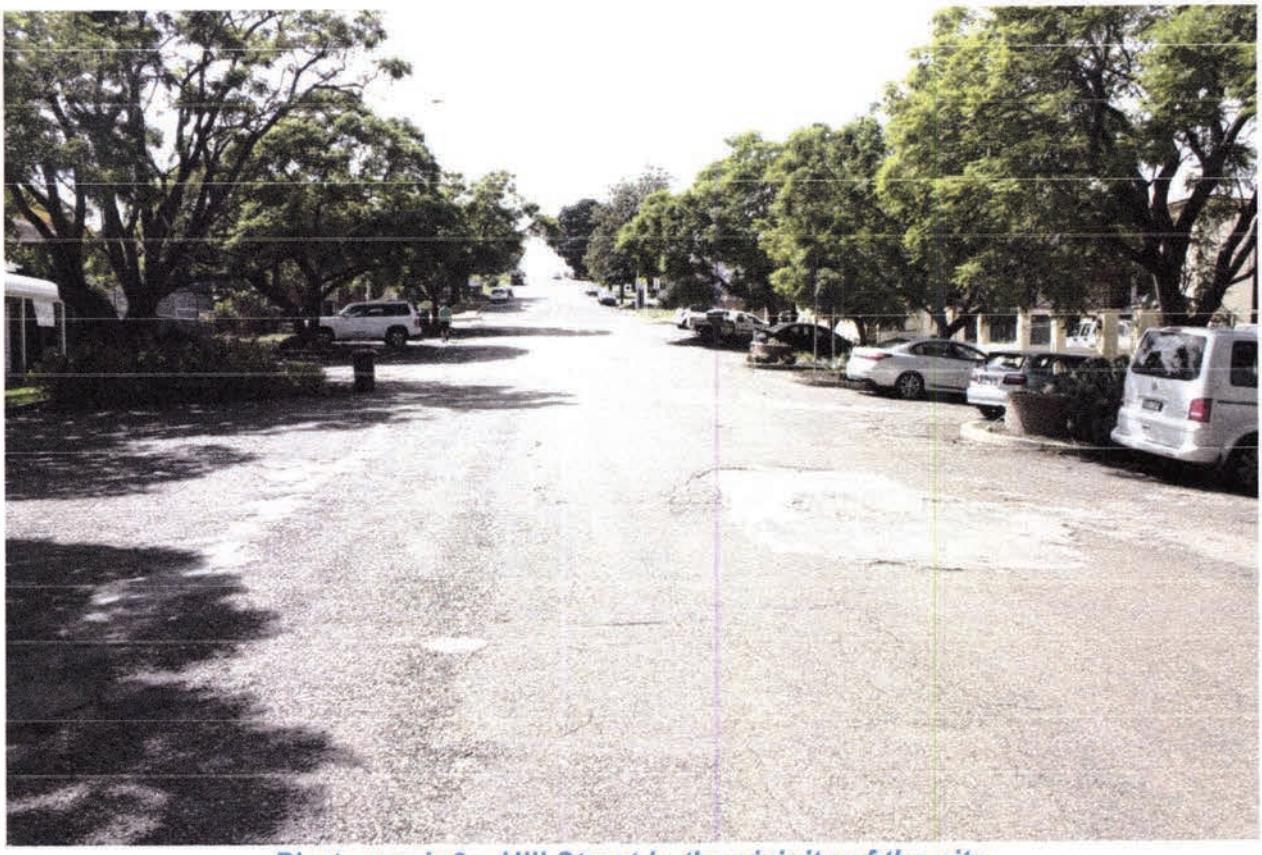
3.1 Bridge Street (SH9)

Bridge Street is part of the New England Highway and as such is a classified state highway (SH9) and a major arterial road in the region. It connects the northern districts of NSW to the Newcastle port area and south to Sydney and represents a major transport route for many commodities and goods. In the vicinity of the site it is a four (4) lane two (2) way road with adjacent parking lanes. Typically travel lane widths are 3.4 metres and parking lanes are 3.0 metres wide. A 50 km/h speed zone exists in this section of the road. At the time of inspection Bridge Street was observed to be in good condition. (See ***Photograph 5***).

Photograph 5 – Bridge Street at Hill Street intersection

3.2 Hill Street

Hill Street in the vicinity of the site is a no through local access road under the care and control of Muswellbrook Shire Council. It provides vehicular access to the properties along its frontage including the development site. It is a two (2) lane (2) two way sealed road with rear to kerb, 90°, 1 hour time limited car parking on both sides of the street from Bridge Street to the cul-de-sac head i.e. approximately 85 metres. It is estimated that this provides an on-street parking capacity of 29 spaces when vehicular accesses are considered. A 50 km/hr speed limit applies to this section of road and at the time of inspection the road was observed to be in good condition. (See ***Photograph 6***).



Photograph 6 – Hill Street in the vicinity of the site

3.3 Bridge Street / Hill Street intersection

The Bridge Street / Hill Street intersection is a give way controlled cross intersection (see ***Photograph 7***). A protected right turn bay is provided for vehicles heading north on Bridge Street and turning east into Hill Street. However no protected turn bays are provided for right and left turn movements from Bridge Street into the section of Hill Street fronting the site. The nearest pedestrian crossing facility on Bridge Street is in the form of a pedestrian refuge in front of the adjacent library (see ***Photograph 9***) while signalised pedestrian crossing facilities are available at the Bridge Street / Brook Street intersection some 170 metres south of the site.(See ***Photograph 8***).

Photograph 7 – New England Highway / Hill Street intersection

Photograph 8 – New England Highway / Brook Street traffic signals

4. TRAFFIC VOLUMES

The RMS has a number of traffic counter stations near the site. The nearest traffic counter site for this assessment would be;

- Station 05.247 – Muswellbrook – S of Hill Street. The latest AADT data from the site available off the RMS is shown in ***Table 1*** below;

Table 1 – AADT (vehicles per day) Station 05.247 – Muswellbrook – S of Hill Street

1995	1998	2001	2004
17,605 vpd	16,852 vpd	15,181 vpd	17,106 vpd

The AADT values fluctuate however over the full span of years the data equates to a decrease of 0.3 % per annum. Whilst the data suggests little traffic growth in the area for this report a conservative background traffic growth rate of 1% per annum has been adopted.

The Muswellbrook Traffic Study completed for Muswellbrook Shire Council by Parsons Brinkerhoff (PB) in 2007 undertook an intersection count at the Bridge Street / Brooks Street intersection south of the site. This intersection count is shown below in ***Figure 3.***

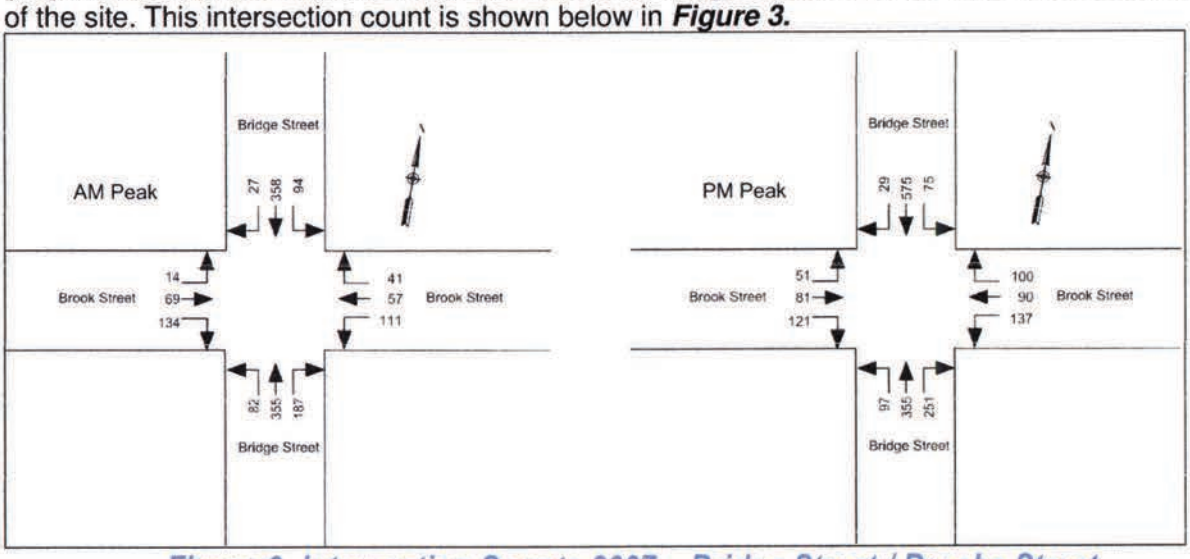


Figure 3- Intersection Counts 2007 – Bridge Street / Brooks Street

With a 1 % background traffic growth applied to the PB intersection count it is determined that the following mid-block traffic volumes would apply to Bridge Street near Hill Street.

- 2014 AM peak – 952 vph
- 2014 PM peak – 1,162 vph
- 2024 AM peak – 1,050 vph
- 2024 PM peak – 1,280 vph

Intersect Traffic also carried out a PM manual traffic count at the Bridge Street / Hill Street intersection on Thursday 6th March 2014 for intersection analysis purposes. This count recorded the following peak mid-block traffic volumes (PM peak) in the vicinity of the site. The manual count field sheets are provided within ***Appendix 2***.

- Bridge Street – 1,104 vph; and
- Hill Street – 54 vph.

This correlates well with the Muswellbrook Traffic Study predictions and are considered suitable for adoption in this assessment.

5. ROAD CAPACITY

The capacity of urban roads is generally determined by the capacity of intersections. However, Tables 4.3 and 4.4 of the RMS' *Guide to Traffic Generating Developments* provides some guidance on mid-block capacities for urban roads and likely levels of service. These tables are reproduced below.

Table 4.3
Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Based on these tables and assuming a LOS C as satisfactory it is considered that;

- Bridge Street has a two way road capacity of at least 3,600 vtph; and
- Hill Street has a two way road capacity of at least 1,800 vtph.

From the data collected in the traffic survey carried out by Intersect Traffic as described in ***Section 4***, both Bridge Street and Hill Street have spare mid-block capacity to cater for additional traffic associated with new development as existing traffic volumes are well below these capacity thresholds. However the ability of the road network to cater for additional traffic in this area will be very dependent on there being spare intersection capacity within the Bridge Street / Hill Street give way controlled cross intersection. This will be analysed later in this report.

6. ALTERNATE TRANSPORT MODES

Osborne Bus Services runs the public transport network in the Muswellbrook area and would service the development through its CBD loop route. The nearest bus stops were observed in Brook Street approximately 170 metres south of the site. This is within convenient walking distance to the site therefore it is considered the site is already well serviced by public transport.

Pedestrian facilities in the area are also considered excellent with concrete footpaths along both sides of both Bridge Street and Hill Street and pedestrian crossing facilities provided on all legs of the signalised Bridge Street / Brook Street intersection some 170 metres south of the site and via a pedestrian refuge on Bridge Street immediately south of the site in front of the library (see ***Photograph 9***).

There are no on or off road cycle lanes in the vicinity of the site and as pedestrian traffic in the area is high the existing footpath is not suitable for bicycle traffic. Therefore bicycle traffic would need to share the outer traffic lanes with other vehicles, making the area really only suitable for experienced cyclists particular given the existence of parallel parking along Bridge Street.

Photograph 9 – Pedestrian refuge – Bridge Street near site.

7. DEVELOPMENT PROPOSAL

The proposed development involves the demolition of the existing visitor information centre (120 m^2 GFA) on the site and the construction of a new tertiary education centre that will house a maximum of 100 students and staff during peak teaching periods. The tertiary education centre will provide a total of 1,472 m^2 GFA over 3 levels and operate on weekdays only between 8 am and 9.30 pm (Monday to Thursdays) and 8 am to 4.30 pm (Fridays).

Site works will result in the loss of approximately 23 existing car parking spaces within the existing car parking areas behind the visitor information area and Loxton House which is located on the Bridge Street frontage in front of the proposed new tertiary education centre building. It should be noted that the operation of the visitor information centre will continue within the precinct from an area within the Muswellbrook Library building albeit a scaled down version of the existing centre.

The proposal does not provide any additional on-site car parking as the existing site is fully developed and multi-story parking is not only considered uneconomical but also unnecessary as the existing public car parking areas in close proximity to the site are currently underutilised. As a result it is argued additional parking is not required as the remaining on-site public car park post development (103 car parking spaces) is under-utilised due to factors such as the availability of suitable on-street car parking areas, combined trip making and staggered peak parking demand periods. This issue is explored and justified later in the report.

8. TRAFFIC GENERATION

The RMS' *Guide to Traffic Generating Development's* provides specific advice on the traffic generation potential of various land uses. However it is noted the RMS Guide does not provide traffic generation rates for education facilities. In the absence of RMS data it is usual to seek guidance from the USA's Institute of Transport Engineers (ITE). The 8th edition of the ITE Trip Generation Report does provide data for education establishments such as schools and colleges. This data has been utilised in this report on the basis it is considered the closest similar land use for which data is available. The data sourced is as follows;

Education Establishment (ITE)

Daily vehicle trips = 2.4 trips per student or 9.1 trips per staff
PM Peak hour vehicle trips = 0.2 per student or 0.9 per staff

In terms of traffic impact the critical variable for assessment purposes is the peak hour traffic. It is also noted that the likely split of students and staff will be 6 staff and 94 students. The additional peak hour traffic generated by the development can therefore be calculated as;

Additional Peak hour traffic = 0.2 x 90 + 0.9 x 10
= **27 vtph**.

Therefore based on the above analysis of traffic generation it has been determined that the proposed Tertiary Education Centre will result in an increase of 27 vtph on the local road network.

9. TRIP DISTRIBUTION

Before carrying out any traffic modelling the additional peak hour traffic generated by the development needs to be distributed through the adjoining road network.

This involves making a number of assumptions as to distribution patterns to and from the site. The following assumptions have been made in this assessment;

- For this assessment it has been assumed the AM peak traffic generation is the same as the PM peak traffic generation period.
- In the AM peak 80 % of traffic is inbound and 80 % of traffic has an origin / destination to the south.
- In the PM peak 80 % of traffic is outbound and 80 % of traffic has an origin / destination to the south.
- Background traffic growth has been estimated at 1 % per annum over the assessment period which is 10 years (2024) as determined in ***Section 4***.

The AM and PM additional traffic movements generated by tertiary education centre, calculated for this assessment are shown in ***Figure 4*** below.

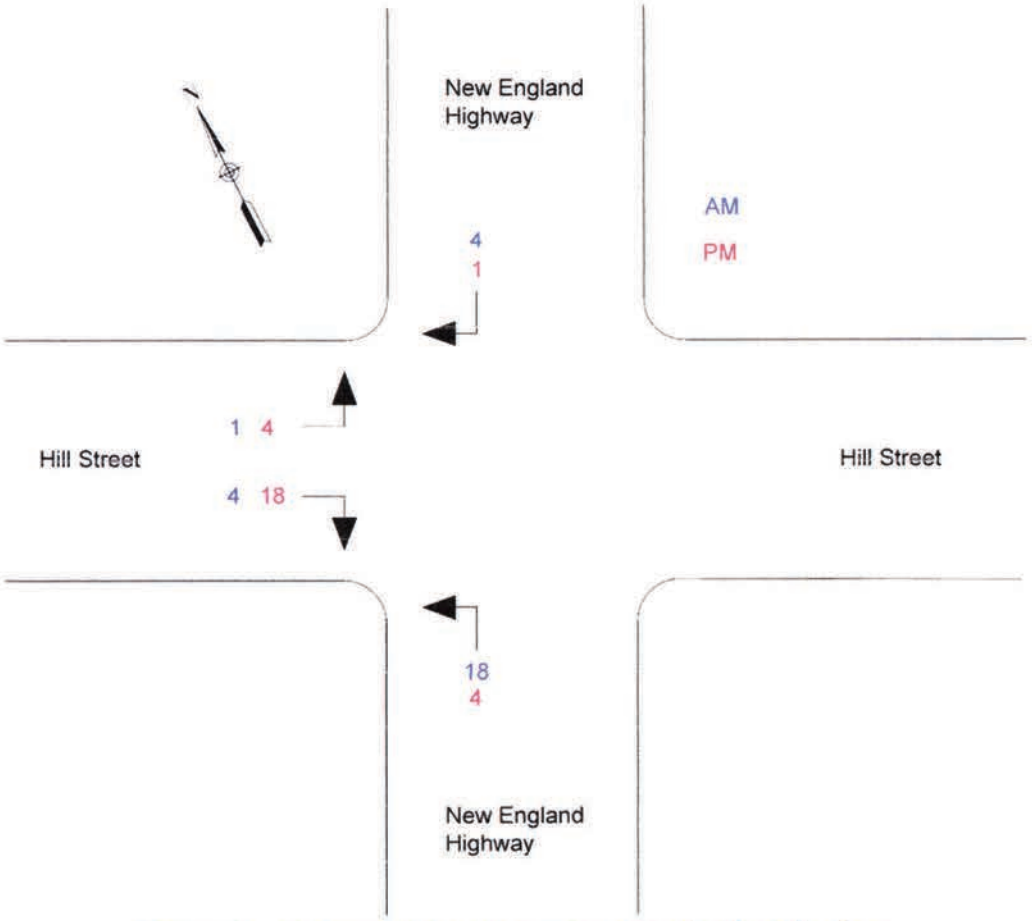


Figure 4 – Assumed Development Traffic Distribution

10. TRAFFIC IMPACTS

10.1 Road Network Capacity

Section 5 of this report has determined that both Bridge Street and Hill Street have spare two way mid-block road capacity.

Based on the traffic distribution calculations associated with this development (***Section 9***), the existing traffic volume data and the historical background traffic growth data the peak hour traffic volumes on the road network in 2024 are predicted to be;

- Bridge Street – approximately 1,240 vtph; and
- Hill Street – approximately 82 vtph;

As these traffic volumes are well below the two way mid-block capacities of the roads calculated in ***Section 5*** i.e. Bridge Street 3,600 vtph and Hill Street 1,800 vtph it is concluded the road network has sufficient spare capacity to cater for this development.

10.2 Intersection Capacity

The give way controlled intersection at the intersection of Bridge Street (SH9) and Hill Street by observation appears to be operating satisfactorily with existing traffic volumes during the AM and PM peak period. The additional development traffic is considered insignificant and is unlikely to have an adverse impact on the operation of the intersection.

To confirm this, the intersection has been modelled using the Sidra 5 intersection modelling software for the critical PM peak both post development and with background traffic growth through to 2024.

The SIDRA software package predicts likely delays, queue lengths and thus levels of service that will occur at intersections. Assessment is then based on the level of service requirements of the RMS shown below;

Table 4.2
Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

A summary of the worst movement results from the modelling for the PM peak is shown below in ***Table 2.*** The Sidra summary tables for each scenario modelled are provided in ***Appendix 3.***

Table 2–Summary Sidra Modelling – Worst Movements – PM peaks

Scenario	Movement	Level of Service (LOS)	Average Delay (s)	95 % Back of Queue Length (cars)
2014 PM	Hill Street East Right Hand Turn	C	32.9	0.6
2014 PM post development	Hill Street East Right Hand Turn	C	33.3	0.6
2024 PM	Hill Street East Right Hand Turn	D	43.2	0.8

The main conclusions to be drawn from these modelling results are;

- The intersection continues to operate satisfactorily post development and with ten years traffic growth through to 2024.
- The worst level of service (LOS) occurs on the right turn out movement from Hill Street east to which the development does not contribute additional traffic. However the LOS still remains at LOS D which is within the acceptable limits as per the RMS assessment guide.
- The right turn out of Hill Street west is the intersection movement most impacted by the development. However this movement continues to operate with a LOS C post development and with ten years traffic growth through to 2024.

Therefore it is concluded the proposed development does not adversely impact on the operation of the Bridge Street / Hill Street give way controlled intersection and no upgrading of the intersection is required.

11. ON-SITE CAR PARKING / ALTERNATIVE TRANSPORT MODES

11.1 Parking and Access

On-site parking and access requirements in Muswellbrook for new developments is contained within *Chapter 16 – Car parking and access*, of the Muswellbrook DCP.

In terms of parking provision this document provides the following objectives and controls for non-residential development;

16.3 NON-RESIDENTIAL DEVELOPMENT

Objectives

a) To ensure adequate provision of off-street parking to maintain the existing levels of service and safety of the road network.
b) To ensure a consistent and equitable basis for the assessment of parking provisions.
c) To ensure the design of parking areas, loading bays and access driveways which function efficiently.
d) To ensure that parking areas are visually attractive and constructed, designed and situated so as to encourage their safe use.
e) To ensure that all traffic generating developments are generally in accordance with those sections of the Traffic Authority of NSW Policies and Guidelines, for traffic generating developments as adopted by this Code.

Controls

(i) Car parking is provided on site in accordance with the requirements of 16.6 of this section of the DCP.
(ii) On-site parking facilities are designed and constructed to comply with the provisions of AS2890.1/AS2890.2.
(iii) To ensure that traffic movements into and out of a site are made, whenever possible, in a forward direction. If a site layout does not permit forward movement for delivery vehicles, then the developer, owner or occupier must provide a risk management plan, to the satisfaction of Council, detailing the measures required to ensure that traffic movements are carried out in an adequate and safe manner.

The relevant requirement contained within Clause 16.6 is considered to be;

- *Educational Establishment – Tertiary – 1 space per 2 employees plus 1 space per 5 students.*

Based on these rates and information on student and staff numbers provided by the client the on-site car parking provision requirements for the development can be calculated as follows;

On-site parking provision = 90 students /5 + 10 staff /2= **23 spaces**.

With the development not providing additional car parking, students and staff are likely to park in the existing public parking areas behind and adjacent to the tertiary education centre as shown in ***Figure 2***. However, other users of developments in the area such as Muswellbrook Library, Loxton House and Weidmann Cottage will also utilise these car parks and as such, there needs to be sufficient spaces to cater for the peak parking demand generated by all these land uses. These existing land uses will already be generating a parking demand that can be determined via a parking survey of the existing car park.

Therefore Intersect Traffic undertook a snapshot parking survey of the existing public car parks adjacent to the development site on Thursday 27th February 2014. The summarised results of this survey are shown in **Table 3** below, while the full parking survey results have been reproduced in ***Appendix 3***.

Table 3 – Parking Survey Summarised Results

Car Park	Time	Number Parked Cars	Number of Available Car Parks	Utilisation Rate (%)
Public Off Street Car Parking Areas (126 Car Parks)	11:00	50	76	39
	12:00	56	70	43
	13:00	46	80	36
	14:00	63	63	49
	15:00	54	72	42
	16:30	43	83	33
	17:30	30	96	23

This survey shows that currently the minimum number of available car parks within the public car parking areas during the day is approximately 63 car spaces. These spaces would be available for use by the tertiary education centre. However, the development also results in the loss of 23 car parking spaces, indicating that on completion of the development only 40 car spaces would still be available for use by the tertiary education centre. As the peak parking demand generated by the tertiary education centre i.e. 23 car spaces is less than the likely available parking within the public car parking areas it is concluded that the public car parking areas have sufficient spare capacity to cater for the likely peak parking demand generated by proposed tertiary education centre. There is also still spare capacity to cater for the use of Weidmann Cottage and the availability of on-street car parking in Hill Street (currently only up to 55 % utilised) has not even been considered in this

assessment. It is therefore considered that the provision of additional off street car parking is not required as there is sufficient available public car parking in close proximity to the site.

The public car parking area to be utilised by this development will be accessed via an existing combined entry / exit access crossing and driveway off Hill Street and Brook Street (See ***Photographs 10 and 11***). In accordance with the requirements of Australian Standards *AS 2890.1-2004 Parking Facilities – Off-street car parking* the access to a user class 1 (long term) car parking facility of between 25 and 100 car spaces fronting a local road is required to be a category 1 access (*Table 3.1 of AS 2890.1-2004*). *Table 3.2 of AS 2890.1-2004* specifies a category 1 access facility as a combined entry / exit between 3 and 5.5 metres wide.

Photograph 10 – Vehicular Access to off street parking Hill Street.

Photograph 11 – Vehicular Access to off street parking Brook Street.

The existing accesses to the public car parking areas are both 6 metre wide combined entry / exit accesses therefore they comply with the requirements of *AS2890.1-2004*. Overall it is concluded that the existing access arrangements to the public car parking areas to be utilised by the development are satisfactory.

11.2 Alternate Transport Modes

11.2.1 Public Transport

As mentioned in ***Section 6*** above Osborne Bus Services runs the public transport network in the Muswellbrook area and would service the development.

The existing CBD loop bus service is considered adequate for this development and there would be no requirement for additional or changed services as well as additional public transport infrastructure.

11.2.2 Pedestrian and Cycle Facilities

There are existing concrete paths over the development frontage and these connect to the existing pedestrian refuge on Bridge Street in front of Muswellbrook Library and the traffic signals at the intersection of Bridge Street / Brook Street. There are signalised crossings at this intersection on all legs.

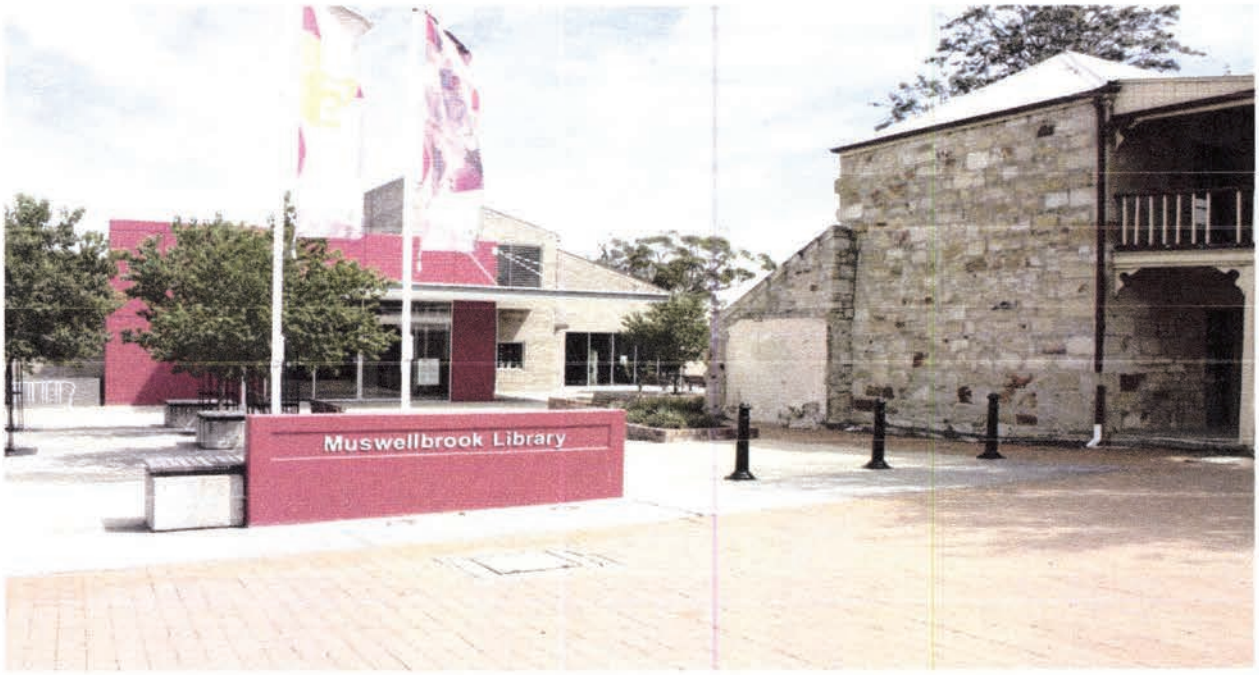
Therefore existing pedestrian facilities in the area are considered satisfactory for the proposed development ensuring as safe as possible passage for pedestrian traffic to and from the development.

Whilst on and off road cyclists facilities in the area are virtually non-existent the level of additional cycle traffic generated by this development is considered low. Therefore apart from the provision of bicycle racks within the development there would appear little nexus to require the provision of additional on or off road cycle infrastructure in the vicinity of the site.

12. CONCLUSIONS

This traffic and parking assessment for the construction of a proposed tertiary education centre on Lots 3 & 4 DP 1122, 85 – 87 Hill Street, Muswellbrook, has concluded the following:

- The proposed development is likely to generate an additional 27vtph during peak traffic periods.
- Both Bridge Street (SH9) and Hill Street has significant spare two way mid-block capacity to cater for additional traffic generated by the proposal without adversely impacting on current levels of service (LOS) experienced by motorists on the roads;
- Sidra analysis of the Bridge Street (SH9) / Hill Street give way controlled cross intersection indicates the additional traffic generated by the proposal does not adversely impact on the operation of this intersection.
- An assessment of the car parking provisions of the Muswellbrook DCP *Chapter 16 – Car parking and access* indicates the proposal is required to provide an additional 23 on-site car parking spaces.
- The proposal does not provide any additional on-site car parking therefore an on-site car parking deficiency exists when assessed against the Muswellbrook DCP.
- It is considered that the provision of additional on-site car parking is not required as there is suitable and available long term public car parking in close vicinity to the site. A parking survey has indicated that the existing public car parking area at the rear of the site is currently under-utilised and even with the loss of 23 car parking spaces as a result of construction of the development would still have sufficient spare capacity to cater for the peak parking demand generated by the development and other land uses in the vicinity of the site.
- The existing CBD loop bus service is considered adequate for this development and there would be no requirement for additional or changed services as well as additional public transport infrastructure.
- Existing pedestrian facilities in the area are considered satisfactory for the proposed development ensuring as safe as possible passage for pedestrian traffic to and from the development.
- Apart from the provision of bicycle racks within the development there would appear little nexus to require the provision of additional on or off road cycle infrastructure in the vicinity of the site.

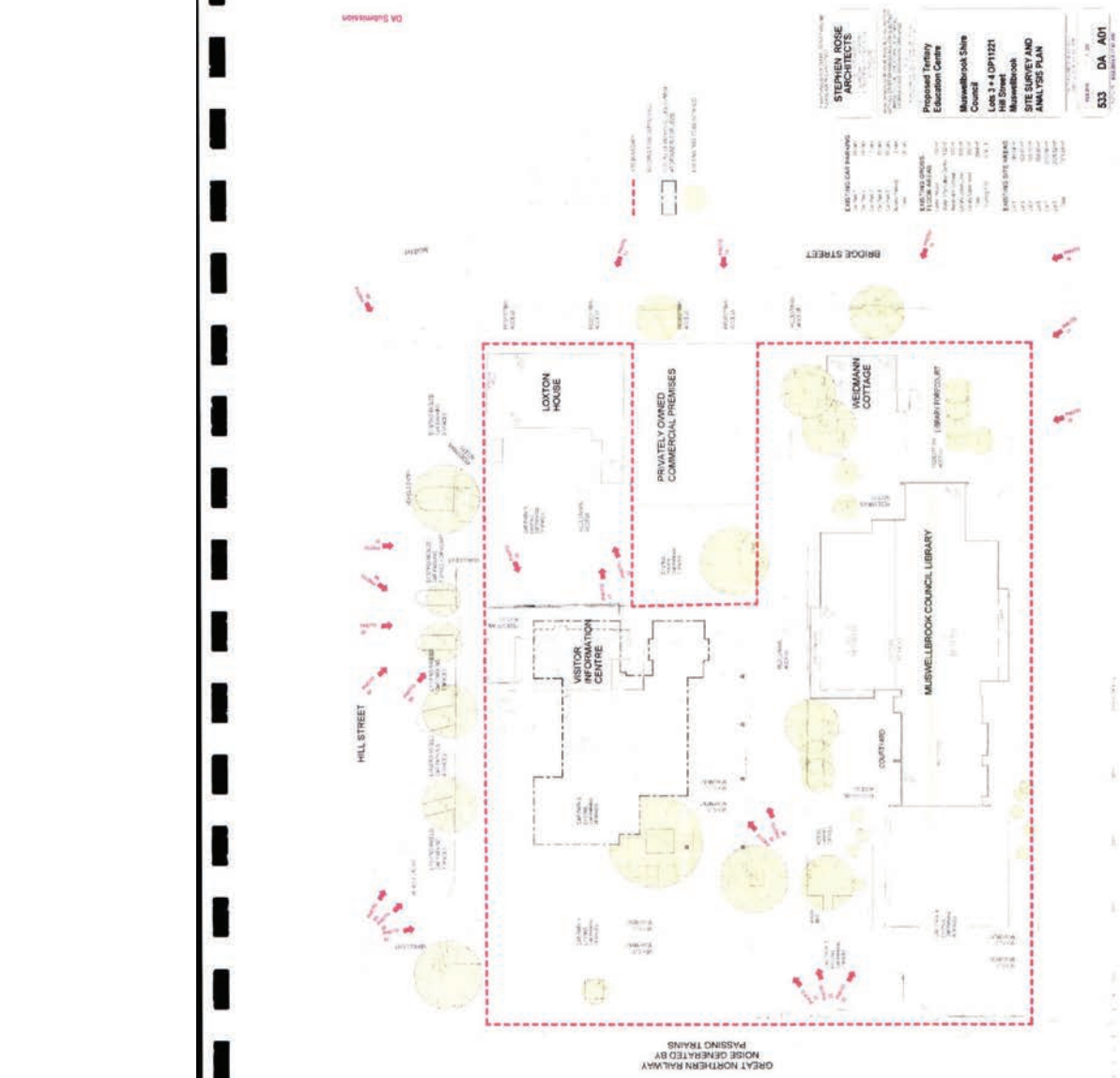


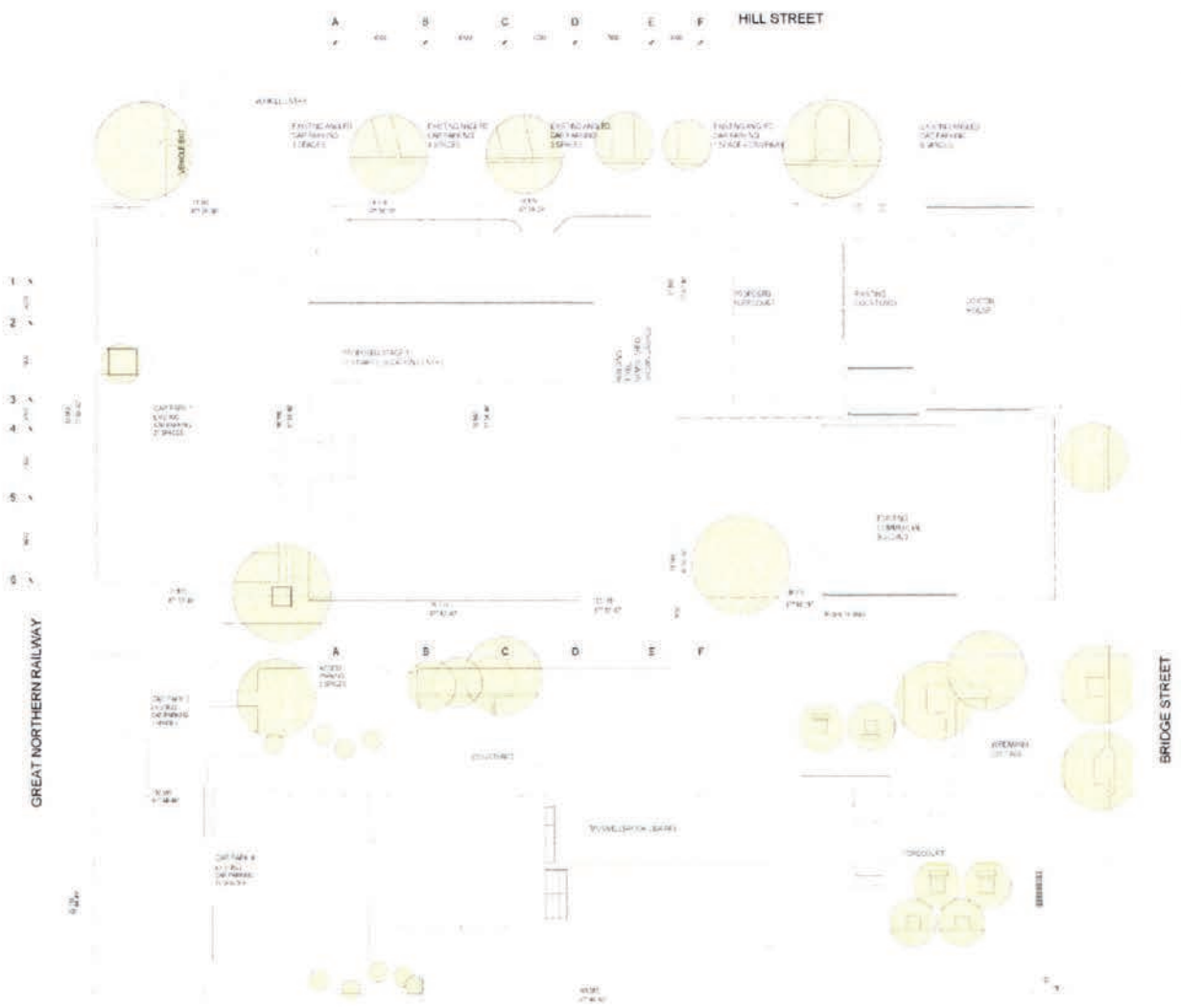
13. RECOMMENDATION

Having carried out this traffic and parking assessment for the construction of a proposed tertiary education centre on Lots 3 & 4 DP 1122, 85 – 87 Hill Street, Muswellbrook it is recommended that the development can be supported from a traffic impact perspective as, subject to Council's support of a variation to its DCP on-site car parking provisions, it will not adversely impact on the local and state road network and complies with all relevant Muswellbrook Council, Australian Standard and RMS requirements.

JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd

APPENDIX 1
DEVELOPMENT PLANS


STEPHEN ROSE ARCHITECTS
Proposed Tertiary Education Centre
Muswellbrook Shire Council
Lots 3 + 4 DP11221
Hill Street
Muswellbrook
SITE SURVEY AND ANALYSIS PLAN
533
DA
A01
BRIDGE STREET
LOXTON HOUSE
PRIVATELY OWNED COMMERCIAL PREMISES
WEIDMANN COTTAGE
VISITOR INFORMATION CENTRE
MUSWELLBROOK COUNCIL LIBRARY
COURTYARD
HILL STREET
GREAT NORTHERN RAILWAY
NOISE GENERATED BY
PASSING TRAINS



Site - Stage 1

PRELIMINARY

PROJECT DETAILS

SITE AREA	
EXISTING BUILDING G F A	
EXISTING SITE COVERAGE - BUILDING	
EXISTING SITE COVERAGE - PARKING	
EXISTING FLOOR SPACE RATIO	
AREA OF BUILDING TO BE DEMOLISHED	
PROPOSED BUILDING G F A	
EXISTING CAR PARKING SPACES	
PROPOSED CAR PARKING SPACES	
PROPOSED SITE COVERAGE - BUILDING	
PROPOSED SITE COVERAGE - PARKING	
PROPOSED FLOOR SPACE RATIO	
NUMBER OF PROPOSED OCCUPANTS	

STEPHEN ROSE ARCHITECTS

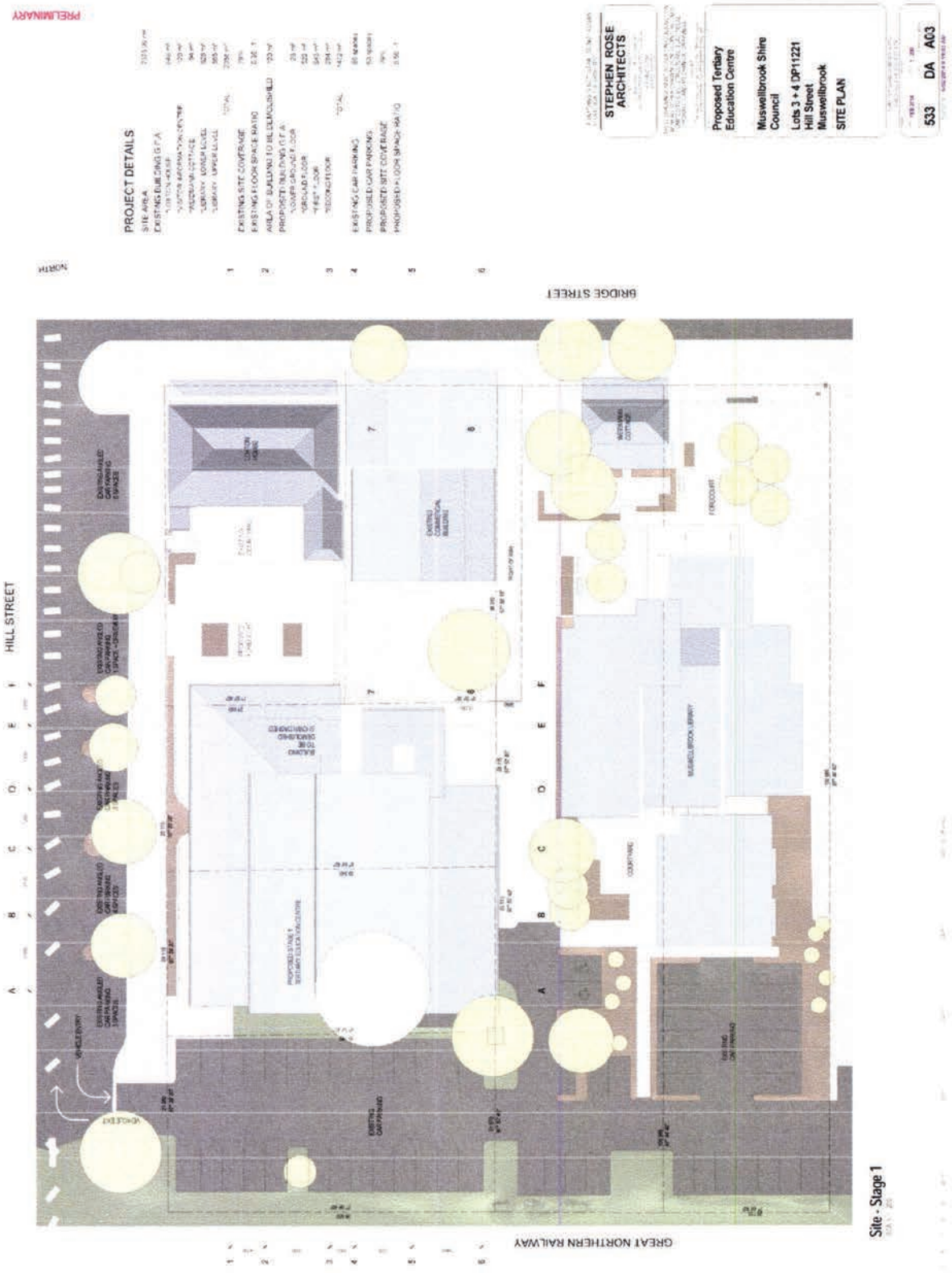
Proposed Tertiary Education Centre

Muswellbrook Shire Council

Lots 3 + 4 DP11221 Hill Street Muswellbrook

SITE PLAN

533 DA A03


PRELIMINARY
PROJECT DETAILS
STEPHEN ROSE ARCHITECTS
Proposed Tertiary Education Centre
Muswellbrook Shire Council
Lots 3 + 4 DP11221 Hill Street Muswellbrook
SITE PLAN
533 DA A03
NORTH
BRIDGE STREET
HILL STREET
GREAT NORTHERN RAILWAY

Site - Stage 1

APPENDIX 2
MANUAL TRAFFIC COUNT FIELD SHEETS

Date	6/03/2013
Day	Thursday
Time	3:00pm - 4:00pm
Weather	
Conducted by	Jeff & Dale

MOVEMENT	1	2	3	4	5	6	7	8	9	10	11	12
3:00 - 3:15	17	131	3	2	1	2	2	106	13	6	0	16
3:15 - 3:30	13	126	3	5	0	4	3	101	14	5	0	21
3:30 - 3:45	10	120	1	0	2	4	5	124	11	9	1	17
3:45 - 4:00	18	137	4	3	0	8	1	106	13	5	0	20
SUM	58	514	11	10	3	18	11	437	51	25	1	74
PEAK	58	514	11	10	3	18	11	437	51	25	1	74

Leg	PHT (vph)
New England Highway North	1056
New England Highway South	1104
Hill Street East	212
Hill Street West	54

APPENDIX 3
SIDRA SUMMARY MOVEMENT TABLES

MOVEMENT SUMMARY

Site: 2014 PM Peak

New England Highway and Hill Street Intersection
2014 PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New England Highway											
1	L	11	5.0	0.139	7.6	LOS A	0.0	0.0	0.00	1.16	41.6
2	T	514	5.0	0.139	1.2	LOS A	0.0	0.0	0.00	0.11	54.5
3	R	58	5.0	0.067	9.9	LOS A	0.3	1.9	0.49	0.72	38.2
Approach		583	5.0	0.139	2.2	NA	0.3	1.9	0.05	0.19	52.0
East: Hill Street											
4	L	74	5.0	0.130	10.2	LOS A	0.4	2.7	0.48	0.75	36.0
5	T	1	5.0	0.184	31.5	LOS C	0.6	4.4	0.87	0.94	19.6
6	R	25	5.0	0.184	32.9	LOS C	0.6	4.4	0.87	0.96	19.4
Approach		100	5.0	0.184	16.1	LOS B	0.6	4.4	0.58	0.80	29.8
North: New England Highway											
7	L	51	5.0	0.137	7.6	LOS A	0.0	0.0	0.00	1.01	46.6
8	T	437	5.0	0.137	1.6	LOS A	1.2	9.0	0.32	0.00	54.2
9	R	11	5.0	0.137	10.7	LOS A	1.2	9.0	0.60	1.01	48.3
Approach		499	5.0	0.137	2.4	NA	1.2	9.0	0.29	0.13	53.4
West: Hill Street											
10	L	18	5.0	0.121	19.4	LOS B	0.4	2.9	0.72	0.83	19.9
11	T	3	5.0	0.121	18.2	LOS B	0.4	2.9	0.72	0.85	20.2
12	R	10	5.0	0.121	20.2	LOS B	0.4	2.9	0.72	0.90	21.9
Approach		31	5.0	0.121	19.5	LOS B	0.4	2.9	0.72	0.86	20.6
All Vehicles		1213	5.0	0.184	3.9	NA	1.2	9.0	0.21	0.23	49.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

Processed: Monday, 10 March 2014 9:28:51 AM
SIDRA INTERSECTION 5.1.13.2093
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SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2024 PM Peak

New England Highway and Hill Street Intersection
2024 PM Peak
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New England Highway											
1	L	17	5.0	0.154	7.6	LOS A	0.0	0.0	0.00	1.14	41.6
2	T	565	5.0	0.154	1.2	LOS A	0.0	0.0	0.00	0.11	54.5
3	R	64	5.0	0.078	10.3	LOS A	0.3	2.2	0.51	0.74	37.8
Approach		646	5.0	0.154	2.3	NA	0.3	2.2	0.05	0.20	51.8
East: Hill Street											
4	L	81	5.0	0.148	10.6	LOS A	0.4	3.2	0.51	0.78	35.5
5	T	1	5.0	0.258	41.7	LOS C	0.8	6.2	0.91	0.98	16.5
6	R	28	5.0	0.258	43.2	LOS D	0.8	6.2	0.91	0.99	16.3
Approach		110	5.0	0.256	19.1	LOS B	0.8	6.2	0.61	0.83	27.6
North: New England Highway											
7	L	56	5.0	0.151	7.6	LOS A	0.0	0.0	0.00	1.01	48.6
8	T	481	5.0	0.151	1.9	LOS A	1.4	10.6	0.33	0.00	53.9
9	R	13	5.0	0.151	11.2	LOS A	1.4	10.6	0.63	1.03	47.9
Approach		550	5.0	0.151	2.7	NA	1.4	10.6	0.31	0.13	53.2
West: Hill Street											
10	L	24	5.0	0.366	34.8	LOS C	1.3	9.8	0.85	1.03	13.4
11	T	3	5.0	0.366	33.6	LOS C	1.3	9.8	0.85	0.99	13.5
12	R	31	5.0	0.366	35.6	LOS C	1.3	9.8	0.85	1.01	15.0
Approach		58	5.0	0.366	35.2	LOS C	1.3	9.8	0.85	1.02	14.3
All Vehicles		1364	5.0	0.366	5.2	NA	1.4	10.6	0.23	0.26	47.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2014 PM Peak - with development

New England Highway and Hill Street Intersection
2014 PM Peak - With Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New England Highway											
1	L	15	5.0	0.140	7.6	LOS A	0.0	0.0	0.00	1.14	41.6
2	T	514	5.0	0.140	1.2	LOS A	0.0	0.0	0.00	0.11	54.5
3	R	58	5.0	0.067	9.9	LOS A	0.3	1.9	0.49	0.72	38.2
Approach		587	5.0	0.140	2.2	NA	0.3	1.9	0.05	0.20	51.9
East: Hill Street											
4	L	74	5.0	0.130	10.2	LOS A	0.4	2.7	0.48	0.75	36.0
5	T	1	5.0	0.186	31.8	LOS C	0.6	4.4	0.87	0.94	19.5
6	R	25	5.0	0.186	33.3	LOS C	0.6	4.4	0.87	0.96	19.3
Approach		100	5.0	0.186	16.2	LOS B	0.6	4.4	0.58	0.80	29.8
North: New England Highway											
7	L	51	5.0	0.137	7.6	LOS A	0.0	0.0	0.00	1.01	48.6
8	T	437	5.0	0.137	1.6	LOS A	1.2	9.0	0.32	0.00	54.2
9	R	12	5.0	0.137	10.7	LOS A	1.2	9.0	0.60	1.01	48.3
Approach		500	5.0	0.137	2.4	NA	1.2	9.0	0.29	0.13	53.4
West: Hill Street											
10	L	22	5.0	0.267	26.4	LOS B	0.9	6.9	0.80	0.96	16.3
11	T	3	5.0	0.267	25.2	LOS B	0.9	6.9	0.80	0.93	16.5
12	R	28	5.0	0.267	27.2	LOS B	0.9	6.9	0.80	0.96	16.1
Approach		53	5.0	0.267	26.8	LOS B	0.9	6.9	0.80	0.96	17.3
All Vehicles		1240	5.0	0.267	4.5	NA	1.2	9.0	0.22	0.25	46.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

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SIDRA INTERSECTION

APPENDIX 4
PARKING SURVEY – 27/02/2014

Car Park	Time	Number Parked Cars	Number of Available Car Parks	Utilisation Rate (%)
Balance Council (38 Car Parks)	11:00	13	25	34
	12:00	14	24	37
	13:00	8	30	21
	14:00	13	25	34
	15:00	12	26	32
	16:30	10	28	26
	17:30	12	26	32
Visitor Centre (51 Car Parks)	11:00	10	41	20
	12:00	14	37	27
	13:00	12	39	24
	14:00	17	34	33
	15:00	13	38	25
	16:30	10	41	20
	17:30	1	50	2
Library (27 Car Parks)	11:00	10	17	37
	12:00	11	16	41
	13:00	7	20	26
	14:00	13	14	48
	15:00	14	13	52
	16:30	9	18	33
	17:30	8	19	30
Loxton House (10 Car Parks)	11:00	3	7	30
	12:00	4	6	40
	13:00	7	3	70
	14:00	4	6	40
	15:00	3	7	30
	16:30	2	8	20
	17:30	3	7	30
Hill Street (29 Car Parks)	11:00	14	15	48
	12:00	13	16	45
	13:00	12	17	41
	14:00	16	13	55
	15:00	12	17	41
	16:30	12	17	41
	17:30	6	23	21