Tweed Valley Hospital

Traffic Impact Assessment Review

80019043

Prepared for

TAFE NSW

28 November 2018

Cardno

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Table of Contents

Tables

Figures

1 Introduction

Cardno has been commissioned by TAFE NSW to carry out an independent peer review of the Traffic Impact Assessment as a part of the State Significant Application for the new Tweed Valley Hospital which was prepared by Bitzios Consulting.

The following documents have been reviewed as part of this peer review:

- P3378.005R Tweed Valley Hospital Project Traffic Impact Assessment report, Bitzios Consulting (18th October 2018)

Cardno has reviewed these documents to ensure it meets the typical objectives of a transport assessment, and provide the findings and recommendations for further study or clarification. The objectives of the aforementioned documents are to investigate the proposed development with regard to the following:

- Identify the traffic and transport impact of the proposed development;
- Identify the number of trips and likely travel modes associated with the proposed land uses;
- Assess the impact the development will have on the capacity of the road system, in particular on intersections;
- Assess any potential impacts that the proposed hospital development might impose on Kingscliff's TAFE site;
- Accessibility to public transport and other transport modes;
- Review the number of off-street parking spaces required to support the development; and
- Identify measures to limit the impact the development will make on the transport network.

1.1 Scope of works

The objective of this report is to prepare a technical report presenting the findings from the peer review of the Transport Impact Assessment and the Traffic Modelling Report (with associated AIMSUN model).

The documents have been reviewed to assess the:

- Traffic trip generation rates applied;
- Car park and cycling, revision of parking rates applied;
- Public Transport accessibility and connectivity approach; and
- Cumulative traffic and parking impacts.

1.2 Study Area

The project site is located off Cudgen Road between Tweed Coast Road and Turncock Street. The project site is currently zoned as RU1 Primary Production and includes a small section of R1 General Residential along the eastern boundary. The Project Site currently includes a single detached dwelling, sheds and is used for agricultural purposes. The site's location is shown in **Figure 1-1** below.

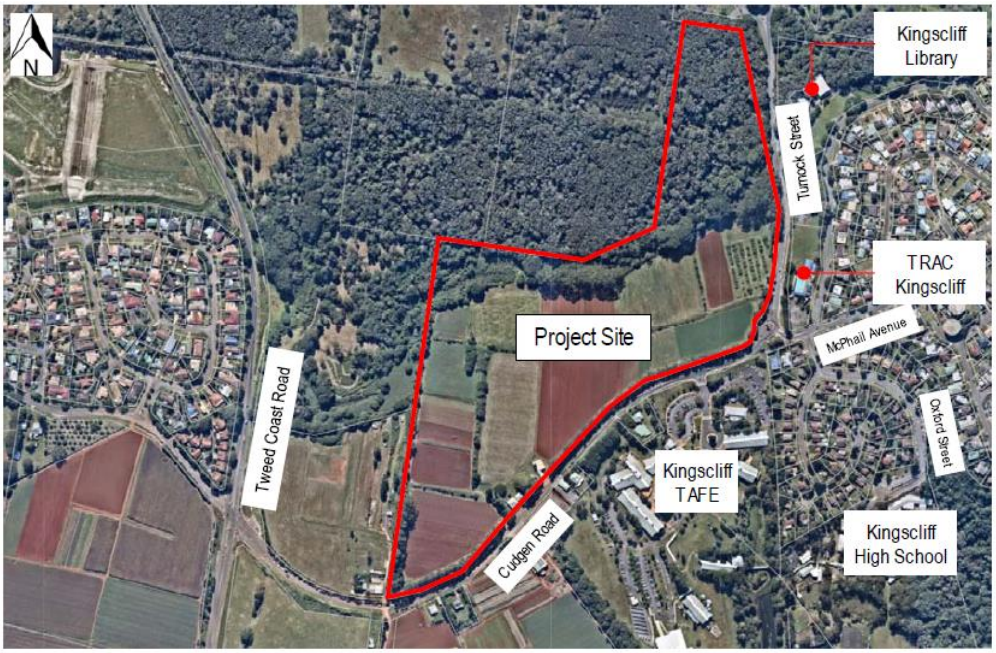

Figure 1-1 Site Location

*Source: Tweed Valley Hospital Project Traffic Impact Assessment Report

1.3 Assumptions and exclusions

The following assumptions and exclusions have been considered while undertaking this peer review:

- No review was made on traffic surveys, traffic modelling, site visits, cost estimates or engineering feasibility of infrastructure recommendations;
- The review is limited to the information available on Department of Planning's website. This does not include any intersection modelling files.
- SIDRA intersection modelling was only reviewed at an overall level and hence model parameters, signal phasing etc were not reviewed.

1.4 Reference documents

As part of this peer assessment, Cardno has reviewed the following documents:

- P3378.005R Tweed Valley Hospital Project Traffic Impact Assessment report, Bitzios Consulting (18th October 2018);
- Tweed Shire Local Environmental Plan (LEP);
- Tweed Development Control Plan (DCP);
- RMS Guide to Traffic Generating Developments (2002); and
- Technical Direction TDT 2013/04a – Guide to Traffic Generating Developments Update

1.5 Report structure

The structure of this report is summarised below:

Part 1 - **Introduction:** Specifies an introduction to this document, including report structure, scope of works and reference documents.

Part 2 - **Review of Tweed Valley Hospital Traffic Impact Assessment:** A review of the P3378.005R Tweed Valley Hospital Traffic Impact Assessment report including trip generation rates, public transport review, travel patterns, car park assessment, modelling results, assumptions, inputs and set up and impacts to the road network.

Part 3 - **Summary of findings and conclusion**: Specifies an overall summary of the review and key items raised that require further assessment.

2 Review of Tweed Valley Hospital Traffic Impact Assessment

Table 2-1 Summary of Review

<table>
<tr><th colspan="3">Review of Tweed Valley Hospital Traffic Impact Assessment</th></tr>
<tr><th>Section Reference</th><th>Summary</th><th>Cardno Comment</th></tr>
<tr><td>3.7.4 Tweed Coast Road / Cudgen Road signalized intersection</td><td>Table 3.6 summarizes SIDRA results for the 2023 background (existing) scenarios</td><td>It was noted that the summary results for the 2023 background scenario in the PM peak at Tweed Coast Rd / Cudgen Rd (overall LoS D) does not match the summary results attached in appendix D that specifies a LoS performance of E. This should be reviewed and updated in the report.
<table>
<tr><th rowspan="2">Approach</th><th colspan="5">Year 2023 AM Peak</th><th colspan="4">Year 2023 PM Peak</th></tr>
<tr><th>OD Movement</th><th>DOS</th><th>Ave Delay (s)</th><th>LOS</th><th>95%ile Queue (m)</th><th>DOS</th><th>Ave Delay (s)</th><th>LOS</th><th>95%ile Queue (m)</th></tr>
<tr><td rowspan="4">South: Tweed Coast Road (S)</td><td>L1</td><td>0.428</td><td>39.8</td><td>LOS C</td><td>72.6</td><td>0.428</td><td>39.8</td><td>LOS C</td><td>72.6</td></tr>
<tr><td>T1</td><td>0.897</td><td>48.9</td><td>LOS D</td><td>180.1</td><td>0.897</td><td>48.9</td><td>LOS D</td><td>180.1</td></tr>
<tr><td>R3</td><td>0.804</td><td>44.6</td><td>LOS D</td><td>100.6</td><td>0.804</td><td>44.6</td><td>LOS D</td><td>100.6</td></tr>
<tr><td>Approach</td><td>0.897</td><td>47.2</td><td>LOS D</td><td>180.1</td><td>0.897</td><td>47.2</td><td>LOS D</td><td>180.1</td></tr>
<tr><td rowspan="4">SouthEast: Cudgen Road (SE)</td><td>L3</td><td>0.095</td><td>8.8</td><td>LOS A</td><td>9.2</td><td>0.095</td><td>8.8</td><td>LOS A</td><td>9.2</td></tr>
<tr><td>T1</td><td>0.277</td><td>39.8</td><td>LOS C</td><td>39.4</td><td>0.277</td><td>39.8</td><td>LOS C</td><td>39.4</td></tr>
<tr><td>R1</td><td>0.938</td><td>73.7</td><td>LOS F</td><td>197.5</td><td>0.938</td><td>73.7</td><td>LOS F</td><td>197.5</td></tr>
<tr><td>Approach</td><td>0.938</td><td>54.7</td><td>LOS D</td><td>197.5</td><td>0.938</td><td>54.7</td><td>LOS D</td><td>197.5</td></tr>
<tr><td rowspan="4">North: Tweed Coast Road (N)</td><td>L1</td><td>0.939</td><td>69.7</td><td>LOS E</td><td>261</td><td>0.939</td><td>69.7</td><td>LOS E</td><td>261</td></tr>
<tr><td>T1</td><td>0.489</td><td>38.1</td><td>LOS C</td><td>86.7</td><td>0.489</td><td>38.1</td><td>LOS C</td><td>86.7</td></tr>
<tr><td>R3</td><td>0.073</td><td>23.9</td><td>LOS B</td><td>5.9</td><td>0.073</td><td>23.9</td><td>LOS B</td><td>5.9</td></tr>
<tr><td>Approach</td><td>0.939</td><td>58.1</td><td>LOS E</td><td>261</td><td>0.939</td><td>58.1</td><td>LOS E</td><td>261</td></tr>
<tr><td rowspan="4">NorthWest: Cudgen Road (NW)</td><td>L3</td><td>0.071</td><td>20.4</td><td>LOS B</td><td>10.5</td><td>0.071</td><td>20.4</td><td>LOS B</td><td>10.5</td></tr>
<tr><td>T1</td><td>0.947</td><td>71.4</td><td>LOS F</td><td>62</td><td>0.947</td><td>71.4</td><td>LOS F</td><td>62</td></tr>
<tr><td>R1</td><td>0.947</td><td>82.4</td><td>LOS F</td><td>62</td><td>0.947</td><td>82.4</td><td>LOS F</td><td>62</td></tr>
<tr><td>Approach</td><td>0.947</td><td>60.4</td><td>LOS E</td><td>62</td><td>0.947</td><td>60.4</td><td>LOS E</td><td>62</td></tr>
<tr><td>All Vehicles</td><td></td><td>0.947</td><td>53.6</td><td>LOS D</td><td>261</td><td>0.947</td><td>53.6</td><td>LOS D</td><td>261</td></tr>
</table></td></tr>
<tr><td>3.7.5 Cudgen Road / Kingscliff TAFE Access</td><td>The traffic report identifies the intersection as a 'seagull intersection', where traffic exiting the TAFE to travel eastbound towards the roundabout does so in two stages. Stage 1 is where exiting vehicles giveway to westbound and right turning vehicles on Cudgen Road whilst Stage 2 is where the exiting vehicle is within the storage / acceleration eastbound lane looking to merge with eastbound traffic on Cudgen Road.

The Cudgen Rd / Kingscliff TAFE access intersection has been modelled in SIDRA as 2 separate intersections due to the intersection’s</td><td>While this is technically true, it is understood that in practice the vast majority of drivers exiting the TAFE to travel eastbound on Cudgen Rd treat this as a normal T intersection (i.e. waiting for a simultaneous gap in both the eastbound and westbound movement along Cudgen Road).

This is likely as a result of eastbound vehicles on Cudgen Road merging into the centre lane to then turn right or travel through at the Cudgen Road / Turnock Street roundabout. As well as TAFE vehicles looking to merge to the kerbside lane as quickly as possible to avoid potential delays in the</td></tr>
</table>

Review of Tweed Valley Hospital Traffic Impact Assessment		
Section Reference	**Summary**	**Cardno Comment**
	geometry using the network function. Additionally, the TAFE approach is modelled as two approach lanes based on an observed width capable of accommodating two vehicles at the hold line.	centre lane associated with the upstream roundabout. The utilisation of the centre lane (storage / acceleration lane under a seagull intersection layout) should be reviewed and reflected in the SIDRA modelling. Furthermore, the two lane approach from the TAFE outbound lanes should be confirmed through a review of current driver behavior to establish if left turning vehicles are separate from the right turning vehicles as indicated in the SIDRA model. Given the close proximity of the Cudgen Road / Turnock Street roundabout to the TAFE intersection (~115m), a SIDRA network assessment should be undertaken to capture the potential influence of queueing from the roundabout, back to the TAFE site.
4.4.1 Car Parking Requirements and Provision & 4.4.4 Bicycle Parking Requirements and Provision	Car parking and bicycle parking rates are based on Council's DCP parking requirements and RMS Guide	While a total number of required car parking spaces was determined, no form of reference/consideration has been given to the number of disabled parking spaces. The proposal outlines that on-site parking facilities will operate under a car parking management plan and paid parking scheme. Given the Cudgen Road prohibits on-street parking, there is a high chance that staff and visitors will utilise the TAFE campus parking (which is currently free). The car parking management is a significant aspect for any hospital, with details around compliance and enforcement should be provided as part of the Stage 1 application to provide a degree of certainty to potentially affected properties, including the TAFE campus. If parking intrusion from the hospital within the TAFE campus occurs, an

<table>
<tr><th colspan="3">Review of Tweed Valley Hospital Traffic Impact Assessment</th></tr>
<tr><th>Section Reference</th><th>Summary</th><th>Cardno Comment</th></tr>
<tr><td></td><td></td><td>unnecessary burden will be placed on the TAFE campus to rectify and police the issue at its own expense and maintenance cost (e.g installation of boom gates and ticketed parking system).</td></tr>
<tr><td>5.2.1 Tweed Valley Hospital Traffic Generation</td><td>Traffic generation is based on the RMS Guide (2002) trip rates.</td><td>It is understood based on previous dealings with RMS / Transport for New South Wales (TfNSW) that the RMS Guide (2002) will be updated / superseded with new trip rates based on more recent comparative surveys.

The current version of the draft guideline provides the following peak hour trip generation for a Low Accessibility site:

AM Peak = 0.41 (Staff) + 0.62 (Beds)

PM Peak = 0.59 (Staff) + 0.05 (Beds)

Comparing the above rates to the traffic generation calculation adopted in the traffic assessment is shown below:
<table>
<tr><th>Proposal</th><th>Period</th><th>Traffic Report</th><th>Draft Guide</th></tr>
<tr><td rowspan="2">430 beds and 1,050 staff (ASDS)</td><td>AM Peak</td><td>255</td><td>698</td></tr>
<tr><td>PM Peak</td><td>525</td><td>641</td></tr>
</table>
Based on the above, it is evident that the submitted traffic report may underestimate the traffic generation potential of the site, particularly during the morning peak period. A comparative survey of a similar hospital site in the region would most likely provide a more reliable result.</td></tr>
</table>

Review of Tweed Valley Hospital Traffic Impact Assessment		
Section Reference	**Summary**	**Cardno Comment**
		Additionally, the traffic report makes mention of additional car parking and facilities (Section 4.4.1) as follows: "While not proposed as part of this application, the site layout and future planning caters for additional parking provision in the form of overflow parking on the site to the north-east of the main building (prior to the provision of allied health and other ancillary land uses being provided)." It is unclear if the intersection design and upgrades will be sufficient to cater for the potential increase in parking and additional floor area of other medical facilities to ensure the intersection are future proof. There is an opportunity for Health Infrastructure and Council to detail the likely ultimate requirements and funding mechanism for other development applications to future proof the road corridor.
5.2.2 Tweed Valley Hospital Traffic Splits	Traffic splits of 70%:30%, 30%:70% were assumed for the morning (MVT) and evening peak (PVT)	No clarifications has been documented on the IN/OUT split choice assumptions. It is unclear if the intersection performance will be sensitive to potential changes in the inbound / outbound floor rate and if infrastructure upgrades may change.
5.3.3 Tweed Coast Road / Cudgen Road Signalized Intersection	Table 5.8 summarises SIDRA results for Upgrade 2 for MVT and EVT design traffic volumes (2023)	SIDRA intersection results seems to be identical between the Upgrade 2 2023 AM (MVT) and 2023 PM (EVT) scenarios, which conflicts with Appendix D results (2023 Design MVT (AM) results show LoS C not B). This should be reviewed and updated in the report.

Review of Tweed Valley Hospital Traffic Impact Assessment

Section Reference	Summary	Cardno Comment

Approach	Year 2023 AM Peak - MVT					Year 2023 PM Peak - EVT				
	OD Movement	DOS	Ave Delay (s)	LOS	95%ile Queue (m)	DOS	Ave Delay (s)	LOS	95%ile Queue (m)
South: Tweed Coast Road (S)	L1	0.511	31.7	LOS C	42	0.511	31.7	LOS C	42
	T1	0.511	27.2	LOS B	42.3	0.511	27.2	LOS B	42.3
	R3	0.599	26.5	LOS B	29.2	0.599	26.5	LOS B	29.2
	Approach	0.599	27.1	LOS B	42.3	0.599	27.1	LOS B	42.3
SouthEast: Cudgen Road (SE)	L3	0.227	10.5	LOS A	21	0.227	10.5	LOS A	21
	T1	0.876	37	LOS C	118	0.876	37	LOS C	118
	R1	0.876	41.2	LOS C	120.8	0.876	41.2	LOS C	120.8
	Approach	0.876	33.6	LOS C	120.8	0.876	33.6	LOS C	120.8
North: Tweed Coast Road (N)	L1	0.621	12.3	LOS A	54	0.621	12.3	LOS A	54
	T1	0.856	33.3	LOS C	97.2	0.856	33.3	LOS C	97.2
	R3	0.17	23	LOS B	9.6	0.17	23	LOS B	9.6
	Approach	0.856	23.5	LOS B	97.2	0.856	23.5	LOS B	97.2
NorthWest: Cudgen Road (NW)	L3	0.053	12.9	LOS A	4.4	0.053	12.9	LOS A	4.4
	T1	0.508	35.4	LOS C	21	0.508	35.4	LOS C	21
	R1	0.508	40.2	LOS C	21	0.508	40.2	LOS C	21
	Approach	0.508	31.1	LOS C	21	0.508	31.1	LOS C	21
All Vehicles		**0.876**	**28.2**	**LOS B**	**120.8**	**0.876**	**28.2**	**LOS B**	**120.8**

3 Summary of findings and conclusion

Cardno has been commissioned by TAFE NSW (Kingscliff site) to undertake an independent peer review of a Traffic Impact Assessment, prepared by Bitzios Consulting, to support the State Significant Infrastructure proposal for the new Tweed Valley Hospital.

As a result of the review, Cardno has identified the following key items which require further consideration:

- Intersection modelling of the Cudgen Road / TAFE access to reflect actual driver behaviour, as well as network operation with regards to nearby roundabout performance
- Clarification and further justification for the traffic generation rates adopted
- Clarification that the proposed upgrades are suitable for the overall hospital and medical precinct (i.e. future proofing)
- Car parking management and enforcement to ensure parking infiltration into the TAFE site does not occur.