



Appendix C

Traffic Assessment

File Name	Prepared	Reviewed	Issued by	Date	Issued to
P3378.001T Tweed Valley Hospital – Traffic Assessment for Modification to Concept Proposal DRAFT	J. Walden-Goodlet	A. Eke	J. Walden-Goodlet	08/08/19	TSA Management (via email) Geolink (via Aconex)
P3378.001T Tweed Valley Hospital – Traffic Assessment for Modification to Concept Proposal	J. Walden-Goodlet	A. Eke	J. Walden-Goodlet	13/09/19	TSA Management (via email) Geolink (via Aconex)
P3378.002T Tweed Valley Hospital – Traffic Assessment for Modification to Concept Proposal	J. Walden-Goodlet	A. Eke	J. Walden-Goodlet	23/09/19	TSA Management (via email) Geolink (via Aconex)

Tweed Valley Hospital

Traffic Assessment for Modification to Concept Proposal

1. Introduction

1.1 Background

On the 11 June 2019 the Minister for Planning and Public Spaces granted approval for the Concept Proposal and Stage 1 Early and Enabling Works for the new Tweed Valley Hospital (SSD 18_9575) located at 771 Cudgen Road, Cudgen (Lot 11 DP1246853).

This technical note has been prepared on behalf of NSW Health Infrastructure in support of a Modification Application to SSD 18_9575 (Concept Plan and Stage 1 Early and Enabling Works). This technical note for the Modification Application should be read in conjunction with the Stage 2 Traffic Impact Assessment submitted with the Stage 2 SSD application and EIS.

1.2 Summary of Proposed Modifications

The proposed modifications are summarised as follows:

- **Multi-deck Car Park** – change of the two approved at grade car parks on the south-western side of the main Hospital building to a multi-deck car park. The multi-deck car park is proposed to cater for additional parking provision following a car parking demand study undertaken for Stage 2 of the Tweed Valley Hospital. The multi-deck car park also caters for improved accessibility and pedestrian amenity and offers higher quality car parking (covered and secure)
- **Car Parking and Internal Road Layout** – the proposed layout is generally consistent with the approved concept layout in terms of car parking and internal road layout, however the following minor changes are proposed:
 - Consolidation of the two separate at-grade car parks to the east of the main Hospital building into a single at-grade car park for public use (noting the proposed multi-deck car park on the south-western side which offers an increased supply of car parking in a consolidated location)
 - Changes to internal connectivity of the road layout. Specifically, all staff access is proposed via access A and D, which limits unnecessary vehicle movements and circulation through the main Hospital drop-off / pick-up areas and high pedestrian activity areas on the site and limitation of public access to Access B and C only which removes public vehicle movements from the internal service ring road, therefore separating public vehicle movements from service vehicles and ambulances
- **Staff and Bed Numbers** – the concept approval is for 430 day and overnight beds and was assessed with an estimated 1,050 staff on-site during the day shift (ASDS). Following a review of bed and staff requirements by NSW Health Infrastructure, the

following is proposed as part of the Stage 2 SSD application and therefore modification to the Concept Proposal is sought for consistency:

- 391 overnight and day only beds by Year 2023 and approximately 1,120 staff on-site during the day shift (ASDS),
- 443 overnight and day only beds by Year 2033 and approximately 1,300 staff on-site during the day shift (ASDS)
- approval for an additional 56 inpatient unit beds is also being sought to accommodate future demand post 2033 (although subject to separate business cases and funding). This scenario includes a total of 499 overnight and day only beds and approximately 1,330 staff on-site during the day shift (ASDS) by Year 2033

These overnight and day only bed numbers (excluding emergency beds - which is consistent with the original Concept Proposal traffic assessment) and number of staff on-site during the day shift have been used for the traffic and parking assessment that supports the Stage 2 SSD application.

- **Support Buildings** – minor modification to Health Hub envelope these will cater for Oral Health, Community Health, Aboriginal Health, Administration and Education, Training and Research. It is understood that the staffing review undertaken by the Local Health District (LHD) considers the overall staffing requirements and therefore the support buildings and services do not result in additional staffing demands as identified in the report. It is noted that an area for “Support” is nominated on the approved Concept masterplan. The location of the Support Buildings is consistent with this.
- **Temporary Skills Centre** – construction of a temporary skills centre on-site for the purpose of hospital prototype rooms and short-term training associated with the Kingscliff TAFE. Once the hospital is operational the skills centre will be removed from the site and any associated training will occur at the Kingscliff TAFE Campus.

The revised Concept Masterplan with the proposed Modifications is included in Appendix A of the Modification Report (note that detailed design of these elements is applicable to the Stage 2 SSD application and EIS).

2. Traffic and Accessibility Assessment

2.1 Parking Provision

Under the Conditions of Approval for the Concept Proposal the Hospital requires "provision of approximately 700 car spaces for the users and the staff members within the public and staff car parking areas and a minimum of 43 bicycle spaces". This was based on Council's Section A2 - Site Access and Parking Code which nominates car and bicycle parking requirements based on hospital bed numbers. Since completion of the Traffic Assessment for the Concept Proposal and Stage 1 Early and Enabling Works a Car Parking Demand Study has been undertaken. This identified a total parking demand in the order of 1,201 car parking spaces in Year 2023/2024, 1,378 car parking spaces in Year 2026/2027 and 1,528 parking spaces in Year 2031/2032.

Change of the approved at-grade car parks on the south-western side of the main Hospital building to a multi-deck car park and consolidation of the two separate at-grade car parks to the east of the main Hospital building into a single at-grade car park will ultimately cater for a parking provision of 1,538 spaces. A minimum of 1,201 car parking spaces will be provided at year of opening, catering for the 2023/2024 parking demand. In this regard, with the multi-deck car park proposed as part of this Modification the car parking provision

generally aligns with the recommendations for the site as identified in the Car Parking Demand Study.

The proposed split-level configuration within the multi-deck car park allows for flexibility in the allocation between staff and visitors over time by way of changing the internal separators and therefore parking allocation to cater for demands.

A detailed assessment of demands, provision and allocation of car parking is presented in the Tweed Valley Hospital Stage 2 Traffic Impact Assessment which has been prepared for Stage 2 Hospital Main Works and Operation of the Tweed Valley Hospital.

2.2 Car Parking Design Compliance

Hospital carparking is classified as User Class 3 under Australian Standards Parking Facilities (AS2890). The multi-deck car park generally complies with the requirements of AS2890 for User Class 3 facilities (2.6m wide by 5.4m long bays with minimum 5.8m wide parking aisles).

Some small car bays have been provided. This is consistent with other hospital multi-deck car parks (e.g. Gold Coast University Hospital) to maximise parking numbers within constrained area of the car park. These bays require clear annotation on the limitation for vehicle size.

It is noted that Stage 1 is a concept proposal only and does not include detailed car parking geometry as part of the masterplan. A detailed of car parking geometry is presented in the Tweed Valley Hospital Stage 2 Traffic Impact Assessment which has been prepared for Stage 2 Hospital Main Works and Operation of the Tweed Valley Hospital.

2.3 Car Parking Circulation and Way Finding

The internal car parking layout of the proposed multi-deck provides a logical two-way circulating ramp format which is separated for both the staff and visitor car parks. Access and egress are located for each car parking area on the bottom levels.

The proposed changes to internal connectivity of the road layout simplifies the circulation and way finding throughout the site (particularly for visitors / the public) by restricting all staff, service vehicle and ambulance movements to Accesses A and D and restricting public movements to Access B and C only. This removes confusion for the general public who do not need to travel on the internal service ring road connecting Access A and D. It also removes unnecessary vehicle movements and circulation through the main Hospital drop-off / pick-up areas and high pedestrian activity areas on the site.

The changes to circulation will be supplemented by an external Way Finding Signage Plan which is included as part of the Tweed Valley Hospital Stage 2 Traffic Impact Assessment which has been prepared for Stage 2 Hospital Main Works and Operation of the Tweed Valley Hospital. An internal way finding strategy has also been prepared as part of the Stage 2 EIS.

2.4 Access Location and Form

No change to the four access locations or form of accesses is proposed as part of this Modification Application.

2.5 Servicing Considerations

No change to servicing provision or operations is proposed as part of this Modification Application.

2.6 Traffic Generation

The increase in day and overnight beds and staff on-site during the day shift (ASDS) results in an increase in traffic generated by the Hospital in the ultimate scenario (Year 2033). It is understood that staff and overall demand for the support hub is catered for in service planning for the overall hospital and is therefore an ancillary component. Similarly, the Temporary Skills Centre will cater for students from the adjacent TAFE and its use is short-term in nature only, with parking to be provided in association with the construction parking for Stage 2 Main Works (it is expected that the Skills Centre would be removed/relocated from the hospital site toward the end of the Stage 2 Main Works period and therefore would not affect the hospital's operational parking

The Roads and Maritime Service (RMS) Guide to Traffic Generating Developments was used to calculate the Project's peak hour traffic generation. The RMS guide specifies three peak period traffic generation rates for hospitals as follows:

- Vehicle Trip Generation in the Morning Commuter Peak Hour (MVT) – this provides an indication of development traffic generation during the typical morning peak hour which typically occurs around 8am – 9am;
- Vehicle Trip Generation in the Evening Commuter Peak Hour (EVT) – this provides an indication of development traffic generation during the typical evening peak hour which typically occurs around 5pm – 6pm; and
- Peak Vehicle Trips (PVT) – this provides an indication of peak development traffic generation. While the time was found to vary, the most common time for the PVT to occur was 3pm-4pm. The PVT incorporates a staff shift change.

The MVT, EVT and PVT traffic volumes for the Project (as modified) are presented in Table 2.1.

Table 2.1: Tweed Valley Hospital Traffic Generation (Peak Hour)

Land Use	Year	Yield	Peak	Peak Hour Trip Rate	Peak Hour Trips
Hospital	2023	391 beds and 1,120 staff (ASDS)	MVT	$MVT = -10.21 + 0.47B + 0.06ASDS$	241
			EVT	$EVT = -2.84 + 0.25B + 0.4ASDS$	543
			PVT	$PVT = -14.69 + 0.69B + 0.31ASDS$	602
	2033	443 beds and 1,300 staff (ASDS)	MVT	$MVT = -10.21 + 0.47B + 0.06ASDS$	276
			EVT	$EVT = -2.84 + 0.25B + 0.4ASDS$	628
			PVT	$PVT = -14.69 + 0.69B + 0.31ASDS$	694
	2033	499 beds and 1,330 staff (ASDS) (Sensitivity Test)	MVT	$MVT = -10.21 + 0.47B + 0.06ASDS$	304
			EVT	$EVT = -2.84 + 0.25B + 0.4ASDS$	654
			PVT	$PVT = -14.69 + 0.69B + 0.31ASDS$	742

Comparatively under the Concept approval the peak hour volumes for both Year 2023 and Year 2033 were as follows:

- MVT: 255 peak hour trips
- EVT: 525 peak hour trips
- PVT: 608 peak hour trips.

With the yields proposed in the Modification Application, this is a minor reduction of peak hour trips in Year 2023 and an increase in peak hour trips in Year 2033. This increase (during the PVT) is approximately 20%.

2.7 Traffic Movements and Capacity

Traffic movements and access intersection capacity was reviewed with consideration to the changes associated with this Modification Application as the Tweed Valley Hospital Stage 2 Traffic Impact Assessment which has been prepared for Stage 2 Hospital Main Works and Operation of the Tweed Valley Hospital. The assessment reviewed the network distributions around the site accesses to reflect the proposed car parking changes on site (distribution of car parking, allocation and changes to the internal road network and connectivity). These changes were re-modelled in SIDRA Intersection. The distribution of traffic is 60% for the western staff car park, 30% for the western public car park and 10% for the eastern public car park. This approximately reflects the distribution and layout of the proposed parking layout under this Modification Application.

The key changes to traffic movements are:

- A greater number of movements using the western left slip in (i.e. due to the greater proportion of staff car parking)
- A reduction in movements turning right into the site at the main signalised access (due to no staff car park access via this route)
- A reduction in movements turning right out of the site at the main signalised access (due to no staff car park access via this route)
- A greater number of movements turning right out of the Cudgen Road / Turnock Street access (as this is the only location staff can egress and turn right).

Minor changes to queuing and operations were observed at site access intersections. All site access intersections were identified to operate within acceptable performance limits.

Changes to distributions were limited to internal distributions and via the various accesses. Changes to distribution of traffic as a result of the changes included in this Modification Application only occur across Access A to D and the Kingscliff TAFE Access. Outside of these accesses / intersections development traffic distributions remain consistent with the Concept approval.

Detailed traffic modelling is presented in the Tweed Valley Hospital Stage 2 Traffic Impact Assessment which has been prepared for Stage 2 Hospital Main Works and Operation of the Tweed Valley Hospital.

Detailed traffic modelling identified all accesses and intersections operate within acceptable limits with the exception the Tweed Coast Road / Cudgen Road intersection (note that this operated outside acceptable limits in some scenarios under the Concept approval). In this regard an additional upgrade is proposed at this intersection as part of Stage 2 which includes extension of the right-turn pocket on the southern approach of Tweed Coast Road by approximately 50m. The recommended works are shown to improve the operating performance of the intersection when compared to base case (i.e. without the Project and subsequent upgrade works). The proposed external intersections works therefore adequately address the Project's net traffic impacts.

For further details refer to the Tweed Valley Hospital Stage 2 Traffic Impact Assessment.

2.8 Internal Pedestrian Movements

The multi-deck will connect to the hospital via an at-grade pedestrian connection incorporated into the 'green spine' on the lower ground level. The pedestrian path will cross the 'alternate access' for ambulance on the northern side of the 'boom gate' located within the green spine zone. Whilst pedestrian volumes will be high during peak daily

periods, the frequency of vehicles utilising the 'alternate access' connection between and speeds through this area will be low.

In addition to the lower ground pedestrian connection, the design also caters for a potential pedestrian bridge which links to the Hospital's ground level.

2.9 **Public and Active Transport**

The proposed Modifications do not have significant implications to public or active transport travel modes. The increase in yield will result in a minor increase in demand for these transport modes. No external infrastructure changes are proposed as a part of this Modification application relative to the Concept approval.

It is noted that a number of service improvements have been announced for the Tweed Shire including over 300 additional weekly bus services, with extended hours and a focus on delivering better connections to local TAFEs, hospitals and better cross-border connections.

With the inclusion of the proposed bus stop infrastructure and future route modifications, the public transport network and infrastructure will suitably service the Tweed Valley Hospital. For further information regarding public and active transport, refer to the Tweed Valley Hospital Stage 2 Traffic Impact Assessment.

3. **Construction Traffic Management Plan – Preliminary Considerations**

The proposed Modifications are to the Concept proposal. No changes to the scope for Stage 1 Early and Enabling works are proposed. Therefore, there are no changes to the considerations for the preliminary Construction Traffic Management Plan. Construction Traffic Management implications associated with the proposed Modifications have been addressed as part the Stage 2 Hospital Main Works and Operation application.

4. Conclusions

The key findings of the traffic assessment for the Modification Application to SSD 18_9575 (Concept Plan and Stage 1 Early and Enabling Works) are as follows:

- the Modification results in an increase of parking supply from “a minimum of 700 spaces” to a minimum of 1,201 spaces at year of opening and ultimately catering for a total of 1,538 spaces. This has been facilitated with the inclusion of a multi-deck car park in place of the at grade parking to the south-west of the main Hospital Building and consolidation of the at-grade parking to the east of the main Hospital building. The new parking provision caters for parking demands identified in the Car Parking Demand Study carried out in accordance with SSD 9575 conditions of consent and in support of the Stage 2 SSD application.
- The multi-deck car park generally complies with the requirements of AS2890 for User Class 3 facilities (2.6m wide by 5.4m long bays with minimum 5.8m wide parking aisles). It is noted that the modification is to the concept proposal only and does not include detailed car parking geometry as part of the masterplan
- No change to the four access locations or form of accesses is proposed as part of this Modification Application
- No change to servicing provision or operations is proposed as part of this Modification Application
- With the yields proposed in the Modification Application, this is a minor reduction of peak hour trips in Year 2023 and an increase in peak hour trips in Year 2033.
- The key changes to traffic movements are:
 - A greater number of movements using the western left slip in (i.e. due to the greater proportion of staff car parking)
 - A reduction in movements turning right into the site at the main signalised access (due to no staff car park access via this route)
 - A reduction in movements turning right out of the site at the main signalised access (due to no staff car park access via this route)
 - A greater number of movements turning right out of the Cudgen Road / Turnock Street access (as this is the only location staff can egress and turn right).

Minor changes to queuing and operations were observed at site access intersections. All site access intersections were identified to operate within acceptable performance limits under the preferred multi-deck option.

- Detailed traffic modelling undertaken for Stage 2 (that is inclusive of the proposed modifications) identified all access and intersection operating within acceptable limits with the exception the Tweed Coast Road / Cudgen Road intersection (note that this operated outside acceptable limits in some scenarios under the original Concept Proposal). In this regard an additional upgrade is proposed as to this intersection as part of Stage 2 which includes extension of the right-turn pocket on the southern approach of Tweed Coast Road by approximately 50m. The proposed external intersections works therefore adequately address the Project’s net traffic impacts.
- No changes to Public and Active Transport are proposed as part of this Modification
- No changes to the scope for Stage 1 Early and Enabling works are proposed. Therefore, there are no changes to the considerations for the preliminary Construction Traffic Management Plan.

Based on the proposed modifications to the Concept Proposal and Traffic Impact Assessment undertaken for Stage 2 (Main Works and Operation) there are no traffic, parking, or access impediments to the Project as modified.