

LETTER

Transport Engineering

REF: N170560

DATE: 4 September 2020

Health Infrastructure
C/- Johnstaff Projects
Level 5, 9 Castlereagh Street
SYDNEY NSW 2000

Attention: Shamma Hasan (Project Manager)

Dear Shamma

RE: LIVERPOOL HOSPITAL REDEVELOPMENT (SSD-10389) – RESPONSE TO TRANSPORT-RELATED SUBMISSIONS

A State Significant Development Application (SSDA) has been submitted for a proposed redevelopment of Liverpool Hospital. The proposed works are located in the western portion of the western hospital campus. The site is legally described as Lot 501 in DP1165217. GTA Consultants (GTA) prepared a Transport and Accessibility Impact Assessment¹ dated 6 May 2020 to support the SSDA.

Subsequent to the SSDA being lodged, a number of agency submissions have been received, with several items relating to traffic and transport. This letter has been prepared to specifically respond to submissions in this regard. The relevant comments are reproduced in Attachment 1 together with detailed responses.

Should you have any questions or require any further information, please do not hesitate to contact me on (02) 8448 1800.

Yours sincerely

GTA CONSULTANTS



Brett Maynard
Director

encl.

Attachment 1 – Response to Transport Related Submissions
Attachment 2 – Shared Zone SIDRA Modelling Results
Attachment 3 – Proposed Bicycle Parking Facilities

¹ Liverpool Health and Academic Precinct Main Works, Transport and Accessibility Impact Assessment, Revision C dated 6 May 2020.

ATTACHMENT 1

Response to Transport Related Submissions

Department of Planning, Industry and Environment comments

DPIE comment: Clarification is sought with regards to the performance of the Lachlan Street/Forbes Street intersection and the potential consequential impacts of a decline in service at this intersection, upon the Lachlan Street/Goulburn Street intersection, as detailed below:

- the SIDRA results (Table 12 of the EIS) indicate that the existing degree of saturation of the Lachlan Street/Forbes Street intersection is 0.93 in the AM peak with the 'proposed' degree of saturation of this intersection to be 0.42. The text supporting this indicates that the Lachlan Street/Forbes Street intersection is expected to operate close to capacity (i.e. degree of saturation 0.93). With this intersection operating at near capacity, the impacts upon the operation of Lachlan Street/Goulburn Street are to be more clearly presented.*

GTA response: Additional Lachlan Street analysis was completed for the likely redistribution of traffic resulting from the proposed Campbell Street Shared Zone and associated single-lane slow point. TAIA Existing conditions SIDRA modelling outputs were not included in TAIA for the Lachlan Street/ Forbes Street and Lachlan Street/ Goulburn Street intersections (as assessment of these intersections was not required by the SEARs), with the SIDRA modelling outputs only included for the following scenarios to understand the operation of the intersections following the redevelopment:

- Post development with Campbell Street shared zone based on existing intersection layouts
- Post development with Campbell Street shared zone and reversed priority at the Lachlan Street/ Forbes Street intersection
- Post development with Campbell Street shared zone and the Lachlan Street/ Forbes Street intersection upgraded to a roundabout.

For completeness, the modelling results for the all scenarios relating to assessment of the shared zone are included in Attachment 2.

The results indicate the existing degree of saturation (DOS) at the Lachlan Street/ Forbes Street intersection is 0.50, with this expected to increase to 0.93 post development following implementation of the shared zone (without mitigation). This is consistent with the relatively high volumes that would be turning into Forbes Street under this scenario (particularly associated with the Liverpool Girls and Boys High Schools), noting that the existing stop-control on Lachlan Street increases delay in comparison to standard give-way intersections. However, reversing the priorities indicates the DOS at the intersection is expected to reduce to 0.42 post development following implementation of the shared zone. Average queues at this intersection are also expected to be around six metres long (one vehicle long) on the west approach during the AM peak hour following reversing the priorities which is better than existing conditions. As such, it is not anticipated there will be any flow-on effects from this intersection to the adjacent Lachlan Street/ Forbes Street following modifications to reverse intersection priority.

- *additional intersection performance tables must be added that clearly show the performance of these intersections currently, once the development is operational and once operational with mitigation measures so that the result of the mitigation measures upon degree of saturation and level of service can be clearly demonstrated.*

GTA response: SIDRA modelling results for the Lachlan Street/ Forbes Street, Lachlan Street/ Goulburn Street and Campbell Street/ Goulburn Street intersections have been included in Attachment 2 for the following scenarios:

- Existing conditions
- Post development with Campbell Street shared zone based on existing intersection layouts
- Post development with Campbell Street shared zone and reversed priority at the Lachlan Street/ Forbes Street intersection
- Post development with Campbell Street shared zone and the Lachlan Street/ Forbes Street intersection upgraded to a roundabout.

The other key intersections assessed are not expected to be impacted by the redistribution of traffic from Campbell Street following the proposed conversion to a shared zone. The below sets out the location of the SIDRA modelling outputs in the TAIA of the other key intersections assessed:

- Table 3.3 – Existing conditions
- Table 9.3 – Future conditions including surrounding developments
- Table 9.4 – Future conditions including surrounding development and LHAP redevelopment.
- *additionally, noting changes may need to be made to the Lachlan Street/Forbes Street intersection (current proposal for stop signs), details of consultation with the relevant roads authority are to be provided.*

GTA response: Changes at the Lachlan Street/Forbes Street intersection are directly linked to the Campbell Street Shared Zone proposal. A workshop was held with Council on 3 August 2020 to discuss the Campbell Street Shared Zone proposal and associated works. Council indicated in-principle support for the Shared Zone and change in priority at the Lachlan Street/Forbes Street intersection, subject to investigation of kerb extensions to improve pedestrian safety and detailed design resolution as part of the Section 138 approval required prior to commencement of the road works.

DPIE comment: Detail of the arrival times and the number of construction vehicles accessing the site is to be provided, including detail of where all construction vehicles will be accommodated and how impacts to the surrounding road network and community will be minimised. Cumulative impacts of the development of the adjoining multi-storey car park at the hospital campus are also to be considered.

GTA response: It is difficult to provide detailed arrival times of construction vehicles and associated hourly volumes given a contractor is yet to be appointed for the project and will depend on their detailed methodology and staging. Construction vehicle arrivals would occur throughout the approved work hours and scheduled according to the available

loading/ unloading area during each work stage. There would also be day-to-day differences in terms of general site activity and concrete pour days.

Notwithstanding, Section 11.6 of the TAIA details initial construction vehicle volume estimates of up to 100 vehicles per day or around 10 vehicles per hour during peak activities which are expected to occur between January 2021 and December 2021 during construction of both the multi-storey car park and Main Works Stage 1. This estimate considers both sites, with the Main Works component expected to make up around 60 of these vehicles per day (six vehicles per hour). Vehicle arrivals will be during the approved work hours, with the anticipated work hours detailed in Section 11.4 of the TAIA and are reproduced below:

- Monday to Friday 7:00am and 6:00pm
- Saturday 8:00am and 3:00pm
- Sunday/ public holiday no work.

Truck volumes will be minimised as much as possible during road network peak periods. It is anticipated that construction vehicles will be accommodated on-site or within approved work zones. Given the Main Works site and the Multi-Storey Car Park site are located in different areas on the hospital campus, the sites will likely have different approach and departure truck routes which will minimise the cumulative construction traffic impact. The anticipated construction traffic can be accommodated on the surrounding road network, noting also that trucks would not be allowed to queue on the surrounding road network.

A detailed Construction Traffic and Pedestrian Management Plan (CTPMP) will be prepared prior to works commencing, including consultation with the relevant agencies to address any concerns associated with the arrival times and the number of construction vehicles accessing the site.

Section 11.6 of the TAIA discusses construction worker parking and traffic, with on-site constraints and off-site opportunities identified. Whilst Health Infrastructure will allow the appointed contractor to nominate a preferred option, initial discussions have been held with potential partners, including a location at Warwick Farm Racecourse. Shuttle bus arrangements would be implemented to transport workers between the site and any remote parking locations.

Liverpool City Council comments

LCC comment: The EIS has noted that bicycle parking would be provided at a bicycle parking rate of five per cent of staff for both staff and visitor provision, due to the hospital's location and limited surrounding cycling infrastructure. Council is working to improve cycling infrastructure in the area, evidenced through the Liverpool Bike Plan 2019-2023 and the Public Domain Masterplan. The Liverpool Collaboration Area Place Strategy and Liverpool Innovation Precinct also indicate the importance of improving cycling infrastructure and rates of cycling in the area.

Noting this, the hospital's role in promoting healthy built environments and in order to assist in enacting the Green Travel Plan (Appendix E), a bicycle parking rate of 10 per cent of staff for both staff and visitor provision is considered more appropriate to meet strategic goals. This would equate to:

- 42 bicycle spaces for staff in the basement of the CP1 car park

- 42 spaces for visitors in the public domain.

GTA response: The future vision for the CBD and bicycle infrastructure in the area is recognised. It is proposed to increase bicycle parking provision, in accordance with Council's suggestion, to the following:

- A minimum of 50 secure staff bicycle parking spaces the P1 basement car park
- A minimum of 25 visitor bicycle parking spaces throughout the new public domain areas
- A minimum of 25 visitor bicycle parking spaces in the new MSCP.

Plans showing the proposed bicycle parking in the P1 basement car park are included in Attachment 3, while the other bicycle parking areas are shown on the updated architectural plans and landscape plans.

Demand for bicycle parking will be monitored as part of the Travel Plan, with the provision to be increased if required to accommodate future demand.

LCC comment: Concern is raised in relation to the proposed 10km/h shared zone along Campbell Street between Goulburn Street and Forbes Street.

Campbell Street is currently carrying approximately 700 and 450 vehicles in the AM and PM peak hours respectively. To meet TfNSW 10km/h shared zone criteria, traffic flow along Campbell Street will be required to reduce to less than 100 vehicles per hour and less than 1,000 vehicles per day.

Based on traffic volumes at Campbell Street and Forbes Street intersection, 93% of traffic is from Goulburn Street South and Campbell Street East. The proposed directional signage plan on the north to the development site might not be effective to reduce traffic from Campbell Street to less than 100 vehicles per hour.

The section of Campbell Street to be changed is currently a bus route and section of bus routes 851, 853, 854 and 857, and a school bus route for the adjoining high schools.

The proposed one-lane two-way slow point within the shared zone will have a significant impact on the bus operation and traffic movement. Consultation is required with TfNSW, bus operators, the schools and the endorsement of the Liverpool Pedestrian Active Transport and Traffic Committee.

As such, the proposed 10km/h shared zone along Campbell Street between Goulburn Street and Forbes Street is to be deferred as part of this development, for the applicant to carry out the above consultation and referral to the Liverpool Pedestrian, Active Transport and Traffic Committee.

Should the applicant wish to pursue the shared zone and associated improvement works, a separate application is to be lodged with Council's Traffic and Transport Section and TfNSW.

Notwithstanding this, conditions of consent relating to traffic and parking as per Appendix B should be imposed on any consent granted for the redevelopment of Liverpool Hospital.

It should be noted that, to minimise traffic impact of the hospital redevelopment, conditions are recommended for the following improvement works to be carried out:

- i. Installation of a roundabout at Forbes Street and Lachlan Street intersection; and*
- ii. Minor signal improvement at Elizabeth Street/Bigge Street intersection.*

Forbes Street/Lachlan Street intersection is an existing four-way intersection with priority sign control. The expected increase in traffic movements would require traffic movements through the intersection to be regulated, with a roundabout.

The Elizabeth Street/Bigge Street intersection is an existing four-way signalised intersection with basic two-phase signal operation and does not have right turn arrows. The expected increase in traffic movements would require right turn movement to be have dedicated right turn arrow phase.

GTA response: Council has provided an addendum to its original submission which indicates support for the intended objective of the shared zone to create a more pedestrianised area. The project team will work with Council and TfNSW to address any concerns regarding the proposed shared zone prior to it being implemented.

There is no reason for the Campbell Street shared zone to be deferred as part of the development, but rather it is suggested that a consent condition be imposed requiring approval to be provided by TfNSW and Council's Traffic and Transport Section prior to construction of the shared zone.

With regard to the intersection works requested by Council, the SIDRA modelling results demonstrate that the Lachlan Street/ Forbes Street intersection does not require upgrading to a roundabout following the hospital redevelopment, both with or without the proposed shared zone. As such, it is not considered appropriate for a condition to be imposed for this intersection to be upgraded to a roundabout (noting also Council's addendum that a roundabout is not desirable for heritage reasons).

A workshop was held with Council on 3 August 2020 to discuss the Campbell Street Shared Zone proposal and associated works. Council are supportive of the Shared Zone proposed by this application, as well as the change in priority at the Lachlan Street/Forbes Street intersection (subject to investigation of kerb extensions to improve pedestrian safety). The project team and Council have agreed that the shared zone is to be approved under this application in-principle, with a condition to submit the detailed design for review and approval by Council through a Section 138 application required prior to commencement of the road works.

As detailed in Section 9.4.2 of the TAIA, the anticipated increase in traffic at the Bigge Street/ Elizabeth Street intersection from the LHAP redevelopment itself is considered minor in comparison to the traffic generated by the assessed surrounding proposed developments, particularly the 26 Elizabeth Street development. Notwithstanding, SIDRA modelling indicates that the additional traffic generated by the LHAP redevelopment and surrounding developments could be accommodated at the intersection under its current arrangement. These results are also consistent with the findings in the Traffic Impact Assessment (ptc., January 2020) prepared to support the 26 Elizabeth Street development. Further to this, preliminary modelling indicates that the additional phase would not improve the intersection operation from its current

arrangement. It is recommended that Council coordinate with TfNSW should it wish to pursue modifications to this intersection.

LCC comment: The proximity to, and health benefits associated with Bigge Park, can be further enhanced by strengthening the connection between the hospital site and Bigge Park. As part of the redevelopment for the hospital precinct, a section of Elizabeth Street (i.e. between Goulburn Street and College Street) should be converted into a pedestrian priority shared zone that will allow for a safer pedestrian environment and open the forecourt of Liverpool hospital towards Bigge Park.

GTA response: Conversion of this section of Elizabeth Street to a shared zone was considered early on in the project, however further design development did not proceed given this section of road accommodates a range of bus services of varying frequency which service the hospital. This location is also directly adjacent to the emergency department and ambulance area, and further pedestrian priority is not considered appropriate from an emergency response/ safety perspective.

Transport for NSW comments

TfNSW comment: Future Transport 2056 emphasises the importance of walking and cycling for short trips and reinforces the importance of walking and cycling to increase the catchment of public transport as part of the whole customer journey.

Building Momentum - State Infrastructure Strategy 2018-2038 includes recommendations related to walking and cycling, including integrating transport with land use; managing travel demand; unlocking capacity in existing assets; and improving population health outcomes through more active transport.

Key Issue 7. Transport and Accessibility of the SEARs requires the Transport Impact Assessment (TIA), to provide:

- *proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance.*

The TIA provided in support of the proposed redevelopment does not adequately address Active Transport considerations:

- *There is an opportunity for the TIA to be updated to comprehensively address the likely demand for bicycle parking similar to the car parking analysis.*
- *Walking is mostly referred to in the report as a trip mode for people living close by. However, walking would be the second likely option for visitors and staff who do not have cars or choose to use public transport. Similarly, the report lacks detailed analysis regarding the likely demand for cycling infrastructure such as bicycle parking (as noted above) and end of trip facilities following the hospital redevelopment.*

Liverpool Council Development Control Plan, 2008 Part 1 provides requirements for bicycle parking and cycling facilities. Additionally, Table 13 (p92) provides requirements for Medical Centres and Health Consulting Rooms.

It is requested that the applicant review the needs of cyclists and pedestrians and if required update the EIS and associated documentation specifically regarding the issues identified below:

- *Any needed improvements to pedestrian connectivity and accessibility to Liverpool and Warwick train stations following the redevelopment;*
- *Detailed analysis of the likely demand for cycling infrastructure including bicycle parking and end of trip facilities following the redevelopment; and*
- *Off-street bicycle parking and end of trip facilities to Liverpool Council requirements as outlined in their DCP 2008 Part 1.*

If the development is approved, it is requested that a condition be imposed as follows:

Prior to the issue of the first Occupation Certificate, off-street bicycle parking spaces and end of trip facilities are to be provided in accordance with the Liverpool Council DCP 2008 Part 1 and in accordance with AS2890.3.

GTA response: The *Planning Guidelines for Walking and Cycling* (Department of Planning, 2004) recommend parking be provided at a rate of 5 to 10 per cent for both staff and visitors. By 2025/ 26, it is estimated that there will be an additional 418 FTE staff working at the LHAP. Assuming average staff per weekday shift (ASDS) is approximately 80 per cent of FTE staff resulting in around 330 ASDS, this equates to a minimum provision of around 34 bicycle parking spaces (17 bicycle spaces for both staff and visitors).

As detailed above in response to Council's comments, the proposed bicycle parking provisions have been increased to a minimum of 100 spaces.

Existing journey to work data indicates that currently around one per cent of staff cycle to the hospital. The revised bicycle parking provision for staff represents much greater than 10 per cent of the additional staffing forecasts and is considered adequate to encourage a mode shift towards cycling, as well as meeting any existing demand that is not already satisfied.

Demand for bicycle parking will be monitored as part of the Travel Plan, with the provision to be increased if required to accommodate future demand.

It is also noted that there is bicycle parking provided in various locations around the hospital including at ground level and in CP1 and CP2, however these facilities are currently significantly under-utilised.

The submission by TfNSW references DCP 2008 bicycle parking rates for Medical Centres and Health Consulting Rooms, however this use is considered very different in scale and nature to a public hospital and therefore this rate is not considered appropriate for the proposed redevelopment.

TfNSW comment: The TIA provides a framework for the preparation and monitoring of a Green/ Workplace Travel Plan, along with a Travel Access Guide. These tools will help the Liverpool Hospital to better manage demand on the transport network. The recommendations below are provided to encourage the use of sustainable transport to the site, which will help reduce the use of single vehicle trips.

It is requested that prior to the issue of the first Occupation Certificate, the applicant be conditioned to prepare a Green/ Workplace Travel Plan in consultation with TfNSW for the proposed development which must be approved by TfNSW. The Travel Plan should be aimed at both staff and visitors and:

- *Set mode share targets that encourage the use of public and active transport and reduce the proportion of single-occupant car journeys to the site;*
- *Identify robust actions and strategies to meet the mode share targets in the first 2, 5 and 10 years post occupation;*
- *Include a Transport Access Guide that provides information to employees, patients and visitors about the range of travel modes, access arrangements and supporting facilities that service the site including bicycle parking and other end of trip facilities;*
- *Identify relevant workplace policies such as flexible working arrangements that enable administrative staff to travel outside peak periods, or which reduce the need for work related travel;*
- *Consider the appropriateness of any relevant parking policies to manage travel demand, including a measure to apply higher car parking charges during peak times to encourage off-peak use;*
- *Details of carpooling operations and monitoring of parking priority;*
- *Appoint a Travel Plan Coordinator to oversee the implementation of the Travel Plan and Transport Access Guide;*
- *Nominate a party responsible for the ongoing monitoring and review of the Travel Plan, including the delivery of actions and associated mode share targets;*
- *Include a breakdown of staff shift patterns including the number of staff commencing shifts at particular times; and the residential postcodes of where those staff are travelling from, if known; and*
- *Include, if available, details of visiting hours and anticipated numbers of patients and visitors.*

GTA response: Noted. The existing Liverpool Hospital Travel Plan would be refreshed in consultation with TfNSW and other stakeholders, with regard to the above.

TfNSW comment: It is noted the applicant submitted a Construction Management Plan and Overview Construction Traffic Management Plan as part of the supporting documentation.

It is requested that the applicant be conditioned to prepare a detailed Construction Traffic and Pedestrian Management Plan (CTPMP) for approval by the Certifying Authority in consultation with Liverpool City Council.

GTA response: Noted.

ATTACHMENT 2

Shared Zone SIDRA Modelling Results

Table 1: Existing AM peak hour network operation

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.24	9	4	A
Lachlan Street/ Forbes Street	Priority	0.50	15	10	B
Lachlan Street/ Goulburn Street	Roundabout	0.11	9	2	A
Campbell Street/ Goulburn Street	Signals	0.47	16	28	B

Table 2: Existing PM peak hour network operation

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.32	9	6	A
Lachlan Street/ Forbes Street	Priority	0.20	14	2	A
Lachlan Street/ Goulburn Street	Roundabout	0.19	9	3	A
Campbell Street/ Goulburn Street	Signals	0.24	15	15	B

Table 3: Post development AM peak hour network operation with Campbell Street shared zone (existing intersection layouts)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.24	9	4	LOS A
Lachlan Street/ Forbes Street	Priority	0.93	31	81	LOS C
Lachlan Street/ Goulburn Street	Roundabout	1.00	29	124	LOS C
Campbell Street/ Goulburn Street	Signals	0.16	14	9	LOS A

Table 4: Post development PM peak hour network operation with Campbell Street shared zone (existing intersection layouts)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.49	8	11	LOS A
Lachlan Street/ Forbes Street	Priority	0.33	20	4	LOS B
Lachlan Street/ Goulburn Street	Roundabout	0.23	11	4	LOS A
Campbell Street/ Goulburn Street	Signals	0.12	13	6	LOS A

Table 5: Post development AM peak hour network operation with Campbell Street shared zone (with mitigated Forbes Street/ Lachlan Street intersection layout)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.26	9	4	LOS A
Lachlan Street/ Forbes Street	Reversed Priority	0.43	27	5	LOS B
	Roundabout	0.32	14	6	LOS A
Lachlan Street/ Goulburn Street	Roundabout	0.12	15	2	LOS B
Campbell Street/ Goulburn Street	Signals	0.16	14	9	LOS A

Table 6: Post development PM peak hour network operation with Campbell Street shared zone (with mitigated Forbes Street/ Lachlan Street intersection layout)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.49	8	11	LOS A
Lachlan Street/ Forbes Street	Reversed Priority	0.15	15	2	LOS B
	Roundabout	0.31	10	6	LOS A
Lachlan Street/ Goulburn Street	Roundabout	0.23	11	4	LOS A
Campbell Street/ Goulburn Street	Signals	0.12	13	6	LOS A

ATTACHMENT 3

Proposed Bicycle Parking Facilities

SK200802 P1 EXTENSION OPTION

