GTAconsultants

University of Technology Sydney
Broadway Precinct - UTS Central
Transport Impact Assessment

Client //	University of Technology Sydney
Office //	NSW
Reference //	16S1024000
Date //	27/04/16

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
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1. Introduction

1.1 Background

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The SSD Application relates to the Concept Plan Approval for the University of Technology Sydney (UTS) City Campus Broadway Precinct, which was approved in December 2009 (MP08_0116).

The proposed works relate specifically to the UTS Central Project, more specifically the extension of Building 1 (podium) and redevelopment of Building 2 at the City Campus, Broadway Precinct.

As the development has a capital investment value of more than $30 million as an educational establishment, it is identified as State Significant Development under the *State Environmental Planning Policy (State and Regional Development) 2011*, with the Minister for Planning the consent authority for the project.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project.

UTS recognised the need to upgrade the City Campus back in 2000, and undertook a number of visioning and master planning projects culminating in the City Campus Masterplan 2020 (BVN, 2008) which provide a framework for refurbishments and new building works across the campus (comprising the Broadway Precinct and other sites in the Sydney CBD) in order to provide improved facilities and to accommodate future expected student and staff growth.

The long term strategic vision for UTS is 'to be one of the world's leading Universities of Technology'.

On 23 December 2009 a critical step in realising UTS's vision and identity for the Broadway Precinct was realised, with approval of the UTS City Campus Broadway Precinct Concept Plan (BPCP) – approved under the former Part 3A of the EP&A Act (MP 08_0116). The approved Concept Plan supports the significant redevelopment of the Broadway Precinct providing for new buildings, alternations and additions to existing buildings, along with associated landscaping and public domain works.

Since approval of the Concept Plan in 2009 UTS has secured the necessary detailed planning approvals and delivered a number of state of the art and iconic learning, research and social facilities across the Broadway Precinct, including:

- Faculty of Engineering and IT Building, designed by Denton Corker Marshall Architects.
- Multi-Purpose Sports Hall.
- Alumni Green, designed by ASPECT Studios Landscape Architects.
- Faculty of Science and Graduate School of Health Building, designed by Durbach Block Jaggers in association with BVN Architecture.
- Library Retrieval System.
- Great Hall and Balcony Room Upgrade, Designed by DRAW Architects in association with Kann Finch Architects.

1.2 Secretary's Environmental Assessment Requirements

The Department of Planning and Environment (DoPE) has issued Secretary's Environmental Assessment Requirements (SEARs) for this project. The issues raised in the SEARs have been considered during the preparation of this transport assessment report. Table 1.1 summarises the relevant issues (as related to transport and traffic) together with descriptions how the issues have been addressed.

Table 1.1: Secretary's Environmental Assessment Requirements

Issues	Report Section
○ the existing pedestrian and bicycle movements, travel routes and facilities within the vicinity of the site	See Section 2
○ an estimate of the total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and cycle trips	See Section 5
○ the adequacy of public transport, pedestrian and bicycle provisions to meet the likely future demand of the proposed development and proposed measures to maintain road safety	See Section 5
○ impact of the proposed development on existing and future public transport infrastructure within the vicinity of the site, including the CBD and South East Light Rail (CSELR) and future public transport options along Broadway in consultation with Transport for NSW, and measures to integrate the development with the transport network	See Section 5
○ measures to promote travel choices that support sustainable travel such as location-specific travel plan, end-of-trip facilities, green travel plan and wayfinding strategies	See Section 7 and Appendix A
○ the daily and peak vehicle movements impact on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works (if required)	See Section 5
○ the proposed access arrangements and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and cycle networks	See Section 4.4
○ proposed car and bicycle parking provision, including consideration of the availability of public transport and the requirements of the relevant parking codes and Australian Standards	See Section 6
○ service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times).	See Sections 4 and 5.
○ traffic and transport impacts during construction, including cumulative impacts associated with other construction activities, including the construction of the CSELR	See the Construction Traffic Management Plan prepared by GTA Consultants (Ref: 151218rep-16S102400 UTS Central CTMP dated 18 December 2015)
○ how the construction impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport operations, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact	See the Construction Traffic Management Plan prepared by GTA Consultants (Ref: 151218rep-16S102400 UTS Central CTMP dated 18 December 2015)

2. Existing Conditions

2.1 Site Description

The Broadway Precinct of the UTS City Campus is located on the southern edge of the Sydney Central Business District with frontages to Broadway, and Thomas, Wattle and Harris Streets (see Figure 2.1). Central station is located less than 500m to the east.

More specifically the UTS Central project site relates to Building 1 (excluding the Building 1 tower) and Building 2 of the Broadway Precinct, refer to Figure 2.2.

Figure 2.1: Site Location Map

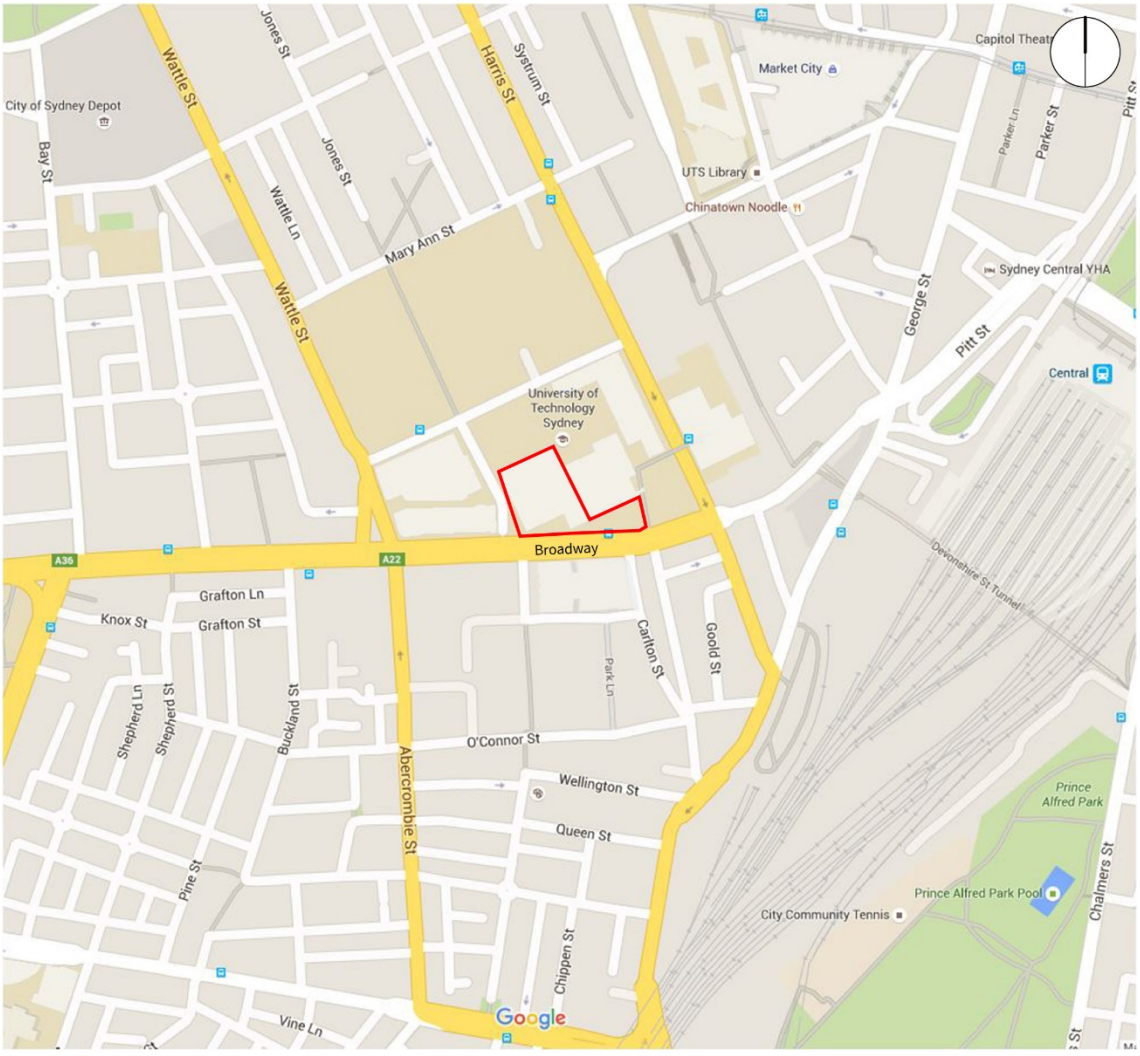
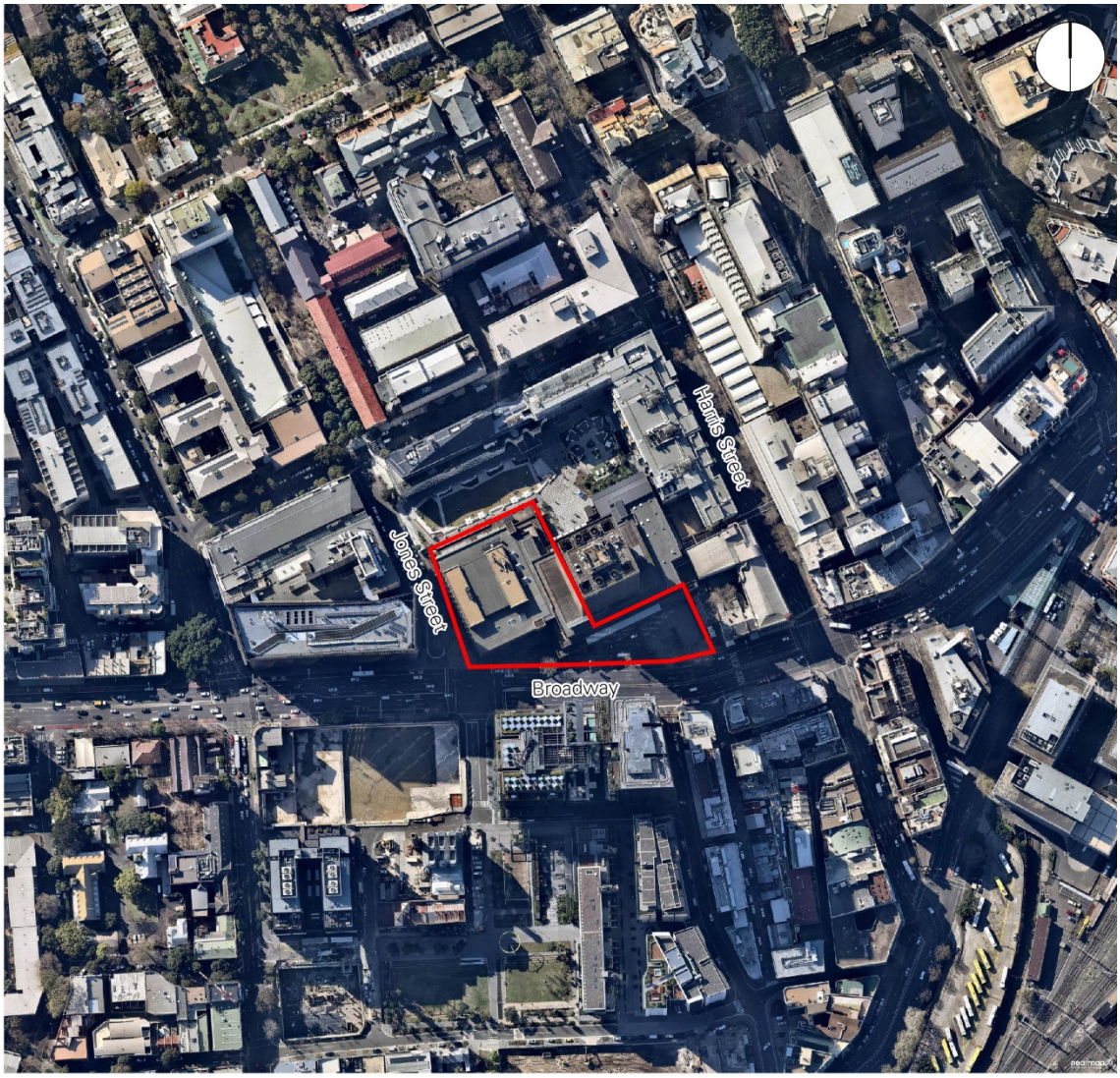


Figure 2.2: Site Environment and Surrounds



The Site

2.2 Road Network

2.2.1 Adjoining Roads

Thomas Street

Thomas Street is a local road in the vicinity of the site aligned in an east-west direction. It is a 12.8m wide, two-way road configured with one lane in each direction, set within a 20m wide road reserve (approx.). Kerbside parking is permitted on both sides of Thomas Street subject to time restrictions.

Jones Street

Jones Street is a local road in the vicinity of the site aligned in a north-south direction. It is a 12.8m wide, two-way road configured with one lane in each direction, set within a 21m wide road reserve (approx.). Kerbside parking is permitted on both sides of Jones Street subject to time

restrictions. In the vicinity of the site, Jones Street is a no through road with its connection to Broadway closed.

Wattle Street

Wattle Street is a classified State Road (MR594) in the vicinity of the site is aligned in a north-south direction. It is a one-way northbound road configured with a four-lane, 14m wide carriageway, set within a 24m wide road reserve (approx.). North of Thomas Street, kerbside parking is permitted on both sides of Wattle Street, subject to clearway and time restrictions. Wattle Street carries approximately 26,000 vehicles per day[1].

Broadway

Broadway is a State Road (HW5) in the vicinity of the site and is aligned in an east-west direction. It is a two-way road configured with four lanes in each direction (including one bus lane in each direction) and functions as one of the main routes for traffic into and out of the Sydney CBD. Broadway carries approximately 72,000 vehicles per day[1].

2.2.2 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Wattle Street/ Thomas Street (unsignalised)
- Thomas Street/ Jones Street (unsignalised)
- Thomas Street/ Harris Street (signalised)
- Wattle Street/ Broadway (signalised)
- Broadway/ Harris Street (signalised).

2.3 Public Transport

The site is well serviced by high frequency public transport with Central Station Transport Interchange, a key transport hub in Sydney located 500m east of the site.

2.3.1 Bus Network

The subject site is located in close proximity to several key bus corridors including Broadway along the southern boundary of Building 1 and 2. Central Transport Interchange features five main bus hubs at Railway Square (200m east of the site), George Street, Eddy Avenue and Chalmers Street which serve destinations across the Sydney Metropolitan Area including Sydney's south, eastern suburbs, inner-west, northern beaches and north-west.

The nearest bus stop to the site is located immediately in front of Building 1 on Broadway. This stop is served by 19 services within the Sydney Buses network and is a major inbound stop in the area. Corresponding outbound bus services from UTS is available from Railway Square, which is approximately 200m to the east of Building 1.

The Sydney bus network continues to grow with the number of available bus services and routes gradually increasing as the demand for public transport grows. Since the approved UTS Concept Plan in 2009, a number of new bus routes and services have been introduced and existing bus routes have been amended. This includes the introduction of several Metrobus services including the M30 between Mosman and Sydenham which serves the UTS site.

[1] Based on 2005 Roads and Maritime Services (RMS) 2005 Annual Average Daily Traffic Data (AADT).

A comparison on bus frequencies reported in the 2009 Concept Plan and current bus frequencies of bus stop on Broadway, nearest to the UTS site, is summarised in Table 2.1.

Table 2.1: Bus Frequency Comparison of Bus Stops on Broadway

Period	Inbound	Outbound	Total
AM Peak (8am – 9am)			
2008 Broadway	116	71	187
2015 Broadway	126	70	196
PM Peak (5pm – 6pm)			
2008 Broadway	64	99	163
2015 Broadway	78	99	177

Source: 2008 information from Halcrow (2009); 2015 information from www.transportnsw.info, accessed November 2015

2.3.2 Rail Network

Central Railway Station Central serves as the key rail hub in Sydney for CityRail services to destinations across the Sydney Metropolitan Area, the Illawarra, Blue Mountains and Central Coast. Central Station is also the hub for interstate rail services in Sydney. Central Station is also the main terminus for the Central to Lilyfield Light Rail Network.

Since the approved Concept Plan in 2009, the rail network has expanded with the South West rail link recently opened for service, and the North West Rail Link currently under construction. The expansions provide a wider reach for public transport availability in wider Sydney.

Table 2.2 summarises the frequency of rail services to and from Central Station.

Table 2.2: Frequency of Rail Services

Rail Line	AM (8am - 9am)		PM (5pm – 6pm)	
	To City	From City	To City	From City
T1 North Shore & Northern Line	19	20	20	16
T1 Western Line	20	20	14	19
T2 Airport Line	14	8	8	12
T2 Inner West and South Line	12	8	8	11
T3 Bankstown Line	8	6	6	8
T4 Eastern Suburbs & Illawarra Line	12	16	17	18
T6 Carlingford Line	2	1	2	2
Blue Mountains Line	4	1	2	4
Central Coast & Newcastle Line	8	2	2	7
South Coast Line	4	1	3	4
Southern Highlands Line	4	1	4	3
Total	**107**	**84**	**86**	**104**

2.4 Pedestrian Infrastructure

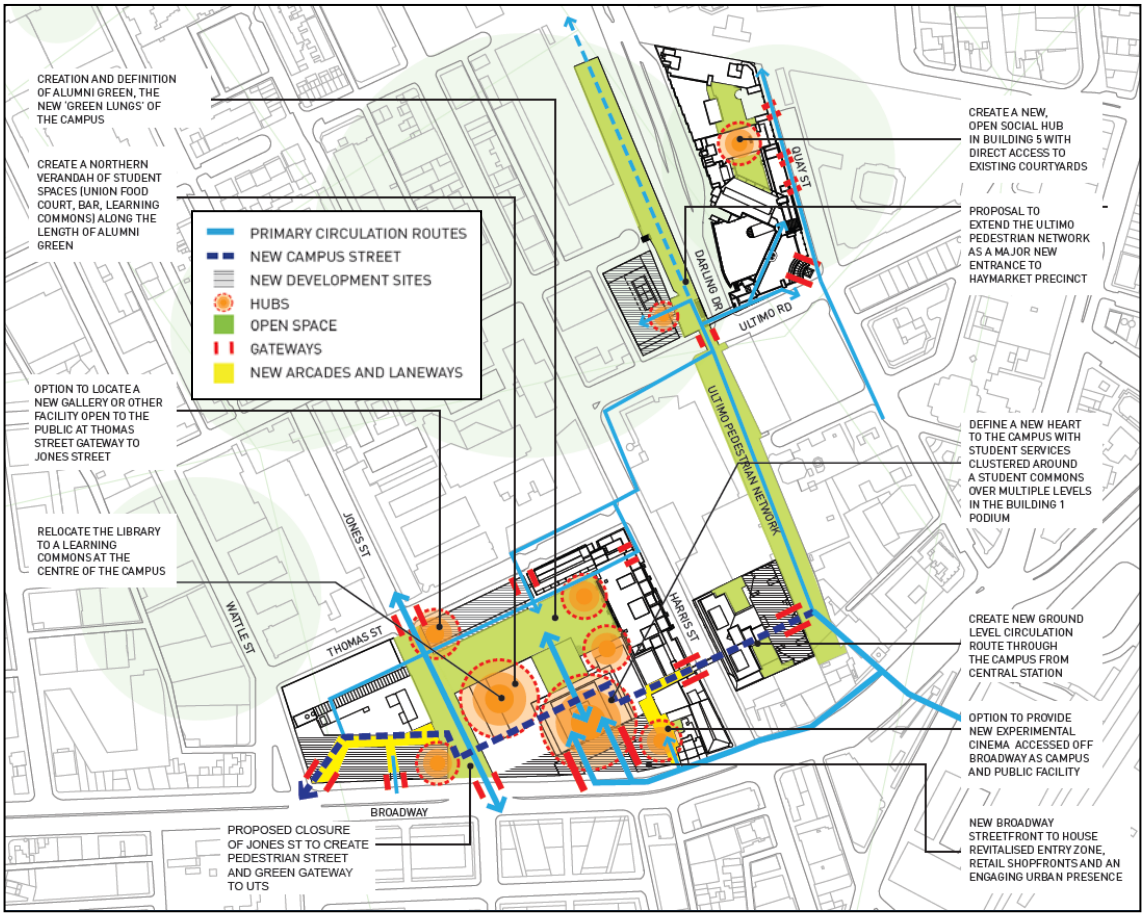
The pedestrian network surrounding the site is well established with pedestrian paths located on both sides of the surrounding roads.

Safe crossing points in vicinity of the site include the following pedestrian crossings:

- two pedestrian crossings at the frontage of Building 2 of the Chippendale Way/ Broadway intersection,
- all legs of the George Street/ Harris Street/ Regent Street intersection.

Within the Campus, UTS has proposed and implemented several pedestrian links as part of the original City Campus Masterplan to enable the connection of key hubs across its City Campus. The Masterplan included the plan to close Jones Street to vehicular traffic from Broadway, which has been implemented. The pedestrian network that was proposed as part of the original City Campus Masterplan is shown in Figure 2.3.

Figure 2.3: UTS Campus Hubs and Pedestrian Network

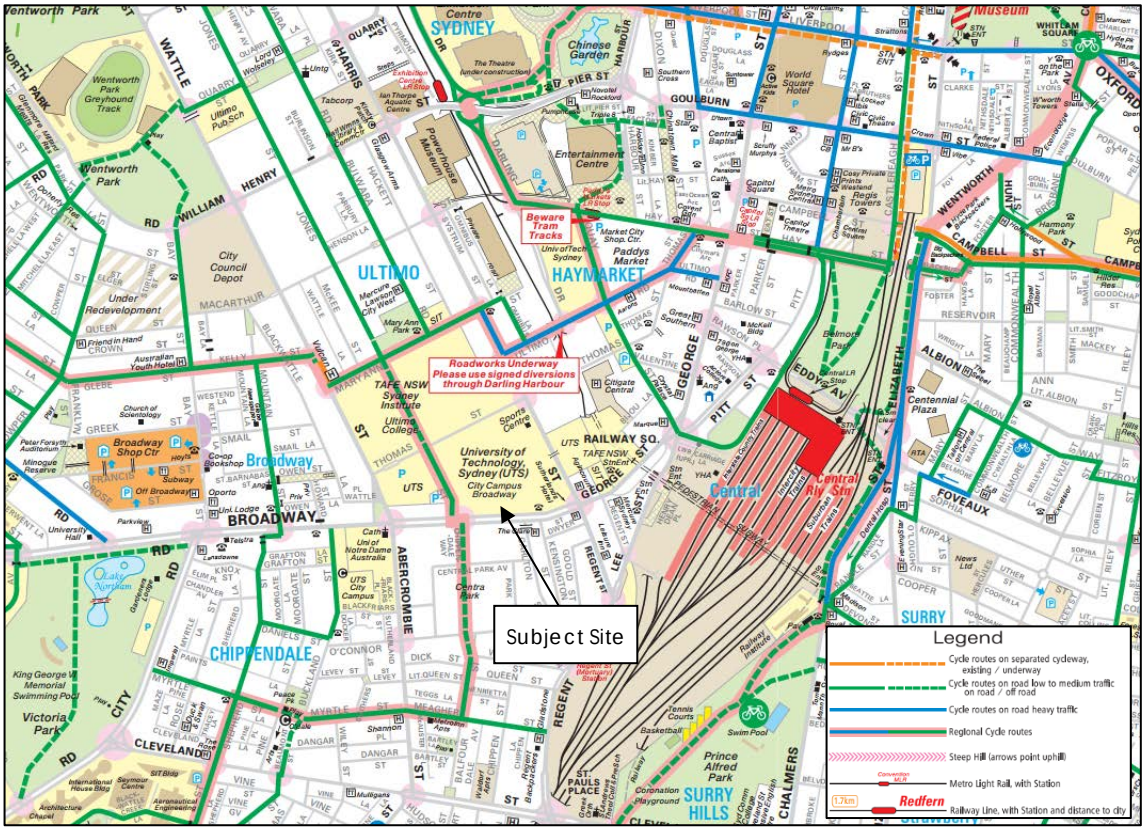


Source: UTS City Campus Masterplan, 2008

2.5 Cycle Infrastructure

The site is located within close proximity to both on and off-road cycling facilities as indicated in an extract from the City of Sydney's cycle network map shown in Figure 2.4. The nearest dedicated cycle facility surrounding the site is the 4m wide shared path along Jones Street between Thomas Street and Mary Ann Street. This section of Jones Street is closed to vehicular traffic and is a key thoroughfare for the TAFE Sydney Institute.

Figure 2.4: Cycle Network



Source: City of Sydney Cycling Map, 2015

Bicycle parking facilities are provided throughout the UTS City Campus with the nearest facilities to the site located at:

- Building 10 car park (entrance located at the corner of Thomas Street and Jones Street)
- Multi-Purpose Sports Hall.

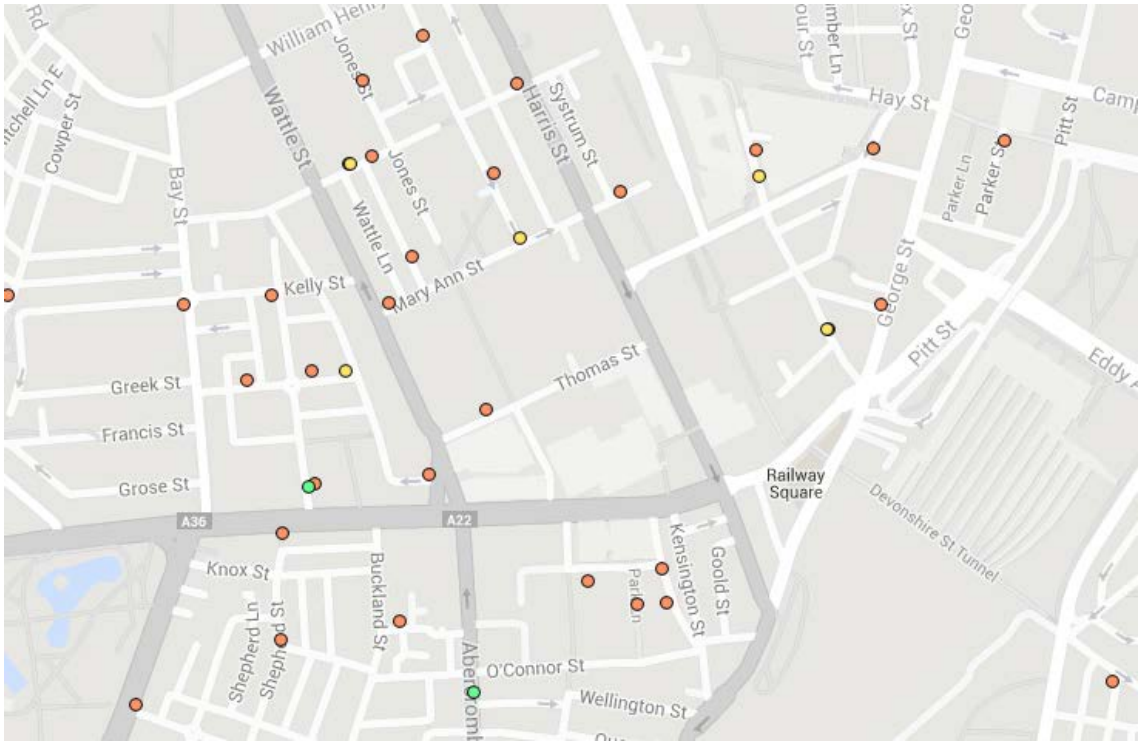
The Building 10 car park currently accommodates 288 bicycle parking spaces, 260 lockers, 14 toilets and 28 male and female showers. These bicycle parking spaces are an initiative of the original Concept Plan to provide staged increases in bicycle parking provision at UTS.

Figure 2.5: Building 10 Bicycle Parking

2.6 Local Car Sharing Initiatives

The locations of go-get car sharing pods in the vicinity of the site are shown in Figure 2.6.

Figure 2.6: Car Sharing Pods



Source: City of Sydney, accessed 12 December 2015

2.7 Travel Mode Share

2011 census data shows the existing Journey to Work patterns of people working in the areas in and around the UTS Campus. Travel Zone 159 contains the Broadway precinct of the UTS Campus and also the TAFE located adjacent to UTS as shown in Figure 2.7. The travel mode split of the travel zone 159 is summarised in Table 2.3.

Figure 2.7: Travel Zone 159

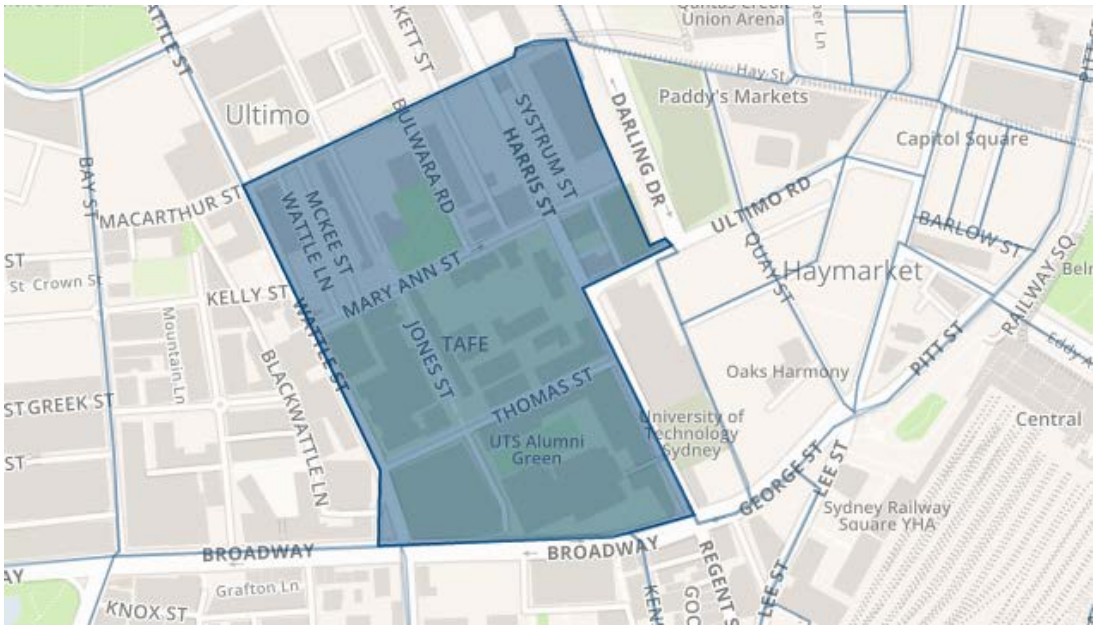


Table 2.3: Journey to Work Comparison

Mode	2006 Mode Share	2011 Mode Share
Vehicle Driver	29%	23%
Vehicle Passenger	4%	3%
Train	38%	42%
Bus	17%	18%
Walked	-	8%
Other	12%	4%
Mode not stated	-	2%
Total	12%	100%

Data source: 2006 data from Positive Traffic (2015), 2011 data from http://visual.bts.nsw.gov.au/, accessed 13/11/2015

The data presented in Table 2.3 relates to employees working in the Travel Zone 159. Due to the nature of the data (i.e. journey to work data from the census), it is unlike to include the travel behaviour of students.

UTS has conducted more recent travel behaviour of their staff and students. This data was presented in the UTS' *Sustainable Transport Plan 2013-2015*.

The data presented in the travel plan provides separated modal split for staff and students at UTS and is summarised in Table 2.4.

Table 2.4: UTS Student and Staff Mode Share

Mode	Staff	Students
Car	19%	7%
Train	43%	52%
Bus	22%	24%
Walk	10%	11%
Cycle	6%	6%
Other	1%	1%
Total	**100%**	**100%**

The modal share split for staff as presented in the travel plan is comparable with the Census data in Table 2.3, where 23% of people drive, 42% catch a train, 18% catch a bus, compared to 19% of drivers, 43% of train and 22% of bus users.

The modal share for students suggests that there is a far greater percentage of students travelling by non-car modes of transport with only 7% driving to the university, 52% catching a train, and 24% catching a bus.

2.8 Strategic Context

2.8.1 NSW Long Term Transport Master Plan (2012)

The NSW Long Term Transport Master Plan (LTTMP) sets the framework for the NSW Government to deliver an integrated, modern transport system. The final version of the NSW Long Term Transport Master Plan was released in December 2012 and sets out 220 short, medium and long term actions to integrate, grow, modernise and manage the transport network across NSW.

The LTTMP provides integrated advice with regards to transport policy; identifying solutions to develop and manage the NSW's transport system. Forming part of the LTTMP is Sydney's Rail Future and Sydney's Light Rail Future. These are long-term plans to increase the capacity of Sydney's rail network, update existing infrastructure and expand Sydney's transport network through the introduction of light rail through the CBD.

The overall aim of the plan intends to increase the capacity of the Sydney's transport network by improving and integrating transport modes including rail, light rail, bus, cycling and walking. The actions set by the LTTMP have significant emphasis on non-car travel modes, with the overall intention to improve the competitiveness of public transport compared to car travel.

2.8.2 Sydney City Centre Access Strategy 2013

The Sydney City Centre Access Strategy (SCCAS) outlines NSW Government's strategy to deliver a fully integrated transport network in Sydney's city centre. It covers all modes of transport, and includes pedestrian and cyclist strategies for the city centre.

The strategy takes into account the potential increase in the number of people accessing the city centre including planned major developments such as UTS. To support the increase in growth, the strategy aims to make key improvements to the rail network to support "up to 100,000 more people an hour" on rail transport.

A more integrated transport system is aimed in the SCCAS with key transport hubs that would allow people to transfer between the different transport modes. Broadway has been identified as a key link in the transport network as a major bus route and as a transport precinct.

2.9 Relevant Transport Studies

2.9.1 UTS Broadway Traffic Report, Halcrow, May 2009

The 2009 Halcrow Traffic report was prepared as part of the original UTS Concept Plan proposal. The report investigated the impact of the proposed Concept Plan and associated traffic generation on the existing road network. It was determined through intersection modelling that there was sufficient capacity within the existing road network to accommodate the proposed UTS City Campus expansion.

2.9.2 Transport Management and Accessibility Plan (TMAP) Report, October 2009

In addition to the UTS Broadway Traffic Report, a TMAP was prepared by Halcrow to support the original UTS Concept Plan proposal. The report investigated public transport capacity and the existing and future travel patterns of students. The report forecasts a notable increase in bus and rail patronage from students but also notes that the patronage is "modest in the context of the current system" and well below the population and expected future growth of the surrounding area.

2.9.3 UTS City Campus, Broadway Precinct – Modification to Approved Concept Plan, Positive Traffic, July 2015

Positive Traffic has prepared a traffic report in July 2015 to support a S75W modification to the original Concept Plan. The S75W modification has been submitted and is now subject to approval by the Department of Planning and Environment (DP&E). Following approval, this report will supersede the 2009 traffic report prepared in support of the original Concept Plan for UTS.

The traffic assessment determines that the proposed modifications, which include an increase in floor area from the redevelopment of Building 2, would not generate any adverse increases in vehicle traffic as no car parking has been provided. Instead, it is expected that trips related to non-car travel modes would increase, in particular public transport usage. The capacity of the public transport network was assessed and determined to be capable of accommodating the increase in patronage generated from the users of Building 2.

2.9.4 UTS Sustainable Transport Plan

UTS is strongly committed to its sustainability and environmental goals. One of the main sustainability objectives is to reduce the number of people driving to the campus. As such, UTS has developed a number of plans across various facets of its operation. One of which is in the transport area – UTS Sustainable Transport Plan 2013 – 2015. UTS promotes the use of public transport for their staff and students as the preferred mode of travel. They do this through marketing and information provision wherever possible. In addition, UTS also encourages active transport modes such as walking and cycling through the provision of on-campus facilities including end of trip facilities.

The UTS' Sustainable Transport Plan includes the following committed actions:

- Improving cycling facilities – The Draft UTS Cycling Strategy 2011 recommended doubling the number of walk and cycle trips by staff and students (based on 2008 travel mode shares) which translates to a target of 25 per cent of staff and students travelling to the campus by active transport. UTS is committed to upgrading its bicycle facilities

with provision of additional bicycle parking spaces with the aim of significantly increasing the number of cyclists at UTS. To facilitate this modal shift to cycle, it is proposed to provide more than 1,500 bicycle parking spaces, approximately 900 lockers and approximately 110 shower cubicles.

- Improving Bike Parking – It is proposed to transform Building 10 into a large bike hub where the vast majority of cycle parking spaces (approximately 700 bicycle parking spaces) would be located. In addition, other buildings scatter across the campus including the recently open Dr Chau Chak Wing Building would have additional bicycle parking spaces. Building 1 which is located adjacent to Building 2 (the subject of this SSDA) would have approximately 150 bicycle parking spaces. In the future, there would be in excess of 1,500 bicycle parking spaces. These bicycle spaces are strategically located so that it is within easy reach of staff and students on campus.
- Broadway Link – This is a City of Sydney Council initiative to enhance pedestrians and cyclists safety and amenities by providing a link for pedestrians and cyclists between Ultimo, Chippendale and Darlington. The link starts at Thomas Street near Harris Street and travels along Jones Street through UTS then on through the Central Park development and into Chippendale. This further connects to Wilson Street Cycleway providing access to Newton and Erskineville for cyclists. The Broadway Link would significantly improve access to the UTS campus across Broadway. UTS has been and will continue to work collaboratively with the City of Sydney to ensure the design of the link benefits all pedestrians and cyclists accessing the campus.
- Goods Line – The recently opened Goods Line is a shared pedestrian and cycle path providing a traffic free, accessible thoroughfare connecting Central Railway Station with Darling Harbour passing in front of a number of UTS buildings.
- Electric Cars and Charging Stations – UTS has provided three electric car charging station inside its Building 11 basement car park.

2.9.5 UTS City Campus Masterplan Cyclist Facility Strategy

As part of the UTS City Campus Masterplan 2020, UTS developed a bicycle parking strategy for staff and students. The '*Cyclist Facility Strategy*' was prepared by Halcrow in September 2011.

The strategy determined the future bicycle parking requirements of the Campus based on Council parking rates as stipulated in the Development Control Plan and the future on-site population of the Campus.

Surveys of the existing Campus population were carried out and indicated that approximately 40 per cent of the Campus EFTSL was on-site at any one time. It was assumed that staff population on site would also be equivalent to 40% and would be consistent for students and staff in future years.

The results of study determined that 1,008 bicycle parking spaces would be required for the whole City Campus which includes 890 spaces for students and 118 spaces for staff.

3. Consultations with Authorities

A meeting was held with Transport for NSW (TfNSW) and the CBD Coordination Office on 16 December 2015. In the meeting, an overview of the proposed project was given to the TfNSW and CBD Coordination Office. The transport and traffic impact assessment methodology and results during normal day to day operation and during construction were also discussed. Items raised in the SEARS under the heading of Transport and Accessibility were also discussed.

TfNSW and CBD Coordination Office were generally supportive of how the issues raised in the SEARS are proposed to be addressed in the transport impact assessment.

Furthermore, in the meeting the following two additional issues were raised:

- the effects to bus operation along the kerbside lane in the eastbound direction on the northern side of Broadway due to construction vehicles accessing Jones Street from the proposed temporary access off Broadway, and
- safety concerns associated with additional pedestrian trips at the intersection of Broadway/George Street with Harris Street/Regent Street.

In relation to Item 1 above, this is addressed further in the construction traffic management prepared by GTA to accompany the SSDA submission.

In relation to Item 2, this is addressed further in Section 5.6.

In addition, TfNSW mentioned that the State Government is proposing to enhance public transport services in the area which includes the Sydney CBD to Parramatta Strategic Transport Plan. This plan is investigating a number of public transport scenarios between Burwood and Sydney CBD. This includes a bus rapid transit route along Parramatta Road (and its extensions) between the CBD and Burwood. This would only improve and enhance travel options for students and staff travelling to and from UTS by public transport.

4. Development Proposal

4.1 Concept Plan Modifications

As part of the staged delivery of the BPCP and as expected in its natural evolution, there have been a number of modifications to the Concept Plan. Of note, Modification No 5 to the Concept Plan provides for the complete redevelopment of Building 2, including additional floors above a new podium building.

4.2 Overview of Proposed Development

This SSD Application seeks approval for the following components of the development:

- Site preparation works, including demolition and clearance of existing Building 2 down to approximately ground level and associated tree removal;
- Retention and re-use of existing basement Level 1 and Level 2;
- Construction and use of a new podium building fronting Broadway (Building 1 extension and new Building 2);
- Construction and use of new floors above new Building 2 podium;
- Public domain improvements surrounding the site;
- Landscaping works to roof levels;
- Retention of existing vehicle access and parking arrangements; and
- Extension and augmentation of physical infrastructure / utilities as required.

The new floor space will accommodate a range of educational and ancillary educational uses, such as:

- Library
- Research
- Teaching Space
- Informal Learning Space
- Student Centre
- Student Union Spaces
- Food and Beverage Outlets
- Academic (including Faculty space)

The modified development will allow for a total gross floor area (GFA) of 39,636m^2 for the new Building 2 and an additional 6,917m^2 GFA for the extension to the Building 1 podium. This is an increase of 17,540m^2 GFA for Building 2, which has an existing floor area of 22,096m^2 GFA.

In total, the increase equates to an increase of approximately 29 per cent from the approved Concept Plan of 84,750m^2 in the UTS Broadway Precinct.

A more detailed and comprehensive description of the proposal is contained in the Environmental Impact Statement (EIS) prepared by JBA.

4.3 Campus Population

The traffic assessment carried out by Positive Traffic (2015) includes a comparative summary of the expectant and actual student population at the UTS City Campus. The approved Concept

Plan has planned facilities and services to accommodate an expectant student load of 15,000 EFTSL (Equivalent Full Time Student Load) by 2015.

Positive Traffic (2015) has indicated that as of 2014, the student load was 17,000 EFTSL. It is now expected that by 2020 there would be a demand of 19,500 EFTSL. This is an increase of 4,500 EFTSL from the approved Concept Plan.

The projected increase in student load would be accommodated by the additional floor area proposed in Building 2 and Building 1 in the Modified Concept Plan. Of the additional 4,500 EFTSL, it is expected that approximately 2,700 EFTSL would be accommodated in the proposed Building 2 and Building 1 extension. In terms of staffing number, the proposed additional floor areas in Buildings 1 and 2 require an additional 300 staff.

4.4 Proposed Vehicle Access and Parking

The development proposal does not include any on-site car parking provision and as such additional vehicle access will not be required.

This is consistent with the approved Concept Plan.

4.5 Proposed Loading Arrangements

In general, the proposed redevelopment of Building 2 will retain the existing loading arrangements. This includes utilisation of the existing loading docks located within the basement level 2 of Building 1.

The basement level loading areas have recently been expanded to include a new loading area for use by the new Library Retrieval System. This loading dock would also be accessible for Building 2 loading operations.

The Building 1 loading docks are accessed from Thomas Street.

5. Traffic and Transport Assessment

5.1 Traffic Impact Assessment

The development of Building 2 and Building 1 extension will include an increase in floor area of 24,457m^2. However, it is not expected that the proposed extension of Buildings 1 and 2 would result in additional development traffic (vehicle trips). Consistent with the approved Concept Plan, it is not proposed to provide any on-site car parking spaces. It is further noted that the existing building also does not include any on-site car parking spaces. As such, the traffic generation of the proposal would likely remain similar to existing conditions. The limited availability of parking off-site further discourages the use of travel by car, with nearby on-street parking imposed with time restrictions, resident parking restrictions and parking fees.

In addition, a significant portion of the additional floor area in Building 2 and 1 would be utilised for low traffic generating land uses such as informal learning space, student union space, research, library etc. The food and beverage outlet land uses would likely generate the highest rate of users however, this land use would account for a small percentage of the overall Building 2 development.

Any development traffic generated by the proposed development would be those relating to service vehicles which would occur largely outside of the peak periods. This is further discussed in Section 5.5 below.

As such, the proposed development would not create any traffic impacts to the surrounding road network, and that it would not require any road improvements to accommodate the proposed development.

5.2 Approved Concept Plan: Public Transport Capacity

The Concept Plan for the modified development originally included an increase in floor area for 31,511m^2 for the Building 2 and Building 1 extension. Positive Traffic (2015) has indicated that the modified proposal which previously included an increase of floor area by 31,511m^2, would have the following implications on public transport:

- There would be an additional trip generation of 10 to 20 per cent from the approved Concept Plan. A large share of the additional trip generation would be accommodated by public transport.
- An increasing supply of residential dwellings in the surrounding areas, particularly to the south of UTS will promote an increase in mode share for walking and cycling.
- Journey to Work data indicates a trend away from car usage for the travel zone containing UTS, and an increase in mode share for public transport. This includes a 6 per cent increase in public transport usage, from a 55 per cent mode share in 2006 and a 61 per cent mode share in 2011; and a 7 per cent decrease in car usage from a 33 per cent mode share in 2006 and 26 per cent mode share in 2011.
- The excellent accessibility of public transport from the site and limited parking availability discourages high car usage to the site and correspondingly encourages public transport usage.

From consultation with TfNSW, Positive Traffic notes that there is available capacity within the bus services serving the UTS campus at Broadway. Positive Traffic went to state that if additional

capacity is required, there are mechanisms in place to enhance and improve bus services capacity.

In addition, the above increase in public transport patronage is expected to be accommodated in the upgraded transit system that is proposed as part of the long term planning of Sydney CBD. As discussed in Section 0, the LTTMP (2012) and SCCAS (2013) includes plans to improve the rail and bus network in the CBD and increase public transport capacity by the implementation of the Central Sydney East Light Rail (CSELR) project.

The strategic long term planning for the Sydney CBD also includes improvements to walking and cycling providing additional capacity for the non-car travel modes to the site.

The improvements to the public transport network aim to support the projected population growth of the overall Sydney City including the growth of UTS City Campus. The additional floor area proposed in the redeveloped Building 2 and Building 1 extension is expected to contain a minor increase in patronage to public transport compared to the general growth in Sydney City.

Based on the above implications to public transport, Positive Traffic (2015) has indicated that the following factors should be considered to support future growth in trip generation at UTS;

- conveniently sited bus stops
- adequate pedestrian connections to bus stops and Central Station
- adequate public transport information for students and staff
- bicycle parking.

5.3 Non-Car Trips

An estimate of the number of non-car trips that would be generated by the proposed development is provided below.

The non-car trips generated by the proposed development has been estimated by applying the percentage travel mode split to the expected additional student and staff population. The current travel mode splits as presented in Table 2.4 have been modified for the subject development to account for a 0% of trip generation from car travel, given that no parking supply is provided.

The modified travel mode share and trip generation for the proposed development is detailed in Table 5.1.

Table 5.1: Travel Mode and Trip Generation

Mode	Current Travel Modes		Modified Travel Modes		Future Daily Trips		
	Staff	Students	Staff	Students	Staff	Students	Total
Train	43%	52%	53%	56%	159	1,518	1,677
Bus	22%	24%	27%	25%	82	686	768
Car	19%	7%	0%	0%	0	0	0
Cycle	6%	6%	7%	7%	21	178	199
Walk	10%	11%	13%	12%	38	318	356
Other	1%	1%	0%	0%	0	0	0
Total	**100%**	**100%**	**100%**	**100%**	**300**	**2,700**	**3,000**

Table 5.1 indicates that for the additional 2,700 students and 300 staff members arising from the proposed development would result in a total of 1,677 one-way train trips and 768 one-way bus trips. The remaining 555 one-way trips would be either walk or cycle trips.

To assess the impact of the additional trip generation on the public transport network, an analysis of Central Railway Station barrier counts have been undertaken as shown in Table 5.2.

Table 5.2: Central Railway Station Patronage

Period	Ins	Outs	Total
2:00am-6:00am	900	900	1,800
6:00am-9:30am	10,400	42,100	52,500
9:30am-3:00pm	21,400	30,200	51,600
3:00pm-6:30pm	45,500	16,300	61,800
6:30pm-2:00am	19,000	7,700	26,700
Daily	**97,200**	**97,200**	**194,400**

Source: http://visual.bts.nsw.gov.au/barrier/, accessed 17/12/15

Table 5.2 indicates that during the peak periods, Central Railway Station sees up to 61,800 commuters for a 3.5 hour evening peak period, and 194,400 commuters on a daily basis.

The additional 3,350 two-way train trips expected to be generated by the proposed development is approximately five per cent of the total patronage generated at Central Railway Station.

In the light of this, it is considered that the additional train trips generated by the proposed development is unlikely to result in adverse effects to existing and future capacity of train services.

Similarly, it is expected that the additional bus, cycle and walk trips would not result in any adverse effects to existing and future infrastructures.

5.4 Effects of Proposed CBD and South East Light Rail (CSELR)

The CBD and South East Light Rail (CSELR) project is a new light rail line from Circular Quay to Randwick/Kensington. It is currently under construction and is expected to be operational in 2019. The nearest stop to UTS City Campus would be the Rawson Place stop which is approximately 500m walking distance.

The CSELR project would enhance existing travel choices to and from UTS City Campus, especially for students and staff living in the eastern suburbs.

The CSELR project is expected to move around 13,500 passengers every hour. Given that the proposed development is expected to generate approximately 3,000 one-way trips per day, it is not expected that the proposed development would create any adverse impacts on the CSELR project.

5.5 Service Vehicles Generation

The proposed development is expected to generate relatively low volume of service vehicle movements. Any traffic movements arising from the service vehicles would occur outside of the peak periods.

There is no published data relating to service vehicle generation for educational facilities. As a conservative approach, service vehicle generation has been estimated based on the service vehicle generation for commercial developments.

In this regards, it is noted traffic generation surveys conducted on behalf of RMS (Trip Generation and Parking Generation Surveys (Office Blocks) by GTA Consultants (September 2010)) indicates that commercial developments have service vehicle generation rates of approximately 0.11 service vehicle trips per day per 100m^2 and 0.025 vehicle trips per peak hour per 100m^2.

Based on a proposed additional floor area of 24,457m^2, the proposed development would generate approximately 28 service vehicle trips per day and 6 service vehicle trips per peak hour.

The low volume of service vehicles is not expected to create any material adverse effects to the operation of the local road network.

The vast majority of service vehicles accessing the site would be vehicles up to an Australian Standard 6.4m long small rigid vehicles with a large proportion of service vehicles being a van/utility type vehicle. Occasionally, waste collection vehicles up to an Australian Standard 8.8m long medium rigid would also access to conduct waste collection.

5.6 Effects of Pedestrian Trips

In the meeting with TfNSW, concerns were raised in relation to the effects of the additional pedestrian trips at the Broadway intersection with Harris Street and Regent Street due to existing pedestrian movements and the constrained pedestrian standing area at the intersection. It was requested that safety issues be considered at this intersection.

To address the safety concern raised by TfNSW, historical crash data was sourced from RMS for the five year to 31st December 2014. The crash data indicates that in the five year period, there were a total 28 crashes occurring within 50m of the intersection. Of these 28 crashes, 13 crashes involving pedestrians. There were no fatalities recorded.

Table 5.3: Broadway-Harris Street Crash Data

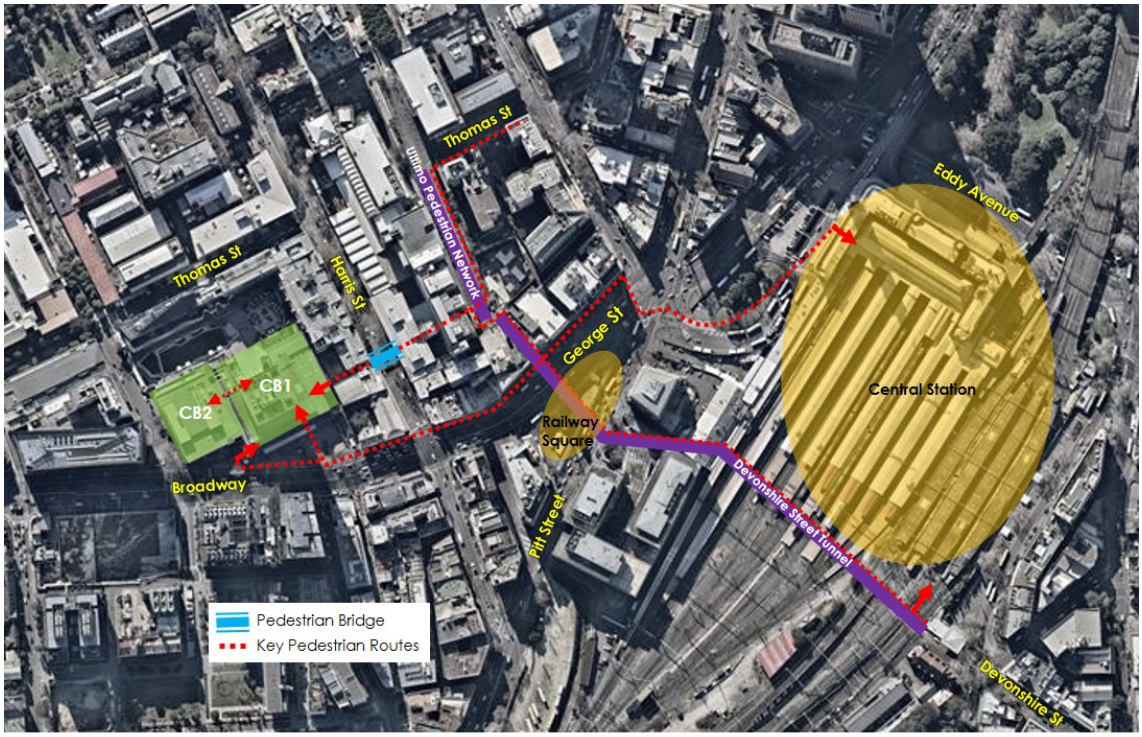
Year	Non-Pedestrian Crashes			Pedestrian Crashes			All Crashes
	Fatality	Injury	Non-Casualty	Fatality	Injury	Non-Casualty	
2010	0	3	0	0	3	0	6
2011	0	3	1	0	2	0	6
2012	0	1	0	0	5	0	6
2013	0	4	1	0	0	0	5
2014	0	1	1	0	3	0	5
Total	0	12	3	0	13	0	28

A close examination of the crash data indicates approximately half of the pedestrian crashes (seven crashes) relate to a pedestrian being hit by a vehicle travelling on the nearside lane. However, this type of crashes does not appear to be concentrated at one location, but instead spread across all corners of the intersection.

However, as indicated previously, the proposed development is expected to generate an additional 3,000 one way trips per day. It is expected that a majority of these trips would become a pedestrian trip to/from the eastern side of the subject site, potentially travelling the intersection of Broadway with Harris Street. However, this is expected to constitute a relatively small proportion of pedestrian volume currently using the intersection.

In addition, there are alternative routes available for pedestrians to access the UTS City Campus site from the east without having to travel through the Broadway intersection with Harris Street. These are shown Figure 5.1.

Figure 5.1: Alternative Pedestrian Route from East



One such route permits pedestrians to walk from Central Railway Station to the proposed Building 2 without using the footpaths along Broadway and across Harris Street at grade. It involves the use of the Devonshire Street tunnel to the southern end of the Goods Line which has now been transformed into a pedestrian and cycle shared area. From here, escalators and in the near future a lift would be available to allow easy access up to Building 6 (Peter Johnson Building). The public passage way inside Building 6 connects to a pedestrian link between Buildings 3 and 4 via a foot bridge across Harris Street. The pedestrian link provides direct access into the lobby area of Building 1 which would also be connected to the proposed Building 2.

The above described alternative link is a public access way for pedestrians connecting Central Railway Station to UTS City Campus.

It is recommended for the situation at the Broadway intersection with Harris Street that this is continued to be monitored to ascertain the effects of the expected pedestrian trips through this intersection following the occupation of the proposed building. It is also recommended that UTS to constructively work collaboratively with all stakeholders to resolve any potential issues.

6. Parking Assessment

6.1 Car Parking Requirement

Parking requirement for the proposed development has been assessed the City of Sydney Council's Sydney Local Environmental Plan 2012 (LEP). The LEP requires parking for education facilities to be provided at a maximum parking provision rate of one space per 200m^2.

The proposed development includes a total floor area of 46,553m^2. Based on the above LEP maximum car parking provision rate, the proposed development has a maximum permissible parking requirement 233 car parking spaces.

As discussed in the preceding sections of this report, the proposed development does not include any on-site car parking spaces. This is consistent with the remaining UTS City Campus where parking provision is not provided or is limited. The proposed of nil car parking spaces within the proposed building is also consistent with the approved Concept Plan.

In addition, given the close proximity of the UTS site to existing transport hubs, namely Central Railway Station which is a key transport interchange with the Sydney metro public transport network and bus stops at the site's door step on Broadway as well as those at the Railway Square bus terminus, with high quality and high frequency public transport services, it is appropriate to provide nil parking spaces for the proposed development. The proposed zero parking space provision for the proposed development is also consistent with various State Government's strategic transport policies and plans aiming to reduce reliance on travel by private vehicles and encourage greater modal shift towards more sustainable travel modes.

It is further noted that UTS has an existing sustainable travel plan with the sole aim of reducing travel to the site by private vehicles and encourage the use of more sustainable and healthy travel modes such as public transport and walk/cycle. A framework for the development and implementation of a green travel plan for the proposed building is contained in this report in Section 7 as well as in Appendix A. The two travel plans would be integrated into one document to provide an overarching green travel plan applicable to the UTS City Campus.

Considering the availability and capacity of public transport services surrounding the site, the proposed zero car parking space is not expected to create any significant increases in car parking demand with users of the site generally discouraged in car usage. As such, the proposed zero parking space provision for the proposed development would be satisfactory.

6.2 Bicycle Parking Requirements

6.2.1 Existing Bicycle Parking Monitoring & Demand

UTS undertakes regular monitoring of its bicycle parking demand with occupancy surveys carried out two to four times a month. The results of the demand surveys carried out between 2013 and 2015 have been analysed and are summarised in Table 6.1, with detailed results of the surveys provided in Appendix B.

Table 6.1: UTS Average Demand & Occupancy of Bicycle Parking (2013-2015)

Year	Min. Demand	Max Demand	Average Demand	Average Occupancy	Supply[1]	Difference in Supply
2013	122	193	158	78%	204	-
2014	98	183	140	55%	253	+24%
2015	84	199	157	33%	483	+91%
Average	**101**	**192**	**152**	-	-	-

[1] Between 2013 and 2015, the supply of bicycle parking had altered twice every year. Thus the average supply is interpolated from average occupancy and average demand.
[2] Summary above does not include bicycle parking demand during holidays, Ride to Work Day, O'Week or during exam periods.

As shown in Table 6.1, the average demand for bicycle parking has been 158, 140 and 157 spaces for the years 2013, 2014 and 2015 respectively. This indicates that demand for bicycle parking has been relatively consistent with a 10% variation in 2014 from other years.

Occupancy on the other hand has reduced significantly, due to an increase in parking supply including an average of 204 spaces available in 2013, 253 spaces in 2014 and an almost doubling of the supply to 483 in 2015.

The results indicate that bicycle parking supply does not have a considerable impact upon the demand for bicycle parking which has been consistent despite significant increase in supply over the years.

The above bicycle parking demand would be generated by the total student and staff population on the site at the same time. To gain an appreciation of the total student and staff population on the site at the same, Halcrow conducted a study at the UTS City Campus in 2010. The Halcrow study indicates that approximately 40 per cent of the total student population (EFTSL) is generally on-site at the same time (see Section 2.9.5). Table 6.2 summarises an analysis of the expected student and staff population during the 2013-2015 bicycle parking demand surveys.

Table 6.2: Campus Student/Staff Population On-Site at Any Given Time

Year	Actual Broadway Campus Loading		Estimated Loading on Campus at any One Time [1]		Total Population
	EFTSL	Staff Loading	Student Loading	Staff Loading	
2013	15,340	2,134	6,136	854	6,990
2014	17,100	2,144	6,840	858	7,698
2015	17,602	2,311	7,041	924	7,965

[1] Population on-site, on Campus at any one time, has been estimated to be 40% of total Campus loading based on results presented in the *UTS City Campus Bicycle Strategy* (Halcrow, 2014).

Table 6.3 presents the existing bicycle parking demand using the 2013-2015 survey data.

Table 6.3: Bicycle Parking Occupancy of On-site Population

Year	Average Bicycle Parking Demand	Student/Staff Population	Bicycle Parking Demand (Spaces per 100 Student/Staff)
2013	158	6,990	2.3 Spaces
2014	140	7,698	1.8 Spaces
2015	157	7,965	2.0 Spaces
Average	152	7,551	2.0 Spaces

The analysis presented in Table 6.3 indicates that the bicycle parking demand is approximately two bicycle spaces per 100 student/staff (on campus at any one time).

6.2.2 Required Bicycle Parking Provision

As indicated in Section 4.3, the proposed development is expected to accommodate approximately 2,700 EFTSL plus 300 staff. This is within the future demand of 19,500 EFTSL.

A 2,700 EFTSL equates to approximately 1,200 student and staff population on campus at the same time. Similarly, a 19,500 EFTSL (for the entire campus) equates to approximately 8,600 student and staff population.

From the previous analysis, based on existing bicycle parking demand, approximately 24 and 172 bicycle parking spaces would be required for the subject proposed development and the entire Broadway Campus respectively.

Allowing for future growth in bicycle parking demand (say at five spaces per 100 student/staff), this would equate to approximately 60 and 430 bicycle parking spaces required for the subject proposed development and the entire Broadway Campus respectively.

It is further noted that City of Sydney Council's development control plan requires one bicycle space per 10 student/staff for tertiary educational facilities. Based on this requirement, for a campus wide population of 8,600 students and staff, a total of 860 bicycle spaces would be required.

6.2.3 Future Proposed Bicycle Parking Provision

The bicycle parking provision for the UTS City Campus, as determined in the UTS City Campus Bicycle Strategy (see Section 2.9.5), is 1,008 bicycle spaces. The bicycle strategy utilised Council's DCP requirements for bicycle parking which stipulates a rate of 1 space per 10 students and staff.

In the light of the discussion in the preceding sections of this report, the provision of 1,008 spaces is considered to be appropriate for the UTS City Campus. It would meet the future expected bicycle parking demand on site, and exceeding the future anticipated transport modal split for bicycles. It is noted that UTS is committed to the overall objectives and targets of sustainability. In respect of this, UTS will continue to monitor the usage of bicycle facilities and will increase the supplies of bicycle parking spaces and associated facilities as the demand for these also grow.

It is further noted that the provision of 1,008 bicycle parking spaces is consistent with the UTS City Campus Bicycle Parking Strategy submitted by UTS in September 2014 to the Department of Planning & Environment as part of the Approved Conditions for the Thomas Street Building (MP09-0213). Condition D5 in that approval is read as follows:

> ***D5 Bicycle Parking***
>
> *Prior to occupation of the building, a bicycle strategy shall be submitted to the Department of Planning and Infrastructure. The strategy should include details of any existing or proposed Council cycle paths, the number and location of bicycle parking spaces on campus, and any facilities for cyclists such as showers and lockers.*

It is further noted that since the preparation of the UTS City Campus Masterplan Cyclist Facility Strategy (Halcrow, September 2011), the expected student loading for 2020 has increased, as discussed in Section 4.3. However, regular surveys of bicycle parking occupancy indicates that demand for bicycle parking has not increased over the years and in 2015 was on average 33 per cent occupied and the demand bicycle parking rate was surveyed to be two spaces per 100 students/staff on site. Given the low demand for bicycle parking, additional parking provision from the UTS City Campus Bicycle Parking Strategy is not deemed to be necessary at this point.

Instead, UTS intends to continue monitoring of its bicycle parking demand and provide additional parking as required. This monitoring and management of UTS bicycle parking is to be carried out by UTS's Sustainability Group.

The Sustainability Group is a team at UTS responsible for ensuring the sustainability of UTS's infrastructure and operations. The group is led by a team of three including a Sustainability Manager, Sustainability Coordinator and a Sustainability Engineer. This team would be involved in actively monitoring bicycle facilities and improving when required.

It should be noted that the Sustainability Group at UTS has shown a history of success in its endeavours at UTS. The UTS Sustainability Group has positively contributed to the design of a number of UTS development projects which have been honoured with numerous sustainability related awards and accolades.

The UTS Sustainability Group has coordinated a number of "green travel" initiatives. These included:

- cycling promotion information provided to students during Student Orientation, including a familiarisation video
- cycling promotion information at all staff induction sessions
- cycling information on the UTS website
- regular cycling events held throughout the year including free bike maintenance workshops, and Ride to Work (UTS) Day
- new end of trip facilities constructed over the past two years with showers, lockers, and secure bike parking.

7. Green Travel Plan

7.1 Introduction

As required by City of Sydney's general requirements for any development consent, a green travel plan is to be prepared to promote sustainable travel. As such, a green travel plan applicable to students, staff and visitors travelling to site would be prepared prior to the occupation of the development. The section below provides a framework for the implementation of such a travel plan.

7.2 Travel Plan Framework

Transport is a necessary part of life, but it has economic, public health and environmental consequences. The transport sector is one of the fastest growing emissions sectors in Australia, and therefore is one of the key opportunities for reducing greenhouse gases. As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure a strong and prosperous community.

The physical infrastructure being provided as part of the development is only part of the solution. A green travel plan will ensure that the transport infrastructure, services and policies both within and external to the site are tailored to the users and co-ordinated to achieve the most sustainable outcome possible.

7.3 What is a Green Travel Plan

A green travel plan is a package of measures aimed at promoting sustainable travel and reducing reliance on the private car. It is not designed to be 'anti-car', but will encourage and support people's aspirations for carrying out their daily business in a more sustainable way. Travel plans can provide both:

- measures which restrict car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel, reduce the need to travel or make travelling more efficient (incentives or 'carrots').

The travel plan would promote the use of transport, other than the private car, provide choice for staff to travel to and from the site, which is more sustainable and environmentally friendly.

Indeed, there are a range of "non-car" transport options that are available at the site which have been described in this report.

Given the subject development does not include any additional parking provision, the implementation of a green travel plan would be beneficial. At the same time it is noted that the limited parking provisions on-site will act to encourage the use of sustainable transport as an alternative to car use and would help support the objectives of a green travel plan.

7.4 Key Objectives

The aim of the green travel plan is to bring about better transport arrangements for working at the site. The key objectives of the Travel Plan are:

- to encourage walking
- to encourage cycling
- to encourage the use of public transport
- to reduce the use of the car, in particular single car occupancy
- where it is necessary to use the car, encourage more efficient use.

It is the intention therefore that the travel plan will deliver the following benefits:

- enable higher mode share targets to be achieved
- contribute to greenhouse gas emission reductions and carbon footprint minimisation
- contribute to healthy living for all
- contribute to social equity and reduction in social exclusion
- improve knowledge and contribute to learning.

7.5 Site Specific Measures

The location of the site, in terms of its close proximity to a wide range of sustainable transport, is a key attribute in the justification of the development. The GTP will then put in place measures to raise awareness and further influence the travel patterns of those people working, studying or visiting the development with a view to encouraging modal shift away from cars.

The following measures are proposed to encourage students, staff and visitors to reduce travel by private cars and adopt alternative and more sustainable travel modes.

7.5.1 Staff

The following potential are available to encourage more sustainable modes for UTS staff:

- UTS could look to joining GoGet as a business to allow staff members the use of the many existing GoGet car share pods surrounding the site. The initiative is aimed at staff members who drive to the university so that they are able to run errands during the day using their car. A freely accessible car share vehicle will allow staff to run errands during the day and take alternative modes of transport to get to/from work
- compliance with the stringent parking controls applicable to the site
- allocate parking spaces to executive staff only
- when new staff is being interviewed for a position, they are to be notified that on site staff parking will not available and that there is limited on-street parking
- a car-pooling forum will be developed on the UTS website to encourage staff to travel in groups. The forum would provide a platform for people travelling on the same route to university to find each other and form groups. Existence of the forum would be advertised at information points on campus (e.g. Student Centre, digital screens around campus), social media and/ or on the campus Transport Access Guide (TAG)
- provide and improve communication technology and facilities to enable staff to conduct video conferencing and tele-working to avoid the need to travel to work and/or travelling between meeting places
- creation of street networks and associated cycle ways, footpaths and links to encourage cycling and walking
- provision of a TAG (the proposed guide is contained in Appendix A) which would be given to every new staff joining UTS
- public transport information boards to make staff more aware of the alternative transport options available (the format of such information boards would be based upon the travel access guide)

- provision of subsidised public transport tickets for new staff for say for the first three months will encourage them to make public transport their modal choice from the day at their new place of employment
- provision of bicycle parking spaces and other related trip end facilities and these to be made known to staff
- regularly promote ride/walk to work days
- a regular newsletter to be provided to all staff members bringing the latest news on sustainable travel initiatives in the area.

7.5.2 Students

The followings are some of the potential measures to encourage students to travel to the campus using non-car travel modes:

- a car-pooling forum will be developed on the UTS website to encourage students to travel in groups. The forum would provide a platform for people travelling on the same route to university to find each other and form groups. Existence of the forum would be advertised at information points on campus (e.g. Student Centre, digital screens around campus), social media and/ or on the campus Transport Access Guide (TAG)
- do not provide and/or remove any student discount to car parking fees within car parks controlled by UTS
- UTS would carry out its own travel demand management by controlling class timetabling to distribute student patronage through the day/week
- develop and promote Health and Well Being programs to encourage students into healthier living styles and ultimately encourage healthier transport options such as cycling or walking. Programs could include fitness classes at UTS gym such as bootcamp, boxing, crossfit, Pilates, yoga and Tai chi. The classes could be offered for free or for a low cost
- public transport information boards to make students and other visitors more aware of the alternative transport options available (the format of such information boards would be based upon the travel access guide)
- provide bicycle parking spaces in prominent locations
- made public transport information publicly available through notice boards in and around the campus as well as intranet websites
- promote the Green Travel Plan including the travel access guide during student open days to introduce to potential new students the facilities available on campus to facilitate travel to UTS by non-car modes.

7.6 Travel Access Guide

A travel access guide (TAG) provides information to students, staff and visitors on how to travel to the site using sustainable transport modes such as walking and public transport. The information is presented visually in the format of a map showing the site location and nearby transport modes highlighting available pedestrian and cycle routes. The information is usually presented as a brochure to be included in a welcome pack or on the back of company stationery and business cards.

A TAG has been prepared by GTA for the Building 2 site and is provided at Appendix A.

It is noted that an existing GTP (or as it is called, Sustainable Transport Plan) currently exists for the overall UTS City Campus, including an associated TAG. It is recommended that UTS update this

Sustainable Transport Plan and TAG with more up to date information upon occupation of the redeveloped Building 2 and Building 1 podium.

7.7 Information and Communication

Several opportunities exist to provide students, staff and visitors with information about nearby transport options. Connecting students, staff and visitors with information would help to facilitate journey planning and increase their awareness of convenient and inexpensive transport options which support change in travel behaviour. These include:

- Transport NSW provides Bus, train and ferry routes, timetables and journey planning are provided by Transport for New South Wales through their Transport Info website: http://www.transportnsw.info
- City of Sydney provides a number of services and a range of information to encourage people of all levels of experience to travel by bicycle: http://sydneycycleways.net/

Connecting students, staff and visitors via social media may provide a platform to informally pilot new programs or create travel-buddy networks and communication.

7.8 Monitoring of the GTP

There is no standard methodology for this but it is suggested that the GTP be monitored to ensure that it is achieving the desired benefits and modify it if required. It will not be possible at this stage to state what additional modifications might be made as this will be dependent upon the particular circumstances prevailing at that time.

The GTP should be monitored on a regular basis, e.g. yearly, by carrying out travel surveys. Travel surveys will allow the most effective initiatives of the GTP to be identified, and conversely less effective initiatives can be modified or replaced to ensure the best outcomes are achieved. It will clearly be important to understand people's reasons for travelling the way they do: - any barriers to changing their behaviour, and their propensity to change. It would be an aim of this GTP to achieve a travel mode share that is an improvement from the mode share recorded in the 2011 Census as detailed in Table 2.3.

To ensure the successful implementation of the GTP, a Travel Plan Coordinator (TPC) should be appointed to ensure the successful implementation of the GTP.

7.9 Summary

Future building owners/managers should be required to develop and utilise a travel plan to increase the use of sustainable transport. Although it is difficult to predict what measures might be achievable until the proposed expansions are occupied, the above measures provide a framework for the development and implementation of a future travel plan for the site.

It is considered that it is appropriate that any development consent is conditioned to ensure that a travel plan is implemented prior to occupation of the development.

8. Summary and Conclusion

This report has been prepared to support a development application for the redevelopment of Building 2 and extension of Building 1 podium. The report assesses the traffic and transport impacts relating to the development. The findings of the report are summarised as follows:

i The redevelopment of Building 2 and extension to Building 1 podium includes an increase of floor area of 24,457m^2. The additional floor area is proposed to accommodate an increase in the projected student population in 2020.

ii No car parking is provided in the proposed redevelopment of Building 2. This is consistent with the approved UTS City Campus Plan where there is limited to no parking provision.

iii The proposed land uses in the proposed Building 2 generally would have low trip generation rates.

iv The additional floor area proposed in Building 2 is not expected to adversely increase car traffic generation. Instead trip generation for non-car travel modes is expected to increase marginally.

v Service vehicle access and loading for the daily operation of Building 2 is to be carried out within the Building 1 basement level 2 loading docks as is the existing arrangement.

vi Service vehicle access and loading for special events is proposed to be carried on-street via Jones Street. An alternative arrangement for loading during special events is proposed as a mean to reduce the number of elevator movements through Building 1 and 2, and to allow large equipment and materials that would not fit into existing elevators.

vii Journey to Work data from census data indicates that there is a high percentage of public transport usage in the travel zone containing UTS. The 2011 census shows an increase of 6% in the mode share for public transport since the 2006 census, and a corresponding reduction in car usage.

viii The public transport network surrounding the site is extensive and would have capacity to accommodate the marginal increase in trip generation relating to the expansion of Building 2 and extension to Building 1 podium. Proposed upgrades to the public transport network as part of the strategic long term planning of the city will provide additional capacity to accommodate trip generation from Building 2 and from the overall UTS City Campus.

ix A green travel plan (GTP) is proposed to be implemented following occupation of Building 2 and extension to Building 1 podium to encourage sustainable transport methods. The GTP would aim to inform students and staff of the transport opportunities surrounding the site and implement initiatives that encourage students and staff to choose non-car modes of transport.

Overall, the proposed development is considered to be satisfactory from a traffic, transport and parking perspective.

Appendix A

Travel Access Guide

By Train: The UTS campus is located in the centre of the Sydney public transport network with Central Station located within a 10 minute walk from Building 2. Central Station provides frequent train services to the wider Sydney rail network. Adjacent to Central Station is the Central bus interchange, connecting UTS to Sydney by both bus and rail.

By Bicycle: Bicycle racks are provided throughout the UTS. Within a 2 minute walk, racks can be found behind the stairwell at the Alumni Green entrance to Building 1, within the Multi-Purpose Sports Hall and within the Building 10 car park. Shower facilities for cyclists are available within the Building 10 car park.

Several official bike routes surround UTS, making UTS a good location to get to by cycling. Cycling is a great way in which you can improve health and reduce greenhouse gas emissions.

Opal Public Transport Tickets: Opal cards are available at news agents within the local area. The Opal card is an easy, convenient way of paying for your travel on public transport. It's the only card you'll need to get around on all public transport including trains, ferries, buses and light rail.

For further public transport information go to www.transportnsw.info or call 131 500

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Transport Access Guide

How to travel to and from
Building 2, University of Technology Sydney

Disabled Access: Building 2 provides an accessible entrance and lift access to upper floors for the mobility impaired. For travel to UTS from public transport, city roads include wide footpaths and ramps to accommodate all pedestrians to walk freely.

By Bus: Building 2 is well serviced by the bus network with the nearest bus stop located within a 1 minute on Broadway and Railway Square, a major bus interchange, located within a 5 minute walk. Together the bus stops near UTS service up to 50 bus routes.

Go to the Transport Info website (www.transportnsw.info) for bus timetables and accessible bus services.

By Light Rail: The Eddy Avenue Light Rail Station is located adjacent to Central Railway Station. The light rail provides services every 10 to 15 minutes up to Dulwich Hill via Lilyfield.

Appendix B

UTS Bicycle Parking Demand Survey Results

Bike Parking Tracking (Prepared by UTS)

2013									O Week		Classes		Classes		Classes		Classes		Classes		Classes		Classes		Classes			Break		Break		Classes		Classes		Classes		Classes		Classes		Classes		Stuvac		Exams		Exams	
Date		**Wed 16 Jan**		**Thur 24 Jan**		**Fri 1 Feb**		**Mon 4 Feb**		**Fri 15 Feb**		**Tue 26Feb**		**Thur 28 feb**		**Mon 4 Mar**		**Tue 19 Mar**		**Wed 26 Mar**		**Mon 8 Apr**		**Thur 10 Apr**		**Tue 23 Apr**		**Fri 10 May**		**Fri 17 May**		**Additional Capacity**	**Wed 3 July**		**22-Jul**		**26-Aug**		**Wed 3 Sept**		**Tue 10 Sept**		**Thur 10 Oct**		**Wed 16 Oct**		**Tue 22 Oct**		**Fri 15 Nov**		**Wed 20 Nov**		**Mon 25**	
Venue	**Capacity**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**																							
Tower back	45	22	23	19	26	18	27	31	14	21	24	36	9	29	16	37	8	43	2	38	7	33	12	22	23	13	32	15	30	18	27	45	5	40	9	36	16	29	23	22	14	31	20	25	20	25	21	24	0	0	0	0	0	0
Tower front	6	3	3	2	4	1	5	4	2	5	1	11	-5	8	-2	11	-5	10	-4	9	-3	10	-4	10	-4	10	-4	8	-2	3	3	6	5	1	6	0	10	-4	12	-6	10	-4	12	-6	12	-6	10	-4	6	0	8	-2	6	0
Blg 10 parking	60	27	33	25	35	28	32	30	30	28	32	31	29	31	29	34	26	40	20	44	16	33	27	40	20	30	30	23	37	26	34	60	22	38	26	34	28	32	31	29	30	30	29	31	29	31	27	33	26	34	32	28	30	30
Jones St	0	3	-3	2	-2	1	-1	4	-4	2	-2	6	-6	3	-3	2	-2	2	-2	6	-6	6	-6	8	-8	7	-7	6	-6	7	-7	0	3	-3	1	-1	7	-7	3	-3	7	-7	3	-3	3	-3	2	-2	2	-2	6	-6	2	-2
Thomas St	0	0	0	0	0	0	0	1	-1	0	0	2	-2	1	-1	0	0	0	0	2	-2	4	-4	5	-5	2	-2	4	-4	3	-3	3	0	3	2	1	4	-1	2	1	2	1	6	-3	6	-3	2	1	3	0	2	1	1	2
MPSH	24	18	6	22	2	19	5	19	5	15	9	4	20	12	12	21	3	29	-5	25	-1	33	-9	27	-3	24	0	20	4	28	-4	24	19	5	23	1	27	-3	22	2	31	-7	24	0	24	0	30	-6	25	-1	26	-2	25	-1
Harris St Blg 4 side	4	3	1	3	1	4	0	4	0	1	3	4	0	4	0	6	-2	5	-1	4	0	2	2	4	0	4	0	4	0	4	0	4	0	3	1	8	-4	10	-6	7	-3	2	2	2	2	4	0	4	0	5	-1	5	-1
Harris St Blg 6 side	6	11	-5	10	-4	12	-6	7	-1	8	-2	15	-9	12	-6	19	-13	19	-13	16	-10	20	-14	29	-23	12	-6	21	-15	20	-14	10	10	0	8	2	21	-11	25	-15	44	-34	18	-8	18	-8	19	-9	9	1	11	-1	7	3
UPN (ABC has 10)	0	2	-2	4	-4	0	0	0	0	0	0	4	-4	2	-2	0	0	1	-1	0	0	2	-2	2	-2	0	0	2	-2	0	0	6	0	6	1	5	4	2	2	4	5	1	3	3	3	3	4	2	2	4	1	5	2	4
Library front	13	7	6	1	12	3	10	9	4	4	9	7	6	7	6	18	-5	15	-2	18	-5	15	-2	11	2	8	5	11	2	8	5	13	7	6	4	9	13	0	12	1	15	-2	10	3	10	3	11	2	7	4	7	6	6	7
Blg 5 lock -up	22	8	14	3	19	4	18	6	16	4	18	11	11	6	16	8	12	13	9	12	10	10	12	10	12	8	14	7	15	8	14	22	2	20	3	19	7	15	8	14	6	16	10	12	10	12	9	13	4	18	6	16	5	17
Blg 5B	9	5	4	5	4	4	5	4	5	5	4	7	2	4	5	6	3	7	2	8	1	8	1	5	4	4	5	4	5	6	3	9	5	4	3	6	6	3	8	1	3	6	7	2	7	2	6	3	4	5	5	4	5	4
Blg 5C	10	5	5	3	7	4	6	4	6	4	6	2	8	3	7	7	3	8	2	10	0	6	4	8	2	3	7	5	5	6	4	10	4	6	4	6	9	1	8	2	8	2	6	4	6	4	10	0	6	4	5	5	5	5
UTS Housing	62																																																					
Total *	**199**	**114**	**85**	**99**	**100**	**98**	**101**	**123**	**76**	**97**	**102**	**140**	**59**	**122**	**77**	**167**	**30**	**193**	**6**	**193**	**6**	**184**	**15**	**179**	**20**	**125**	**74**	**130**	**69**	**137**	**62**	**212**	**86**	**126**	**93**	**119**	**160**	**52**	**166**	**46**	**182**	**30**	**150**	**62**	**150**	**62**	**155**	**57**	**98**	**67**	**114**	**53**	**99**	**68**

* Total figure doesn't includ UTS Housing as area not publically accessible

Operating beyond capacity

2014						O Week		Classes		Classes		Classes		Classes		Classes		Classes		VC week		Classes		Classes		Classes		Classes		Classes			Classes		Classes		Classes		Classes		Exams		Holidays		Holidays		Holidays		Holidays	
Date		**Tue 13 Jan**		**Mon 3 Feb**		**Fri 21 Feb**		**Mon 24 Feb**		**Additional Capacity**		**Tue 4 Mar**		**Wed 12 Mar**		**Thur 20 Mar**		**09-Apr**		**15-Apr**		**01-May**		**07-May**		**20-May**		**Additional Capacity**		**Wed 6 Aug**			**Tue 19 Aug**		**27-Aug**		**11-Sep**		**08-Oct**		**16-Oct**		**03-Nov**		**17-Nov**		**04-Dec**							
Venue	**Capacity**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**		**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**
Tower back	12	1	11	0	0	0	0	0	0	0																																											
Tower front	6	5	1	7	-1	10	-4	16	-10	6		16	-10	12	-6	11	-5	12	-6	6	0	14	-8	7	-1	9	-3	0		9	-3		8	2	4	2	3	3	5	1	6	0	5	1	3	3	4	2						
Blg 10 parking	60	34	26	37	23	24	26	26	34	60		32	28	33	27	30	30	33	27	22	38	24	36	26	34	26	34	288		18	270		25	255	18	237	33	255	40	248	48	240	55	233	54	234	30	258						
Jones St	0	1	-1	3	-3	5	-5	3	-3	0		6	-6	7	-7	7	-7	4	-4	5	-5	4	-4	11	-11	6	-6	0		10	-10		3	-3	2	-2	4	-4	11	-11	10	-10	10	-10	10	-10	10	-10	4	-4						
Thomas St	3	3	0	0	3	3	0	3	0	3		3	0	1	2	1	2	2	1	1	2	1	2	2	1	2	1	3		0	3		1	2	0	3	0	3	2	1	3	0	1	2	4	-1	1	2						
MPSH	24	26	-2	19	5	19	5	31	-7	24		28	-4	26	-2	27	-3	27	-3	26	-2	26	-2	26	-2	26	-2	24		24	0		26	-2	25	-1	25	-1	20	4	22	2	25	-1	19	5	17	7						
Harris St Blg 4 side	4	5	-1	3	1	5	-1	6	-2	40		13	27	25	15	15	25	21	19	11	29	12	28	17	23	19	21	40		13	17		7	33	6	34	16	24	5	35	15	25	11	29	15	25	7	33						
Harris St Blg 6 side	10	7	3	8	2	12	-2	23	-13	10		13	-3	31	-21	13	-3	15	-5	8	2	14	-4	17	-7	13	-3	10		13	-3		9	1	14	-4	13	-3	12	-2	18	-8	19	-9	10	0	4	6						
UPN (ABC has 10)	6	4	2	2	4	1	5	3	3	10		8	2	9	1	8	2	5	5	3	7	3	7	6	4	9	1	10		1	9		3	7	0	10	2	8	2	8	2	8	1	9	1	9	2	8						
Library front	13	7	6	4	9	7	5	9	4	13		11	2	15	-2	14	-1	12	1	10	3	13	0	16	-3	12	1	13		10	3		8	5	7	3	10	3	7	3	12	1	6	8	10	3	7	5						
Blg 5 lock -up	22	11	11	4	18	4	18	8	14	22		5	17	8	14	10	12	12	10	7	15	12	10	13	9	10	12	22		8	14		6	16	10	12	9	11	8	14	13	9	9	11	8	14	8	14						
Blg 5B	9	6	3	6	3	7	2	10	-1	9		9	0	8	1	10	-1	6	3	7	2	5	4	6	3	7	2	9		10	1		7	2	8	1	9	0	9	0	9	0	8	1	9	0	5	4						
Blg 5C	10	3	7	7	3	3	7	4	6	10		5	5	8	2	9	1	8	2	8	2	9	1	7	3	7	3	10		3	7		4	6	4	6	4	6	6	4	5	5	4	6	3	7	4	6						
UTS Housing																																																				
Total *	**179**	**113**	**66**	**100**	**67**	**100**	**56**	**142**	**25**	**0**	**207**	**149**	**58**	**183**	**24**	**155**	**52**	**157**	**50**	**114**	**93**	**137**	**70**	**154**	**53**	**146**	**61**	**429**		**119**	**308**		**107**	**324**	**98**	**301**	**128**	**305**	**127**	**305**	**163**	**272**	**154**	**280**	**146**	**289**	**93**	**341**	**0**	**0**	**0**	**0**	**0**	**0**

2015		Holidays				O Week		O Week		Classes		Classes		Classes		Classes				Classes		Classes		Classes		Classes			Classes		Classes		Break		Break		Classes		Classes		Classes		Classes		classes		Ride to UTS		classes		Break	
Date		**Thur 15 Jan**		**Additional Capacity**		**10-Feb**		**17-Feb**		**26-Feb**		**Wed 4 Mar**		**Thur 5 Mar**		**Tue 10 Mar**		**Additional Capacity**		**Wed 18 Mar**		**Mon 23 Mar**		**Wed 1 Apr**		**Tue 7 Apr**		**Mon 13 Apr**		**Wed 15 Apr**			**Fri 1 May**		**Tue 19 May**		**27-May**		**Mon 29 June**		**14-Jul**		**06-Aug**		**11-Aug**		**21-Aug**		**09-Sep**		**06-Oct**		**14-Oct**		**09-Nov**		**24-Nov**	
Venue	**Capacity**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**		**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**used**	**free**	**Used**	**Free**
Tower front	6	0	6	6		3	3	7	-1	9	-3	4	2	1		7	-1	6		9	3	8	-2	4	2	7	-6	6	0	5	1		4	2	7	-1	9	3	5	1	3	3	5	1	8	-2	9	-3	8	-2	1	5	6	0	6	0	9	-3
Jones St	0	0	0	0		2	-2	10	-10	4	-4	10	-10	12	-12	8	-8	0		11	-11	16	-16	9	-9	9	-9	8	-8	7	-7		6	-6	11	-11	0	0	5	-5	2	-2	9	-9	15	-15	14	-14	14	-14	14	-14	20	-20	20	-20	17	-17
Blg 10/11 underground	288	39	249	288		49	239	48	240	50	238	67	221	56	232	51	237	288		60	228	55	233	60	228	52	236	60	228		26	262	50	238	50	238	46	242	41	247	62	226	61	227	52	226	44	244	70	218	84	204	57	231	55	233
Thomas St	3	0	3	3		2	1	0	3	3	0	2	1	2	1	1	2	3		1	2	4	-1	2	1	1	2	4	-1	2	1		1	2	2	1	2	1	0	3	2	1	1	2	1	2	1	2	1	2	0	3	1	2	2	1	1	2
Sports Hall	24	12	12	24		15	9	19	5	19	5	16	8	18	6	23	1	24		19	5	20	4	11	13	17	7	19	5	20	4		9	15	19	5	15	9	17	7	13	11	10	14	18	6	17	5	20	4	14	10	25	-1	18	6	12	12
Harris St Blg 4 side	40	7	33	40		4	36	12	28	12	28	19	21	10	30	19	21	40		14	26	19	21	21	19	9	31	5	35	12	28		5	35	9	31	13	27	5	35	3	37	9	31	12	28	8	32	5	35	11	29	12	28	9	31	4	36
Harris St Blg 6 side	16	5	5	16		12	4	15	1	20	-4	15	1	18	-2	17	-1	16		20	-4	27	-11	16	0	16	0	12	4	11	5		9	7	20	-4	18	-2	12	4	14	2	17	-1	16	0	20	-4	20	-4	18	-2	17	-1	11	5	12	4
The Goods Line (ABC h	10	3	7	10		2	8	2	8	2	8	1	9	1	9	3	7	10		3	7	4	6	3	7	5	5	0	10	0	10		0	10	2	8	1	9	1	9	0	10	0	10	1	9	1	9	3	7	4	6	3	7	0	10
Library front	13	4	9	13		6	7	9	4	10	3	8	5	6	7	11	2	13		10	3	11	2	12	1	8	5	7	6	11	2		4	9	11	2	8	5	1	12	5	8	2	11	8	5	6	4	9	4	11	2	7	6	8	5	7	6
Blg 5B	9	3	6	9		12	10	3	6	3	6	3	6	8	1	4	5	9		4	5	6	3	5	4	7	2	4	5	3	6		3	6	4	5	5	4	4	5	6	3	4	5	4	5	5	4	5	4	4	5	5	4	5	4
Blg 5C	10	3	7	10		3	6	4	6	12	-2	6	4	3	7	8	2	10		10	0	10	0	4	6	6	4	4	6	7	3		6	4	7	3	10	0	6	4	5	5	4	6	7	3	3	7	8	2	8	2	9	1	4	6	2	8
Blg 5 lock -up	22	8	14	22		2	8	10	12	8	14	13	9	11	11	10	12	22		12	10	12	10	9	11	10	12	8	14	7	15		7	15	10	12	10	12	9	13	7	15	14	8	10	12	9	11	8	14	8	14	8	14	7	15	10	12
Chau - Mary Ann St	36			36		4	14	5	31	5	31	9	27	8	28	10	26	14		4	10	4	10	3	11	1	13	1	13	1	13		1	13	3	11	3	11	2	12	1	13	3	11	5	9	5	9	3	11	3	11	3	11	6	8
Chau - Underground	74																	74		3	71	3	71	5	69	5	71	6	68	5	69		3	71	3	71	4	70	3	71	2	72	2	72	1	73	3	71	4	70	4	70	6	68	5	69	3	71
Chau - Ultimo Rd	0													0	0	3	-3	0		1	-1	0	0	1	-1	2	-2	1	-1	0	0		0	0	2	-2	2	-2	2	-2	2	-2	1	-1	1	-1	2	-2	2	-2	1	-1		
	0																																																			
UTS Housing																																																					
Total *	**551**	**84**	**351**	**0**	**477**	**116**	**343**	**144**	**333**	**157**	**320**	**173**	**304**	**154**	**318**	**175**	**302**	**0**	**529**	**181**	**354**	**199**	**330**	**165**	**362**	**155**	**371**	**137**	**392**	**151**	**378**		**84**	**445**	**160**	**369**	**150**	**385**	**121**	**408**	**103**	**426**	**145**	**384**	**166**	**363**	**154**	**358**	**153**	**376**	**171**	**358**	**208**	**321**	**160**	**369**	**144**	**385**

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