

CBD & South-East Light Rail Project - Modification 1 SSI 6042 (MOD 1)



Modification to CBD and South East Light Rail Project

Submitted to NSW Department of Planning and Environment
On Behalf of University of NSW

December 2014 ■ 13533

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Contents

1.0	Introduction	1
2.0	UNSW Supports the Project	3
3.0	Key Issues Arising from the Modifications Report	4
3.1	Increased Length of LRVs and Platforms	4
3.2	Reduced Frequency of Service	5
3.3	Increased Risk to Pedestrian Safety	8
3.4	Increased Risk of Noise, Vibration, EMI and RFI Impacts	9
3.5	Increased Visual Impact	13
3.6	Lack of Consultation with UNSW	14
4.0	Impacts to UNSW Stops	15
4.1	UNSW Anzac Parade Stop	15
4.2	UNSW High Street Stop	15
5.0	Other Issues Relating to the Modifications Report	17
5.1	Revised Construction Methodology for Anzac Parade Tunnel	17
5.2	Modified Moore Park Stop	17
5.3	Realignment of Light Rail Track at Anzac Parade/Alison Road	18
5.4	Modified Randwick Racecourse Stop	18
5.5	Arthur Street/Botany Street Traffic Signals	18
5.6	Wansey Road Shared Path	19
6.0	Issues Remaining for UNSW (Outside of the Modifications Report)	20
6.1	Construction and Post Construction Impacts	20
6.2	Student and Staff Access	20
6.3	Operations and Delivery	20
6.4	UNSW Construction Program	21
7.0	Conclusions	22

Figures

1	Total boarding and alighting passenger volumes per 15 min (2014)	6
2	By Stop boarding and alighting passengers per 15min (2014)	6
3	Total boarding and alighting passengers per rolling hour (2014)	7
4	Operating Frequency at opening year – Randwick and Kingsford Lines	7
5	Current and future sensitive environments within the Campus	10
6	Figure 3.17 of the Modification Report – Affected blocks (identifying New College)	11
7	UNSW High Street Stop – UNSW Scheme	16
8	UNSW High Street Stop – Critical Constraints to be addressed	19

Contents

Tables

1	Expected usage of UNSW stops - 2014	6
2	UNSW Capital Development Program – Short term	21

Appendices

A	UNSW Stops - Drawing Set <i>Tzannes Associates / UNSW</i>	
B	Review of Modifications Report <i>Traffix</i>	
C	UNSW 2014 Travel Survey and Campus Counts Analysis Summary <i>UNSW</i>	
D	Passenger and Platform Calculations <i>Traffix</i>	

1.0 Introduction

This submission has been prepared by JBA on behalf of the University of NSW (UNSW).

The proposed CBD and South East Light Rail (CSELR) project (the Project) provides a once-in-a-generation opportunity to provide central and south-eastern Sydney with a world class light rail system. As a key partner in the Randwick Education & Health Specialised Precinct (Precinct) and the CSELR delivery process, UNSW strongly supports the Project and the public benefits it will bring to the community, the Precinct and to the University.

UNSW shares the same objectives and stated likely public benefits as Transport for NSW (TfNSW). UNSW has also identified its own key Project objectives since its involvement as a lead partner and key stakeholder in the process. These key objectives are:

- Staff and student safety;
- Improved urban amenity;
- A fully integrated transport solution;
- Environmental sustainability;
- Business continuity; and
- Capacity and capability for the future.

Whilst these objectives were broadly met by the scheme approved on 4 June 2014, UNSW has focussed its attention on its fundamental concern, staff and student safety, to ensure a consistent, but superior outcome may result, not only for its community, but also the wider community. Concerns remain and have been further identified following the review of the exhibited material of the State Significant Infrastructure Approval (SSI-6042), Modifications Report.

This submission addresses the concerns arising from the Modifications Report with specific regard to the impacts on the UNSW Anzac Parade Stop and UNSW High Street Stop, as well as a range of remaining construction and operational issues.

It is noted that a letter of response to the Infrastructure Approval was prepared by UNSW (dated 1 September 2014) and sent to the Department of Planning and Environment. UNSW was advised that the Department of Planning and Environment would respond in the near future when it has completed its investigation of the issues raised. To date, no formal response has been received.

The key issues arising from the Modifications Report are:

- The impacts arising from the modification to the length of Light Rail Vehicles (LVRs) and platforms;
- The impacts associated with the modification to the frequency of service, in particular to the UNSW Anzac Parade and High Street stops;
- Increased risk to pedestrian safety as a result of the proposed modifications;
- The increased risk of noise, vibration, electromagnetic interference (EMI) and radio frequency interference (RFI) impacts upon sensitive teaching, research and other University environments during construction and operation of the light rail as a result of the proposed amendments;
- Visual impacts associated with the proposed modifications; and
- The lack of consultation between TfNSW and UNSW.

The key issues summarised above are interdependent, and are considered likely to adversely impact on pedestrian safety, traffic, and operations of the University.

Other issues include the impacts upon general UNSW operations including construction and post- construction impacts and maintaining 'business-as-usual' in terms of traffic and access, and bus services.

It is essential that UNSW ensure its typical daily operations can continue as unaffected as possible in recognition of the importance the University plays in the Precinct and to the economy in general. Significant detrimental effects have the potential to introduce wider-ranging and longer-term impacts upon the Precinct's and University's viability, amenity, character and reputation.

As part of this submission, suggested plans for each of the UNSW stops (Anzac Parade and High Street) have been prepared by Tzannes and UNSW. These are included at **Appendix A**. A Review of the Modifications Report has also been undertaken by Traffix Group, which is provided at **Appendix B**.

2.0 UNSW Supports the Project

As a key partner in this once-in-a-generation project, UNSW strongly supports the Project and its broader objectives and wide-ranging benefits it will bring to the CBD and the south-eastern suburbs, for the following reasons:

- The opportunity to improve pedestrian and passenger safety, in particular for UNSW students and staff within the network;
- Improved reliability, efficiency, amenity, capacity and quality of the public transport network;
- The provision of a fully integrated transport solution with access to major destinations in the south east including Moore Park, UNSW, Royal Randwick Racecourse and the Randwick Education & Health Specialised Precinct (Precinct);
- Opportunities to improve the overall amenity of public spaces and the public domain;
- The increased use of sustainable transport modes and improved environmental sustainability;
- Meeting long-term travel demand between the CBD and suburbs to the south east and leaving a lasting legacy; and
- Facilitating orderly and efficient growth of urban development and economic activity along the corridors and particularly within the Precinct.

Reflecting this support and partnership approach UNSW is committed to providing resources to the Project.

3.0 Key Issues Arising from the Modifications Report

3.1 Increased Length of LRVs and Platforms

UNSW requires further information (such as plans) showing the proposed changes to the stops at High Street and Anzac Parade to be able to fully assess the impact at these stops.

3.1.1 Length of LRVs and Vehicle Capacity

The vehicle specifications for the Project included light rail vehicles (LRVs) of approximately 45 metres in length with a capacity of approximately 300 people. The modified design proposes to increase the length to approximately 67m, with an increased capacity to approximately 466 people. The modifications result in vehicle length increase by approximately 40% with an increase by approximately 55% in passenger capacity.

UNSW is concerned with the flow on effects arising from this modification, including the proposal to revise platform lengths only, and an associated reduction in frequency (particularly during peak periods), the potential traffic impacts during construction and operations on University activities, and most importantly the potential pedestrian safety impacts. All of these items are considered in the sections below.

3.1.2 Increased Platform Length

The Modifications Report identifies that “increases will be required to each stop” in response to the increase length of LRVs, but that the increases “would be accommodated within the approved project footprint”. However, from the Modifications Report it is unclear whether any physical changes will be required to the UNSW Anzac Parade or High Street stops, as no plans or specific details pertaining to each stop have been provided. Additionally, it is unclear whether as a result of the increased length and capacity (and reduced frequency) any other design amendments will be considered, such as increased widths of platforms, additional pedestrian crossings, or increased canopy lengths.

On page 25 of the Modifications Report (Section 3.6.2), TfNSW states:

The modified design would provide larger LRVs approximately 67 metres in length (allowing for an increased vehicle capacity of approximately 466 people) as well as associated increases to the length of each stop. Each of the increases to approved stop lengths would be accommodated within the approved project footprint and would retain the general design of the approved stops (i.e. island stop, side platform stop etc.). All additional facilities and infrastructure associated with each of the stops (canopies, stop furniture, signage, bike parking (if proposed)) would be maintained as part of the design for the increased stop lengths.

The increase in length of the platforms, as well as the increase in length of the LRV, has the potential to significantly change the layout and operation of the UNSW stops, in particular the High Street stop.

No details are provided regarding the proposed 67m long LRV such as door locations and swept paths. In particular, swept path changes at the intersection of High Street and Wansey Road may impact on the surrounding properties.

Additionally, Section 3.6.2 of the Modifications Report notes that reductions in the length of the Central Station and Moore Park stops are proposed as part of the modifications. For the UNSW Anzac Parade stop (centre island arrangement), with

a 98m platform length, the Modifications Report does not provide any detail regarding proposed amendments or reductions, UNSW assumes that this will be retained. The 98m platform footprint is preferred and possible due to the location of the proposed northern Pedestrian Operated Signals at College Walk.

Within the Modifications report, there is also no discussion regarding the need to increase the width of any stops to cater for the increased capacity of LVRs in conjunctions with increased wait times arising from reduced frequency of service.

UNSW believes there is a real need to increase platform widths not just lengths to meet industry standard guidelines and design standards.

3.2 Reduced Frequency of Service

UNSW has repeatedly raised the concerns of passenger and pedestrian safety at the UNSW stops in previous submissions. The proposed increase in the capacity of the LRV, in conjunction with the reduction in service frequency, particularly during peak hours, is considered to be a significant enough reason to review the capacity, operation and passenger safety of each of the UNSW stops.

UNSW is quite concerned that the impacts of the proposed changes to the service frequency (and capacity of the LRV) on the stop operation, capacity and safety have not been adequately addressed. UNSW's estimated patronage (that includes only UNSW staff and students) using the most recent 2014 campus survey data predicts light rail passenger volumes (by 2021) at the Anzac Parade and High Street stops will be much higher than TfNSW's passenger volumes (for 2038) at these stops. These Passenger and Platform calculations are provided at **Appendix D** to this submission.

A review of the TfNSW patronage data has been undertaken by Traffix Group, using the current UNSW 2014 Travel Survey and Campus Counts, which were not available the time of Planning Approval to the Project.

UNSW's 2014 campus survey indicates that 26,000 (or 60.1%) staff and students currently use public transport to access the campus, this is a 10.6% increase since 2007. This, coupled with an increase in campus population of 41% during the same period, indicates the significant role that the light rail will provide for access to the campus. Using 2014 figures, it is predicated that approximately 21,000 (or 49%) UNSW staff and students will use the light rail at opening (in 2012/13).

The UNSW 2014 Travel Survey was independently conducted over a three-week period in April 2014 and received a significant number of responses from approximately 2,500 staff and 7,700 students. The responses represented 19.6% of staff and students attending the campus.

In 2014, simultaneously with the Travel Survey, the University conducted a detailed survey count of movements around the entire campus perimeter during a typical semester's week (Campus Counts). The aim was to obtain more specific data of where and how many pedestrians, cars, bicycles, motorbikes and commercial vehicles arrived and departed from, the entire campus. All arrival and departure movements at strategic points on the campus perimeter were counted in 15 minute intervals over a 24 hours period for 7 days – Friday 4th April to Thursday 11th April.

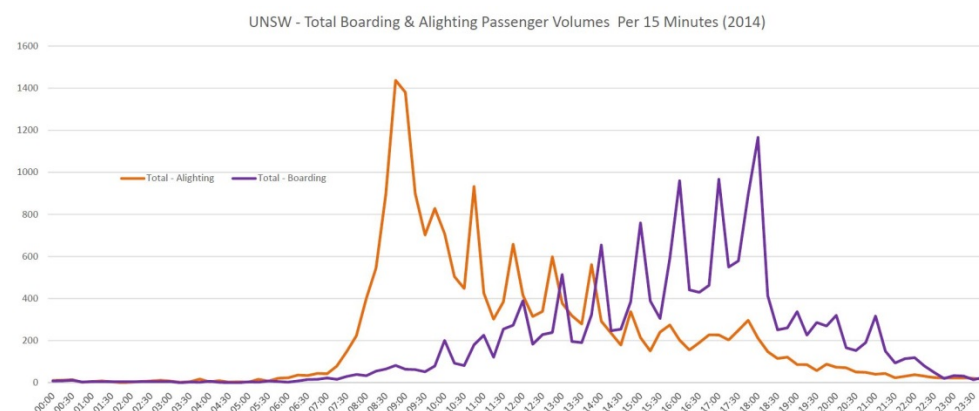
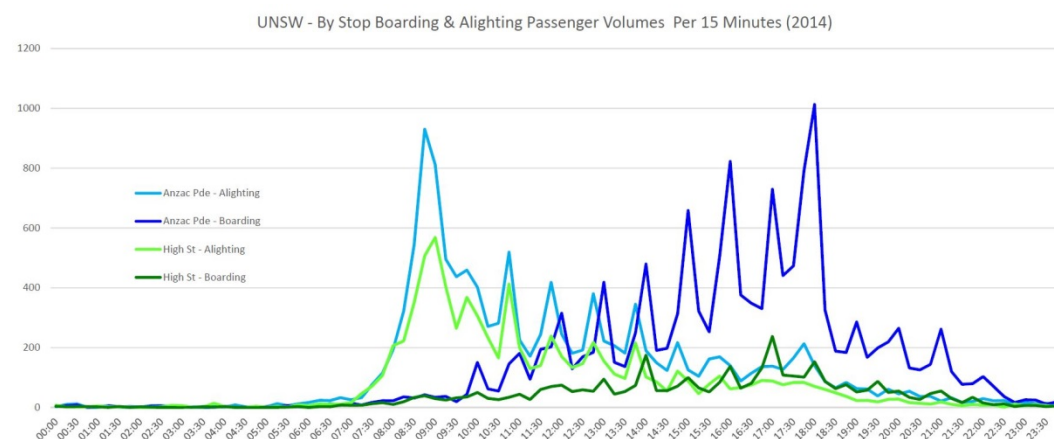
This updated data has been used to predict expected usage of the UNSW High Street and Anzac Parade stops. The graphs below (**Figures 1, 2 and 3**) present the predicted boarding and alighting at the stops (for 2014). Key findings of 2014 figures are also provided in **Table 1** below.

Table 1 – Expected usage of UNSW stops - 2014

2014	Type	Maximum 15 Min Volume	Maximum Hourly Volume	Daily Volume
Anzac Parade	Alighting	930	2,781	12,516
	boarding	1,013	2,719	14,607
High Street	Alighting	569	1,830	8,124
	boarding	238	584	3,792
Total (of both stops)	Alighting	1,437	4,611	20,640
	boarding	1,166	3,187	18,399

Adopting a conservative 2% p.a. growth rate for the campus population (which has grown at 5% p.a. since 2007) and retaining the existing proportion of public transport users (60%), light rail patronage for the campus stops will increase by 15% by 2021. Assuming a peak hour capacity (at opening in 2021) of 3,495 patrons per hour (7.5 LRVs per hour x 466 patrons per LRV) per line, UNSW passengers will utilise up to 90% (3,200 passengers) of the services on opening in 2021 on the Kingsford branch line and up to 76% of the capacity (5,300 passengers) on both lines that service UNSW.

Importantly, all the above figures are for UNSW staff and students only. Additional passengers already on each LRV will reduce their capacity to take on passengers at the UNSW stops or be used by UNSW passengers to get to the campus. Passengers from the surrounding areas using the UNSW stops will increase crowding on the stops and at the access points to the stops.

**Figure 1** – Total boarding and alighting passenger volumes per 15 min (2014)Source: *Traffix***Figure 2** – By Stop boarding and alighting passengers per 15min (2014)Source: *Traffix*

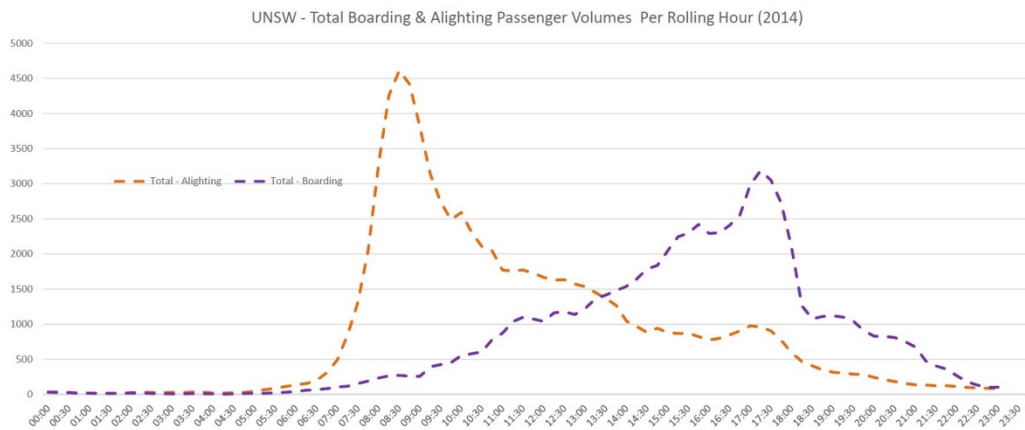


Figure 3 – Total boarding and alighting passengers per rolling hour (2014)

Source: *Traffix*

UNSW is concerned that although additional services may be provided to cater for the additional growth in patronage over time, the size of the stops have not been designed to cater for this expected growth.

The proposed change in LRV capacity (from 300 to 466) and change in peak hour service frequency (from 10 vehicles per hour to less than 8vph at opening (2021)) (see **Figure 4**) will significantly affect the patronage of the UNSW stops at Anzac Parade and High Street. Importantly, the Modifications Report does not consider the impacts of these changes on the operation of the two stops, particularly with regard to platform capacity, level of service, and pedestrian safety.

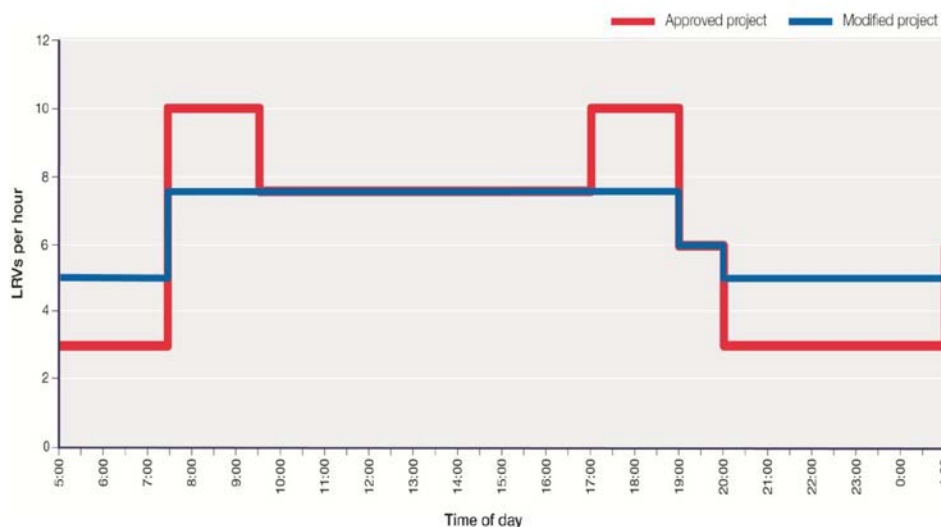


Figure 4 – Operating Frequency at opening year – Randwick and Kingsford Lines

Source: *TfNSW*

Based on the detail provided by TfNSW, it is understood that the Project will commence operations in 2021, while the future service frequencies may not be implemented until 2031, ten years after opening if at all.

The TfNSW Additional Information Report (dated June 2014) provided a summary of predicted boardings and alightings at the UNSW stops. This information was analysed by Traffix Group (as shown in at **Appendix B**) and compared against the numbers provided within the recent 2014 Travel Survey. The analysis highlights that in the morning peak hour (8am – 9am (AM)):

- The proportion of passengers from other areas is between 21% and 91% of the total use of the UNSW stops. Therefore the UNSW analysis using only UNSW passengers is quite conservative;
- UNSW's predicted number of UNSW passengers in 2014 (between 8-9am) is significantly higher than TfNSW's predicted number of UNSW passengers in 2036 (AM) for the Anzac Parade Stop;
- UNSW's predicted number of UNSW passengers in 2021 (between 8-9am) is expected to be 15% higher than the current 2014 (8-9am) numbers; and
- The 15 years of growth from 2021 to 2036 has not been calculated by UNSW due to too many uncertainties, but it is considered that the passenger numbers will be significantly larger.

Based on the morning analysis, Traffix expects that for the afternoon (PM) peak there will be similar discrepancies.

3.3 Increased Risk to Pedestrian Safety

UNSW has significant concerns that TfNSW has not addressed the issue of how passengers will get on to and off each of the stop platforms via the adjoining public footpaths.

UNSW's 2014 independent travel survey indicated that 60.1% of all staff and students or 26,000 people use public transport to access the campus, a 10.6% increase since 2007. This, coupled with an increase in campus population of 41% during the same period, indicates the significant role that the light rail will provide for access to the campus. It is predicated that approximately 49% of UNSW staff and students or 21,000 people will use the light rail.

All previous advice from TfNSW has been that the proposed stops have been designed to cater for 'one load' of a LRV to board or alight. It is understood from the Modifications Report that TfNSW proposes to cater for the increased length of LRVs by lengthening the stop platforms proportionately, however as noted previously this is unclear, given that the revised design of each stop (in particular UNSW Anzac Parade and High Street) has not been provided with the Modifications Report. TfNSW has also not provided any details of the pedestrian Level of Service categories used in its assessment of determining the proposed platform size or walkway widths.

UNSW has significant concerns that TfNSW has not addressed the issue of how passengers will safely and efficiently get on to and off each of the stop platforms, given the significant increase in carrying capacity, combined with a reduction in peak period frequency. There is no mention within the Modifications Report as to how the 55% increase in passenger capacity on each LRV will impact the ramps and crossing points, and the subsequent traffic effects (such as increased vehicle wait times for pedestrians to cross). The need for the second crossing at the Anzac Parade stop (College Walk/NIDA) is considered essential to cater for the increased passenger flows.

At the Anzac Parade stop, it is highly unlikely that the capacity of a single LRV or 466 passengers would be able to cross Anzac Parade during the 30 seconds 'walk' phase (every 110 seconds) at the single pedestrian operated signals. Given the current design of a single crossing point in Anzac Parade, this lack of capacity and inability to clear circulation areas will encourage pedestrians to unsafely cross against the signals or to cross at unsignalised locations.

Alternatively, Anzac Parade vehicular traffic may need to be stopped for longer periods of time (in excess of 30 seconds) to allow pedestrians to clear the platform/footpath. This would also increase delays to the LRV which would affect service reliability and potentially the frequency at other stops on the network. It

would also impact the flow of vehicle traffic along Anzac Parade, including bus services.

This increase in capacity makes it imperative that the second signalised crossing point (at College Walk/NIDA) is provided. Presently, the approved TfNSW plans indicate these signals as only being *"subject to further discussion with RMS [Roads and Maritime Services]"*.

It is noted that within the Modifications Report (on page 12, Section 3.3.3) for two other stop locations and arrangements, TfNSW has acknowledged the *"marginally higher risk of pedestrians not complying with the pedestrian signals or crossing directly between the platform and the footpath' associated with a longer centre island stop"*.

The changes to the proposed physical changes to the centre island stops at High Street and Anzac Parade are not addressed in the Modifications Report. Without this further information contained within the Modification's Report, UNSW is not able to assess the proposed changes and safety implications, nor is the Department of Planning and Environment. It is requested that this information be provided to allow consideration of the impacts to be understood by UNSW as well as the Department of Planning and Environment.

At the meeting with TfNSW on 17 November 2014, it was advised that Customer Service Attendants (37) would be included in the Project. However within the Modifications Report, there is no mention of Customer Service Attendants being located at the UNSW Anzac Parade or High Street stops. UNSW does not consider that the use of Customer Service Attendants is an appropriate measure to mitigate a poor design outcome.

UNSW has repeatedly raised the concerns of passenger and pedestrian safety at these stops. The proposed increase the capacity of the LRV is considered to be significant reasons to review the capacity, operation and passenger safety of each of the UNSW stops.

UNSW agrees with the statement on page 18 of TfNSW's Additional Information Report (June 2014) that...*"it is always best to err on the side of caution with respect to design forecasts to ensure safety is not compromised"*. However, this approach contradicts the statement in the Modifications Report on page 12, Section 3.3.3 with TfNSW acknowledging the *"marginally higher risk of pedestrians not complying with the pedestrian signals or crossing directly between the platform and the footpath' associated with a longer centre island stop"*.

3.4 Increased Risk of Noise, Vibration, EMI and RFI Impacts

3.4.1 Sensitive Environments on the Campus

Sensitive environments at UNSW include but are not limited to:

- Current and future research spaces, such as the Lowy Cancer Research Centre (\$106m) and Wallace Wurth Building (\$146m) (which front High Street), the Tyree Energy (\$125m);
- Technologies Building which fronts Anzac Parade, the Mark Wainwright;
- Analytical Centre, the Newton Building and Old Main Building and research development sites such as the Materials Science and Engineering Building
- Stages 1 and 2 and the Biosciences Renewal Project Stages 1 and 2;

- Teaching and performance spaces in vicinity of the proposed stops and construction compound;
- Student accommodation along both Anzac Parade and High Street;
- Teaching and performance spaces at NIDA at Anzac Parade (and adjacent to the proposed construction compound location); and
- Other UNSW environments in the vicinity of the proposed stops.

The location of these sensitive receivers is shown below in **Figure 5**.

Additionally, some environments at the Kensington campus also have sensitive periods, such as exam, enrolment and census periods. Exams are typically held during the whole of June and whole of November and from 9am to 5pm throughout the day, enrolment periods are typically from mid-February to mid-March and mid-July to mid-August and census periods are generally from the beginning of April to mid-April and the beginning of September to mid-September. Summer exams also occur in early to mid-February, typically from 9am to 4pm. Further, student vacation periods' acting as study time precedes each of the exam periods and are also considered sensitive periods. UNSW exams are also held at Randwick Racecourse which provides significant space during these periods.

To ensure normal business is able to continue for UNSW and it is able to provide teaching and research consistent with its obligations to its students and its charter, particularly in relation to exam conditions, careful consideration needs to be made to prevent construction impacts during these periods and to preserve consistent amenity. We note any disruption to published and timetabled bus services during construction will also affect students' ability to arrive at the campus for classes and at exam locations.

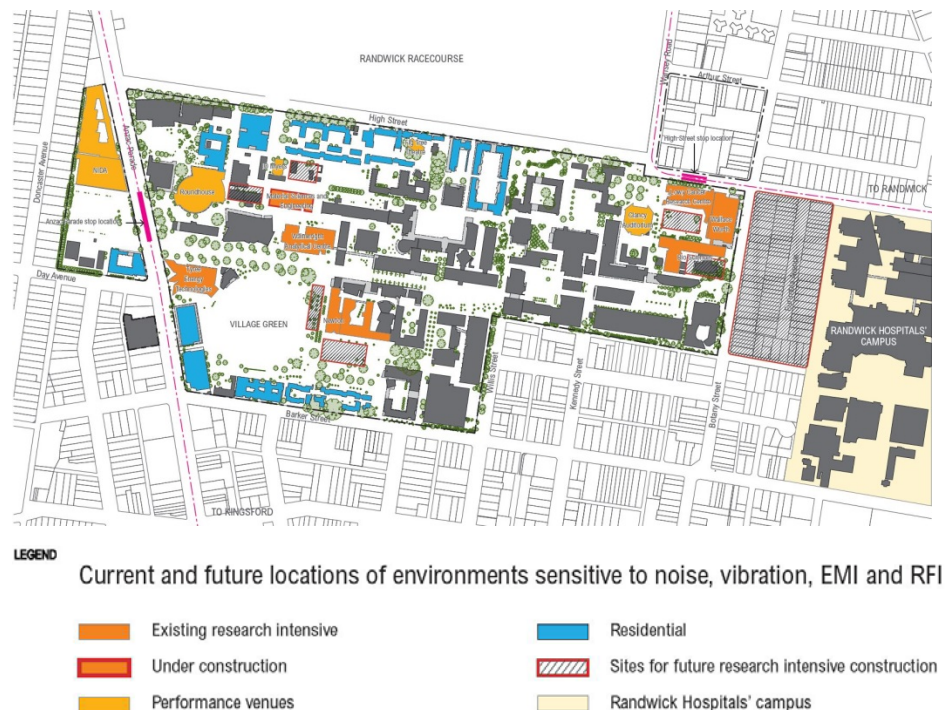


Figure 5 – Current and future sensitive environments within the Campus

Source: UNSW

3.4.2 Noise and Vibration Impacts

UNSW is concerned that the tables and associated figures provided within the Modifications Report do not present the full impact of the increase in additional noise and vibrations exceedances. The Modifications Report does not provide any additional assessment of the vibration impacts as a result of the proposed modifications.

Figure 3.9 of the Modifications Report indicates that the longer LRVs will increase the duration of the maximum noise level (based on a measured distance of 15m and the LRV travelling at 60km/h), with a maximum sound variation from five to six seconds.

Table 3.4 of the Modifications Report indicates a significant increase in the noise exceedances (above excepted levels) within the NCA04.2 catchment area which includes Kensington and UNSW. The modifications result in an addition 22 'blocks' and 44 individual receptors being affected. However Figure 3.17 of the Modification Report does not identify New College, a UNSW residential college located on the eastern side of Anzac Parade. Figure 3.17 of the Modification Report has been reproduced below (**Figure 6**) with the location of New College shown.

It is also unclear from the Modifications Report whether the modification will have any additional effect on other sensitive receivers within the Campus including sensitive research buildings.

Given the methodology adopted in Table 3.4 of the Modifications Report, concern is also raised that the extent of impact significantly under-represents the potential impact on UNSW's high density residential buildings.

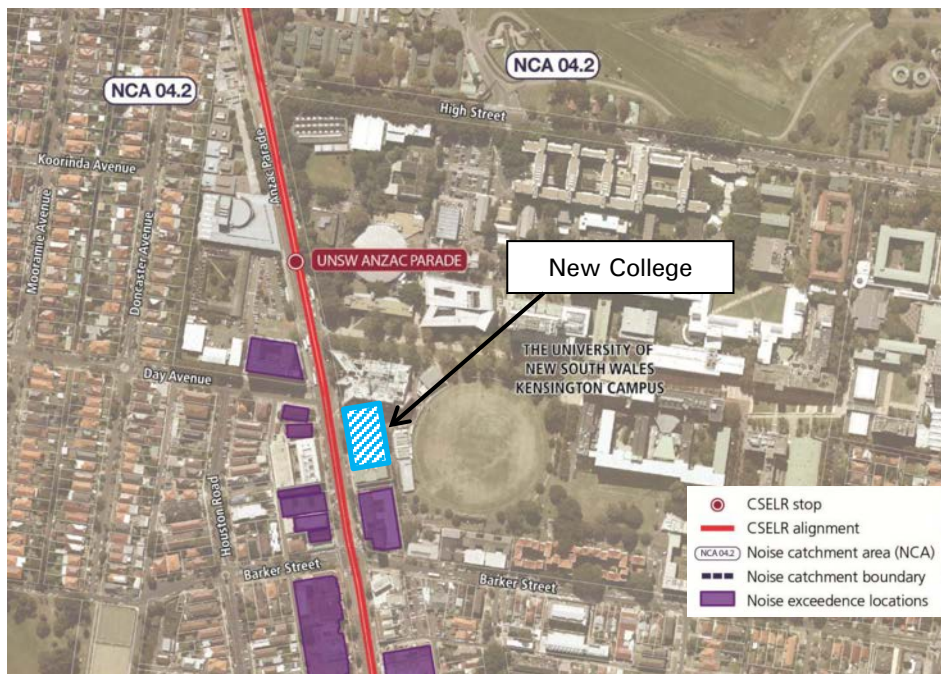


Figure 6 – Figure 3.17 of the Modification Report – Affected blocks (identifying New College)
Source: TfNSW + JBA

Additionally, it is noted that Figure 3.18 of the Modifications Report identifies the location of the UNSW High Street stop on Wansey Road, rather than High Street as understood to be approved. It is therefore unclear whether the modelled noise impacts have been based upon the stop being on Wansey Road or High Street.

However since this change does not appear elsewhere in the modification nor were UNSW advised of the change at our meeting on the 17 November 2014 we assume that this is an error and we reserve our rights to comment if this is not the case.

3.4.3 Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI)

Background to the University's Concerns

Electromagnetic interference (EMI) is disturbance that affects an electrical circuit due to either electromagnetic induction or electromagnetic radiation emitted from an external source. In this case, there is a known risk of EMI associated with Light Rail Vehicle operations manifesting as a time-varying DC magnetic field adjacent to the Light Rail alignment either caused by DC magnetic field emissions from the Light Rail Vehicle propulsion power system and/or by temporary shifts in the earth's static DC magnetic field caused by movement of LRVs.

As noted in previous submissions, there are specific examples where such EMI has caused negative impacts to the operation of advanced scientific and medical research equipment, affecting the ability to fulfil research missions at specialist university research facilities.

For UNSW the relevant research facility is the recently constructed, purpose built Lowy Cancer Research Centre located immediately opposite, and within 25m of the proposed light rail stop on High Street.

Effect of the Proposed Modification

Despite being raised by UNSW previously, the effect of the proposed modification particularly increased vehicle lengths, as well as consideration of alternatives (such as the use of a third rail power system in the CBD) has not been considered in the Modifications Report. Whilst the requirements of Condition B18 are acknowledged, it is requested that the associated impacts of the modification need to be included in the Environment Assessment section of the Modifications Report, so that the impacts can be understood by UNSW.

Without certainty around these issues UNSW is subject to a significant level of risk in terms of its ability to ensure business continuance or fulfil research missions.

For example the Lowy Cancer Research Centre is provided in the short, medium and long term with a building at which the Centre can proceed with its research mission. If the research mission of the Lowy Cancer Research Centre is jeopardised, then it would have no alternative than to find an alternative location, resulting in UNSW having to relocate the entire Research Centre or losing the Research Centre entirely to another university.

Notwithstanding this, UNSW is an active supporter of the CSELR and is supportive of light rail stop located on High Street. However, given the significance of these impacts it is suggested by UNSW that a precautionary approach to managing the issues from design through to operations would be prudent.

Alternative Power Solution (Third Rail)

It is understood that a ground level power supply system, Alstom's Aesthetic Power Solution (APS) will be used within the CBD, to improve the aesthetic appearance of the light rail. It is understood that the APS also provides a lower EMI outcome than the traditional methodology of suspended electrified wires to minimise the impacts on sensitive environments in and around the UNSW campus. UNSW requests further consideration of the use of third rail wire-free infrastructure.

As noted in the Modifications Report (Section 3.9.2) *“...As the APS system provides continuous power for LRVs along the light rail alignment, this system does not require the LRVs to have a battery or overhead charging units to be provided”*. As this technology is already in place within the proposed light rail infrastructure, it should not be an additional impost on the network. Given the addition of third rail infrastructure proposed within the CBD, and fitted to all LRVs, UNSW seeks that this be considered as reduction strategy at this stage of the Project. It is also considered that the implementation of this third rail would have the additional benefit of significant reduction in the visual impact of the proposal.

Furthermore, the Modifications Report notes the benefits of this technology reducing the visual impact, and improving reliability of services such as in poor weather or flooding as can be experienced in Anzac Parade.

As noted earlier, Condition B18 of the Conditions of Approval requires the preparation of a detailed Vibration and Electro-Magnetic Management Plan in consultation with Health Infrastructure and UNSW. As part of this condition, subsection (d) states that the Vibration and Electro-Magnetic Management Plan shall include *“identification of reasonable and feasible vibration and electro-magnetic field reduction strategies, technologies and design and operational measures that will be implemented to reduce and manage impacts”*.

3.5 Increased Visual Impact

The proposed modification, including increased platform length and LRV length will contribute to and increased visual impact.

3.5.1 Alternative Power System

As noted above, the use of the APS power system (third rail) is being adopted within the CBD to minimise visual impacts. UNSW considers that the use of the third rail infrastructure surrounding the Campus will provide a significant aesthetic benefit, which will complement the importance of these locations, with material improvements to the EMI impacts to sensitive receivers within the Campus.

3.5.2 Tree Removal

As part of the Project, a number of trees are required to be removal along High Street and Anzac Parade. Whilst the Modifications Report identifies that no additional trees are proposed to be removed as part of the modified platform design, it is noted that the final number of trees for removal will be subject to detailed design.

However, it is considered that the UNSW options provide opportunities to retain existing trees that should be further considered at the above stops. The opportunities are:

- Two side platforms for High Street which locates the two light rail tracks as far north as possible this enables the south side of High Street to maintain several existing mature trees;
- Third wire infrastructure (to remove need for overhead wires and poles); and
- Pedestrianisation of High Street to minimise road widening.

3.6 Lack of Consultation with UNSW

As a key partner in the Project, UNSW seeks to maintain positive and meaningful engagement on the project in ensuring its objectives can be achieved.

UNSW has sought to work collaboratively in achieving optimal outcomes for the University and the wider community. Its strong desire is to assist in detailed design outcomes as put forward in this submission, particularly for light rail stops at its perimeter and those along the route that affect the daily operations of the campus.

Section 6.1 of the Modifications Report refers to consultation undertaken with relevant stakeholders. As noted in the Modifications Report a single meeting was held between UNSW and TfNSW on 17 November 2014 where no papers were provided or material released. The issues raised during this meeting, in previous submissions and correspondence were not fully addressed. Many have still not been addressed as part of the Modifications Report as they relate to the UNSW, including:

- Safety and capacity;
- Platform crowding;
- High Street pedestrianisation; and
- Protection of underground utilities.

Despite UNSW covering the safety and capacity issues in detail in its previous EIS Submissions and raising these issues at the meeting with TfNSW on 17 November 2014 this still has not been addressed by TfNSW in the Modification Report.

To achieve suitable and meaningful input into the detailed design phase, UNSW seeks the preparation and implementation of a stakeholder liaison protocol and sign-off mechanism to address early works and main construction works to assist in input, feedback (and critically) notification of when certain works may be carried out. As noted, UNSW has numerous sensitive uses and functions for which significant disruptions (programmed or otherwise) may pose significant issues to those uses and the University in general. Accordingly, the potential staging of works will be an important consideration for and impact upon UNSW.

UNSW acknowledges that the detailed design process for the Project will continue after the EIS process has completed. UNSW proposes the following principles for the Upper and Lower campus stop designs and for the corridors on Anzac Parade (between High Street and Barker Street) and High Street (between Wansey Road and Botany Street) as well as any services, utilities, bus stop and other impacts on the Kensington campus;

- Notice period of 13 business days for comment on any design changes;
- A clear rationale for any design changes with reference to UNSW's priorities, the social impact objectives of the project and previous design drawings and concepts; and
- Engagement of an independent certifier should there be a dispute between TfNSW and UNSW on a design solution.

As noted previously, a Business and Landowner Engagement and Management Plan as well as a Business Management and Assistance Strategy are to be implemented by TfNSW to proactively work with businesses. UNSW requests that it is defined as a business for the purposes of these plans and strategies.

Lastly, UNSW will also be party to a Development Agreement as part of the Project and, as relevant, this will seek to address management and issues mitigation procedures and a range of development and construction matters in that agreement.

4.0 Impacts to UNSW Stops

The impacts of the proposed amendments as they relate to the UNSW stops of Anzac Parade and High Street are summarised below.

4.1 UNSW Anzac Parade Stop

- The increased vehicle and platform length as well as the reduction in frequency of service (particularly during peak periods) will result in an increased number of people waiting on platforms than the approved scheme and more passengers alight at any one time.
- Significant concerns are raised regarding the safety of pedestrians moving to and from the centre island platform, given the increased patronage whilst providing only one crossing (with the northern crossing subject to RMS approval).
- The current arrangement without a confirmed northern crossing will encourage pedestrians to cross during non-walk periods or cross outside of the marked pedestrian crossings.
- Should additional time be allocated to the signalised pedestrian crossings, flow on impacts to vehicle traffic and LRV services reliability could be expected.

UNSW feels strongly that a second pedestrian crossing, as shown on the plans provided at **Appendix A** should be included at this stop.

4.2 UNSW High Street Stop

- TfNSW has on many occasions discussed the benefits of platforms on either side of High Street in lieu of a central platform, which UNSW fully support. However, TfNSW has not provided any supporting details or documentation (such as plans) of this proposal. As a result UNSW has designed the High Street stop on this basis and this is now included in the submission (see Section 4.2.1).
- The increased in vehicle and platform length affects the geometry and location of the High Street stop and reduces overall safety, particularly in relation to geometry and location of the rails as LVRs move through towards the Botany Street intersection.
- The reduction in frequency of service (particularly during peak periods) will result in an increased number of people waiting on platforms than the approved scheme and reduce the overall safety at the stop.
- This increased platform length is likely to have impacts on existing utilities, services and UNSW properties, which have not been addressed within the Modifications Report.
- The final location of the proposed shared pathway to provide access for bicycles (adjacent to the Racecourse boundary) is of concern to UNSW.

4.2.1 UNSW Scheme

On Page 12 of the Additional Information Report (dated June 2014), TfNSW stated that they were *"...currently considering the option to provide two side platforms for the High Street stop (rather than an island platform), which would be compatible with future pedestrianisation of High Street."*

In the absence of any communication from TfNSW regarding the progress of this option, which is a requirement under part B43 of the Infrastructure Approval, UNSW has proactively prepared a new design for the High Street stop with side

platforms that seeks to address the key issues raised by the University, in particular the stop safety and capacity. These plans, prepared by Tzannes and UNSW are provided at **Appendix A** and **Figure 7** below. This scheme locates the tracks in the centre of the road, such that they do not need to merge back together over a short distance between a centre island stop and the Botany Street intersection.

The UNSW Option:

- Locates the two light rail tracks as far north as possible away from the sensitive UNSW facilities such as the Lowy Cancer Research Centre to reduce the potential vibration and EMI impacts;
- Creates a larger construction zone clear of the UNSW property boundary, avoids the existing large and fragile water main other in-ground services located along the south side of High Street, and maintains many existing mature trees within the Campus.
- Removes direct access to/from High Street for the UNSW properties along the north side of High Street between Wansey Road and Botany Street.
- Reinstates property access via a new access lane on UNSW properties from Arthur Street to the rear of the High Street properties;
- Allows for additional capacity at the rear of the platforms where they join with the adjacent footpaths, reducing the risk of passengers queueing on to the tracks;
- Is also more compatible with the future pedestrianisation of High Street to create a layout similar to those proposed in the CBD; and
- allows for the best urban design outcome with the integration of the stops in to the surrounding areas.



Figure 7 – UNSW High Street Stop – UNSW Scheme
Source: Tzannes and UNSW

5.0 Other Issues Relating to the Modifications Report

5.1 Revised Construction Methodology for Anzac Parade Tunnel

The Modifications Report details a 'cut and cover' technique will be used to construct the Anzac Parade light rail tunnel, which is currently approved as two driven tunnel options that would otherwise not impact the road surface of Anzac Parade. UNSW is concerned that the impacts associated with the modified construction methodology may increase the impact the existing bus services and traffic in the immediate area which could impact on the reliability of public transport to and from the University, particularly during exam periods.

As the busway along Anzac Parade is used by a significant number of buses that service UNSW, the impacts during construction must be minimised. With regard to the impacts to bus routes, the Modifications Report states:

"The modified construction methodology is not expected to have any additional impacts on the Moore Park busway. However, temporary bus stop relocations along Anzac Parade would be required as a result of the proposed lane deviations. Suitable alternate bus stops and associated facilities would be provided to mitigate any associated impacts. Construction activity at the Moore Park busway (the impacts of which are described in the CSELR Project EIS) would not commence until traffic diversions on Anzac Parade are complete, to reduce any associated impacts. Overall the duration of the impacts to the busway are expected to be reduced as a result of the modified construction method".

Additionally, the operation of the Campus has a number of sensitive periods throughout the year including exam periods, enrolment and census periods. Exams are typically held during the whole of June and whole of November and from 9am to 5pm throughout the day, enrolment periods are typically from mid-February to mid-March and mid-July to mid-August and census periods are generally from the beginning of April to mid-April and the beginning of September to mid-September. Summer exams also occur in early to mid-February, typically from 9am to 4pm. Further, student vacation periods' acting as study time precedes each of the exam periods and are also considered sensitive periods. It is noted that many exams are also held at Randwick Racecourse during the above times.

It is requested that consultation be undertaken with UNSW so that the construction program and staging is clearly communicated to ensure minimal disruption to staff and students, particularly during sensitive periods as identified above.

5.2 Modified Moore Park Stop

It is understood that the increased stop lengths would align with the proposed 67 metre LRVs. The approved lengths of the Central Station and Moore Park stops were 90 metres. The proposed length of these stops would be reduced to approximately 75 metres as part of the modification to accommodate the changed LRV sizes.

For the Anzac Parade centre island stop, with a potential 98m platform length, there is no detail regarding any proposed reduction in the length of the 98m platform footprint. This should be maintained.

The 98m platform footprint is possible due to the location of the proposed northern Pedestrian Operated Signals at College Walk.

5.3 Realignment of Light Rail Track at Anzac Parade/Alison Road

The Modifications Report identifies a realignment of the light rail track at the Anzac Parade and Alison Road intersections. The modifications relocate the separation of the Kingsford and Randwick Branch lines north of the intersection with Robertson Road.

Overall, it is considered that the proposed modifications to the intersection provide a simpler and more efficient operation. The use of the traffic signals to the north of the Dacey Avenue/Alison Road intersection to cross the LRV over the southbound carriageway is similar to the existing bus crossover at the same location and will reduce the complexity of the Dacey Avenue/Alison Road intersection.

It is noted that the realignment works at this intersection may impact the busway and bus services to UNSW. As the busway along Anzac Parade/Alison Road is used by a significant number of buses that service UNSW, the impacts during construction must be minimised.

5.4 Modified Randwick Racecourse Stop

The Modifications Report seeks to relocate the Randwick Racecourse, Alison Road stop from its approved location. There are no detailed plans that show the location and arrangement of the pedestrian crossing/s between Randwick Racecourse and the proposed stop. The location identified within the Modifications Report is further separated from Darley Road, and is not considered to provide direct access to serve the nearby TAFE or the UNSW Randwick Campus. The proposed relocation is also not considered to directly service Randwick Racecourse. UNSW is of the view that this stop should be relocated closer to Darley Road to directly service the various institutions noted above.

Additionally, as Alison Road is used by is used by students travelling to and from UNSW, particularly during exam periods (to the Racecourse) the impacts on bus services and roadways during construction must be minimised.

It is understood that the westbound right turn from Alison Road to Darley Road will be prohibited under the Modification. Based on previous TfNSW plans from March 2014, westbound right turns are prohibited at John Street and Cowper Street/William Street. To access the area north of Alison Road, the only signalised access will be the Wansey Road/Prince Street intersection. There is no discussion in the Modifications Report regarding the impact of the removal of the westbound right turn in to Darley Road, which UNSW believes will have a traffic impact.

5.5 Arthur Street/Botany Street Traffic Signals

Table 4.3 of the Modifications Report identifies the revised 'Environmental Management Measures' for the CSELR operation. It is noted that under Traffic, transport and Access' (AH.6) that traffic signals (lights) have not been identified for the intersection of Arthur Street and Botany Street. UNSW considers that these signals are an important part of the project to facilitate access around the one way section of Wansey Road and the UNSW High Street stop.

5.6 Wansey Road Shared Path

Table 4.3 of the Modifications Report identifies the revised 'Environmental Management Measures' for the CSELR operation. Under the heading 'Traffic, Transport and Access' (AH.23) it is mentioned that the shared path would be reinstated on the 'outside' of the tracks (adjacent to Randwick Racecourse). However, on Wansey Road, adjacent to the UNSW High Street stop the shared path is currently proposed between Wansey Road and the light rail track. This creates a significant safety issue the intersection of Wansey Road and High Street.

UNSW considers that the safer location for the shared path on Wansey Road is on the 'outside' of the tracks, as shown below in **Figure 8** and provide at **Appendix A**.

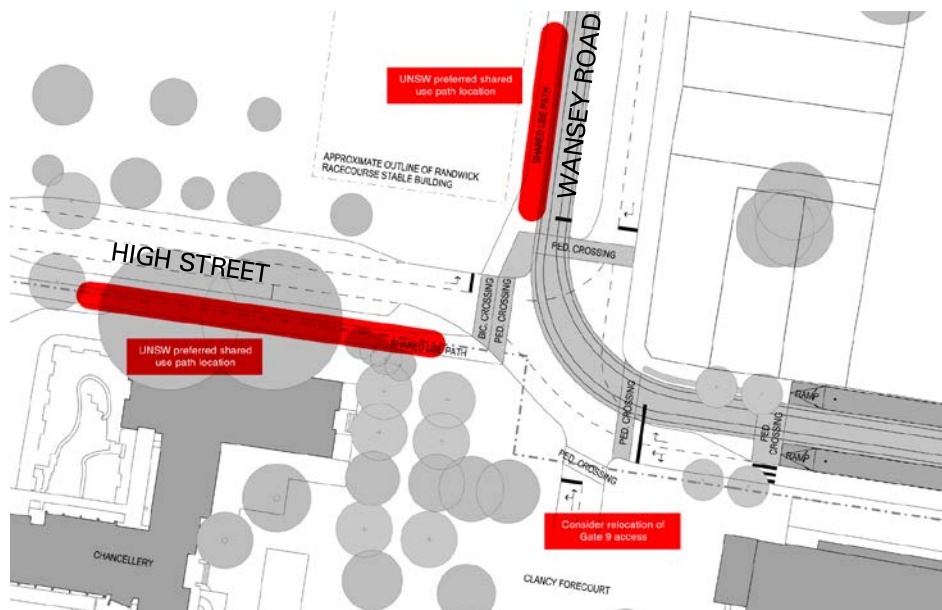


Figure 8 – UNSW High Street Stop – Critical Constraints to be addressed
Source: Tzannes and UNSW

6.0 Issues Remaining for UNSW (Outside of the Modifications Report)

6.1 Construction and Post Construction Impacts

This response is driven predominantly by UNSW's desire to see a safe and accessible environment at the campus for its students and staff and one which achieves and maintains a high level of amenity within, and at the edges of, the campus. To that end, these key concerns remain those tied to broadly meeting the project's objectives from a public benefit standpoint, but also the ability for UNSW to continue to be able to provide a learning, teaching, and research environment commensurate with its place as one of Australia's and the Asia-Pacific Region's premier universities, during both construction and operation.

It is essential that UNSW be able to operate as normally as possible during the Project construction works period. Maintaining traffic and transport access to the campus is fundamental to ongoing operations not being detrimentally affected, and in turn affecting the University's reputation and standing, particularly with student intake and its ability to maintain a competitive business edge and attract not only students but the best staff and key supporters of education, research, technology, and innovation.

6.2 Student and Staff Access

In addition to the 26,000 persons arriving by public transport, UNSW currently has approximately 7,000 staff and students arriving by private vehicle, 5,400 walking and more than 1,800 cycling to campus each day.

In order to continue operations, sufficient access points and capacity for each of these modes needs to be managed and maintained throughout construction and beyond in a safe and efficient manner.

Any changes to arrangements need to be coordinated and communicated in advance to avoid confusion and disruption to operations.

6.3 Operations and Delivery

Daily campus delivery requirements and campus specific construction traffic must be considered and managed during construction and delivery phases of the Project.

Ongoing access for deliveries is essential for normal operations to continue. Access to the University is limited to a number of entry/exit points. All access points are likely to be affected by the construction works in one way or another, and especially so, dependent upon the size of the delivery vehicle.

Certain access points presently cannot cater for oversized vehicles, whereas other access points can. Should any one Gate be affected for an extended duration (including the route to that Gate) severe impacts to supplies of materials and other important deliveries is likely to result. Importantly, not all loading docks or parts of the campus are readily accessible from other parts of the campus.

Some research activities rely on specialised gas and other services for their operation. Due to the infrastructure involved, use of alternative gates and access points may not be possible. Regular access for these activities will need to be maintained throughout the construction process.

6.4 UNSW Construction Program

The UNSW Kensington Campus has a building replacement cost value of approximately \$2.5bn. With ageing built infrastructure the university currently spends in the order of \$200m a year on facilities.

At present there are three major projects underway on the Kensington Campus:

- Materials Science Building (completion June 2015) - \$145m;
- Mechanical Engineering Refurbishment (completion March 2015) - \$68m; and
- Biological Sciences Project (completion in 2017) - \$150m.

In December 2013 the University Council approved a borrowing strategy and capital program that will see the University continue to undertake a similar level of activity throughout the period of the construction of the Project. The capital works in the following table (**Table 2**) are funded from University reserves and the borrowing strategy. They require no other external funding to proceed.

Table 2 – UNSW Capital Development Program – Short term

Project	Budget	Construction Period	Construction Access
Biosciences Phase 1	\$150m	2014 - 2017	Gate 11 Botany Street
Biosciences Phase 2	\$120m	2017 - 2020	Gate 11 Botany Street
Materials Science Lab Fit Out	\$38m	2015	Gate 2 High Street
Chemical Sciences Refit	\$63m	2016 - 2017	Gate 2 High Street
Electrical Engineering Refit	\$100m	2015 - 2016	Gate 2 High Street
Civil Engineering Refit	\$40m	2016 - 2017	Gate 11 Botany Street
Squarehouse / Blockhouse	\$48m	2017 - 2018	Gate 2 High Street

As with routine deliveries, only certain access points and Gates will be able to directly serve individual construction sites. Access to some of these gates are directly affected by the timing, duration and location of the Project.

To assist in resolving routine and construction access issues and likely impacts, UNSW seeks to work proactively with TfNSW to formulate a construction program that is mutually acceptable to both parties and considers the economic and business impacts of each project or entity.

7.0 Conclusions

UNSW is a significant contributor to the ongoing success of the Sydney public transport network and the success of the Project, bringing some 26,000 passengers to the Kensington campus on weekdays, including 17,000 alone on buses between Central and the campus. Additional to this are the visitors to campus for special events both during the week and at weekends.

To that end alone it is Sydney Buses biggest single customer destination. This is expected to continue to grow as UNSW itself grows. Indeed, UNSW provides “special event” status to the network on a twice daily basis. The EIS has noted this in nominating the two proposed UNSW stops as the 4th and 5th busiest in the Project, and the two busiest on the south-eastern corridors. This UNSW daily passenger load clearly provides the single greatest driver of the benefit case for the light rail.

As a key partner in the Project UNSW will continue to liaise with TfNSW (and the now appointed contractor) to clarify and resolve any issues raised in this submission and to find appropriate outcomes that enhance the facilitation and delivery of the light rail network. UNSW has sought to work collaboratively with TfNSW in achieving optimal outcomes for the UNSW and the wider community.

This submission addresses remaining concerns arising from both the Infrastructure Approval and Modifications Report relating to both stops at UNSW (at Anzac Parade and at High Street), as well as a range of remaining construction and operational issues.

The key issues arising from the proposed modification are:

- The impacts arising from the modification to the length of Light Rail Vehicles (LVRs) and platforms;
- The impacts associated with the modification to the frequency of service, in particular to the UNSW Anzac Parade and High Street stops;
- Increased risk to pedestrian safety as a result of the proposed modifications;
- The increased risk of noise, vibration, electromagnetic interference (EMI) and radio frequency interference (RFI) impacts upon sensitive teaching, research and other University environments during construction and operation of the light rail as a result of the proposed amendments;
- Visual impacts associated with the proposed modifications; and
- The lack of consultation between TfNSW and UNSW.

It is essential that UNSW ensures its typical daily operations can continue as unaffected as possible in recognition of the importance the University plays in the Precinct and to the economy in general. Significant detrimental effects have the potential to introduce wider-ranging and longer-term impacts upon the Precinct’s and University’s viability, amenity, character, reputation, business continuity and capacity and capability for the future.

UNSW looks forward to the opportunity to provide further comment on any further amendments and welcomes the opportunity to meet with TfNSW and the Department of Planning and Environment to discuss anything contained within this submission.