

Sydney CBD and South East Light Rail Environmental Impact Statement- Comments on Safety

Introduction

Few would argue against the premise that for Sydney to remain competitive as an international “world” city it must solve the transport problems that are sapping its energy as an economic, educational, commercial, residential and tourist hub. Sydney therefore needs the best possible rapid transit and personal transport systems. Safety is a fundamental and essential ingredient of any new transport proposal since the world community will not accept anything less than the best practice safety standards. This paper argues from an examination of one section of the current proposal that it is not best practice as far as safety is concerned, having major deficiencies that also challenge its efficiency and useability. The paper discusses the fact that the proposal compromises the potential for cycling to add a new dimension to the city’s personal transport infrastructure. Sydney cannot afford to make another wrong decision concerning its transport future.

It has been many years since trams have operated in Sydney streets and much has changed in light rail transport since those times. Much of the world is following a trend to remove street based light rail and replace it by rail transit systems with reserved track and pedestrian separation from road traffic. The aims are to improve safety and remove conflict with the need to reduce journey times. There is a large amount of data justifying the need for separation of light rail transit from all other modes of movement (as an example see TCRP report 137 “Improving Pedestrian and Motorist Safety along Light Rail Alignments”, sponsored by the US Federal Transit Administration). Given this international evidence and a strong movement towards safety, it would be foolhardy indeed to ignore the potential for legal liability. Street based light rail where it is still used in European and North America has commonly been upgraded in safety by reserving the track and restricting rail crossings to designated controlled vehicular/ pedestrian crossings and enhancing passenger safety by providing platforms at the designated stops that have physical barriers to achieve separation of from road traffic.

Since removing all of its street based tramways Sydney has experimented with light rail and has introduced and subsequently removed a monorail service which had a reserved right of way and relatively safe passenger management in stations and elsewhere. The inner west light rail has been introduced almost entirely on reserved track but with a relatively short length of track on city streets. For the most part, safe stations are provided with adequate safety standards. The service operates with low frequency and at low speed and sadly, with low patronage as well. Melbourne has improved the safety of much of its tramway system with the separation of pedestrians from road traffic at “superstops”, together with increased reservation of track from road and pedestrian traffic. The Glenelg tramway in Adelaide has seen similar upgrading.

The Devonshire Street Transport Axis

The light rail proposal has correctly identified Devonshire Street as a transport axis with very large growth potential, given the large residential population increases planned at Centra Park and the growing student bodies at UTS, Notre Dame University and the University of Sydney, the growing businesses in Surry Hills and the existing educational campuses and entertainment venues.

Figure 1 shows the precincts that are connected by this corridor with the activity centres that are origins or destinations for journeys in the Devonshire Street corridor. The activity centres in these

precincts are commercial, educational, recreational, health care, residential, commercial, hotel and other retail and service industries. The usage by pedestrians is high and could be higher given a clear connection to Moore Park along Parkham Street that is not currently well delineated, but will be if the light rail proposal goes ahead. Usage by cyclists of this corridor is currently impeded by the lack of a good cycle connection across Central station as well as the lack of a well defined link through Parkham Street. To achieve the cycle link through central station, the Devonshire Street pedestrian tunnel could be made more cycle friendly. There is a need for an east-west cycle crossing of the city to allow cyclists to avoid the hazardous route along Cleveland Street. Cleveland Street is not an alternative to the Devonshire Street corridor as it provides poor conditions for cyclists because of conflict with motorised road traffic and also has a poor amenity for pedestrians. The light rail proposal provides an opportunity to enhance the amenity of this corridor for cyclists.

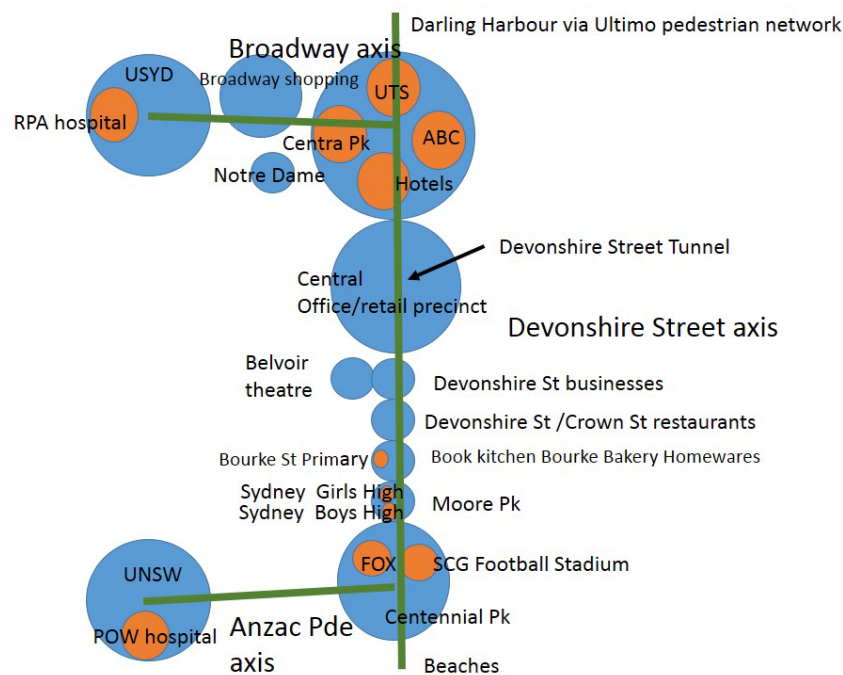


Figure 1. The Devonshire Street transport axis: Pedestrian usage is currently high, cycling could be enhanced by correct design of the Light rail proposal

Aims of this report

The aim of this report is to identify hazards in some areas of conflict between transport modes, specifically between pedestrians (including passengers) with other transport modes that arise from the presence of the light rail as proposed. Mitigations will also be suggested.

Light Rail Safety - a World Perspective and the Principle of Modal Separation

There is a very large body of evidence accumulated over many years worldwide concerning the occurrence of injuries and fatalities associated with street based light rail and conventional rail systems. An outcome of these studies is the Principle of Modal separation. This principle is based on the soundly based observation that hazard arises at the intersections of different modes and states that the optimum safety of transport is achieved by maximal separation of transport modes.

Transport modes for these purposes include: 1) pedestrian; 2) cycling (non-motorised); 3) rapid transit; 4) motorised vehicular. An example of modal separation is the separation of pedestrians

from the other modes by physical means such as separated pathways. In some situations of conflict, safety may be assessed as adequate when the operation speeds are low, the frequencies of potentially conflicting interactions are low, visibility is good, braking distances are short, there are no “at risk” categories of pedestrians such as unaccompanied minors or adults with impaired perception, judgement or mobility. In all cases safety measures should be implemented by engaging in a risk assessment process combined with risk mitigation process that achieves the maximum practicable modal separation.

Workplace Health and Safety (WHS) practices are now mandated in all workplaces in NSW and a similar process should be engaged in when a proposal such as the current CBD and South East Light Rail proposal is made which has widespread implications for the safety of citizens. This report proposes the first steps in such an assessment for one section of the proposed route from Central Station to Moore Park but in no way can be considered comprehensive. Figure 2 shows contrasting safety features in Sydney’s more recent light rail implementations. The monorail system meets or exceeds the safety criteria for a “first generation light rail” system as defined below, while the section of the inner west light rail near Paddy’s Market right only meets criteria for a “legacy tramway”.



Figure 2. Safe and unsafe practice in light rail: The safety principles of reserved track and separation of passengers from the rail corridor and road traffic are evident in the Sydney monorail stop (left) but absent in the inner west light rail stop where uncontrolled track crossings occur (right) (photograph from Wikipedia).

Definitions

For the purposes of this report, a light rail system that has unreserved sections of track with permitted unregulated pedestrian and/or vehicular crossings and potential conflict between passengers and road traffic will be termed a “legacy tramway”. The CBD and South East light Rail proposal in its present form appears to have in the section of interest here, unreserved track, uncontrolled crossings and conflict with road vehicles at stops and therefore is a legacy tramway.

A light rail transit system that has reserved track with level crossings with traffic/pedestrian lights and/ or automated barriers and platforms for embark/disembark with full barrier separation from road traffic will for the purposes of this report be termed “first generation” light rail system. A light rail transit system that has fully reserved track with no level crossings, platforms with full barrier separation from road traffic and full barrier isolation of passengers at platforms from the light rail vehicles will be termed a “second generation” light rail system. A light rail system that meets second generation criteria but includes full back to base electronic surveillance of the passenger spaces,

both on-platform and in-vehicle, with driverless operation and automated ticketing will be termed a “third generation” light rail system. Third generation is operating in many world cities at the present time (Singapore, London, Torino, to name a few) and is increasingly used for airport light rail terminal connections worldwide.

A light rail vehicle (LRV) is a motorised or non -motorised vehicle travelling on the light railway tracks. The following is the NSW Gazetted definition of a railway that is useful as a legal definition governing rail transport in NSW and clarifies that a “light railway” or “tramway” is in law the same as a “heavy railway” and therefore subject to the same laws:

“railway” means a guided system or proposed guided system designed for the movement of rolling stock having the capability of transporting passengers or freight (or both) on a railway track with a gauge of 600 millimetres or more... includes the following:

- (a) A heavy railway
- (b) A light railway
- (c) A monorail
- (d) An inclined railway
- (e) A tramway
- (f) A railway within a marshalling yard or a passenger or a freight terminal
- (g) A private siding
- (h) A guided system or guided system of a class prescribed by the national regulations to be a railway

Risk Identification and Mitigation-Elizabeth to Crown Streets

Discussed in this report is the safety of the proposed route that includes the length of Devonshire Street from Elizabeth Street to Bourke Street and the residential precinct between Bourke Street and Moore Park.

Hazard-Conflict Between embarking/disembarking passengers and road traffic

It is understood there is a proposed station in Devonshire Street at the corner of Riley Street. At the same time there is in the plan provided an immediately adjacent traffic lane presenting a collision hazard to embarking and disembarking passengers. The risk is unacceptably high in view of the weight of historical data on street based rail systems and must be mitigated.

Proposed Mitigation

If the station is retained at this location it will be necessary to take a large part or preferably all of the traffic lane for the length of the light rail vehicles and provide the platform area with a barrier against passing vehicles to ensure safe embarkation and disembarkation. The platform area need not be raised above road level but could be raised to pavement level to ensure ease of access and avoid trip hazards at the kerb. The remaining part of the traffic lane could be a cycle lane for example.

Hazard- Crossing pedestrians and cyclists

It is understood that the current proposal allows uncontrolled casual crossings of the line at other than designated traffic light controlled crossings in Devonshire Street. The proposed length of the trains is up to 60 metres so that obscured visibility will be experienced by a crossing pedestrian or cyclist of an oncoming train. The hazard is magnified in view of the location of the line in a street of high pedestrian activity and its location near a major residential precinct and recreational facility

(Ward Park) where unaccompanied minors are present. An additional hazard is generated by adult pedestrians accessing the Belvoir Street Theatre or one of the bars, restaurants or other premises on Devonshire Street. The lack of a separating fence enclosing the line will encourage risk taking.

Proposed mitigation

A safety fence along the full length of Devonshire Street on both sides of the track with periodically spaced traffic light controlled crossings of Devonshire Street is proposed as a mitigation of this hazard. For example, pedestrian /cycle crossings could be located at Riley, Waterloo, Clisdell and Holt Streets as well as at the vehicular crossing at Crown Street. Coordination of the lights will enable crossings except when a train is imminent.

Hazard- Pedestrian falling or push chair rolling from the adjacent pavement into the path of or into contact with a city bound LRV in Devonshire Street. The risk is similar to that found on a City Rail platform where an approximately one metre exclusion zone is marked on the platform edge by a yellow line.

Proposed Mitigation

The strategy for the previous identified hazard will serve in this case also, except at a designated platform where a suitable exclusion zone may be deemed sufficient.

Risk Identification and Mitigation- Crown Street to Moore Park.

Hazard-Collisions with children attending Bourke Street Primary School, cycle and vehicular traffic

This is a high activity area with major pedestrian, cycle and road traffic activity. The rail line will represent a significant community hazard that requires the highest level of attention to safety.

The design creates an undesirable conflict between safe operation at low speed and the need to achieve competitive transit times. Unless fully resolved this will place LRV drivers and the Sydney City Council and others in legal as well as physical jeopardy.

Proposed Mitigation

Uncontrolled crossings of the line by vehicles, cyclists and pedestrians should be prevented by physical barriers except at controlled crossing points.

Consideration should be given at Wimbo Park area to a full enclosure of the line at locations other than controlled crossings to ensure safety of school children attending the nearby Bourke Street School as well as school students walking to the Sydney Boys' and Sydney Girls' high schools and other park users. Traffic light controlled crossings will be essential at Nixon Street, Bourke Street, Olivia Lane and Parkham Place to avoid collisions with pedestrians/cycles and road vehicles in restricted visibility situations. Strict limits on LRV speed will need to be enforced in case of unforeseen events causing line blockages. The speed limit will need to be determined to accommodate loss of braking efficiency in wet conditions to allow drivers to bring a train to an emergency stop when line blockages occur at short notice.

Conclusions

The current plan has unacceptably high risks for passengers, pedestrians and other affected parties. Safety measures need to be built in to the plan. The underlying problem is the conflict between safety and journey times that needs to be addressed and resolved. Consideration should be given to undergrounding the line for as much of its length as possible.

The proposal appears on the information available to be a “legacy tramway” according to the definitions of this report. At a minimum, in common with processes underway in other Australian and international cities, the proposal should be provided with first generation safety features by reserving the track, providing safe embarkation and disembarkation stops, and controlling all crossings (including pedestrian, cycle and road vehicle crossings) with lights. For example, the conflict between passengers and motorised traffic at the stop in Devonshire Street will require part or all of the traffic lane to be reserved for a platform area with safety barricade.

It is a misconception to think that in Australia’s safety conscious society, rail based vehicles can be “mixed” with pedestrians and road traffic, except possibly at very low speeds that will be unacceptable to a large part of the potential passenger cohort. The braking distances possible for a vehicle with steel wheels on steel rails especially under wet conditions precludes this kind of mixing at the speeds now required for a modern competitive rail based transit system.

A major deficiency of the design of the proposal in the Devonshire street corridor is the lack of incorporation of a cycle path that will lead an adverse impact on cycling. Cycling is a sustainable personal transport solution for linking the educational, residential, commercial, retail and recreational centres along the Devonshire Street corridor.