



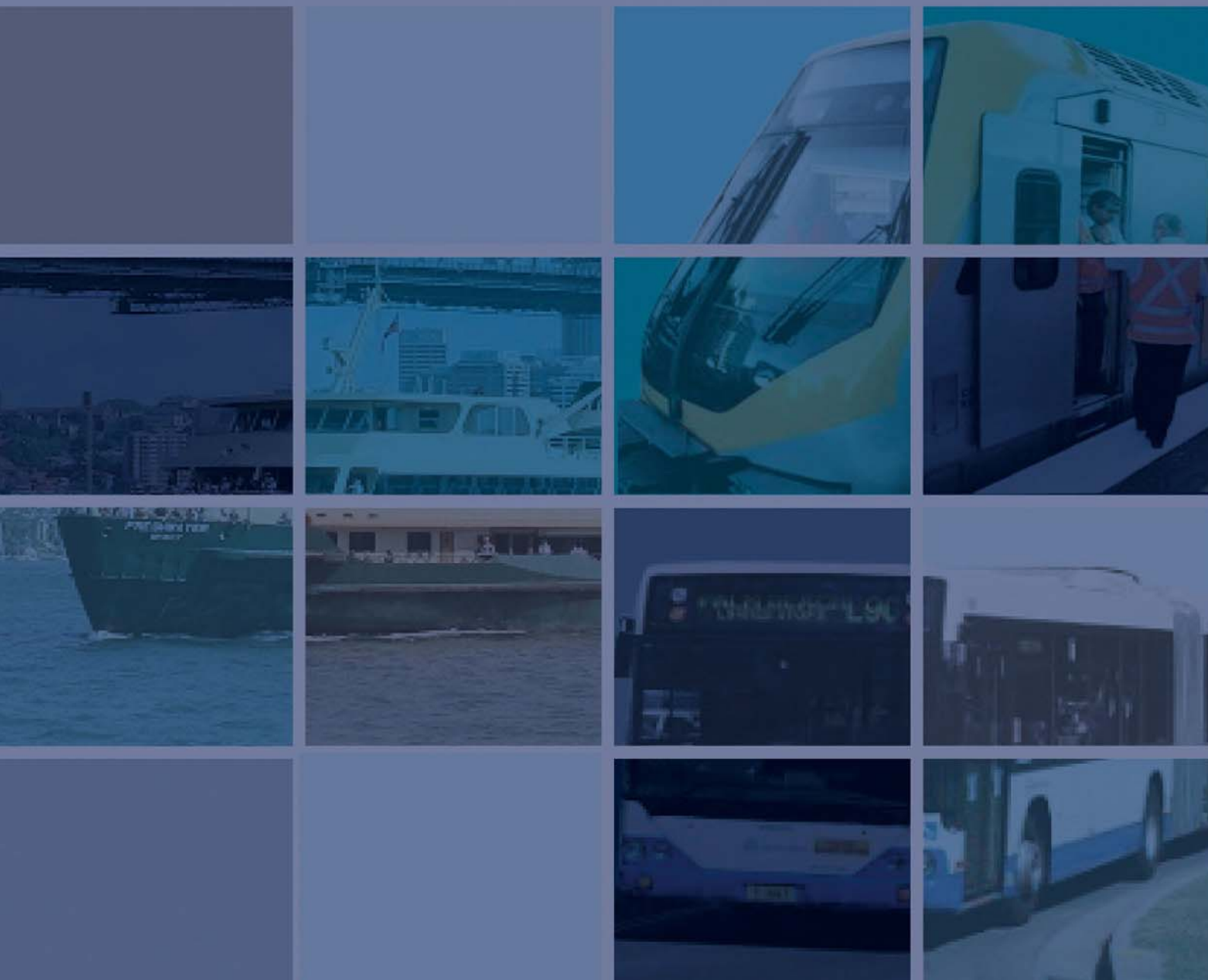
Office of Transport Safety Investigations

BUS SAFETY INVESTIGATION REPORT

BUS ACCIDENTS OCCASIONING DEATH AND SERIOUS INJURY

WEST PENNANT HILLS, RUTHERFORD AND SYDNEY CBD

19 – 27 JUNE 2007



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Published by: The Office of Transport Safety Investigations
Postal address: PO Box A2616, Sydney South, NSW 1235
Office location: Level 17, 201 Elizabeth Street, Sydney NSW 2000
Telephone: 02 9322 9200
Accident and incident notification: 1800 677 766
Facsimile: 02 9322 9299
E-mail: info@otsi.nsw.gov.au
Internet: www.otsi.nsw.gov.au

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THE OFFICE OF TRANSPORT SAFETY INVESTIGATIONS

The Office of Transport Safety Investigations (OTSI) is an independent NSW agency whose purpose is to improve transport safety through the investigation of accidents and incidents in the rail, bus and ferry industries. OTSI investigations are independent of regulatory, operator or other external entities.

Established on 1 January 2004 by the Transport Administration Act 1988, and confirmed by amending legislation as an independent statutory office on 1 July 2005, OTSI is responsible for determining the causes and contributing factors of accidents and to make recommendations for the implementation of remedial safety action to prevent recurrence. Importantly, however, OTSI does not confine itself to the consideration of just those matters that caused or contributed to a particular accident; it also seeks to identify any transport safety matters which, if left unaddressed, might contribute to other accidents.

OTSI's investigations are conducted under powers conferred by the Rail Safety Act 2002 and the Passenger Transport Act 1990. OTSI investigators normally seek to obtain information cooperatively when conducting an accident investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to interview persons, enter premises and examine and retain physical and documentary evidence.

It is not within OTSI's jurisdiction, nor an object of its investigations, to apportion blame or determine liability. At all times, OTSI's investigation reports strive to reflect a "Just Culture" approach to the investigative process by balancing the presentation of potentially judgemental material in a manner that properly explains what happened, and why, in a fair and unbiased manner.

Once OTSI has completed an investigation, its report is provided to the NSW Minister for Transport for tabling in Parliament. The Minister is required to table the report in both Houses of the NSW Parliament within seven days of receiving it. Following tabling, the report is published on OTSI's website at www.otsi.nsw.gov.au.

OTSI cannot compel any party to implement its recommendations and its investigative responsibilities do not extend to overseeing the implementation of recommendations it makes in its investigation reports. However, OTSI takes a close interest in the extent to which its recommendations have been accepted and acted upon. In addition, a mechanism exists through which OTSI is provided with formal advice by the Independent Transport Safety and Reliability Regulator (ITSRR) in relation to the status of actions taken by those parties to whom its recommendations are directed.

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TERMS OF REFERENCE

OTSI's Investigating Officer in Charge (IIC) was required to investigate the circumstances of the following accidents involving:

- a bus, operated by Hillsbus Pty Ltd, and a pedestrian on the M2 Hills Motorway at West Pennant Hills on 19 June 2007 in which the pedestrian sustained fatal injuries;
- a bus, operated by STA, and a pedestrian on Clarence Street, Sydney on 19 June 2007 in which the pedestrian sustained fatal injuries;
- a bus, operated by Hunter Valley Buses, and a cyclist on Arthur Street, Rutherford on 20 June 2007 in which the cyclist sustained fatal injuries, and
- a bus, operated by STA, and a pedestrian on Druitt Street, Sydney on 27 June 2007 in which the pedestrian was seriously injured.

The IIC's Instrument of Appointment and Terms of Reference prescribed that the purpose of the investigation was to:

- identify the circumstances surrounding the accidents;
- identify those factors that caused or contributed to the accidents with consideration being given to, but not limited by, the following factors;
 - the actions of the bus drivers, the pedestrians and the cyclist;
 - road conditions including, but not limited to, vehicular and pedestrian control devices;
 - the design and mechanical condition of the buses;
 - whether the buses were operated in accordance with NSW road rules and regulations and any conditions attached to the operating company's accreditation;
- examine the adequacy of the emergency responses, and
- identify any other matters arising from the investigation that would enhance the safety of bus operations in NSW.

EXECUTIVE SUMMARY

During the period 19 – 27 June 2007 two pedestrians and a cyclist were killed and a fourth person was seriously injured, in separate accidents, after being struck by a bus.

The circumstances pertaining to the accidents were as follows:

- **M2 MOTORWAY, WEST PENNANT HILLS:** On 19 June 2007, a male adult pedestrian sustained fatal injuries after being struck by a bus, operated by Hillsbus, on the M2 Hills Motorway at West Pennant Hills. The pedestrian had alighted from a car and was attempting to cross three lanes of traffic when he was hit by the bus in a 'Buses Only' lane.
- **CLARENCE STREET, SYDNEY CBD:** On 19 June 2007, a female adult pedestrian sustained fatal injuries after being struck by a bus, operated by the State Transit Authority (STA), while crossing Clarence Street near its intersection with Druitt Street in the Sydney CBD.
- **ARTHUR STREET, RUTHERFORD:** On 20 June 2007, a 16 year old male cyclist was killed after he lost control of his bicycle and was run over by a bus, operated by Hunter Valley Buses, at the intersection of Hillview and Arthur Streets at Rutherford.
- **DRUITT STREET, SYDNEY CBD:** On 27 June 2007, a female adult pedestrian sustained serious injuries after being struck by a bus, operated by the STA, while crossing Druitt Street near its intersection with Kent Street in the Sydney CBD.

These occurrences and OTSI's related findings are described in Parts 1 – 4 of this report. It is significant that in each instance, the pedestrians and the cyclist placed themselves at risk and that the ensuing accidents could not, in any way, be attributed to the actions of the bus drivers. While the actions of one of the pedestrians could be regarded as being quite extreme, the actions of the other two are considered to be commonplace by OTSI investigators who have undertaken observations of pedestrian behaviour on many streets throughout the Sydney CBD.

FINDINGS

PEDESTRIAN FATALITY, 19 JUNE 2007, M2 MOTORWAY, WEST PENNANT HILLS

a. Causation

The pedestrian was struck and fatally injured in the “Buses Only” lane while attempting to reach the Oakes Road bus interchange by crossing three lanes of the M2 instead of using the authorised pedestrian ramp access route.

b. Contributory Factors

The pedestrian may have taken the route that he did because he was concerned about the prospect of missing his bus and being late for work in a position he had only recently secured.

c. Adequacy of the Emergency Response

The bus driver and bystanders acted quickly to assist the pedestrian and to alert the Police and Ambulance Services whose officers arrived in quick succession and acted efficiently.

d. Other Matters that would enhance the Safety of Bus Operations

- i. There is an absence of signage at the Pennant Hills Road off-ramp to dissuade pedestrians from attempting to reach the Oakes Road bus interchange by other than the permitted pedestrian route. There may also be scope to improve existing barriers, signage and fencing arrangements in the vicinity of the off-ramp.
- ii. There is an absence of signage at the bus interchanges on the M2 to provide commuters with a point of contact in the event that they see unsafe acts occurring in their vicinity.
- iii. Because the CCTV fitted to the bus was mounted internally and rear-facing, it was of little use in revealing the circumstances of the accident. As a safety device, its effectiveness was restricted to recording driver and passenger behaviour. This is the case with the majority of buses operating within the greater Sydney area, and buses operating in the rest of NSW are not required to be fitted with any form of CCTV. OTSI considers that there is a requirement for digital CCTV to be fitted to buses as a safety device and that to be effective, it needs to be both forward-looking and rear-facing. Such a capability would provide a

significant long-term situational enhancement to the safety of bus drivers and passengers and should be fitted to all large buses operating on regular passenger service routes, and those operating over longer distances on a regular or chartered basis throughout NSW.

- iv. Some Hillsbus employees are uncertain about aspects of the company's safety incident reporting system.

PEDESTRIAN FATALITY, 19 JUNE 2007, CLARENCE STREET, SYDNEY CBD

a. Causation

The pedestrian was struck and fatally injured when she was engaged in crossing Clarence Street at other than a designated pedestrian crossing and at a time when the nearest traffic signals regulating pedestrian movement were displaying a red 'Don't Walk' indication.

b. Contributory Factors

- i. The pedestrian's decision to cross where and when she did may have been influenced by adverse weather conditions and traffic signal phasings that provide limited opportunities, in terms of both frequency and duration, for pedestrian movement in this area.
- ii. The pedestrian's visibility of the oncoming bus may have been restricted by the reduced effectiveness of her glasses in the wet conditions, her use of an umbrella and a general reduction in lighting conditions caused by the inclement weather.
- iii. It is unlikely that the bus driver would have been expecting the pedestrian to cross the street when and where she did, and the combination of her dark attire and the overcast conditions would have further diminished his ability to see her crossing.

c. Adequacy of the Emergency Response

The bus driver and bystanders acted quickly to assist the injured pedestrian and to alert the Emergency Services. Police and Ambulance officers arrived within a short period of time and acted efficiently at the scene. Valuable assistance was also rendered by an STA Customer Service Coordinator.

d. Other Matters that would enhance the Safety of Bus Operations

The CCTV equipment fitted to the bus has limited utility and should be replaced with equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images, even when the bus is subject to the forces associated with a collision.

CYCLIST FATALITY, 20 JUNE 2007, ARTHUR STREET RUTHERFORD

a. Causation

The cyclist placed himself at risk when he attempted a diagonal turn from the wrong side of Arthur Street into Hillview Street, at speed and in wet conditions. As he did so, he encountered a bus which was making a right turn from Hillview Street into Arthur Street and sought to avoid it by passing between the bus and a median strip. In the process, he lost control of his bicycle and, as a consequence, slid under the rear wheels on the driver's side of the bus.

b. Contributory Factors

- i. The bike had a worn rear tyre and effective braking would have been further inhibited by wet wheel rims and brake pads and a wet road surface. These factors would have been further exacerbated by the fact that the cyclist was travelling downhill, with a tailwind.
- ii. In addition to not expecting he would be approached from the wrong direction, the bus driver's visibility of the cyclist was restricted by both moisture on his windscreen and side window, and a blind spot caused by the dimensions and placement of his vehicle's 'A' pillar and the right-hand side mirror. Because he did not see the cyclist, the bus driver was not in a position to take any avoiding action.

c. Adequacy of the Emergency Response

The emergency response was timely and efficient.

d. Other Matters that would enhance the Safety of Bus Operations.

Buses operating outside the Sydney, Newcastle and Wollongong metropolitan areas are not required to be fitted with CCTV. However, this technology can greatly assist in understanding the circumstances of an accident. Moreover,

the installation of such cameras discourages inappropriate behaviour on buses by assisting in the identification of offenders, thereby reducing the requirement for drivers to have to concentrate on matters other than the operation of their bus.

PEDESTRIAN SERIOUSLY INJURED, 27 JUNE 2007, DRUITT STREET SYDNEY CBD

a. Causation

The pedestrian was struck and seriously injured when she was engaged in crossing from the Northern to the Southern side of DrUITt Street at other than a designated pedestrian crossing and at a time when the nearest traffic signals regulating pedestrian movement were displaying a red 'Don't Walk' indication.

b. Contributory Factors

- i. Eastbound buses travel up DrUITt Street infrequently and the pedestrian may have, over time, become conditioned to discount the prospect of such movement.
- ii. Barriers which were positioned to discourage the type of behaviour engaged in by the pedestrian had been removed from DrUITt Street in August 2005, but have recently been replaced.
- iii. The pedestrian's decision to cross where and when she did may have been influenced by traffic signal phasings that provided limited opportunities, both in terms of frequency and duration, for pedestrian movement in this area.

c. Adequacy of the Emergency Response

- i. Several witnesses to the accident used their mobile phones to contact Emergency Services and passengers and witnesses acted quickly to assist the pedestrian. Officers from a variety of Emergency Services agencies arrived in quick succession and acted effectively at the scene.
- ii. STA's practice of rostering Customer Service Coordinators to be on site at busy bus stops meant that it was able to have someone on site within minutes, and that representative made an effective contribution to the emergency response.

d. Other Matters that would enhance the Safety of Pedestrians

The CCTV equipment fitted to the bus has limited utility and should be replaced with equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images, even when the bus is subject to the forces associated with a collision.

Recommendations

In order to prevent a recurrence of these types of accidents, the following remedial safety actions are recommended for implementation by the organisations specified below:

a. Ministry of Transport

Require that all large buses operating on regular passenger and school service routes, and those operating on longer distance tours and charters throughout NSW, be equipped with forward-looking and rear-facing digital CCTV.

b. Roads and Traffic Authority

- i. Maintain the revised traffic management arrangements in Druitt Street that were introduced for World Youth Day as permanent arrangements.
- ii. In cooperation with the City of Sydney Council, conduct a trial of 'countdown' pedestrian signals at selected locations in the Sydney CBD to determine whether such equipment should be used more widely within the City.
- iii. Assist the Transurban Group to improve barriers, signage and fencing in the vicinity of its bus interchanges on the M2, especially in the vicinity of the Pennant Hills Road off-ramp near the Oakes Road interchange at Carlingford, to further deter pedestrians from attempting to access or depart from the interchanges by other than the designated routes.

c. State Transit Authority

- i. Conditional upon confirmation that the recently revised traffic arrangements in Druitt Street are permanent, permanently reintroduce Eastbound running along Druitt Street.

- ii. Reissue its Safety Alert relating to pedestrian safety to all its drivers at the start of June each year.

d. Transurban Group (Owner/operator of M2 Hills Motorway)

- i. In conjunction with the RTA, improve barriers, signage and fencing in the vicinity of its bus interchanges on the M2, especially in the vicinity of the Pennant Hills Road off-ramp near the Oakes Road interchange at Carlingford, to further deter pedestrians from attempting to access or depart from the interchanges by other than the designated routes.
- ii. Include a phone number on its signage at its interchanges to facilitate the public reporting of unsafe acts to Transurban.

e. Hillsbus

- i. Equip all of its buses with CCTV equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images even when the bus is subject to the forces associated with a collision.
- ii. Continue to emphasise to its employees the importance of reporting any instance of unsafe activity.

f. Hunter Valley Buses

- i. Review the positioning of all external mirrors throughout its fleet to ensure that the requirements of *ADR 14/02* are met and to eliminate blind spots to the extent that it is possible. In the interim, bring to the attention of all of its drivers information concerning blind spots that are already known to exist, and the strategies that should be used to compensate for them.
- ii. Equip all its buses with digital CCTV equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images even when the bus is subject to the forces associated with a collision.

PART 1 PEDESTRIAN FATALITY ON THE M2 MOTORWAY, WEST PENNANT HILLS, 19 JUNE 2007

FACTUAL INFORMATION

Accident Narrative

- 1.1 At approximately 7:55am¹ on 19 June 2007, a 27 year-old male pedestrian alighted from a car on the Pennant Hills Road off-ramp, located on the Northern (City bound) side of the M2 Hills Motorway² at West Pennant Hills, and attempted to cross three lanes on the M2 to reach the Oakes Road bus interchange (see *Photo 1*). He successfully negotiated two lanes of slow-moving City-bound traffic but was struck by a bus that was travelling at approximately 80km/h in the third lane which was for 'Buses Only'.

Emergency Response

- 1.2 Immediately following the collision, the bus driver stopped and, assisted by two passengers, forced open the front door of his bus, which was damaged in the accident, in order to reach the pedestrian.
- 1.3 The driver of a nearby truck, who also witnessed the accident, blocked traffic on an adjacent lane so bystanders could safely render cardio-pulmonary resuscitation to the pedestrian. Despite this attention, and that rendered by ambulance officers who arrived 16 minutes later, the pedestrian died.

Location

- 1.4 The location of the accident is depicted in *Diagram 1*. Vehicles travelling in the three Eastbound lanes along this section of the M2 are permitted to travel at 100km/h. Pedestrian access to and egress from the bus interchange is via a pedestrian ramp which leads from street level at Oakes Road to the Western end of the interchange, via a subway. (See *Photos 1-3*).

¹ All times in this report are Australian Eastern Standard Time.

² Hereafter referred to throughout this report as "the M2".





Photo 2: Street level pedestrian subway entrance from Oakes Road

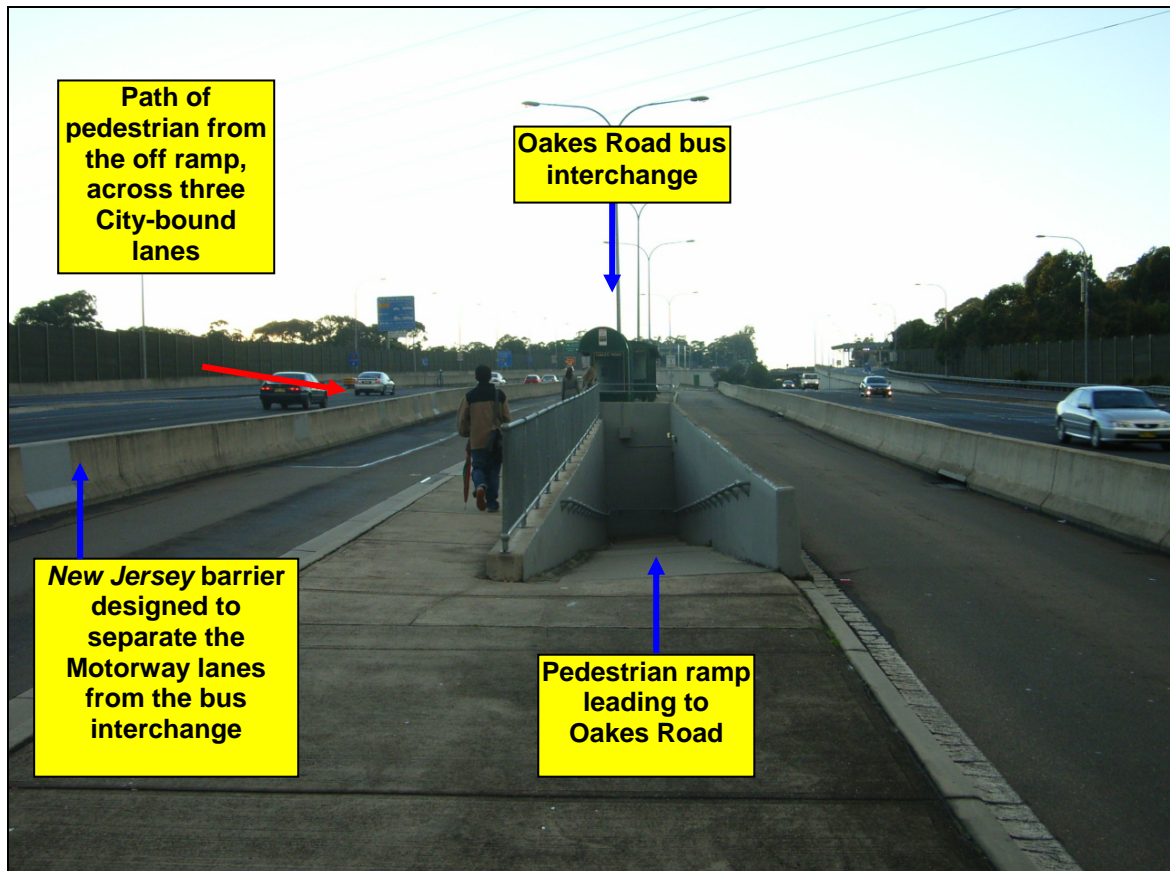


Photo 3: Road level pedestrian entrance at Oakes Road bus interchange

Bus Information

- 1.5 The bus, a Mercedes Benz 0405 Mark II model, was first registered in October 1998 and was one of 49 such buses operated out of the Hillsbus depot at Northmead. The bus is licensed to accommodate 57 seated and 27 standing passengers. At the time of the accident all of its 36 passengers were seated.
- 1.6 The bus was fitted with one CCTV recording camera which faced rearwards and was positioned to record activity within the bus; as such the accident was not captured on film. In addition, the images that were captured at the moment of the collision and during the sudden braking that immediately followed were distorted because the recording equipment was jolted during this period.
- 1.7 The bus was examined at the scene by the NSW Police soon after the accident and although there were obvious signs of damage because of the accident (refer to *Photo 4*), no mechanical or electrical defects that might have caused, or contributed, to the accident were discovered. A later check of servicing records also indicated that the bus had been serviced at the required intervals.



Photo 4: Damage to bus
(Photo courtesy of Hillsbus)

Bus Driver Information

- 1.8 The bus driver was first issued with a Public Passenger Vehicle Driver's Authority in September 2001 and commenced his employment with Hillsbus immediately thereafter. His Public Passenger Vehicle Driver's Authority was renewed in September 2004.
- 1.9 On the day of the accident, the bus driver commenced work at the Northmead Depot at 6:26am and was due to conclude his driving duties at 9:44am. An examination of the driver's roster for the previous seven days indicated that he was being tasked within acceptable industry fatigue guidelines. The driver also advised that he did not have any form of secondary employment.
- 1.10 The bus driver's last work-related medical examination was in September 2006 and as a result of that examination he was required to undergo additional testing after which he was granted an unconditional medical clearance. The bus driver returned negative results when tested for the presence of alcohol.

Environmental Conditions

- 1.11 Witnesses indicated that light rain had been falling at the time of the accident and that this had been preceded by heavier rain. These descriptions were consistent with the Bureau of Meteorology's forecast for the day.

ANALYSIS**Exclusions**

- 1.12 The following matters were able to be readily eliminated as either causal or contributory factors;
- a. environmental conditions,
 - b. the condition of the bus, and
 - c. the condition of the bus driver.

Operation of the Bus

- 1.13 The speed limit for all vehicles on the three Eastbound lanes in the area where the accident occurred was 100km/h and the bus driver estimated that he was

travelling at approximately 80km/h at the time he saw the pedestrian. He also described having noticed the pedestrian only an instant before the collision. Passengers on the bus and witnesses at the interchange provided speed estimations which were broadly consistent with that provided by the bus driver. Given the conditions at the time, and the fact that the bus was being operated in a dedicated bus lane, OTSI considers the bus driver was operating at an appropriate speed. Further, information provided by the Police and passengers praised the driver for the manner in which he controlled his vehicle, under emergency braking, in wet conditions.

Pedestrian's Behaviour

- 1.14 The M2 Motorway is unique in that it is the only motorway in Sydney that integrates bus interchanges within the Motorway. Within the M2 system, the Oakes Road interchange is also unique in that none of its other three interchanges are adjacent to an off-ramp.
- 1.15 There were two permissible routes available to the pedestrian to reach the Oakes Road subway which was the only means of accessing the bus interchange. He could have continued to have been driven via Pennant Hills Road, around to Oakes Road and dropped-off at the Oakes Road pedestrian subway or he could have walked from the top of the off-ramp (along Pennant Hills Road itself) via suburban streets and pathways to the subway. From the top of the Pennant Hills Road off-ramp to the subway, these routes entailed distances of approximately 3km and 1.7km respectively. Instead, the pedestrian opted to take a short cut across the M2, which also would have entailed his climbing over a 1070mm high concrete safety barrier. OTSI received advice which suggested that his motivation for crossing the M2 may have been concern at the prospect of missing his bus and being late for work in an employment situation that he had only recently secured. OTSI also received advice from several employees at Hillsbus that they had previously observed the pedestrian taking the same short-cut. However, when OTSI reviewed the Company's incident database to pursue this line of inquiry, there was no record of any such occurrences having been reported, and the employees admitted that they could not be certain that the person who was struck by the bus on the morning of 19 June 2007 was the same person they

had previously seen illegally crossing the M2. When asked why they had not formally reported these occurrences, some of the employees indicated that they were uncertain about aspects of the company's safety reporting system. Since the accident, the operators of the M2 have monitored the area in the vicinity of the off-ramp more closely and have sought, and been provided with, Police assistance to deter illegal pedestrian activity in that area.

- 1.16 OTSI also considered the possibility that the pedestrian's decision-making may have been affected by medication, alcohol or illicit substances, although there was no suggestion by any of the witnesses that this might have been the case. OTSI was subsequently advised that the toxicological tests that formed part of the autopsy eliminated this possibility.

Emergency Response

- 1.17 The driver and bystanders acted quickly to assist the pedestrian and to alert the Emergency Services. One of the bystanders administered CPR until the arrival of Police and Ambulance officers. While these immediate actions were in progress, a truck driver positioned his vehicle to block traffic in the adjacent lane so that the responders were not exposed to the risk of passing traffic. Despite these effective and timely actions, and the arrival of Police and Ambulance officers in quick succession, the pedestrian did not recover and was pronounced deceased at the scene.

Remedial Actions

- 1.18 In November 2007, the Transurban Group commissioned a report from an independent consultant to investigate possible measures to deter illegal or unsafe pedestrian activity on the M2. Transurban also commissioned a behavioural scientist to examine the likely effectiveness of the measures proposed by the consultant's recommendations. The views of the behavioural scientist were subsequently incorporated into the consultant's report and the consolidated report was provided to the RTA. In May 2008, Transurban sought in-principle support from the RTA for the enhancements proposed by the consultant and the behavioural scientist, which included improved line marking, fencing and signage, before seeking quotations for the related work. Transurban has advised OTSI that subject to the provision of acceptable

quotes and final approval from the RTA, it is aiming to have the upgrades completed by 31 August 2008.

- 1.19 In February 2008, Hillbuses' parent company, ComfortDelgroCabcharge, included an article in its corporate newsletter which emphasised the importance of employees reporting safety matters and which reiterated the reporting 'chain'. ComfortDelgroCabcharge also advised OTSI that it has made a formal submission to MoT seeking Government funding to install forward-facing digital CCTV on its buses. The Company has argued that such equipment will expedite the investigation of accidents and assist in the apprehension of vandals and those who may seek to attack its drivers. Its submission was not endorsed by the MoT, and while ComfortDelgroCabcharge hopes that the decision will be reversed, it has decided to fit such equipment, at its expense, to its new buses as they are introduced into service.
- 1.20 At present, only buses servicing Metropolitan and Outer Metropolitan routes are required to have CCTV and the requirement is for rearwards-facing equipment only. Much of the equipment that has been fitted to comply with this requirement is of the analogue type and, as a consequence, the footage that is captured during incidents that occur suddenly, such as collisions, is often blurred or distorted, and activities taking place outside the bus are rarely captured within the limited peripheral range of the camera.
- 1.21 While the MoT did not endorse ComfortDelgroCabcharge's submission, it has indicated to OTSI that it is currently developing its specification for buses operating under Metropolitan and Outer Metropolitan bus contracts and noted that this will include CCTV arrangements. OTSI understands that MoT is considering specifying a requirement for forward-looking and rear-facing digital CCTV. In the interim, OTSI notes that STA has already commenced to fit such equipment across its fleet, at its expense, as part of a \$25m program to upgrade safety and security on its buses. STA's CEO recently stated that improved CCTV has already led to the apprehension of people behaving inappropriately on buses and of some of those involved in vandalism.⁴ He

⁴ Article on front page of Issue 1 of the *Transit Times* (June 2008)

further indicated that the improved CCTV is also being utilised to investigate collisions and resolve customer complaints.

- 1.22 OTSI considers that ComfortDelgroCabcharge's and STA's introduction of forward-looking and rear-facing digital CCTV is a very positive safety development. It also considers that MoT's inclusion of a requirement in a revised specification that all new buses servicing Metropolitan and Outer Metropolitan routes under Government bus contract arrangements be fitted with forward-looking and rear-facing digital CCTV would be a very positive safety development. However, OTSI believes that large buses servicing regular passenger and school bus routes outside these areas should be similarly equipped. While such buses may be less likely to be involved in a serious accident or to be the object of vandalism, and their passengers are less likely to be the victims or perpetrators of anti-social behaviour, such occurrences are not confined to the Metropolitan and Outer Metropolitan areas. It also believes that those operating like-sized buses over long distances, be they on regular or charter services, should be similarly equipped. These types of buses do not come to the attention of OTSI as frequently as those of regular route and school services because they are operated under conditions where there is less likelihood of passengers being threatened or behaving in a threatening manner and where it is less likely that a bus will be vandalised. However, when such buses are involved in an accident or incident, it is often at high speed which can magnify the consequences of the occurrence.
- 1.23 MoT has indicated that the cost of equipping buses operating under Government contract arrangements in the Metropolitan and Outer Metropolitan areas with forward-looking and rear-facing digital CCTV is estimated at between \$20m-30m and believes that any extension of requirements beyond that which is already proposed would need to be supported by a rigorous safety and business case assessment. It has also highlighted the fact that the important aspect of whether the operators or the State should meet, or share, these costs, has yet to be resolved. OTSI acknowledges that these are appropriate considerations, but would observe that while the question of affordability is important, a more pressing factor is

whether or not a safety benefit would accrue from the investment in such equipment.

FINDINGS

1.24 As a result of its investigation, OTSI has determined that the accident was not caused by the actions of the bus driver or the condition of the bus. Rather, the findings of the investigation are attributed as follows:

a. Causation

The pedestrian was struck and fatally injured in the “Buses Only” lane while attempting to reach the Oakes Road bus interchange by crossing three lanes of the M2 instead of using the authorised pedestrian ramp access route.

b. Contributory Factors

The pedestrian may have taken the route that he did because he was concerned about the prospect of missing his bus and being late for work in a position he had only recently secured.

c. Adequacy of the Emergency Response

The driver and bystanders acted quickly to assist the pedestrian and to alert the Police and Ambulance Services whose officers arrived in quick succession and acted efficiently.

d. Other Matters that would enhance the Safety of Bus Operations

- i. There is an absence of signage at the Pennant Hills Road off-ramp to dissuade pedestrians from attempting to reach the Oakes Road bus interchange by other than the permitted pedestrian route. There may also be scope to improve existing barriers, signage and fencing arrangements in the vicinity of the off-ramp.
- ii. There is an absence of signage at the bus interchanges on the M2 to provide commuters with a point of contact in the event that they see unsafe acts occurring in their vicinity.
- iii. Because the CCTV fitted to the bus was mounted internally and was rear-facing, it was of little use in revealing the circumstances of the accident. As a safety device, its effectiveness was

restricted to recording driver and passenger behaviour. This is the case with the majority of buses operating within the greater Sydney area, and buses operating in the rest of NSW are not required to be fitted with any form of CCTV. OTSI considers that there is a requirement for digital CCTV to be fitted to buses as a safety device and that to be effective, it needs to be both forward-looking and rear-facing. Such a capability would provide a significant long-term situational enhancement to the safety of bus drivers and passengers and should be fitted to all large buses operating on regular passenger service routes, and those operating over longer distances on a regular or chartered basis throughout NSW.

- iv. Some Hillsbus employees are uncertain about aspects of the company's safety incident reporting system.

PART 2 PEDESTRIAN FATALITY ON CLARENCE STREET, SYDNEY CBD, 19 JUNE 2007

FACTUAL INFORMATION

Accident Narrative

- 2.1 At approximately 5:58pm on 19 June 2007, a 50 year old female pedestrian was struck by a State Transit Authority (STA) bus while attempting to cross Clarence Street, near DrUITt Street, at other than a controlled pedestrian crossing. The pedestrian sustained head injuries which proved to be fatal.

Emergency Response

- 2.2 A witness called '000' within seconds of the accident occurring and bystanders immediately commenced to assist the unconscious pedestrian. The Police and an STA Customer Service Coordinator, who relocated from nearby to the scene, arrived shortly thereafter and provided further assistance. They were followed in quick succession by two ambulances, one of which conveyed the pedestrian to St Vincent's Hospital, Darlinghurst. The pedestrian failed to recover and was declared deceased at 11:52pm.

Location

- 2.3 The accident occurred in Sydney's CBD District on Clarence Street, near its intersection with DrUITt Street (refer to *Diagram 2*).

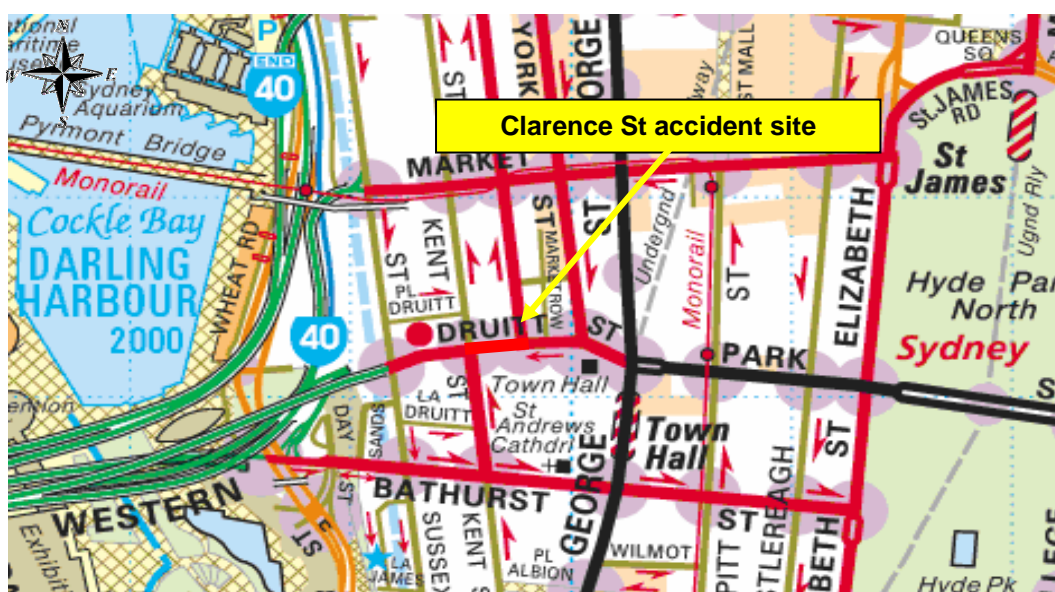


Diagram 2: Location of the accident in Clarence Street

- 2.4 There are three vehicle lanes in DrUITT Street; two run downhill, from East to West, and the third lane, which is dedicated for buses only, runs uphill. Vehicle movements at the intersection of DrUITT Street and Clarence Street are regulated by traffic lights. A 'green arrow' signal controls the flow of vehicles seeking to turn right into Clarence Street after travelling Westwards on DrUITT Street. Clarence Street has four Northbound lanes and parking is permitted in the two kerbside lanes (refer to *Diagram 3*).
- 2.5 There are two signal-controlled pedestrian crossings at the intersection of DrUITT Street and Clarence Street. To cross Clarence Street in this vicinity in the same direction as the pedestrian was proceeding, i.e., from West to East, pedestrians are required to use a pedestrian crossing located on the Northern side of DrUITT Street. To cross DrUITT Street from North to South, pedestrians are required to use a pedestrian crossing located on the Western side of Clarence Street.

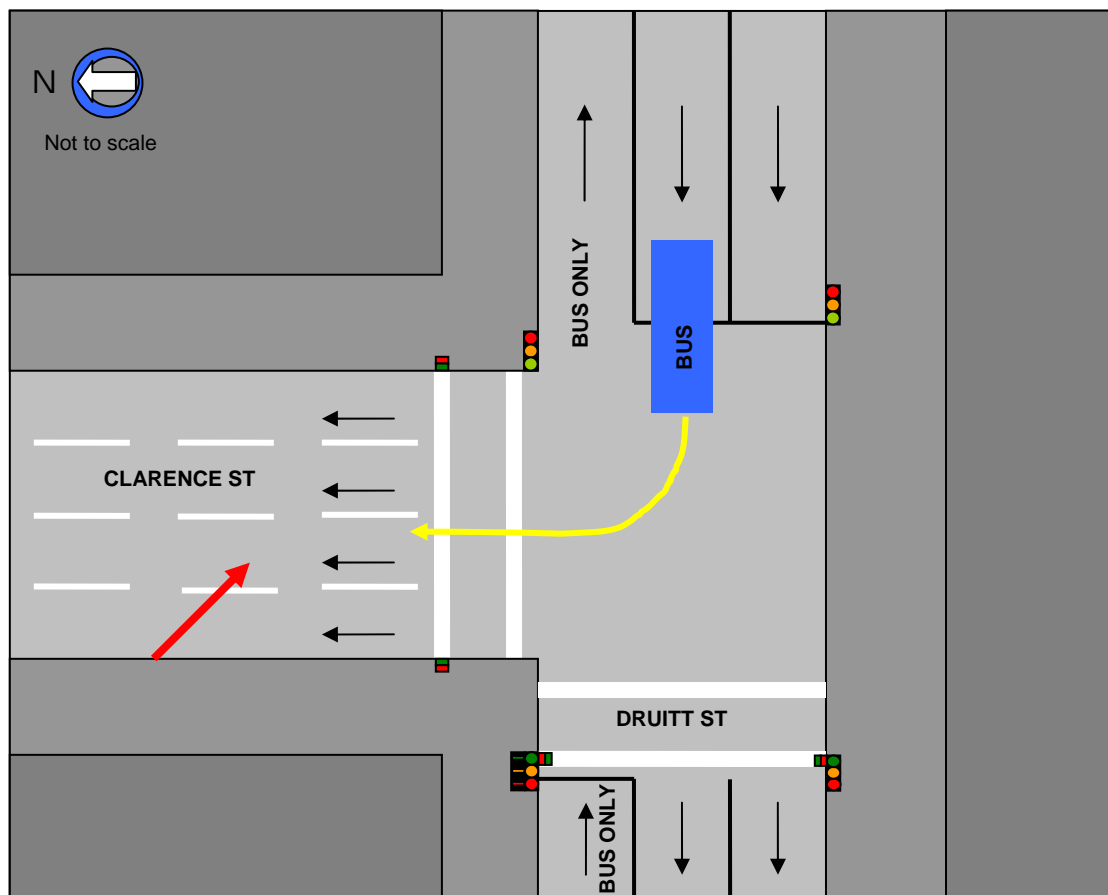


Diagram 3: DrUITT and Clarence Street intersection
(The approximate paths of the pedestrian and the bus are shown in red and yellow respectively)

Bus Information

- 2.6 The bus, a 1983 model Mercedes Mark III based out of the Willoughby Depot, is one of approximately 160 such buses being operated by the STA. It is licensed to carry 47 seated and 22 standing passengers and at the time of the collision all of its 21 passengers were seated.
- 2.7 The bus was fitted with one CCTV camera which faced rearwards and as such the incident was not recorded.
- 2.8 Following the accident, the bus was driven to the STA's Bus Depot at Tempe where it was later examined by the Police Vehicle Examination Unit. No mechanical defects were found. A later check of service records by OTSI indicated that the bus had been serviced at the specified intervals and that it was last serviced on 23 May 2007.

Bus Driver Information

- 2.9 The bus driver was first issued with a Public Passenger Vehicle Driver's Authority in September 1994 but had been employed as a fulltime bus driver by STA since 1986.⁵ His Public Passenger Vehicle Driver's Authority was last renewed in September 2006. The bus driver's last work-related medical examination, which was passed unconditionally, was in June 2006.
- 2.10 On the day of the incident, the bus driver commenced work at the Willoughby Depot at 7:37am and finished his morning shift at 11:42am. He then had a rest break before recommencing to drive at 2:53pm. He enjoyed a further rest break, of approximately 20 minutes, before commencing his last scheduled run for the day. This run, a regular scheduled service between Sydney and Marsfield, started outside the Queen Victoria Building in York Street at 5:57pm and was due to conclude at Marsfield at 6:48pm.
- 2.11 An examination of the driver's roster for the preceding 14 days indicated that he was being tasked in accordance with the industry's fatigue guidelines. The bus driver indicated that he did not have any form of secondary employment.
- 2.12 Following the accident, the driver was breath-tested and returned a negative result for the presence of alcohol.

⁵ Bus drivers were not required to hold a Public Passenger Vehicle Driver's Authority before 1994.

Environmental Conditions

2.13 Witnesses at the scene stated that it was raining, cold and windy at the time of the accident. OTSI noted that these observations were consistent with those of the Bureau of Meteorology which recorded 38mm of rainfall and a maximum temperature of 13.2°C at Observatory Hill over the corresponding 24-hour period. OTSI also noted that sunset occurred at 5:53pm, which was approximately five minutes before the accident and that cloud cover would have further reduced any ambient lighting.

ANALYSIS

Exclusions

2.14 The following matters were able to be readily eliminated as either causal or contributory factors;

- a. the condition of the bus, and
- b. the condition of the bus driver.

Operation of the Bus

2.15 The bus driver described departing from a bus stop in York Street, adjacent to the Queen Victoria Building, and making a right turn into Druitt Street before he proceeded Westwards down Druitt Street. His passage along Druitt Street was slowed by the congested peak-hour traffic. He recalled that as he approached the intersection with Clarence Street, he had a green right-turn arrow signal indication and he therefore commenced to turn from the right-hand lane in Druitt Street into the second lane, from the West side, of Clarence Street (refer to *Diagram 3*). He estimated that his turning speed was approximately 10-15km/h and stated that he did not see the pedestrian until she was immediately in front of his windscreen. The driver's estimate of his speed was subsequently corroborated by comparing the time required, at varying speeds, to travel between landmarks that could be seen on the periphery of CCTV recordings that were captured on the bus at the time, and the related elapsed timings.

Pedestrian's Behaviour

- 2.16 The pedestrian worked in the CBD, was familiar with Clarence and Druitt Streets and was on her way home at the time of the accident. A witness described her as wearing dark attire, walking quickly, carrying an opened umbrella and attempting to cross diagonally from the Western to the Eastern side of Clarence Street. This witness estimated the pedestrian was approximately 10m away from the designated pedestrian crossing when she commenced her crossing and noted that it was dark and raining at the time. OTSI noted that there was no evidence to suggest that the pedestrian was using a mobile phone or a portable music listening device and might therefore have been distracted as she commenced her crossing. The post-mortem report from the State Coroner confirmed that toxicological testing established that the pedestrian was not under the influence of drugs or alcohol.
- 2.17 OTSI visited the scene of the accident over several days between 4-8pm and observed that:
- a. There were high levels of traffic congestion at the intersection of Clarence and Druitt Streets between 4-6pm.⁶
 - b. The primary source of lighting in the immediate area is three overhead high pressure sodium lamps positioned on the Southern side of Druitt Street opposite Clarence Street; on the North-Western corner of Druitt and Clarence Street; and on the Western side of Clarence Street, 13m from the intersection, respectively. Ambient light is also enhanced by shops and offices on both sides of Clarence Street. Notwithstanding these sources of illumination, the lighting under wet conditions is quite variable, as can be seen in *Photos 5 and 6*.
 - c. There are few opportunities for shelter on either side of the street, the exception being the South-Eastern corner of Druitt and Clarence Streets where there is an large awning projecting from a building.
 - d. The phasing of traffic signals at the intersection is such that at the time the bus driver commenced his right turn from Druitt Street into Clarence

⁶ Traffic volume data provided by the RTA indicates that, on average, 700 vehicles travel Westwards down Druitt Street per hour in this peak period, of which 350 make a right turn into Clarence Street.

Street on a green arrow indication, the traffic signal regulating the pedestrian's movement across Clarence Street would have been indicating 'Don't Walk' in red.

- e. Large numbers of pedestrians cross Clarence Street at its intersection with Druitt Street.
- f. Pedestrians are required to wait up to 90 seconds between crossing opportunities and many of them opt not to do so (refer to *Photo 7*).
- g. Those pedestrians who proceed against the lights impede the progress of vehicles which have the right of way to turn into Clarence Street and contribute to inappropriate driver behaviour which results in vehicle congestion across the pedestrian crossing. Because the pedestrian crossing becomes blocked, pedestrians then attempt to cross at other than the designated crossing place, or proceed at a time when they are not permitted to do so.



Photo 5: Lighting conditions in Clarence Street

(The approximate paths of the pedestrian and the bus are shown in red and yellow respectively)

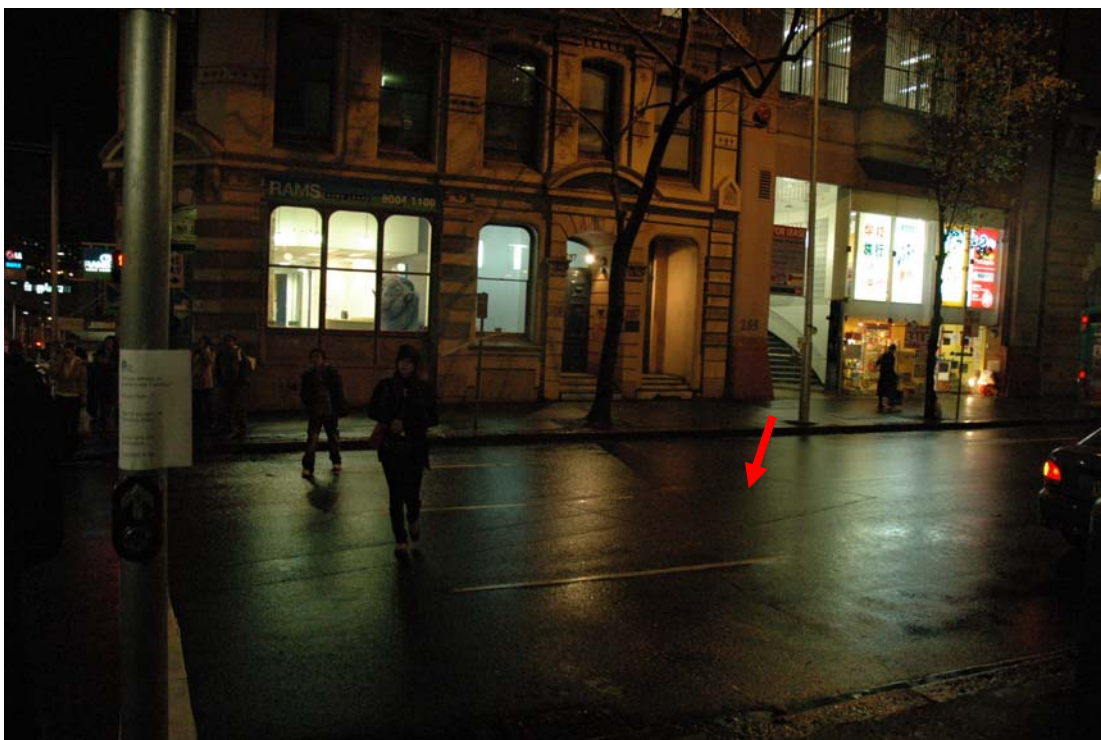


Photo 6: Lighting conditions in Clarence Street
(The approximate path of the pedestrian is shown in red)

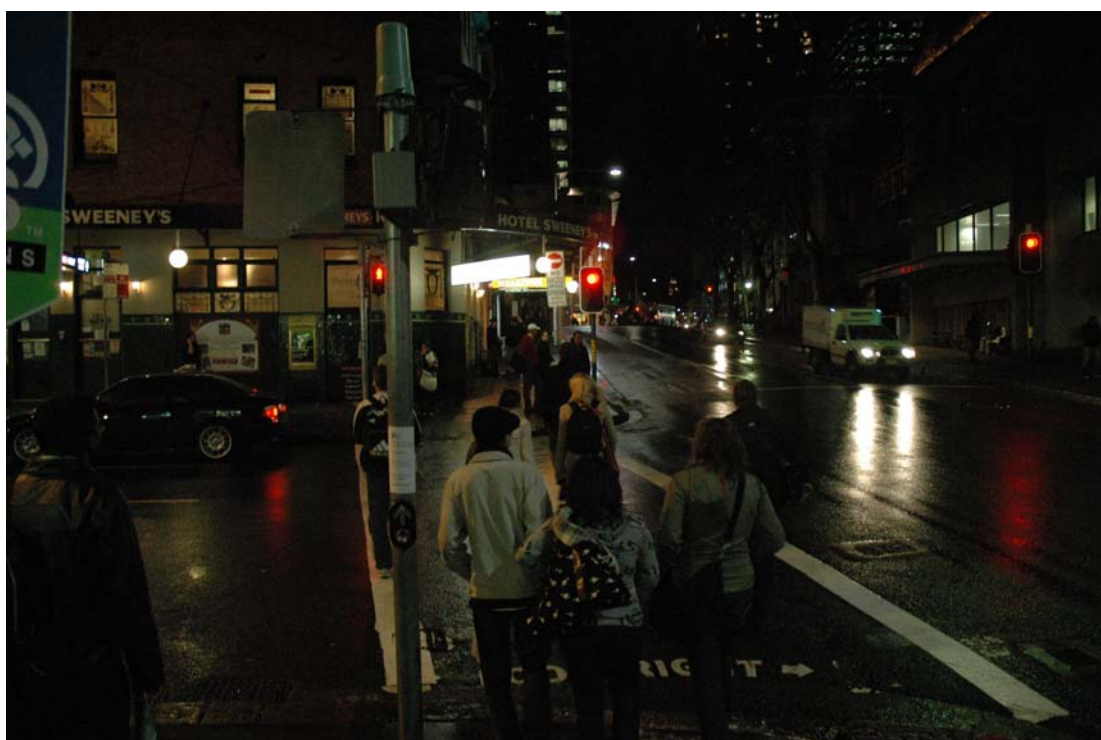


Photo 7: Pedestrians crossing against the traffic lights in Clarence Street

2.18 The most probable explanation for the pedestrian's decision to cross Clarence Street when and where she did is that she was seeking to avoid waiting, in

inclement conditions, for the traffic lights controlling the pedestrian crossing to change. OTSI also noted that the pedestrian wore glasses and their effectiveness may have been reduced in the wet conditions. The pedestrian's use of an umbrella may have also restricted her field of view. It was further noted that the bus engine is located at the rear of the bus and the downhill run from Druitt Street into Clarence Street may have meant that there was less noise generated by the engine, thereby reducing the prospect of the pedestrian hearing the approaching bus.

Effectiveness of the Emergency Response

- 2.19 The accident occurred at 5:58pm and within seconds a witness had called '000'. The Police arrived a few minutes later after being flagged down by bystanders who were assisting the injured person. One of STA's Customer Service Coordinators heard the driver's emergency radio call and because of his proximity, immediately relocated to the scene. At the request of the Police, the Customer Service Coordinator moved the bus to the side of the road, thereby allowing ambulance officers easier access to the pedestrian.
- 2.20 The first ambulance arrived on site at 6:12pm and a second ambulance arrived a minute later. The pedestrian was unconscious and was transported, in a critical condition, to St Vincent's Hospital, Darlinghurst, but did not recover.

Remedial Actions

- 2.21 Following the accident, the STA issued a Safety Alert⁷ reminding its drivers of the need for additional caution during poor weather conditions and calling on them to allow a greater margin for safety especially in the vicinity of pedestrians. While there was no evidence to suggest that the bus driver had contributed in any way to this accident, OTSI considers STA's alert to have been most prudent.

FINDINGS

- 2.22 In relation to those matters prescribed by the Terms of Reference as the principal lines of inquiry, OTSI finds as follows:

⁷ Safety Alert 'Pedestrian Safety' WI 50.08.06 issued on 2 July 2007.

a. Causation

The pedestrian was struck and fatally injured when she was engaged in crossing Clarence Street at other than a designated pedestrian crossing and at a time when the nearest traffic signals regulating pedestrian movement were displaying a red 'Don't Walk' indication.

b. Contributory Factors

- i. The pedestrian's decision to cross where and when she did may have been influenced by adverse weather conditions and traffic signal phasings that provide limited opportunities, in terms of both frequency and duration, for pedestrian movement in this area.
- ii. The pedestrian's visibility of the oncoming bus may have been restricted by the reduced effectiveness of her glasses in the wet conditions, her use of an umbrella and a general reduction in lighting conditions caused by the inclement weather.
- iii. It is unlikely that the bus driver would have been expecting the pedestrian to cross the street when and where she did, and the combination of her dark attire and the overcast conditions would have further diminished his ability to see her crossing.

c. Adequacy of the Emergency Response

The bus driver and bystanders acted quickly to assist the injured pedestrian and to alert the Emergency Services. Police and Ambulance officers arrived within a short period of time and acted efficiently at the scene. Valuable assistance was also rendered by an STA Customer Service Coordinator.

d. Other Matters that would enhance the Safety of Bus Operations

The CCTV equipment fitted to the bus has limited utility and should be replaced with equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images, even when the bus is subject to the forces associated with a collision.

PART 3 CYCLIST FATALITY ON ARTHUR STEET, RUTHERFORD, 20 JUNE 2007

FACTUAL INFORMATION

Accident Narrative

- 3.1 At approximately 8:31am on 20 June 2007, a 16 year old male cyclist lost control of his bicycle in wet conditions while travelling North-Eastwards along Arthur Street towards its intersection with Hillview Street, at Rutherford. As a consequence, the cyclist and his bicycle slid under the rear wheels of a school bus which had entered the intersection.
- 3.2 The bus driver did not see the cyclist but recalls hearing a thump from the vicinity of the driver's side of the bus. He was alerted by his passengers to stop the bus, which he did immediately. Several witnesses at the intersection were able to see that the cyclist was trapped under the rear wheels of the bus and urged the bus driver to move the bus. The bus driver was unable to see the cyclist in his rear vision mirror and initially reversed a short distance. However as he did so, he was called upon by the witnesses to drive forward, which he did.

Emergency Response

- 3.3 The initial '000' call was made by mobile phone at 8:35am and an ambulance arrived at the scene at 8:41am. The Police arrive shortly thereafter. In the intervening period, witnesses and bystanders attempted to assist the cyclist.
- 3.4 The cyclist was transferred by ambulance to Maitland Hospital and was subsequently airlifted to John Hunter Hospital, at Newcastle, but died later in the morning.

Location

- 3.5 Rutherford is located approximately 132km North-West of Sydney in the Hunter Valley region of NSW. The accident occurred at the intersection of Hillview and Arthur Streets (see *Photo 8* and *Diagram 4*).

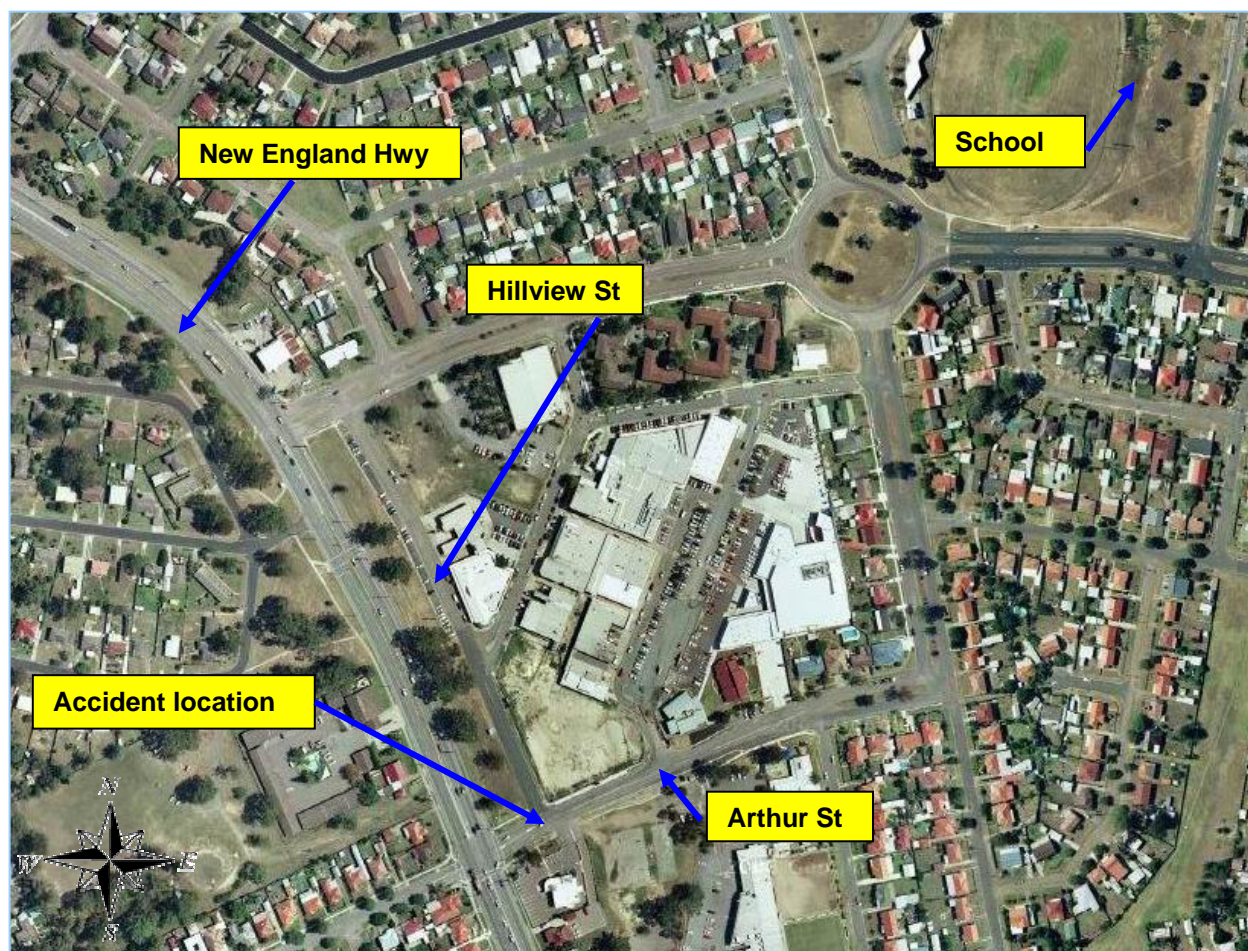


Photo 8: Aerial photo showing the location of the accident at Rutherford



Photo 9: Road sign at intersection of Hillview and Arthur Streets

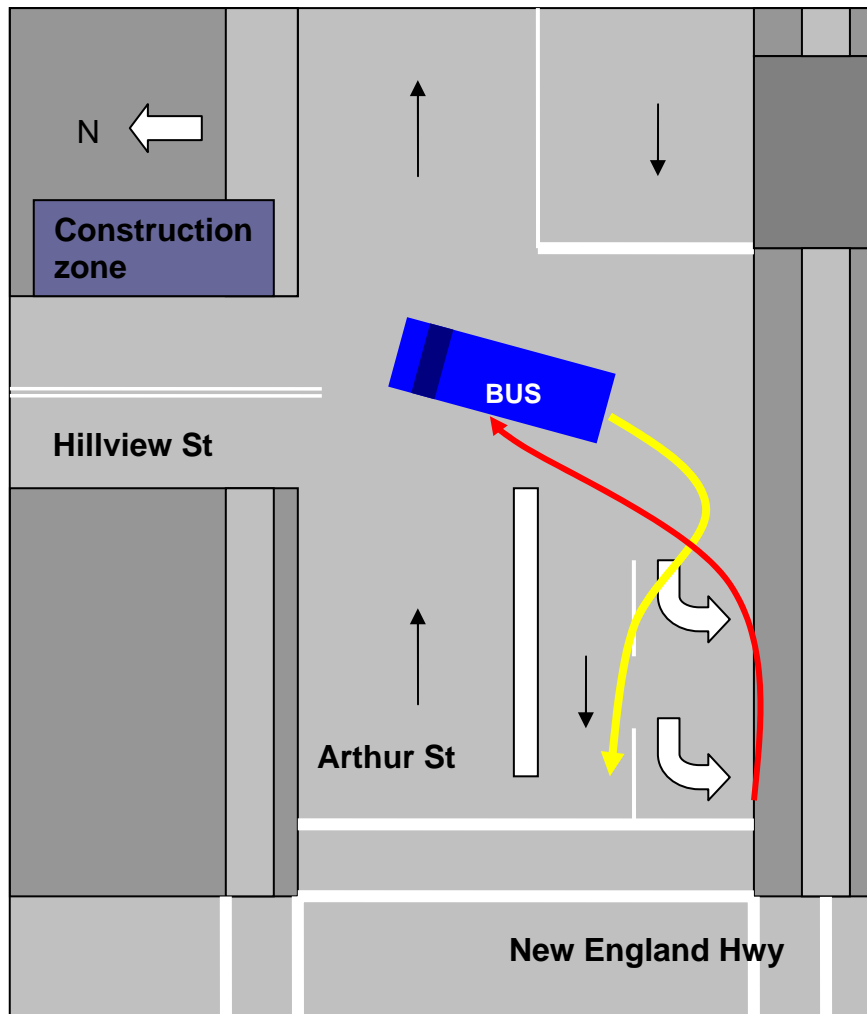


Diagram 4: Bus and Cycle passage at intersection of Hillview and Arthur Streets

(The approximate paths of the bus and cyclist, as reported by witnesses, are indicated by yellow and red arrows respectively)

- 3.6 The general traffic arrangements in the area at which the accident occurred and the relative direction of travel of the bus and the cyclist are depicted in *Diagram 4*. It is important to note that only buses and vehicles over six metres in length are permitted to turn right from Hillview Street into Arthur Street (see *Photo 9*), and that the cyclist commenced to turn into Hillview Street from the wrong side of Arthur Street.

Bus Information

- 3.7 The bus, a 1984 Austral, is operated by Hunter Valley Buses Pty. Ltd., and is licensed to carry 57 seated and 22 standing passengers. At the time of the accident, it was on a scheduled school run and had nine students onboard. The bus, which is not fitted with CCTV cameras, was examined at the scene after the accident by members of the NSW Police Crash Investigation Unit and

there were no indications to suggest that the accident was caused or contributed to by any form of mechanical failure or defect. A later check of the vehicle's service records by OTSI indicated that it had been serviced at the required intervals.

Bus Driver Information

- 3.8 The 42 year old bus driver had held a Public Passenger Vehicle Driver's Authority since September 2006, and had been employed by Hunter Valley Buses, as a part-time casual driver, since 4 October 2006. His last work-related medical examination was in October 2006.
- 3.9 The bus driver was familiar with the school run and had been on the same route since the commencement of the 2007 school year. For three months of the preceding school year the driver had been tasked on the same bus he was operating on the day of the accident.
- 3.10 The bus driver had worked the two days prior to the accident after having the previous weekend off. His rosters on these two work days required him to work from 7:00am until 9:15am and then from 2:15pm to 4:30pm, i.e., a total of nine hours over the two days. The bus driver also had a casual job filling vending machines which he did occasionally during the break between the morning and afternoon rostered shifts. He had worked in his second job on the day prior to the accident; however, this was the only day on which he had engaged in such secondary work over the eight days that preceded the accident. An examination of the bus driver's roster over the 14 days preceding the accident indicated that he was being tasked within industry fatigue guidelines and OTSI does not consider that either the nature or duration of his secondary employment would have resulted in the driver suffering from any form of work-related fatigue.
- 3.11 The driver returned negative results when tested for the presence of drugs and alcohol.

Cyclist Information

- 3.12 The cyclist lived locally and attended Rutherford Technical High School. At the time of the accident he was travelling from his home, situated on the

Western side of the New England Highway, to school. He was wearing an approved helmet.

- 3.13 Toxicological testing found no trace of alcohol or illicit drugs in the cyclist's bloodstream.

Bicycle Information

- 3.14 Police Crash Investigators examined the bicycle, which is shown in *Photo 10*. The 18-speed/geared 'mountain bike' had front and rear quick-release calliper brakes. The front tyre was found to be in a serviceable condition but the rear tyre was quite worn.



Photo 10: Bicycle involved in collision

Environmental Conditions

- 3.15 Local residents indicated that there had been heavy rain and strong winds prior to the accident, but witnesses stated that the conditions had eased, although light rain was still falling and the wind was still blowing from the South-West to West at the time of the accident.

ANALYSIS

Exclusions

- 3.16 On the basis of evidence provided to and obtained by it, OTSI was able to exclude the bus driver's fitness for duty as a causal or contributory factor.

Cyclist's Actions

- 3.17 OTSI has reviewed witnesses statements provide to the Police and these indicate that the cyclist was riding the wrong way down Arthur Street close to the Southern kerb at speed, and was attempting a diagonal turn towards the North-Eastern corner of Hillview Street. They also indicated that he lost control of his bicycle when he attempted to avoid the bus which had commenced to turn right, by passing between the bus and the median strip (see *Diagram 4*), after which he and his bicycle slid under the rear wheels of the bus.
- 3.18 OTSI noted that the cyclist was travelling downhill at speed in wet conditions, and with a tailwind, as he attempted to turn. The wet conditions would have meant that, in addition to the road being wet, the bicycle's wheel rims and brake pads would also have been wet. When OTSI examined the bicycle, it found that it was in 7th gear and the Police confirmed that this was the gear selection at the time of the accident. There were clear indications of the frame, pedals, front handlebars and rear wheel having been crushed but no sign of any metal-on metal damage. While the brakes could not be tested, they appeared to be well adjusted. There was a marked difference between the condition of the front and rear tyres. However, the front tyre was in good condition but the tread on the rear tyre was quite worn (see *Photo 11*).

Bus Driver's Actions

- 3.19 The witness statements indicate that the cyclist, in effect, cut across the path of the bus, but the bus driver insists that he did not see the cyclist do so. The bus driver described being on schedule, travelling South along Hillview Street and stopping at its intersection with Arthur Street. He noted that at the time it was raining and that he had both his wipers and demister on, although his view in the side mirrors and out of his side windows was affected to a degree by misting and the rain.



Photo 11: Rear and front tyres, left to right respectively

(Note the worn tread on the centre of the rear tyre)

- 3.20 After waiting for traffic in Arthur Street to clear, the driver proceeded to turn right and thought that he heard a thump on the side of the bus when he was about half way through this turn. He estimates that he was travelling at less than 5 km/h, when he heard the noise and then recalls being called upon to stop by some of his passengers, which he immediately did.
- 3.21 After stopping, the driver looked at the driver's side mirror but was unable to see anything untoward. However, nearby witnesses alerted him that a person was under the rear wheels of the bus. The driver advises that because he was unable to see this person in his side mirror, he commenced to alight from the bus but in the process of doing so he was confronted with a number of witnesses who were yelling at him to get off the cyclist. He therefore decided to move the bus and to follow his instincts, which were to go *"backwards....about 1 to 2 feet"*. This was based on his perception that because he was going forwards at the time he heard the thump and stopped immediately upon being called to do so, he needed to reverse to release the person who was trapped. However as he commenced to do so, the witnesses called to the driver to *"get off him, go forward"*. In response, the driver ceased

reversing and then drove forward and as he did so, the cyclist was released from under the rear wheels of the bus.

Examination of the Scene

3.22 The Police Crash Investigators advised that there were no skid marks or other marks on the road surface to indicate the exact point where the cyclist lost control of his bicycle. Police identified smudge marks on the right-hand side of the bus, 1.7 metres forward of the rear offside tyres. A build up of dirt was apparent on the sides of the bus and these smudge marks were consistent the removal of the dirt by virtue of some form of recent contact, which was almost certainly associated with the collision with the cyclist. The position of the smudge marks indicated the cyclist was not in an upright position at the time of impact.

Matters Impacting on Visibility

3.23 Although it was raining at the time, and notwithstanding that he did not properly take into account its path, the cyclist would almost certainly have had visibility of the bus at the time he started his diagonal crossing on the wrong side of Arthur Street towards the North-Eastern corner of Hillview Street. However, as previously mentioned, the bus driver insists that he did not see the cyclist until after the collision. OTSI therefore sought to establish whether there were matters that might have interfered with the bus driver's field of vision.

3.24 When OTSI examined the bus it noted that:

- a. The driver's side mirror provided a good field of view to the rear but it would not have allowed the bus driver to have detected the cyclist when he was trapped under the rear wheels (see *Photo 12*).
- b. The windscreen wiper and the demister were fully operational.
- c. The windscreen wipers do not clean an area approximately 112mm in width on the driver's side and the view offered by the side mirrors is affected considerably in wet conditions (see *Photo 13*).
- d. The position and dimensions of the 'A' Pillar, in combination with the side mirror, creates a significant 'blind spot' (as can also be seen in *Photo 13*).



Photo 12: View from driver's side mirror

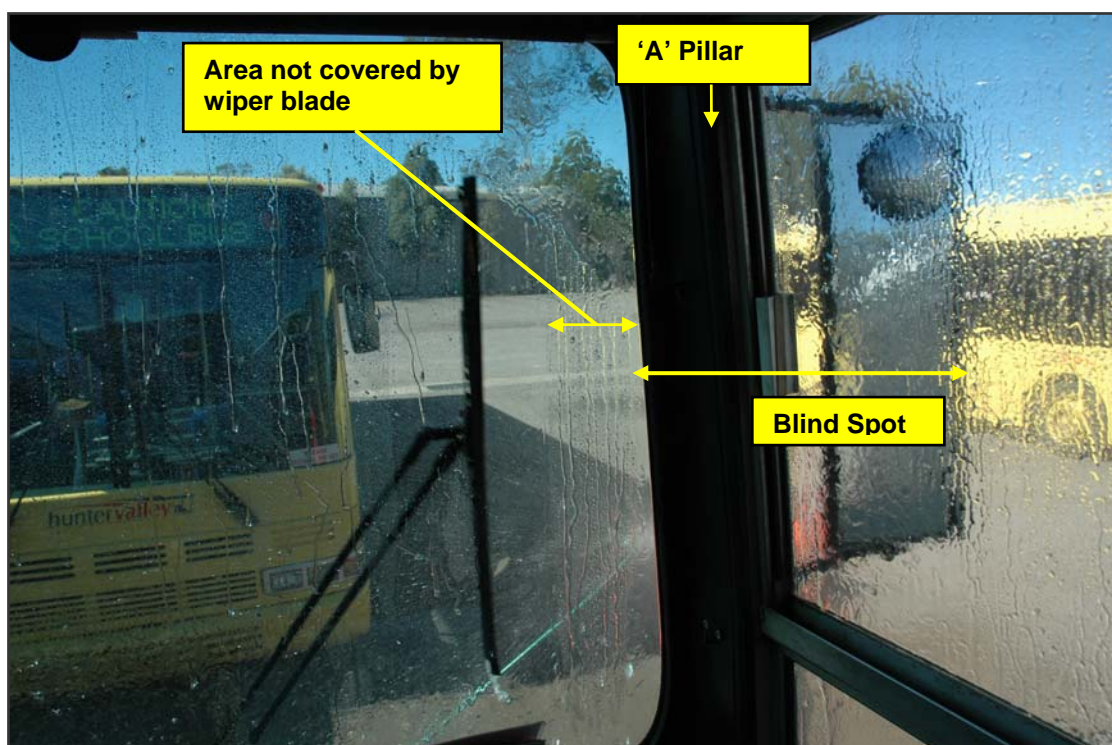


Photo 13: Effect of water on bus front and side windows

3.25 OTSI conducted a series of measurements to determine the extent of the blind spot caused by the 'A' pillar and the driver's side mirror and the results are depicted in *Diagram 5*. *Diagram 5* shows that the 'A' pillar and side mirror do impact on a driver's forward visibility. This is not uncommon and drivers can compensate for this to an extent by shifting their position to, in effect, look around the pillar. *Photographs 14* and *15* show the extent of the blind spots projected over distance. The person in *Photograph 14* was visible at 18m, from the left of the 'A' pillar, but was lost from view when he continued to move and did not reappear until 6.5m later. *Photograph 15* shows the same person at a distance of 12.5m after which he disappeared for 3.5m behind the side mirror.

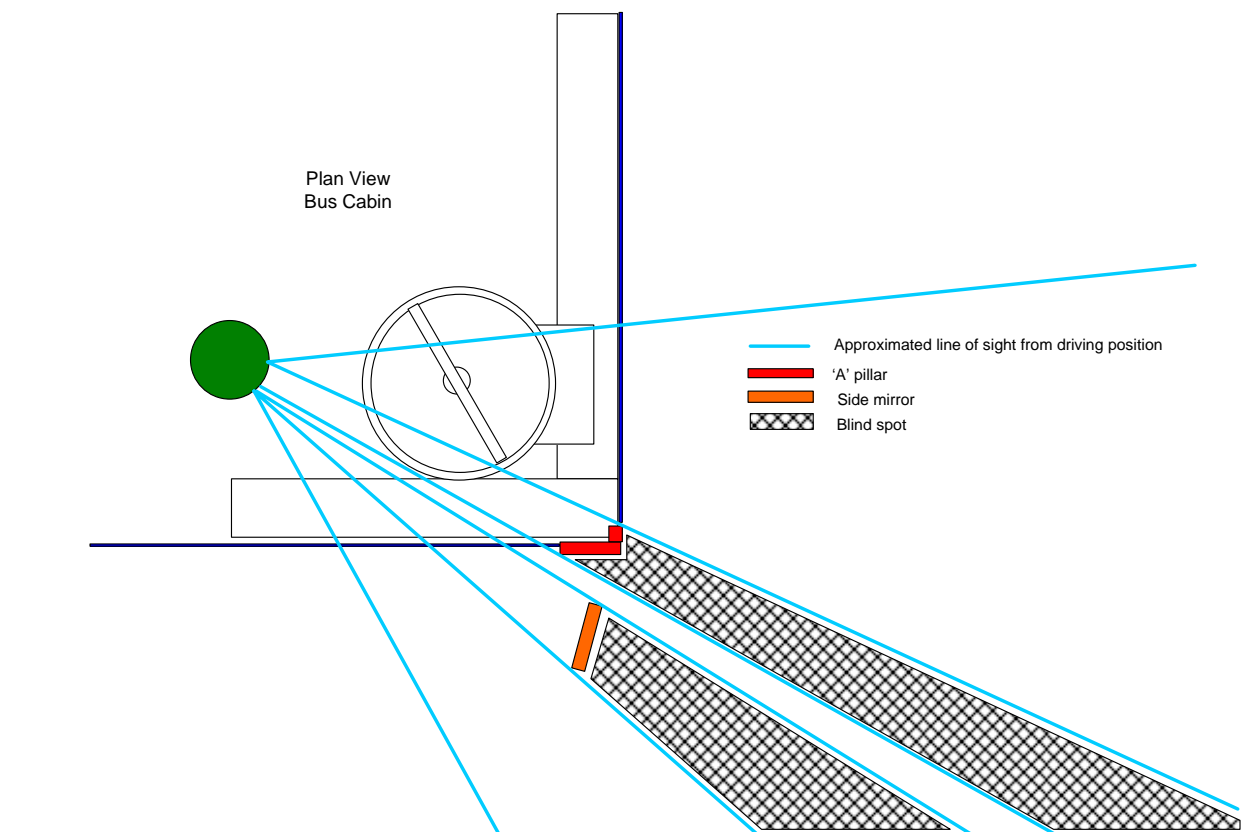


Diagram 5: Depiction of Bus Blind Spot

3.26 Based on its measurements, OTSI concluded that the bus did have a blind spot and, in combination with the wet weather and the limitations of the wiper blade's coverage, this might explain why the driver did not see the cyclist until after the collision.



Photo 14: Pedestrian visible at 18m from bus, disappearing behind 'A' pillar for 6.5m



Photo 15: Pedestrian re-appearing from behind 'A' pillar to disappear again for 3.5m, behind the mirror, as he walks towards the bus

Emergency Response

3.27 The emergency response to the initial '000' call was received at 8:35am and an ambulance was at the scene by 8:41am. In the intervening period, witnesses and bystanders attempted to assist the cyclist. One of these persons was a trained nurse and she administered oxygen. These people were relieved by Ambulance officers and paramedics who attended to the cyclist for a period of approximately eight minutes. The ambulance left the scene, with the cyclist onboard, at 8:49am and arrived at Maitland Hospital at 8:52am. After further examination, the cyclist was transferred to Newcastle's John Hunter Hospital where he later died.

3.28 OTSI considers that the response to the accident was both timely and efficient.

Other Safety Matters

3.29 OTSI noted that in order to turn right into Arthur Street from Hillview Street, bus drivers are required to take quite a wide approach because of the extent of the median strip which means that as they proceed through the intersection, they initially enter Arthur Street's kerbside lane which is designated only for the use of vehicles intending to turn left to get onto the New England Highway. Unless the intention is to proceed onto the New England Highway, and the driver of the bus involved in the accident did not, drivers must then move back into the centre lane. The extent to which bus drivers have to 'swing' in order to avoid the median strip is depicted in *Photo 16*. As it happens, the effect of the median strip on bus manoeuvrability resulted from a decision by Maitland Council to extend the median strip in order to prevent semi-trailers from a nearby construction site turning right into Arthur Street.



Photo 16: Bus turning from Hillview Street into Arthur Street

- 3.30 Maitland Council advised OTSI that it is considering changing the traffic arrangements in this area to accommodate its commercial re-development and that under the arrangements being considered, buses would no longer travel South in Hillview Street and be permitted to turn right into Arthur Street.

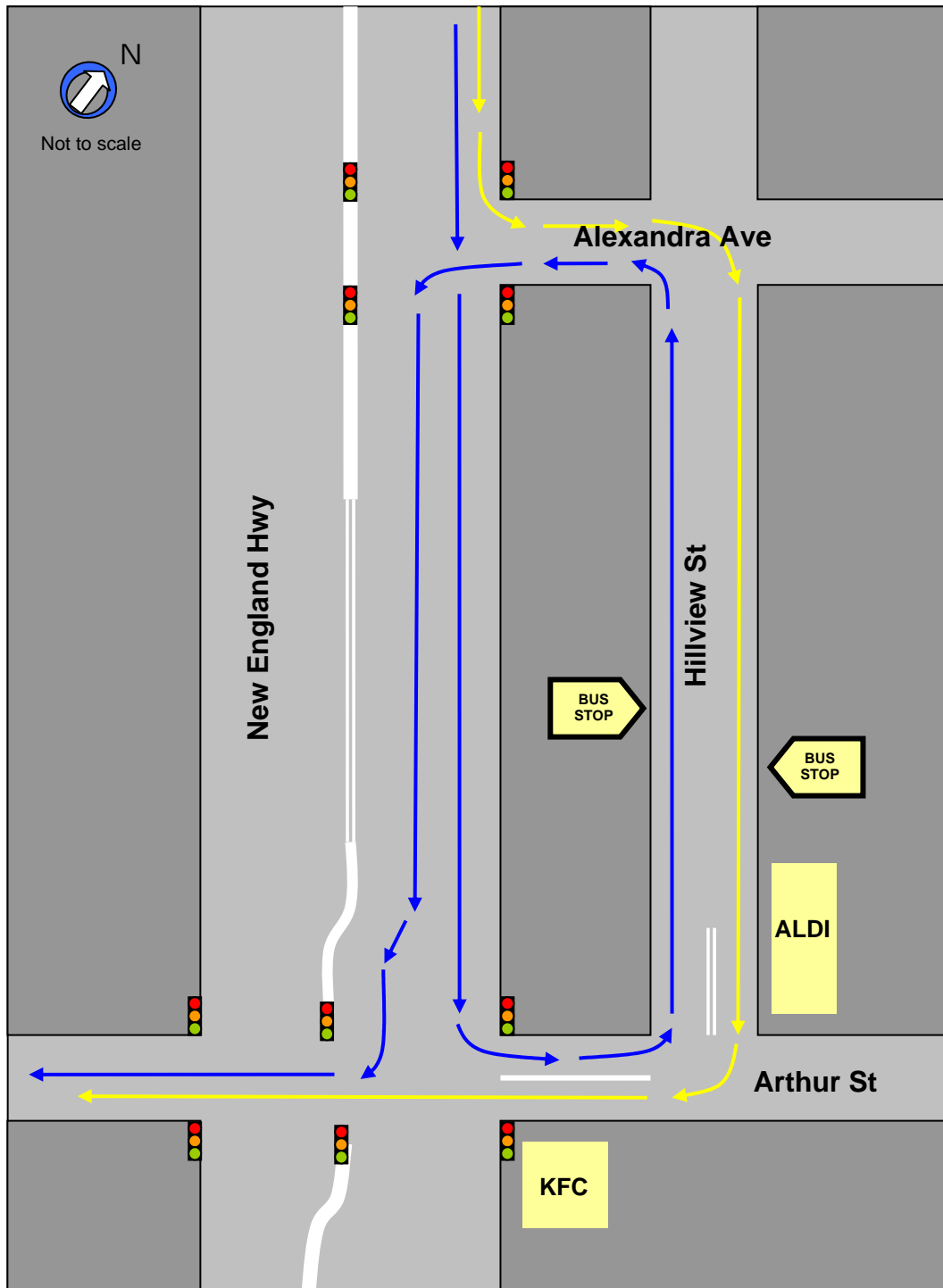


Diagram 6: Existing route and possible alternate route, in yellow and blue respectively

Instead, buses would enter Arthur Street by turning left from the New England Highway into Hillview Street, then travel North, stopping at a bus interchange. Thereafter, they would turn left at Alexandra Avenue and re-enter the New England Highway. These arrangements would require the installation of several sets of traffic lights but would mean that buses would no longer be required to make the difficult right turn from Hillview into Arthur Street and then to immediately move across into the centre lane. A comparison of the existing route and that which is being considered is provided in *Diagram 6*.

FINDINGS

3.31 In relation to those matters prescribed by the Terms of Reference as the principal lines of inquiry, OTSI finds as follows:

a. Causation

The cyclist placed himself at risk when he attempted a diagonal turn from the wrong side of Arthur Street into Hillview Street, at speed and in wet conditions. As he did so, he encountered a bus which was making a right turn from Hillview Street into Arthur Street and sought to avoid it by passing between the bus and a median strip. In the process, he lost control of his bicycle and, as a consequence, slid under the rear wheels on the driver's side of the bus.

b. Contributory Factors

- i. The bike had a worn rear tyre and effective braking would have been further inhibited by wet wheel rims and brake pads and a wet road surface. These factors would have been further exacerbated by the fact that the cyclist was travelling downhill, with a tailwind.
- ii. In addition to not expecting he would be approached from the wrong direction, the bus driver's visibility of the cyclist was restricted by both moisture on his windscreen and side window, and a blind spot caused by the dimensions and placement of his vehicle's 'A' pillar and the right-hand side mirror. Because he did

not see the cyclist, the bus driver was not in a position to take any avoiding action.

c. Adequacy of the Emergency Response

The emergency response was timely and efficient.

d. Other Matters that would enhance the Safety of Bus Operations.

Buses operating outside the Sydney, Newcastle and Wollongong metropolitan areas are not required to be fitted with CCTV. However, this technology can greatly assist in understanding the circumstances of an accident. Moreover, the installation of such cameras discourages inappropriate behaviour on buses by assisting in the identification of offenders, thereby reducing the requirement for drivers to have to concentrate on matters other than the operation of their bus.

PART 4 PEDESTRIAN SERIOUSLY INJURED ON DRUITT STREET, SYDNEY CBD, 27 JUNE 2007

FACTUAL INFORMATION

Accident Narrative

- 4.1 At approximately 4:50pm on 27 June 2007, a 51 year old female pedestrian was seriously injured when she was struck by an Eastbound bus while attempting to cross from the Northern to the Southern side of DrUITT Street in the vicinity of Kent Street in Sydney's CBD. The pedestrian sustained multiple fractures and head injuries but has subsequently made a good recovery.

Emergency Response

- 4.2 Emergency Services were advised of the accident when a witness called '000' and the pedestrian was subsequently conveyed by ambulance to St Vincent's Hospital, Darlinghurst. In the intervening period, nearby pedestrians and a Customer Service Coordinator from the State Transit Authority (STA), who was on duty at a bus stop diagonally across the road, assisted the injured pedestrian.

Location

- 4.3 The accident occurred on the Northern side of DrUITT Street approximately seven metres West from its intersection with Kent Street (see *Diagrams 7 and 8*). There are three lanes in this section of DrUITT Street; two run downhill in a Westerly direction while the third, which is for Eastbound buses only, runs uphill. The bus was travelling in the Eastbound lane.

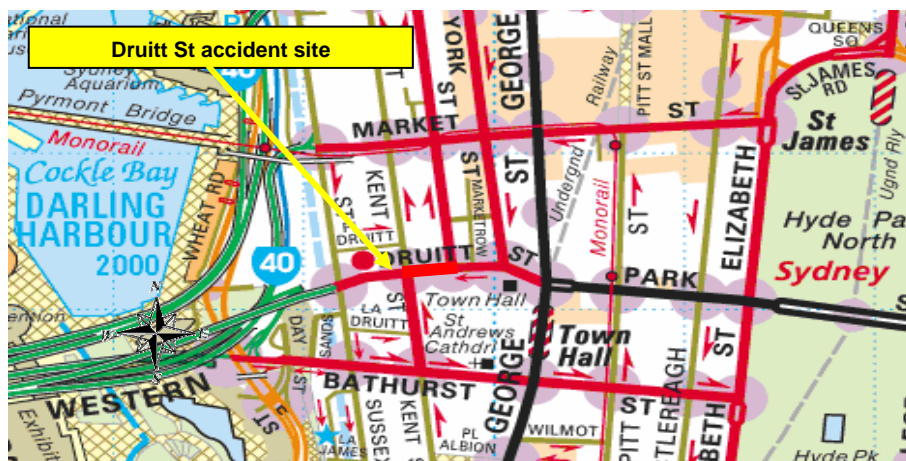


Diagram 7: Location of accident in DrUITT Street

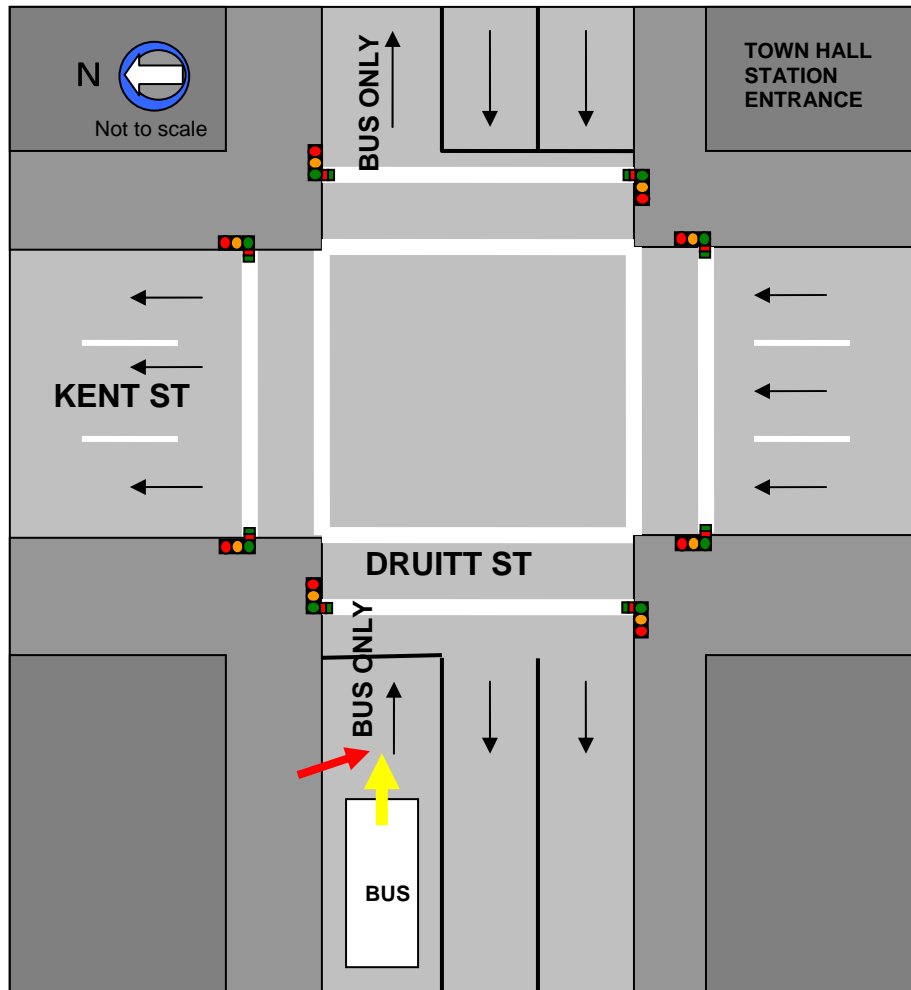


Diagram 8: Traffic arrangements at the intersection of Druiitt and Kent Streets, with the paths of the pedestrian and the bus shown in red and yellow respectively

Bus Information

- 4.4 The Mercedes Mark IV bus entered service in June 1986 and is one of approximately 350 of its type in service with the STA. The bus is licensed to carry 43 seated and 22 standing passengers but it did not have any passengers onboard at the time of the accident.
- 4.5 The bus was examined following the accident and there was no indication of any defect or mechanical failure that might have caused or contributed to the accident. OTSI's examination of maintenance records identified that the bus had been serviced on a regular basis and that its last service had occurred only three days before the accident.

Bus Driver Information

- 4.6 The bus driver has been employed on a fulltime basis by STA since October 2003 and had acquired her Public Passenger Vehicle Driver's Authority in November 2003. This Authority was last renewed on 10 October 2006. Her last work-related medical check occurred in September 2006.
- 4.7 The bus driver commenced duty on the day of the accident at 7:22am and finished her morning shift at 10:02am. She then had a rest break before commencing the afternoon shift at 2:41pm. She had a further break between 3:54pm and 4:24pm, at Burwood, before again commencing to drive. Her afternoon shift was due to conclude at 7:09pm.
- 4.8 An examination of the driver's roster for the preceding 14 days indicated that she was being tasked in accordance with the industry fatigue guidelines. The bus driver was not engaged in any other employment outside her duties with the STA.
- 4.9 Following the accident, the driver was subjected to a breath-test and returned a negative result.

Pedestrian Information

- 4.10 OTSI interviewed the pedestrian after she was released from hospital. During the interview, she stated that she worked in an office building on the Northern side of Druitt Street near to where the accident occurred. She also stated that she was familiar with the area and that it was her usual practice on her way home to walk East up Druitt Street before crossing to the Southern side to access Town Hall train station.

Environmental Conditions

- 4.11 Witnesses state that it was dry, cold and cloudy at the time of the accident and this is consistent with the NSW Bureau of Meteorology's data. The witnesses also advised that, notwithstanding the cloud cover, visibility was still good at the time. Although the sun was setting⁸, the presence of cloud and a significant number of high-rise buildings meant that neither the pedestrian's, nor the driver's vision, should have been affected by the sun.

⁸ Sunset was recorded at 5:55pm

ANALYSIS

Exclusions

- 4.12 The following matters were able to be readily eliminated as either causal or contributory factors;
- a. environmental conditions,
 - b. the condition of the bus, and
 - c. the condition of the bus driver.

Operation of the Bus

- 4.13 The bus driver described coming off the Western Distributor and proceeding along Druitt Street at approximately 50km/h. This was the maximum speed permitted in Druitt Street and the bus driver's estimate was subsequently confirmed after OTSI's examination of CCTV recordings taken on board the bus and calculation of the time taken to pass specific points that could be identified on the recordings. The driver recalled that she had a green traffic indication as she approached the intersection with Kent Street and that the indication at the next intersection, with Clarence Street, was also green (refer to *Photo 17*).
- 4.14 The bus driver stated that she did not see the pedestrian step out from the kerb on the Northern side of Druitt Street and that she only became aware of the pedestrian's presence in the instant before the striking her. When she saw the pedestrian, she instinctively turned the bus to the right and braked heavily and as a result the bus came to a stop before the Kent Street crossing. The only CCTV camera onboard was mounted forward of the bus driver and faced rearwards. It shows the bus driver turning her head to her left and the recordings thereafter are blurred for a few seconds. The timings associated with this recorded sequence correlate to that of the accident and the blurring of the images is the consequence of the bus driver braking suddenly and the moment of impact with the pedestrian.

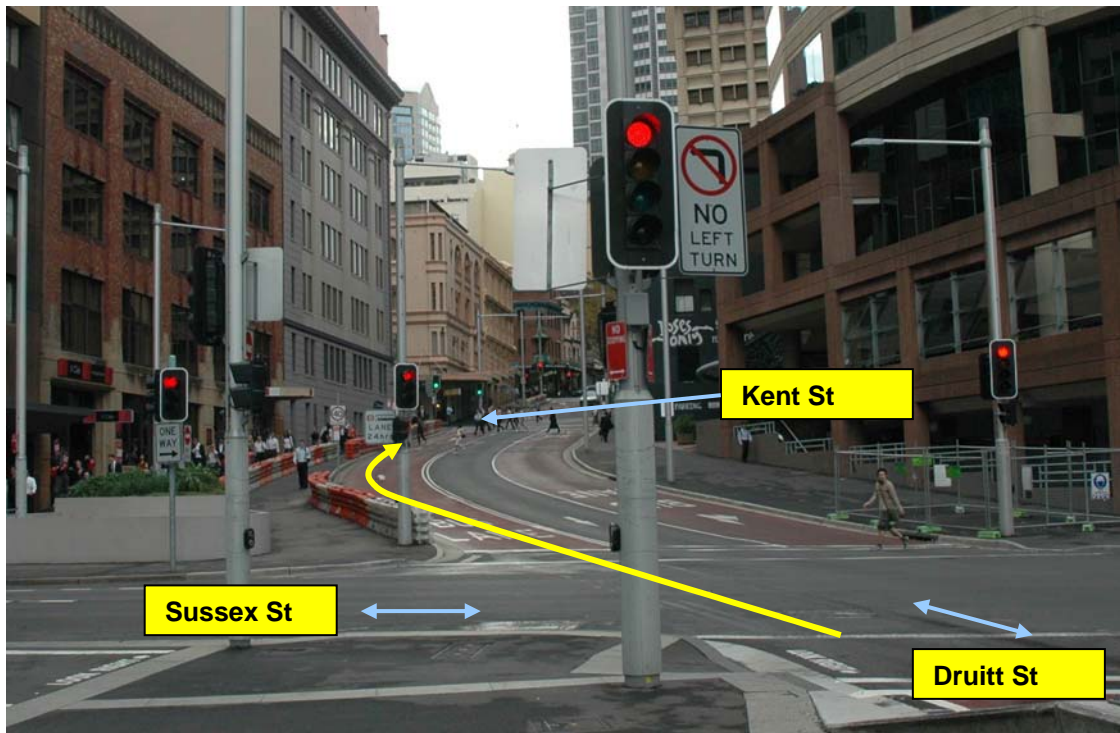


Photo 17: Druitt Street, looking Eastwards with the approximate path of the bus shown in yellow

Pedestrian's Behaviour

- 4.15 When interviewed, the pedestrian indicated that she attempted to cross from the Northern to the Southern side of Druitt Street in order to reach Town Hall Station. She admitted that she did not attempt to cross at a pedestrian crossing and also to having attempted to cross at a time when the traffic signal indication for pedestrians was red. She stated that she initially looked right and there was no approaching traffic. She then described looking left and waiting for a bus and car to pass before stepping out from the footpath onto the roadway. She acknowledged that her reason for crossing when and where she did was to save time, and that she did not look to the right a second time before she stepped onto the road.
- 4.16 Witnesses described the point at which the pedestrian commenced her crossing as being approximately seven metres West of the designated pedestrian crossing. *Photos 18 and 19* indicate where the pedestrian should have crossed and approximately where she commenced her crossing respectively. *Photo 19* also shows three pedestrians, in the foreground, who are also not making use of the designated pedestrian crossing. The one on the right is attempting to cross from about the same location as the pedestrian who was seriously injured on 27 June 2007.



Photo 18: Intersection of Druitt and Kent Streets, looking Westwards

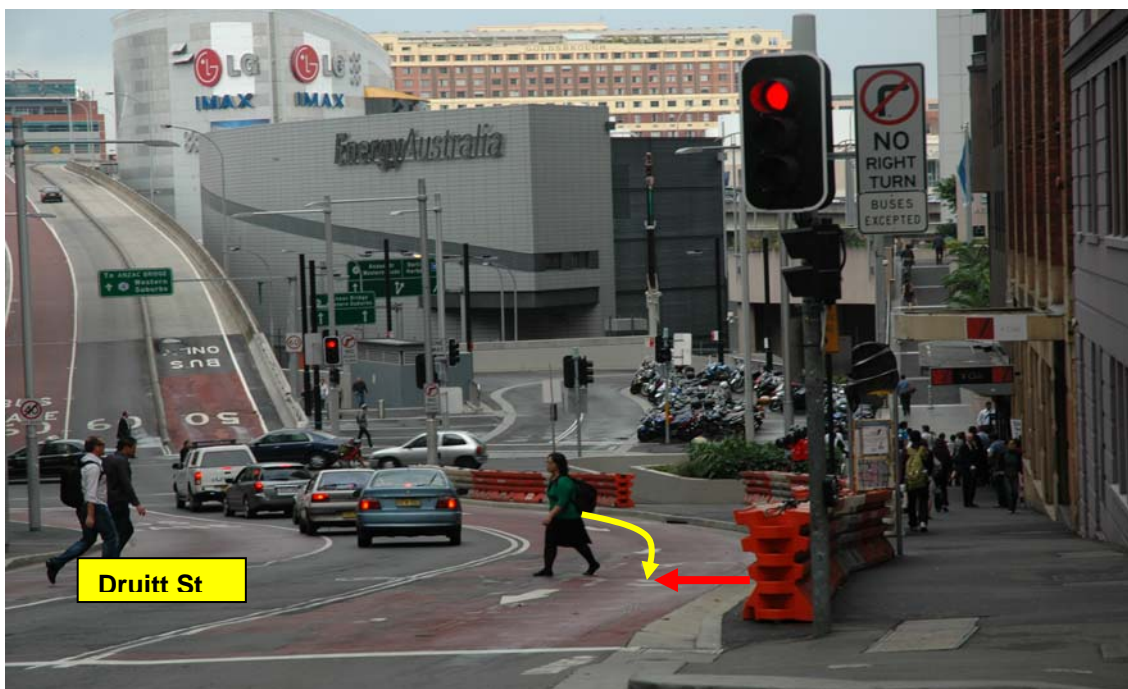


Photo 19: Druitt Street looking Westwards immediately beyond its intersection with Kent Street, with the approximate paths of the pedestrian and the bus shown in red and yellow respectively

Traffic Data

4.17 The RTA advised OTSI that an average of 700 vehicles per hour travel Westward along Druitt Street during the peak period of 4pm to 6pm, but on

average only 40 buses per hour travel Eastward along the street during the same period. It also advised that on average 900 vehicles per hour travel Northward along Kent Street during the same period. Suffice to say, pedestrian and vehicular traffic can be heavily congested at the intersection of Kent and Druitt Street during this peak period, and OTSI's observations reveal instances of both drivers and pedestrian acting impatiently, and sometimes recklessly, in this area.

- 4.18 STA advised OTSI that its buses had been involved in 14 collisions with pedestrians in Druitt Street during the period 2 September 2005 - 21 August 2007, with five of these accidents occurring within a month of the opening of the Cross City Tunnel on 28 August 2005. These five accidents all involved pedestrians walking from the Northern side of Druitt Street and being struck by an Eastbound bus. It is highly significant that, considering the low volume of traffic that travels in an Easterly direction, 13 of the 14 accidents involved buses that were moving in an Easterly direction. This could suggest that bus drivers on this route are not paying sufficient attention to pedestrian movements; however, the fact that 12 of the 14 accidents involved pedestrians who were crossing at other than a designated pedestrian crossing, indicates that on balance, it is the behaviour of pedestrians rather than the performance of bus drivers that is at issue.
- 4.19 OTSI investigators observed the site of the accident over several days to examine whether there were matters other than the direction and volume of traffic that might be contributing to the accidents involving buses and pedestrians. They recorded pedestrian waiting times of up to 110 seconds at the intersection of Druitt and Kent Streets before a 15 second crossing 'window' opened.⁹ Within this 15 second crossing window, the green indication lasted only five seconds after which a flashing red indication followed. When pedestrians missed this window, many opted to cross against the 'Don't Walk' if there was a slight break in vehicle traffic. When one pedestrian decided to cross, others took a cue from this behaviour and followed. Research has shown such behaviour is contagious and lowers

⁹ Research undertaken by Baass K G (1989) entitled '*Review of European and North American practice of pedestrian signal timing*' suggests that pedestrians are generally willing to wait between 30-45 seconds after which they become impatient and prone to make illegal crossings.

pedestrians' assessment of risk to the extent that "Crossing the road in a familiar environment becomes a habitual, or mindless, behaviour".¹⁰

- 4.20 The RTA recorded a total of 1503 collisions between vehicles and pedestrians within the Sydney CBD in the period 2000-2006. In fact, there will have been many more incidents of such collisions because the RTA's figures include only those occurrences that have resulted in a person being injured or killed, or where the vehicle involved has had to be towed away. In 148 of the 1503 recorded collisions with pedestrians, the vehicle involved was a bus.
- 4.21 In the period January 2001 to June 2006, the RTA recorded 48 collisions between vehicles and pedestrians in the precinct encompassing Druiitt, Clarence, Kent and Sussex Streets. The breakdown of the accident locations showed that four occurred in York Street, seven in Clarence Street, eight were in the middle of the block, 13 occurred in Sussex Street and 16 in Kent Street. As such, the data indicates that there are problems along the entire length of Druiitt Street. The broader distribution of such accidents throughout the Sydney CBD over the same time period is indicated in *Diagram 9* on page 44. Notwithstanding that the two pedestrian accidents that occurred in Clarence Street and Druiitt Street in 2007 are outside this data set, it is readily apparent that the problems associated with the interaction of vehicles and pedestrians within the CBD are not confined to these two streets.

Efforts to Improve the Safety of Pedestrians

- 4.22 In recent times, the City of Sydney Council (hereafter referred to as Sydney Council) has introduced a number of safety initiatives to improve the safety of pedestrians throughout its boundaries. These have included the introduction of 'Look Left' and 'Look Right' road markings at pedestrian crossings and 'Changed traffic conditions' signage, as depicted in *Photos 20 and 21 (on Page 45)*. OTSI noted that such signage was in place at the intersection of Druiitt and Kent Streets and also at the intersection of Clarence and Druiitt Streets at the time of the accident. Sydney Council, in conjunction with the RTA, has also mounted a pedestrian safety education campaign using the themes 'Watch out cars about' for pedestrians and a 'Watch out people about'

¹⁰ Johnson, L. and Peace, V. (2007) *Where did that car come from? Crossing the road when traffic comes from an unfamiliar direction*. Accident Analysis and Prevention, Volume 39

for the drivers of vehicles. This campaign has been promoted largely through signage on buses, posters around City Circle train stations, and safety messages in newspapers.

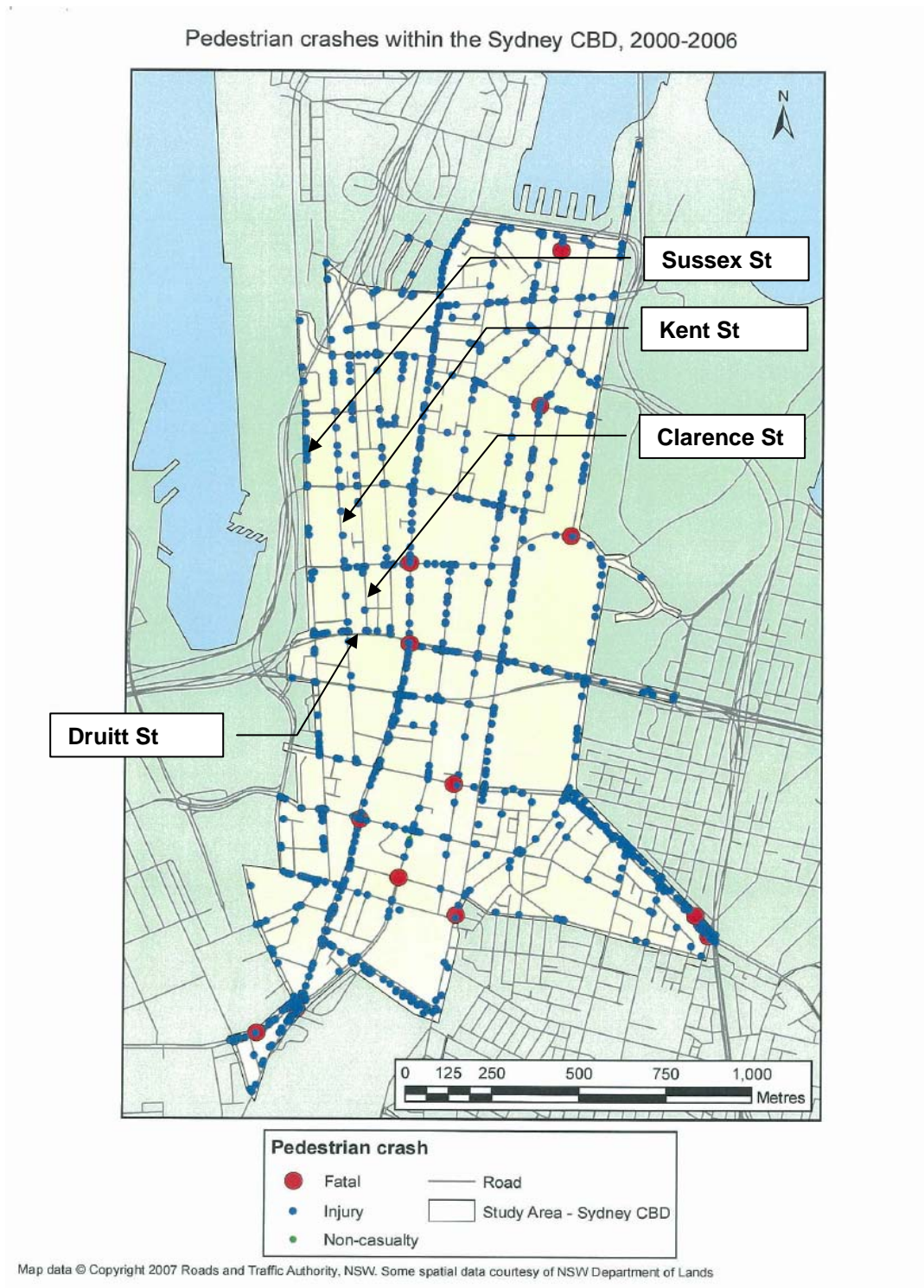


Diagram 9: RTA data on collisions between vehicles and pedestrians in the Sydney CBD, 2000-2006

- 4.23 Sydney Council has also advised OTSI that it is giving consideration to the introduction of countdown pedestrian signals. These signals provide pedestrians with an indication of how much time they have before a solid red 'Don't Walk' signal appears (refer to *Photo 22* below). Such devices are already in use in many cities throughout the world including Boston, London, New York, San Francisco and Tokyo. While the timers provide extra information for pedestrians relating to their crossing time, there is little reliable research as yet to confirm the extent to which they positively influence pedestrian behaviour, although a recent New Zealand study¹¹ indicates that behaviour improved at one of two sites at which such devices were installed in Auckland, but deteriorated at the other. It also suggested that the effectiveness of the devices appeared dependant on choosing suitable locations for their installation. That said, OTSI considers that it would be useful to trial such signals within Sydney's CBD.



Photo 20: Pedestrian warning signage



Photo 21: Pedestrian road markings



Photo 22 : Countdown pedestrian signal indicating that there is 12 seconds until a solid red 'Don't Walk' signal appears

¹¹ 'A Trial of Pedestrian Signal Countdown Displays' (2007) Report by A. Hooper, A., V. Vencatachellum, and M. Tse.

- 4.24 Following the accident on 27 June 2007, STA imposed a speed limit of 40km/h on its buses while travelling in Druitt Street and the RTA agreed to the installation of the related signage. STA also re-routed its Eastbound buses away from Druitt Street into Sussex and then into Bathurst Street in response to representations from its drivers who indicated that they were not prepared to continue to travel along the section of Druitt Street between Sussex and Kent Street until it had been made safer. As previously mentioned in Part 2 of this report, the STA also issued a Safety Alert to its drivers highlighting the increased risk of injury to pedestrians in poor weather conditions and the reduced visibility that is generally associated with winter.
- 4.25 In August 2007, the firm of Jamieson Foley – Transport & Traffic Engineers was commissioned jointly by the Sydney Council, the STA, the RTA and the MoT to undertake a safety audit of Druitt Street. The major observations from this audit were that:
- a. While Park and George Streets are busy in both directions, there are only light levels of Eastbound traffic on Druitt Street and that this could cause pedestrians in Druitt Street not to look for Eastbound buses when crossing against signals. The likelihood of this type of occurrence was assessed as high and the potential consequences as being serious. As such, the risk was identified by the auditors as being intolerable.
 - b. Pedestrian data from the RTA showed that the frequency of accidents was about the same at the Druitt Street intersections at Clarence, Kent and Sussex Streets, and the mid-block accidents on Druitt Street did not indicate a particular pattern.
 - c. There were deficiencies including street lighting in some areas, traffic signal coordination, pedestrian kerb ramps and traffic flow from Park Street. The auditors identified that the long times that pedestrians were required to wait before they were permitted to cross, and the relatively short period of signalling available to them when they could, presented an intolerable risk. They also observed that the relatively long periods where there were no approaching cars led pedestrians to attempt to cross the street at inappropriate times and identified this too as an intolerable risk.

- d. The amended speed limit of 40km/h on the Eastbound lane appeared too high.
- 4.26 Sydney Council believes that the problems identified in the audit report are best addressed by widening the footpaths along Druitt Street and adjustments to the phasing of traffic lights at each of the intersections along its length. The Council also favours the introduction of 'scramble' crossings at the intersections. In order to facilitate the widening of footpaths and the creation of cycle lanes in Druitt Street, the lane dedicated to Eastbound buses would have to be resumed and buses would be permanently prevented from travelling in this direction on Druitt Street. The Council also sees Druitt Street in the wider context of its recently released paper entitled "*City of Sydney (2008) - Public Spaces Public Life Sydney – Proposed Feasibility And Implementation Action Plan*" and as part of its vision for the City as articulated in its '*Sustainable Sydney 2030*' draft plan. The 2008 paper proposes major changes to way in which traffic, pedestrians and public transport interact. Significantly, the study found that Sydney is a city dominated by traffic that moves at speed and that pedestrians are accorded low priority. It also identified that the low priority accorded to pedestrians is encouraging them to behave autonomously, by ignoring traffic signals.
- 4.27 STA favours the permanent return of Eastbound running in Druitt Street and has provided data to MoT which indicated that the requirement to divert into Sussex Street and thereafter Bathurst Street, to avoid Druitt Street, added an average of nine minutes to the running times of the affected services. MoT advised that it fielded a significant number of complaints from bus passengers while the diversion was in effect. Some complainants indicated that the requirement for buses to move into a single lane to turn right into Sussex Street as they came off the Anzac Bridge, and thereafter turn into Bathurst Street, rather than proceeding straight onto Druitt Street was resulting in delays of up to 20 minutes.
- 4.28 In April 2008, the Minister for Transport released a document entitled '*New Bus Priority Measures during busy World Youth Day*'. Within this document, there were a number of proposed temporary changes to Druitt Street to improve pedestrian safety and to facilitate the return of Eastbound buses in

Druitt Street. The following arrangements were subsequently put into effect in the street prior to the commencement of the WYD program:

- a. a median pedestrian safety fence was erected between Sussex and Kent Streets;
- b. kerbside pedestrian fencing was erected on the Northern footpath, between Sussex and York Streets;
- c. resurfacing and revised lane marking;
- d. a new pedestrian crossing, allowing for 'scramble' crossings, was created on the Eastern side of the street, at its intersection with Clarence Street;
- e. additional safety signage was installed at pedestrian crossings;
- f. a 30km/h speed limit was imposed on all vehicles;
- g. vehicles over 6m in length were banned from making a left turn from Kent Street into Druitt Street,
- h. signal phasing was altered to provide pedestrians with more frequent crossing opportunities, and
- i. buses recommenced Eastbound running on the street.

4.29 The above arrangements will not permit the widening of the footpaths on Druitt Street. However, OTSI considers that on balance, and at a time when there is increased demand for bus services, the decision to reintroduce Eastbound running is an appropriate one. Provided the above arrangements are retained, OTSI believes that buses should continue to be permitted to operate in an Easterly direction along Druitt Street.

FINDINGS

4.30 In relation to those matters prescribed by the Terms of Reference as the principal lines of inquiry, OTSI finds as follows:

a. Causation

The pedestrian was struck and seriously injured when she was engaged in crossing from the Northern to the Southern side of Druitt Street at other than a designated pedestrian crossing and at a time

when the nearest traffic signals regulating pedestrian movement were displaying a red 'Don't Walk' indication.

b. Contributory Factors

- i. Eastbound buses travel up Druitt Street infrequently and the pedestrian may have, over time, become conditioned to discount the prospect of such movement.
- ii. Barriers which were positioned to discourage the type of behaviour engaged in by the pedestrian had been removed from Druitt Street in August 2005, but have recently been replaced.
- iii. The pedestrian's decision to cross where and when she did may have been influenced by traffic signal phasings that provide limited opportunities, both in term of frequency and duration, for pedestrian movement in this area.

c. Adequacy of the Emergency Response

- i. Several witnesses to the accident used their mobile phones to contact Emergency Services and passengers and witnesses acted quickly to assist the pedestrian. Officers from a variety of Emergency Services agencies arrived in quick succession and acted effectively at the scene.
- ii. STA's practice of rostering Customer Service Coordinators to be on site at busy bus stops meant that it was able to have someone on site within minutes, and that representative made an effective contribution to the emergency response.

d. Other Matters that would enhance the Safety of Pedestrians

The CCTV equipment fitted to the bus has limited utility and should be replaced with equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images even when the bus is subject to the forces associated with a collision.

PART 5 RECOMMENDATIONS

5.1 In order to prevent a recurrence of these types of accidents, the following remedial safety actions are recommended for implementation by the organisations specified below:

a. Ministry of Transport

Require that all large buses operating on regular passenger and school service routes, and those operating on longer distance tours and charters throughout NSW, be equipped with forward-looking and rear-facing digital CCTV.

b. Roads and Traffic Authority

- i. Maintain the revised traffic arrangements in Druiitt Street that were introduced for World Youth Day as permanent arrangements.
- ii. In cooperation with the City of Sydney Council, conduct a trial of 'countdown' pedestrian signals at selected locations in the Sydney CBD to determine whether such equipment should be used more widely within the City.
- iii. Assist the Transurban Group to improve barriers, signage and fencing in the vicinity of its bus interchanges on the M2, especially in the vicinity of the Pennant Hills Road off-ramp near the Oakes Road interchange at Carlingford, to further deter pedestrians from attempting to access or depart from the interchanges by other than the designated routes.

c. State Transit Authority

- i. Conditional upon confirmation that the recently revised traffic arrangements in Druiitt Street are permanent, permanently reintroduce Eastbound running along Druiitt Street.
- ii. Reissue its Safety Alert relating to pedestrian safety to all its drivers at the start of June each year.

d. Transurban Group (Owner/operator of M2 Hills Motorway)

- i. In conjunction with the RTA, improve barriers, signage and fencing in the vicinity of its bus interchanges on the M2, especially in the vicinity of the Pennant Hills Road off-ramp near the Oakes Road interchange at Carlingford, to further deter pedestrians from attempting to access or depart from the interchanges by other than the designated routes.
- ii. Include a phone number on its signage at its interchanges to facilitate the public reporting of unsafe acts to Transurban.

e. Hillsbus

- i. Equip all of its buses with CCTV equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images even when the bus is subject to the forces associated with a collision.
- ii. Continue to emphasise to its employees the importance of reporting any instance of unsafe activity.

f. Hunter Valley Buses

- i. Review the positioning of all external mirrors throughout its fleet to ensure that the requirements of *ADR 14/02* are met and to eliminate blind spots to the extent that it is possible. In the interim, bring to the attention of all its drivers information concerning blind spots that are already known to exist, and the strategies that should be used to compensate for them.
- ii. Equip all its buses with digital CCTV equipment that can cover events both forward and rear of the driver and which can be relied upon to capture high resolution images even when the bus is subject to the forces associated with a collision.

Appendix 1: Sources and Submissions

Sources of Information

Bureau of Meteorology

City of Sydney Council

Hillsbus (ComfortDelgroCabcharge Pty Ltd)

Hunter Valley Buses (ComfortDelgroCabcharge Pty Ltd)

Maitland Shire Council

Officers of the NSW Ambulance Service

Officers of the NSW Police Force

Officers of the NSW Roads and Traffic Authority

Officers of the NSW State Transit Authority

Sydways Pty Ltd

Transurban Group (Owner-operators of M2 Hills Motorway)

Other witnesses who gave evidence on the basis of the provisions of Section 45C(3) of the *Transport Administration Act 1988 (NSW)* that they would not be identified by name in any material published by OTSI

Submissions

The following Directly Involved Parties were invited to make submissions on the Draft Report:

- City of Sydney Council
- Hillsbus (ComfortDelgroCabcharge Pty Ltd)
- Hunter Valley Buses (ComfortDelgroCabcharge Pty Ltd)
- Independent Transport Safety and Reliability Regulator
- Maitland Shire Council
- NSW Ministry of Transport
- NSW Roads and Traffic Authority
- NSW State Transit Authority
- NSW Police Force
- Transurban Group (Owner-operators of M2 Hills Motorway)

Submissions were received from the following Directly Involved Parties:

- City of Sydney Council
- ComfortDelgroCabcharge Pty Ltd
- Independent Transport Safety and Reliability Regulator
- Maitland Shire Council
- NSW Ministry of Transport

The Chief Investigator considered all representations made by Directly Involved Parties and responded to the author of each of the submissions advising which of their recommended amendments would be incorporated in the Final Report, and those that would not. Where any recommended amendment was excluded, the reasons for doing so were explained.