Our Ref: 20406

25 May 2021

Ethos Urban
173 Sussex Street
SYDNEY NSW 2000

Attention: Mr Gareth Bird

Dear Gareth,

RE: DIGITAL SIGNAGE – HELP STREET, CHATSWOOD
RESPONSE TO SUBMISSIONS

As requested, please find herein The Transport Planning Partnership (TTPP)'s Response to Submissions (RtS) to road safety queries made by government agencies for the proposed digital signage on Help Street in Chatswood.

Background

Initially, Sydney Trains sought approval to install two new digital sign boards off the sides of the existing overhead railway bridge above Help Street in Chatswood. The proposed digital signage was to be located on both sides of the rail bridge, facing eastbound and westbound travel lanes on Help Street.

A Development Application for the proposal was on public exhibition from Tuesday 2 February 2021 until Monday 15 February 2021. Submissions were received from Willoughby City Council dated 3 February 2021. On behalf of Sydney Trains (the Proponent), TTPP reviewed the submissions and provided responses as contained in this RtS letter.

Notably, TfNSW reviewed the application and provided no further queries on the submission.

At the time of preparing the initial RtS letter (dated 1 April 2021), the Department of Planning, Industry and Environment (DPIE) had provided no submissions. Following this, DPIE has provided its submissions which have been addressed in this version of the RtS letter.

The Transport Planning Partnership
Suite 402, 22 Atchison Street
ST LEONARDS NSW 2065

Furthermore, in response to feedback received from Willoughby City Council and the local community submissions, the Proponent has amended the digital signage proposal on Help Street; namely, the amended proposal no longer includes the digital signage on the eastern side of the railway bridge.

There will be no change to the digital signage on the western side of the railway bridge.

The amended signage design plan has been attached to this letter for reference.

Submissions by Department of Planning, Industry and Environment

Submission 1: The western elevation is within the 35m safe stopping distance of the stop line at Orchard Road and, whilst at an oblique angle, dependant on vehicle type and car interior, is visible for the first 10m of the safe stopping distance. This is not compliant with the Transport Corridor Outdoor Guidelines (3.2.3) and (3.3.1) which state:
3.2.3 (a) The sign should not be located:
i. less than the safe sight distance from an intersection, merge point, exit ramp, traffic control signal or sharp curves
ii. Less than the safe stopping sight distance from a marked foot crossing, pedestrian crossing, pedestrian refuge, cycle crossing, cycleway facility or hazard within the road environment
iii. So that it is visible from the stem of a T-intersection.
3.3.1 (a) The advertisement must not distract a driver from, obstruct or reduce visibility and effectiveness of, directional signs, traffic signals, prescribed traffic control devices, regulatory signs or advisory signs or obscure information about the road alignment.
3.3.1 (b) The advertisement must not interfere with stopping sight distance for the road's design speed or the effectiveness of a prescribed traffic control device.

The proposed digital signage on the west approach is situated within the 35m safe stopping sight distance (SSD) of the traffic signals at the Help Street – Orchard Road signalised intersection. The signage is to be located on the western face of the overhead rail bridge which is measured to be 25m away from the traffic signals. Therefore, for the first 25m of the safe stopping distance (from the traffic signals) the signage is not visible to motorists at all since a driver will have physically passed the signage. This point is explained and shown diagrammatically in Figure 1.

For a motorist travelling on approach to the traffic signals, the sign would become out of driving view when positioned closely to the face of the sign. This point is also made in Figure 1. In context of the proposed signage, Figure 2 shows the driving view of a motorist positioned 14m away at which point the signage would be out of driving view. Figure 3 shows the driving view 10m away at which point the signage is fully out of view.

Practically, variation in the vehicle type and car interior would have a minuscule impact on the point where the signage becomes out of driving view. The fact of the matter is that the proposed signage would not be within driving view for the full length of the 35m safe stopping

distance on approach to the traffic signals. Therefore, it would not take away the attention of a driver from the traffic signals ahead.

Figure 1: Driver Visibility towards Proposed Signage on Help Street

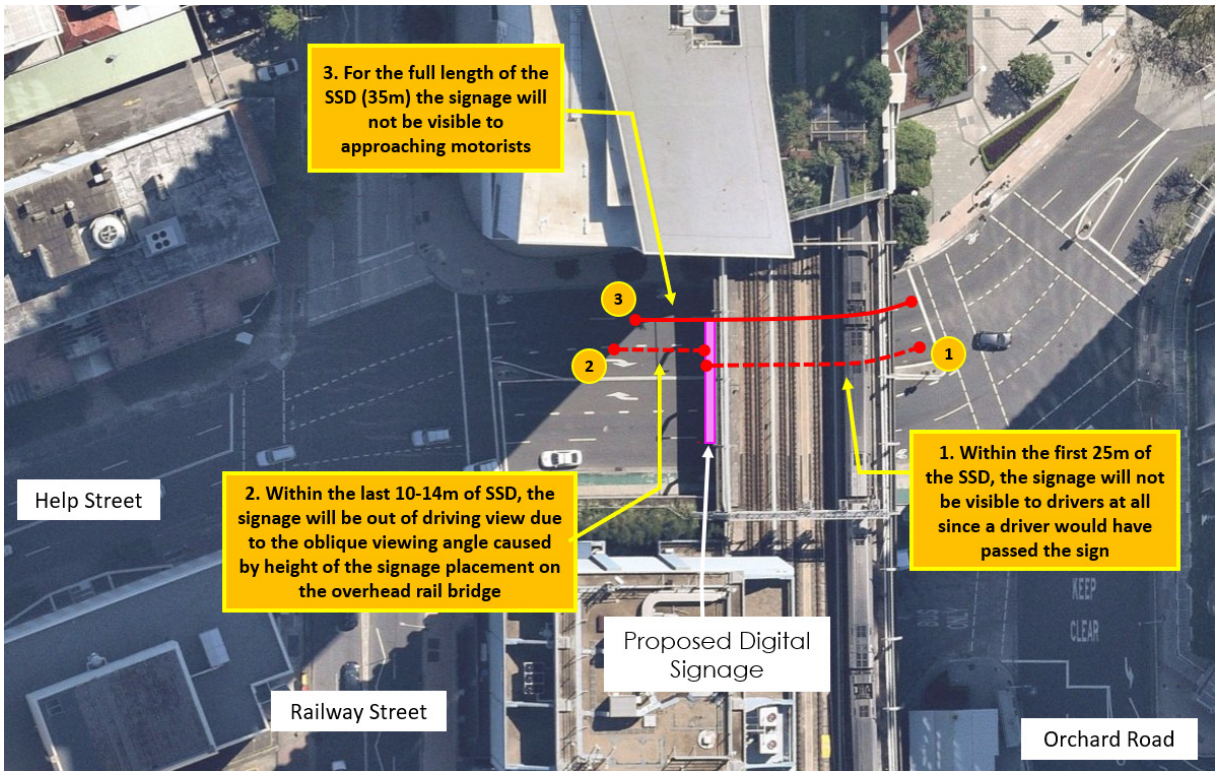


Figure 2: Driver's View on Help Street West Approach – 14m Away

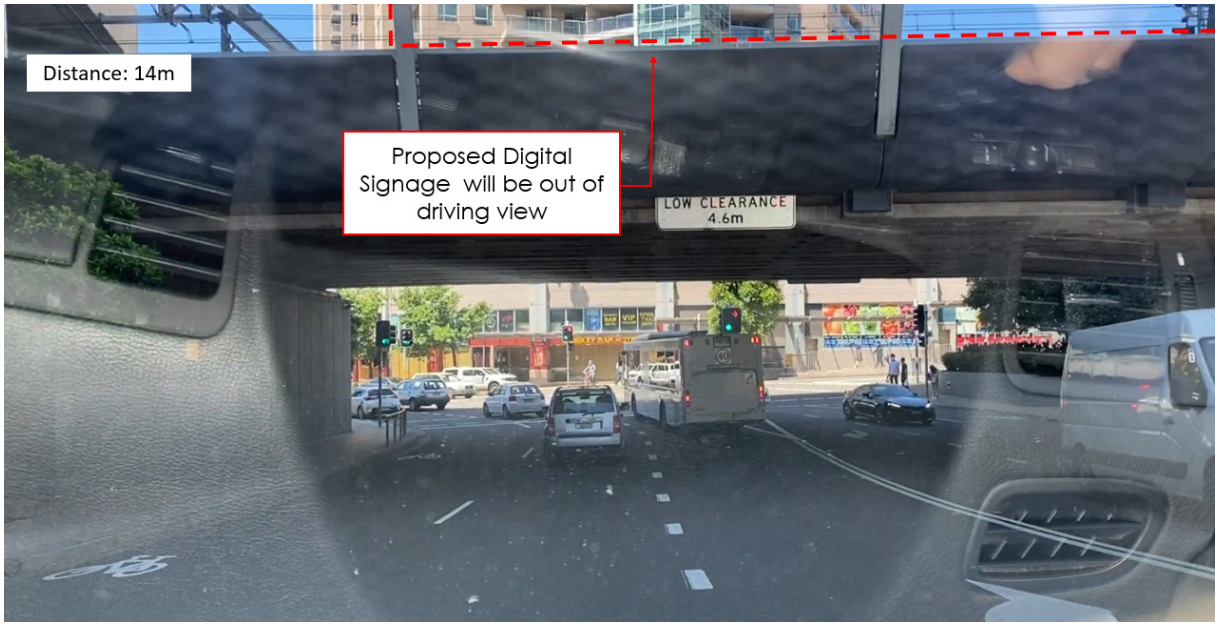
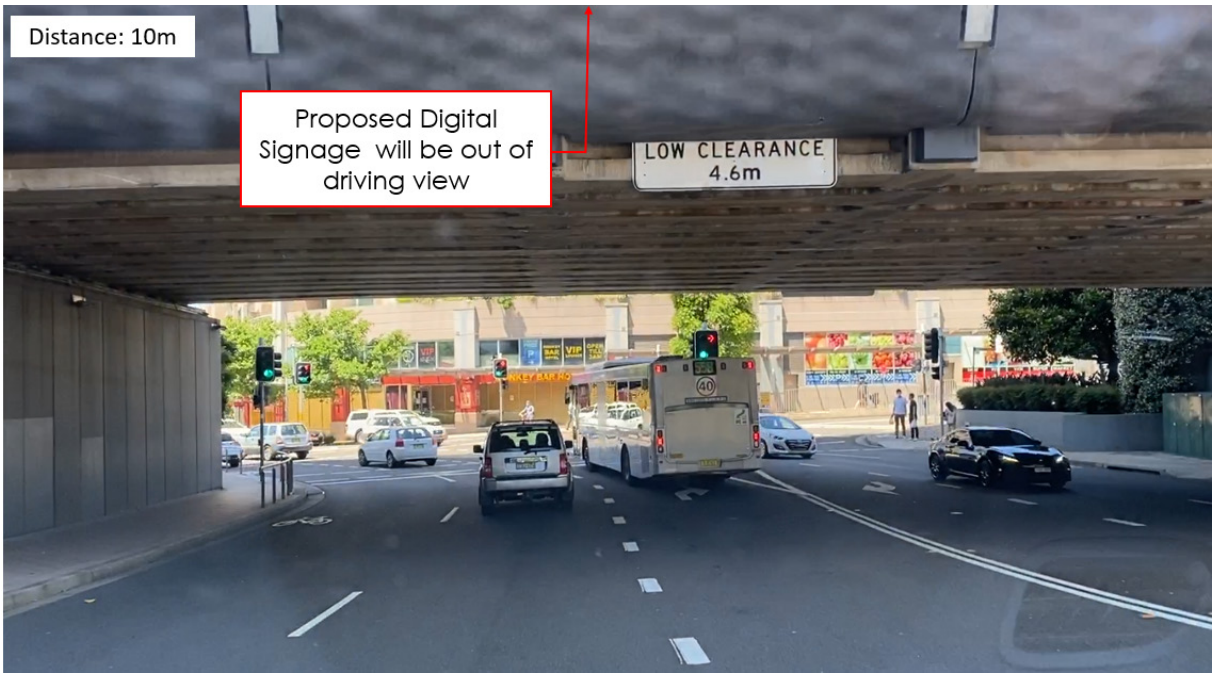


Figure 3: Driver's View on Help Street West Approach – 10m Away



Source: Photograph taken by TTPP dated 11/11/2020

Notwithstanding the above, there are several examples of digital and static signage boards in Sydney that are situated within the minimum safe stopping distance.

A digital signage is located on the northern side of a pedestrian bridge above King Georges Road in Beverley Hills, as shown in Figure 4. The digital signage is located 55m north of the King Georges Road - Shorter Avenue signalised intersection.

Given that King Georges Road has a speed limit of 60km/h, the minimum SSD is 64m as per the Austroads Guide Part 3. The Traffic Control Signal plan for the intersection indicates that there is a downhill slope of 6.1% on the approach to the digital signage (i.e. King Georges Road north approach). Applying a grade correction of an additional 8m to the SSD, the minimum SSD on King Georges Road north approach is 72m. As such, the digital signage is located within the minimum SSD as shown in Figure 5.

Figure 4: Existing Digital Signage on King George Road, Beverley Hills

Source: Google Streetview, imagery dated October 2020

Figure 5: Safe Stopping Sight Distance on King Georges Road

Similarly, a digital signage has recently been installed on the south side of the pedestrian footbridge across Pacific Highway in Gordon. The digital signage is located approximately 40m south of the Pacific Highway and Dumaresq Street signalised intersection as shown in Figure 6. Pacific Highway has a posted speed limit of 60km/h, and therefore, the minimum stopping sight distance to the traffic signals on Pacific Highway south approach is 64m. Hence, the digital signage is located within the minimum stopping sight distance as shown in Figure 7.

It is noted that a land and environment court proceeding (Captive Vision Pty Ltd v Ku-ring-gai Council (No 3) [2019] NSWLEC 1472) was undertaken for the digital signage on 19-20 September 2019. An extract from the court transcripts where TfNSW's expert witness, Ms Samsa, was in support of the proposed digital signage is provided below:

- *EXPERT WITNESS SAMSA: Well it was more that there is - when I analysed the crash data, on both approaches there were obviously crashes for both approaches, but on the southbound approach there were more crashes in the approach to the pedestrian bridge than beyond it, whereas the opposite is for the northbound approach. So there's not a lot of crashes towards it, but after you pass the pedestrian bridge there's been crashes, a larger portion of crashes beyond it. So to me that suggests that there's something about that, that northern section around Dumaresq Street and beyond that is causing drivers issues, and I can't qualify what that is. It could be a number of factors, but to me that was just a bit of a, a point to go well I wonder what's happening here that's making it difficult for drivers to negotiate that particular section of road in particular that would be causing those crashes?*
- *SENIOR COMMISSIONER: Do I understand your evidence is that you support the north or you don't?*
- *EXPERT WITNESS SAMSA: I would support the north approach.*
- *SENIOR COMMISSIONER: Irrespective of that conundrum about not understanding the after the sign area, is that right?*
- *EXPERT WITNESS SAMSA: I think, I think there's less of a chance for drivers to be distracted or to be thinking of a sign beyond once they've passed it.*
- *SENIOR COMMISSIONER: Okay, thank you.*
- *ASTILL: Just to clarify, you said north approach, you mean northbound commissioner?*
- *SENIOR COMMISSIONER: Yes, northbound.*

Figure 6: Existing Digital Signage on Pacific Highway, Gordon

Source: Photograph taken by TTPP on 24/05/2021

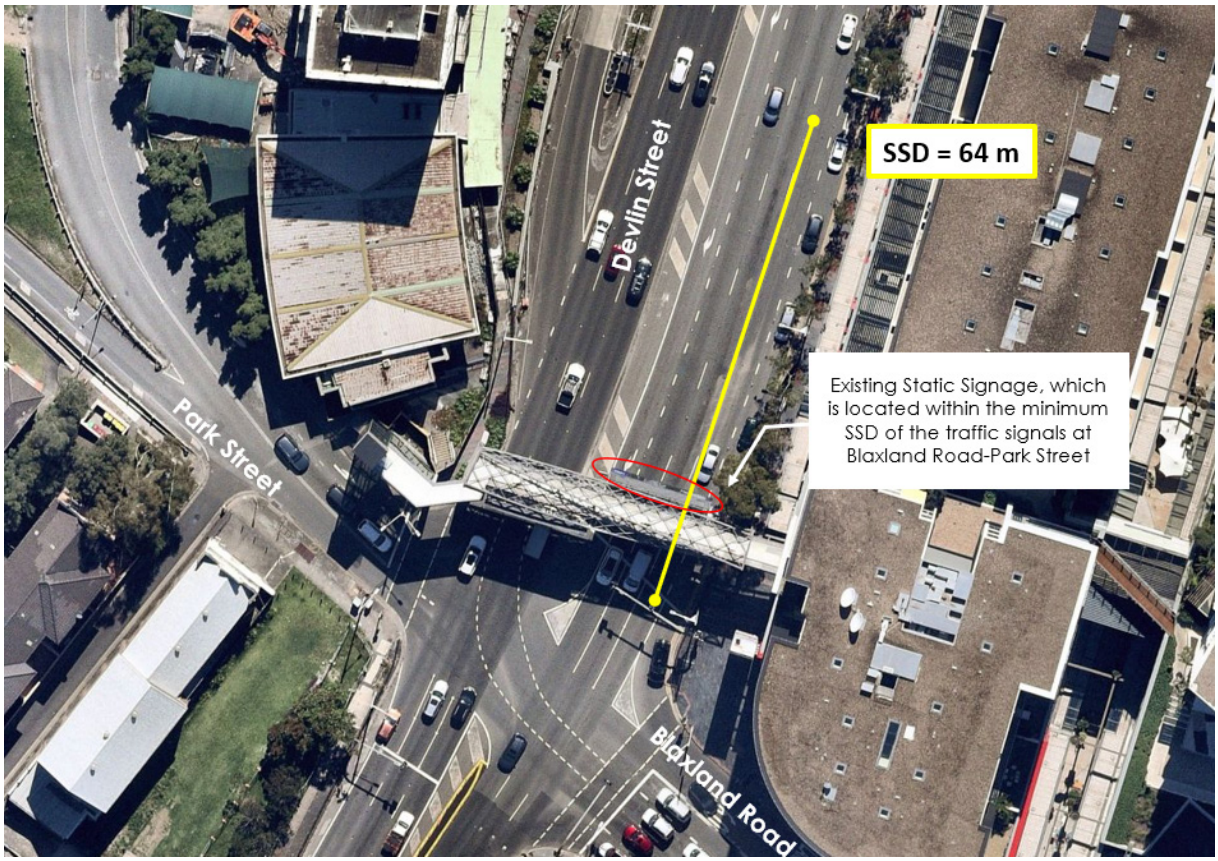
Figure 7: Safe Stopping Sight Distance on Pacific Highway

Another example is an existing static signage located on the pedestrian bridge above Devlin Street in Ryde. The existing signage is located 14m north of the stop line at the Devlin Street - Parkes Street - Blaxland Road signalised intersection as shown in Figure 8. In the vicinity of the signage, Devlin Street is posted as 60km/h giving a minimum SSD of 64m. As such, the signage is located within the minimum SSD to the traffic signals as shown in Figure 9.

Figure 8: Existing Signage on Devlin Street, Ryde

Source: Google Streetview, imagery dated November 2020

Figure 9: Safe Stopping Sight Distance on Devlin Street

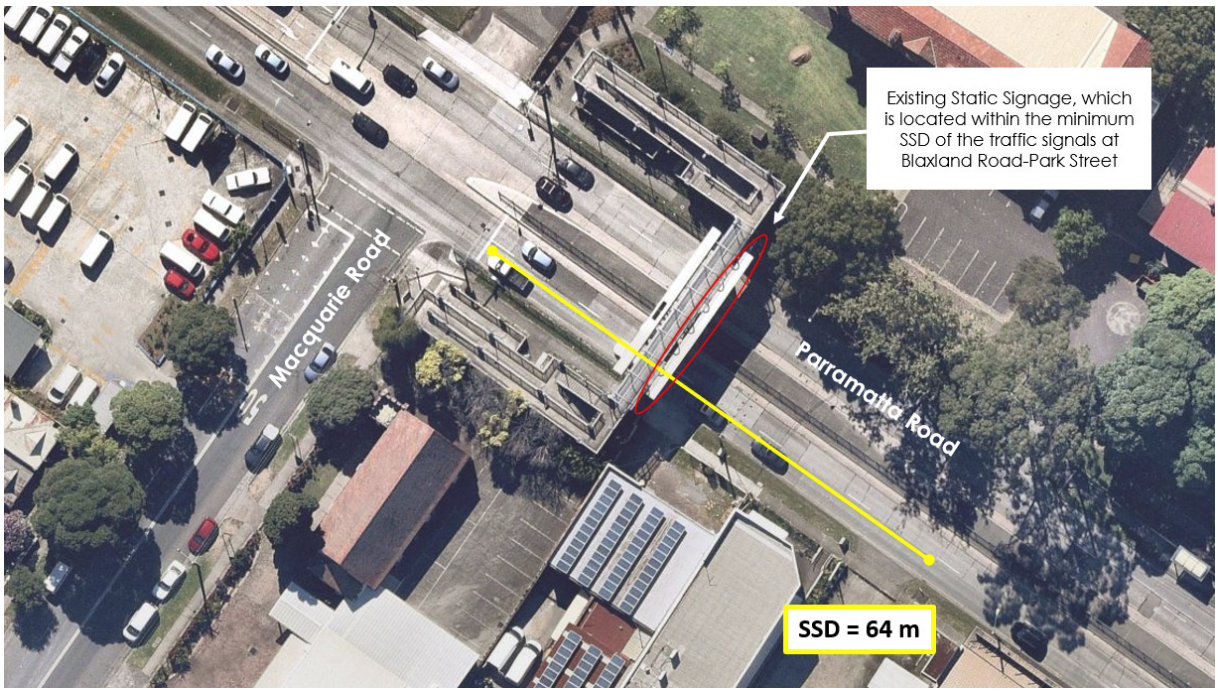


A third example is the static billboard fixed to the side of the overhead pedestrian bridge on Parramatta Road in Auburn. On the east approach to the Parramatta Road – Macquarie Road signalised intersection, there is a sign board located within 25m of the traffic signals. The driving view on approach to the traffic signals and signage is shown in Figure 10. The posted speed limit on Parramatta Road is 60km/h which gives a minimum SSD of 64m. Thus, the existing billboard is located less than the minimum SSD to the traffic signals.

Figure 10: Existing Signage on Parramatta Road, Auburn

Source: Google Streetview, imagery dated October 2020

Figure 11: Safe Stopping Sight Distance on Parramatta Road



Based on the above, there are several instances where there are existing digital and static signs located less than minimum safe stopping sight distance to traffic signals. Technically speaking, the above examples are also non-compliant with the Transport Corridor Outdoor Guidelines. However, like the Help Street proposal, these signs do not and would not be expected to cause an unsafe level of distraction for motorists on approach to the respective traffic signals.

As such, for road safety assessments of digitals signs, the Signage Guidelines should be applied as general principles rather than standards or warrants.

Submission 2: The proposed western and eastern elevations are located behind traffic signals, which has the potential to cause distraction for drivers upon approach of the traffic signals. The location of the illuminated signage in this location does not seem appropriate, and the Department is concerned that it will have safety implications.

There is a general perception that digital signage would cause an unsafe level of distraction for a motorist which is likely to result in a crash incident. A study was carried out in November 2015 by Carolyn Samsa, Level 3 Road Safety Auditor at Samsa Consulting, which assessed whether digital billboards are distracting to motorists. The study concluded that motorists have spare cognitive capacity to observe the road environment ahead in the presence of a digital signage without increased risk of a vehicle to vehicle and/or pedestrian collision. Further detail of the Samsa Consulting study is provided below in response to Willoughby City Council Submission 1.

In addition, TTPP has undertaken an analysis of crashes on roads with an existing digital signage at seven different locations in Sydney. The supplementary crash analysis aimed to understand whether there has been an increase in crashes since the operation of the digital signage. The supplementary crash analysis determined that all seven analysed sites did not result in an increase in crashes since the operation of the digital signage and the equivalent time period prior to its installation. As such, it is determined that digital billboard signs do not cause a significant distraction to motorists which result in road safety concerns.

Further information of the supplementary crash analysis is provided in response to Willoughby City Council Submission 1.

The proposal no longer includes a digital signage on the eastern side of the railway bridge. Hence, there will be no impacts to traffic on the Help Street east approach at this location.

Submissions by Willoughby City Council

Submission 1: There are pedestrian crossings at the intersection of Help Street and Orchard Road to the east of the bridge and at the intersection of Help Street and Railway Street to the north of the bridge. The proposed signage will cause distraction of those motorists approaching the crossings and will therefore increase danger to pedestrians.

Generally, there is a perception that a digital signage would cause an unsafe level of distraction for a motorist which is likely to result in a crash incident. A study was carried out in November 2015 by Carolyn Samsa, Level 3 Road Safety Auditor at Samsa Consulting, which assessed whether digital billboards are distracting to motorists.

The study, which was conducted in Queensland, identified that the average eye fixation duration spent by drivers observing a digital billboard is 0.207 seconds. This is well below 0.750 seconds which is considered to be the minimum perception-reaction time to an unexpected event, for example, a pedestrian crossing the road. The study identified that digital billboards do not draw drivers' attention away from the road for dangerously long periods of time compared to the other signage types and drivers maintained a safe average vehicle headway in the presence of such signs. The findings of Samsa's investigation supported international studies which generally found that the presence of billboards did not significantly affect the percentage of time drivers devoted to glancing at the forward roadway.

Conclusively, motorists have spare cognitive capacity to observe the road environment ahead in the presence of a digital signage without an increased risk of a vehicle-pedestrian collision.

Further to the above, TTPP has undertaken an analysis of crashes in the vicinity of existing digital signs like the digital signage that is proposed on Help Street. The supplementary crash analysis investigates seven (7) digital signs located across the Sydney road network. The aim of the crash analysis at additional sites is to determine whether the operation of digital signs at these locations has resulted in any safety impacts to road users. Attachment One of this letter contains the crash analysis of additional sites.

The supplementary crash analysis indicates that the distraction potential due to the presence of a digital signage is minimal and evidently has not contributed to creating a road environment that is any less safe for road users. However, a practical example which can be used to draw such conclusion is the existing digital signage on Victoria Road in West Ryde.

Of the sites assessed by the supplementary crash analysis, the proposal at Help Street would be most comparable to the digital signage on Victoria Road in West Ryde where there is significant pedestrian presence.

The digital signage in West Ryde, which was installed in October 2016, is located on the western side of an overhead railway bridge above Victoria Road as shown in Figure 12. There are two pedestrian crossings on Victoria Road at the intersection with West Parade located approximately 90m and 115m away from the digital signage. Motorists travelling eastbound on Victoria Road would be able to view the digital signage prior to the pedestrian crossings at the intersection with West Parade, as shown in Figure 13.

Figure 12: Existing Digital Signage on Victoria Road, West Ryde

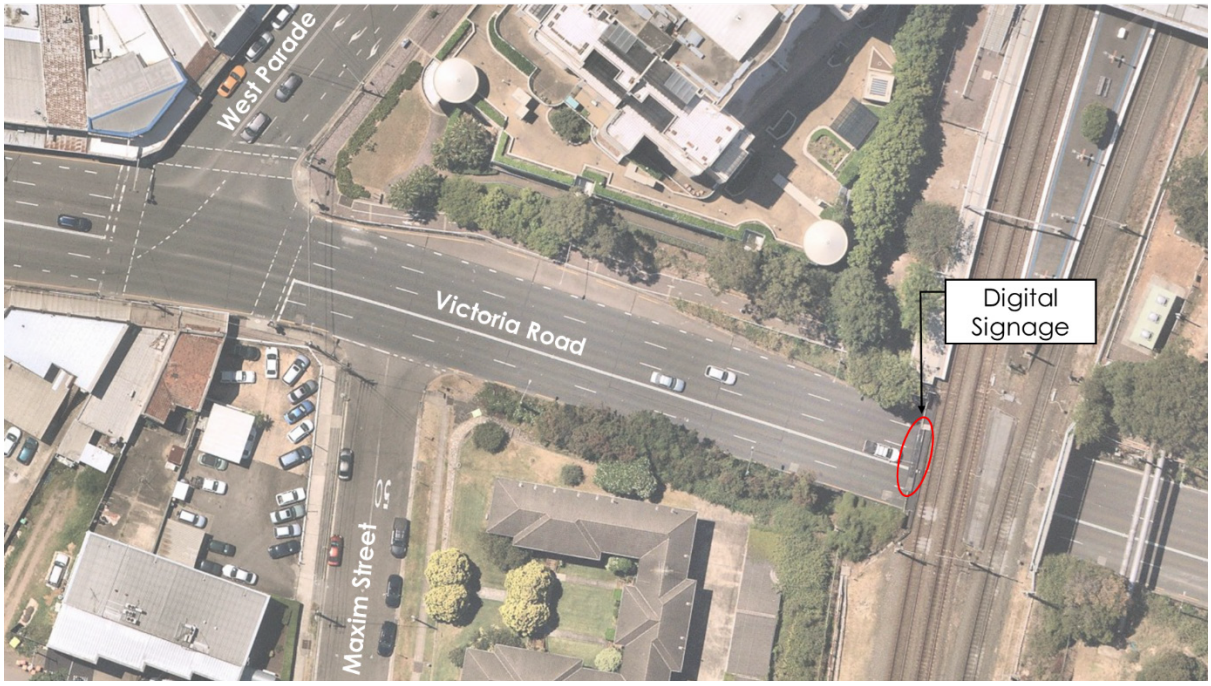


Figure 13: Motorist's View of Digital Signage on Victoria Road West Approach

The findings of the supplementary crash analysis during the pre-installation and operational periods for the digital signage on Victoria Road are summarised in Table 1.

Table 1: Crash History Summary on Victoria Road, West Ryde

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2011 - 2 October 2016)					
Pedestrian Near Side (RUM CODE 0)		2			
Pedestrian Far Side (RUM CODE 02)		1			
Left Near (RUM CODE 16)		1			
Right Through (RUM CODE 21)					1
Rear End (RUM CODE 30)			1	2	1
Lane Side Swipe (RUM CODE 33)					1
Lane Change Left (RUM CODE 35)			1		
Other on Path (RUM CODE 69)					1
Out of Control on Carriageway (RUM CODE 74)			1		
Off Carriageway Left on Left Bend into Object or Parked Vehicle (RUM CODE 87)					1
Sub-total	**0**	**4**	**3**	**2**	**5**
Total	**14**				
Operational Period (3 October 2016 - 31 December 2020)					
Right Off Carriageway into Object or Parked Vehicle (RUM CODE 73)			1		
Sub-total	**0**	**0**	**1**	**0**	**0**
Total	**1**				

The findings of the crash analysis on Victoria Road suggest that the presence of a digital signage does not result in an unsafe amount of information exposure and/or driver distraction that is likely to result in further crashes. This conclusion is based on there being no additional crashes following operation of the digital signage on Victoria Road. Of significance, there were fewer pedestrian related incidents since the digital signage has been operational.

Furthermore, the analysis findings at all seven locations indicate that there has been no increase in the number of crashes following operation of a digital signage. Attachment One of this RtS contains the crash analysis of additional sites.

Notwithstanding the above, the amount of text and information displayed on the proposed digital signage will be kept to a minimum in accordance with the Transport Corridor Outdoor Advertising and Signage Guidelines. The Guidelines state the information and text presented should be no more than a driver can read at short glance. This is to ensure that all motorists would still be able to process the information shown on the surrounding traffic signals. Also, the contents and images displayed on the proposed digital signage would not utilise colours and shapes (e.g. red, amber or green circles, octagons, crosses or triangles or shapes or patterns) that may result in the advertisement being mistaken for a traffic signal.

It is noted that the local roads in the vicinity of the proposed digital signage are signposted as 40km/h High Pedestrian Activity Area. As such, motorists approaching the digital signage at lower speeds would have more time to observe and react to pedestrians crossing the road.

There are several locations across Sydney Metropolitan where a digital signage is located in a motorist's peripheral vision of traffic signals and pedestrian crossings. Relevant examples are shown in Figure 14 to Figure 15.

Figure 14 shows the existing digital signage located on Waterloo Road in Macquarie Park. The digital signage faces the south approach to the signalised intersection of Waterloo Road and the Macquarie Shopping Centre car park access. This intersection forms one of the main shopping centre access points, and is located opposite medium-high density residential and commercial developments where there is a high volume of pedestrian activity crossing Waterloo Road.

Figure 14: Waterloo Road, Macquarie Park

A digital signage is fixed to the side of the overhead pedestrian bridge across King Georges Road in Beverly Hills as shown in Figure 15. The digital signage faces the south approach on King Georges Road, and is visible to motorists prior to the signalised intersection of King Georges Road - Shorter Avenue. The digital signage is located within a 40 km/h School Zone and adjacent to a primary school. As such, there is high pedestrian and vehicular activity in the vicinity during school peak periods. Presumably, the digital signage display would be static during school zone periods as per the Guidelines. Notwithstanding this, the digital signage is located in an area with regular busy periods where motorists are continually focused on the surroundings.

Figure 15: King Georges Road, Beverly Hills

An existing digital signage is fixed to the side of a building facing the west approach on Hume Highway. The digital signage is visible at the signalised intersection of Hume Highway-Highland Avenue as shown in Figure 16. On the east side of the road, there are several shops and health facilities while on the opposite side of Hume Highway is Yagoona train station. Hence, there is a significant level of pedestrian activity throughout the day particularly crossing Hume Highway at this intersection.

Figure 16: Hume Highway, Yagoona

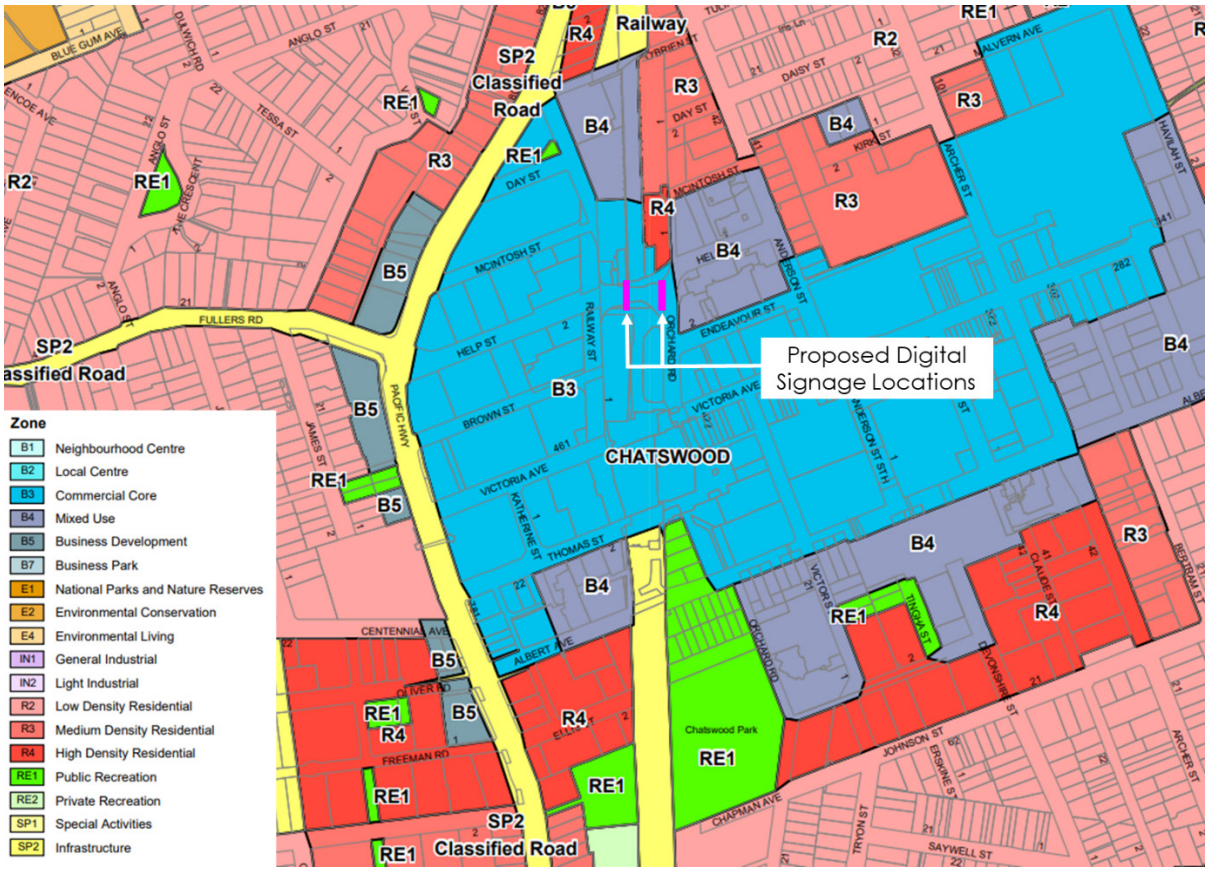
Submission 2: The following issues will result in the proposal breaching the following provisions of SEPP 64:

- ***Item 7 Schedule 1 – the illuminated sign will adversely affect safety of pedestrians and vehicles at the pedestrian crossing***

The proposed digital signage has been assessed in accordance with the Transport Corridor Outdoor Advertising and Signage Guidelines. As addressed in response to Willoughby City Council Submission 1 , there is a general perception of digital signage distracting motorists and causing an increase in the likelihood of crashes. Studies carried out by Samsa Consulting as well as the supplementary crash analysis undertaken by TTPP demonstrate that there is no evidence that digital signs result in increased driver distraction and increased safety risk for motorists and pedestrians.

The luminance levels of the proposed digital signage will be designed in accordance with Table 6 of the Transport Corridor Outdoor Advertising and Signage Guidelines. The proposed digital signage is located within B3 Commercial Core as shown in Figure 17.

Figure 17: Land Zoning Surrounding the Proposed Digital Signage



Source: Willoughby City Council LEP 2012

Based on the above, the proposed digital signage would be applicable for Zone 2 luminance levels as reported in the Digital Signage Safety Assessment.

In addition, the proposed digital signage will not display images that would dazzle or distract drivers or contain flickering or flashing content.

As such, the proposed digital signage would not adversely affect the safety of pedestrians and vehicles at the pedestrian crossing.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

Wayne Johnson
Director

Attachment One

Crash Analysis of Additional Digital Signage Locations

Our Ref: 20406

26 March 2021

Ethos Urban
173 Sussex Street
SYDNEY NSW 2000

Attention: Mr Gareth Bird

Dear Gareth,

RE: DIGITAL SIGNAGE SAFETY ASSESSMENT
EXISTING DIGITAL SIGNAGE CRASH DATA ANALYSIS

As requested, please find herein The Transport Planning Partnership (TTPP)'s crash data analysis at locations along the Sydney Trains network with existing digital signage billboards.

Background

Ethos Urban, on behalf of Sydney Trains, have submitted proposals for a new digital signage at various locations within Sydney NSW. Submissions made by Council and Transport for NSW (TfNSW) have been received which identify concerns for such digital sign boards to cause potential distraction to road users.

There is a perception that digital signage boards would result in an unsafe level of distraction to a motorist or pedestrian which is likely to result in a crash incident. As such, a review has been undertaken of crash data in the vicinity of existing digital billboard signs, like those which Sydney Trains is proposing to implement. The aim of the analysis is to determine whether the digital signage at each location has resulted in any safety impacts to road users within the vicinity of the signage.

This study assessed crash data that has been obtained from TfNSW at seven locations having digital signage owned by Sydney Trains. The crash data has been analysed to compare the number of crashes and severity of crashes for the same duration of time before and after the digital signage was installed. The findings of the analysis as presented herein identifies whether existing digital signs cause sufficient distraction to road users which result in road crashes.

Existing Digital Signage Locations

Existing digital signs which have been assessed as part of this investigation are as follows:

- M4 Motorway, Homebush,
- Parramatta Road, Lewisham,
- City West Link Eastbound, Lilyfield
- City West Link Westbound, Lilyfield,
- Pacific Highway, Pymble,
- Boundary Street, Roseville, and
- Victoria Road, West Ryde.

The location of each digital signage within the context of the surrounding road network is shown in Figure 1 to Figure 6.

Figure 1: M4 Motorway, Homebush

Figure 2: Parramatta Road, Lewisham

Figure 3: City West Link, Lilyfield

Figure 4: Pacific Highway, Pymble

Figure 5: Boundary Street, Roseville

Figure 6: Victoria Road, West Ryde

Crash History Analysis

Historic crash data has been obtained from TfNSW and assessed for incidents at seven locations with digital signage. The crash data analysis includes incidents that have occurred within the visible distance of the existing digital signage. For the purpose of this assessment, the visible distance has been based on desktop observations.

Crash data has been assessed on the approaches to the digital signage for a period prior to its installation and whilst it has been operational. The installation date varies for each signage location (as detailed below). Notwithstanding this, crash data during the operation of each digital signage has been assessed up to 31 December 2020.

M4 Motorway, Homebush

A digital signage is located on the eastern side of an overhead railway bridge across the M4 Motorway as shown in Figure 1. This digital signage, which was installed on 25 July 2016, is visible to motorists travelling on the M4 Motorway east approach within approximately 350m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 18 February 2012 to 24 July 2016. 4 years, 5 months, 7 days
- Post installation period: 25 July 2016 to 31 December 2020. 4 years, 5 months, 7 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 1. The location of crashes recorded during these periods are illustrated in Figure 7 and Figure 8 respectively.

Table 1: Crash History Summary on M4 Motorway, Homebush

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (18 February 2012 - 24 July 2016)					
Rear End (RUM CODE 30)				1	7
Accident or Broken Down (RUM CODE 62)		1			
Struck Object (RUM CODE 66)			1		
Load or Missile Struck Vehicle (RUM CODE 91)					1
Sub-total	**0**	**1**	**1**	**1**	**8**
Total	**11**				
Operational Period (25 July 2016 – 31 December 2020)					
Rear End (RUM CODE 30)					1
Other Same Direction (RUM CODE 39)					1
Sub-total	**0**	**0**	**0**	**0**	**2**
Total	**2**				

Figure 7: Crash Locations at M4 Motorway, Homebush – Pre-Installation

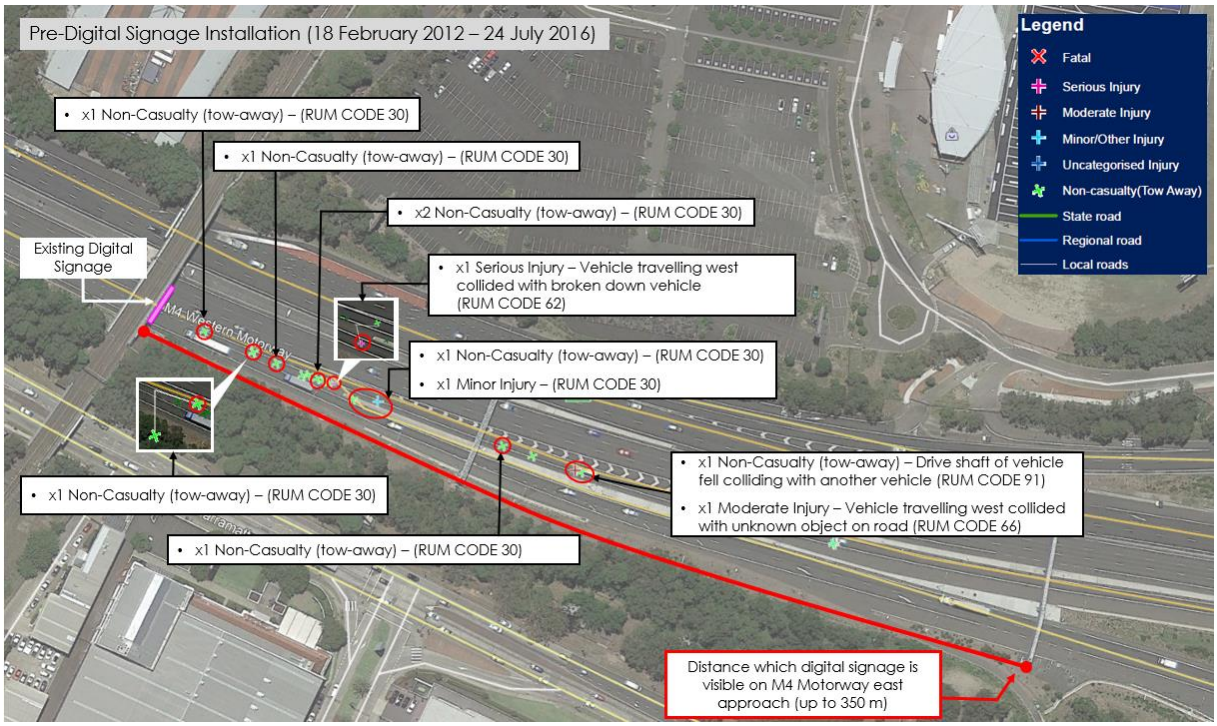
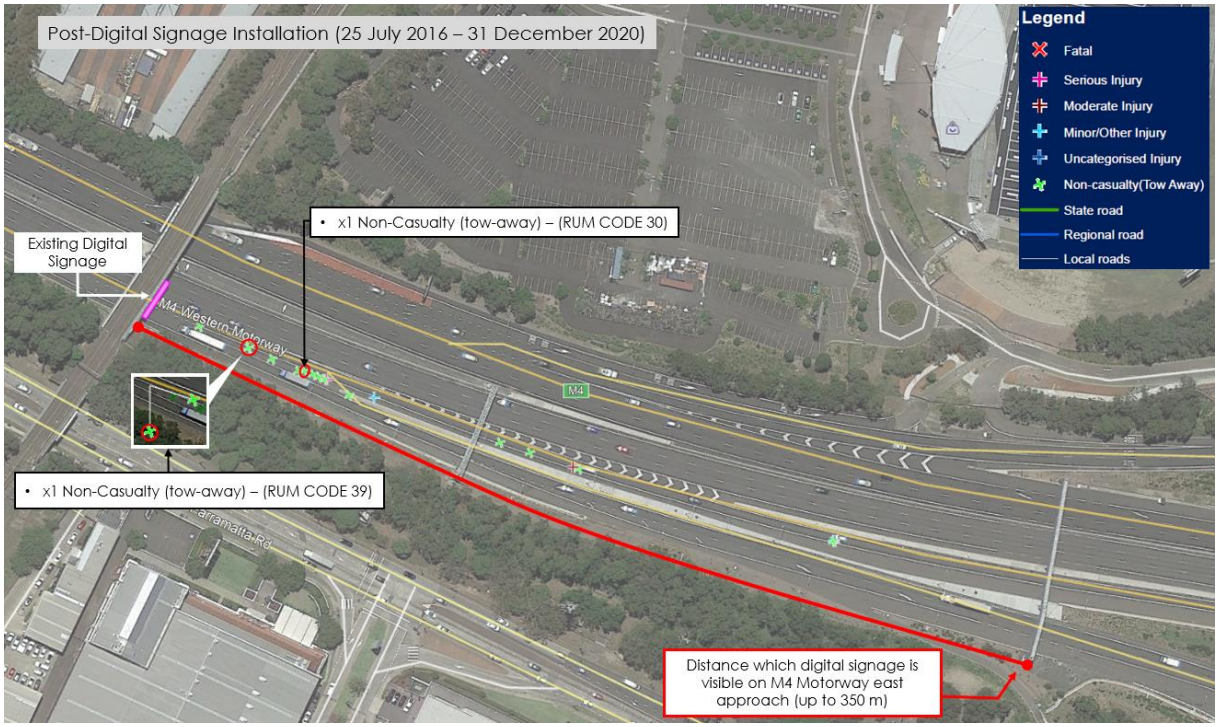


Figure 8: Crash Locations at M4 Motorway, Homebush – Operational



From Table 1, a total of 11 incidents occurred in the time period prior to the digital signage. The majority of the crashes resulted in no injuries or casualties, only vehicles being towed-away; that is, 8 out of 11 crashes. As a result of the crashes, there was one serious injury, one moderate injury, and one minor injury.

The serious injury crash was a result of a vehicle colliding into a broken-down vehicle (RUM CODE 62) on the M4 Motorway. The moderate injury crash occurred when a vehicle collided with an object on the road (RUM CODE 66). The minor injury crash was a result of a rear end collision (RUM CODE 30).

Prior to installation of the digital signage, the most common type of crash was a rear end crash which made up 8 out of 11 crashes.

Once the digital signage was in operation, there was a total of two crashes recorded. Both incidents resulted in a no injuries (tow-away). One incident was a rear end crash and the other was the result of two vehicles travelling in the same direction colliding with one another (RUM CODE 39).

Overall, the number of crashes on the M4 Motorway east approach has not increased following the installation of the digital signage.

Parramatta Road, Lewisham

A digital signage is located on the western side of an overhead railway bridge across Parramatta Road in Lewisham as shown in Figure 2. This digital signage, which was installed on 29 May 2017, is visible to motorists travelling on the west approach on Parramatta Road within approximately 230m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 26 October 2013 to 28 May 2017. 3 years, 7 months, 3 days
- Post installation period: 29 May 2017 to 31 December 2020. 3 years, 7 months, 3 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 2. The location of crashes recorded during these periods are illustrated in Figure 9 and Figure 10 respectively.

Table 2: Crash History Summary on Parramatta Road, Lewisham

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (26 October 2013 - 28 May 2017)					
Rear End (RUM CODE 30)			1	2	1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)		1			
Sub-total	**0**	**1**	**1**	**2**	**1**
Total	**5**				
Operational Period (29 May 2017 - 31 December 2020)					
Right Off Carriageway into Object or Parked Vehicle (RUM CODE 73)					1
Sub-total	**0**	**0**	**0**	**0**	**1**
Total	**1**				

Figure 9: Crash Locations at Parramatta Road, Lewisham – Pre-Installation

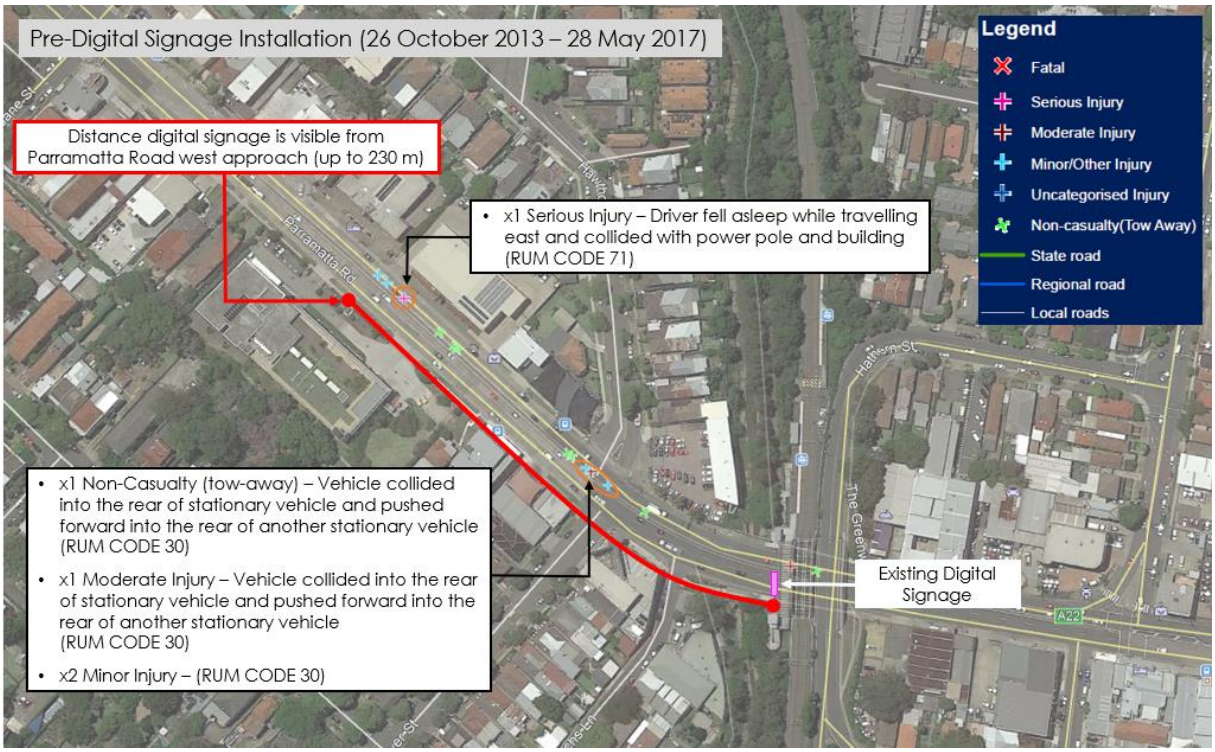


Figure 10: Crash Locations at Parramatta Road, Lewisham – Operational

In the time period prior to the digital signage, there were a total of five crashes recorded within the visible distance of the digital signage. The serious injury crash was the result of driver fatigue which caused the driver to veer from the carriageway and collide into a power pole (RUM CODE 71). The moderate injury crash was related to a rear end incident. There two minor injuries resulting from rear end collisions (RUM CODE 30), and one crash that resulted in no injuries (tow-away).

Since the digital signage has been in operation, a vehicle has veered from the carriageway colliding into a parked vehicle (RUM CODE 73). This crash resulted in the vehicle being towed away, however, no injuries.

Whilst the digital signage has been operational, there has been no increase in the number of crashes within the signage visible distance on Parramatta Road.

City West Link (Eastbound), Lilyfield

A digital signage is located on the northern side of the City West Link carriageway at Lilyfield, facing eastbound traffic as shown in Figure 3. This digital signage, which was installed on 20 April 2015, is visible to motorists travelling on the western approach on Parramatta Road within approximately 350m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 1 January 2010 and 19 April 2015. (5 years 3 months 18 days)
- Post-installation period: 20 April 2015 and 7 August 2020. (5 years 3 months 18 days)

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 3. The location of crashes recorded during these periods are illustrated in Figure 11 and Figure 12 respectively.

Table 3: Crash History Summary on City West Link (Eastbound), Lilyfield

Crash Type	Crash Severity (No. of Crashes)					
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)	Uncategorised Injury
Pre-Installation (1 January 2010 – 19 April 2015)						
Head On (RUM CODE 20)		1				
Rear End (RUM CODE 30)					2	
Sub-total	**0**	**1**	**0**	**0**	**2**	**0**
Total	**3**					
Operational Period (20 April 2015 – 7 August 2020)						
Other Same Direction (RUM CODE 39)				1		
Sub-total	**0**	**0**	**0**	**1**	**0**	**0**
Total	**1**					

Figure 11: Crash Locations at City West Link (Eastbound), Lilyfield – Pre-Installation

Figure 12: Crash Locations at City West Link (Eastbound), Lilyfield – Operational

A total of three crashes have been recorded during the five-year period prior to the digital signage. One incident occurred east of the City West Link – Catherine Street intersection which was a head on crash (RUM CODE 20) that resulted in a serious injury. The other two incidents were rear end crashes which resulted in vehicles being towed away.

Whilst the digital signage has been operational there has been one crash recorded. This crash resulted in a minor injury which was due to an uncommon crash between two vehicles travelling in the same direction (RUM CODE 39).

Overall, there has been no increase in crashes on City West Link western approach following the installation of the digital signage.

City West Link (Westbound), Lilyfield

A digital signage is located on the northern side of City West Link at Lilyfield, facing westbound traffic as shown in Figure 3. This digital signage is located 100m east of the intersection of City West Link – Catherine Street. The digital signage, which was installed on 31 October 2016, is visible to motorists travelling on the eastern approach on City West Link within approximately 230m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 30 August 2012 to 30 October 2016. 4 years, 2 months, 1 day
- Post-installation period: 31 October 2016 to 31 December 2020. 4 years, 2 months, 1 day

It is noted that there have been no crashes recorded following installation of the digital signage. A summary of crashes pre-installation of the digital signage is presented in Table 4. The location of crashes recorded pre-installation is illustrated in Figure 13.

Table 4: Crash History Summary on City West Link (Westbound), Lilyfield

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2011 – 30 October 2016)					
Rear End (RUM CODE 30)					1
Sub-total	**0**	**0**	**0**	**0**	**1**
Total	**1**				

Figure 13: Crash Locations at City West Link (Westbound), Lilyfield – Pre-Installation

During the time period prior to the digital signage, there was one rear end crash which resulted in no injuries and only the vehicle/s being towed away. Since the signage was installed, there have been no crashes recorded within the visible distance on City West Link in the westbound direction.

Thus, the digital signage has not contributed to any further road crashes in the vicinity.

Pacific Highway, Pymble

A digital signage is located on the eastern side of Pacific Highway in Pymble as shown in Figure 4. This digital signage, which was installed on 23 March 2015, is visible to motorists travelling on the north approach on Pacific Highway. The digital signage would become visible immediately after passing the Pacific Highway - Livingstone Avenue intersection which is approximately 180m from the signage.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 1 January 2010 and 22 March 2015. (5 years 2 months 21 days)
- Post installation period: 23 March 2015 and 13 June 2020. (5 years 2 months 21 days)

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 5. The location of crashes recorded during these periods are illustrated in Figure 14 and Figure 15 respectively.

Table 5: Crash History Summary on Pacific Highway, Pymble

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2010 - 22 March 2015)					
Right Through (RUM CODE 21)					1
Rear End (RUM CODE 30)					2
Off Carriageway Left on Right Bend into Object or Parked Vehicle (RUM CODE 81)			1		1
Off Carriageway Right on Left Bend into Object or Parked Vehicle (RUM CODE 85)					2
Sub-total	**0**	**0**	**1**	**0**	**6**
Total	**7**				
Operational Period (23 March 2015 – 13 June 2020)					
Right Through (RUM CODE 21)					2
Rear End (RUM CODE 30)			1		
Lane Change Left (RUM CODE 35)				1	
Sub-total	**0**	**0**	**1**	**1**	**2**
Total	**4**				

Figure 14: Crash Locations at Pacific Highway, Pymble – Pre-Installation

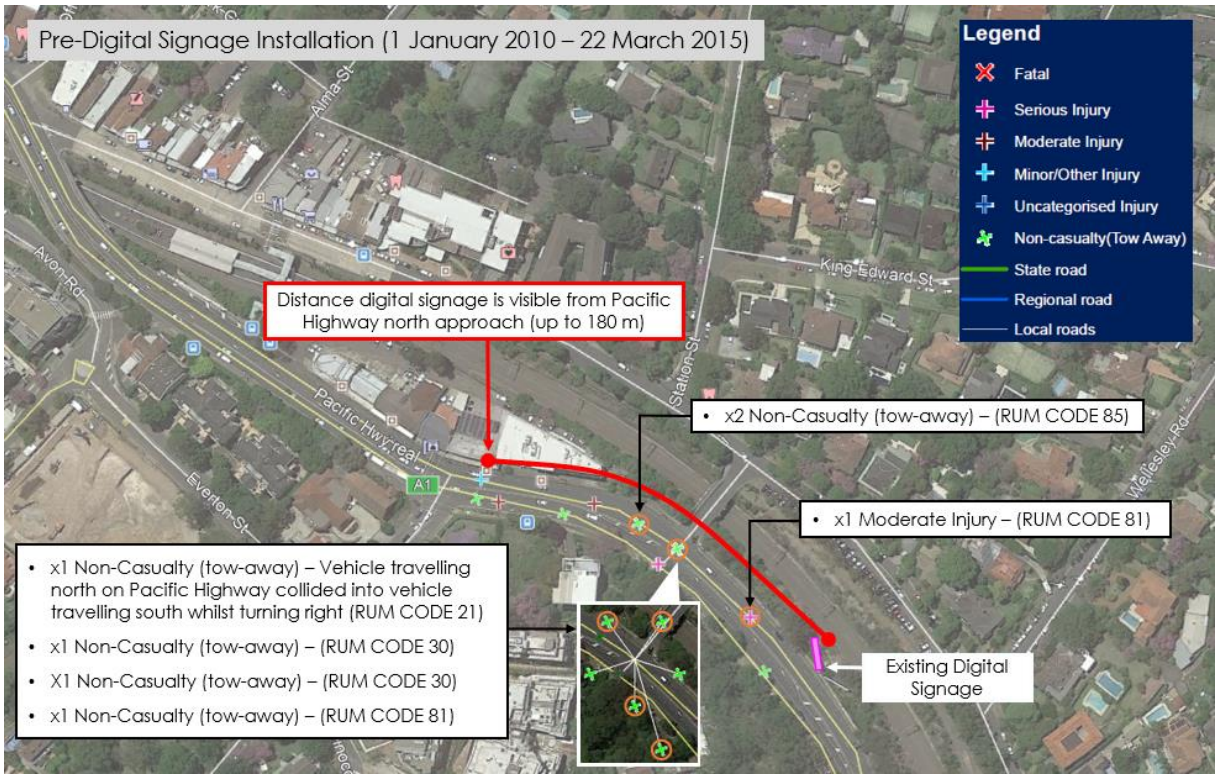
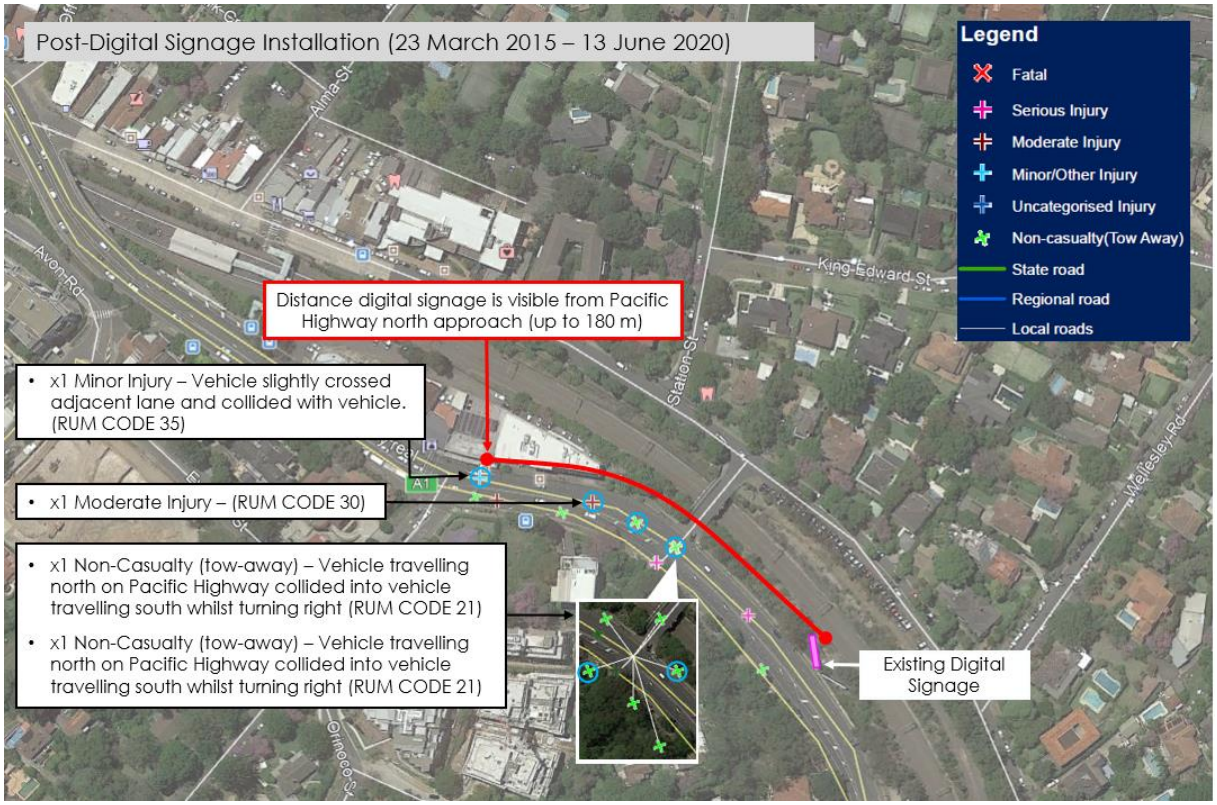


Figure 15: Crash Locations at Pacific Highway, Pymble – Operational



There were seven crashes recorded within the time period prior to the digital signage. Most of these crashes occurred at the intersection of Pacific Highway with the side road bridge crossing towards Grandview Street, and resulted in no injuries. The crashes include two rear end collisions, a vehicle travelling south colliding into vehicle turning right onto the bridge (RUM CODE 21), and three vehicles veering from carriageway at the bend into an object (RUM CODE 81 and RUM CODE 85). A similar incident occurred approximately 40m south of the bridge where a vehicle veered from the carriageway at the bend into an object resulting in a moderate injury.

Following the installation of the digital signage, four crashes have been recorded. Two of the crashes were due to a vehicle travelling south colliding into a vehicle turning right onto the bridge. The remainder of incidents were rear end crashes and a vehicle colliding with another vehicle in the adjacent travel lane (RUM CODE 35).

Overall, the number of crashes at this location has not increased following the installation of the digital signage.

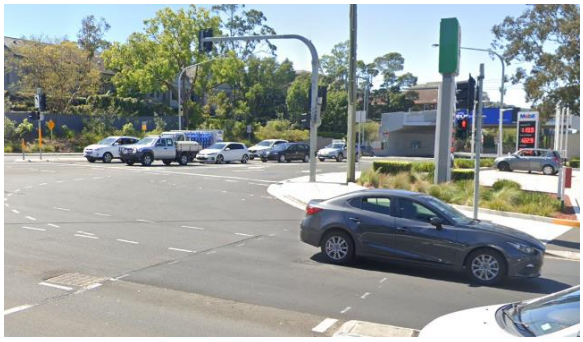
Boundary Street, Roseville

A digital signage is located on the western side of the overhead railway bridge across Boundary Street as shown in Figure 5. This digital signage was installed on 17 July 2017.

On Boundary Road west approach, the signage becomes visible after a motorist has turned left or right from Pacific Highway. The digital signage is not visible on Pacific Highway north approach, and visibility is partially obstructed on the south approach as shown in Figure 16.

Figure 16: Pacific Highway North Approach and South Approach

Motorist's view from north approach



Motorist's view from south approach

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 2 February 2014 to 16 July 2017. 3 years, 5 months, 15 days
- Post installation period: 17 July 2017 and 31 December 2020. 3 years, 5 months, 15 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 6. The location of crashes recorded during these periods are illustrated in Figure 17 and Figure 18 respectively.

Table 6: Crash History Summary on Boundary Street, Roseville

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (2 February 2014 - 16 July 2017)					
Left Far (RUM CODE 12)			1		
Rear End (RUM CODE 30)			1	2	2
Lane Change Left (RUM CODE 35)					1
Left Turn Side Swipe (RUM CODE 37)				1	1
Other Same Direction (RUM CODE 39)					1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)				1	
Sub-total	**0**	**0**	**2**	**4**	**5**
Total	**11**				
Operational Period (17 July 2017 - 31 December 2020)					
Pedestrian Far Side (RUM CODE 02)	1				
Cross Traffic (RUM CODE 10)					1
Other Same Direction (RUM CODE 39)					1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)				1	
Sub-total	**1**	**0**	**0**	**1**	**2**
Total	**4**				

Figure 17: Crash Locations at Boundary Street, Roseville – Pre-Installation

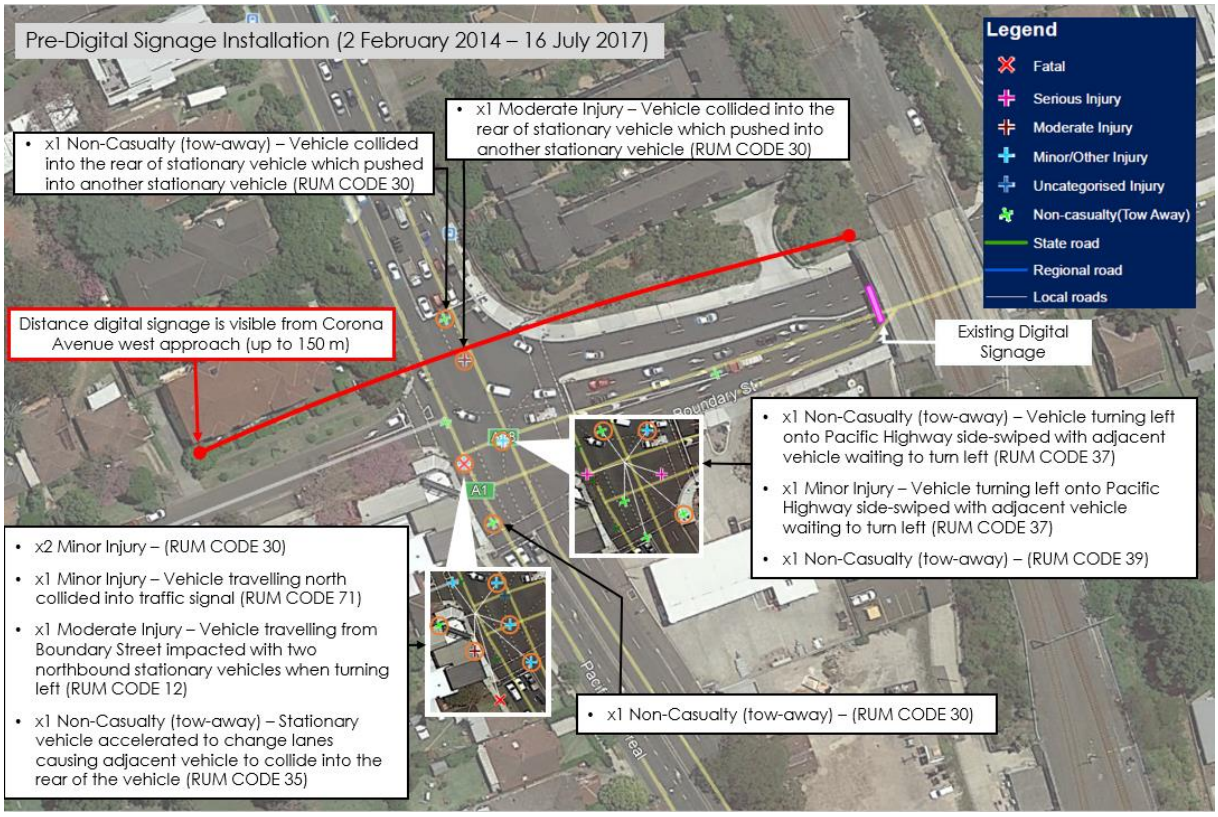


Figure 18: Crash Locations at Boundary Street, Roseville – Operational

From Table 6, the recorded crashes have all occurred at the intersection of Pacific Highway-Boundary Street. There was a total of 11 crash incidents within the time period prior to the digital signage. Of those 11 crashes, there were two moderate injuries, four minor injuries, and five non-casualties (tow-away). It is noted that these crashes occurred at the signalised intersection of Pacific Highway - Boundary Street where vehicles were recorded as travelling north and south through the intersection. Given that the digital signage is partially obstructed or not visible from the north approach and south approach, such crashes would be unrelated to the presence of a digital signage on Boundary Street.

Following the installation of the digital signage, four crashes have been recorded at the Pacific Highway - Boundary Street intersection. Of these incidents, one crash resulted in a fatality, one minor injury, and two non-casualties with vehicles being towed away. The incident which resulted in a fatality involved a pedestrian illegally crossing the intersection from the north-east corner to the south-west corner which resulted in the pedestrian being struck by a vehicle travelling northbound on Pacific Highway. The driver's visibility of the pedestrian was obstructed by a truck waiting to turn right from Pacific Highway to Boundary Street. Since the pedestrian breaking the law by crossing at an unmarked crossing location, this incident is an uncommon situation. More importantly, such incident was unrelated to the digital signage on Boundary Street.

Overall, the number of crashes within the visible distance of the digital signage has not increased since being installed in 2017.

Victoria Road, West Ryde

A digital signage is located on the western side of an overhead railway bridge across Victoria Road in West Ryde as shown in Figure 6 This digital signage, which was installed on 3 October 2016, is visible to motorists travelling on the west approach on Victoria Road from 265m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 4 July 2012 – 2 October 2016. 4 years, 2 months, 29 days
- Post installation period: 3 October 2016 – 31 December 2020. 4 years, 2 months, 29 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 7. The location of crashes recorded during these periods are illustrated in Figure 19 and Figure 20 respectively.

Table 7: Crash History Summary on Victoria Road, West Ryde

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2011 - 2 October 2016)					
Pedestrian Near Side (RUM CODE 0)		2			
Pedestrian Far Side (RUM CODE 02)		1			
Left Near (RUM CODE 16)		1			
Right Through (RUM CODE 21)					1
Rear End (RUM CODE 30)			1	2	1
Lane Side Swipe (RUM CODE 33)					1
Lane Change Left (RUM CODE 35)			1		
Other on Path (RUM CODE 69)					1
Out of Control on Carriageway (RUM CODE 74)			1		
Off Carriageway Left on Left Bend into Object or Parked Vehicle (RUM CODE 87)					1
Sub-total	**0**	**4**	**3**	**2**	**5**
Total	**14**				
Operational Period (3 October 2016 - 31 December 2020)					
Right Off Carriageway into Object or Parked Vehicle (RUM CODE 73)			1		
Sub-total	**0**	**0**	**1**	**0**	**0**
Total	**1**				

Figure 19: Crash Locations at Victoria Road, West Ryde – Pre-Installation

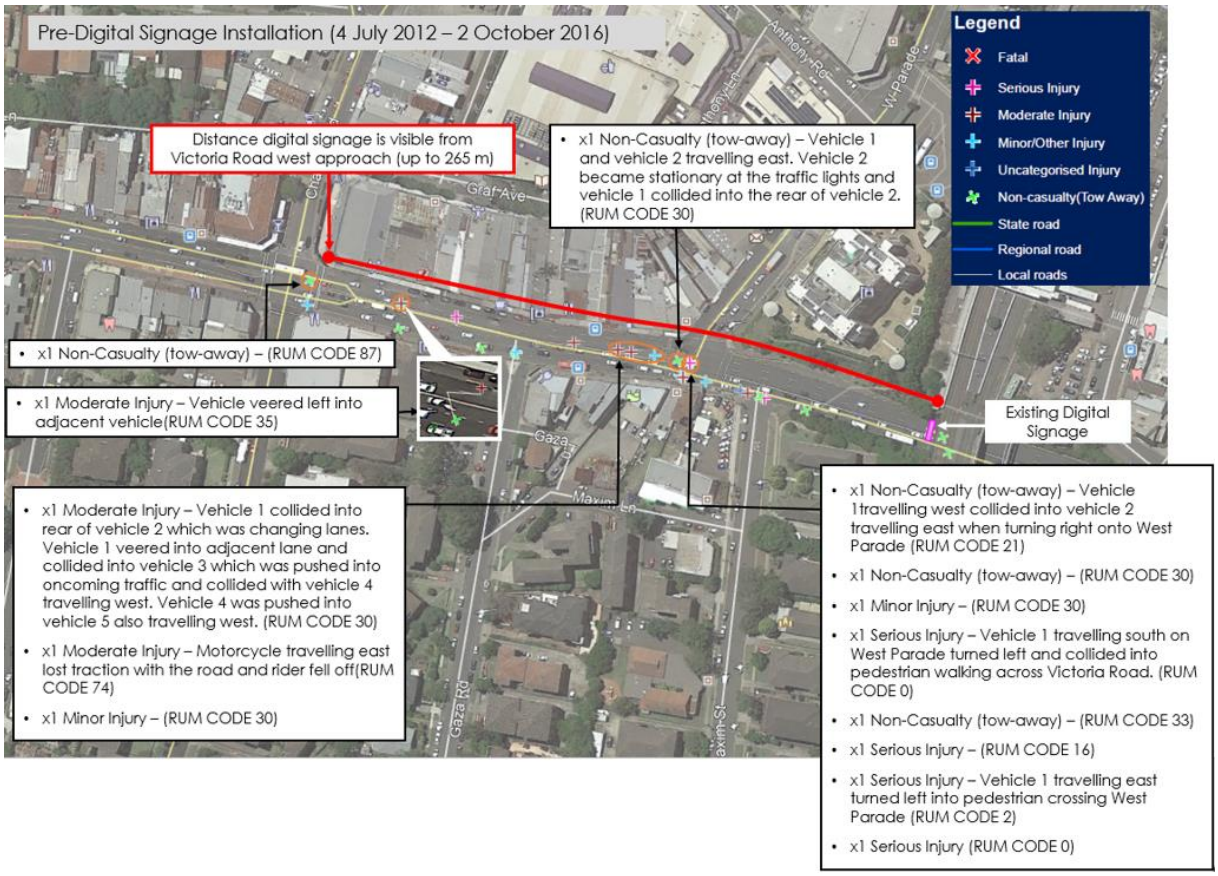
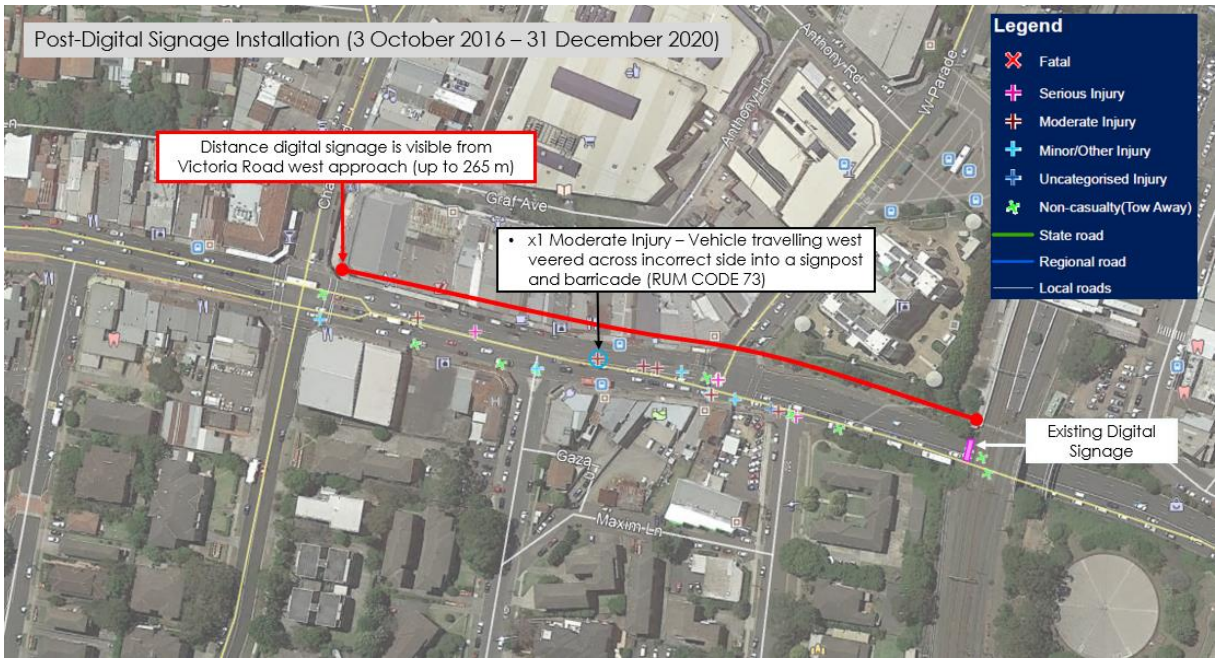


Figure 20: Crash Locations at Victoria Road, West Ryde – Operational



From Table 7, there are a total of 14 crashes recorded in the period prior to the digital signage. Of these incidents, four crashes resulted in serious injuries, three crashes with moderate injuries, and two crashes with minor injuries. Five crashes resulted in no injuries and a vehicle tow-away.

The four incidents resulting in a serious injury occurred at the signalised intersection of Victoria Road - West Parade where three crashes involved a pedestrian (RUM CODE 0 and RUM CODE 02), and one crash involved a vehicle colliding into the rear of a vehicle after turning left from West Parade (RUM CODE 16). The moderate and minor injuries were the result of a rear end, lane change (RUM CODE 35), and loss of control (RUM CODE 74) incidents.

After the digital signage was installed in 2016, there has been one crash recorded within the visible distance on Victoria Road. The crash occurred approximately 20m east of Gaza Road which involved a vehicle travelling eastbound veering to the opposite side of the carriageway causing the vehicle to collide with a signpost and barricade (RUM CODE 73).

Hence, it is concluded that the number of crashes on Victoria Road eastbound has not increased since the installation of the digital signage.

Summary and Conclusion

There is a perception that digital signage boards would result in an unsafe level of distraction to a motorist of pedestrian which is likely to result in a crash incident. As such, a review has been undertaken of crash data in the vicinity of existing digital billboard signs, like those which Sydney Trains is proposing to implement. The aim of the analysis is to determine whether the digital signage at each location has resulted in any safety impacts to road users within the vicinity of the signage.

This study assessed crash data that has been obtained from TfNSW at seven locations having an existing digital signage owned by Sydney Trains. The crash data has been analysed to compare the number of crashes and severity of crashes before and after the digital signage was installed. The findings of the analysis suggest that existing digital signs do not cause distraction to road users which leads to road crashes. In fact, at all site locations, historic crash data indicates that there were a greater number of incidents recorded prior to the installation of each digital signage.

Based on the analysis presented in this letter, it can be concluded that the perceived distraction potential for road users due to the presence of a digital signage is minimal and evidently has not resulted in creating a road environment that is any less safe for motorists, pedestrians, and cyclists.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

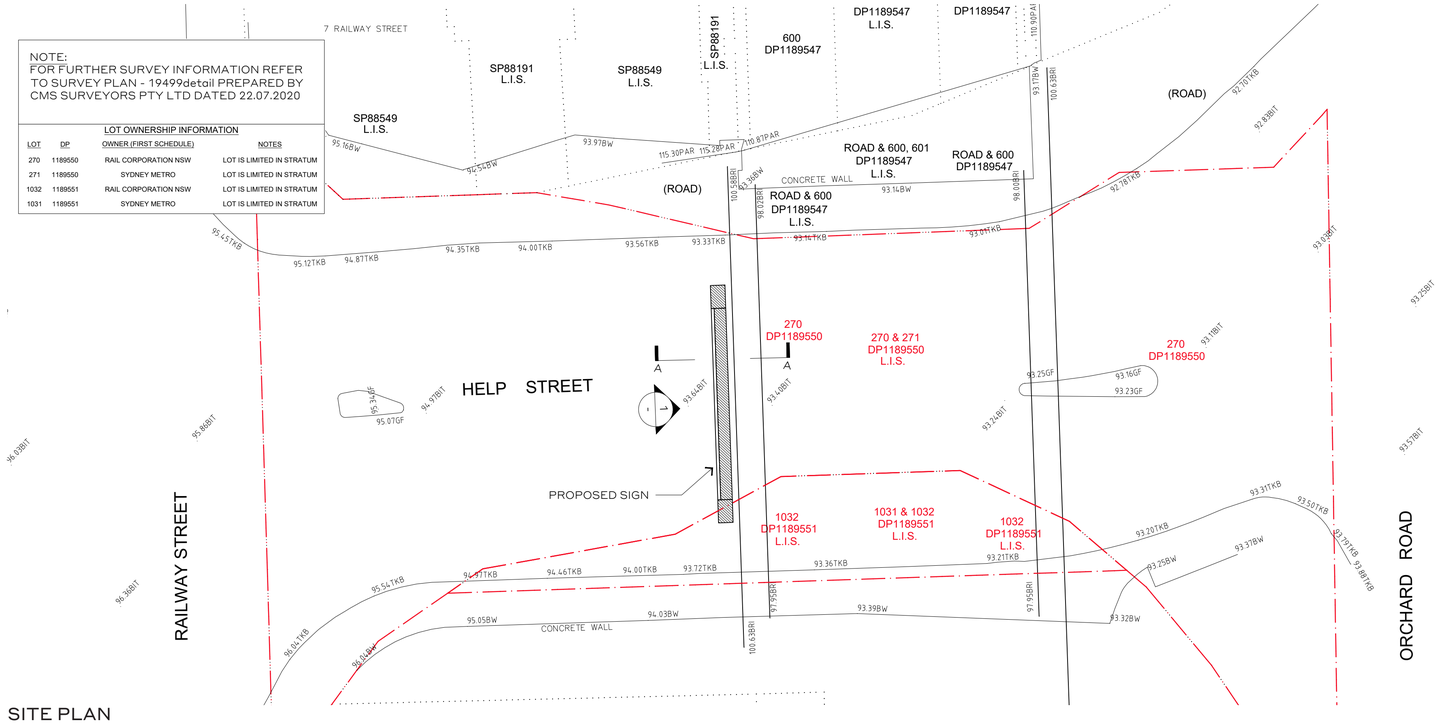
Wayne Johnson
Director

Attachment Two

Amended Design Plan of Proposed Digital Signage

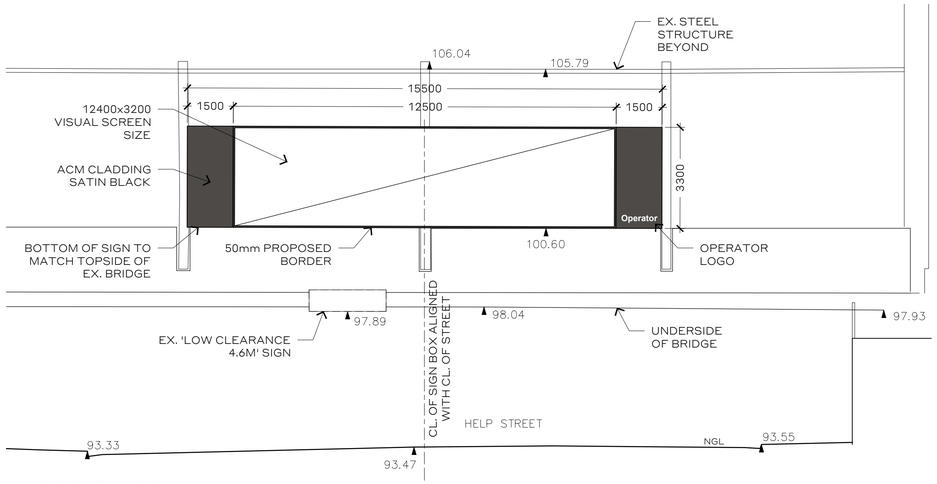
LOCATION PLAN - AERIAL PHOTO

NTS



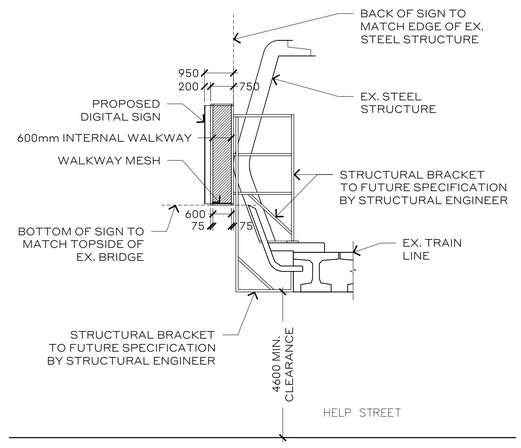
SITE PLAN

SCALE 1:200 @ A1



WEST ELEVATION

SCALE 1:100 @ A1



SECTION A-A

SCALE 1:100 @ A1

PHOTOMONTAGE - VIEW 1

View from Help Street looking East

NOT FOR CONSTRUCTION

ETHOS URBAN

Ethos Urban Pty. Ltd.
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www.ethosurban.com
173-185 Sussex Street Sydney NSW 2000
t +61 2 9956 6962

LEGEND / NOTES

- Site boundary
- Photomontage location
- Proposed sign (NTS)

ACM	Aluminium composite material
CL	Centre line
EX	Existing
LIS	Limited in stratum

ISSUE	DATE	REVISION	REVISION BY	APPROVED BY
A	17.12.20	DA Issue to DPIE	PN	SM
B	18.05.21	Response to Submissions	PN	SM

RESPONSE TO SUBMISSIONS - DA 10662

PROJECT

DOOH Development Applications

Prepared for Sydney Trains

SCALE
AS SHOWN @ A1

DRAWING

Site Plan & General Arrangement 1 **A-13.1**

Site 13 - Chatswood (Help Street - Western Side) /B

JOB NO.	DWG NO.	ISSUE	DATE	DRAWN BY
2200249	A-13.1	B	18.05.21	PN