The National Roads & Motorists' Association

WestConnex Stage 1 M4 widening submission to NSW Department of Planning & Environment

Application number SSI 13_6148

September 2014

Introduction

The National Roads & Motorists Association (NRMA) comprises more than 2.4 million Members across New South Wales (NSW) and the Australian Capital Territory (ACT). For more than 90 years, NRMA has represented the interests of motorists in relation to traffic management and road safety.

NRMA strongly supports completing the missing links in Sydney's motorways to create a connected and functional road network. The proposed upgrade to the existing M4 motorway (WestConnex Stage 1a between Parramatta and Homebush Bay Drive) is a very important stage in providing a new motorway route between the M4 and M5 motorways, connecting with Sydney Airport and Port and providing links to the Western Distributor and Harbour crossings.

The existing M4 motorway is relied upon by millions of road users every year and this critical role will be expanded when the M4 is joined to the other proposed components of the WestConnex project.

NRMA views the Stage 1a Project as much more than simply a motorway widening exercise. We continue to encourage for this project to be viewed as a significant opportunity to improve traffic management (as distinct from simply catering for more vehicles), and to reduce the road toll along this nationally important road corridor. The recommendations made in this submission are focused on addressing these issues.

NRMA has previously raised concerns with the way the financing mix for WestConnex is being determined without input from the wider community. We have, however, confined our recommendations in this submission to operational traffic management issues since financing issues are not included in the M4 widening EIS.

Comments and queries

NRMA has outlined in this submission a number of key recommendations for consideration by the NSW Department of Planning & Environment and by the Proponent. We would welcome the opportunity to discuss this submission with the Department and to assist the Department in undertaking its assessment.

Should you require any further information about this submission, please contact Mr Mark Wolstenholme, Senior Policy Adviser - Traffic & Safer Roads on 02 8741 6000.

Making WestConnex work for traffic

Making the road work for traffic

The fundamental issues for the WestConnex project are how well it will work for traffic and how well it will be perceived by users and the wider community. If the road does not work as expected, if it is not seen as representing value for money, and if it is not supported by users, then the anticipated benefits to local communities will not be achieved.

Currently large sections of the M4 motorway fail just when we need them most – during peak times. Widening the motorway will help to make a positive difference to these long suffering road users.

The challenge is to make sure the benefits of upgrading the M4 motorway, such as higher traffic throughput, quicker and more reliable travel times and improved road safety, continue into the future. This is imperative if the expected improvements to local amenity and urban regeneration are to be achieved and maintained.

To do this the motorway must be designed and operated to work for traffic. NRMA's 2014 report "WestConnex: Getting it Right" highlighted a number of important ways to keep traffic moving, reduce the numbers of incidents such as crashes and breakdowns, and also new ways to manage these incidents when they do occur. A copy of NRMA's report is included in Appendix A to this submission.

The planning approval process for motorway projects understandably has a large focus on those issues affecting local communities along the route, such as noise, air quality and traffic management during construction.

However, as outlined in NRMA's WestConnex report, the strategic operational traffic management issues are critical to the success of a project and ultimately they impact on the journeys of millions of users of the motorway. Assessing the traffic and road safety operational issues requires a special mix of traffic and motorway management skills, road safety skills and experience in dealing with private toll road operators on these issues.

In 2011 NRMA published its Decongestion Strategy highlighting the critical role that motorways play and highlighting how traffic on Sydney's motorways remains largely unmanaged, apart from the traditional incident response such as crashes and breakdowns.

Unfortunately, neither of the subsequent M2 or M5 west motorway widening projects in Sydney embraced the managed motorway concepts, or even the basic concepts, such as providing motorists with travel time information prior to making the decision to access the motorway.

We were disappointed that the other recommendations we made to improve traffic and safety on these projects, such as profiled (raised) line markings, and 21st Century colour / picture electronic variable message signs in place of 20th Century amber text technology were not adopted.

Any attempt to retrofit widened on-ramps to these motorways to facilitate ramp signals in the future will be that much more costly and difficult whilst dealing with increased traffic volumes, and will cause additional disruption for motorists. Whilst users of Melbourne's motorways will benefit from every motorway being actively managed within the next five years, there is no such commitment in Sydney.

Whilst the Stage 1a project will now incorporate colour / picture VMS, along with widened ramps to enable ramp signals to be installed in the future, it is unclear why there is seemingly no timeline or funding as part of the Stage 1a project for implementing all the necessary associated Intelligent Transport System technology to enable it to be actively managed like the Melbourne motorways, in particular the freeway management system including the ramp signals.

NRMA continues to advocate for a network approach to managing motorways, instead of each motorway being managed as isolated links and the EIS does not provide any insight as to how the Roads & Maritime Services proposals for actively managing the M4 to the west of Parramatta will integrate with an unmanaged widened M4 motorway to the east of Parramatta.

Summary of Recommendations by NRMA

We submit NRMA's "WestConnex: Getting it right" report and its four recommendations as part of our submission to the WestConnex Stage 1a Environmental Impact Statement (EIS).

The four recommendations are:

1. **New ways to keep WestConnex moving**
2. **New ways to minimise crashes and breakdowns**
3. **New ways to manage incidents and their impacts**
4. **Celebrate tunnel [road] infrastructure**

RECOMMENDATION 5 - Traffic modelling
That any proposed changes to the number and / or type of traffic lanes on roads around the M4 motorway, such as Parramatta Road, are included in the EIS.

It is unclear from the traffic modelling what road network assumptions have been included in the traffic model, for example, how many lanes will be available for general traffic on Parramatta Road.

Given this, it is difficult to gauge from the information provided in the EIS just how well the project will work, as the full scope of work for the WestConnex project has not been outlined.

RECOMMENDATION 6 – Road safety comments
NRMA's own published reviews of crashes on the M4 motorway highlights the high number of crashes that occur at on and off ramps on the motorway. Our review recommended a variety of ways to address this through improved signs and line markings. This does not appear to be reflected in the crash analysis undertaken for the EIS which appears to indicate instead that the majority of crashes occur away from intersections. NRMA also expects that the implementation of a managed motorway scheme will have positive implications for road safety into the future.

RECOMMENDATION 7 – That the Proponent routinely display current travel time information to motorists prior to entering the M4 to enable motorists to make informed decisions as to whether to access the motorway and pay a toll.

RECOMMENDATION 8 – That the Proponent be required to publish detailed crash and breakdown data, along with traffic volume data, quarterly.

This recommendation would help NRMA and the community to gauge how well the project is working, to gauge the effectiveness of road safety treatments, and to make comparisons with other motorways. It will be very useful information for input into future road projects.

RECOMMENDATION 9 – Resolve the issue of incident responders having to pay tolls on the M4 whilst responding to incidents on the M4 and whilst travelling to incidents on other key routes

As demonstrated by **Recommendation 3 in NRMA's 'WestConnex: Getting it right' report,** NRMA is a key incident responder on the M4 motorway. Over the last ten years NRMA has responded to over 40,000 stranded motorists on the M4.

As such, NRMA is acutely aware of the risks associated with working and travelling on motorways. Whilst traffic models tend to assume that all drivers behave appropriately, in reality, no two drivers are the same. Drivers experience varying levels of stress, tiredness and fatigue, they may have varying levels of driving experience, and may be either familiar or unfamiliar with driving on motorways or the M4.

The EIS acknowledges that "even minor incidents on a congested road network can have an immediate and serious impact on travel times".

We expect the volume of breakdown incidents on the M4 will increase as traffic volumes increase. This has the potential to impact on congestion and safety as well as on toll road revenue for the toll road operator.

NRMA's WestConnex report highlights how even a vehicle stopped in a breakdown lane can reduce the carrying capacity of a road by 250 vehicles per hour as motorists slow when they drive past.

Reintroducing a toll on the M4 motorway will again mean that NRMA and other major incident responders such as the Transport Management Centre, Roads & Maritime Services and the emergency services will again be required to pay tolls, increasing the costs to the NSW taxpayer and to the NRMA. As incident responders play a critical role in keeping traffic moving, we urge the NSW Government to address this anomaly.

The following recommendations relate to the safety of cyclists, road workers, incident responders, motorists who have broken down.

RECOMMENDATION 10 – That the Proponent install a continuous line of profiled line marking [raised markings] as an edge line to delineate the traffic lanes from the road shoulder and provide both a visual and audible alert to any motorist deviating from the carriageway. This will improve safety for anyone using the road shoulder, such as broken down vehicles, cyclists, or maintenance workers, and will improve delineation, particularly at night and in wet weather.

RECOMMENDATION 11 – That the Proponent undertake a risk analysis of bicycles using Sydney motorways, including a comparison with the use of urban motorways by cyclists in other Australian States.

RECOMMENDATION 12 – Subject to the outcome of the risk analysis, where bicycles are expected to use the M4 road shoulder, the Proponent must install a minimum one metre wide buffer strip of chevron line markings within the road shoulder, immediately to the left of the carriageway edge line, to enhance the safety of cyclists, incident responders, maintenance workers and the travelling public.

The concept of using buffer zones to protect vulnerable users is well established. On train station platforms a yellow line helps to maintain separation between moving trains and passengers. Recently the NRMA, Bicycle NSW, and the NSW Government have all partnered with the Amy Gillett Foundation to promote the 'metre matters' road safety campaign to improve safety for cyclists.

RECOMMENDATION 13 – That the Proponent ensures the motorway shoulder is swept of debris at a minimum interval of once every week.

BACKGROUND TO RECOMMENDATIONS 10 to 13

NRMA is concerned that crashes involving cyclists on motorways typically result in deaths or serious injuries. In early January 2009, a cyclist was killed and one of his training partners incurred severe head injuries after being hit by a truck on the M7.[i] In April 2010, a cyclist was killed and three riders injured after being hit by a truck when riding in the breakdown lane on the M4.[ii]

NSW is the only State in Australia to permit bicycles to use the road shoulder on toll roads, however, no specific enhancements have been adopted to protect cyclists using the road shoulder, other than at on and off-ramps. A 2.5m wide road shoulder does not offer much protection for anyone within the shoulder if a motor vehicle potentially travelling at 110km/h for whatever reason was to veer into the shoulder.

Other States, such as Victoria, and other countries around the world, such as the UK, require motorways and toll roads to utilise profiled edge lines to provide both an audible and visual warning to any motorists drifting into the road shoulder. This protection is provided even though cyclists are not permitted to use the road shoulder in these States and countries. In NSW, cyclists, maintenance workers and any other persons who have broken down are often not afforded the protection of a profiled edge line.

The NSW Government State Plan and the RTA Bike Plan commit to encouraging more people to ride bicycles more often and more safely in NSW and to an increase in the number of bicycle trips made in the Greater Sydney region at a local and district level to 5% by 2016. Increasing numbers of cars, trucks, and bicycles using the M5 west are likely to increase the risk of exposure to accidents. NRMA's recommendations seek to manage this risk and improve safety for all road users.

NSW Bike Plan Action Item 3.13 requires the RTA (NSW Centre for Road Safety) to provide information to minimise conflicts between cyclists and high-speed traffic on motorways where breakdown lane cycling is permitted.

NRMA's proposal for a raised profile edge line and buffer strip would help the RTA to comply with this action item by providing road users with both audible and visual information that they are drifting out of their lane, as well as enhancing delineation, particularly in wet weather and at night. There is some precedence already for this type of facility on RMS roads, for example, on the M1 Princes Motorway, to the south of Sydney.

Our proposed buffer zone within the road shoulder would provide separation between cyclists and the traffic lane under normal circumstances. The road shoulder is typically 2.5m wide and the majority of heavy vehicles such as buses, small trucks, semi-trailers and B-double trucks are built to this maximum width (i.e. 2.5m), however, this excludes wing mirrors that usually project 200mm on each side of the vehicle.

Given the volumes of trucks that are projected to use the M4 and given that cyclists are permitted to use the road shoulder, opportunities to widen the road shoulder, even if only on some sections of the Project should be considered.

Even if the shoulder width is not able to be widened, it is important to recognise that a properly designed buffer strip need not necessarily reduce the physical shoulder width available for use by broken down vehicles. This is contrary to the media comments attributed to the RTA in relation to NRMA's submission on the M2 upgrade project - NRMA blasts RTA's 'just say no' policy'[iii].

The example below from Melbourne helps to illustrate NRMA's buffer strip concept

Example of chevron lines observed at Somerville Road, near Gannon Street, Footscray, Victoria. Source Google Maps.

Appendix A - WestConnex: Getting it Right

Westconnex: Getting it right

NRMA's recommendations for:

New ways to keep WestConnex moving
New ways to minimise crashes and breakdowns
New ways to manage crashes and breakdowns
Celebrating tunnel infrastructure

July 2014

About The National Roads & Motorists' Association

The National Roads and Motorists' Association (NRMA) comprises 2.5 million Members in NSW and the ACT. For more than 90 years, NRMA has represented the interests of motorists, delivering better results for our Members by lobbying for better roads, increased road infrastructure funding, new ways to manage congestion and improve safety, fairer licensing for older and younger drivers, better value petrol prices, greener motoring and much more.

Background to this Report

This Report identifies a number of relatively low cost ways to improve the design and operation of WestConnex and particularly its road tunnels.

The design and approval process for road tunnels understandably has a large focus on traffic modelling, fire and life threatening safety issues, and managing construction impacts such as noise and impacts to road users. Within this context, however, new ways to improve traffic flow and road safety have not always been given the attention they deserve.

NRMA strongly believes that WestConnex must learn from past mistakes. The recommendations and ideas in this Report are not meant to be exhaustive, but we believe they can contribute to making a positive difference for road users, and form the basis for generating other ideas.

Comments and Queries

All comments and queries about this report may be directed to:

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Introduction

WestConnex is one of the most important transport infrastructure projects undertaken by the NSW Government in a generation. Not since the construction of the Sydney Harbour Bridge in the 1920s and 1930s has an infrastructure project had such potential to shape and influence Sydney's long term future and economic sustainability.

Just like the Sydney Harbour Bridge, it is crucial that the NSW Government and the WestConnex Delivery Authority ensure that WestConnex is designed to stand the test of time.

At approximately 13 kilometres long, the WestConnex Stage 1 tunnel between the M4 and St Peters will be the longest road tunnel in Australia, three times the size of Sydney's M5 East tunnel.

It is just one of an unprecedented number of proposed new road tunnels to be dug under Sydney. The WestConnex and NorthConnex tunnel projects combined will add an extra 26 kilometres (a 73% increase) to the existing 15 kilometres of major road tunnels. More tunnels are also currently being considered as part of the WestConnex extension to Victoria Road, for the F6 extension and for the Military / Spit Road corridor on the North Shore.

At 33 kilometres, WestConnex is the largest of a group of toll road projects proposed by the NSW Government to help keep Sydney moving. Once completed, it will provide important connections between Western and Southern Sydney, Sydney Airport and Port Botany, as well as with the Western Distributor and the North Shore.

It will help to deliver significant economic and social benefits for Sydney through faster and more reliable travel times, helping to relieve chronic congestion problems in Western and South Western Sydney on the M4 and M5 motorways. It will help in overcoming the sharp divisions between the west and east of Sydney, and will help fuse Sydney into a single housing and labour market.

WestConnex will also help to revitalise Parramatta Road, which has suffered from chronic traffic congestion, as well as creating opportunities to revitalise other roads, such as Forest and Stoney Creek roads through Bexley, and sections of the Princes Highway.

Over a number of years, NRMA has strongly advocated for the construction of WestConnex and the other missing links in Sydney's motorway network. Following NRMA's *Seeing Red on Roads* campaign in the lead up to the 2011 NSW State Election and the Australian Automobile Associations (AAA) *Demand Better Roads* campaign during the 2013 Federal Election, the NSW and Australian Governments announced a combined $3.3 billion commitment to allow construction of the first stage of WestConnex to begin in 2015.

NRMA is a strong supporter of WestConnex and welcomed the decision of the NSW and Australian Governments to commit funding towards its development. However, it must be noted that NRMA's support for WestConnex is not unconditional.

NRMA has clearly expressed to the NSW Government that it is crucial that it gets the planning right to ensure that WestConnex delivers value for money for motorists and caters for future growth. It is crucial that WestConnex provides a future proofed and lasting infrastructure solution, and the recommendations contained in this Report are intended to benefit motorists by helping to guide the development of WestConnex and future motorway projects.

Recommendations

Recommendation 1: New ways to keep WestConnex moving

NRMA recommends the NSW Government ensures that the WestConnex motorway is designed to keep traffic moving, both now and into the future.

The challenge, particularly with the WestConnex tunnels, is to get the design right up front, as there are limited opportunities to fix any problems once the motorway is open to traffic.

WestConnex must adopt new thinking in the way it is designed and operated.
The main overriding objective for the WestConnex project must be long term effective traffic management, not lowest cost or revenue maximisation.

This means that WestConnex must:

(a) Have sufficient traffic lanes to cater for foreseeable future demand;

It is crucial that the NSW Government and the WestConnex Delivery Authority ensure that like the Sydney Harbour Bridge, WestConnex is designed to stand the test of time.

With tunnels typically costing four times as much as surface roads, and with motorists paying tolls to travel on WestConnex, it is imperative WestConnex is designed and operated to keep traffic moving both now and into the future.

If the severely congested M5 East tunnel had been built with three lanes instead of two, it reputedly would have added just $100 million to the $800 million cost – a massive difference compared with the current proposal to go back and construct a new tunnel.

(b) Be actively managed like the Monash Freeway in Melbourne, to minimise congestion and ensure that high traffic flows and travel time reliability can be maintained;

The days of pumping more traffic into a motorway system to join the back of a queue of stationary traffic are over. Allowing motorways to operate like car parks in peak periods just when we need them most should no longer be an option.

NRMA's Decongestion Strategy[iv] revealed how the Victorian roads agency, VicRoads, has led the world in the development of motorway management systems. Sydney motorists continue to suffer from the 'business as usual' approach to managing motorways – neither of the recent upgrades to the M2 or the M5 motorways have embraced these systems.

In contrast, these motorway management systems will be operating on every freeway in Melbourne within the next five years, consistently maintaining high traffic flows in peak periods and enabling these critically important roads to be operated as a network, instead of as isolated links.

NRMA continues to have concerns that the 'in-house' system being considered by Transport for NSW for WestConnex will not perform as well as the tried and tested Melbourne system. Motorists paying to use WestConnex should have the best motorway management system.

(c) Ensure that entry and exit ramps and merge points are designed and operated to minimise motorway disruption and enhance safety;

WestConnex needs to make it easier and safer for motorists to merge with the main tunnel by extending the merging area within the tunnel on-ramps. This should be coupled with improved warning signs, road markings, and tunnel lighting to make it obvious where the merge takes place for both merging traffic and for traffic already in the main tunnel.

A previous NRMA report has revealed that two thirds (66%) of crashes on Sydney's motorways may be attributed to merge related issues[v].

In stark contrast to travelling in tunnels, motorists travelling on surface motorways can usually see traffic about to join the motorway as it travels along the entry ramp. In response, motorists both on the ramp and those already on the motorway are able to adjust their speed and the gap between their vehicle and any vehicle in front.

In tunnels, however, traffic often appears from behind a tunnel wall to merge with very little warning. This has clear implications for both traffic flow and road safety, but in spite of this, tunnel on-ramps continue to be designed in the same way as surface motorways, with the same amount of distance provided for traffic to travel parallel to each other before merging[vi].

(d) Avoid right hand on-ramps (such as the Cross City Tunnel to Eastern Distributor southbound ramp). Right to left merges are very difficult for drivers, particularly for truck drivers, resulting in both congestion and road safety issues;

(e) Avoid right hand off-ramps (such as the M5 East city bound off-ramp to Bexley Road). These contribute to congestion and impact on safety as they require slower vehicles to travel in the right hand lane to access the off-ramp. The M5 East issue is exacerbated by the left to right weave across the motorway resulting from traffic entering the M5 East at King Georges Road to exit at Bexley Road;

(f) Consider the implications for traffic flow when choosing locations for speed cameras; Motorists braking at speed cameras can cause 'shock-waves' to travel back (or forward) along the tunnel, causing congestion and increasing the potential for rear end crashes by requiring other motorists to also brake);

(g) Avoid steep uphill and downhill gradients as these can cause traffic to travel at different speeds, disrupting traffic flow. Grades can also contribute to the formation of shockwaves where the disruption travels forwards or backwards along a motorway causing traffic to grind to a halt for no apparent reason.

Without a real horizon to guide motorists in tunnels, both uphill and downhill grades can be difficult for motorists to perceive. Opportunities should be explored to orientate tunnel wall panels or use patterns on these panels to help illustrate when the road is going up or downhill.

Recommendation 2: New ways to minimise crashes and breakdowns

The main WestConnex tunnel will stretch over 13 kilometres from the end of the M4 motorway to the Princes Highway at St Peters. It will be the longest road tunnel in Australia, three times longer than Sydney's longest existing tunnel - the M5 East. Driving through WestConnex will be a new experience for Sydney's motorists. With mistakes by motorists contributing to 95 per cent of crashes, the challenge is to make it a good experience.

Whilst Sydney's existing road tunnels generally have a reasonable safety record, the longer the tunnel, the greater the likelihood of an incident, such as a crash or breakdown somewhere in the tunnel. NRMA's studies also show that the busier Sydney's motorways get, the more crashes occur.

When a big incident occurs on a surface motorway, like the M4, traffic is generally allowed to continue along the motorway and leave at the last exit prior to the incident. However, when these types of incidents occur in tunnels, the whole tunnel is closed and traffic on the surrounding surface streets and adjacent motorways slows to a crawl. WestConnex must be designed to minimise the number of crashes and breakdowns.

This means WestConnex must:

(a) Have the world's best systems and designs to stop over-height vehicles, and vehicles carrying dangerous goods from attempting to enter the tunnels. These include heavy vehicle diversion lanes, pull over bays, and active systems, for example, the ability to broadcast safety messages to warn drivers approaching the tunnel;

(b) Use innovative lighting and design to guide drivers safely through the tunnel, to keep drivers alert, and to reduce fatigue and tiredness;

The design of tunnels can positively or negatively influence driver's feelings and actions including stress, panic and speed.

Tunnels can be monotonous for drivers due to their form (e.g. few intersections, one way flow). Fatigue or tiredness in drivers in tunnels is more prevalent. Truck drivers can experience these effects more than drivers of other vehicles due to the large distances involved whilst in transit.

Whilst drivers must not be unduly distracted by tunnel designs, there is the potential for different lighting colours and images to be projected to guide drivers, maintain interest and reduce fatigue. Potentially lighting could also be tailored to different times of the day.

Lighting could also be used to highlight the location and radius (tightness) of curves, green and red lighting could be used to alternately reinforce to motorists when an off-ramp is open or closed.

New forms of lighting are being used in Scandinavian tunnels, and the 'Vivid Sydney' festival[vii] has provided a flavour of what can be achieved with modern lighting. Some examples from overseas tunnels are provided later in this report.

(c) Avoid locating drainage pits along the wheel path of driver's vehicles; Observations by NRMA from the M5 East 'Cooks River' Tunnel in Sydney reveal that drivers appear to be uncomfortable travelling across these pits located in the right hand lane, causing some drivers to shift their vehicle position to the left to avoid the uneven ride across the pits. This places their vehicle much closer to vehicles in the adjacent lane, with consequent implications for traffic flow and road safety;

(d) Reduce the mass of signs facing drivers as they approach tunnels; At 200 metres out from the tunnel, motorists are preparing and lining themselves up for entering the tunnel. They are generally not focused on signs, other than looking for speed limit signs, and are unable to read and respond to the existing mass of signs;

For example, NRMA has queried why RMS, unlike VicRoads, requires three static signs associated with electronic variable speed limits. Reducing sign clutter was another recommendation from NRMA's Decongestion Strategy[viii].

(e) Give national and international ITS experts and companies the freedom to recommend the systems and devices that should be used on WestConnex. This will help RMS and the TMC to identify and capture innovations;

RMS and the TMC have traditionally specified the devices and systems that should be included on private motorways. This approach can stifle innovation and limit private sector technology experts and providers from specifying what may well be better, or more cost effective technology.

This recommendation will help avoid the situation where RMS and the TMC failed to act on NRMA's previous suggestions and instead specified 20th Century technology on the recent M2 and M5 motorway upgrades.

This led to electronic variable message signs being installed that can only display amber text messages (instead of installing 21st Century signs that can display colour pictures of traffic signs along with text), along with fixed speed limit signs instead of variable speed limit signs.

NRMA has previously highlighted to RMS the benefits of installing picture VMS on the basis that "a picture tells a thousand words", helping motorists to recognise, process and respond quickly to information displayed on these signs. If picture VMS had been installed on the M2 and M5 upgrades it would also have helped road users who find word comprehension difficult, including people for whom English is a second language, have dyslexia, or other literacy deficiencies.

(f) Seek to positively influence driver behaviour by making sure motorists are aware that their actions are being captured on CCTV.

Recommendation 3: New ways to manage incidents and their impacts

Today, the M4 is Sydney's busiest motorway, carrying over 170,000 cars and trucks. More NRMA Members break down on the M4 than on any other road in metropolitan Sydney. Studies show that even a vehicle stopped in a breakdown lane can reduce the carrying capacity of a road by 250 vehicles per hour, as motorists slow when they drive past[ix].

Over the last ten years, NRMA has helped over 40,000 stranded motorists on the M4, coordinated from NRMA's Sydney Operations control centre strategically positioned next to the M4 / WestConnex at North Strathfield. Quickly responding and clearing incidents will be even more important for incident responders when WestConnex becomes operational.

As well as the congestion impacts, the level of safety (including the potential for secondary crashes) is largely dependent on the motorway operators and the people performing rescue services.

NRMA's Decongestion Strategy[x] highlighted how traffic jams on busy motorways can build at the rate of 1.5 kilometres per minute. When something does go wrong on WestConnex it has the potential to quickly create 'gridlock' across Sydney, severely impacting on people's lives and on businesses.

To help address this, NRMA has identified a number of ways to better manage these incidents and their impacts when they do occur.

This means that WestConnex must:

(a) Include rigorous and detailed analysis about how traffic will be managed efficiently and how incidents will be minimised. This information should be made public in the same way that Environmental Impact Assessment information is made public;

(b) Ensure the detour routes maintain sufficient capacity to cater for the high traffic volumes that will be diverted to the surrounding streets, whenever WestConnex is closed. For example, new bus lanes proposed on Parramatta Road will need to be suspended during major incidents;

(c) Ensure the lane widths on detour routes are wide enough to safely cater for large trucks, including petrol tankers that are not permitted in the tunnels, so as to avoid conflict with other vehicles and vulnerable road users, such as cyclists and pedestrians;

(d) Be designed to minimise the number of times it is closed for maintenance;

NRMA's Decongestion Strategy revealed that the M5 East motorway was closed 72 times for planned maintenance and 45 times for unscheduled maintenance between July 2009 and July 2010[xi].

(e) Be designed to enable incident responders to deliver rapid response during traffic incidents such as crashes and breakdowns; For example, incident response vehicles, including heavy tow trucks, must be strategically positioned at either end of the tunnels and at key entry and exit points;

(f) Take a network wide approach to clearing incidents by enlisting help from private WestConnex incident response teams to quickly clear traffic incidents both upstream and downstream from the WestConnex entry and exit points;

Whilst these locations are outside the traditional 'lease' area controlled by private motorway operators, it would make sense to involving the WestConnex operators in the incident response on these roads, given the proximity and potential to cause congestion on WestConnex, added costs for motorists, and the impact on toll revenue for the operator. It would also help to avoid any delays in the Transport Management Centre responding to incidents.

For example, under this proposal, incident response crews based at the existing M5 East control centre overlooking Marsh Street would be able to respond to crashes and breakdowns on Marsh Street, or in the airport tunnel, both of which are outside the current lease area but directly affect traffic travelling to and from the M5 East.

(g) Resolve the perverse situation where key incident responders, such as the Transport Management Centre (TMC), Roads & Maritime Services, NRMA and the emergency services, are required to pay tolls in order to keep Sydney moving;

As an example, today on the M5 motorway and adjacent roads, the NRMA, along with the TMC and emergency services help to keep Sydney moving by providing 24/7 response to traffic incidents. In spite of this, each of these organisations (other than emergency service vehicles displaying flashing blue lights) are required to pay tolls.

Traffic incidents are unplanned events that reduce road capacity. A 2007 Austroads report showed how they "can have significant impacts on roadway system operations, and hence road users and the community. Within major urban areas, incidents are a major contributor to traffic congestion" [xii].

NRMA has previously highlighted the issue of incident responders paying tolls with Transport for NSW and the TMC. Unfortunately the opportunity to resolve this issue was not taken during the contract negotiations for the recent M2 and M5 motorway upgrades. This issue must be addressed.

(h) Provide travel time information to motorists, along with much greater access to CCTV camera images and ensure that motorists are aware that their driving behaviour is being observed whilst travelling on WestConnex.

Recommendation 4: Celebrate Tunnel Infrastructure

Sydney's bridges, such as the Harbour and Anzac Bridges, are celebrated as iconic structures and engineering marvels.

By their nature, tunnels are hidden away from view, but this should not mean tunnels and their facades can be ignored. NRMA believes that there are real opportunities to improve motorist's experiences in road tunnels and to celebrate tunnel infrastructure.

The following examples from around the world reveal what is possible for WestConnex.

Image 1.1 – Image of the Södra länken motorway, Stockholm, Sweden

Image 1.2 – Image of a private car park tunnel, London, United Kingdom[xiii]

Image 1.3 – Image of a private car park tunnel, London, United Kingdom[xiv]

Image 1.4 – Example of traditional tunnel lighting Lane Cove Tunnel, Sydney, Australia[xv]

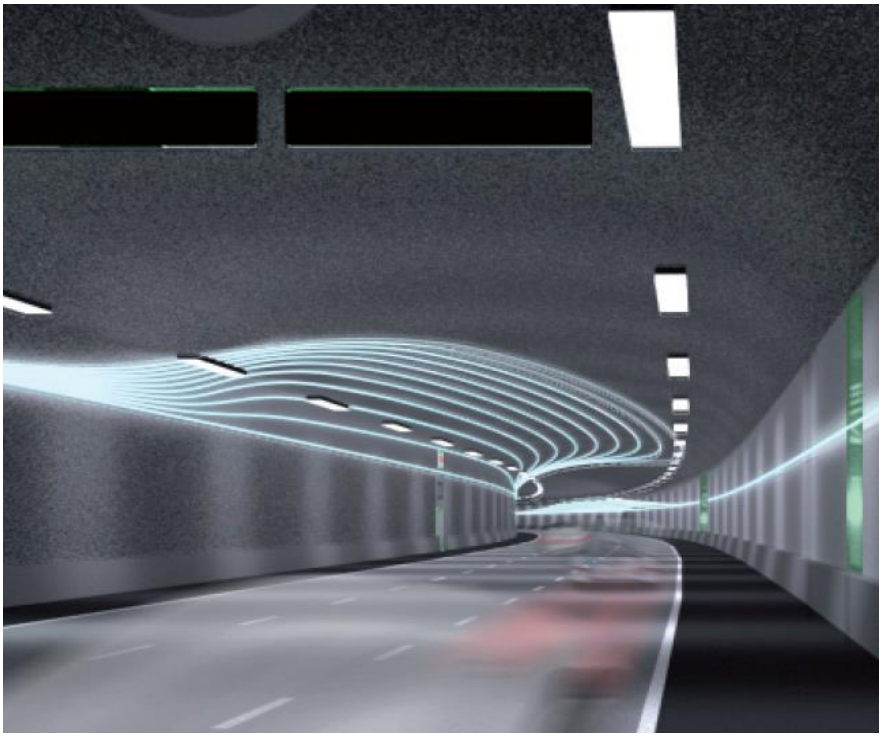

Image 1.5 – Concept design from the Stockholm bypass project (a new 21kilometres motorway with 18 kilometres of tunnels), Stockholm, Sweden[xvi]

Supporting Information

WestConnex is one of the largest road infrastructure projects ever undertaken in Australia. Not since the construction of the Sydney Harbour Bridge has a single infrastructure project had the capacity to influence the long term future and prosperity of Sydney. WestConnex is the next step in providing a truly connected motorway network in Sydney.

Based on figures provided by the NSW Government in the *NSW Long Term Transport Master Plan* Sydney's population is expected to grow from 4.3 million to around 5.6 million by 2031[xvii], with a majority of this growth occurring in the North West and South West Growth Centres. It is estimated by the NSW Department of Planning and Infrastructure that these areas will see a significant increase in population with over 181,000 homes expected to be built over the next 25 to 30 years[xviii].

It is therefore critical that WestConnex is appropriately designed and constructed to ensure the safe and efficient movement of traffic in the long term, having particular regard to the expected future population growth and demand in the North West and South West Growth Centres.

It is arguable that many of the previous road infrastructure projects undertaken in Sydney in recent times have failed to consider a long term vision and have instead focused on the immediate or short term. Failure to anticipate or acknowledge future population growth and demand for road usage in Sydney has led to the construction of major road transport infrastructure projects that have reached capacity shortly after completion, causing lengthy delays and eventually necessitating difficult and expensive upgrades.

The opening of the two lane M5 East in December 2001 provides a good example of a project that failed to adequately address or anticipate future capacity issues due to increased road usage and Sydney's continued population growth. Soon after opening, the M5 East was already operating near capacity and today congestion extends across much of the day.

The M5 East sought to improve access between South Western Sydney, Sydney Airport and Port Botany, and the CBD, and aimed to reduce traffic congestion, improve traffic flow and remove heavy vehicles from local roads. These are not dissimilar to the planned goals for WestConnex.

Currently, 95,000 vehicles per day use the M5 East tunnel, many of these being heavy vehicles[xix]. RMS has stated that congestion on the M5 East negatively impacts on access to Sydney Airport and Port Botany, hurting Sydney's economic productivity and competitiveness[xx].

These statistics support the conclusion that the M5 East, while also partly a victim of its own success, failed to adequately address capacity issues during the planning and design phase. Many lessons have been learnt from the design, public consultation and operation of the M5 East and from the subsequent Cross City and Lane Cove Tunnels, but as NRMA's recommendations in this Report reveal, there are a large number of other issues that also need to be considered for WestConnex.

Designing the WestConnex Stage 1 Tunnel – M4 to St Peters

The longest of the WestConnex tunnels, between the M4 and St Peters, will be 13 kilometers in length, making it the longest road tunnel in Australia, and one of the longest road tunnels in the world. It is therefore important that the tunnel is designed to allow for the efficient movement of traffic and to ensure the number of incidents and closures to the tunnel are minimised.

The main WestConnex tunnel will also be Sydney's longest road tunnel, more than three times the length of M5 East tunnel, which is currently Sydney's longest road tunnel. The graph below provides a comparison of the proposed WestConnex tunnel with other tunnels currently in operation in Sydney.

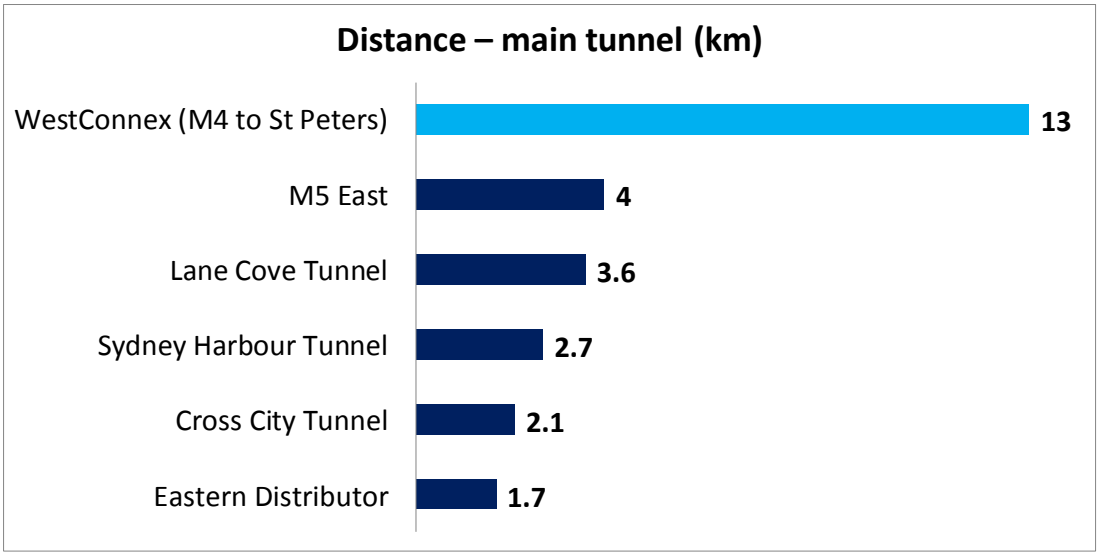

Figure 1.1 – Comparison of WestConnex with other road tunnels in Sydney

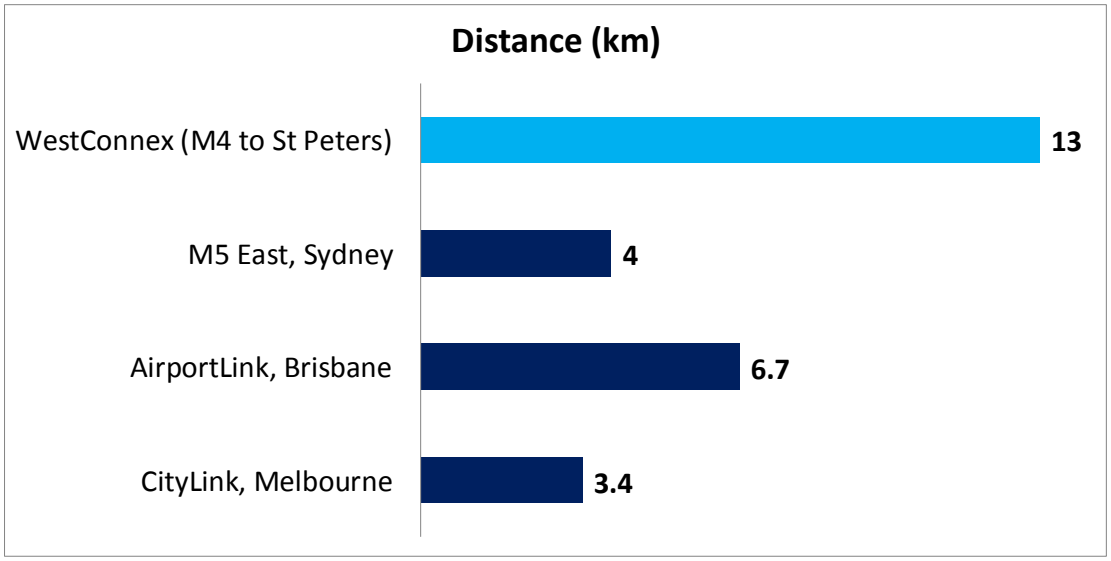

Figure 1.2 – Comparison of WestConnex with other existing road tunnels in Australia

Incorporating the longest road tunnel ever built in Australia, the WestConnex tunnels will require the world's best systems and designs embedded into the project to facilitate the efficient flow of traffic and provide a safe road environment for motorists. Taking the traditional approach to tunnel design and simply replicating the design of previous tunnel projects is unlikely to be sufficient for mega projects like WestConnex.

In constructing WestConnex, it is important that lessons are learnt from previous projects like the M5 East to ensure compromises are not made to critical elements of the design such as on and off ramps. It will also be important to ensure basic errors such as the construction of steep grades and right hand on and off ramps are not repeated in the design of WestConnex.

Incidents involving overheight and heavy vehicles

A key aim of WestConnex is to provide quicker and more reliable trips between Western Sydney, the Sydney Airport and Port Botany to assist freight movements[xxi].

Sydney motorists know all too well the congestion associated with overheight vehicles that illegally attempt to enter the city's major road tunnels. Nearly every month, overheight vehicles are caught on the approach to tunnels, blocking traffic and causing extensive delays. As recently as 14 November 2013, an overheight vehicle caused significant damage to the M5 East tunnel during the morning peak, causing long and frustrating delays for motorists[xxii].

Heavy vehicle drivers travelling through Sydney's other major road tunnels are subject to height restrictions[xxiii]. However many operators of heavy vehicles are either ignorant of these requirements or choose to take risks and simply ignore warning signs placed on the approach to the tunnels.

In an attempt to address this issue, the NSW Government has already signaled its intention to ensure the WestConnex tunnels are constructed higher than existing tunnels, but the WestConnex tunnels will also need to be equipped with advanced technologies and solutions to deter overheight vehicles from entering and potentially damaging the WestConnex tunnel.

The importance of managed motorways

For many years, NRMA has raised concerns about the reluctance of RMS to embrace the concept of managed motorways. A managed motorway approach seeks to use integrated technologies to manage the road network to reduce travel times, improve reliability and increase road safety[xxiv].

In May 2011, NRMA released a comprehensive strategy titled *Decongestion – 10 ways to relieve Sydney's traffic headache*[xxv]*. The Decongestion Strategy* noted that up to 25 per cent more capacity could be achieved from Sydney's existing motorways by simply changing the way they are managed, and by adopting proven technology[xxvi].

NRMA strongly believes that all new or upgraded motorways in NSW should incorporate an electronic freeway management system. Indeed, the ARRB Group has stated that the implementation of such systems 'should be considered whenever a new urban motorway is to be built or upgraded[xxvii]'.

Considering the high costs involved in building Sydney's motorway network, it makes sense to ensure that traffic using the network is properly managed using the latest and most advanced technologies. NRMA is disappointed that RMS failed to incorporate managed motorway principles and new technologies in either the M2 or M5 motorway upgrades. Trying to retrofit the devices and widened ramps will not only be costly, but also difficult to construct now that additional traffic resulting from the widening will need to be contended with.

The failure of RMS to embrace managed motorways for these upgrades is in stark contrast to the approach adopted by VicRoads in upgrading and managing Melbourne's road network. Melbourne's Monash Freeway uses intelligent transport systems such as information, communication and control systems to manage traffic flows, including motorway entry, lane use and driving speeds[xxviii].

VicRoads' adoption of managed motorways has delivered a 50 per cent improvement in travel times and a 50 per cent reduction in crashes on the Monash Freeway[xxix]. Following on from this success,

the intention is for every freeway in Melbourne incorporates the same managed motorway technologies within the next five years. Queensland is now also implementing the Victorian system

NRMA believes that RMS must follow the lead of their counterparts in Melbourne and Brisbane and adopt the managed motorway principles in the design and operation of WestConnex. NRMA continues to have concerns that the 'in-house' system being considered by Transport for NSW for WestConnex will not perform as well as the tried and tested Melbourne system. Motorists paying to use WestConnex should have the best motorway management system.

Managing tunnel closures

The longer the tunnel, the greater the likelihood of unplanned incidents such as a crash or breakdown occurring somewhere in the tunnel. At 13 kilometres and more than three times the length of the current M5 East tunnel, this statement is particularly relevant for the main WestConnex tunnel. It is likely that the entire tunnel will be forced to shut down whenever a serious accident occurs within the tunnel. Therefore any serious incident within any of the WestConnex tunnels is liely to quickly result in traffic gridlock across the Sydney motorway and surrounding road network.

NRMA notes that following the release of NRMA *Decongestion Strategy* in 2011, the NSW Government adopted NRMA's recommendation to clear major road incidents on Sydney roads within 4 hours. This target has been included within *NSW 2021* as a target to help reduce travel times by improving the efficiency of the road network during peak times[xxx]. It is crucial that the Transport Management Centre, the private motorway operators and emergency services meet this critical target when unplanned incidents occur on WestConnex.

To ensure the WestConnex tunnels remain resilient and adaptive in the event of major unplanned incidents, NRMA believes that the NSW Government must continue to pursue new ways to manage incidents. The NSW Police response to the NSW Government adopting the target clearance time has been very successful and has resulted in more crash investigators being sent to major incidents, and to Operation Freeflow where highly visible Police vehicles have been stationed on Sydney's motorways.

This Operation has helped to slash Police response times to motorway incidents on average from 18 to 6 minutes and importantly has helped to change driver behaviour leading to a 25% reduction in the number of crashes.

The overwhelming success of visible policing indicates that it is important to let motorists know that they are being watched whilst travelling on WestConnex and particularly within the tunnels.

NRMa has also recommended elements of the UK's CLEAR initiative[xxxi], such as using 3D laser scanning to quickly gather evidence at crash scenes can also help to reduce delays for road users.

Additionally, it is important that WestConnex is designed to ensure that detour and exit routes for the motorway have sufficient capacity to cater for vehicles that are unable to access the tunnels such as overheight vehicles and B-double petrol tankers. This will be particularly important should a major incident occur within the WestConnex tunnel, as all traffic will be required to these surface detour routes, mixing with petrol tankers and overheight trucks.

In such an event, NRMA believes that proposed bus lanes on Parramatta Road would need to be suspended and opened up to general traffic until the incident or breakdown is cleared by the emergency services and traffic is back to normal.

Innovative design to improve tunnel safety

Driving through lengthy road tunnels can quickly become tedious for motorists, with drivers experiencing greater levels of fatigue and tiredness. Clearly the longer the tunnel, the greater the likelihood of unplanned incidents such as a crash occurring somewhere in the tunnel.

This is particularly relevant for the longest of the WestConnex tunnels. This tunnel will be approximately 13 kilometres in length, double the length of Brisbane's Airport Link road tunnel. Not only will this make it the longest ever built in Australia, but it will also be one of the longest road tunnels built anywhere in the world.

As previously noted, the consequence of a major crash or incident in the WestConnex tunnel has the potential to cause gridlock across Sydney. Therefore it is important that the WestConnex tunnels are designed to minimise the number of unplanned incidents that could potentially close the tunnel for significant periods of time.

Traditionally, Sydney's road tunnels have been designed and constructed with a number of safety features to assist motorists in the event of a major incident. These include emergency broadcasts, electronic message boards, flashing lights to guide motorists to emergency exits, fire extinguishers and emergency phones located at least every 60 metres, and 24 hour CCTV monitoring[xxxii].

While it is expected that these safety features will be included in the design of the WestConnex tunnels, NRMA believes that due to the unprecedented length of the main tunnel, the NSW Government should consider incorporating best practice designs similar to those found in Scandinavian countries to keep drivers alert, and to guide them safely through the tunnel.

Tunnel design in Scandinavia

Some of the longest road tunnels in the world are located in Scandinavia. To help motorists safety navigate these long tunnels, Scandinavian road authorities have incorporated new technology solutions such as the use of innovative lighting displays in their design to make the driving experience safer for motorists.

The Lærdal Tunnel in Norway is 24 kilometres in length and is currently the longest road tunnel in the world, taking approximately 20 minutes to drive the length of the tunnel. Construction of this innovative tunnel commenced in 1995 and it opened to traffic in 2000, before Sydney's M5 East tunnel that opened in 2001, and well before Sydney's subsequent Cross City and Lane Cove Tunnels.

Image 1.6 – Image of the Lærdal Tunnel, Norway

Image 1.7 – Image of the Lærdal Tunnel, Norway

Given the significant length of the Lærdal Tunnel, the Norwegian Public Roads Administration (NPRA) designed the tunnel to ensure that motorists had a pleasant driving experiencing, incorporating new ideas to attempt to break the monotony of the long below ground trip[xxxiii].

Image 1.6 above provides an example of the innovative approach undertaken by the NPRA in designing the Lærdal Tunnel. The tunnel is divided into four sections and includes three 30 metre diameter halls, similar to that of Image 1.6 above.

The NPRA used simulators to determine the best lighting levels to use in the tunnels. As shown by Image 1.7 above, the main tunnel is lit white, with blue and yellow lighting used within the three caves, giving motorists the impression of a sunrise[xxxiv]. The lighting in the caves are meant to break the routine for motorists, providing a refreshing view and allowing drivers to take a short rest from the perceived monotony of the tunnel.

It would not be difficult to incorporate new lighting designs within the WestConnex tunnels to enhance the driving experience for motorists, keeping motorists alert and providing a safer road environment which may assist in reducing the number of accidents within the tunnel.

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