NorthConnex Project (SSI 6136)

Operational Traffic Management Plan

Transport for NSW | April 2020

NSW GOVERNMENT

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1 Introduction and background

1.1 The Condition of Approval

The Operational Traffic Management Plan has been prepared in accordance with the NorthConnex Condition of Approval E27, which reads:

Prior to operation, the Proponent shall prepare and implement an Operational Traffic Management Plan. The Plan shall outline the proposed measures to ensure the satisfactory performance of the SSI during operation. The Plan shall be prepared in consultation with the Transport Management Centre. The Plan shall include, but not necessarily be limited to:

(a) detail of public transport improvements in and around Pennant Hills Road resulting from opportunities provided by the project, prepared in consultation with Transport for NSW;
(b) a description of the tolling strategy for the SSI, with reference to the existing and proposed arrangements for the Sydney motorway network more generally;
(c) details of legally enforceable mechanisms for restricting dangerous goods vehicles from the tunnel; and
(d) details of legally enforceable mechanisms for restricting heavy vehicles from Pennant Hills Road, except where those vehicles are entering or exiting destinations accessible only via Pennant Hills Road or are subject to (c) above.

1.2 Purpose of Document

The purpose of this document is therefore to satisfy the Condition of Approval E27 requirement. It is not intended to be a document outlining the opening logistics for NorthConnex. This will be a separate exercise, prepared in consultation with the Transport Management Centre and Sydney Coordination Office, to facilitate a seamless opening of the NorthConnex as it integrates the connection between the existing M1 Pacific Motorway in the north and Hills M2 in the south.

2 Summary of Tunnel Operation

2.1 Overarching Summary of Key Operational Components of NorthConnex

NorthConnex is a nine kilometre tunnel that links the Ml Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills. It comprises twin tunnels around nine kilometres in length with a height clearance of 5.1 metres and a speed limit of 80 km/ h. The carriageway width includes two operational traffic lanes in each direction in the mainline tunnels and a 2.8m wide breakdown lane. There are single traffic lanes on and off ramps to Pennant Hills Road in the north and south.

The main operational centre is located on Pennant Hills Road and adjacent to the Hills M2 and opposite Pennant Hills Golf Course. The main Motorway Control Centre (MCC) and maintenance facilities are located here and are manned 24/7. There are unmanned satellite facilities at Wilson Road (Pennant Hills), Trelawney Street (Thornleigh) and Woonoona Avenue (Wahroonga) sites. In the event of an incident requiring the evacuation of the main control room, there is a back up control room Disaster Recovery Centre (DRS) at the Wilson Road site.

The tunnel has the following key systems.

2.1.1 Electrical (High Voltage and Low Voltage)

The tunnel has dual power feeds at 66,000 volts from an Endeavour transmission substation in Carling ford , which provides a high degree of reliability. There is also a degree of duplication of electrical equipment throughout the seven substations and battery back up of the key safety systems to ensure the tunnel can be safely closed in the unlikely event of a total power loss.

2.1.2 Lighting

The tunnels have an overhead LED lighting system to ensure motorists can safely transition from bright daylight to the darker interior tunnel section. The lights are switched progressively to ensure the most appropriate lighting level is selected for all weather and external conditions. The connections from the tunnel to the approach and exit roads are also lit to ensure a safe transition.

The tunnel has a comprehensive system of emergency lighting, to assist with motorists having to egress from the tunnel in the event of an emergency.

In addition, the tunnel will have in tunnel aesthetic lighting and visual graphic ‘events’ as part of the integrated design of the tunnel. The in tunnel lighting considerations include:

- Tunnel safety – Maintaining operational criteria of all safely features;
- Perception of safety – Maintaining driver recognition of safety features within the tunnel;
- Driver fatigue – Providing interest along the journey and avoiding fatigue due to a repetitive visual environment;
- Driver orientation – Providing awareness of where drivers are in Sydney, or how far along their journey they have travelled; and
- Driver distraction – Adding interest to the experience without compromising road awareness.

2.1.3 Fire Detection and Suppression

As with other tunnels in NSW, a deluge system is installed to discharge large quantities of water over vehicles in the event of a fire. There are also cabinets at 60 metres spacing along the length of the tunnels containing hose reels and fire extinguishers for the use by motorists on small fires.

Whilst most tunnel fires are visually identified by the operators in the motorway control centre using the closed circuit TV (CCTV) system, there is also a dedicated heat detection system in the tunnels which will alarm in the control room and automatically discharge the deluge system. To prevent false-alarm automatic discharge of the deluge, an operator alert is provided and discharge is delayed for a suitable time to allow the operator to check CCTV images and cancel if necessary.

2.1.4 Tunnel Ventilation

There is a longitudinal ventilation system installed in the NorthConnex tunnels which comprise of around 140 roof mounted jet fans to assist to move air to an extraction point towards the end of each major carriageway. At these locations, there is a large building that contains five fans used to extract the air from the tunnel and discharge it to the atmosphere. There are no portal emissions. There are more than 60 air monitoring devices within the tunnel and these provide inputs to the control system to ensure an appropriate level of ventilation is provided.

As the tunnel is comparatively long compared with other NSW tunnels, there are two tunnel support facilities at Wilson Road (Pennant Hills) and Trelawney Street (Thornleigh) that can extract smoke or pull fresh air in the event of an incident.

There are significant controls on ventilation and air quality, which are detailed in other related Conditions of Approval.

2.1.5 Pumps and water treatment plant

There is a single sump near the southern end of the tunnel which captures all water entering the tunnel. From here, it is pumped to a water treatment plant near the Motorway Control Centre, where it is treated prior to being discharged.

2.1.6 Operations and Management Control Systems (OMCS)

A comprehensive control system (OMCS) is provided for the motorway and the control room is continuously manned by trained operators who can take action to manage the circumstances that arise. The OMCS has a number of automatic systems that require no input from the operator (e.g. pumps turning on and off, tunnel lights changing to suit the ambient light conditions, ventilation changes to suit traffic conditions and control tunnel air quality etc.). A suite of dynamic rule-based traffic management plans and pre-determined static plans are configured in the OMCS to allow operators to effect a suitable response to incidents that may occur in the tunnel. In these cases, the operator is prompted to implement a particular plan, which after checking the situation via the CCTV system, they can either implement as prompted or amend the plan to suit the particular situation. The operator can also manually control individual devices as required or isolate faulty devices by placing them out of service.

The MCC and DRS house a dual redundant computer system which provides a high system availability. There are three operator consoles at the MCC which are manned by at least two operators on a 24/7 basis. The control system is highly automated but has operator prompts to ensure the proposed actions are in keeping with what the operator can observe via the surveillance systems. In addition to controlling the tunnel systems and devices, the OMCS also provides a comprehensive reporting system.

2.1.7 Communications systems

The tunnels have a number of communications systems. There are fixed phones in cabinets at 60m spacing along the tunnel and also in cross passages and plant and equipment rooms. There is a comprehensive mobile phone system allowing Telstra and Optus coverage. Optus is the lead carrier. There will be 3G and 4G coverage.

There is a Public Address system and a radio rebroadcast break-in facility to allow the control room operators or emergency services to communicate with motorists in the tunnel.

2.1.8 Signage, surveillance and traffic control devices

There is a comprehensive signage system comprising static and electronic signage on the approaches to and throughout the tunnel as well as various traffic management devices. The electronic signage and traffic control devices allow the implementation of various traffic management plans to suit incidents that occur within the tunnel, from issuing cautions regarding an incident ahead through to a full tunnel closure using the dedicated barriers on the tunnel approaches .

The operators can view the entire tunnel and approaches using the CCTV camera system which has over 700 cameras. Additionally, an Automatic Video Incident Detection (AVID) system utilising the same cameras provides alerts to draw the operators' attention to incidents such as a stopped vehicle, an object on the roadway, or a pedestrian in the tunnel and smoke etc.

The tunnel is restricted to vehicles that are under 5.1m high, with over-height detectors on the approaches that can initiate an automatic tunnel closure and/or trigger alarms for the operators. Dangerous goods placard vehicles are also excluded from NorthConnex (as with other Sydney tunnels) and there is signage on the approaches to warn drivers to detour (further detailed in section below).

2.2 Safety and Emergency Management

The NorthConnex project has given detailed consideration to the safety and emergency management design of the tunnel. The key aspects of the design include:

- A unidirectional, non-contra flow design to avoid the potential for head-on collisions.
- Prohibition of dangerous goods carriage through the project tunnels.
- A higher and wider design than other domestic tunnels, to minimise the potential for vehicle strike and to provide some capacity for vehicle manoeuvrability to avoid in- tunnel incidents.
- An emergency lane and shoulder/ breakdown lane to allow emergency vehicle access or to provide a safe location for vehicle breakdowns away from the main traffic carriageway.
- Fire resistant design and project elements to minimise the risk of fire escalation and to protect project infrastructure until fire suppression and/ or emergency services bring a fire event under control.
- Automatic linear heat and video, smoke detection and alarm systems.
- Closed circuit television monitoring of in-tunnel conditions.
- A public address emergency warning system.
- An automatic and manually-operated deluge system capable of delivering 10 millimetres of water per minute in a minimum 60 metre length of traffic lanes with full coverage for a full kerb to kerb tunnel width.
- Dual supply fire hydrants at 60 metre intervals, with fire hydrant boosters at each tunnel portal.
- Emergency/ fire cabinet points at 60 metre intervals, including dry extinguishers, hydrants/ hoses, power outlets and emergency telephones.

- A tunnel ventilation system capable of limiting the extent of smoke zones within the tunnels, and extracting smoke and tunnel air at high temperature.
- Two vehicular cross passages near the Wilson Road and Trelawney Street sites, to allow for emergency vehicle access.
- Evacuation cross passages located at 120 metre intervals along the main alignment tunnels, and disabled persons egress capability.
- Directional sounding exit signs and illuminated egress exit signs.
- Operational measures to minimise and manage congested traffic conditions, to ensure acceptable in-tunnel air quality and to minimise the risk of congestion related incidents.

The transportation of dangerous goods and hazardous substances will be prohibited through the main alignment tunnels and on and off-ramp tunnels. The project will install static signage on the approaches to the tunnel entrance points to warn drivers carrying dangerous goods and hazardous substances to not enter the tunnel and use the alternative route of Pennant Hills Road.

Heavy vehicles carrying dangerous goods will not be penalised for using Pennant Hills Road. The enforcement cameras installed on the heavy vehicle regulation gantries located on Pennant Hills Road will be capable of identifying vehicles with dangerous goods placards and will exclude them from the enforcement system. Refer to Section 6 for more details.

2.3 Incident Management

NorthConnex tunnel has been designed with a high tunnel clearance to reduce the likelihood of an incident involving over height vehicles. To further minimise the likelihood of an incident associated with over height vehicles within the tunnel, an over height detection system has been included in the project comprising:

- Electronic over height detectors prior to the tunnel portals.
- Vehicle presence detectors.
- Warning signs with lanterns installed that would light up upon detection of an over height vehicle.

Detectors will be installed prior to divergence points to the tunnels to allow over height vehicles to divert to an alternative route. Secondary detectors would also be installed after the divergence point to detect over height vehicles that have not diverted. The detection of over height vehicles would be alarmed to the motorway operator and the nearest camera switched onto the incident monitors so that the operator can control traffic management devices such as moveable physical barrier and portal variable message signs to stop the vehicle from entering the tunnel.

Over Height Detection devices are located on all approaches. The first trigger is prior to the diversion point so the offending vehicle has the option for an alternate route. The second trigger will see the tunnel closed to prevent the offending vehicle from entering. A physical barrier is also in place to protect tunnel infrastructure in case the vehicle does not stop.

2.4 Signage, Surveillance and Traffic Control Devices

Tunnel signage includes an Integrated Speed and Lane Use (ISLUS) sign above each lane, with a single Tunnel Message Sign at approximately 180 metres spacing. The tunnel message sign can display messages to motorists and the ISLUS can:

- Display whether a lane is open with the speed limit;

- Prepare for lane closure with cross flashing;
- Lane closure with a red cross; and
- Indicate merge with an arrow showing direction of merge.

Large variable message signs are located on the tunnel approaches and surrounding roads to alert motorists to the conditions within the tunnel or surrounding road network.

A Ramp Control system, comprising specific traffic control signals, is available for both Pennant Hills Road on ramps to the tunnel. This system can be used to regulate the entry of vehicles into the mainline tunnel so as to maintain a more uniform traffic flow.

Standalone regulatory systems are installed in both carriageways to detect speeding vehicles and large smoky trucks. These systems are separated from the OMCS such that the necessary enforcement actions can be managed by the relevant authorities.

3 Network Integration

3.1 Overview

The NorthConnex tunnels connect to the M1 Pacific Motorway at Wahroonga and the Hill M2 at West Pennant Hills. There are also on and off ramp connections to Pennant Hills Road, near Pearce's corner in the north, and just north of the Hills M2 in the south. The NorthConnex OMCS system is connected to the Transport for NSW Traffic Management Centre (TMC) and provides regular information on how the motorway is performing as well as the status of some of the electronic signage and traffic control devices.

Information is also provided to the Hills M2 motorway. Therefore, if there is an incident in NorthConnex that affects the surrounding surface roads, or vice versa, the communication paths are in place to allow the relevant information to be shared between the various control centres and the appropriate incident response plans to be implemented.

3.2 Systems and process to manage traffic flow in and around the tunnel

The NorthConnex project includes a comprehensive signage system comprised of static and electronic signage on the approaches to and throughout the tunnel, as well as various traffic management devices. The electronic signage and traffic control devices allow the implementation of various traffic management plans to suit various operational scenarios that may occur within the tunnel, from issuing cautions regarding an incident ahead through to a full tunnel closure using the dedicated barriers on the tunnel approaches. The operators can view the entire tunnel and approaches using the CCTV camera system which has more than 700 cameras. Additionally, an Automatic Video Incident Detection (AVID) system utilising the same cameras provides alerts to draw the operators' attention to incidents such as stopped vehicles, object on roadway, pedestrian in tunnel etc. Large variable message signs are located on the tunnel approaches and surrounding roads to alert motorists to the conditions within the tunnel or surrounding road network.

A suite of dynamic rule-based traffic management plans and pre-determined static plans are configured in the Operation and Maintenance Control System (OMCS) to allow operators to effect a suitable response to the various operational scenarios that may occur in the tunnel. In these cases, the operator is prompted to implement a particular plan, which after checking the situation via the CCTV system, they can either implement as prompted or amend the plan to suit the particular situation. The operator can also manually control individual devices as required or isolate devices that are faulty by placing them out of service.

The NorthConnex OMCS will be connected to the Transport for NSW Traffic Management Centre (TMC) and will provide regular information on how the motorway is performing as well as the status of some of the electronic signage and traffic control devices. These communication paths are in place to allow the relevant information to be shared between the various control centres and the appropriate plans to be implemented in the event of an incident.

Incident response plans will support incident responses for:

- Local area responses, which address the immediate safety issues on the carriageway in the local area surrounding the incident location, such as lane use control, driver advisory sign control and integrated speed and lane use signs (ISLUS).
- Tactical responses, which address the re-routing of traffic around the incident.
- Location and reducing speed limits to slow traffic arriving at the incident location.

- Strategic responses, which address the wide area issues of the Incident and discourage new traffic from coming into the incident location.

A Ramp Control system, comprising specific traffic control signals, is available for both on ramps to the tunnel. This system can be used to regulate the entry of cars into the mainline tunnel so as to maintain a more uniform traffic flow.

4 Tolling Strategy

The $3 billion NorthConnex project is based on an unsolicited proposal from Transurban and the Westlink M7 Shareholders to construct, operate and maintain the tunnel. The project was initiated via an unsolicited proposal from Transurban and its sponsors, and is being managed as a public private partnership (PPP). The project is financed by both Transurban and Government. The proposed toll on the NorthConnex tunnel will align with the existing toll on the Hills M2 Motorway.

The provision of a toll on the project supports the user pays concept based on the full life cycle costs of providing the goods. Whilst the upfront capital costs have been provided by a combination of private funding and a contribution from the NSW and Australian Governments, this funding will be recouped through a toll to cover the upfront construction, and ongoing operation and maintenance costs.

The NorthConnex toll is a single trip/toll collection point arrangement (as opposed to distance based tolling). There will be four NorthConnex toll collection points. These points are located at the southern interchange entering/exiting the tunnel from/to the Hills M2 Motorway and to/from Pennant Hills Road. Each trip is recorded by sophisticated roadside equipment housed in a gantry and processed through a state-of-the-art back-office tolling system. The electronic tolling system requires each user to maintain a vehicle registered tolling transponder (tag) to enable the trip to be processed (although technology is being developed where a tag is not required). Penalty infringement notices will be issued to those users who use the tunnel without a valid tolling account registered to their vehicle.

Toll prices will increase in line with the proposed concession agreement with the Government. The concession agreement for the tunnel will continue to 2048.

The effect of motorway tolls on motorists' behaviour and desire to use the NorthConnex tunnel have been taken into account as part of the traffic forecasts conducted for the project. Human choices are simulated in the model for different combinations of attributes. For example, a freight vehicle driver with a priority delivery is likely to choose the quickest route regardless of distance or tolls; whereas a retiree visiting friends may choose the shortest route and avoid toll roads. The model then assigns trips across the road network based on a calibrated assessment of:

- 'Value of time' (individual's perception of the value they put against their time for a particular journey).
- Vehicle operating costs.
- Tolls.
- Assessment of journey time (which takes account of distance, intersections and their performance, congestion and average speed for that time and day).

This is a tried and tested approach which the level of confidence of the accuracy of the model can be validated by current and historic observations of actual conditions. For NorthConnex, the toll has been determined based on an alignment with Hills M2 Motorway and the tunnels forecast traffic, capital, operation and maintenance costs, the concession period and government funding contribution.

These traffic forecasts have underpinned the assessments presented in the Environmental Impact Statement. The benefits of the project for heavy vehicle freight (Class 2 Heavy Vehicles) in terms of travel time savings and reduced vehicle running costs outweighs the cost of the toll.

5 Public Transport

5.1 Introduction

Cardno were engaged relatively early in the project to investigate the current bus performance and any potential opportunities that may arise from the NorthConnex Project. The report was finalised in June 2017 and prepared in consultation with the Easing Sydney's Congestion (ESC) program office, specifically their Bus Priority Infrastructure Program (BPIP). The BPIP was set up as part of the ESC program to review infrastructure and traffic management along important bus corridors in Sydney to improve bus travel speeds, safety, reliability, customer service and accessibility.

The Pennant Hills Road corridor was analysed against the BPIP performance objectives and targets, which include:

- Achieve on time running for 95 per cent of bus services along the corridor;
- Promote efficient movement of buses along the bus corridor to achieve an average travel speed of
- 25-30km/hr for bus rapid bus routes and 18-25km/hr for suburban bus routes;
- Improve the level of road safety along the bus corridor to reduce the fatality rate to no more than
- 4.3 per 100,000 population by 2016 or a 30 per cent reduction in fatal and serious injuries by 2021;
- Optimise journey time reliability and network efficiency for all traffic, to maintain average journey times for general traffic along the corridor; and
- Improve accessibility to bus services operating along the bus route by ensuring all bus stops meet Transport for New South Wales (TfNSW) standards.

The purpose of the study commissioned was to:

- Provide an evidence based assessment of the bus performance along Pennant Hills Road between the M2 Motorway at Beecroft to the interchange of the M1 Motorway in Wahroonga;
- Identify issues along the corridor that affect bus performance;
- Highlight the opportunities that the NorthConnex tunnel provides; and
- summarise any opportunities for the rest of the corridor.

The report in its entirety can be found in Appendix A.

5.2 Existing Bus Performance

5.2.1 Bus Capacity

Along the corridor, the number of passengers boarding and alighting from buses was highest at the Pennant Hills interchange at Pennant Hills train station, while there was also high usage at stops close to schools, key land uses and at Cardinal Avenue and Aiken Road (West Pennant Hills).

However, there were no issues with bus service capacity, with almost all bus services having over 15 per cent passenger capacity remaining.

5.2.2 Bus Stop Capacity

The assessment identified that there were key issues relating to bus stop capacity along the corridor, which may be having a flow on effect to bus travel times and reliability. The issue of bus stop capacity was mainly prevalent in the south of the corridor between Pennant Hills Interchange and the M2 Motorway (in particular,close to Aiken Road and Cardinal Avenue) with a number of buses arriving at the stop at the same time, blocking the road network.

Bus stop rationalisation was also identified as an issue with bus stop locations either doubling catchment areas or creating large gaps in the catchment area.

5.2.3 Intersection Performance

Intersection performance along the corridor found that both Copeland Road and the Comenarra Parkway/Parkes Street intersections fail in both the AM and PM peak period. Other poor performing intersections include the Hills M2 Motorway and Beecroft Road in the PM peak, and the Pacific Highway in the AM Peak.

5.3 Issues and Opportunities after NorthConnex Opening

5.3.1 Benefits after NorthConnex

NorthConnex will bring many benefits to Pennant Hills Road that will help improve bus performance and reliability along the corridor resulting from the anticipated shift of both heavy and light vehicles from Pennant Hills Road to the tunnel.

A LinSig traffic model was used to assess the performance of the corridor following the opening of the tunnel. The model indicated that heavy vehicle traffic volumes will be reduced by close to 50 per cent following the opening of the tunnel, while light vehicle volumes will be reduced by approximately 30 per cent during the peak periods. This will result in significant time savings along the whole corridor for general traffic, as well as providing improved reliability of bus services.

Most of the intersection along Pennant Hills Road will see improvements as a result of NorthConnex. This is due to the general reduction of traffic travelling northbound and southbound along the corridor. The reduction of traffic on Pennant Hills Road will lead to reduced queues of up to 500 metres at some intersections in the peak periods.

5.3.2 Issues

In total, 194 issues were found along the corridor. Of these issues:

- 79 related to bus stop accessibility;
- 52 involved bus stop or bus service capacity;
- 45 were traffic-related;
- 11 involved obstructions; and
- 7 related to the safety of the corridor.

Of these issues, 20 were identified as having the potential to be resolved following the opening of the NorthConnex tunnel. These improvements related to travel times, speeds, intersection performance, queueing and safety.

For the remaining 174 issues, opportunities resulting from the construction of NorthConnex were identified. For example, following the opening of the tunnel, traffic demands and queues along Pennant Hills Road are expected to decrease, which may result in the optimisation of signalised intersections improving operation, and the introduction of queue jumps which could prove more effective due to smaller queues overall.

5.3.3 Opportunities

There were 158 opportunities were identified to improve bus and traffic performance and safety along the corridor. These opportunities include:

- Providing queue jumps for buses at intersections;
- Timetable changes;

- Signal optimisation;
- Relocation/rationalisation of bus stops;
- Additional bus stops;
- Additional pedestrian crossing facilities;
- Bus stop capacity improvements;
- Provision of signage;
- Relocate/remove obstructions;
- Traffic calming;
- Upgrades to the footpath network; and
- Upgrades to bus stops to meet TfNSW standards.

Green light opportunities

Key intersections where increases in green time will improve bus services were at Cardinal Avenue, Railway Street, Aiken Road, Castle Hill Road and Boundary Road. In addition, bus queue jumps are recommended at Aiken Road and Boundary Road. Bus stop length increases on Pennant Hills Road, south of Cardinal Avenue and Aiken Road are recommended, to accommodate a greater number of buses at one time.

Timetable review

Improved bus travel times along Pennant Hills Road should also be reflected in new timetables along the corridor to reflect actual bus travel times.

Road Safety

Road safety opportunities that arose from this study focus on relocation of bus stops, or increasing bus stop lengths. Traffic calming on driveways leading to retail land uses close to Thompsons Corner may also be required, to reduce pedestrian crashes in this area. Additional crossing locations are also recommended near Pennant Hills Station to mitigate unsafe crossing along the corridor.

Bus queue jumps

Improvements to journey time reliability will come through bus queue jumps on Copeland Road and Aiken Road (northbound), Loch Maree Avenue (northbound), the M1 motorway intersection (both directions) and Beecroft Road (northbound).

In addition to this, signal optimisation should be completed at the Railway Street and Yarrara Road intersections, and the Comenarra Parkway, to filter traffic along Pennant Hills Road and reduce queues for buses and general traffic.

Accessibility to bus services

Opportunities to improve accessibility to bus services are focused on ensuring that the bus stops provided meet TfNSW standards. This includes provision of compliant seating and armrests (where required), lighting, one wheel chair space at each bus stop, and Disability Discrimination Act compliant footpaths along the corridor.

5.4 Summary

The Bus Performance and Opportunities Study Pennant Hills Road (Cardno, June 2017) (Appendix A) provides guidance on potential scope for improvement to bus performance, once NorthConnex opens to traffic.

Introduction of any improvements to the surrounding road network, including bus performance measures, will be assessed 12 months after opening, in accordance with the Condition of Approval E28 Road Network Performance Review Plan. Any requisite improvements to the bus services along Pennant Hills Road will then be guided by the opportunities identified in the Bus Performance and Opportunities Study Pennant Hills Road (Appendix A).

The Bus Performance and Opportunities Study Pennant Hills Road (Cardno, June 2017) did not identify or recommend the inclusion of a specific dedicated bus lane on Pennant Hills Road was required to improve bus service or reliability.

6 Heavy Vehicle Restriction from Pennant Hills Road

6.1 Background

As required in the NorthConnex Project Deed, the Environmental Impact Statement and Planning Approval condition E27(d), Roads and Maritime Services (now referred to as Transport for NSW) will use its “best endeavours” to implement Pennant Hills Road Truck Regulatory Measures to achieve the key project objective of reducing the number of heavy vehicles using Pennant Hills Road.

There are effectively three stages to implementation of the truck regulation on Pennant Hills Road:

1. Legislative
2. Data and systems
3. Enforcement.

Transport for NSW are working closely with the truck and bus industry to ensure they have sufficient information about the regulation and understand what it means for their business.

Updates on each of the above stages are detailed below.

6.2 Legal update

An amendment has been made to the Road Transport Act 2013 to allow for camera technology to be gazetted which will be able to detect and certify vehicle length (previously allowable camera detection only provides for speed, red light, and lane use).

An amendment was drafted and formed part of a Bill called the “Transport Omnibus Bill”. The Act of Amendment passed December 2017, and based on this a regulatory amendment to the Road Rules 2014 was made to enable the enforcement of length and height camera technology.

It is this provision which enables regulation of trucks and buses over a certain length and height to be enforced on Pennant Hills Road. Note, legislation was not passed that was specific to Pennant Hills Road only, and the legislation is also used on other roads in NSW, including Galston Gorge for length and Sydney Harbour Tunnel for height.

6.3 Exempt Vehicles

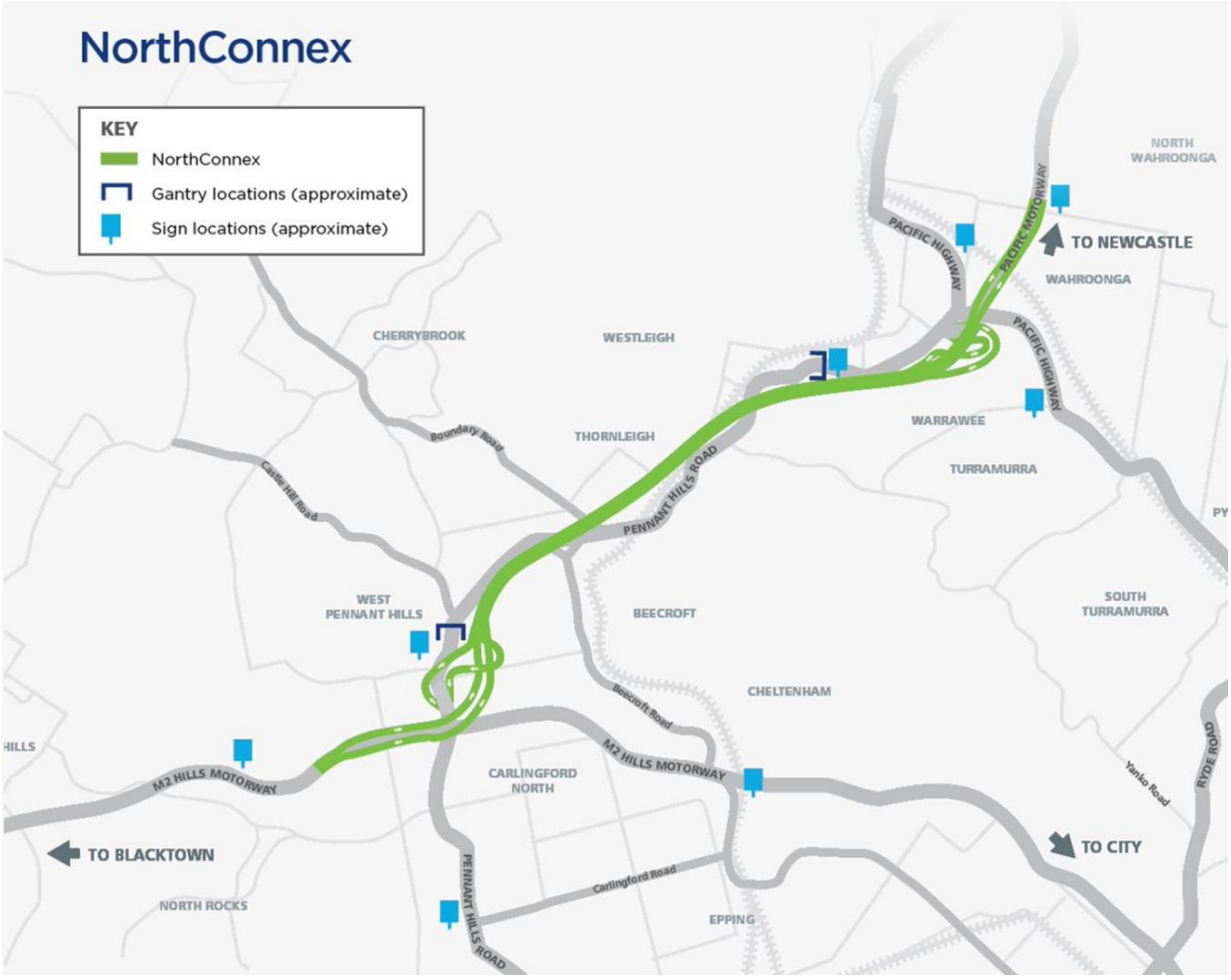
Exempt vehicles on Pennant Hills Road, between the M1 and M2, include:

- trucks or buses 12.5 metres or less in length and trucks or buses 2.8 metres or less in height
- trucks or buses greater than 5.1 metres in height
- those which are not exempt but which have a local destination along Pennant Hills Road
- emergency services vehicles
- buses that operate on a route requiring stops along Pennant Hills Road
- restricted access vehicles (over size, over mass and Class 1 heavy vehicles) and/or vehicles permitted or gazetted to use Pennant Hills Road
- recreational and/or non-commercial vehicles (eg motorhome or car towing a caravan, trailer, boat or horse float)
- vehicles transporting dangerous goods with a placard.

6.3.1 Vehicles Eligible for Enforcement

Apart from the exemptions above, if a truck or bus travels along Pennant Hills Road between the northern and southern gantry locations (north of Dartford Road and Hannah Street, respectively) with the flow of traffic, an image will be taken that will be examined and potentially used for enforcement purposes.

Gantry and Sign Locations



The current fine is $191 (as of February 2020).

This is summarised in the below regulatory sign which will be used for enforcement purposes and placed at decision points approaching Pennant Hills Road between the M1 and M2.

Regulatory sign on approach to Pennant Hills Road

Regulatory sign on Pennant Hills Road

For all other heavy vehicles, they will be required to use the NorthConnex Tunnel, unless they can satisfy one of the following:

- Delivery or pick up destination only accessible by Pennant Hills Road
- Ineligible to travel in tunnel.

6.4 Data and System Requirements

The Transurban Back Office system will process and match the transactions of eligible trucks and buses if such have been detected at the two Pennant Hills Road gantries. The Pennant Hills Road gantries will be equipped with a Kapsch cameras.

This process will determine if the vehicle is an eligible truck or bus based on automatically or manually identifying vehicles via license plates, using classification data to determine that the vehicle is a Heavy Vehicle and exclude over-height vehicles and the times of the detection events to determine that the event meets travel time requirements.

Dangerous goods vehicles will be removed from the list of potential offences by an automated detection system and/or manual validation.

In the event that eligible Heavy Vehicles cannot utilise NorthConnex (due to ramp or tunnel maintenance or other event) then the Transurban Back Office will remove from the list of potential offences any detected offences during that period. This is done using a ‘filtering’ system whereby

times and dates would be used to exclude images from processing and would be from the time the NorthConnex tunnel and entering ramps were not in operation and Pennant Hills Road had to be used.

Once per day a file of filtered potential offences will then be transferred to the Transport for NSW (Camera Enforcement System) back office.

The roadside measurement equipment will consist of the following equipment and located at the two gantry locations on Pennant Hills Road:

- Kapsch camera type VRX shall be used for heavy vehicle detection.
- Kapsch Vehicle Detection and Classification (VDC) sub-system utilising stereoscopic cameras shall measure and classify Heavy Vehicles.

It is proposed not to install tag reader equipment in order to avoid perception that vehicles are being tolled on Pennant Hills Road by eliminating tag beeps.

6.5 Enforcement

Implementation of the legislation through enforcement will be done using the data provided by Project Company (points above).

A daily file of identified potential offenses will be generated by Project Company and sent to Transport for NSW for review and possible enforcement. Transport for NSW is responsible for providing specifications for the interface with their system. Part of the information exchange process will involve a reconciliation of the data provided by the Project Company system, verifying the incidents that are prosecutable.

Transport for NSW will be responsible for any associated development of the system to receive and administer enforcement, including evidential packs etc. Transport for NSW will be responsible for:

- Claims review process;
- Auditing of data;
- Issuing of Enforcement Notices;
- Collecting payment.

7 Summary and Conclusions

The NorthConnex project is based on an unsolicited proposal from Transurban and the Westlink M7 Shareholders to construct, operate and maintain the project. It is being run by NorthConnex Project Company.

NorthConnex is a nine kilometre tunnel that links the Ml Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills. It comprises twin tunnels around nine kilometres in length with a height clearance of 5.1 m and a speed limit of 80 km/ h. The carriageway width includes two operational traffic lanes in each direction in the mainline tunnels and a 2.8m wide breakdown lane. There are single traffic lanes on and off ramps to Pennant Hills road at the north and south.

NorthConnex has been designed to ensure the efficient and safe operation of the tunnel, in accordance with the latest technology and standards.

By its natures, as a connection between two existing Motorways (M1 to the north and M2 to the south) it will become an integrated part of the Motorway network on opening. Close monitoring of traffic light sequencing will be undertaken on opening to ensure the flow of traffic on Pennant Hills Road and at intersections, particularly at Pearces Corner.

Toll prices are aligned with the Hills M2 and will increase in line with the proposed concession agreement with the Governmentuntil 2048.

A report on current bus performance and any potential opportunities that may arise from the NorthConnex Project was undertaken and completed by Cardno in June 2017. Whilst opportunities were identified, the key benefit will be derived from the opening NorthConnex to help improve bus performance and reliability along the corridor resulting from the anticipated shift of both heavy and light vehicles from Pennant Hills Road to the tunnel.

Introduction of any improvements to the surrounding road network, including bus performance measures, will be assessed 12 months after opening, in accordance with the Condition of Approval E28 Road Network Performance Review Plan. The Bus Performance and Opportunities Study Pennant Hills Road (Cardno, June 2017) did not identify or recommend the inclusion of a specific dedicated bus lane on Pennant Hills Road was required to improve bus service or reliability.

An amendment passed December 2017 to the Road Transport Act 2013 to allow for camera technology to be gazetted which will be able to detect and certify vehicle length (previously allowable camera detection only provides for speed, red light, and lane use). Based on this a regulatory amendment to the Road Rules 2014 was made to enable the enforcement of length and height camera technology.

NorthConnex Project Company will use image technology to ascertain length and height of vehicles and if they have travelled with the flow of traffic between specific gantries established on the north and south ends of Pennant Hills Road between the M1 and M2.

A daily incident file will be passed to Transport for NSW for processing of fines.

8 Appendix A - Bus Performance and Opportunities Study