

WestConnex M4 East Project

Peer Review of Traffic & Transport Assessment

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1. Introduction

The full WestConnex project will link Parramatta to Sydney's central business district (CBD), Sydney Airport, the Port Botany precinct and the M5 in south-west Sydney via a 33 kilometre tolled motorway.

The Sydney Motorway Corporation (on behalf of Roads and Maritime Services) proposes to deliver WestConnex in a series of project stages as follows:

- M4 West Widening (M4 Widening) from Parramatta to Homebush.
- M4 East from Homebush to Haberfield.
- New M5 – King Georges Road at Beverly Hills to St Peters.
- King Georges Road Interchange Upgrade.
- M4–M5 Link: Haberfield to St Peters, including the Southern Gateway and Southern Extension.

The M4 East forms part of Stage 1 of the WestConnex project. It involves upgrading and extending the M4 Motorway from Homebush Bay Drive at Homebush to Parramatta Road and City West Link (Wattle Street) at Ashfield / Haberfield.

This report details a review of the traffic and transport impact assessment for the proposed Project and has been prepared by *Samsa Consulting Pty Ltd*, Transport Planning & Traffic Engineering Consultants, for *NSW Department of Planning & Environment (DP&E)* as part of its project assessment process.

1.1 Objectives & Scope of Work

The DP&E requires independent technical advice with respect to the Project's traffic and transport assessment. This review has been carried out to provide the independent technical advice including:

- Review of relevant documents and information including:
 - Traffic and transport assessment within the Environmental Impact Statement (EIS), SSI Application Report, etc.
 - Submissions received from the public and government agencies including local councils and RMS.
 - The Project's Response to Submissions Report including the Preferred Infrastructure Report and/or RMS response, as required.
- Site familiarisation visit of Project area to observe and assess traffic and transport issues generally, determine surrounding road environment, road network conditions, etc.
- Liaison with DP&E staff at Preliminary Review stage, review / response to agency comments and upon completion of review and recommendations.
- Identify additional information or clarification required from the proponent to complete an adequate assessment of the application and the identification of any gaps including specifically the adequacy of survey and modelling methodologies.
- Prepare a Preliminary Review report with specific consideration of the adequacy of the

information provided and whether an assessment of the impacts of the proposal is able to be suitably made.

- Consolidate and finalise Preliminary Review report following DP&E comments / feedback.
- Assess the adequacy and suitability of any mitigation measures proposed and specifically any road network capacity and intersection upgrade measures proposed for parallel routes.
- Develop recommended actions and conditions of approval that could be applied to avoid, minimise, mitigate, and/or manage the residual traffic and transport impacts of the Project.
- Prepare a draft Review Report on the EIS summarising the above and finalise the report following comments / feedback from DP&E.

In undertaking the review, the main document reviewed was AECOM Australia / GHD "*WestConnex M4 East, Environmental Impact Statement (EIS)*", 5/08/2015, which incorporated the AECOM Australia "*Traffic and Transport Assessment*", September 2015. Other documents that were referenced / reviewed include the following:

- AECOM Australia "*WestConnex M4 East, Traffic and Transport Assessment of Design Changes*", December 2015
- AECOM Jacobs "*WestConnex Traffic Analysis: Traffic Patronage Report (Final Report)*", September 2014
- Jacobs "*WestConnex Traffic Study: Value of Travel Time Savings (Final Report)*", July 2014
- Transport NSW "*Road Network Modelling Assumptions Book (Version 1.4)*", 4 July 2013
- Secretary's Environmental Assessment Requirements (SEARs), 16 June 2015
- Submissions received from the general community, government agencies (including Local Councils) and other organisations.
- Sydney Motorway Corporation "*M4 East Submissions Report*", December 2015

1.2 Report Structure

The remainder of this report is presented as follows:

Chapter 2 describes the proposed Project.

Chapter 3 provides a review of the traffic and transport assessment undertaken for the project.

Chapter 4 provides conclusions and recommendations.

2. Project Details

2.1 Background

NSW Roads and Maritime Services (RMS) is the project proponent (*Application No.SSI 6307*). The NSW Government has established the Sydney Motorway Corporation (SMC) to manage delivery of the WestConnex projects. SMC has been established as a public subsidiary corporation of RMS.

The M4 East project has been deemed as State Significant Infrastructure (SSI) and the environmental assessment approval process is under *Part 5.1* of the *EP&A Act*.

2.2 Project Description

The project is generally located in the inner-west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield local government areas (LGAs). The project travels through ten suburbs: Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield.

The project is generally located within the M4 and Parramatta Road corridor, which links Broadway at the southern end of the Sydney central business district (CBD) to Parramatta, about 20 kilometres to the west of the Sydney CBD. This corridor also provides the key link between the Sydney CBD and areas further west of Parramatta (such as Penrith and western NSW).

The western end of the project is located at the interchange between Homebush Bay Drive and the M4 Motorway and would tie in with the M4 Widening project. Tunnels, which form part of the project, would continue east until the intersection of Parramatta Road and Wattle Street at Ashfield / Haberfield.

The project would include interchanges between the tunnels and the above ground road network, along with other surface road works, at the following locations:

- M4 Motorway and Homebush Bay Drive interchange at Sydney Olympic Park and Homebush.
- Powells Creek, near George Street at North Strathfield.
- Queen Street, near Parramatta Road at North Strathfield.
- M4 Motorway and Sydney Street, Concord Road and Parramatta Road interchange at North Strathfield.
- Wattle Street (City West Link), between Parramatta Road and Waratah Street at Haberfield.
- Parramatta Road, between Bland Street and Orpington Street at Ashfield and Haberfield.

The project would comprise the construction and operation of the following key features:

- Widening, realignment and resurfacing of the M4 Motorway between Homebush Bay Drive at Homebush and Underwood Road at Homebush.
- Upgrade of the existing Homebush Bay Drive interchange to connect the western

end of the new tunnels to the existing M4 Motorway and Homebush Bay Drive, while maintaining all current surface connections.

- Two new three-lane tunnels (the mainline tunnels), one eastbound and one westbound, extending from west of Pomeroy Street at Homebush to near Alt Street at Haberfield, where they would terminate (until the completion of the possible future M4–M5 Link project). Each tunnel would be about 5.5 km long and would have a minimum internal height clearance of 5.3 m.
- A new on-ramp from Parramatta Road to the M4 Motorway westbound at Powells Creek, west of George Street at North Strathfield.
- An interchange at Concord Road, North Strathfield / Concord with on-ramps to the eastbound tunnel and off-ramps from the westbound tunnel. Access from the existing M4 Motorway to Concord Road would be maintained via Sydney Street. A new on-ramp would be provided from Concord Road southbound to the existing M4 Motorway westbound, and the existing on-ramp from Concord Road northbound to the existing M4 Motorway westbound would be removed.
- Modification of the intersection of the existing M4 Motorway and Parramatta Road, to remove the left-turn movement from Parramatta Road eastbound to the existing M4 Motorway westbound.
- An interchange at Wattle Street (City West Link) at Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. The project also includes on and off-ramps at this interchange that would provide access to the (future) M4–M5 Link. In addition, the westbound lanes of Wattle Street would be realigned.
- An interchange at Parramatta Road, Ashfield / Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. In addition, the westbound lanes of Parramatta Road would be realigned.
- Installation of tunnel ventilation systems, including ventilation facilities within the existing M4 Motorway road reserve near Underwood Road at North Strathfield (western ventilation facility) and at the corner of Parramatta Road and Wattle Street at Haberfield (eastern ventilation facility). The eastern ventilation facility would serve both the project and the (future) M4–M5 Link. Provision has also been made for a fresh air supply facility at Cintra Park at Concord.
- Associated surface road work on the arterial and local road network, including reconfiguration of lanes, changes to traffic signalling and phasing, and permanent road closures at a small number of local roads.
- Pedestrian and cycle facilities, including the permanent re-routing of part of the existing eastbound cycleway on the northern side of the M4 Motorway from west of Homebush Bay Drive (near Hill Road) to near Pomeroy Street, and a new westbound cycleway on-ramp connection from Queen Street at North Strathfield to the existing M4 Motorway.
- Tunnel support systems and services such as electricity substations, fire pump rooms and tanks, water treatment facilities, and fire and life safety systems including emergency evacuation infrastructure.
- Motorway operations complex on the northern side of the existing M4 Motorway, east of the Homebush Bay Drive interchange.

- Provision of road infrastructure and services to support the future implementation of smart motorway operations.
- Installation of tolling gantries and traffic control systems along the length of the project.
- Provision of new and modified noise walls.

The project does not include work required for reconfiguring Parramatta Road as part of urban revitalisation nor ongoing motorway maintenance activities during operation, which would be subject to separate assessment and approval as appropriate.

The project would not include surveys, test drilling, test excavations, geotechnical investigations, utility adjustments or other tests, surveys, sampling or investigation for the purposes of the design or assessment of the project.

It is proposed that the M4 East project would be complete by the first quarter of 2019, taking approximately three years to build.

The location of the proposed M4 East project is shown in *Figure 2.1* following.

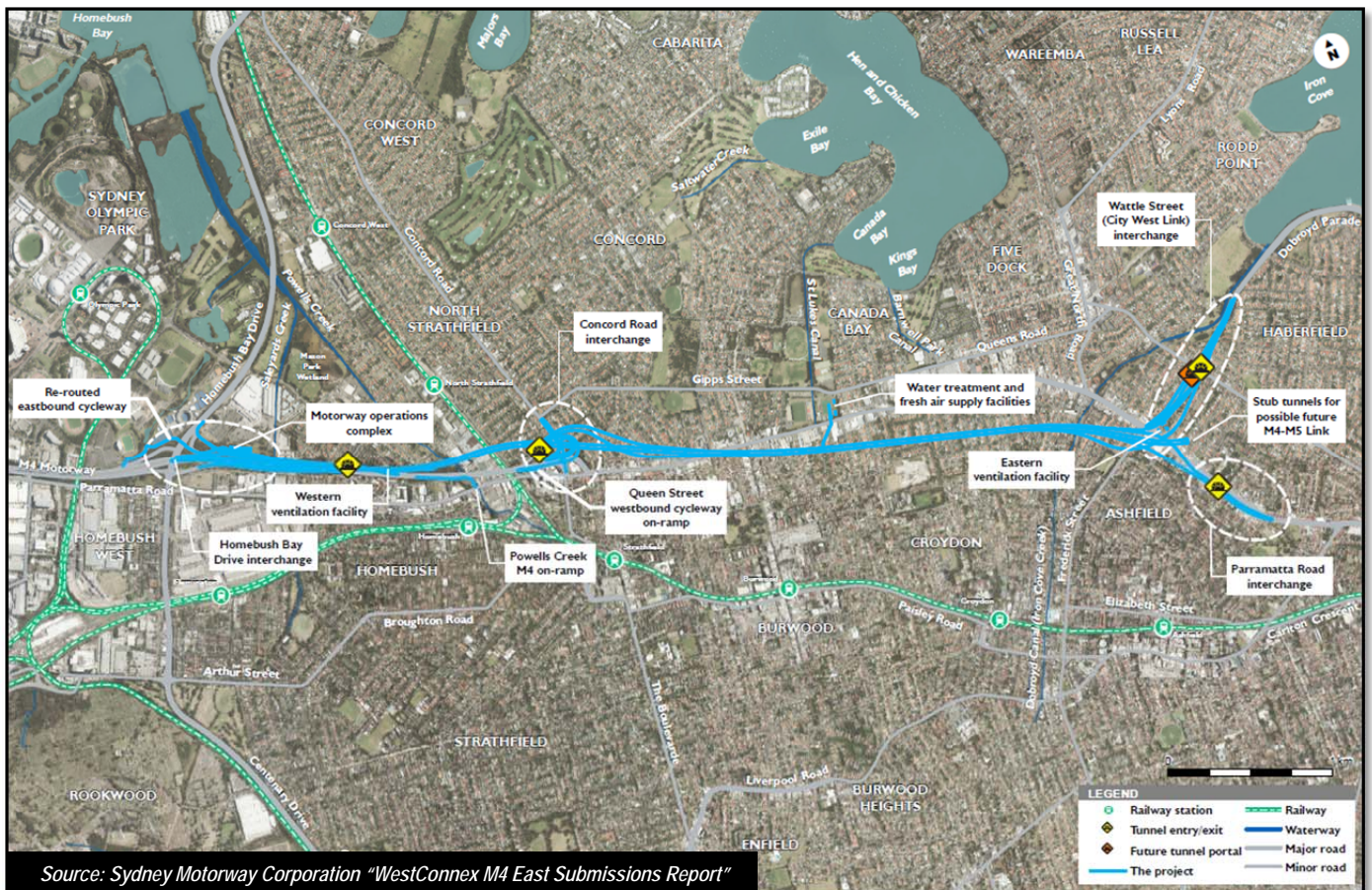


Figure 2.1: Proposed Project Location and Key Features

2.3 Summary of Submissions

A total of 4,903 submissions were received in response to the EIS. This included 4,887 submissions from the public and special interest groups, nine submissions from State government agencies, and seven submissions from local government authorities (councils).

The most common traffic and transport-related issues raised were as follows:

- Justification for the M4 East and full suite of WestConnex projects.
- The adequacy of the traffic modelling including the methodology and sensitivity testing.
- Increase in traffic congestion especially along the parallel Parramatta Road route in the vicinity of Pomeroy Street and George Street in the west and Frederick Street / Dobroyd Parade in the east.
- Traffic impacts on north-south routes across the Project corridor, eg. Frederick Street, Concord Road.
- Impacts to the local / minor road network surrounding the Project areas including 'rat-running' through local streets.
- Public transport alternatives to the M4 East and WestConnex infrastructure.
- Limited improvements to pedestrian and cyclist facilities.
- Crash benefits and road safety issues.
- Cumulative impacts associated with the ultimate development of future WestConnex projects, eg. New M5, M4-M5 Link, etc.
- Construction related issues including heavy vehicle routes, impacts to the local road network, cumulative impacts and construction parking.

2.4 Clarifications and Project Changes

Further assessment and project design development were undertaken by the proponent during the EIS display period and preparation of the Preferred Infrastructure Report. This was undertaken to provide further detail for the project and to address comments received in submissions. The changes to the project related to traffic and transport are as follows:

- **Homebush Bay Drive civil site (C1) expansion** – expand the construction footprint at the Homebush Bay Drive civil site (C1) to the north to allow for utilisation of 300 car parking spaces, reconfiguration of site office, amenities and workshop facilities, and reorientation of other site operations. Light vehicles would have left-in / left-out access via either Homebush Bay Drive southbound or the eastbound M4 Motorway on-ramp. Heavy vehicles would have left-in / left-out access via the eastbound M4 Motorway on-ramp.
- **Homebush Bay Drive interchange** – the configuration of ramps and connections between the M4 Motorway and M4 East at the Homebush Bay Drive interchange is proposed to be modified in order to reduce the size of bridge structures, follow more direct grade lines and provide a more intuitive alignment for drivers entering and exiting at the Homebush Bay Drive interchange.

In the eastbound direction, a new lane for M4 Motorway surface traffic would be provided to the north of the existing traffic lanes, and would travel under a short bridge

structure carrying the M4 East on-ramp from Homebush Bay Drive. The M4 Motorway surface traffic lane would widen to two lanes as it joins with a lane from the Homebush Bay Drive on-ramp.

In the westbound direction, two traffic lanes would be provided for M4 Motorway surface traffic, realigned to the south of the existing traffic lanes. These lanes would continue at grade before merging with the existing M4 Motorway to the east of Homebush Bay Drive.

The westbound off-ramp to Homebush Bay Drive would be realigned to the south and would diverge from the surface M4 Motorway just east of Derowie Avenue. Traffic coming out of the westbound mainline tunnel and choosing to exit at Homebush Bay Drive would use a new exit lane just west of Derowie Avenue, which would travel over Saleyards Creek and then over a second small bridge structure near Flemington Road, after which it would join the surface M4 Motorway to the Homebush Bay Drive off-ramp. The two off-ramps would tie into the existing off-ramp about 250 m east of the signalised intersection with Homebush Bay Drive.

The proposed re-routed cycleway would travel under the Homebush Bay Drive on-ramp via an underpass. The off-road section of the re-routed eastbound cycleway has been shortened, and would connect back into the M4 Motorway shoulder on the eastbound Homebush Bay Drive on-ramp connection to the surface M4 Motorway about 150 m east of the underpass.

- **Wattle Street (City West Link) interchange** – the configuration of the Wattle Street interchange is proposed to be modified to combine the dive and cut and cover structures for both the M4 East ramps and the M4-M5 Link ramps. The M4 East tunnel entry from Wattle Street would be relocated further to the east, so that the on-ramp would be the kerbside lane while Wattle Street would continue in the centre lanes. The dive structure for this on-ramp would start on the southern side of Martin Street.

The Wattle Street westbound lanes would be realigned to the east of their existing alignment, however, they would continue in the centre lanes by travelling over the cut and cover sections of the M4–M5 Link on and off-ramps.

The M4-M5 Link cut and cover structures would start in approximately the same location but would be realigned so that they are positioned between the M4 East on and off-ramps. The on-ramp dive structure would be lengthened, while the off-ramp dive structure would be shortened.

A cul-de-sac would be established at Martin Street abutting the eastern side of the project.

- **Ramsay Street and Martin Street (west) intersection works** – the Ramsay Street / Martin Street intersection would be reopened for all turning movements with 'Give Way / Stop'. In addition, the eastern end of Martin Street (west) would be altered to be left-in only.
- **Temporary closure of Ramsay Street** (south of Wattle Street) may be required, as an alternative construction method to accommodate for the construction of the cut and cover section of the dive structure. Diversion / detour routes are proposed for all travel directions along Ramsay Street and Wattle Street.

- ***Parramatta Road lane reduction*** – during construction it is proposed that the available lane capacity on Parramatta Road between Bland Street and Dalhousie Street would be reduced from three lanes to two lanes. This would impact on both the eastbound and westbound carriageways as they pass the Parramatta Road civil site (C10).

3. Review of Traffic & Transport Assessment

3.1 Secretary's Environmental Assessment Requirements (SEARs)

The Secretary's environmental assessment requirements for the assessment of traffic and transport impacts (SEARs issued by the DP&E) include the following.

- Details of how the following meet the traffic and transport objectives of the project, taking into account adjacent sensitive land uses, future growth areas, approved and proposed infrastructure projects, and traffic (vehicular, cyclist and pedestrian) needs:
 - preferred alignment and design;
 - proposed widening of the M4 Western Motorway between the Pitt Street underpass at Parramatta, and Homebush Bay Drive, Homebush;
 - proposed interchanges and connections to the surrounding road network; and
 - associated road infrastructure facilities.
- An assessment and modelling of operational traffic and transport impacts on the local and regional road network (including Parramatta Road, Queens Road, Gipps Street, and other arterials) and the Sydney motorway network.
- Induced traffic and operational implications for public transport (particularly with respect to strategic bus corridors and bus routes) and consider opportunities to improve public transport patronage.
- Impacts on cyclists and pedestrian access and safety and consideration of opportunities to integrate cycleway and pedestrian elements with surrounding networks;
- Construction traffic and transport impacts of the project (including ancillary facilities) and associated management measures, in particular:
 - impacts to the road network (including safety and level of service, pedestrian and cyclist access, and disruption to public transport services and access to properties);
 - route identification and scheduling of transport movements;
 - number, frequency and size of construction related vehicles (both passenger, commercial and heavy vehicles);
 - nature of existing traffic on construction access routes (including consideration of peak traffic times); and
 - need to close, divert or otherwise reconfigure elements of the road network associated with construction of the project, having reference to the cumulative construction impacts of other infrastructure preparing for or commencing construction.
- Details of how the project meets the objectives of the overall WestConnex Scheme.

The SEARs for the environmental assessment formed the basis of issues considered in the peer review. Issues identified during the peer review are characterised in the following

sections.

Where the proponent has provided relevant responses, these have been included below each identified issue / comment (*in blue italics*). Additional comments on proponent responses are included *[in red and brackets]*.

3.2 Assessment Methodology and Modelling Tasks

In general, the assessment has been undertaken quite thoroughly with an appropriate methodology. This is particularly the case for the modelling tasks, which incorporated an independent peer review in the assessment of the model calibration and validation. This provides a high level of confidence in the outputs and is considered to be an excellent approach to ensure rigorous model results.

The modelling adopted a toll choice diversion model known as a distributed value of time (VOT) multiclass equilibrium assignment model, which is considered suitable for the overall WestConnex planning task. This type of model is appropriate for the overall planning task because it considers toll route choice, which is relevant to the Sydney road network and its tolled road network. The modelling adopted a three stage approach – forecasting, rebasing and operational traffic modelling with an exclusive focus on the study area rather the wider Sydney road network.

Three streams of modelling have been undertaken as part of the whole WestConnex project, known as the WestConnex Road Traffic Model (WRTM). Stream 1 was initially developed for the business case study, Stream 2 was further developed into a full working model (used in the M4 Widening assessment) and Stream 3 was used for operational conditions including the 'do minimum' and 'do something'¹ scenarios in 2021 and 2031 for the M4 East assessment. Additional models were developed for the construction scenario in 2017 when construction impacts were deemed to be greatest.

The model provided outputs for the morning peak hour period, afternoon / evening peak hour period, inter-peak period (six hours) and average weekday traffic. This is considered to be a reasonable approach in reporting traffic operational outputs.

The modelled traffic volume outputs were also reported as a number of north-south screenlines across the project corridor – eastern, central and western screenlines as well as an additional screenline at the eastern portal area. The screenlines are useful in gaining an understanding and comparison of future year volumes and patterns in the project corridor for each modelled scenario, traffic flows along the M4 East mainline and ramps and the level of traffic that would potentially transfer to the project from parallel routes along the surrounding road network.

While the assessment methodology and particularly the modelling tasks are considered to be adequate and appropriate for this study assessment, the following comments are provided:

- The methodology behind induced travel demand has been discussed but further information / explanation is required of precisely how much induced traffic may be generated by the Project.

¹ 'Do minimum' scenario included M4 widening and King Georges Road Interchange Upgrade projects (currently under construction) while the 'do something' scenario included the full suite of WestConnex projects including the M4 East.

Commentary on the magnitude of induced demand is in Section 4 of the Traffic and Transport Report.

[Acceptable response by proponent.]

- It is assumed that there would be no entry toll point for the Powell Street on-ramp because it does not access the M4 East road. If that is the case, vehicles would be able to travel between the Powell Street on-ramp and Homebush Bay Drive without being tolled – please confirm / clarify.

The toll point for vehicles entering the M4 Motorway westbound using the Powells Creek on-ramp is shown on Figure 5-15 of the EIS.

[Acceptable response by proponent.]

- It is unclear whether the M4 Motorway westbound surface traffic would pay a toll exiting onto Homebush Bay Drive – please confirm / clarify.

As part of the WestConnex tolling strategy, a toll collection point would be installed for all vehicles using this section of the M4 Motorway. The toll location is shown on Figure 5.14 of the EIS.

[Acceptable response by proponent.]

- For future year model development for the construction scenario (2017) there were no changes proposed for the access into C4 site off Parramatta Road (west of George Street).

Access would only be permitted via Underwood Road and Powell Street and this is accounted for in the operational traffic modelling.

[Acceptable response by proponent.]

- It is unclear whether future bus operations (eg. bus lanes and other bus priority measures along Parramatta Road) have been considered as part of the model scenarios – please confirm / clarify to what extent bus lanes and other bus priority measures were included as part of the modelling.

Section 4.1.3 in the Traffic and Transport Report provides details of the bus lane provisions that were assessed as part of the operational traffic modelling.

[Acceptable response by proponent. It is noted that the operational traffic modelling for the 2021 'do something' scenario adopted the provision of kerbside bus lanes along Parramatta Road between Burwood Road and Chandos Street (east of Bland Street) with the retention of two through traffic lanes in each direction. For the 2031 'do something' scenario, additional bus lane provision was adopted along Parramatta Road from west of Hume Highway to east of Sloane Street (eastbound), and from west of Norton Street to Hume Highway (westbound).]

- For the traffic survey locations (*Figure 5-9* in the Draft TTA) there were no sites surveyed on Parramatta Road or M4 Motorway west of the M4 East project. It is considered that these should have been included – please clarify whether traffic volumes from these sites were obtained from other secondary data or discuss why these were not required.

Only a selection of Automatic Traffic Count (ATC) locations that were analysed to understand and document traffic patterns on key roads in the study area is shown. Additionally, AM peak and PM peak intersection turning count data was sourced for the 38 modelled intersections shown in Figure 4.4. Further locations west of the project area were modelled in the WestConnex Road Traffic Model (WRTM), which was calibrated to existing traffic count data.

The traffic study area was identified based on the Secretary's Environmental Assessment Requirements (SEARS), and following initial consultations with Roads and Maritime Services based on forecast wider traffic impacts.

[Acceptable response by proponent.]

- In the assessment of screenline analysis (*Section 8.2* in the Draft TTA), there is discussion in relation to the M4 Widening project traffic reducing during the 'do something' scenario (and diverting to Parramatta Road and other parallel routes) due to toll avoidance. However, the 'do minimum' scenario includes the M4 Widening project and its toll, so why is there toll avoidance during the 'do something' scenario but not during the 'do minimum' scenario. Moreover, there is no discussion on why there is toll diversion (avoidance) on the M4 Widening project but not on the M4 East project, which also is tolled, eg. during the 2021 'do something' scenario, there is an increase of traffic along the M4 East from the 'do minimum' scenario. Clarification is required on toll diversion (avoidance) along the road network.

This comment is correct in that there would be no toll avoidance due to the M4 East project. The commentary on toll avoidance was included in error in the pre-adequacy version of the report and was removed from the version of the report that was submitted for the adequacy review and also for the final report.

[While clarification on toll avoidance has not been specifically addressed, toll avoidance was accounted for in the modelling tasks, which were undertaken rigorously and incorporated an independent peer review.]

- In *Figures 8-2* and *8-3* (Draft TTA), clarification / discussion is required to explain why westbound traffic flows are greater than eastbound flows in the AM peak. Similarly, for the PM peak, eastbound traffic is greater than westbound. This is counter-intuitive to the general Sydney CBD-centric traffic flows along the Sydney road network.

It is acknowledged that on face value, the predicted WRTM peak hour traffic volumes are counter-intuitive. However, this is caused by the following key factors that have been included in Section 4.1.1 of the Traffic and Transport Report:

- *The foundation of the future forecasts is the base matrices. These have been calibrated against existing traffic flows. However, on highly constrained corridors such as Parramatta Road, the flow across the stop-line in the peak direction is actually lower than the counter peak, not because of lower demand, but because of network constraints. Therefore the counter peak "demand" is accurately captured in the counter peak direction but flow rather than demand is captured in the peak direction.*
- *As these base matrices form the foundation of future demands, as population growth is factored in, the counter intuitive peaks are retained.*
- *The induced demand method utilised is elasticity based and the magnitude is directly related to the original forecast demands, which further skews the volumes in favour*

of the counter peak direction.

- The counter peak direction draws in more traffic from parallel routes.*
- Changes in future land use may also be having an impact on travel patterns.*

[Acceptable response by proponent.]

3.3 Road Network / Traffic Operations

In general, the assessment of road network and intersection operations has been undertaken thoroughly. The majority of significant intersections were analysed for existing as well as future scenarios, either with full WestConnex development ('do something' scenario) or partial WestConnex development ('do minimum' scenario incorporating the M4 Widening and King Georges Road Interchange Upgrade projects – currently under construction). The 'do minimum' and 'do something' scenarios were adopted for 2021 and 2031 assessment. In addition, a 2017 assessment was undertaken for the impact of construction traffic.

As well as the previously mentioned screenline traffic volumes, traffic flows for the operational scenarios were reported along all sections of the M4 East including along entry and exit ramps.

Intersection analysis for the operational scenarios reported on average vehicle delay and levels of service while road (mid-block) sections also reported levels of service related to volume / capacity ratios.

It is noted that queue lengths were not provided for the intersection analysis. While average delay is considered to be more relevant to road users and levels of service, queue lengths can provide additional information with respect to traffic operations related to congestion and road safety.

Travel times were derived from the modelling outputs as a means of quantifying measures that would directly relate to motorists.

As part of the Submissions Report / Preferred Infrastructure Report, *Table 8.1 (page 8-2)* provides a summary of safeguards and management measures including *OpTT1* to *OpTT6* for measures during operations.

An operational traffic review is proposed to be undertaken to confirm the operational traffic impacts of the project on surrounding arterial roads and major intersections 12 months after the commencement of operation of the project. As part of the review process, a Road Network Performance Mitigation Plan would be used to monitor traffic patterns and operations, and implement road network mitigation improvements for areas where consequent traffic performance is at unsatisfactory levels before, during and after construction of the project.

Prudently, it has been acknowledged that this review would address any limitations of the modelling process with respect to predicted volumes and traffic operations. The effectiveness of any proposed mitigation measures relies on the post-opening operational traffic review.

The following are more specific comments on the road network and traffic operations assessment:

- The assessment requires additional analysis / discussion on the levels of service for the M4 East mainline carriageway segments as well as along the ramps. Some of the traffic volumes indicate that capacity is being approached / exceeded by 2031 – refer to *Tables 8-2 and 8-3* in the Draft TTA. Congestion along the M4 East would affect route choice, especially as it is a tolled facility, and would likely result in traffic diverting onto alternative routes.

Section 10.1.2 of the Traffic and Transport Report provides specific discussion regarding motorway mid-block / ramp capacities and performance levels. Section 4 of the Traffic and Transport Report provides information on the tolling modelling method used to achieve balanced traffic flows between alternative tolled versus non-tolled routes through the project area.

[Acceptable response by proponent.]

- The analysis for the Parramatta Road intersections at Concord Road and M4 Motorway indicate significant operational improvement and almost halving of traffic for the M4 Motorway junction during the 'do something' scenario in both 2021 and 2013 in comparison with the 'do minimum' scenario. However, the nearby Concord Road junction increases traffic by approximately 10% with a similar poor level of service – refer to *Tables 9-12, 9-14, 9-16 and 9-18* in the Draft TTA. Clarification is required as to why traffic flows are so different when the two intersections share a common road section, ie. eastern leg of the Concord Road junction connects directly to the western leg of the M4 Motorway junction.

While the two intersections share a common section of road, the other three arms approaching the Concord Road intersection are predicted to have an increase in traffic volumes. In addition to this, traffic patterns change at the Concord Road interchange as a result of the project. A combination of these two factors results in an increase in delay at this location.

[Acceptable response by proponent.]

- Confirmation is required as to whether traffic volumes reported in *Tables 9-8* through *9-11* in the Draft TTA are in PCUs or vehicles. The traffic volumes in these tables do not seem to be compatible with the screenline volumes from *Tables 8-3* through *8-6* in the Draft TTA. If the traffic volumes in *Tables 9-8* through *9-11* are meant to be PCUs (assumed to be evaluated from vehicle numbers in *Tables 8-3* through *8-6*), then different PCU equivalency factors have been used. Clarification is required on the approach used to derive the subject numbers.

The tables were amended in the final report to reflect the specific units. Further details on the approach used to derive PCUs can be found in Section 4.1.3 of the Traffic and Transport Report.

Furthermore, it is noted in Section 8.3 that the screenline volumes presented in the EIS are taken directly from the WRTM for high level comparison, and have not been rebased as described in Section 4.1.2. These volumes should not therefore be directly compared with volumes used in the operational modelling results shown in Section 9 and 10.

[Acceptable response by proponent.]

- In proposed management and mitigation measures, smart motorway management is recommended to be implemented, however it is unclear whether the M4 East project allows for retro-fitting of smart motorway technology.

It is not proposed as part of the M4 East project; however provision has been made in the design to allow for the future integration of smart motorways systems.

[Acceptable response by proponent.]

- For base road network / intersection operations (Tables 6-6 and 6-7 in the Draft TTA), site observations do not indicate such high levels of service for some intersections along Parramatta Road, eg. along the section between Pomeroy Street and Concord Road, all intersections are at LOS C or better.

Performance of intersections between Pomeroy Street and Concord Road reflect site observations and a less congested environment than east of Concord Road. Base models were developed based on traffic surveys (and/or SCATS), IDM data and peak hour site observations. Consultations also took place with the TMC.

[Acceptable response by proponent although it is acknowledged that site observations may vary significantly.]

- It is assumed that indicative AM and PM peak hours were derived from existing counts.

This is correct – refer to Section 4.1.2 and Figure 4-3 of the Traffic and Transport Report.

[Noted - acceptable response by proponent.]

- The assessment of road safety / crashes is considered to be of minimal value with crash rates simply being a proportion of vehicle-km travelled. There is no discussion on possible smart motorway technology to reduce crash rates or the potential less congested road network conditions resulting from the project that may reduce crash rates.

Lower crash rates for tunnels are already included in the calculations based on existing performance. Less congested conditions do not necessarily reduce crash rates as speeds can increase.

[Noted - acceptable response by proponent.]

- Clarification is required of what the network and corridor optimisation approach to managing delay and queuing impacts actually entails – refer to Section 10.2.3 in the Draft TTA.

This is explained in some detail in Section 11.2.3 of the Traffic and Transport Report.

[Noted - acceptable response by proponent.]

- In Table 10-2 (Draft TTA), the proposed management and mitigation measures suggest adopting a network and corridor optimisation approach to managing delay and queuing impacts. However, only a number of intersections are included. It would be prudent to include the length of Parramatta Road from Concord Road, Strathfield through to Hume Hwy / Liverpool Road, Ashfield, rather than just at limited number of intersections.

The text does not imply that optimisation only occurs at these specific locations. The principles governing network management are laid out in Section 11.2.3 of the Traffic

and Transport Report and clearly identify an overall corridor/network approach rather than a concentration on individual intersections.

[Acceptable response by proponent.]

- The proposed Ramsay Street and Martin Street (west) intersection works would result in an unsignalised, four-way junction with a relatively busy road (Ramsay Street). There is concern with respect to road safety, specifically related to cross movements to/from Wolseley Street and right-turn movements onto and from Ramsay Street and the potential congestion this may cause by reducing traffic flows along Ramsay Street to a single lane in each direction. There has been no intersection assessment on operations or road safety undertaken for these proposed works.

[Proponent to undertake an operational and road safety assessment of this new four-way intersection as part of the preparation of a TMSP. The new junction should also be included as part of any post-operations review as well as covered by an independent road safety audit.]

- Emergency management plans for traffic diversions in the event of a tunnel closure (including during tunnel maintenance periods) are unclear. Confirmation / clarification is required on whether the proposed traffic management and safety plan (TMSP) to be prepared would include emergency / maintenance planning measures during operations.

[Proponent is to include emergency / maintenance tunnel closure management plans as part of the proposed TMSP.]

- There has been limited assessment of the impacts of 'pinch-points' at the Parramatta Road and Wattle Street interchanges where the merging of tunnel and surface lanes occurs.

[Prior to Project implementation, the proponent is to undertake a detailed investigation of potential mitigation measures to address identified traffic performance impacts.]

3.4 Public Transport Operations

Generally, the assessment of public transport (bus services) has been undertaken adequately. However, the discussion on bus operations is largely related to potential Parramatta Road corridor improvements with minimal discussion on the effects of the project on cross-corridor routes.

During operations, and also potentially during construction, a number of intersections and road sections surrounding the project corridor have been identified as having a reduction in level of service and/or an increase in journey times due to increased congestion. While this is likely to affect both cross-route bus operations as well as along Parramatta Road (and other parallel) routes within the study area, minimal discussion and detail of possible mitigation measures have been provided for this potential impact.

The assessment on opportunities to improve public transport patronage appears to be minimal and essentially is limited to potential express bus services between Burwood and the Sydney CBD. It is noted that the assessment states that future provision of bus priority measures is not precluded by the project design.

3.5 Pedestrian / Cyclist Issues

In general, the assessment of pedestrian and cyclist issues has been adequately assessed considering the majority of network changes associated with the project occur underground and at existing intersections. The resultant impacts have been assessed to be largely insignificant.

For both pedestrians and cyclists, opportunities to enhance facilities along the project corridor have been deferred to separate urban revitalisation as part of reconfigurations along Parramatta Road and surrounding project areas. The improved integration of cyclist elements along and across the project corridor is considered beneficial for the potential connectivity with surrounding facilities.

3.6 Construction Phase Issues

It is considered that the assessment generally covers construction impacts thoroughly. As part of the identification of traffic impacts, a 2017 model was prepared to determine the impact of construction traffic on background traffic levels during the peak construction period.

From the draft layout of ten (10) work sites, the locations of site compounds and other construction facilities appear to be reasonable. All have suitable access onto the major road network and would ensure heavy vehicle transport routes minimise impacts on local roads in particular. While some local roads are required to be used for access to work sites, it has been acknowledged that preparation of suitable traffic management plans (TMPs) and traffic control plans (TCPs) to appropriate standards would be undertaken.

The general objectives for traffic management of construction activities are considered to be reasonable and adequate. These have been detailed in suitable form within the assessment and would form the basis in the preparation of a project Construction Traffic and Access Management Plan (CTAMP), which would be prepared by the contractor to the satisfaction of relevant local Councils and RMS.

As part of the Submissions Report / Preferred Infrastructure Report, *Table 8.1 (page 8-2)* provides a summary of safeguards and management measures including TT1 to TT14 for measures during construction.

The temporary lane reduction on Parramatta Road (as part of the amendments detailed in the Submissions Report) would reduce capacity, and the operational performance of vehicles travelling on this section of Parramatta Road is predicted to deteriorate from LoS D to LoS E and F. As such, the proponent has recommended that:

- A review of the operation of signalised intersections on the approach to and departure from the Parramatta Road lane closures would be undertaken to ensure that this section of the network continues to operate at maximum efficiency; and
- In consultation with TMC, an assessment would be undertaken to determine the optimum extent of the proposed lane closure and also the timing of these works in relation to other temporary road closures proposed during construction.

The following miscellaneous construction-related comments are provided:

- Assessment of cumulative construction impacts is limited to other WestConnex projects only. There is likely to be other major projects that would occur over the project period that would need to be considered, if not actually imparting cumulative impacts.

At present, there are no other major projects whose construction would significantly increase traffic volumes and patterns along the Parramatta Road corridor – within the project area during the construction period. Construction volumes associated with minor works are anticipated to have a negligible impact similar to that of daily or seasonal variations in traffic volumes and patterns. Notwithstanding, any scheduled construction activities would be taken into account during construction planning for the project.

[Acceptable response by proponent.]

- There seems to be minimal discussion on the scheduling of construction transport movements, especially with respect to cumulative impacts.

Table 7.2 of the Traffic and Transport Report provides indicative details of light and heavy vehicle volumes predicted to arrive and depart from compounds during a typical AM peak, PM peak and daily period. The daily and peak hour volumes are based around targeted spoil haulage between 7 am and 10 pm daily however it is acknowledged that 24 hour spoil haulage will be required during tunnelling activity.

Notwithstanding, Table 7.2 and supporting commentary provides details of predicted heavy vehicle volumes (per hour) outside the standard working hours. Also, Section 7.4.8 provides details of the cumulative construction impacts, including the timing in accordance with other known large infrastructure projects.

[Acceptable response by proponent.]

- The cycleway diversion route (*Figure 7-9* in the Draft TTA) is appropriate for the M4 Widening project east to Concord Road but there are no other specific M4 East project areas to the east that have been identified for cycleway detours or similar temporary measures during the construction period.

Figure 7.9 and accompanying commentary in Section 7.4.7 of the Traffic and Transport Report reflect the extent of the cycleway diversion east of the Concord Road interchange during construction of the project.

[Noted – acceptable response by proponent.]

- The access point for the C1 work site appears to require access across the existing M4 Motorway eastbound on-ramp from Homebush Bay Drive. It is unclear whether there is a conflict, whether the on-ramp is to be reconfigured and whether M4 Motorway eastbound traffic accessing the work site would need to weave across on-ramp traffic.

The works at the western end of the project are to be staged to provide continued operation of the M4 Motorway in both east and west directions. For the northern side of the M4 works in the vicinity of Homebush Bay Drive, initial works will involve the establishment of construction site facilities as detailed. This construction site will be linked with other sites further east and linked by a construction site haul road. For the initial stage of construction, vehicle access and egress would be to and from the M4 Motorway and Homebush Bay Drive on their existing alignment. A construction access road, with acceleration and deceleration lanes in accordance with Austroads guidelines,

would be built within the construction footprint to provide access from the M4 Motorway. Following progression of the staged construction works, eastbound traffic would be realigned onto the permanent roadworks. At this time, access to the site compound will be modified to suit the new alignment of the eastbound carriageway of the M4 Motorway and also the realigned Homebush Bay on-ramp.

It is not the intention for construction vehicles entering the site at this location to cross existing carriageways of the M4 Motorway or future new alignments. The plan presented shows the existing M4 Motorway carriageways and also future alignment carriageways to be constructed for the M4 East project.

[Acceptable response by proponent.]

- It is unclear whether the Pomeroy Street footbridge across M4 Motorway is to be closed or remain operational during construction – the location of the C2 work site appears to sever the link between Pomeroy Street and the footbridge.

The pedestrian bridge would generally remain open for the duration of the project. However work would be required in and around the bridges, so a short-term closure may be needed for safety reasons. Users would be provided with appropriate advance warning, signage, etc. of any short-term closure.

[Acceptable response by proponent.]

- For the traffic generation and distribution of spoil (*Section 7.2* in the Draft TTA), the estimates for re-use within the project and for disposal off-site are not made clear. Therefore, it is unclear what the haul movement numbers are based on.

Haul movement numbers are based on total excavated spoil. LSJH plan to remove tunnel spoil from site via truck. LSJH has yet to determine on-site re-use opportunities, however it is important to note that re-use of any spoil 'within' the project will still require truck movements outside the construction ancillary facility sites to transport the material to the location at which it could be re-used.

[Noted, although the numbers have not been specifically stated and thus it is still unclear what the haul movement numbers are based on. It is envisaged that these movements will be clarified as part of the CTAMP.]

- The light vehicle volumes in *Table 7-3* (Draft TTA) seem low. If they don't access the sites via the specified road locations in *Table 7-3*, which routes would they use? There is a significant discrepancy between the total light vehicle volumes in *Table 7-2* and light vehicle volumes in *Table 7-3*.

The heavy vehicles in Table 7.2 and Table 7.3 in the Traffic and Transport Report are similar because trucks generated by individual sites have a common destination via the M4 Motorway. However, generated light vehicles are assumed to have a range of destinations that would be accessed via various local and regional routes within and external to the project area. Consequently, for light vehicles Tables 7.2 and 7.3 are not easily cross-referenced and details of light vehicle movements were removed from Table 7.3 to avoid further misinterpretation.

[Acceptable response by proponent.]

- If the off-site spoil destinations and haulage routes adopted for assessment (ie. to/from the west) were not actually used during construction, the CTMP would need to address possible impacts resulting from trips in other directions, especially if travelling to the east.

The TMSP will be updated as required to accommodate any changes to potential spoil receiving locations as they arise during the construction phase. If at a later date the spoil receiving sites are determined to be to the south, north or east of the M4 East project corridor, the CTMP will assess the potential impact and be revised to incorporate any required changes to mitigation measures. The revised CTMP will have to be reviewed and approved by relevant stakeholders including RMS, Councils, etc.

[Acceptable response by proponent.]

- During the PM peak 'With Construction' scenario in *Table 7-17* (Draft TTA), the intersection performance along Dobroyd Parade at Waratah Street and Timbrell Drive improve despite an increase in traffic due to additional construction-related traffic. This is described as potentially being caused by upstream effects. However, it is unclear what upstream effects there would be during the PM peak because they are the first intersections that vehicles encounter during the predominant PM movement westbound.

Results have been corrected in the final version of the Traffic and Transport Report. The performance of intersections experiencing additional construction demands show increased delay.

[Acceptable response by proponent.]

- It is acknowledged that as the detailed design develops, additional bus stops requiring relocation may be identified during the construction period. This should be identified and detailed in the CTMP.

This will be addressed in the CTMP. LSJH is preparing the draft CTMP, which includes the potential impacts to bus operations / routes and bus stops / bays during construction and how they will be managed in consultation with the State Transit Authority, WestConnex M4, RMS, TMC, local council/s, etc.

[Acceptable response by proponent.]

- The westbound bus stop along Parramatta Road at Chandos Street is to be closed during construction and will not be relocated. The distance between the bus stops either side (Orpington Street bus stop and the next westbound bus stop east of Frederick Street) is almost 1 km (about 10 min walk), which is significant. Has some form of temporary bus stop been considered?

This will be addressed in the CTMP. LSJH is preparing the draft CTMP, which includes the potential impacts to bus operations / routes and bus stops / bays during construction and how they will be managed in consultation with the State Transit Authority, WestConnex M4, RMS, TMC, local council/s, etc.

[Acceptable response by proponent.]

- In *Table 7-15* (Draft TTA), there appear to be some anomalies in the construction traffic generated. The Parramatta Road location between Bland Street and Dalhousie Street has significantly lower eastbound traffic increases (34 construction vehicles) in comparison to westbound increases (over 100 vehicles).

A comparison of roadway traffic volumes between Table 7.14 and Table 7.15 shows an error in westbound construction traffic volumes used in the level of service analysis for the location on Parramatta Road between Bland Street and Dalhousie Street. The westbound increase should be 55 vehicles.

[Acceptable response by proponent.]

- In Section 2.1.1 of the 'Traffic and Transport Assessment of Design Changes' document, light vehicles are described as being able to access the Homebush Bay Drive civil site (C1) via the M4 Motorway eastbound on-ramp, but only heavy vehicle movements are shown (green arrows) in Figure 2.1.

[Clarification is required by proponent of vehicular access to the C1 compound.]

- In Table 5-1 of the 'Traffic and Transport Assessment of Design Changes' document, the Parramatta Road / Concord Road intersection 'with construction (EIS C1 design change)' is forecast to have a greater volume than 'without construction' but with a resultant reduction in delay, which seems incorrect. Clarification is required.

[Clarification is required by proponent of operational results.]

3.7 Miscellaneous Issues

The following miscellaneous comments are provided:

- The paragraph at the top of page 7-23 (above Table 7-14 in the TTA) states average growth of 6% and 4% in the AM and PM peak periods, but Table 7-14 below shows averages of 5% and 1% for the respective peaks.

[The inconsistency is noted. It is considered that any impact would be insignificant and that the inconsistency is an error in the report.]

4. Conclusions & Recommendations

4.1 Conclusions

The following conclusions are provided in the peer review of the proposed Project's traffic and transport assessment:

- In general, the assessment has been undertaken quite thoroughly with an appropriate methodology. This is particularly the case for the modelling tasks, which incorporated an independent Peer Review Committee, thus providing a high level of confidence in the outputs and is considered to be an excellent approach to ensure rigorous model results.
- An operational traffic review is proposed to be undertaken to confirm the operational traffic impacts of the project on surrounding arterial roads and major intersections 12 months after the commencement of operation of the project. As part of the review process, a Road Network Performance Mitigation Plan would be used to monitor traffic patterns and operations, and implement road network mitigation improvements for areas where consequent traffic performance is at unsatisfactory levels before, during and after construction of the project
- While the assessment of public transport (bus services) has been generally undertaken adequately, the discussion on bus operations is largely related to potential Parramatta Road corridor improvements with minimal discussion on the effects of the project on cross-corridor routes. The assessment on opportunities to improve public transport patronage is minimal and essentially limited to potential express bus services between Burwood and the Sydney CBD. It is noted that the future provision of bus priority measures is not precluded by the project design.
- In general, the assessment of pedestrian and cyclist issues has been adequately assessed considering the majority of network changes associated with the project occur underground and at existing intersections. The resultant impacts have been assessed to be largely insignificant.
- An operational traffic review is proposed to be undertaken 12 months after the Project is complete and operations begin. The review aims to address several operational issues including unsatisfactory intersection and road network performance and bus network operations. The timing of the traffic review (12 months after operations have started) is considered an inappropriate and reactive approach to the assessment. One of the objectives of the modelling task is to make predictions on future traffic operations, which can then be acted upon to determine appropriate mitigation measures. While a post-operations review is considered advantageous and should be undertaken, it should not be in lieu of a suitable assessment during the EIS process. Moreover, it is unclear who would be responsible for the review assessment, who would be responsible for implementation of any actions arising from the review, what timeframe would be agreed to and how any works would be funded. In summary, there are too many unknowns related to the post-operations review process.
- The assessment generally covers construction impacts thoroughly with a 2017 model prepared to determine the impact of construction traffic on background

traffic levels during the peak construction period. The general objectives for traffic management of construction activities are considered to be reasonable and adequate, have been detailed in suitable form within the assessment and would form the basis in the preparation of a project Construction Traffic and Access Management Plan (CTAMP), which would be prepared by the contractor to the satisfaction of relevant local Councils and RMS.

- As part of the Submissions Report / Preferred Infrastructure Report, *Table 8.1 (page 8-2)* provides a summary of safeguards and management measures including TT1 to TT14 for measures during construction and OpTT1 to OpTT6 for measures during operations.

4.2 Recommendations

Based on the areas of concern described above, a number of Conditions and/or commitments would be required by the proponent to appropriately determine final impacts and provide suitable mitigation measures.

The following Draft Conditions or commitments from the proponent are recommended:

1. Prior to Project construction, the preparation of a Construction Traffic and Access Management Plan (CTAMP) would need to be undertaken by the chosen contractor in consultation with, and to the satisfaction of relevant local councils and RMS. The overall Project CTAMP should include, but not be limited to, the following:
 - Construction car parking strategy;
 - Haulage movement numbers / routes;
 - Detailed travel management strategy for construction staff;
 - Maintaining pedestrian and cyclist links / routes;
 - Independent road safety audits on construction-related traffic measures; and
 - Measures to account for any cumulative activities / work zones operating simultaneously.

For the Parramatta Road lane reductions, specific measures (suggested by the proponent) would include:

- A review of the operation of signalised intersections on the approach to and departure from the Parramatta Road lane closures to ensure that the network continues to operate at maximum efficiency; and
- In consultation with TMC, undertake an assessment to determine the optimum extent of the proposed lane closure and also the timing of these works in relation to other temporary road closures proposed during construction.

For the temporary Ramsay Street closure, specific measures (suggested by the proponent) to manage and control traffic operation and access during the closure period would include:

- Contractor to review and develop the three proposed Ramsay Street closure options to establish an optimum construction strategy that would aim to have the minimum amount of disruption to affected residents; and
- Manage and maintain adequate property access by providing reasonable and practical alternate traffic routes. This would be undertaken in consultation with Roads and Maritime, local councils and property owners likely to be impacted.

The CTAMP would need to be a Condition.

2. Prior to Project implementation, undertake additional detailed investigations of the following intersections / sections of road network to the satisfaction of relevant local councils and RMS:
 - Assessment of the impacts of 'pinch-points' at the Parramatta Road and Wattle Street interchanges where the merging of tunnel exit traffic and surface traffic would occur.
 - Parramatta Road / George Street.
 - Parramatta Road / Pomeroy Street.
 - Parramatta Road / Frederick Street / Wattle Street.
 - Parramatta Road / Concord Road
 - Concord Road / Patterson Street / Sydney Street.
 - Concord Road off-ramps.
 - Pomeroy Street on-ramp.

As part of these investigations, potential mitigation measures should be developed to address identified traffic performance impacts, and then 'downstream' impacts and/or cumulative impacts should be determined of any measures.

3. Prior to Project implementation, detail the responsibilities for the post-operations review including (as a minimum) who would be responsible for the review assessment, who would be responsible for implementation of any actions arising from the review, what timeframe would be agreed to and how any works would be funded.
4. Prior to and post-Project implementation, prepare and implement a Road Network Performance Review to be used to monitor traffic patterns and operations, and implement road network mitigation improvements for areas where consequent traffic performance is at unsatisfactory levels after construction of the project.
5. At Project implementation, provide dedicated public transport lanes along Parramatta Road (both directions) as per the modelled scenarios. This should include associated support infrastructure, eg. stations / stops, pedestrian connections, etc. The provision of dedicated public transport lanes along Parramatta Road is consistent with the NSW Government's strategic plans including *Sydney CBD to Parramatta Road Strategic Transport Plan* (September 2015) and *Sydney's Bus Future* (December 2013).
6. Independent road safety audits are to be undertaken for all stages of further design development. Any issues identified by the audits will need to be closed out to the satisfaction of the relevant authorities including RMS and/or Councils.