# Western Harbour Tunnel and Warringah Freeway Upgrade EIS

## Peer Review of the Traffic and Transport Assessment

For Department of Planning, Industry and Environment

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# EXECUTIVE SUMMARY

**Context**

Transport for New South Wales has proposed the Western Harbour Tunnel and Warringah Freeway Upgrade under Part 5 of *the Environmental Planning and Assessment Act 1979* and has prepared an Environmental Impact Statement (EIS) for the project. Bitzios Consulting has been commissioned by the Department of Planning, Industry and Environment (DPIE) to undertake a Peer Review of the Traffic and Transport assessment within the EIS. This review has considered the project need, the project description, the construction period impact assessment and the operational period impact assessment in view of the Secretary's Environmental Assessment Requirements (SEARS) dated 15th December 2017. This review has also considered stakeholder and resident submissions and TfNSW's responses to those submissions.

**Strategic Options Assessment and Methodologies**

The roads and traffic impact assessment in the EIS makes use of the Sydney Strategic Travel Model (STM), Sydney Motorway Planning Model (SMPM) and microsimulation traffic models for Rozelle and surrounds, Warringah Freeway and surrounds, and Gore Hill Freeway and surrounds, as well as SIDRA intersection models in each area. These models are considered to be the right mix to assess broader network needs and localised impacts near interchanges and access / egress points to the project.

The strategic options assessment considered conventional alternatives to the project but did not consider the cumulative option of Travel Demand Management + Improvements to Existing Routes + Improvements to Public Transport on Person-Hours Travelled (PHT) and Vehicle-Kilometres Travelled (PKT) statistics, nor have any network-wide public transport patronage impacts outputs been presented. The corridor-level options assessment was however adequately described.

While the modelling packages, versions and methodologies used are acknowledged to be the best available at the time, it is noted that:

- The STM and the SMPM have a 2014 base year and the microsimulation and SIDRA models have a 2016 base year. Considering an opening year of 2027 and a forecast year of 2037, these models may now be considered as outdated and should be renewed in any further modelling as the project progresses through design development
- Input demands have been adjusted when moving from strategic demands to microsimulation and intersection demands so that the nominal capacity is not exceeded. Whilst unconventional, this is a pragmatic approach. The scale of reductions should ideally be documented for completeness and to advise whether the strategic modelling needs some reconsideration based on the scale of the changes required to the lower order models
- Large volumes of unreleased vehicles in some of the microsimulation models do not allow for an equitable comparison between 'Do Minimum' and 'Do Something' scenarios, particularly given the simulated queuing patterns at the edges of the models are not presented in the EIS
- The use of Level of Service (LoS) with intersection delays capped at '>100 seconds' is likely to be masking intersections with excessive delays and queuing back into the surrounding network, possibly outside of the modelled areas. The consequential impacts at these locations on other locations cannot be quantified and may be significant.

**Construction Period Impacts**

The assessment of construction period impacts is generally 'high level' with a deferral of management strategies and plans to more detailed construction traffic management plans which would follow in the design and construction phases. It is noted that:

- The process for defining the scope of the modelled areas for construction impacts has not been documented. There would have been benefit in broadening the modelled areas to include the construction traffic routes as well as the likely detour routes for displaced traffic due to construction related congestion or turn restrictions particularly where these displaced routes include local government roads
- The cumulative construction traffic vehicle movements are not presented to show the overlaps in haulage routes by construction traffic for the various closely located construction sites. The cumulative impacts particularly around Rozelle associated with the M4-M5 Link construction have not been identified in detail or any programming mitigation strategies raised to minimise overlaps in truck traffic generation
- The Levels of Service (LoS) for some intersections are shown as LoS F and delay >100 seconds. To adequately understand operational period traffic patterns and associated impacts, either the actual delays should have been published, or queue length plots out of the simulation models should be shown to compare different scenarios. The reporting methods mask the effects of localised congestion which could be significant in some areas
- Insufficient information is provided to have confidence that the construction worker parking demand will be manageable without intrusive impacts into areas around each site. At a minimum, peak parking demand and available supply estimates for each site should be calculated and related to the availability of on street overflow parking, particularly in parking-constrained areas. Public transport plus walk to site is raised as a potential mitigation measure although no assessment has been done on whether this is practical given stop locations and path locations. Park and Ride and shuttle bus options have also been raised but no examples have been used to demonstrate that this can work successfully and for what share of the construction worker market
- Closure of the Birchgrove Ferry Wharf at WHT4 (Yurulbin Point) will impact local residents. An alternative nearby ferry stop is the preferred mitigation measure and if this is not achievable a thorough education campaign would be required to direct residents to using the 441 bus service, some 750m away. No truck access. Louisa Road is a long, narrow, Dead-end residential street and should not be used for truck access to this construction site and only minimal light vehicle access should be permitted.
- Access to WHT7 (Berry's Bay) uses Bays Road and Balls Head Road which are local residential streets with no through traffic, narrow lanes, on street parking, on street cycling and LATM devices for speed management. Access to this site by vehicles larger than a Medium Rigid Vehicle (MRV) should not be permitted.
- Access to the Berry Street North site appears unlikely to be able to be safely achieved without full traffic control with associated traffic impacts and this has not been raised as an issue in the EIS. TfNSW's response to this issue is that it will be addressed with the CTMP however there is sufficient doubt now as to whether it can be addressed at all. Access to/from the two Cammeray Golf Course sites do not contemplate or dismiss the potential for a shared access point or the potential for truck acceleration lanes to minimise conflicts with Warringah Freeway traffic
- Impacts on active transport and on public transport are adequately covered.

**Operational Period Impacts**

The operational period modelling considered 'link-based' Levels of Service (LoS) along the Western Harbour Tunnel and Warringah Freeway as well as travel times and the intersection performance LoS within the three surface interface areas near Rozelle, North Sydney and Lane Cove using outputs from the microsimulation models. Whilst the process is appropriate, the level of detail provided from the microsimulation models is insufficient to completely understand pinch point effects and queuing patterns and how they influence congestion extending outwards from the modelled areas.

In general, the modelling shows that more traffic is attracted to the Western Harbour Tunnel – Warringah Freeway Corridor because of the accessibility and travel time benefits of the projects. What this does however is intensify traffic movements at the entry and exit points of the facility and induce significantly worse local congestion in some parts of Rozelle and North Sydney in particular. Overall though, the impacts in local areas are more than offset by the travel time benefits across the entire study area.

In terms of the microsimulation modelling and the intersection modelling for the operational period it is noted that:

- The definition of the boundaries of the simulation model areas is not justified or explained
- The Levels of Service (LoS) for some intersections are shown as LoS F and delay >100 seconds. To adequately understand operational period traffic patterns and associated impacts, either the actual delays should be published, or queue length plots out of the simulation models should be shown to compare the effect of the different scenarios
- The LoS analysis of intersections does not allow the reader to interpret how pinch points are influenced by the project either on approach to the project or downstream of the project. In particular, there are some future year scenarios with excessive 'unreleased trips' and there is limited commentary on what those trips mean to impacts at locations outside the modelled network
- At the Rozelle interchange, there appears to be a need to release traffic from the tunnel into the intersection of The Crescent/City West Link at rate which would congest other movements at this intersection and attract an excessive volume of traffic to/from the intersection of The Crescent / Johnston Street. This area warrants further investigation for capacity / queue management or additional upgrades
- In North Sydney, Miller Street, West Street and the Pacific Highway are impacted by congestion, which is greater with the project than without it, but somewhat buffered by unreleased vehicles in the simulation models. No mitigation measures have been identified to address these issues with access through North Sydney to access the Warringah Freeway appearing to be passively discouraged via this congestion
- In Lane Cove, there are likely impacts to Longueville Road and Reserve Road on approach to Epping Road and the Gore Hill Freeway which may be influenced by the Transit Lanes that are in place. If they are beneficial for removal to allow the release and entry of traffic associated with the project, then this should be contemplated as part of the project rather than following the project as proposed in the EIS.

In terms of local traffic, parking, active transport and public transport impacts, it is noted that:

- Parking has proposed to be removed through clearways or 'full time' near upgraded intersections primarily in North Sydney. The impacts of this parking loss, particularly in residential areas which have limited parking already, has not been addressed
- Active transport concepts are generally well covered and the benefits of a number of additional connections well presented. Public transport travel times will have impacts (in local areas) and benefits (mostly along the Warringah Freeway Upgrade) with the published overall system benefits being plausible.

**Alfred Street North**

The project's design adjacent to and along Alfred Street North should be reconsidered to minimise on-street parking loss and re-instate levels of property accessibility similar to what currently exists.

The widening of the Warringah Freeway eastwards removes parking along the western edge of the northbound carriageway. A net loss of 73 bays will have a significant impact on local residents who rely on this parking because this parking supply is not available in the side streets which are within reasonable walking distance. Also, the narrowing raises concerns about the ability for vehicles to manoeuvre from side streets and some driveways into Alfred Street North.

In terms of access, the removal of the U-turn from the Warringah Freeway southbound off ramp into Alfred Street North will inconvenience a number of local residents with an additional 1 km of travel required to access their properties.

**Conclusions**

In general, the EIS adequately covers the requirements of the SEARs.

For some items as noted above, insufficient detail is provided to determine whether the SEARs have been addressed to the level of certainty warranted at this stage of the project development process and further detail would be required in order to conclude that the impacts could be sufficiently mitigated without additional works or management measures. For other aspects where impacts which have not been addressed these could be addressed through conditions of approval as suggested below.

**Recommendations**

In addition to the DPIE's standard conditions, the following additional conditions are recommended (with wording to be refined by DPIE):

- CEMP sub plans, or Traffic and Transport Impact Management Plans should be submitted to, and approved by, the Planning Secretary for each construction site and prior to site occupation. The plans should identify:
  - Construction traffic volumes by type of vehicle over the duration of the site occupation
  - Traffic impacts on haul routes as well as routes that traffic is diverted due to construction-related network changes or due to additional construction traffic
  - Parking demand, site supply and specifically how overflow parking will be managed to mitigate impacts on parking in surrounding streets
  - Impacts on pedestrian, cycling and public transport facilities and how temporary facilities of a similar standard will be provided
- Submit a Parking Management Plan for managing construction worker parking impacts around North Sydney Oval
- To mitigate the impacts of the Birchgrove Wharf closure, relocate a ferry stop nearby or undertake a comprehensive public education campaign of bus route 441 for residents within the walking catchment of the Wharf
- No truck access should be permitted to the Birchgrove Wharf site and minimal light vehicle movements should be permitted (e.g. up to 100 vpd)
- Trucks larger than an MRV should not be permitted to access the WHT5 (Berrys Bay)
- Written approval of the Port Authority should be obtained for the use of its private roads
- Identify upgrade projects on Longueville Road and Reserve Road in Lane Cove and assist Council in implementing these works to mitigate the impacts of the project
- Re-design the Warringah Freeway alignment adjacent to Alfred Street North to minimise parking loss and preserve driveway accessibility or replace the 73 bays removed on this street with new parking within walking distance of the removed bays.

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# 1. INTRODUCTION

## 1.1 Background

The Western Harbour Tunnel, Warringah Freeway Upgrade, Beaches Link and the Gore Hill Freeway connection are part of an integrated proposal to manage traffic growth north of Sydney Harbour. This combined proposal is presented in Figure 1.1. The planning and approvals for the Western Harbour Tunnel and Warringah Freeway Upgrade components are progressing before the other two components.

The **Western Harbour Tunnel** provides a new crossing of the Sydney Harbour by connecting the WestConnex M4-M5 Link at Rozelle with the Warringah Freeway at North Sydney. It is proposed to be a toll road with two mainline tunnels with three lanes of traffic in each direction. The project is mostly underground and its surface connections are at Rozelle, North Sydney and Cammeray.

The **Warringah Freeway Upgrade** component includes reconfiguration of the Warringah Freeway from immediately north of the Sydney Harbour Bridge through to Willoughby Road at Naremburn, upgrades to interchanges at Falcon Street in Cammeray and High Street in North Sydney and new and upgraded pedestrian, cyclist and 'shared user' infrastructure. The project also includes upgrades to existing surface roads and bus facilities around the Warringah Freeway.

Transport for New South Wales (TfNSW), is the proponent for the Western Harbour Tunnel and Warringah Freeway Upgrade project and is seeking approval to construct and operate it. This approval is being sought under Division 5.2 of the *Environmental Planning and Assessment Act 1979*. The NSW Minister for Planning and Public Spaces has been requested to declare the project to be State Significant Infrastructure and an Environmental Impact Statement (EIS) has been prepared, dated January 2020.

This peer review has been prepared for the Department of Planning, Industry and Environment (DPIE) to assist with its response to the EIS.

*This peer review is limited to the EIS prepared for the Western Harbour Tunnel and Warringah Freeway Upgrade Project. The Beaches Link component and the Gore Hill Freeway Connection component are not within the scope of this EIS but the effects of their future implementation is considered in the EIS and have been reviewed.*


**Legend**

**Operational features**
- Beaches Link
- Gore Hill Freeway Connection
- Western Harbour Tunnel
- Warringah Freeway Upgrade
- M4-M5 Link tunnel fitout and commissioned as part of Western Harbour Tunnel

**Connecting projects**
- M4-M5 Link connections (indicative)
- Northern Beaches Hospital road upgrade

**Existing rail network**
- Heavy rail
- Light rail

*Source: Western Harbour Tunnel and Warringah Freeway Upgrade Project Environmental Impact Statement*

**Figure 1.1 Western Harbour Tunnel and Beaches Link Components and Extents**

## 1.2 Scope and Limitations

This report provides an independent peer review of the traffic and transport assessments published as part of the Western Harbour Tunnel and Warringah Freeway Upgrade EIS. The parts of the EIS that this review has focussed on are:

- **Volume 1, Chapter 5:** Project description
- **Volume 1, Chapter 6 (in part):** Construction work, relevant to traffic and transport needs and impacts
- **Volume 1, Chapter 8:** Construction traffic and transport
- **Volume 1, Chapter 9:** Operational traffic and transport
- **Volume 1, Chapter 21 (in part):** Socio-economics, relevant to roads and private access and public and active transport impacts
- **Volume 2A, Appendix A:** Secretary's Environmental Assessment Requirements (SEARs) checklist
- **Volume 2A, Appendix F:** Technical working paper: Traffic and transport
- **Volume 2J, Appendix Y:** Compilation of environmental management measures (relevant to traffic and transport aspects)

This peer review report is structured as follows:

- **Section 2** summarises the results of the Consistency Review completed at the start of the review process
- **Section 3** reviews the justification of the need for the project
- **Section 4** provides a brief description of the project to provide context for the following chapters and also reviews the sufficiency of the project description in order to understand potential impacts
- **Section 5** reviews the assessment methodologies, key assumptions and breadth and depth of coverage of each impact item
- **Section 6** reviews the construction period impacts and management measures for traffic and transport
- **Section 7** reviews the traffic and transport impacts with the project in its operational phase and considering the management measures proposed
- **Section 8** summarises the findings of the review of TfNSW's response to submissions
- **Section 9** provides conclusions and recommendations for consideration by the DPIE in preparing its response to the EIS

This review is on the basis that WestConnex M4-M5 Link is approved and will be implemented as proposed.

This review has not included detailed verification of transport models although some basic checks of published outputs have been completed based on site investigations and local knowledge of prevailing traffic patterns and conditions.

This review has assumed that the construction methodologies and construction period traffic estimates are reasonable and has focussed on the documentation of the impacts of construction activities on traffic, public transport, pedestrians and cyclists during the construction period.

## 1.3 SEARS

The SEARs dated 15 December 2017 lists the items that the EIS must address. The requirements relevant to traffic and transport considerations are:

- The EIS must include, but not necessarily be limited to, the following:
  - (b) a description of the project and all components and activities (including ancillary components and activities) required to construct and operate it, including:
    - the proposed route
    - design of the tunnels, interchanges (inclusive of tunnel portals and entry and exit ramps), road user, pedestrian and cyclist facilities, and lighting
    - surface road upgrade works, including road widening, intersection treatment and grade separation works, property access, parking, pedestrian and cyclist facilities (including appropriate locations for overbridges) and public transport facilities
    - location and operational requirements of construction ancillary facilities and access
    - the relationship and/or integration of the project with existing and proposed public and freight transport services
  - (d) a summary of the strategic need for the project with regard to its State significance and relevant State Government policy
  - (e) an analysis of any feasible alternatives to the project
  - (o) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed
- The Proponent must assess construction transport and traffic (vehicle, marine, pedestrian and cyclists) impacts, including, but not necessarily limited to:
  - (a) a considered approach to route identification and scheduling of marine and land transport movements, particularly outside standard construction hours
  - (b) the number, frequency and size of construction related vehicles (passenger, marine, commercial and heavy vehicles, including spoil management movements)
  - (c) construction worker parking
  - (d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements including internal Port roads and land if utilised during construction)
  - (e) access constraints and impacts on public transport, pedestrians and cyclists
  - (f) how construction of the project affects the capacity of, and the need to close, divert or otherwise reconfigure elements of, the road, cycle and pedestrian network
  - (g) details of how construction and scheduling of works are to be coordinated in regard to public events and cumulative traffic impacts resulting from concurrent work on the project and other major projects, under or preparing for or commencing construction in the vicinity of the proposal
  - (h) alternatives to road transport of construction spoil including marine and rail options as well as potential re-use in existing land reclamation areas or in association with Resource Recovery Exceptions (if obtained from the EPA) to minimise traffic impacts on the road network
  - (i) the likely risks of the project to public safety, paying particular attention to pedestrian safety and users of Sydney Harbour
  - (j) impacts to water based traffic and shipping channels on Sydney Harbour

- The Proponent must assess and model the operational transport impacts of the project including, but not necessarily limited to:
  (a) forecast travel demand and traffic volumes (expressed in terms of total numbers and heavy and light vehicle numbers) for the project and the surrounding road, cycle and public transport network, including potential shifts of traffic movements on alternate routes outside the proposal area (such as toll avoidance) and impact of permanent street closures directly attributable to the SSI
  (b) accessibility impacts in commercial centres within the vicinity of the project
  (c) travel time analysis
  (d) performance of key interchanges and intersections by undertaking a level of service analysis at key locations
  (e) wider transport interactions (local and regional roads, cycling, public and freight transport), taking into account the Sydney City Centre Access Strategy and planned future urban release areas such as the Bays Precinct
  (f) induced traffic and operational implications for existing and proposed public transport (particularly with respect to strategic bus corridors and bus routes and permanent closure/relocation of bus stops) and consideration of opportunities to improve public transport
  (g) impacts on cyclists and pedestrian access and safety
  (f) induced traffic and operational implications for existing and proposed public transport (particularly with respect to strategic bus corridors and bus routes and permanent closure/relocation of bus stops) and consideration of opportunities to improve public transport
  (h) opportunities to integrate cycling and pedestrian elements with surrounding networks within the project
  (i) property and business access and on street parking
  (j) an explanation for the scope of the modelled area, including justification of the nominated boundaries.

# 2. SUMMARY OF THE CONSISTENCY REVIEW

## 2.1 General Findings

The September 2019 release of Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement (EIS) was reviewed initially in relation to its consistency with the SEARs for the project and these findings were provided by DPIE to TfNSW.

The consistency review identified that the EIS documentation generally provides sufficient coverage on most of the SEARs items related to traffic and transport to enable a review of the EIS to be undertaken. The EIS comprehensively addressed the strategic need and alternative options assessment of the project except for documenting the changes to public transport usage across the network with the project versus Do Minimum.

In terms of the construction and operational period impact assessments:

- **Construction period:** the SEARs are generally well covered except for construction working parking demands and impacts and intersection impacts for intersections that are shown to operate at or near capacity in the 2037 Do Minimum case
- **Operational period:** the LoS analysis of intersections does not allow the reader to interpret how pinch points are influenced by the project either on approach to the project or downstream of the project as it pushes more traffic into surface streets at a faster rate. Publication of additional microsimulation modelling outputs would have allowed for a more informed interpretation of impacts and benefits against the SEARs. The absence of this information means that residual risks remain that parts of the local road network, post-opening of the project, would be significantly impacted without any mitigation or management measures introduced.

## 2.2 Additional Information Requested

Additional information was requested to provide the level of detail in the EIS needed to adequately assess the project's traffic and transport impacts and mitigation measures against the SEARs as follows:

- **Strategic Need and Metrics:** The EIS dismissed the publication of strategic network VHT and VKT statistics for the project, however these statistics are important for understanding the need and effects of the project on the strategic network. Other statistics such as modal share, public transport travel time savings and screenline volumes are usually presented and would be valuable in responding to the strategic need and options evaluation requirements of the SEARs**.** *This additional information was not provided by TfNSW.*
- **Construction site worker parking**: Sites that will provide on-site parking should be specified and the approximate parking demands and supply should be quantified by site, including likely overflow to surrounding streets. Generic mitigation measures identified such as shuttle bus arrangements should be quantified (where from/to, how often, what types of contractors etc.). *This additional information was not provided by TfNSW.*
- **Construction site maps**: Modifying the construction site maps to also identify what on street parking they will occupy/remove and what existing footpath/cycleway connections that they will cut through will assist in the review of these impacts against the SEARs. *This additional information was not provided by TfNSW.*
- **Timing of the M4/M5 Link:** It is unclear if the intention is to open the link between the M4-M5 Link and the Anzac Bridge before or after construction of the Project has commenced. This is important in order to understand the construction period impacts of the project on this link or the impacts on the surface road system. *This additional information was not provided by TfNSW.*

- **Intersection impacts:** The average delay is reported as ">100" and DOS as ">1" in cases where intersections are well over capacity in both the construction period and the operational period impact assessment chapters. It is important to understand the degree to which these intersections are over capacity in either the construction or operational phases. The microsimulation modelling outputs should be provided to augment the SIDRA modelling outputs in locations where SIDRA models operate outside of their capacity range so that queue lengths and associated impacts (both upstream queueing and downstream traffic restraint) can be considered in addressing the SEARs. *This additional information was not provided by TfNSW.*

# 3. PROJECT NEED AND ALTERNATIVES

## 3.1 Review of the Project Need

Chapter 3 of the EIS outlines the strategic context and project need.

In Section 3.2, various contextual issues are presented as follows:

- High volumes of commuter traffic on the critical links around the Harbour CBD, with the Sydney Harbour Bridge and Sydney Harbour Tunnel being two of the busiest roads in NSW
- Congestion on key roads around the Harbour CBD add additional strain on capacity of the road network, with congestion costs forecast to increase as the population grows
- Low network resilience of the Harbour CBD due to it being incapable of coping with incidents which quickly cause significant impacts to the wider transport network
- Sub-optimal performance of the Warringah Freeway as one of Australia's busiest road corridors due to complexity of the road layout and poor separation
- Congestion impacting streetscapes, sustainability and liveability across the Eastern City and North Districts as places of destination.

These issues are highlighted with detailed overviews, traffic volumes, congestion costs and forecasts and crash history.

The EIS states that the project addresses the above issues by:

- Reducing congestion and pressure on the existing critical links servicing the important catchment around the Harbour CBD due to a new harbour crossing acting as a western bypass, which will improve journey times and reliability between the northern suburbs and south and west of Sydney Harbour
- Improving efficiency of access and connectivity to Greater Sydney with an integrated transport network and improved configuration of the Warringah Freeway
- Increasing the resilience of the eastern Harbour City road network to reduce the impact of incidents by providing additional road capacity while maintaining movement of traffic
- Reducing traffic along local streets due to a relocating a significant volume of traffic to the underground Western Harbour Tunnel, improving urban amenity and introducing opportunities for improving public spaces.

*The project benefits align with the stated project objectives and have a clear nexus to the challenges raised.*

Section 3.6 sufficiently and correctly summarises the strategic need for the project with regard to its state significance and the following relevant state government policies:

- Australian Infrastructure Plan
- NSW State Priorities
- State Infrastructure Strategy
- Future Transport Strategy 2056
- Greater Sydney Region Plan
- District Plans
- Directions for a Greater Sydney
- NSW Freight and Ports Plan.

## 3.2 Review of the Alternative Strategic Options Assessment

Chapter 4 of the EIS presents a 'hierarchy' of consideration of alternatives from the strategic level (e.g. network wide, transport mode), corridor level (essentially route options) and project level (project elements and method options).

At the **strategic-level**, five alternative scenarios for addressing the identified contextual issues of the critical links surrounding the Harbour CBD were raised in Section 4.3 of the EIS, as follows:

- Alternative 1 – Do nothing
- Alternative 2 – Travel demand management
- Alternative 3 – Improvements to the existing harbour crossing capacities and road network
- Alternative 4 – A new motorway crossing of Sydney Harbour
- Alternative 5 – Improvements to alternative transport modes.

Alternatives 1, 2 ,3, and 5 are identified to not overcome the issues of the immediate growing congestion and pressure associated with the few critical links of the Harbour CBD, and as such, Alternative 4, a new motorway crossing of Sydney Harbour, was selected as the preferred Strategic Alternative.

This was published as a qualitative assessment only. No quantification of the potential cumulative effects of Alternatives 2 + 4 + 5 versus Alternative 3 were presented using, say, strategic modelling. *It would be valuable to understand what the regional consequences would be of implementing Alternatives 2, 3 and 5 in terms instead of Alternative 3 using metrics such as Person-Hours Travelled (PHT), Vehicle Kilometres Travelled, economic impacts (existing travellers) and growth dampening/relocation impacts (future travellers)*. Regardless, there is a clear case made for additional cross-harbour road network capacity.

Section 4.4 of the EIS presents the **corridor-level** assessment. From four shortlisted corridor alternatives: brown, red, orange and blue, the blue corridor was selected as the preferred corridor. The criteria used to assess the alternatives aligned with the project objectives and included connectivity and performance, constructability and design, community and environment, and economic factors.

*Only qualitative assessment outcomes were presented in the EIS, and no discussion was included on the criteria weightings and scoring as part of (presumably) a Multi-Criteria Assessment (MCA) process. It would have been beneficial to review how the scoring was undertaken and how the weightings were determined.* In any case, the selection of the preferred option appeared to be heavily weighted towards the minimisation of construction impacts and reduced constructability risk, which is understandable given the complexity of the project and its location.

The **project-level** alternatives relevant to traffic and transport included:

- **North-Sydney connection alternatives:** The preferred option of an off ramp connecting to Falcon Street and an on ramp connecting from Berry Street has been selected based on minimising impacts rather than necessarily provided the best traffic congestion outcome. This option and the basis for its selection seems reasonable
- **Spoil transport alternatives:** The preferred option included a mix of truck and barge depending on the site location and this seems reasonable.

# 4. PROJECT DESCRIPTION DETAIL

## 4.1 Traffic and Transport Interface Areas

### 4.1.1 General

The majority of the Western Harbour Tunnel is underground or submerged and hence the majority of the project length has no to/from the operational period impacts on traffic and transport facilities. Surface connections to the tunnel are proposed to be located at Rozelle with connections to the WestConnex M4-M5 Link and Warringah Freeway at North Sydney and Cammeray. These are the primary locations for impact consideration during the operational phase. Construction and spoil site locations being the primary areas of interest for consideration of construction phase traffic and transport impacts.

The Warringah Freeway Upgrades include surface works along Warringah Freeway through to Gore Hill Freeway from Milsons Point to Cammeray / Crows Nest. Works further north and extending to the Gore Hill Freeway are included as part of the Beaches Link and Gore Hill Freeway Connection project.

Several upgrades to interchanges and the surrounding network allow for integration works and access to the Western Harbour Tunnel and Warringah Freeway. Modifications and relocations to road bridges are also required to accommodate the Warringah Freeway Upgrade component.

### 4.1.2 Rozelle and Surrounds

The Western Harbour Tunnel is connected at Rozelle via stub tunnels approved as part of the M4-M5 link project. The stub tunnels would be located between the Rozelle Interchange to around the boundary of Rozelle and Balmain. The exact locations of the tunnel connections are not yet confirmed due to the ongoing construction of the M4-M5 Link, however, it is reasonable to expected that there will be insignificant operational period impacts as the connections between the Western Harbour Tunnel and the M4-M5 Link are underground. There are surface connections located in Rozelle near industrial sites and residential buildings at the intersection of City West Link and The Crescent. Currently, the proposed space to be used for the surface connections is not occupied by any buildings.

*At the tunnel surface connections, the concept plans show no details of provisions for turnaround facilities on the approaches to the tunnel in case of an errant vehicle and the design and project description do not provide a traffic strategy for 'accidental entry' into the tunnel*.

Directional signage and weaving will be key considerations in the multi-path, complex road environment along the Warringah Freeway. *In order to adequately assess merge, diverge and weave complexities (and lane signage complexities), an overarching map highlighting these 'zones' along the Warringah Freeway Upgrade and its interface with the Western Harbour Tunnel would certainly assist in describing the project. Whilst this would ordinarily not be warranted at the EIS-stage, the sheer number of ramp movements in this area warrant such a diagram and consideration in the EIS for this project*. The zones associated with the Beaches Link ramps/connections would also be valuable to show on this diagram.

### 4.1.3 Warringah Freeway and surrounds

The Western Harbour Tunnel has surface connections via on and off ramps to the Warringah Freeway at the following locations:

- Cammeray – north of Earnest Street
- North Sydney – on ramp from Berry Street, and off ramp to Falcon Street.

At North Sydney, Berry Street currently leads onto the Warringah Freeway via an on ramp. The immediate section adjacent to the Warringah Freeway is occupied by landscaping and trees. The Warringah Freeway also has an existing off ramp to Falcon Street, which is adjacent to the Bon Andrews Oval. Upgrades will occur at the Falcon Street interchange, which connects the Warringah Freeway to Military Road to the east, and connections to Pacific Highway to the west.

Near Milsons Point, several integration and upgrade works will be undertaken near the Warringah Freeway, with the addition of an access ramp to Warringah Freeway. Upgrades will occur at the High Street interchange, which connects the Warringah Freeway with the Pacific Highway to the north-west, Cahill Expressway to the south, and connections to Kirribilli to the east.

All of these connections are adequately described in the EIS.

### 4.1.4 Gore Hill Freeway and surrounds

The Gore Hill Freeway connects directly with the Warringah Freeway at Naremburn. The Warringah Freeway Upgrade component is proposed to include a tunnel to tunnel connection between the Western Harbour Tunnel component of the project and the Beaches Link and Gore Hill Freeway Connection project mainline tunnels (in the future).

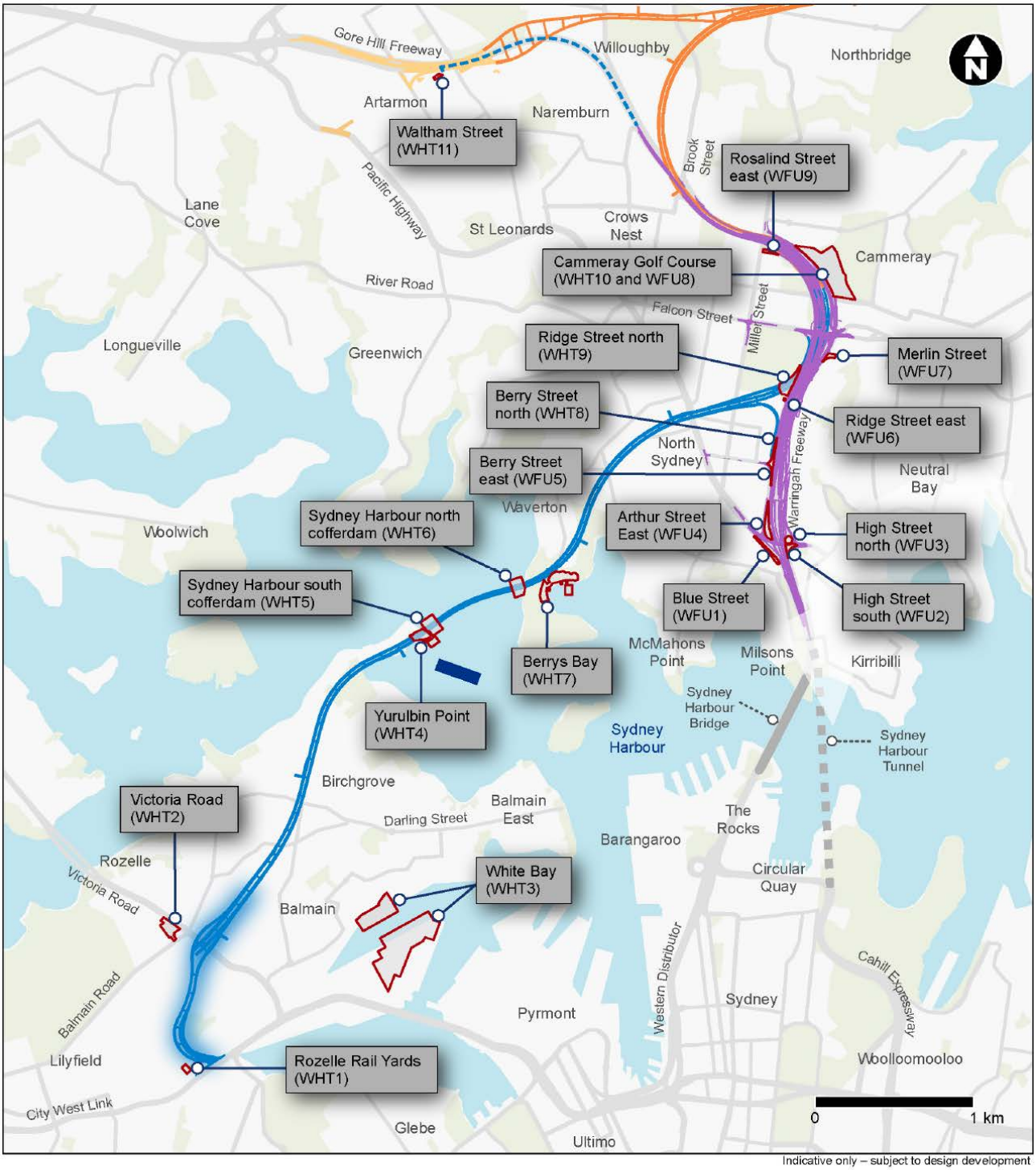
All of these connections are adequately described in the EIS.

## 4.2 Staging and Cumulative Impact Considerations

### 4.2.1 Staging

The Western Harbour Tunnel and Warringah Freeway Upgrade Project is proposed to commence construction from the last quarter of 2020 until the end of the first quarter of 2026. Construction of the Warringah Freeway Upgrade components are planned to begin in 2021, and tunnelling works around 2022. Construction support sites have been identified (see Figure 3.2) and summarised as follows:

- WHT1 – Rozelle Rail Yards (Q2 2023 to Q1 2026)
- WHT2 – Victoria Road (Q3 2021 to Q3 2025)
- WHT3 – White Bay (Q2 2021 to Q3 2025)
- WHT4 – Yurulbin Point (Q2 2021 to Q3 2025)
- WHT5 – Sydney Harbour south cofferdam (Q4 2021 to Q4 2025)
- WHT6 – Sydney Harbour north cofferdam (Q4 2021 to Q4 2025)
- WHT7 – Berrys Bay (Q2 2021 to Q3 2025)
- WHT8 – Berry Street north (Q1 2021 to Q3 2025)
- WHT9 – Ridge Street north (Q1 2021 to Q3 2025)
- WHT10 and WFU8 – Cammeray Golf Course (Q1 2021 to Q3 2025)
- WHT11 – Waltham Street (Q4 2023 to Q4 2025)
- WFU1 – Blue Street (Q1 2021 to Q3 2025)
- WFU2 – High Street south (Q1 2021 to Q3 2025)
- WFU3 – High Street north (Q1 2021 to Q3 2025)
- WFU4 – Arthur Street East (Q1 2021 to Q3 2025)
- WFU5 – Berry Street east (Q1 2021 to Q3 2025)
- WFU6 – Ridge Street east (Q1 2021 to Q3 2025)
- WFU7 – Merlin Street (Q1 2021 to Q3 2025)
- WFU9 – Rosalind Street east (Q1 2021 to Q3 2025).




*Source: Western Harbour Tunnel and Warringah Freeway Upgrade Project Environmental Impact Statement*

**Figure 3.1 Overview of the Construction Support Sites for the Project**

### 4.2.2 Cumulative Impacts

There are a number of relevant road and public transport projects being planned and implemented in Sydney which will have direct relevance to the volume of traffic using the Western Harbour Tunnel and Warringah Freeway Upgrade. The 'strategic' projects which have been included in the 2027 and 2037 'Do Minimum' network assumptions (essentially as committed projects) are:

- NorthConnex
- WestConnex
- Sydney Metro North West
- Sydney Metro City & South West

All of these projects are under construction and hence including them is a reasonable assumption.

There are a number of other project proposals which have been included in a 'Cumulative Impacts' assessment, such as:

- Sydney Gateway (by 2027)
- Beaches Link and Gore Hill Freeway Connection (by 2027)
- F6 Extension Stage 1 (by 2027)

The effects of major public transport improvements such as Sydney Light Rail, Sydney Metro Northwest and Sydney Metro CBD and Southwest on traffic demands have also been included insofar as the traffic volumes that are exported out of the STM mode choice modelling and into the SMPM.

*What is not included however are the traffic reduction effects of any light rail extensions (which are unknown at this stage) or Sydney Metro West which might be in place by the 2037 assessment year, should it be approved. This has been a consequence of the timing of the finalisation of the EIS and the announcement of the Sydney Metro West (October 2019) being similar. Notwithstanding this, the Sydney Metro West would be expected to be in direct competition with origin-destination travel markets otherwise benefitting from the M4 East, the M4-M5 Link and the Western Harbour Tunnel and Warringah Freeway Upgrade although the scale of reduction in traffic demand with Sydney Metro West would be expected to be relatively small, particularly by 2037.*

# 5. METHODOLOGIES & ASSUMPTIONS REVIEW

## 5.1 Traffic Modelling

### 5.1.1 Models and Process

It is understood that, in broad terms, the traffic modelling process involved:

- Strategic modelling using the Sydney Motorway Planning Model (SMPM):
  - running the "base demand model" which is founded on the Strategic Travel Model (STM) for the Sydney Greater Metropolitan Area to forecast person-trip demands by zone. Then, through trip distribution and mode choice modelling, creating traffic demands for private vehicles, light commercial vehicles (LCVs), and heavy commercial vehicles (HCVs) for peak and off-peak demand periods
  - using these vehicle demands, running the SMPM toll choice assignment model which was based on a distributed Value of Time (VoT) multi-class equilibrium assignment methodology
  - including induced demand effects associated with the increased accessibility between trip origins and trip destinations because of the project in the project case
- Creating and/or refining microsimulation models:
  - modelling under two cases: Construction period and operational period
  - using Vissim microsimulation and SIDRA intersection modelling for construction period modelling surrounding construction sites and more broadly for operational period modelling
  - calibrating and validating local microsimulation models for each of the interface areas
  - using the growth in traffic demands calculated from growth in SMPM forecasts and adding traffic to each microsimulation model's traffic demands to create future year traffic demands
  - running future year scenario models to understand the effects of complex vehicle movements in these areas due to the expected changes in traffic demands and local networks, including proposed associated improvement works.

The models were not in scope for consideration as part of this review and it is assumed that all calibrated and validated base models were deemed fit for purpose.

The SMPM base year was 2014. For a project assessed in 2020 and opening in 2027, this base year would ordinarily be considered 'out of date'. *It would be appropriate to refresh the base SMPM and the demand flowing through to the microsimulation models in subsequent stages of the project to assess whether the design is still optimal for more current traffic patterns and volumes and whether refinements are needed.*

### 5.1.2 Construction Period Modelling Approach

- Three scenarios were modelled for the construction period:
  - 2022 base (SIDRA and VISSIM), with existing road network with no new projects or upgrades. This is reasonable as no new roads will be open until 2022 in the Rozelle, Warringah Freeway, Gore Hill and surrounding areas.
  - 2022 construction (SIDRA) for peak tunnelling for the project only. The EIS is silent as to whether Sydney Metro City & Southwest construction traffic was included in this scenario and it should have been given that the North Sydney Metro Station will be under construction at the corner of Miller Street / Berry Street and is not due for completion until 2024.
  - 2022 construction (VISSIM), peak tunnelling for the project, Sydney Metro City & Southwest and M4-M5 link. Only Rozelle and surrounds were modelled.
  - 2024 construction (VISSIM), peak construction year for the project and the Beaches Link and Gore Hill Freeway Connection. Only Warringah Freeway and surrounds were modelled. The existing road network was used as no new roads will be open until 2024 in the Warringah Freeway area.

- *A modelling boundary area has been defined for each interface area however there is no justification or reasoning for the definition of these boundaries. For example, for the Warringah Freeway and surrounds, the intersection of Falcon Street / Pacific Highway is not included in the model and it is not clear why this is the case*.
- *SIDRA modelling was completed for intersections with traffic increases of less than 50 vehicles per hour. Some of these intersections may be highly sensitive to additional construction truck traffic and each construction vehicle may be equivalent to 3-4 PCUs (i.e. equivalent to an additional 150-250 ordinary vehicles per hour), which could be significant.*
- *Only 9 intersections have been modelled to assess construction period impacts and this seems to be insufficient given the number of sites and the scale of traffic, particularly near North Sydney. No commentary has been provided as to why only 9 intersections have been assessed.*

### 5.1.3 Operational Modelling Approach

- Four scenarios were modelled for the operational phase:
  - 'Base Year' (2016). The models were presumably calibrated and validated to a 2016 base year. *These models are quite old and conventional practice would have been to update these models to a 2019 base year in order to more accurately forecast year 2027 and 2037 demands.*
  - 'Do minimum' (2027 & 2037). These models exclude the project but include other approved and under construction projects such as NorthConnex, WestConnex and Sydney Metro City & Southwest
  - 'Do Something' (2027 & 2037). These models are the 'Do Minimum' with the project added
  - 'Do Something cumulative' (2027 & 2037). These models are the same as 'Do Something' models but add proposed projects such as Beaches Link and Gore Hill Freeway Connection, Sydney Gateway and F6 Extension Stage 1
- Surface interface models were created for the three surface interface areas:
  - Rozelle and surrounds
  - Warringah Freeway Upgrade
  - Gore Hill Freeway Connection
- Similar to the construction modelling description, there is no reasoning provided for the definition of the boundaries of the three operational simulation model areas
- A tunnel model was also created to assess future year operational traffic performance of the tunnels
- Input demand was adjusted so that it did not substantially exceed nominal capacity, claimed in the EIS to reflect a more realistic assessment of the performance of the road network under high forecast demands. This is an unconventional approach but it's basis is valid. *The issue with this approach however is that is not transparent in the documentation and there is no way of knowing how much demand is unsatisfied in the peak periods in each year. This should be documented in order to understand the reasonableness of assumptions made and whether the effects are so significant to warrant reconsideration of the level of induced demands in the strategic modelling.*

Notwithstanding this, the modelling approach used is considered to be the most appropriate methodology based on the models available in Sydney at the time of the assessment. *A review and update of all of the strategic and microsimulation modelling for the operational period should be undertaken as part of the future optimisation of the design given the age of the source models.*

## 5.2 Assessment Criteria and Methods

### 5.2.1 Construction Period

Impact assessment criteria have considered three spatial levels:

- The overall network impact
- Impacts at key intersections
- Mid-block impacts near key intersections.

These levels of assessment are appropriate for the scale and geographical spread of this project's construction which has broad community effects as well as localised impacts.

### 5.2.2 Operational Period

The impact assessment methodology has considered four spatial 'levels':

- At overall network level
- At corridor level for general traffic and bus travel times
- At intersection level at key intersections
- At mid-block level only.

These levels of assessment are appropriate and sufficient for a project of this scale.

### 5.2.3 Definition of Impact

At a network level, the use of VHT, VKT and average speed are reasonable criteria to determine overall impacts and benefits of the project.

At the intersection or mid-block level the methodology adopted relies heavily on identifying changes in Level of Service (LoS) between the 'Do Minimum' and 'Do Something' scenario as well consideration of if the performance was worse than a LoS of D (i.e. was E or F). This approach is limited in constrained urban environments as it does not capture the effects of the impacts relatable to drivers on a daily basis. *Measures such as average delay, number of green signal changes to pass through the intersection, travel times and queue lengths are far more relatable criteria for assessment of traffic impacts in congested urban networks.*

One of the key benefits of using microsimulation models is the visualisation of queuing patterns and pinch points, in order to better understand the causes and effects of pinch points due to the project. The EIS would have benefited from showing queueing patterns and typical queue lengths near interchanges and at the exit and entry points of the Western Harbour Tunnel to demonstrate the impacts and limitations of the project and particularly of its interchanges. This would allow determination, for example, if queues from surface road constraint points queued back into the project (or back into local surface roads) and what capacity and safety considerations would be a consequence of this.

*Queue length outputs/screen captives should have been provided as a key comparison metric for each sub-area for which a microsimulation model has been created. The metrics used to describe impact do not allow the reader to comprehend the true extents of the impacts generated in any relatable way.*

# 6. CONSTRUCTION PERIOD IMPACTS

## 6.1 Methodologies

### 6.1.1 Network Impacts / Cumulative Impacts

The EIS assessed five core components for construction traffic and transport impacts, as follows:

- Road traffic
- Local roads and parking
- Public transport
- Pedestrian and cyclists (active transport)
- Maritime traffic.

Qualitative impact assessments were completed for all components with the exception of road traffic for which traffic modelling was completed to provide a quantitative assessment of the road network performance. The *Technical working paper: Traffic and transport* includes the quantitative analysis details, and the majority of Section 6 and Section 8 of the EIS focuses on the qualitative assessment.

Three construction traffic modelling scenarios were run as follows:

- **Base Case 2022:** The existing road network with 2022 traffic demands
- **Construction 2022:** The peak tunnelling period for the project. This includes the Base Case road network movements plus the project's construction traffic movements plus Sydney Metro City & Southwest and M4–M5 Link project effects
- **Construction Cumulative 2024**: Peak construction year for the Western Harbour Tunnel and Beaches Link program of works and the Gore Hill Freeway Connection project.

### 6.1.2 Localised Impacts

The most contentious localised impacts around construction site access points usually relate to additional traffic congestion for access to/from sites, the potential for construction worker parking in nearby residential streets and the street and park closure impacts on the accessibility and amenity of nearby residents or visitors.

The construction traffic and transport impacts have mostly been assessed qualitatively and it is unclear how each site could affect each local area. Several construction work sites will provide car parking spaces, but as this detail is not quantified, there is insufficient information to identify the parking demand of each site, what parking is available, the overflow of parking to surrounding streets, and the impact mitigations measures that could be required.

It is recognised that detailed construction site planning may not have been undertaken and will be further assessed as the construction strategy evolves, *but sufficient calculations are warranted to determine potential on-site parking accommodation, as has been completed for similar EIS's*.

It has been raised that several recreational parks would be affected during special events. *The impacts on event parking North Sydney Oval as a result of reductions in parking on Ridge Street due to construction during events should be addressed. At a minimum, the need or framework for a parking management plan should be identified. It is also anticipated that during special events, the closure of Yurulbin Park may increase the pressure of other locations*.

## 6.2 Haul Routes and Times

The EIS identifies access points to works sites but does not define or map haul routes for heavy vehicles, although these are provided as indicative construction vehicle routes in the *Technical working paper: Traffic and transport*. Much more detail is provided for construction spoil and unloading between construction support sites and Section 6.8.2 of the EIS provides a marine transport and construction vessel routes map. *It would be reasonable to assume that a similar level of detail could be provided for road haulage routes and impacts as is provided for vessel transport*.

Cumulative construction traffic vehicle movements are not presented on any site haul route overlaps, such as eastbound on Anzac Bridge in the AM peak. These volumes would be best illustrated on the haulage route maps. It is also not stated how the one-hour peak construction volumes were determined and when the peak hours are. It is assumed this information is used in the modelling but it is not presented in the EIS.

It is possible that construction volumes may have been underestimated. For example, in Table 5-8 of the *Technical Working Paper: Traffic and Transport*, for the volumes in 2022 Base and Construction scenarios, The Crescent west of Victoria Road carries no construction traffic in AM and PM peaks in the westbound direction and only 40 and 60 vehicles eastbound.

## 6.3 Western Harbour Tunnel Construction Sites

### 6.3.1 General

The EIS states that workers accessing the construction support sites would be provided limited time parking at some sites and that shuttle bus transfers between sites would also be provided where required. For many of the sites, the EIS also states that where insufficient on-site parking is available, that construction workforce 'would be required to park on-street'. The EIS does not provide sufficient information to allow determination what quantum of parking is available on site, what construction worker parking demand is likely for each site, what overflow parking is probable onto surrounding streets and what scale of impact mitigation measures could be required. *It is acknowledged that detailed construction site planning may not have been undertaken but sufficient calculations are warranted now to determine the scale of potential impacts to determine if they are manageable within the bounds of mitigation measures being contemplated, or not, as has been completed for similar EIS's.*

### 6.3.2 WHT1: Rozelle Rail Yards

The site is largely vacant. There are residences located immediately north of the site. This site would have arrangements for access in and out via City West Link Road. Underground works and deliveries to the tunnel would be carried out up to 24 hours per day, seven days per week.

Construction works for the project at this site will overlap with construction works for the approved M4-M5 Link which uses part of the Rozelle Rail Yards. *It is unclear what mechanisms would be required to ensure that construction works for the project at this location would be carried out in coordination with the construction contractors of the approved M4-M5 Link*.

### 6.3.3 WHT2: Victoria Road

A number of vacant commercial premises as well as residences currently occupy the site. The Rozelle Public School is also located north-east of the site. Tunnel construction and fit out would be carried out up to 24 hours per day, seven days per week either within an acoustic shed or underground. Night-time deliveries would be required to support the tunnelling activities. The site would have arrangements for access in and out of the site via Victoria Road.

*An existing public car park will be removed at this site and is not identified within the EIS. There are no details on the number of spaces to be removed. As the area features various retail outlets, the removal of this car park may encourage drivers to park on-street, impacting local businesses. This issue has not been specifically identified.*

### 6.3.4 WHT3: White Bay

The site is bound by a mixture of industrial and high density residential properties and the bay. The site would consist of a combined land and water-based site, and as such, will include marine traffic as well as land traffic. The site is currently an operating port facility and the proposed construction support site will use the wharf areas and berthing facilities. Some deliveries to and from the site would be required during the evening and night-time to support casting of immersed tube tunnel units and construction activities at the Yurulbin Point (WHT4) and Berrys Bay (WHT7) construction support sites.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS to determine if it is sufficient and what the impacts are if it is not.*

### 6.3.5 WHT4: Yurulbin Point

The site is bound by Sydney Harbour and Yurulbin Park. There are residential properties to the north and west of the site. Areas of Yurulbin Park within the construction footprint including an existing car park, would be closed during construction. As this site's construction footprint overlaps with the Birchgrove Ferry Wharf, this would also result in the temporary closure of access to Birchgrove Wharf (around two years).

An existing public car park will be removed at this site. The details on the number of spaces to be removed is adequately described in Section 8.4 of the EIS. The car park is attached to and primarily services visitors to Yurulbin Park, which will be utilised for the construction site. The parking loss impact is redundant due to the closure of the park.

The location of Birchgrove Ferry Wharf at the end of the long, narrow Louisa Road suggests that a large proportion of ferry boarding and alighting movements at this wharf is by local residents. Closing the ferry terminal would have a significant impact on these residents. The nearest Bus Stop is at the eastern side of Birchgrove Oval which is a 750m walk from the ferry wharf. This stop services the 441 which provides a 20 minute service to the CBD. An alternative temporary ferry wharf location is the preferred mitigation strategy however the use of the 441 is a reasonable alternative strategy but would need thorough public consultation and educational information.

Furthermore, Louisa Road is very narrow with on street parking. Construction vehicles (trucks) using this road would be expected to cause significant impacts and should be completely avoided (via an approval condition) as suggested in Table 6-15 of the EIS.

### 6.3.6 WHT5: Sydney Harbour south cofferdam and WHT6: Sydney Harbour north cofferdam

These sites consist of temporary cofferdams located at two sides of the Sydney Harbour to accommodate the immersed tunnel crossing, at Yurulbin Point, Birchgrove and next to Balls Head coal loader, Waverton. There are no traffic or transport issues identified for these sites.

### 6.3.7 WHT7: Berrys Bay

This site is situated in a vacant space between Berrys Bay and residential properties to the north, east and west.

While the site is vacant, there are large rock cuttings along the northern boundary, an existing Sydney Water asset, and a number of commercial buildings and sheds in the southern end, including heritage listed structures. Construction would be designed to retain and protect these existing structures where feasible. There would be arrangements for access to site via Balls Head Road for road traffic and Sydney Harbour for marine construction vessels used for major deliveries and spoil haulage.

*An undetermined number of car parking spaces is available on site for construction workers and should be quantified within the EIS.*

Moorings within the vicinity of the Berrys Bay site would require temporary relocation, in consultation with the lease holders.

In terms of road access, Chapter 6 of the EIS suggests that Balls Head Road would be used for "limited deliveries to the site at night". Chapter 8 of the EIS states "Under a worst case, up to 210 light vehicle movements and 55 heavy vehicle movements per day would access this construction support site". Bays Road and Balls Head Road are local residential streets with no through traffic, narrow lanes, on street parking, on street cycling and LATM devices for speed management. Trucks larger than an MRV should not be using this road and this should be conditional accordingly. Night time deliveries to the Berrys Bay site by road would be expected to introduce significant impacts compared to the base situation.

### 6.3.8 WHT8: Berry Street north

The site is situated within the Warringah Freeway corridor between Warringah Freeway and Berry Street on ramp with the nearby high rise residential buildings to the west. Some construction activities supported by this site would require out of hours work, including during connection of new works to the existing road.

There would be arrangements for access into the site via Berry Street and out of the site via Warringah Freeway. *It is not clear within the EIS how the entry / exit at Berry Street could be provided safely in the proposed location as there are sight line limitations and a very limited range of a potential points of access/egress. It is likely that all exits would need to be under traffic control which would be disruptive to heavy traffic volumes and this should be stated if it is the case*.

An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS. On-site parking should be discouraged for this site because of the access sight line limitations. The EIS states that where insufficient on-site parking is available, that construction workforce 'would be required to park on-street'. *It doesn't state where on street as limited parking is available near this site and what is available is heavily occupied.*

### 6.3.9 WHT9: Ridge Bay north

The site is situated on the south-eastern corner of St Leonards Park and is bounded by Warringah Freeway to the east and Ridge Street to the south. Sensitive receivers nearby include, residential properties towards the south past Ridge Street, various schools towards the south and west, and the public accessing the St Leonards Park for recreational purposes. Some construction activities supported by this site would require out of hours work on occasion, including connection of new works to the existing network.

The site will be accessed primarily via the Warringah Freeway and via Ridge Street for light vehicles during site establishment. As the site has a secondary access off Ridge Street into the park's public car park, there will be impacts to parking spaces. The impact on these parking spaces is not defined and should be as should the undetermined number of car parking spaces required for construction workers and provided on site.

An existing public car park exists on Ridge Street and spaces will be removed to allow for the site access. The details on the number of spaces to be removed is adequately described in Section 8.4 of the EIS.

### 6.3.10 WHT10: Cammeray Golf Course

The site is situated on the south-west portion of the Cammeray Golf Course and is bound by residential properties and the WFU8: Cammeray Golf Course construction support site to the north, Cammeray Golf Course and Cammeray Park to the east, Warringah Freeway to the west, and Ernest Street to the south. It is not clear within the EIS if the two sites at WFU8 and WHT10 will be operational simultaneously. *If there are simultaneous operations, it is unclear why two accesses are required in close proximity which could lead to potential weave conflicts when an internal link may be possible instead. For the southern egress, no acceleration lane is provided and there could be a significant speed conflict present with limited gaps for trucks to enter as well. It is unclear how traffic control might be used to mitigate this issue.*

There are residential properties past Earnest Street towards the south, and residential buildings at immediately to the north. The site has been designed to avoid impacts to the football pitch, skate park, croquet club, and tennis courts at Cammeray Park, and the Cammeray Golf Course, which would all remain open during construction. Tunnel construction and fit out would be carried out up to 24 hours per day, seven days per week either within an acoustic shed or underground.

Night time deliveries would be required to support the tunnelling activities. Crushing and screening activities would also be carried out within the acoustic shed.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS given the scale and importance of this site and the impacts of overflow parking on residents*.

### 6.3.11 WHT11: Waltham Street

The site is situated in the Artarmon industrial area and is bounded by Gore Hill Freeway to the north, Taylor Lane to the south, and Waltham Street to the west. The site is currently occupied by industrial buildings. The site would have access via Waltham Street.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS*.

A number of parking spaces may be removed temporarily to provide suitable access and is adequately described in Section 8.4 of the EIS. It is not stated whether the footpath or cycling infrastructure would be affected, however, as the site will not access via Gore Hill Freeway, it is expected that there will be no related impacts to pedestrians and cyclists using the separated shared path on the southern side of Gore Hill Freeway.

## 6.4 Warringah Freeway Upgrade Construction Sites

### 6.4.1 General

The EIS states that workers accessing the construction support sites would be provided with limited time parking at some sites. Shuttle bus transfers between sites would also be provided where required. There is no quantification of what parking will be demanded, what will be provided and what will overflow into the limited parking on streets around each site. The only parking impacts that are described are the loss of on street parking due to lane closures or construction site access locations.

### 6.4.2 WFU1: Blue Street

The site is situated at North Sydney and is bound by Blue Street to the north, the North Shore railway line to the west and Pacific Highway to the east and south. The site is located next to local and state significant heritage items associated with the Sydney Harbour Bridge approaches, arches and viaducts.

*An undetermined number of car parking spaces for construction workers is available on site and these should be quantified within the EIS*.

### 6.4.3 WFU2: High Street south

The site is situated within the Warringah Freeway corridor at North Sydney and is bound by the Cahill Expressway to the west and south, High Street off ramp to the east, and High Street to the north. The nearest residential buildings are located on High Street towards the north and McDougall Street towards the south. Access is via High Street.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS*.

### 6.4.4 WFU3: High Street north

The site is situated within the Warringah Freeway corridor at North Sydney and is bound by Alfred Street North / Cahill Expressway to the west, and High Street to the north, south, and east.

The nearest residential buildings are located on High Street towards the east, and Whaling Street towards the south. Access is via Alfred Street North to the north and via Pacific Highway to the west.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS.*

### 6.4.5 WFU4: Arthur Street east

The site is situated within the Warringah Freeway corridor at North Sydney and is bound by Warringah Freeway to the east, Arthur Street to the west, Mount Street to the north, and High Street to the south. Access is via Arthur Street to the west measures will be put in place for pedestrian access for construction workers via Arthur Street.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS*.

### 6.4.6 WFU5: Berry Street east

The site is situated within the Warringah Freeway corridor at North Sydney and is bound by Warringah Freeway to the east, Arthur Street and Berry Street to the west, and Doris Fitton Park to the south. There are high density residential apartments located towards the north-west and opposite the site on Berry Street. Access is via Berry Street to the west and egress from the site is available directly onto the Warringah Freeway to the north.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS. Acceleration lane requirements for access directly onto the Warringah Freeway have not been described.*

### 6.4.7 WFU6: Ridge Street east

The site is situated within the Warringah Freeway corridor at North Sydney and is bounded by the Warringah Freeway to the east, residential properties on Ridge Street to the south and west, and St Leonards Park to the north. There are residential properties towards the south and west on Ridge Street. Access is via Ridge Street to the north.

Pedestrian and cyclist access across the Warringah Freeway is expected to be maintained via the old bridge until the upgraded crossing is completed.

### 6.4.8 WFU7: Merlin Street

The site is situated in Neutral Bay on the eastern side of Warringah Freeway within the Merlin Street Reserve, which is owned by Transport for NSW. The site is bound by residential properties to the north, Merlin Street to the east, Alfred Street to the south, and McIntosh Lane and Warringah Freeway to the west. A public footpath runs along the east and south of Merlin Street reserve. Access is via Military Road and Merlin Street.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS*.

### 6.4.9 WFU8: Cammeray Golf Course

The site is located within the north-west portion of the Cammeray Golf Course, adjacent to the Warringah Freeway. The site is bound by residential properties to the north, the Cammeray Golf Course to the east, Warringah Freeway to the west, and the Western Harbour Tunnel construction support site, WHT10, to the south. The golf course would remain operational during construction. There are residential buildings towards the north along Warringah Road and Morden Street.

The site would also provide a temporary bus layover area, as the existing Warringah Freeway bus layover is to be removed and relocated. Site access is directly off the Warringah Freeway to the north and via Ernest Street to the south.

This a key construction site and there is an undetermined number of car parking spaces for construction workers to be made available. Given the scale of this potential demand and the site access off the freeway, this demand should be quantified within the EIS. The safety and operational capacity needs of the access directly off the Warringah Freeway should be addressed in the CTMP and at least an overarching strategy provided in the EIS.

*Together with WHT10, this site is one of the higher impact, higher volume combined construction sites. A reasonable inclusion in the EIS would be the definition of heavy vehicle routes and a cumulative impact assessment with mitigation measures described, including a traffic control strategy at entry/egress points.*

### 6.4.10 WFU9: Rosalind Street east

The site is situated within the Warringah Freeway corridor and is bound by Warringah Freeway to the north and east, Rosalind Street to the south and Miller Street to the west. There are residential properties located towards the south on Rosalind Street. Access is via Miller Street to the east and Rosalind Street to the south.

*An undetermined number of car parking spaces for construction workers is available on site and should be quantified within the EIS.*

## 6.5 Traffic Delay Impacts

### 6.5.1 General

For each construction scenario, the following areas were assessed:

- Rozelle and surrounds
- Birchgrove to Waverton (Sydney Harbour crossing)
- Warringah Freeway and surrounds
- Gore Hill Freeway and Artarmon.

SIDRA and VISSIM modelling was completed for the estimated combined peak construction and background traffic periods. The modelled areas and types are explained well however the interfaces between the modelling are not described at all. It is important to understand how the actual flows or demand flows move between the strategic, microsimulation and intersection-level models and over what time periods these demands are considered.

*The potential construction timing interfaces with the M4-M5 Link are not discussed. It should be confirmed if the intention is to open the Western Harbour Tunnel before or after the M4-M5 link section between the Rozelle Interchange and the Anzac Bridge is open to traffic as this will have bearing impacts and benefits of the project on the M4-M5 Link project. Similarly, the currently ongoing Sydney Metro City & Southwest construction works are anticipated to finish in 2024, but the overlap of timing interfaces with the Warringah Freeway Upgrades is not presented*.

### 6.5.2 Rozelle and Surrounds, 2022 Scenario

The construction support sites included in the Rozelle and surrounds study area are WHT1 to WHT4.

The intersection of City West Link / The Crescent will increase its average delays from 90 secs to >100 seconds.

The lack of specificity of this impact is significant because this is high volume location and additional delays impact a lot of vehicles, with queues consequentially affecting other intersections. *Further consultation period mitigation works should be considered at this intersection if possible.*

Table 8-14 provides no guidance as to the scale of impacts of construction traffic. The heavily congested network will worsen in this area and the extent of queuing change should be presented so that impacts can actually be evaluated. It is clear that City West Link / The Crescent is the key pinch point in this area which will need further relief during the construction period. *Further information is required (such as queue lengths) in order to substantiate what the construction period impacts actually are at these intersections and on which intersection approaches as this is indeterminable from the information provided*.

### 6.5.3 Warringah Freeway and Surrounds, 2022 Scenario

The changes in traffic volumes in the area are relatively small in general and even though the Miller Street / Falcon Street intersection goes from a 90 second average delay in the AM peak to >100 seconds during construction, this is unlikely to be a significant change with the addition of 30 vehicles per hour (vph).

### 6.5.4 Gore Hill Freeway and Artamon

There are no issues with the intersections impacts or mid-block impacts for this area.

### 6.5.5 Cumulative Construction Period Impacts, 2024 Scenario

The EIS reports significant delay impacts at the Willoughby Road / Gore Hill Freeway interchange, Brook Street / Warringah Freeway ramps and Brook Street / Merrenburn Avenue intersection with an increase in average delay of 30-40 seconds. *No mitigation has been proposed to relieve the heightened congestion levels around this area and a construction traffic management strategy should be prepared to mitigate this scale of impact.*

Other cumulative construction period impacts in 2024 identified but not addressed include:

- Travel times increase by two minutes per vehicle eastbound and 5 minutes per vehicle westbound in the AM peak on City West Link – Western Distributor
- Travel times increase by three minutes northbound in the AM peak on Victoria Road
- Major impacts in the Rozelle area generally along Victoria Road and City West Link for which there are no feasible alternative routes to use for mitigation.

*The scale of these impacts suggests that further consideration is needed regarding how best to coordinate the construction programs of this project and the M4-M5 Link so that the construction vehicle demands can be separated in time. Even night time full closures will be challenging as the set-up of traffic control, and its removal, would take many hours, raising questions as to the value of any full closures anyway.*

### 6.5.6 Warringah Freeway Closure

The closure of part of all of the Warringah Freeway will inevitably have major, widespread impacts. The full closure options should be discouraged or even removed from consideration due to the lack of alternative north-south access to/across Sydney Harbour and the extreme consequences that this poses in the event (albeit unlikely) of a CBD evacuation.

## 6.6 Active Transport Impacts

In Chapter 6 in the EIS, generally, the figures do not show pedestrian/cyclist paths that are intercepted by construction sites, nor do they show on-street or off-street parking areas that may be covered.

However, active transport impact maps are highlighted in Chapter 8 as a 'high level' overview. Identifying these areas would facilitate an understanding of what ancillary works the project would need to incorporate in its definition in order to address these impacts.

Where existing routes/paths have been physically affected by construction works, reasonable alternative routes have been recommended. In various sections in Chapter 8, the impacts to active transport are generally anticipated to be moderate and manageable.

The most significant construction period active transport impacts are in the Warringah Freeway corridor however these have been adequately addressed in the EIS. The existing path adjacent to the freeway does include a missing section on approach to the bridge crossing the freeway at Naremburn. There is a clear opportunity for TfNSW to complete this missing section as part of the project however it is recognised that the completion of this link is not required as a consequence of the project.

The Falcon Street diverging diamond interchange is a new concept in the study area and the safety impacts/needs as a result of consolidating pedestrian crossings into a central median shared user path should be further considered during construction and once the interchange is constructed.

The connection of new or modified pedestrian and cyclist paths across intersections is not clear in all locations. For example, it is not clear if pedestrians crossings are being provided across the north to east and east to south slip lanes at the High Street interchange during or post-construction.

## 6.7 Public Transport Impacts

The ferry travel time impacts are either minor or short-lived and have been addressed adequately.

There are a locations where public bus travel times and reliability will be significantly impacted such as through Rozelle (Victoria Road, City West Link) and the bus lanes/access via the Warringah Freeway. A number of temporary bus stop relocations are proposed which would need to be addressed on a case-by-case basis considering the duration of relocation and walking catchments and pedestrian access routes.

## 6.8 Public Transport and Walk Access to Construction Sites

The EIS emphasises that the project should encourage construction workers to access each site via public transport but no assessment has been done as to whether this is possible or probable given the location of bus stops and footpaths during construction and in relation to pedestrian access points to/from each site. *Pedestrian access routes between each site entry and the nearest likely public transport stops should be identified.*

## 6.9 Proposed Environmental Management Measures

Section 8.5 in the EIS documents proposed management measures for the construction period traffic and transport impacts identified.

In general, the measures to manage traffic congestion, parking and local traffic intrusion impacts are generic and describe what will be done with little 'back-up' as to how the measures will be achieved. It is understood that the 'how' is usually left for subsequent environmental management plans to follow approval of the EIS however there are a number of impacts where some generalised strategies would warrant further explanation in the EIS to understand if they are possible.

# 7. OPERATIONAL PERIOD IMPACTS

## 7.1 Context

The EIS provides an assessment of the project is operational impacts on:

- Road traffic
- Public transport
- Pedestrian and cyclists (active transport)
- Maritime traffic.

The road traffic impacts assessment primarily relies on traffic modelling but also considers local traffic and parking impacts. The modelling of the road traffic impacts considers the scenarios of 'Do Minimum', 'Do Something' (i.e. with the project) and 'Do Something Cumulative' for 2027 and 2037. The Do Something Cumulative scenario included proposals not yet approved by Government but currently under consideration, or will be under consideration soon, such as the Beaches Link, Gore Hill Freeway Connection, Sydney Gateway and F6 Extension (Stage 1).

## 7.2 Broader Transport Network

The Do Something Scenario, as expected, reduces traffic volumes and congestion on the other Harbour crossings while the improved cross-harbour accessibility induces more north-south travel. For example the EIS identifies that '*peak period heavy vehicle demands across Sydney Harbour would increase by up to 15 per cent'.*

These are expected outcomes as the project essentially 'opens up' a range of trip markets for trips across the harbour. The key benefit of the project is to draw traffic from surface roads into the Western Harbour Tunnel system and this is expected. This has an effect on the screenline results on the other north-south links showing decreases in the north-south daily volumes in 2027 and 2037 with the project. The 'Cumulative' scenario also reports greater changes in 2037 north-south surface road volumes to the without project scenario, with the Western Harbour Tunnel volumes increasing significantly.

These results are expected and demonstrates that the north-south surface road links (generally between the City and North Sydney) are largely improved by the Western Harbour Tunnel. This is reinforced in Table 8-3 in the *Technical Working Paper: Traffic and Transport* which show that all major north-south road links, with the exception of the Gladesville Bridge (which is beyond the practical reach of the project) have reduced volumes due to the project in 2027 and 2037.

The results in Table 8-7 of the *Technical Working Paper: Traffic and Transport* demonstrate that VKT increases and VHT reduces with the project and this is typical when new motorway-standard roads are added to congested networks.

*The EIS does not present changes to public transport system patronage. SEARS item 2(a) requires documentation of forecast travel demands on the public transport network and this has not been provided. The project and its relief on travel times for other north-south routes will reduce patronage on radial public transport such as the Metro and the B-Line however B-Line patronage reduction may be offset by the bus priority measures being built as part of the project. It would have been prudent to describe any reductions or increases in public transport demand as a consequence of the project.*

## 7.3 Western Harbour Tunnel

The Western Harbour Tunnel is anticipated to carry about 83,000 vehicles per day (vpd) which is expected to be well within its six lane capacity. It is expected that its merge, weave and diverge areas will be designed to prevailing standards at the time of construction.

## 7.4 Rozelle and Surrounds

As expected, the Rozelle area generally performs better with the project because the through traffic demand that would have otherwise used the surface road system is now underground between the M4-M5 Link and the Western Harbour Tunnel. The exception though is localised congestion around the tunnel access points via the Rozelle Interchange. This 'localisation' of traffic movements at the key entry and exit point is a key consideration. While the reduction through traffic offsets this local impact in the AM peak, there are residual issues in the PM peak which have not been addressed. In particular the areas between The Crescent / City West Link / Rozelle interchange and the Crescent / Johnston Street needs further consideration. Travel times have been shown to increase in the PM peak on City West Link with the project compared to 'Do Minimum', with substantial increases northbound in the AM peak on Victoria Road as well due to the merge of the M4-M5 link with Victoria Road. The more efficient dissipation of this merging traffic into the network is not a direct consequence on the project but the impacts of the M4-M5 link are exacerbated by traffic using the project.

In order to release traffic from the tunnels in the PM peak and minimise queue back into the tunnel through lanes, it appears that traffic is being released from the intersection of The Crescent / City West Link and towards the Western Distributor and towards Johnston Street.

*The EIS does not provide any traffic management strategy to 'buffer' the impact on the intersection of The Crescent / Johnston Street and should have identified how this low capacity intersection will be managed or upgraded.*

## 7.5 Birchgrove to Waverton

This area influences maritime movements however with the re-installation of the Birchgrove ferry wharf post-construction, there are no operational period impacts.

## 7.6 Warringah Freeway and surrounds

As is the case in Rozelle, the Western Harbour Tunnel reduces traffic and travel times on major north-south routes and given the scale of traffic on these routes demonstrates an overall network benefits. However, the project's attractiveness around entry and exit points means more traffic and more congestion and delays locally in areas like North Sydney than would otherwise be the case. For example, intersections along Miller Street are far more congested substantially increasing travel times southbound in the AM peak and northbound in the PM peak. Falcon Street, the western end of Military Road, Berry Street, Mount Street and intersections along the Pacific Highway north of the Bay Road intersection are all impacted by the inducement of traffic to and from the increased accessibility introduced by the project.

The increased congestion on streets like Berry Street, Miller Street and Falcon Street are even after localised capacity improvements have been introduced (EIS Table 7-26, Appendix F). The localised capacity improvements would reduce pedestrian and parking areas near a number of intersections.

Closer inspection of the simulation modelling results identifies that there are also over 6,000 more unreleased vehicles in the 2037 PM peak with the project than in the 2037 'Do Minimum'. The average traffic speed increases for the 2037 'Do Something' scenario need to be interpreted in this context.

The extent of unreleased vehicles in this network is significant and may influence congestion worsening well beyond the modelled area. These effects cannot be verified however as typical queue profile screenshots were not provided from the simulation models. *This information should have been provided to demonstrate the significant level of queueing and 'blocking back' in the simulation models in both the AM and PM peaks in both future years.*

## 7.7 Gore Hill Freeway and Artarmon

The total traffic demand able to enter this interface area remains about the same with the project compared to the 'Do Minimum' case. The modelling shows minimal improvements in network statistics for the 'Do Something' case compared to the 'Do Minimum' case. This is expected because the attractiveness of the project induces more traffic into the Gore Hill Freeway but there are no associated adjacent capacity improvements in this area.

The most significant impacts in this area appear to be on Longueville Road-Gore Hill Freeway, and particularly eastbound in the AM peak. Due to no queue length screenshots being provided from the model it is unclear whether eastbound traffic queues back from the Gore Hill Freeway through to the western end (Lane Cove Road) and southern end (Longueville Road). There are similar congestion effects along Reserve Road given its direct access to the M2 and queue-back congestion.

The increase in demand and congestion along Longueville Road is in conflict with the pedestrianised environment through the Lane Cove Town Centre. *Further consideration should have been given as to what supporting upgrade projects are needed to mitigate impacts of the project on Longueville Road and on Reserve Road.*

## 7.8 Cumulative Scenario Effects

The modelling suggests that the primary influence of expected future projects such as the Beaches Link is to increase traffic on the Western Harbour Tunnel and Warringah Freeway by drawing more traffic away from the Harbour Tunnel and Sydney Harbour Bridge, CBD, Anzac Bridge and the Eastern Distributor. These results appear logical, particularly for access to or from the Northern Beaches.

While there are overall network benefits with more traffic diverted to the higher capacity motorway network, the localised congestion issues raised above around Rozelle, Iron Cove Bridge, North Sydney and Lane Cove will also be exacerbated with increased access/egress demand to/from the motorway network.

*Further mitigation measures may need to be considered in the future for dealing with the localised impacts around entry and exit points at Rozelle, Iron Cove Bridge, North Sydney and Lane Cove.*

## 7.9 Local Property Access and Parking

### 7.9.1 Parking: General

The impacts associated with the removal of on street parking are mostly introduced in the construction period with parking generally replaced following construction, with some notable exceptions.

The permanent parking loss is associated with intersection upgrades (extensions of queueing lanes into on-street parking sections) and peak period clearways, particularly in the North Sydney area. The EIS identifies that parking restrictions will be imposed on High Street, Clark Road, West Street, Ben Boyd Road, Miller Street and Amherst Street. Some of these areas are residential streets with residential parking permits in place suggesting insufficient on-site parking.

*In general, the extent of parking loss/restriction is too loosely defined are there is no quantification of lost spaces and how they could be replaced nearby, particularly in residential areas.*

### 7.9.2 Parking: Alfred Street North

The construction of the Ridge Street pedestrian bridge, the Alfred Street North realignment/widening works and the High Street interchange will result in the permanent loss of 47 parking spaces between Wyagdon Street and Ridge Street and a further 49 spaces between Ridge Street and Whaling Road (to be replaced with 23 new parking spaces following completion of works). This parking is 9P Mon-Fri (9am-6pm) and marked as such as it is primarily used by North Sydney commuters during weekday business hours. Outside of these hours, these bays are heavily relied on by residents of the local area with many of the multi-unit buildings to the east of the Warringah Freeway having insufficient parking for all of their residents and no visitor parking.

The nett loss of 73 bays will be a significant impact on local residents. Nearmap imagery reviewed for Saturdays and Sundays along this section shows an occupancy of about 70%-80% with higher occupancies towards the Mount Street intersection. Site observations also revealed 90%+ occupancy after business hours on weekdays. Adjacent street parking in the few narrow east-west streets that exist is also heavily occupied due to unit blocks in this area with insufficient parking.

A key issue with replacing this parking loss for residential parking is that it spans over about 1,000m in length and one centralised parking area would provide little to mitigate to the impact. TfNSW should be encouraged to work with North Sydney Council to identify how the project can be modified to accommodate an additional 60 (approx.) bays along Alfred Street North as part of the detailed design.

In addition to the parking loss, the removal of kerbside space means that other kerbside needs such as pick-up/drop-off, delivery vehicles, mobility impaired parking and visiting trades will not be able to park on street, or is many cases off street either as some properties have no site parking.

### 7.9.3 Access: General

In most locations, property accesses that are directly or indirectly impacted are mostly affected during construction. North Sydney is the exception where street changes and turn bans will permanently influence property car park access and egress. Unresolved issues include:

- How the eastbound to westbound U-turn function at High Street / Alfred Street will be re-instated when it is signalised?
- The banning of the right turn from Miller Street (northbound) into Berry Street (buses excepted) will impact a public car park which exits onto Miller Street northbound. This traffic would require a very long recirculation distance to access the freeway to head south

- There are properties on West Street with garages that require drivers to reverse directly onto West Street. The kerbside parking currently protects these movements and its removal may affect the ease and safety of these reversing manoeuvres. An education process with affected residents would be a reasonable future impact mitigation measure.

### 7.9.4 Access: Alfred Street North

The project is removing the current 'tight' U-turn from the Warringah Freeway southbound off ramp into Alfred Street North northbound. The traffic that uses this turn is primarily accessing the on street parking along the western side of Alfred Street North (northbound) or the property accesses for 373-393 Alfred Street North. Removing the U-turn means that this traffic would need to continue southwards on the Warringah Freeway off ramp to the High Street bridge, use the bridge, Arthur Street, Mount Street and then left into Albert Street North. To access 373 - 393 Alfred Street North, this involves an extra 1 km (approx.) of travel distance through congested intersections.

Similarly, if residents travelling southbound and intending to park in the remaining on street bays in Albert Street North can't find an available car park, they would need to re-circulate 1 km (approx.) to access available parking across the road. Even through the northbound and southbound carriageways have separation constraints, U-turn facilities could be investigated near Kuraba Road (north-to-north) and near Eaton Street (south-to-south).

Some areas of the freeway widening may directly impact the ability for residents to reverse out of their Alfred Street North driveways (where the roadway fronting the driveway crossover is less than 6.0m wide) and some crossovers may need to be widened. Driveway assessments of all impacted driveways would be needed to be included in the CTMP. Similarly, it is unclear whether a car, let alone an MRV, will be able to make the turn from Winter Avenue into a narrower Alfred Street North. These issues should be addressed in finalising the design with the associated objective of trying to re-instate sufficient width to maintain the on street parking along the western edge of Alfred Street North near Winter Avenue.

## 7.10 Public Transport

### 7.10.1 Rozelle Area

Bus travel times will be subjected to the same issues identified for private vehicle travel times. Times would generally increase through the Rozelle area but then reduce north of it as the congestion relief provided by the WHT is realised. Similarly, travel time reliability would be impacted through the area but would improve north of it, providing an overall expected 'balance' in travel time reliability when comparing the 'Do Minimum' and 'Do Something' scenarios. The additional bus travel time outbound along Victoria Road in the AM peak is a prevailing issue with the Iron Cove Bridge and M4-M5 Link ramp arrangements but this is more so a M4-M5 link issue than a Western Harbour Tunnel issue.

### 7.10.2 North Sydney Area

The primary beneficiaries of the project are services on the Warringah Freeway that would now have uninterrupted, dedicated bus lanes and much improved travel times compared to the 'Do Minimum' configuration. The Falcon Street access / egress for buses would also improve under the project however local services on Miller Street and the Pacific Highway would be impacted by longer travel times. This will be a particular issue for the bus-to-Metro catchments to the north of the North Sydney Metro Station and no mitigation measures have been contemplated in the EIS.

### 7.10.3 Lane Cove Area

The EIS has not contemplated the impacts on bus travel times on Longueville Road which will be impacted by longer travel times particularly northbound in the AM peak.

## 7.11 Active Transport

The majority of active transport impacts are associated with the construction phase of the project with many closed or impacted routes re-instated at the end of construction.

An exception is the pedestrian and cycle underpass on the eastern side of the Falcon Street bridge which will be closed permanently, justified by the low existing pedestrian and cyclist volumes.

The volumes, presented in Figures 4-23 to 4-25 of *Technical Working Paper: Traffic and Transport*, show underutilisation of the underpass, with fewer than 12 pedestrians and cyclists per hour on the weekday, and fewer than 6 on the weekend.

The new facilities to be constructed in Lilyfield, Rozelle, North Sydney and Cammeray are considered to be improvements on the existing facilities in these areas. While most active transport improvements, particularly those surrounding Warringah Freeway, will be completed as part of the project, some active transport improvements are to be completed as part of Beaches Link project, including a shared user path to be provided on the southern side of Gore Hill Freeway.

The connection of new or modified pedestrian and cyclist paths across intersections is not clear in all locations. For example, it is not clear from the drawings or the text if pedestrian crossings are being provided across the north to east and east to south slip lanes at the High Street interchange.

Additionally, the Falcon Street diverging diamond interchange is a new concept in Sydney along with its consolidation of pedestrian crossings into a central median shared user path. The safety impacts and needs of this arrangement warrants further discussion.

## 7.12 Environmental Management Measures

The proposed environmental management measures for the operational phase are limited to consideration of the performance of major roads and intersections, as well as the transit lanes on the Gore Hill Freeway. It is expected that the transit lanes will 'hold up' traffic eastbound in the AM peak and provide a constriction westbound in the PM peak and this may have been noticed in microsimulation modelling undertaken for the project. If this was the case, then the need/intention to remove these lanes should be clarified now rather than deferring it until later as proposed in the EIS.

*The measures do not contemplate any monitoring and evaluation of local traffic, safety, parking and access in North Sydney due to the project changes and this would be a worthy measure to include through before v after traffic safety and parking occupancy reviews, say at 12 months post opening*.

# 8. REVIEW OF THE RESPONSE TO SUBMISSIONS

## 8.1 Key Items

This section provides a summary of the review of the TfNSW Response to Submissions (RtS) Report dated 28 August 2020. Key items from the EIS submissions and TfNSW's responses to these items have been reviewed and are summarised in **Appendix B.** Appendix B also includes recommendations which may be used by DPIE to inform conditions of approval for the project, if it is to be approved.

In summary, the following key issues have been identified in how TfNSW has responded to some of the submission items:

- Many of the TfNSW responses to items related to project need and alternatives assessment are generic and primarily re-iterate what is already stated in the EIS. The lack of specificity in responses is not however relevant to the consideration of conditions of approval.
- Localised operational period impacts in Rozelle and from North Sydney to the northern extent of the project have not been assessed in sufficient detail to enable councils to determine what supporting traffic management works they need to implement in parallel with the project, and with support from TfNSW. These studies may not be able to be conditioned as part of any approval to the project but nonetheless are important to undertake. The same potential consequential impacts are likely at the northern end of the project at the Gore Hill Freeway interface and further assessment of 'downstream' impacts would seem warranted.
- Traffic and Transport Impact Assessment Reports (with mitigation strategies) should be provided for each Construction Site prior to construction as part of the CTMP. These studies should include local network assessments and not only consider the haul routes and site access locations
- The EIS should have documented the public transport patronage, modal share and hours-travelled reductions due to the project compared to the Do Minimum case and modelled an alternative public transport + travel demand management + active transport scenario. It is unlikely however that this would have shown the public transport scenario to be a better alternative to the project based on the stated objectives
- The Alfred Street North impacts have raised a number of submissions by North Sydney Council and by residents. These impacts on parking and access are significant and detailed in Section 7.9.2 and Section 7.9.4 of this report and are worthy of further consideration of the design in this area.

## 8.2 Review of the Revised Environmental Measures

The revised environmental management measures (Part D of the RtS report) have been reviewed with key comments as follows:

- The Traffic Management Sub-Plan (i.e. prior to construction) should also include:
  - Local area traffic and transport impact assessments and mitigation plans for construction sites.
- Traffic and Transport Environmental Management Measures should also include:
  - New item, Pre-Construction: *A traffic and transport impact assessment report will be prepared for each construction site which identifies the direct and indirect impacts of the site and outlines mitigation measures for each identified impact*
  - CTT11: *No trucks are to queue across pedestrian paths or shared user paths*
  - CTT19, add a statement to the effect of "*in accordance with relevant design standards for the facility type affected*"
  - OT1 (add): *The assessment is to include estimation of volume of traffic deviated to and from the project using local government roads compared to pre-project conditions; particularly in Rozelle and in the Crows Nest - Cammeray - Neutral Bay - North Sydney areas.*

# 9. CONCLUSIONS AND RECOMMENDED CONDITIONS

## 9.1 Conclusions

A review of the Western Harbour Tunnel and Warringah Freeway Upgrade EIS has been completed considering traffic and transport impacts, including active transport impacts, during the operational and construction phases of the project.

The assessment processes, including the strategic and microsimulation models used, is generally considered appropriate and complete in responding to the SEARs. Some of the limitations of the EIS in terms of responding to the SEARs are described below.

**Project Need and Assessment Methodologies:**

- The project is adequately described in the EIS
- The assessment of strategic alternatives did not consider a scenario which combined all non-project measures together such as *Travel Demand Management* + *Improvements to Existing Harbour Crossings* + *Improvements to Alternative Transport Modes* and this would have been a worthwhile option to compare Person-Hours Travelled and Vehicle-Kilometres Travelled metrics
- The Strategic Transport Modelling should have published public transport patronage and network statistics for the options modelled to adequately respond to SEARs Item 2(e)
- The strategic modelling has a 2014 base year and the simulation modelling a 2016 base year. With an opening year of 2027 there is a need to update the models to a more recent base year as part of the design development phase. The Sydney Metro West project would likely be included in any update of the future year cumulative scenario models
- The microsimulation model outputs should include queue length screen captures as there is evidence of extensive queuing back beyond the model extents, and this should be reported on.

**Construction Period Impacts:**

- A Parking Management Plan (PMP) for impacts on North Sydney Oval should be included as a condition of approval. The condition should specify what this PMP should contain
- Traffic and Transport Impact Assessments of each construction site should be a condition of approval which emphasises the need to assess construction vehicle capacity impacts and parking demand versus parking supply, methods to control overflow parking, the impacts of overflow parking and what pragmatic alternative construction staff access arrangements can be ensured, including shuttle bus strategies (in detail)
- Road haulage route volumes should be presented for 2022 and 2024 to understand cumulative effects of sites at the route level
- Closure of the Birchgrove Wharf will impact local residents who are the primary users of his wharf. The preferred alternative is to temporarily relocate the wharf nearby. If this can't be achieved then the 441 bus service (750m away) could be relied upon subject to thorough local public consultation. Louisa Road is a narrow two way road with on street parking. Truck access to the Birchgrove Wharf Site should not be permitted with only minimal light vehicle access allowed as well
- Access to WHT7 (Berry's Bay) uses Bays Road and Balls Head Road which are local residential streets with no through traffic, narrow lanes, on street parking, on street cycling and LATM devices for speed management. Access to this site by vehicles larger than a Medium Rigid Vehicle (MRV) would cause significant impacts in these streets.

- Far more information on construction site parking demand, likely supply, overflow and street impacts should be presented as construction sites are in areas where limited on-street parking exists. The use of public transport or shuttle buses will have limited scope and the practicalities of these mitigation strategies are not raised. No information is provided on footpath links between each site and nearby public transport stops
- It is unclear how safe access to the Berry Street north site could be achieved at all unless under traffic control for each exiting vehicle, which would create significant traffic impacts during the day
- The Cammeray Golf Course site(s) have two accesses to the Warringah Freeway and no information is provided as to why this is needed and how acceleration lane facilities could possibly be provided to minimise conflicts with passing traffic
- Insufficient detail is provided in the Rozelle area to understand the scale of construction period impacts particularly related to peak construction activity for the M4-M5 Link as well. A delay of '>100 seconds' at The Crescent / City West Link intersection provides insufficient insight into potential impacts.

**Operational Period Impacts:**

- Operational period impacts on public transport patronage as required under SEARs Item 2(e) are not presented and they should be
- Further clarification is warranted to describe the methods to mitigate the impacts of the project on The Crescent / City West Link through to The Crescent / Johnston Street in Rozelle
- The extent of queues blocking back in the North Sydney models should be shown to understand the relative impacts to local traffic and on which routes
- Potential supporting upgrade projects for Longueville Road and Reserve Road in Lane Cove should be identified to mitigate the impacts of the project on delays on these routes
- If the modelling has identified the need to remove the Transit Lanes to the north of the project area, then this should be implemented as part of the project and not after the project has been operational for some time
- Further assessment is warranted of the impacts and mitigation measures of clearways and all-hours parking removal in North Sydney, particularly in residential areas where there are already residential parking permit schemes and limited on-street parking
- The on street parking impacts in Alfred Street North are significant and have not been mitigated. The property accessibility impacts to 373 - 393 Alfred Street North and for parking circulation in Alfred Street North are also significant, and there are concerns regarding the residual road width north of Bent Street. The design of this area should be reconsidered with a view to retaining the width and on-street parking in Alfred Street North
- The Environmental Management Measures could include a 12-month review of local traffic safety, parking impacts and accessibility in North Sydney and an associated action plan to address any excessive or unforeseen impacts.

## 9.2 Recommended Conditions

In additional to DPIE's standard conditions, we recommended that conditions be framed / modified or added as follows:

- CEMP sub plans, or Traffic and Transport Impact Management Plans should be submitted to, and approved by, the Planning Secretary for each construction site and prior to site occupation. The plans should identify:
  - Construction traffic volumes by type of vehicle over the duration of the site occupation
  - Traffic impacts on haul routes as well as routes that traffic is diverted due to construction-related network changes or due to additional construction traffic
  - Parking demand, site supply and specifically how overflow parking will be managed to mitigate impacts on parking in surrounding streets
  - Impacts on pedestrian, cycling and public transport facilities and how temporary facilities of a similar standard will be provided
- Submit a Parking Management Plan for managing construction worker parking impacts around North Sydney Oval
- To mitigate the impacts of the Birchgrove Wharf closure, relocate a ferry stop nearby or undertake a comprehensive public education campaign of bus route 441 for residents within the walking catchment of the Wharf
- No truck access should be permitted to the Birchgrove Wharf site and minimal light vehicle movements should be permitted (e.g. up to 100 vpd)
- Trucks larger than an MRV should not be permitted to access the WHT5 (Berrys Bay)
- Written approval of the Port Authority should be obtained for the use of its private roads
- Identify upgrade projects on Longueville Road and Reserve Road in Lane Cove and assist Council in implementing these works to mitigate the impacts of the project
- Re-design the Warringah Freeway alignment adjacent to Alfred Street North to minimise parking loss and preserve driveway accessibility or replace the 73 bays removed on this street with new parking within walking distance of the removed bays.

# Appendix A:

## SEARS Responses Summary Table

| Secretary Requirements | EIS Coverage |
|---|---|
| **Environmental Impact Statement** | |
| *1. The EIS must include, but not necessarily be limited to, the following:* | |
| (a) an executive summary; | |
| (b) a description of the project and all components and activities (including ancillary components and activities) required to construct and operate it, including: | |
| - the proposed route; | ▪ Adequately covered in the EIS. |
| - design of the tunnels, interchanges (inclusive of tunnel portals and entry and exit ramps), road user, pedestrian and cyclist facilities, and lighting; | ▪ The surface connections are generally adequately described.<br>▪ New or modified pedestrian/cyclist paths across intersections is not clear at all locations. |
| - surface road upgrade works, including road widening, intersection treatment and grade separation works, property access, parking, pedestrian and cyclist facilities (including appropriate locations for overbridges) and public transport facilities; | ▪ There are no details on provisions for turnaround / U-turn facilities on the approaches to the motorways / freeways in the case of 'accidental entry'<br>▪ Directional signage and weaving will be key considerations in the multi-path, complex road environment along the Warringah Freeway. An overarching map highlighting these 'zones' along the Warringah Highway upgrade and its interface with the WHT would assist in describing the project. Whilst this would ordinarily not be warranted at the EIS-stage, the sheer number of ramp movements in this area warrant such a diagram and consideration in the EIS for this project. The zones associated with the Beaches Link ramps/connections would also be valuable to show on this diagram. |
| - ancillary infrastructure and operational facilities, such as operational and maintenance facilities, ventilation structures and systems, and fire and emergency services and infrastructure for the proposal, including (if required) additional infrastructure (such as tolling infrastructure); | |

| Secretary Requirements | EIS Coverage |
|---|---|
| - location and operational requirements of construction ancillary facilities and access; | ▪ For the Rozelle Rail Yards site (WHT1), construction works for the project at this site may overlap with construction works for the approved M4-M5 Link which uses part of the Rozelle Rail Yards. It is unclear what mechanisms would be used to ensure that construction works for the project at this location would be carried out in coordination with the construction contractors of the approved M4-M5 Link.<br>▪ For the Berry Street site (WHT8), it is not clear within the EIS how the access at Berry Street could be provided safely in the proposed location as there are current sight line limitations.<br>▪ It is unclear if the two nearby site accesses (WHT10 and WFU8) will operate at the same time in the construction program and if so, why two accesses are required in close proximity with potential weave conflicts when an internal link may also be possible.<br>▪ Public transport usage is a mitigation measure for construction personnel access to sites however the availability of pedestrian paths between sites and nearby public transport stops is not shown. |
| - land use changes as a result of the proposal and the acquisition of privately owned, Council and Crown lands, and impacts to Council and Crown lands; and | |
| - the relationship and/or integration of the project with existing and proposed public and freight transport services; | ▪ Bus facility improvements are identified and improvements to freight efficiency are described in the context of general traffic efficiency improvements. |
| (c) a statement of the objective(s) of the project, | |
| (d) a summary of the strategic need for the project with regard to its State significance and relevant State Government policy; | ▪ Adequately covered in the EIS. |
| (e) an analysis of any feasible alternatives to the project; | ▪ The strategic alternatives assessment, the corridor alternatives assessment and the project alternatives assessments (localised options) are analysed<br>▪ No combined scenario of travel demand management + improvements to existing road crossings + improvements to public transport is assessed as the 'next best suite of measures'<br>▪ No quantified outputs are present for the strategic alternative assessment. |
| (f) a description of feasible options within the project, including: | |
| - alternative methods considered for the construction of the project, including the tunnels; and | |
| - staging of the proposal; | |

| Secretary Requirements | EIS Coverage |
|---|---|
| (g) a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to, and options(s) within, the project were selected, including: | |
| - details of the short-listed route and tunnel options considered, and the criteria that was considered in the selection of the preferred route and tunnel design; | |
| - details of the alternative construction methods that were considered for tunnel construction, particularly those areas spanning Sydney Harbour; | |
| - the alternative tunnel design and ventilation options considered to meet the air quality criteria for the proposal; and | |
| - a justification for the preferred proposal taking into consideration the objects of the Environmental Planning and Assessment Act 1979; | |
| (h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described; | |
| (i) a demonstration of how the project design has been developed to avoid or minimise likely adverse impacts during construction and operation of the project; | |
| (j) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome; | |
| (k) a statement of the outcome(s) the proponent will achieve for each key issue; | |
| (l) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact; | |
| (m) consideration of the interactions between mitigation measures, between impacts and between measures and impacts; | |
| (n) identification of other environmental impacts (such as protected and sensitive lands, sedimentation and erosion and impacts to waterfront land) and proposed measures for managing and/or mitigating the level of impact; | |

| Secretary Requirements | EIS Coverage |
|---|---|
| (o) an assessment of the cumulative impacts of the project taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed; | ▪ Generally adequately covered in the EIS, however the potential construction timing interfaces with the M4-M5 Link are not discussed. It should be confirmed if the intention is to open the Western Harbour Tunnel before or after the M4-M5 link section between the Rozelle Interchange and the Anzac Bridge is open to traffic as this will have bearing impacts and benefits of the project on the M4-M5 Link project.<br>▪ What is not included in the EIS are the traffic reduction effects of any light rail extensions (which are unknown at this stage) or Sydney Metro West which might be in place by the 2037 assessment year, should it be approved. This has been a consequence of the timing of the finalisation of the EIS and the announcement of the Sydney Metro West (October 2019) being similar. Notwithstanding this, the Sydney Metro West would be expected to be in direct competition with origin-destination travel markets otherwise using the M4 East and the M4-M5 Link although the scale of reduction in traffic demand with Sydney Metro West would be expected to be relatively small, particularly by 2037.<br>▪ The modelling could be considered as almost out of date for classification as 'fit for purpose' and should be re-calibrated/re-validated and future years models updated as part of any future design development. |
| (p) statutory context of the project as a whole, including: | |
| - how the project meets the provisions of the EP&A Act and EP&A Regulation; and | |
| - a list of any approvals that must be obtained under any other Act or law before the project may lawfully be carried out; | |
| (q) a chapter that synthesises the environmental impact assessment and provides: | |
| - a succinct but full description of the project for which approval is sought; | |
| - a description of any uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the project; | |
| - a compilation of the impacts of the project that have not been avoided; | |
| - a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts; | |
| - a compilation of the outcome(s) the proponent will achieve; and | |

| Secretary Requirements | EIS Coverage |
|---|---|
| - the reasons justifying carrying out the project as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts; and | |
| (r) relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software. | |
| 2. *The EIS must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the EIS and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.* | |
| **Transport and Traffic** | |
| *1. The Proponent must assess construction transport and traffic (vehicle, marine, pedestrian and cyclists) impacts, including, but not necessarily limited to:* | |
| (a) a considered approach to route identification and scheduling of marine and land transport movements, particularly outside standard construction hours; | ▪ The EIS identifies access points to works sites but does not define or map haul routes for heavy vehicles, although these are provided as indicative construction vehicle routes in the Technical Report. |
| (b) the number, frequency and size of construction related vehicles (passenger, marine, commercial and heavy vehicles, including spoil management movements); | ▪ Adequately covered in the EIS in terms of truck-trip and light vehicle-trip generation, but volumes for each site are not overlaid on a route map. |
| (c) construction worker parking; | ▪ The EIS states for multiple construction sites that where insufficient on-site parking is available, that construction workforce 'would be required to park on-street'. The EIS does not provide sufficient information to allow the reader to identify what parking is available on site, what construction worker parking demand is likely for each site, what on-site parking is likely to be available, what overflow parking is probable onto surrounding streets and what impact mitigation measures could be required. It is recognised that detailed construction site planning may not have been undertaken but sufficient calculations are warranted to determine potential on-site parking accommodation, as has been completed for similar EIS's.<br>▪ No feasibility assessment of public transport and walk access to sites has been provided. |
| (d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements including internal Port roads and land if utilised during construction); | ▪ Adequately covered in the EIS, except for parking arrangements as noted above. |

| Secretary Requirements | EIS Coverage |
|---|---|
| (e) access constraints and impacts on public transport, pedestrians and cyclists; | ▪ Adequately covered in the EIS. |
| (f) how construction of the project affects the capacity of, and the need to close, divert or otherwise reconfigure elements of, the road, cycle and pedestrian network; | ▪ **Road network impacts**: Average intersection delay is 'capped at ">100" and DOS as ">1". It is difficult to assess how much an intersection has deteriorated when these values have not been specifically quantified for 2022 base and construction scenarios. Further information such as queue lengths would be required in order to substantiate what the construction period impacts actually are at key intersections.<br>▪ **Cycle and Pedestrian Network:** Adequately covered in the EIS. |
| (g) details of how construction and scheduling of works are to be coordinated in regard to public events and cumulative traffic impacts resulting from concurrent work on the project and other major projects, under or preparing for or commencing construction in the vicinity of the proposal; | ▪ Cumulative construction impacts are adequately addressed.<br>▪ The impacts on event parking North Sydney Oval as a result of reductions in parking on Ridge Street due to construction during events should be addressed, including a framework for a parking management plan. |
| (h) alternatives to road transport of construction spoil including marine and rail options as well as potential re-use in existing land reclamation areas or in association with Resource Recovery Exceptions (if obtained from the EPA) to minimise traffic impacts on the road network; | ▪ Adequately covered in the EIS. |
| (i) the likely risks of the project to public safety, paying particular attention to pedestrian safety and users of Sydney Harbour; and | ▪ Adequately covered in the EIS. |
| (j) impacts to water based traffic and shipping channels on Sydney Harbour. | ▪ Adequately covered in the EIS. |
| *2. The Proponent must assess construction transport and traffic (vehicle, marine, pedestrian and cyclists) impacts, including, but not necessarily limited to:* | |
| (a) forecast travel demand and traffic volumes (expressed in terms of total numbers and heavy and light vehicle numbers) for the project and the surrounding road, cycle and public transport network, including potential shifts of traffic movements on alternate routes outside the proposal area (such as toll avoidance) and impact of permanent street closures directly attributable to the SSI; | ▪ VHT saving, VKT savings, modal share, average speed etc. metrics are not provided for the entire study area and should be provided from the strategic models. |
| (b) accessibility impacts in commercial centres within the vicinity of the project; | ▪ No quantification is provided for this item. Changes in travel times to/from and within commercial centres could be published to demonstrate project benefits/impacts. |
| (c) travel time analysis; | ▪ Adequately covered in the EIS for key routes. |

| Secretary Requirements | EIS Coverage |
|---|---|
| (d) performance of key interchanges and intersections by undertaking a level of service analysis at key locations; | ▪ It is presumed that intersection traffic volumes for input into the LoS analysis (using SIDRA) have come from the microsimulation models. If this is the case, it could be that specific pinch points (shown in SIDRA as LoS F and delay >100 seconds) could be constraining arrival flows to downstream intersections and, hence influencing their performance. To adequately understand operational period traffic patterns and associated impacts, either the actual delays should be published, or queue length plots out of the simulation models should be shown to compare the relative performance of 'Do Minimum' and 'Do Something" scenarios on intersections, interchanges and corridors. LoS should not only consider average delays but should also report on queue lengths and queues blocking roads on approach to the project and more arrival traffic 'flooding' downstream roads and intersections. These issues are not contemplated at all in the EIS. |
| (e) wider transport interactions (local and regional roads, cycling, public and freight transport), taking into account the Sydney City Centre Access Strategy and planned future urban release areas such as the Bays Precinct; | ▪ Demands are covered in the EIS via the strategic modelling. However, the SMPM base year was 2014. For a project assessed in 2020 and opening in 2027, this base year would ordinarily be considered 'out of date'. It would be appropriate to refresh the base SMPM and the demand flowing through to the microsimulation models in subsequent stages of the project to assess whether the design is still optimal for more current traffic patterns and volumes and whether refinements are needed. It would also provide an opportunity to include recent projects proposals such as Sydney Metro West in the Cumulative Assessment. |
| (f) induced traffic and operational implications for existing and proposed public transport (particularly with respect to strategic bus corridors and bus routes and permanent closure/relocation of bus stops) and consideration of opportunities to improve public transport; | ▪ Induced traffic is adequately covered in the EIS through harbour screenline analysis, however a public transport passenger screenline analysis should also be presented (along with strategic model patronage modal share statistics) to understand public transport patronage change impacts. |
| (g) impacts on cyclists and pedestrian access and safety; | ▪ Generally well covered<br>▪ It is not clear if pedestrian crossings are being provided across all approaches at new or modified signalised intersections. |
| (h) opportunities to integrate cycling and pedestrian elements with surrounding networks within the project | ▪ Adequately covered in the EIS. |

| Secretary Requirements | EIS Coverage |
|---|---|
| (i) property and business access and on street parking; and. | ▪ Parking impact assessments have not specifically considered impacts on loading zones where on street parking is required to be permanently removed.<br>▪ Property access impacts due to turn bans (e.g. Military Road into Berry Street) or due to the removal of parking in residential areas have not been described. |
| (j) an explanation for the scope of the modelled area, including justification of the nominated boundaries. | ▪ The modelled areas and types are explained well however the interfaces between the modelling types are not described in detail and should be. It is important to understand how the actual or demand flows move between the models and over what time periods these demands are considered from strategic to microsimulation and from microsimulation to intersection level.<br>▪ A modelling boundary area has been defined for each interface area however there is no justification or reasoning for the definition of these boundaries. For example, for the Warringah Freeway and surrounds, the intersection of Falcon Street / Pacific Highway is not included in the model and it is not clear why this is the case. |

# Appendix B:

## Review of Key Response to Submissions Items

| Issues Raised | Peer Reviewer's Response |
|---|---|
| **Project Benefits Items** | |
| ▪ CoS raised the issue that the project is not cost effective. The reasoning being, the cumulative scenario for 2037 will result in up to 13% total unreleased trips, as compared with 17% in the "Do Minimum". | ▪ Unreleased vehicles is only one metric and the other metrics, such as Vehicle Hours Travelled show that the project introduces significant travel time savings overall. It is not clear whether the unreleased trips have been accounted for in the total travel time benefits of the project compared to the base case and this should be clarified. In particular, the methodology to account for the travel times of unreleased trips for an equitable comparison between the Do Minimum and Project cases should be explained. |
| ▪ CoS disputed the benefits of the project, such as travel time savings, improved public transport and improvements to walking and cycling routes.<br>▪ IWC questioned the ability of time travel savings to create noticeable improvements across the road network.<br>▪ IWC also thinks that the project benefits listed in the EIS may be achieved in the short term but will be eroded in the long term due to induced traffic. It disagrees that the suggested long-term transport benefits of the project. | ▪ The vehicular travel time benefits, and other benefits of the project are adequately described. Induced traffic is adequately covered in the EIS through harbour screenline analysis which shows a level of induced traffic. More traffic will be attracted into the study area but the reason that this occurs is because there is a travel time saving (from elsewhere in the network) to do so.<br>▪ A public transport passenger screenline analysis has not been presented and should also be presented (along with a patronage impact assessment including modal share statistics) to understand public transport patronage change impacts. |
| ▪ CoS queried the bypass benefits of the tunnel and questioned what improvements are planned for Sydney CBD streets as a consequence of traffic being diverted to the Western Harbour Tunnel. | ▪ Further information regarding the traffic volume reductions expected within the Sydney CBD streets would address this concern however this may be better provided directly to CoS rather than from within the EIS due to the level of detail required. |
| ▪ CoS requested clarification on how the project will manage the road connections to reduce the flow of vehicles into the CBD and the area around St Peters and Rozelle interchanges. | ▪ The SIDRA modelling and the microsimulation modelling of the Project cases versus the Do Minimum cases identifies likely changes to the surface entry and exit locations associated with the WHT. There are no surface connections proposed directly into the CBD and demonstration of reduced traffic in the CBD should address this concern. As for the operational strategies around St Peters and Rozelle interchanges, insufficient information has been provided within the EIS to understand how queue management will be used to 'flush' traffic out of the tunnels into the surface street system and how to manage the additional demand entering the tunnel system at these interchanges. Queue length plots from the microsimulation model and a queue management strategy at these locations would be worthy of inclusion in the proponent's responses. |

| Issues Raised | Peer Reviewer's Response |
|---|---|
| ▪ CoS queried how surface road network can be improved with the project. | ▪ Directional signage and weaving will be key considerations in the multi-path, complex road environment along the Warringah Freeway. An overarching map highlighting these 'zones' along the Warringah Freeway upgrade and its interface with the WHT would assist in describing the project. Whilst this would ordinarily not be warranted at the EIS-stage, the sheer number of ramp movements in this area warrant such a diagram and consideration in the EIS for this project. The zones associated with the Beaches Link ramps/connections would also be valuable to show on this diagram. |
| **Modelling Methodology & Modelling Outputs** | |
| ▪ CoS questioned why alternative options analysed did not include options for a heavy rail along the Western Harbour Tunnel alignment to encourage a mode shift to public transport.<br>▪ NSC raised the issue that the relative merits of different motorway and non-motorway project options are unclear. | ▪ There are a myriad of options that could have been considered. The top down approach adopted of strategic (multi-modal) options, corridor location options and then project detail options is appropriate. A heavy rail alignment along the WHT tunnel is not a "*feasible option"* as per the SEARS and would be considered as an entirely different project proposal.<br>▪ The strategic options assessment considered conventional alternatives to the project but did not consider the cumulative scenario of Travel Demand Management + Improvements to non-motorway routes + Improvements to Public Transport which would be the 'best alternative case' and would address the NSC and CoS issues raised. |
| ▪ IWC requested clarification on the assumptions input into the model. | ▪ This information would be contained in the modelling calibration and validation report which was not provided with the EIS material. These reports should be made available for comment as they inform the interpretation of the adequacy of the modelling tools used. |
| ▪ IWC believes the modelling of scenarios is flawed as it doesn't link to traffic reduction from public transport and demand management - in particular, weekday peak spreading.<br>▪ IWC also believes there are many "project costs" of motorways (compared to public transport) that are ignored or underestimated in the strategic justification.<br>▪ IWC is concerned that the traffic modelling does not appear to include detailed analysis of the Metro West project, or the increased capacity of the Cruise Passenger Terminal. | ▪ The modelling approach used included strategic modelling first which included expected public transport improvements in future years and hence accounted for links to traffic reductions from public transport. Neither the Do Minimum or the Project cases strategic models account for peak spreading or demand management because these are unknown variables which, by omission, are treated equally in both sets of cases anyway.<br>▪ The EIS did not include traffic reduction effects of any light rail extensions (which are unknown at this stage) or Sydney Metro West which might be in place by the 2037 assessment year, should it be approved. It is common to not include projects that are not approved in either the Do Minimum case or the Project cases. In any event, Sydney Metro West and the Cruise Passenger Terminal would be expected to introduce negligible differences between the Do Minimum and the Project cases by 2037. |

| Issues Raised | Peer Reviewer's Response |
|---|---|
| ▪ NSC suggested that the travel demand and network modelling:<br>– To be modified based on updated land-use planning assumptions reflective of Sydney Region Plan strategic land-use outcomes and North District Plan growth targets<br>– To include Metro West in network modelling assumptions<br>– To recognise the impact of road ceiling capacities on traffic demand under 'no project' scenarios<br>▪ WCC questioned if the traffic models have taken into account:<br>– the latest information on land use and transport provision in the Chatswood and St Leonards Strategic Centres<br>– existing and new rapid transit modes such as Metro City and South West and B-line, and changes to transport mode splits | ▪ The demands from the strategic modelling had a base year of 2014. For a project assessed in 2020 and opening in 2027, this base year would ordinarily be considered 'out of date'. This provides further weighting to the need for a regular (say annual) "Update report" to be conditioned to update those specific input aspects that have change since the EIS was prepared.<br>▪ It would be appropriate to refresh the base SMPM and the demand flowing through to the microsimulation models in subsequent stages of the project to assess whether the design is still optimal for more current traffic patterns and volumes and whether refinements are needed. It would also provide an opportunity to include recent projects proposals such as Sydney Metro West in the cumulative assessment and any recent updates to growth plans, such as those referred to by NSC and WCC. It is not considered reasonable to update the modelling as part of ongoing project development because the size of the project's influence area means that the modelling assumptions will never be 'up to date' with the latest planning.<br>▪ In any case, updating the Do Minimum and Project case models for current planning assumptions is expected to have little influence on the project benefits calculations and will more so be of benefit for design refinement as the project design evolves. |
| ▪ NSC identified inconsistencies to the project development methodology when analysing it against Transport for NSW best practice guidelines. | ▪ Further information from council is required to expand on this statement such as specific areas and inconsistencies. |
| ▪ NSC suggested that the scope of the project be revised to include the delivery of agreed North Sydney Integrated Transport Program directions.<br>▪ WCC suggested that the project scope include the Sydney Harbour Bridge and provide opportunity to address Sydney safety and operational issues on the bridge in conjunction with the operation of the Western Harbour Tunnel. | ▪ Given the importance of the relationships between the WHTWFU with the integrated transport program for North Sydney, it is important that the two projects are aligned. From an EIS perspective though, sufficient conditions could be imposed to identify and mitigate these risks, rather than attempting to identify them now when both projects are still evolving.<br>▪ The WHT reduces traffic volumes on the Sydney Harbour Bridge. There are some interface issues where the WHT joins the WFU and where the WFU joins the Sydney Harbour Bridge. Apart from that, dealing with pre-existing safety issues on the bridge itself is outside of the reasonable scope of the EIS but could be considered separately to capitalise on the opportunities created with the reduction in traffic volumes. |

| Issues Raised | Peer Reviewer's Response |
|---|---|
| ▪ WCC accepts the approach that the level of performance of intersections outside the scope of work will operate no worse than under the 'Do Minimum' scenario. However, WCC states that the project must address problems that it may cause. | ▪ The EIS does (generally) identify the consequential impact of the project on the surrounding traffic and transport system with exceptions as previously identified by Bitzios Consulting (ref: *P3579.001R WHTWFU EIS Traffic and Transport Review.pdf*) |
| ▪ WCC requested clarification about traffic modelling on:<br>– the difference in traffic performance results of introducing a toll on the Sydney Harbour Bridge and Sydney Harbour Tunnel as opposed to the existing status quo<br>– the high forecast heavy vehicle volumes using the Bridge following the commissioning of the Western Harbour Tunnel<br>– the meaning of network measures, and how they relate to the model operation<br>– | ▪ The tolling scenario requested by WCC is considered out of scope in relation to the SEARS but could be considered by the proponent separately from the EIS in its response to WCC.<br>▪ There is no worsening of heavy vehicle traffic on the bridge in the Project cases compared to the Do Minimum case<br>▪ Broader network measures alluded to in the EIS as a mitigation strategy should be detailed by the proponent in its response. |
| **Construction Traffic & Parking** | |
| ▪ IWC is concerned about construction vehicle movement to and from construction sites that will use Johnson and Booth Streets.<br>▪ IWC raised issues with traffic congestion and road safety impacts from trucks that will service activities at White Bay and Glebe Island. | ▪ The construction period traffic modelling results are well considered and described in the EIS. There are no excessive impacts identified at these locations and minor impacts can be managed through conditioning for provision of a Construction Traffic Management Plan (CTMP). |
| ▪ IWC suggested the identification of all construction vehicles with a unit number clearly displayed, and all vehicles should be fitted with GPS tracking. | ▪ This may form part of the CTMP and be conditioned accordingly. |

| Issues Raised | Peer Reviewer's Response |
|---|---|
| ▪ IWC raised the issue that no details on worker parking arrangements were included in the EIS. | ▪ The EIS states for multiple construction sites that where insufficient on-site parking is available, that construction workforce 'would be required to park on-street'. It is agreed that the EIS does not provide sufficient information to allow the reader to identify what parking is available on site, what construction worker parking demand is likely for each site, what on-site parking is likely to be available, what overflow parking is probable onto surrounding streets and what impact mitigation measures could be required. It is recognised that detailed construction site planning may not have been undertaken but sufficient calculations are warranted to determine potential on-site parking accommodation, as has been completed for similar EIS's.<br>▪ No feasibility assessment of public transport and walk access to sites has been provided as justification for reducing potential site parking demand. |
| ▪ NSC raised the issue that during construction, there will be significant disruption to Warringah Freeway, leading to significant flow-on impacts on other arterial and local roads in the North Sydney LGA<br>▪ NSC is concerned that during cumulative construction in 2024, intersections with service levels of E or F are likely to result in additional traffic using the surrounding local network (rat-running). | ▪ The intersection traffic volumes for input into the LoS analysis (using SIDRA) appear to have come from the microsimulation models. It could be that specific pinch points (shown in SIDRA as LoS F and delay >100 seconds) could be constraining arrival flows to downstream intersections and, hence influencing their performance. To adequately understand operational period traffic patterns and associated impacts, either the actual delays should be published, or queue length plots out of the simulation models should be shown to compare the relative performance of 'Do Minimum' and 'Do Something" scenarios on intersections, interchanges and corridors. LoS should not only consider average delays but should also report on queue lengths and queues blocking roads on approach to the project and more arrival traffic 'flooding' downstream roads and intersections. These issues are not contemplated at all in the EIS. This information could then be used to assess the potential for construction period impacts on local streets. |
| **Operational Traffic & Parking** | |
| ▪ IWC is concerned that increased delays to main roads will encourage diversion of traffic to local roads (rat runs). | ▪ The microsimulation modelling has included some local streets but the delays to traffic accessing and egressing local streets has not been provided for many unsignalized intersections. Visual outputs from the microsimulation modelling could be used to demonstrate the likely minimal differences in 'rat running' between the Do Minimum and Project cases. |

| Issues Raised | Peer Reviewer's Response |
|---|---|
| ▪ NSC identified that within 1 year of opening, the Western Harbour Tunnel will stimulate 26% and 18% of total traffic growth for Harbour crossings in the AM and PM peak respectively.<br>▪ IWC is concerned about the 14% or more increase in traffic through Rozelle. | ▪ Induced traffic is a consequence of major new road projects in congested environments and the impacts of induced traffic have been identified in the EIS<br>▪ Addressing IWC's concerns will benefit from being able to compare queue lengths between Do Minimum and Project cases. This is a legitimate concern and further information on the local street impacts of induced demand near the Rozelle Interchange is worthy of further consideration using visual outputs from the microsimulation models comparing Do Minimum and Project cases. |
| ▪ NSC raised the issue of the permanent net loss of 73 parking spaces on Alfred Street North and the high demand of parking in the LGA. | ▪ Parking impact assessments have not specifically considered impacts on the removal of parking in residential areas and Alfred Street north is a particular impact 'hot spot' that should have a mitigation plan in place. |
| ▪ WCC is concerned about the proposed reconfiguration design of the Warringah Freeway at Brook Street and Willoughby Road, leading to an increase in traffic on Willoughby Road and Penshurst Street. | ▪ Modelling results have not been provided in sufficient detail to assess this concern. Outputs should be extracted to demonstrate operational impacts to WCC at these locations with mitigation measures described as necessary. |
| ▪ WCC raised the issue that the capacity of Warringah Freeway / Gore Hill Freeway between Brook Street and Willoughby Road is not proposed to be changed as part of the project. | ▪ In the outbound direction, the 'flooding' effect of additional outbound traffic is worthy of being mentioned with reference to the visual outputs from the microsimulation model to identify any merging congestion source points.. |
| ▪ WCC raised the issue that there is a potential for increase in regional traffic using the non-State road network (rat running). | ▪ The delays to traffic accessing and egressing local streets has not been provided for many unsignalised intersections. Visual outputs from the microsimulation modelling could be used to demonstrate the likely minimal differences in 'rat running' between the Do Minimum and Project cases. |
| ▪ WCC raised the issues that the traffic modelling forecasts a worsening of performance and delays along the freeway, approach routes such as Lane Cove Tunnel, Pacific Highway and Reserve Road. | ▪ There are a number of local routes where re-routed traffic near the project increases localised delays. The differences between the project cases and the Do minimum case have been represented by LoS comparisons which may mask the extent of additional delays to and from nearby routes. Microsimulation modelling outputs will provide a more comprehensive basis to compare impacts. |
| ▪ WCC suggested extending and/or retaining the 24-hour T2 Transit Lane on Gore Hill Freeway. | ▪ This is a broader policy consideration that is deemed to be beyond the scope of the project's influence. |

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| **Port Authority Submission** | |
| ▪ Port Access Road and Somerville Road are private roads managed by the Port | ▪ The construction contractor would need to secure access rights to these roads through the Port Authority and presumably satisfy the Authority that it will not increase road safety or operational risks for other vehicles on the site |
| ▪ Traffic volumes in the 2016 model are lower than those counted but the Authority in 2020 | ▪ TfNSW's response was essentially that their VISSIM assessment was for a future construction year and that the differences seen between the 2020 count by the Authority and 2016 VISSIM model at the James Craig Road / The Crescent intersection would have been accounted for anyway in the construction year VISSIM modelling. No evidence of this has been provided by TfNSW. The construction CTMP should re-assess the intersection impacts due to construction and identify if any mitigation works need to be implemented and achieve a no significant worsening in intersection performance just prior to and during construction. |
| ▪ Not satisfied with the sparsity of impact mitigation measures related to navigation impacts, including barge movements | ▪ This was deferred by TfNSW to CTT18 which commits to construction vessel movements not impacting port operations without approval from the Harbour Master. This appears to be a reasonable condition to impose providing the Authority with approval rights over the Marine / Vessel Traffic Management Plan. |
| **Mosman Council Submission** | |
| ▪ Failure to proceed with Beaches Link and (therefore) no upgrades in the Spit-Military Road corridor | ▪ TfNSW deferred the detailed consideration of these issues to a future Beaches Link and Gore Hill Freeway Connection Project EIS, should this eventuate. Based on scope limitations, this is a reasonable position. |
| ▪ The project should be expanded to include local road corridors | ▪ TfNSW deferred the detailed consideration of these issues to a future Beaches Link and Gore Hill Freeway Connection Project EIS, should this eventuate and agreed to work with councils generally in planning their local road corridors. Given the scope of the project, this is a reasonable position |