



**Planning &
Environment**

**Northern Beaches Hospital Connectivity &
Network Enhancement Works: Concept
Proposal and Stage 1 (SSI 14_6434)**

Independent Traffic & Transport Review

June 2015

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1. Introduction

Roads and Maritime Services (RMS) is proposing to undertake a suite of road works to enhance arterial and sub-arterial road network connectivity in the proposed Northern Beaches Hospital Precinct at Frenchs Forest. The overall project (Concept Proposal) is known as the Northern Beaches Hospital Road Connectivity and Network Enhancements Project.

RMS is seeking approval for the Concept Proposal and approval of the Stage 1 Connectivity Works to enable Stage 1 to proceed to construction. The Concept Proposal includes two stages:

- Stage 1 – Hospital Connectivity Works which aim to enhance the existing road network to facilitate the opening of the proposed Northern Beaches Hospital in 2018.
- Stage 2 – Network Enhancement Works which are directed towards broader network capacity enhancement, particularly along Warringah Road.

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

1.1 Objectives & Scope of Work

The Department of Planning and Environment (DP&E) requires an independent peer review of the subject Project's traffic and transport assessment for the overall Concept Proposal and Stage 1 of the Project. The review includes the following tasks.

Preliminary Review

- Site familiarisation visit of the Project area to observe and assess pertinent traffic and transport issues.
- Review the traffic and transport assessment in the Environmental Impact Statement (EIS) and comment on the technical adequacy and completeness of the assessment taking into account relevant guidelines, requirements and legislation. The review includes:
 - Adequacy of surveys and modelling that have informed the assessment, including consideration of the assumptions and results of the VISSIM models used for the Concept Proposal and for Stage 1.
 - Project's construction and operational traffic and transport impacts for both the Concept Proposal and Stage 1, including cumulative and induced impacts with particular focus given to the Forest High School and residents along Frenchs Forest Road West and East.
 - Consideration of the adequacy of the information presented and whether it is sufficient to enable an assessment of the Project's impacts to be made.
- Consider whether additional information is required to address gaps in the traffic and transport impact assessment.

- Meetings with the proponent's design and assessment teams to discuss methodology and results.
- Prepare a report on the findings of the Preliminary Review identifying the issues raised.

EIS and Submissions Report Review

- Consolidate the findings of the Preliminary Review, following DP&E review
- Review the appropriateness and effectiveness of management and mitigation measures recommended Project.
- Review agency, council and public submissions on the traffic and transport impact assessment.
- Review the RMS response to traffic and transport impacts raised in submissions and undertake a review of the amendments to the proposal.
- Prepare a Summary Report on the findings of the review, including:
 - Adequacy and completeness of the traffic and transport impact assessment.
 - Compliance of the project with applicable legislation, guidelines and best practice.
 - Adequacy and appropriateness of the management and mitigation measures recommended.
 - Development of recommended actions and conditions of approval (in conjunction with DP&E staff) that could be applied to avoid, minimise, mitigate, and/or manage the residual traffic and transport impacts.

In undertaking the review, the main document reviewed was SMEC "*Northern Beaches Hospital Road Connectivity and Network Enhancement Project, Environmental Impact Statement (EIS)*", October 2014, which incorporated the GTA Consultants "*Northern Beaches Hospital Connectivity and Network Enhancements, Traffic and Transport Assessment (TTA)*", 16/10/2014.

Other documents that were referenced / reviewed include the following:

- GTA Consultants "*Northern Beaches Hospital Connectivity and Network Enhancements, Traffic and Transport Assessment*", 18/03/2015
- SMEC "*Northern Beaches Hospital Road Connectivity and Network Enhancement Project, Concept Proposal and Stage 1: Submissions Report & Preferred Infrastructure Report*", April 2015
- DP&E Secretary's Environmental Assessment Requirements (SEARs), 8 September 2014
- Submissions received from the general community, government agencies (Warringah Council) and other organisations.

1.2 Report Structure

The remainder of this report is presented as follows:

Chapter 2 describes the proposed Project.

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

Chapter 4 provides conclusions and recommendations.

2. Project Details

2.1 Background

The proponent, Roads and Maritime Services (RMS), has submitted a staged infrastructure application (*Application No.SSI 14_6434*) for the Northern Beaches Hospital Connectivity and Network Enhancement Works Concept Proposal and Stage 1, as State Significant Infrastructure under *Part 5.1* of the *Environmental Planning and Assessment Act 1979*.

The Northern Beaches Hospital Connectivity and Network Enhancement Works Concept Proposal seeks to enhance arterial and sub-arterial road network connectivity in the Northern Beaches Hospital Precinct at Frenchs Forest within the Warringah Local Government Area. The Stage 1 project proposes to provide essential road works to enhance connectivity to the Northern Beaches Hospital which is due to open in 2018.

The first stage of the Concept Proposal, the Stage 1 Project, comprises the provision of essential road works to enhance connectivity to the hospital. Further design development would inform a more detailed description and assessment of the Concept Proposal for the Stage 2 Project which comprises road network enhancement works to improve the existing road network capacity. A detailed assessment of the Stage 2 Project would be the subject of a separate environmental impact statement which will follow in mid 2015.

The Concept Proposal aims to:

- Assist in the management of journeys in connection with anticipated future intensification of medical, commercial and residential land uses surrounding the new hospital.
- Mitigate the worsening of traffic congestion on the Warringah Road and Wakehurst Parkway arterial road corridors and their principal feeder roads.
- Enhance access arrangements by car, bus and active transport for the hospital's employees, patients, outpatients and visitors.
- Mitigate intersection delays to facilitate improved access to the hospital and the surrounding employment precincts.
- Have key infrastructure components in place for the proposed hospital opening in 2018.

The strategic aims of the Concept Proposal relate to provision of a road network solution that optimises connectivity of the arterial and sub-arterial road network to the Northern Beaches Hospital and its environs. At a wider level, the Concept Proposal and Stage 1 Project also aim to reinforce Warringah Road and Wakehurst Parkway as key arterial connections between the beachside suburbs of Sydney's north and Chatswood and Sydney's CBD. Specific project objectives are to:

- Improve peak period travel speeds and reliability on Warringah Road following the development of the Northern Beaches Hospital and the surrounding precinct.
- Improve the network performance surrounding the Northern Beaches Hospital to support the development of the precinct.
- Support the activation of the Northern Beaches Hospital Precinct by facilitating access connections to the proposed hospital.

- Allow for road based public transport along and across the corridor.
- Maintain or improve road safety in accordance with current standards.
- Minimise impacts on the environment.
- Optimise the design to provide an urban design and landscape outcome that complements the surrounding environs.

2.2 Project Description

The overall project (Concept Proposal) comprises the Stage 1 Connectivity Enhancement Works (Stage 1 Project), being the provision of essential road works to enhance connectivity to the hospital, and the Stage 2 Network Enhancement works to improve the broader network capacity (Stage 2 Project). Collectively these comprise the Concept Proposal which would broadly include the following.

- Widening of Warringah Road from west of Fitzpatrick Avenue to east of Allambie Road to include:
 - Subsurface eastbound and westbound travel lanes in slot (underpass), through the middle of the Warringah Road corridor, generally from west of Forest Way through to east of Wakehurst Parkway for more than one kilometre.
 - Surface eastbound and westbound lanes running parallel to the slot as part of the Warringah Road corridor to provide access to side roads and the Northern Beaches Hospital.
 - Upgrades to intersections with Forest Way, Hilmer Street and Wakehurst Parkway at surface level.
- Widening, intersection upgrades, new signalised intersections and changes to access along sections of Forest Way, Naree Road, Frenchs Forest Road and Allambie Road.
- Widening of Wakehurst Parkway from north of the intersection with Frenchs Forest Road to south of Aquatic Drive.
- Provision of a new connection at Aquatic Drive and Wakehurst Parkway and traffic management measures along a number of local roads.
- Substantial utility relocations, including water, sewer, telecommunication, electricity and gas services.
- Ancillary works for construction including, but not limited to, construction compounds, sedimentation basins, batch plants and stockpile sites.

More specific detail is provided on the Stage 1 Connectivity Works which are proposed generally along the Naree Road / Frenchs Forest Road corridor and intersections with Forest Way, the proposed hospital, Wakehurst Parkway, Allambie Road and Warringah Road. The Stage 1 works would include:

- Widening and intersection upgrades along Forest Way between about 100 metres north of Warringah Road and south of Adams Street.
- Upgrade of the existing bus bay fronting the Forest Way shopping centre on Forest Way, to accommodate two buses within the bay.

- Widening of Naree Road, Frenchs Forest Road West and a section of Frenchs Forest Road East from the Wakehurst Parkway intersection to Allambie Road.
- Provision of traffic signals with pedestrian crossings at:
 - Naree Road and Forest Way;
 - Naree Road, Frenchs Forest Road West and Rabbett Street;
 - Frenchs Forest Road West at a new access to the hospital opposite Gladys Avenue;
 - Frenchs Forest Road East and Romford Road; and
 - Frenchs Forest Road East, Patanga Road and Allambie Road.
- Provision of dedicated kerb side bus lanes along approaches and departures to the Frenchs Forest Road intersection with Wakehurst Parkway.
- Widening and upgrades to the intersection of Frenchs Forest Road and Wakehurst Parkway.
- Widening of Wakehurst Parkway from about 330 m north of the intersection with Frenchs Forest Road to the intersection with Warringah Road.
- Widening of Allambie Road to the north of the intersection with Warringah Road.
- Widening and upgrade to the Warringah Road and Allambie Road (north) intersection.
- Widening of Warringah Road from west of Allambie Road for about 700 m to east of Courtley Road.

The location of the proposed Project and its key features is shown in *Figure 2.1* following.

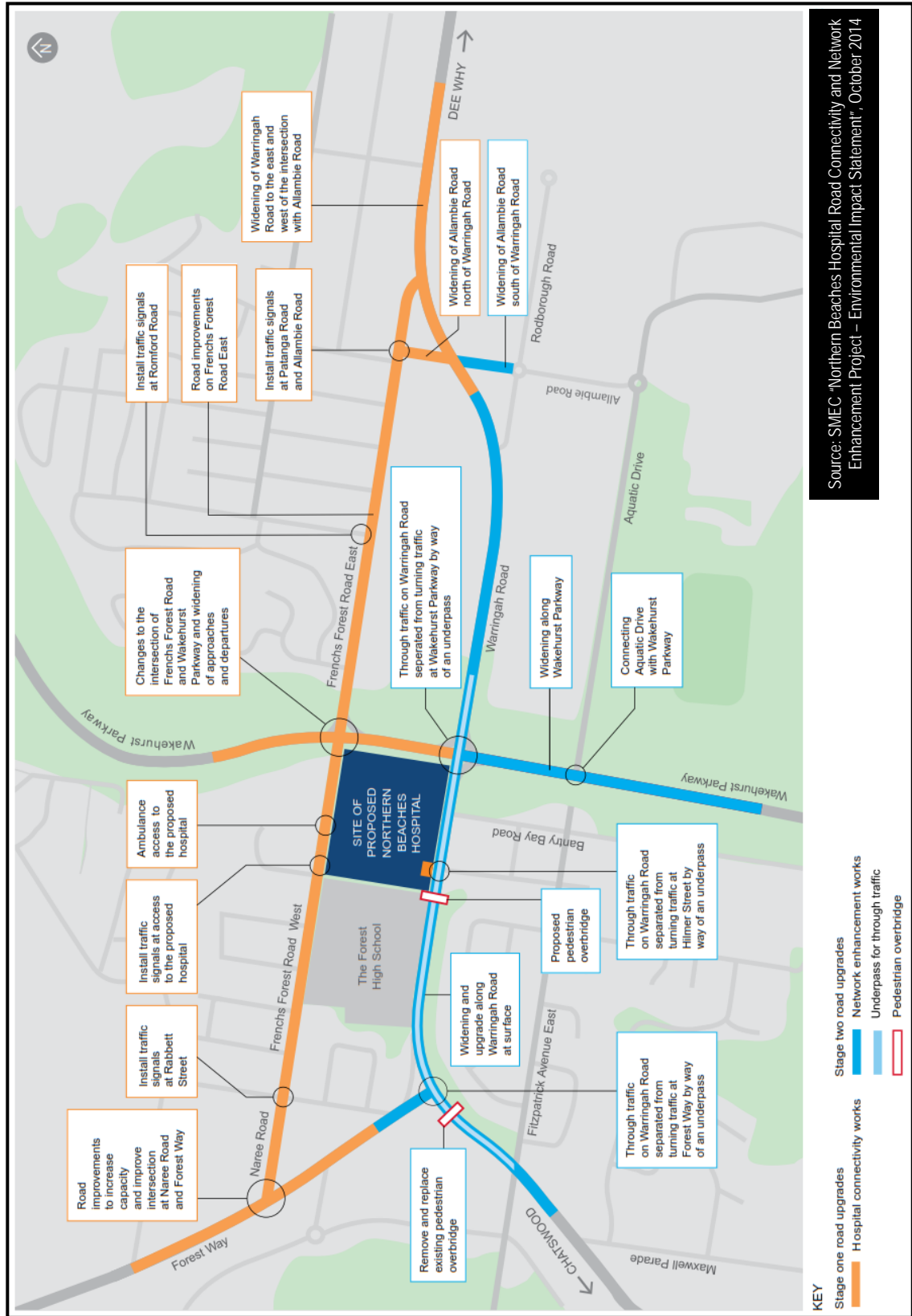


Figure 2.1: Proposed Project Location and Key Features

2.3 Project Amendments

A number of amendments and additional investigations were carried out post EIS exhibition and included as part of the Submissions Report / Preferred Infrastructure Report (PIR). These were undertaken to address commitments made in the EIS and/or address comments received from submissions.

Traffic and transport-related amendments include the following:

- Assessment of a second construction compound site located on RMS land at the intersection of Warringah Road and Wakehurst Parkway, which would facilitate improved access to materials, plant and equipment as well as emergency and spill containment products and measures in the event of an incident.
- Revised parking arrangements at the Skyline Shops comprising one (1) disabled parking bay, one (1) loading bay in front of the Skyline Shops and 20 perpendicular parking bays along the southern side of Frenchs Forest Road East between Allambie Road and Warringah Road.
- Refinements in relation to shared path connectivity with the existing or proposed cycleways indicated on the Warringah Bike Plan.
- Provision of an additional signalised pedestrian crossing on Frenchs Forest Road West between Bluegum Crescent and Sylvia Place
- Minor design refinements related to widening on Forest Way, deletion of a proposed marked pedestrian crossing on the western side of the Wakehurst Parkway / Frenchs Forest Road intersection and retention of a bus stop on Allambie Road in its current location.

Additional traffic and transport-related investigations include the following:

- Operational assessment made to the traffic model post EIS.
- Additional assessment of construction and operational noise impacts.

The Project EIS has also revised the environmental management measures to make additional commitments and modify the wording so that the outcome of the commitment is clearer to implement.

2.4 Secretary's Environmental Assessment Requirements (SEARs)

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

- Detailed assessment and modelling of operational traffic and transport impacts with consideration of:
 - Assessment of impacts and/or benefits on the local and regional road network including in relation to and beyond those associated with the Northern Beaches Hospital, considering potential future land use patterns and intensification in the area detailed in regional planning documents.
 - Key intersections, and the level of service/performance of intersections upstream and downstream of the project area.
 - Impacts on property and business access and on street parking provision, including permanent and temporary (construction) changes to access and

- parking.
- Operational implications for public transport (particularly with respect to strategic bus corridors and bus routes) and opportunities to improve public transport services and patronage, including the need to move or upgrade public transport infrastructure.
 - Safety and access impacts on road users (including cyclists and pedestrians) and consideration of opportunities to integrate cycleway and pedestrian elements with surrounding networks and attractors (existing and proposed). This should include impacts associated with The Forest High School and Frenchs Forest Public School, informed by surveys of traffic movements and mode distribution associated with the schools.
- Detailed assessment of construction traffic and transport impacts of the proposal (including ancillary facilities) and associated management measures, in particular:
 - Impacts to the road network including safety and level of service, pedestrian and cyclist access, maintenance of construction access to the Northern Beaches Hospital site, and disruption to public transport services and access to properties.
 - Impacts of potential shifts of traffic movements to alternative routes outside the proposal area.
 - Availability of on-street parking within and surrounding the project area.
 - Impacts to school related traffic (bus, service, emergency and private vehicles) both on-site and on-street, and pedestrian and cycle movements.
 - Route identification and scheduling of transport movements, including movements to transport spoil.
 - Number, frequency and size of construction related vehicles including passenger, commercial and heavy vehicles.
 - Nature of existing traffic on construction access routes including consideration of peak traffic times.
 - The need to close, divert or otherwise reconfigure elements of the road network associated with construction of the proposal, having reference to the cumulative construction impacts of other developments preparing for or under construction, including concurrent construction associated with subsequent stages of this proposal and/or the Northern Beaches Hospital proposal.
 - Details of stakeholder consultation regarding access disruption, including The Forest High School, Frenchs Forest Public School, Northern Beaches Hospital, and emergency services.

3. Review of Traffic & Transport Assessment

The Secretary's requirements for the environmental assessment (SEARs) formed the basis of issues considered in the independent review. Issues identified during the review are characterised in the following sections.

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

3.1 Assessment Methodology and Modelling Tasks

In general, it is considered that the methodology and analysis of traffic and transport impacts has been undertaken quite rigorously and in adequate detail. Moreover, it is considered that the SEARs have generally been addressed adequately.

There is some ambiguity with respect to the wording used in the assessment, which is considered to be non-committal. This is mainly used for bicycle, pedestrian, parking and public transport measures and issues. It is considered that firm and positive commitments are desirable in conjunction with associated timeframes and responsibilities for the various measures so that greater confidence can be made in the assessment of the proposal.

Notwithstanding the above, it is noted that the staged assessment process offers the opportunity to defer project details and corresponding assessment to later stages of the Project, ie. Stage 2 assessment, which will provide greater detail on the Concept Proposal.

With respect to the modelling tasks, the use of the VISSIM model is considered to be appropriate. The model scenarios used ('Do Minimal', Stage 1 and Concept Proposal for the years 2018 / 2021 and 2036) are considered to be adequate, especially as it is understood, that there will be further model development for the ultimate Stage 2 scenarios for the Project.

The model network statistics / results used in the assessment are considered to be comprehensive in determining future-year traffic operations and impacts. These included the number of vehicles that have left and remain in the network, total distance and time travelled, average vehicle speed, average and total vehicle delay, average number of stops per vehicle, unreleased time and unreleased demand. These parameters provide a suitable indication of network performance and importantly, provide key statistics that can be used to compare scenarios.

Notwithstanding the general adequacy of the modelling tasks, the following comments are provided for consideration:

- It is unclear if the Bureau of Transport Statistics (BTS) employment figures used for the assessment and modelling include employment for the new hospital.
The BTS data does not specifically include the proposed NBH. The traffic generation and distribution was calculated separately and included in the demand matrices for the VISSIM modelling.
- In determining hospital traffic generation it is unclear how trip generation was determined – bed numbers, parking numbers or other factors from similar hospitals?

The trip generation for the NBH has been based on the revised staff, hospital bed and outpatient numbers, as well as deliveries.

[Noted – this could be further addressed via a detailed traffic operations review.]

- In 2018 most of the hospital staff live to the east of the site but in 2028, most of the staff live to the west, which would have different traffic distribution patterns. It is unclear why this has changed and how the 2028 pattern was derived based on trip length distribution.

Many of the clinical services from Manly and Mona Vale Hospitals are expected to be transferred to the NBH and so the spatial distribution of the staff trips to these two hospitals was considered for the NBH assessment.

It was acknowledged that some workers at Manly and Mona Vale Hospitals may change residence as a result of being transferred to the NBH, and this may affect the traffic distribution pattern over time. As such, two different traffic distribution profiles were adopted for the NBH assessment as follows:

- 1) *For the 2018 scenario, it has been assumed that staff transferring to the NBH would continue to reside at their current residential address.*
- 2) *For the 2028 scenario, it has been assumed that the spatial distribution of staff work trips may change as hospital workers change residence locations. Some staff may no longer work at the NBH and new staff may commence at the NBH over the first 10 years of operation.*

The above methodology was agreed at a workshop.

- There is comment on induced demand and in particular, whether there would be an increase on traffic along the Warringah Road corridor at the expense of alternative routes. However, it is unclear if any increase has been considered as part of the modelling and there has been no sensitivity assessment done on this.

The provision of the Concept Proposal is not expected to result in a change in regional travel patterns. Results indicate that it would be expected to result in marginal changes to the distribution of traffic between the Northern Beaches and the rest of the Sydney.

- The comparison of Stage 1 with 'Do Minimal' scenarios may be slightly misleading or skewed because the signal timings of some of the intersections were reviewed and modified during the Stage 1 assessment to improve the overall performance of intersections, which wasn't done for the 'Do Minimal' scenarios.

The 'Do Minimal' scenario was based on the 2012 Existing Conditions model, with the addition of the basic access arrangements required to cater for the proposed NBH. No adjustment of the signal timings for existing intersections was undertaken for this scenario, although since a new signalised intersection was introduced to access the NBH on Frenchs Forest Road, the timings of this intersection were optimised.

The Stage 1 design provided additional capacity along the Frenchs Forest Road corridor and associated changes to the geometry of the intersections along this corridor. Due to the additional capacity on Frenchs Forest Road, the traffic volumes at each of the intersections along Frenchs Forest Road and Warringah Road, between Forest Way and Allambie Road, are different to the 'Do Minimal' scenario. Therefore, the timings of the traffic signals were required to be modified to reflect the different traffic volumes under this scenario.

The optimisation of traffic signal timings for all intersections in the 'Do Minimal' scenario

was not considered necessary.

- The current assumption for shift changeover is that it occurs during background traffic peak periods but it appears that no change in shift changeover times has been considered so that they may occur during non-commuter peak periods, which would result in some of the major hospital traffic generation occurring during periods when the adjacent road network has spare capacity, especially after Stage 2 works are operational.

The scope of the TTA is to assess the impacts of traffic volumes based on the Stage 1 and Stage 2 design. The assessment has not considered recommending changes to how the NBH would operate as this is considered outside the scope of this study.

3.2 Road Network / Traffic Operations

In general, the assessment of road network and intersection operations has been undertaken thoroughly. The majority of significant intersections were analysed for existing as well as future scenarios.

As mentioned previously, the staged assessment process offers the opportunity to defer some of the detailed assessment to Stage 2 of the Project where it is anticipated that there will be further assessment for the ultimate Stage 2 scenarios.

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

- Will upstream / downstream intersections be included for the wider Stage 2 assessment (assuming this is completed prior to hospital opening and in conjunction with Stage 1)?

As the same demand matrices are used for the Stage 1 and Stage 2 assessment, it is not expected that other intersections along Warringah Road outside of the assessment area would be impacted by the Stage 2 works. However, intersections not impacted by the Stage 1 works that will be impacted by the Stage 2 works will be addressed in the Stage 2 assessment (ie. Allambie Road / Rodborough Road and Allambie Road / Aquatic Drive) due to the proposed connection of Aquatic Drive to Wakehurst Parkway in Stage 2.

- The 2012 Base Scenario indicates that there is an approximate 16.4% higher number of vehicles (demand) in the network during PM peak in comparison to AM peak – are there different routes in PM?

The 2012 demand matrices for the AM and PM peak periods were developed based on a sub-area cordon matrix from the RMS strategic EMME model, and modified to reflect the actual traffic volumes from various traffic count data available throughout the study area for the 2012 AM and PM peak periods. The demand matrices for the 2012 PM peak period are higher than the 2012 AM peak period as this is reflected in the traffic count data.

- In Table 5.3 of the TTA, it is unclear why the unreleased demand has not increased and why a higher number of vehicles (approximately 10% additional) have left the network in 2028.

While there is a 4% increase in traffic between 2018 and 2028, the different distribution patterns adopted for the NBH staff (for 2018 and 2028) may result in different volumes on the key major roads. For example, 3% of NBH staff travel from Warringah Road (west

of Forest Way) in 2018 and this increases to 21% in 2028. This will result in lower staff trips from other areas in the model (ie. from Warringah Road, east of Allambie Road). Therefore, it may be possible that more vehicles can complete their journey due to the different staff distribution between the two scenarios, as indicated by the 10% increase

- There is only a 5% increase in AM and 4% increase in PM in overall demand between 2018 and 2028 (over 10 years), which seems low particularly as population and employment is expected to grow by significantly higher rates. If these increases are to be adopted, what transport demand measures will be used to control private vehicle travel to ensure low levels of increase?

Growth rates have been calculated based on the difference in traffic volumes between 2011 and 2021 and between 2011 and 2036 cordon trip matrices from the RMS strategic model. These growth rates have been applied to the 2012 base matrices, to generate the 2018 and 2028 background demand matrices. The NBH traffic volumes have then been added to obtain the final 2018 and 2028 demand matrices.

The car matrices in the RMS strategic model have been provided from the BTS STM model, which utilises the BTS population and employment land use forecasts. Therefore, these car matrices include the predicted increase in car volumes associated with these higher land use forecasts.

As the BTS STM model estimates car and public transport usage, some of the additional trips associated with the increased land use forecasts may use public transport. As such, the car demand matrices provided by BTS to RMS will only include the car trips and therefore does not reflect the number of trips undertaken by other modes (ie. public transport) associated with the increased land use forecasts.

No modifications to the demand matrices have been undertaken with respect to limiting the increase in private vehicle travel.

- The travel time comparison uses three routes but not along Wakehurst Parkway, which is the major north-south route and is considered to be one of the major routes through the area.

The three routes in were used in the development of the 2012 base models and for consistency these have been adopted just to compare travel times for the 'Do Minimal' scenarios.

- In Tables 7.1 and 7.2 of the TTA, there is greater vehicle demand in the 'Do Minimal' scenario than for the Stage 1 scenario (approximately 500 additional vehicles in the AM peak and approximately 1,000 additional vehicles in the PM peak). Clarification is required of the wider network effects whereby vehicles are diverted to alternative routes outside the study area when Stage 1 is operational.

After the Stage 1 TTA report was finalised, it was identified that the results in Table 7.1 – Table 7.4 indicated some unusual differences between the scenarios. In reviewing the modelling of Stage 1, GTA identified that changes to the network coding were required to evaluate the traffic impacts of the Stage 1 and Stage 2 works more accurately using the VISSIM model. To ensure consistency between all the model scenarios, these changes were also incorporated into the 'Do Minimal' models where relevant.

The results from these revised 2018 models indicate that the difference in the total volumes is fewer than 50 vehicles in the AM and PM peak period. This is significantly better than the previous results included in the Stage 1 TTA report referred to above.

- Due to the timeframe between Stage 1 works being completed and Stage 2 works starting, consideration should be given to providing flexibility with the 12-month 'waiting' period to undertake the operational traffic review to confirm the operational traffic impacts of the project on the adjacent road network in close proximity to the hospital.
- The modelling predicts high percentages of unreleased demand, which is likely to result in 'rat running' along local street routes. While the 'rat running' occurs at present, there are no specific mitigation measures proposed to address this aside from enhancement to the capacity of the road network to cater for the increase in background traffic volumes and traffic generated by the proposed hospital.
- Some proposed road widths are less than 3.5 m (general urban standard), which has the potential to adversely affect road safety and traffic operations – refer to Design Parameters in *Table 5.4* of EIS.

3.3 Parking Issues

In general, the assessment of parking issues has been undertaken adequately. The use of a kerbside parking survey is considered appropriate to determine available on-street parking and existing utilisation. Off-street parking was addressed for the adjacent Forest High School parking.

The following are specific comments relating to parking issues:

- For the parking surveys, it is unclear why the Frenchs Forest Road East survey area did not extend east to Warringah Road, why Holland Cres and Skyline Place were not included and why Nandi Avenue did not go to Newell Place (since Newell Place was included).

The car parking survey was provided to GTA and did not extend east of Allambie Road. GTA is not aware of why it did not extend to Warringah Road, however, it is possible that at the time the car parking survey was commissioned, the Stage 1 design was not expected to impact the section of Frenchs Forest Road East, to the east of Allambie Road. The survey on Nandi Avenue extended beyond Newell Place, however, no car parking demand was observed during the survey.

*[Because of the Project impacts on Skyline shops and the area east of Patanaga Road (existing on-street car parks outside the Skyline shops are proposed to be removed), it would be prudent to extend the parking survey information east along Frenchs Forest Road East to Warringah Road. This would also provide a basis in the options development for provision of compensatory parking for Skyline Shops – refer to dot-point following. *Table 2.6* (Kerbside Parking Surveys) in the revised TTA still refers to the Nandi Avenue section running between Frenchs Forest Road East to Bimbadeen Crescent rather than extending to Newell Place.]*

No parking demand survey has been undertaken at this location. The rationale for providing compensatory parking for patrons is based on the principle of providing 'like for like'. In fact, RMS proposes to provide more than the current arrangement – 20 parking spaces, 1 disabled parking space and 1 loading bay in lieu of the current formalised 16 car parking spaces. It should be noted the project has been subjected to 'safety in design audit' and further road safety audits would be undertaken at detailed design stage and prior to opening the works to traffic

- There are a number of alternate parking options being considered, eg. Skyline shops. It is unclear whether these would be finalised / determined during the Stage 2 assessment.

Having considered a number of alternate options for provision of compensatory parking for Skyline Shops following road widening, the following works are proposed:

- One disabled parking bay utilising the residue pavement opposite the shops.
- One loading bay utilising the residual pavement opposite the shops.
- Twenty 90-degree parking spaces along Frenchs Forest Road on the southern side between Allambie Road and Warringah Road.

Road design requirements dictate that access to and from car parking spaces need to be confined within the adjacent traffic lane. This has resulted in a narrow lane width on Frenchs Forest Road east, which precludes the provision of parallel parking on the northern side of the carriageway.

The rationale for providing compensatory parking for patrons is based on the principle of providing 'like for like' – see comment above.

- It is stated that "Parking demand on Rabbett Street could potentially increase as a result of removal of parking supply on Naree Road", but no mitigation measure is proposed.

Based on the parking occupancy data, it is expected that the vehicles on Naree Road could be accommodated within the unrestricted kerbside car parking on Rabbett Street (between Frenchs Forest Road and Adams Street). Therefore, it is not expected that compensatory parking would be required due to the loss of kerbside car parking on Naree Road in the peak periods.

- The perpendicular parking proposed on the southern side of Frenchs Forest Road East opposite the Skyline shops, does not have a suitable connection between the shops and parking. This may cause shop users to cross the road in an uncontrolled manner away from the traffic signals at Allambie Road, which creates a road safety issue. The Skyline shops attract significant passing trade, which ideally requires adjacent access.

The project has been subjected to 'safety in design audit' and further road safety audits would be undertaken at detailed design stage and prior to the opening of the works.

3.4 Public Transport Operations

In general, the assessment of public transport operations has been undertaken adequately. The existing services serving the area as well as the bus stop hubs within the area at Skyline shops and Forest Way Shopping Centre form part of the only public transport services in the area. These operate in conjunction with school buses (particularly for Forest High School) and will need to interact with any proposed buses serving the proposed NBH.

The following are specific comments relating to public transport / bus infrastructure:

- The assessment states that one of the project objectives is to "Grow patronage on public transport by making it a more attractive choice" but it is unclear how this may be undertaken and how patronage would be increased.

The Stage 1 TTA does not make any specific reference to any increase in public transport patronage, as this project is related to the provision of additional road capacity and does not assess changes in public transport service provisions.

Bus priority measures have been incorporated into the Stage 1 and Stage 2 design to

assist in providing improved bus travel times through the corridor.

As part of the Northern Beaches BRT Feasibility Study, there are changes to some of the bus routes within the VISSIM model study area, and these changes have been included in the VISSIM models for the 'Do Minimal', Stage 1 and Stage 2 scenarios.

Public transport patronage modelling is undertaken by TfNSW and therefore any change in public transport patronage due to changes in bus services and improved travel times would need to be provided by TfNSW.

- The assessment does not specifically address the possible future provision of BRT services within the area (as proposed by the "Northern Beaches Bus Rapid Transit (BRT) Study – Draft Feasibility Summary Report", "Sydney's Bus Future" and "Northern Beaches Transport Action Plan"). Would Stage 1 / Stage 2 works be able to accommodate BRT services (lanes, stations and other related infrastructure) or would they inhibit development of this type of transport infrastructure? There is minimal discussion on how future BRT may be incorporated.

The Stage 1 and Stage 2 designs include targeted bus priority measures within the study area and these have been included in the VISSIM modelling for these scenarios. The Stage 1 and Stage 2 VISSIM models have also included the proposed changes to bus routes / services provided by TfNSW as part of the Northern Beaches BRT Feasibility Study.

The modelling shows that although the Concept Proposal results in substantial improvements in traffic performance along Warringah Road than would otherwise occur, the intersections of Forest Way, Wakehurst Parkway and Allambie Road would still operate at LOS E during either or both of the AM and PM peak periods in 2018 and 2028. Indeed, there are heavy left-turns at some of these intersections that are not changed by the Concept Proposal. Introduction of kerbside BRT by reallocation of lane space at these locations would result in the intersections having insufficient capacity to accommodate traffic without substantial loss of performance.

TfNSW is currently reviewing the bus network that services the wider Northern Beaches area, to inform the design and delivery of the Northern Beaches Bus Rapid Transit project (including kerbside BRT between Mona Vale and the Sydney CBD). As part of its work to deliver the Northern Beaches Transport Action Plan, TfNSW is working with Warringah Council and RMS to identify and investigate medium and long-term bus servicing scenarios for the Frenchs Forest precinct, to complement the Concept Proposal.

At this stage BRT is not proposed for this corridor and the RMS has advised that its design has responded to the requirements of Transport for NSW and the strategic plans for the area.

[It is understood that DP&E has issued supplementary SEARs for Stage 2 of the Project on this matter which require the RMS to describe how the SSI will assist in improving bus services and what actions would be undertaken to assist in meeting the outcomes of Sydney's Bus Future (Transport for NSW, December 2013) and Northern Beaches Transport Action Plan. Moreover, RMS need to describe what actions could be taken to enhance bus services to meet increased bus demand resulting from potential land use change within the vicinity of the SSI, such as the Northern Beaches Hospital Precinct Structure Plan, being prepared by Warringah Council.]

- There is no discussion on the discontinued bus service routes 137 and 282 including whether they are being replaced or incorporated into other routes.

TfNSW have advised that these services will be discontinued as part of its bus services review and not as a result of the project. Other changes have been undertaken which will provide additional bus services through the study area.

RMS has been advised by TfNSW that bus services 137 and 282 are being discontinued as part of a broader bus servicing review for the area. RMS has not questioned TfNSW as to the rationale behind these changes. Please note that additional bus services on existing routes and new bus services are being provided.

- A new southbound bus stop, on Allambie Road north of Rodborough Road, is to be provided in lieu of bus stops on Allambie Road, north of Warringah Road. However, it is unclear where a northbound bus stop would be relocated / accommodated.

The TTA indicated that both bus stops on Allambie Road (between Warringah Road and Frenchs Forest Road) would be removed, with a new southbound bus stop provided. Subsequent advice from RMS has indicated that only the northbound bus stop will be removed and the southbound bus stop will be retained in the current location. The bus services which used the northbound bus stop will instead use the existing bus stop on Frenchs Forest Road East, west of Patanga Road.

- Comment has been made that Stage 2 works are expected to result in improved bus travel times. However, these do not appear to have been quantified and it is unclear whether they would meet TfNSW target route speeds.

Bus travel times will be further evaluated as part of the Stage 2 assessment.

[It is noted that bus travel times have been predicted by the modelling to operate with an average speed of between 9 km/h and 15 km/h during the peak periods, which is lower than the target average operating speed of between 18 km/h and 25 km/h, sought by TfNSW along the corridor.]

3.5 Pedestrian / Cyclist Issues

In general, the assessment of pedestrian and cyclist issues has been adequately assessed taking into account the existing conditions, proposed plans by other parties and various constraints, eg. the scale of the Wakehurst Parkway and Warringah Road corridors and the volumes of traffic in the peak periods create an uninviting pedestrian environment with distinct north-south and east-west severances, resulting in the central core of Frenchs Forest being hard to reach for cyclists and pedestrians.

For pedestrians, any increase in vehicles and travel times along the area's road network may have an impact on pedestrian transport, eg. longer vehicle 'green times' at congested intersections resulting in less 'green time' and consequent reduced level of service for pedestrians.

The integration of cyclist infrastructure with future plans throughout the area (especially Council's *Warringah Bike Plan*) is considered to be an important aspect for cycleway connectivity within the area and to surrounding areas.

Specific issues relating to pedestrian and cyclist infrastructure are as follows:

- For the NBH signalised intersection on Frenchs Forest Road West, there is no pedestrian crossing on the eastern side (refer to *Section 5.1* of the TTA report) although drawings show pedestrian crossings across all four legs. Please clarify.

The latest Stage 1 design provided by RMS includes pedestrian crossings on all four legs of the intersection.

[Noted, however *Section 5.1* of revised TTA still states that there is no pedestrian crossing on the eastern side of the NBH signalised intersection on Frenchs Forest Road West.]

The decision to rationalise marked pedestrian crossings at the above intersections was taken jointly by RMS and the Traffic Management Centre with a view to improving traffic flow at these intersections.

- There is comment on the Warringah Bike Plan and its proposals but further information is required on the status of bike plan implementation and the potential timing of future projects and how these will be incorporated into any proposals developed by the NBH project, eg. what is the timeframe for Council bike plans and will this correspond with Stage 1 or Stage 2 works.

The extent of shared path proposed as part of Stage 1 works has now been finalised and would include shared paths along:

- *Allambie Road on the western side between Warringah Road and Frenchs Forest Road East;*
- *Frenchs Forest Road East on the southern side between Allambie Road and Wakehurst Parkway;*
- *Wakehurst Parkway on the eastern side between Frenchs Forest Road East and Warringah Road; and*
- *Forest Way on the eastern side between Naree Road and Warringah Road.*

Shared paths proposed as part of Stage 1 works would connect with the shared paths proposed along Warringah Road as part of Stage 2. Timing for Council shared paths is not known at this stage.

[Noted, however the above does not appear to have been documented in the TTA – refer to *Section 6.5* of revised TTA.]

The proposed shared paths highlight a significant gap in connectivity between Forest Way and Wakehurst Parkway until future cycleways (shown to be undertaken by others) are provided. It is considered that the integration of proposed cyclist infrastructure with future *Warringah Bike Plan* proposals is important for cycleway connectivity to surrounding areas. It is understood that DP&E has issued supplementary SEARs for Stage 2 of the Project on this matter, which require the RMS to identify actions to be undertaken to assist in the delivery of a connected cycleway network within and adjoining the Concept Proposal area.]

- There are a number of 'missing' pedestrian crossings at signalised intersections where the general RMS standard is to provide crossings on all intersection legs. This creates pedestrian connectivity issues, which may potentially result in unsafe (uncontrolled) pedestrian movements across busy roads, as follows:
 - Removal of the pedestrian crossing across the western side of Wakehurst Parkway at the Frenchs Forest Road intersection – although there is an alternative pedestrian crossing across Frenchs Forest Road West at the signalised hospital access intersection (almost 300 m to the west) in addition to the signalised crossing on the

eastern leg of the intersection, this may not prevent uncontrolled pedestrian movements.

- No pedestrian crossing across the eastern side of the Naree Road / Rabbett Street / Frenchs Forest Road West intersection – although there is a new marked pedestrian crossing proposed to the east of Sylvia Place (approximately 250 m to the east) in addition to the signalised crossing on the western leg of the intersection, this may not prevent uncontrolled pedestrian movements.
- No pedestrian crossing across the northern side of the Forest Way / Naree Road intersection – although there is a marked pedestrian crossing across the southern leg of the intersection, this may not prevent uncontrolled pedestrian movements.

The decision to rationalise marked pedestrian crossings at the above intersections was taken jointly by RMS and the Traffic Management Centre with a view to improving traffic flow at these intersections.

3.6 Construction Phase Issues

The proponent acknowledges that the sequence of construction activities relating to the Concept Proposal and the Stage 1 Project are not yet fully known in detail and will be refined as detailed design progresses. However, from the concept layout of potential work sites and construction methodologies, the assessment appears to cover construction impacts thoroughly.

In lieu of further detail, a general framework of principles, guidelines and parameters has been provided to assist in identifying potential assessment impacts. A key objective in mitigating potential impacts on road network operations was to maintain the current peak period capacity of the road network during the construction stage of the Concept Proposal and the Stage 1 Project.

As per the staged application approach for the Project, the traffic and transport impacts of Stage 2 Project construction activities will be assessed separately in more detail as part of the Stage 2 Project EIS.

The original concept site compound location at Aquatic Drive appears to be reasonable. An additional site compound has been identified to the north-east of the Wakehurst Parkway / Warringah Road intersection. While the original Aquatic Drive site would have adequate storage capacity, the additional site would be within or immediately adjacent to the work areas. This would facilitate better day-to-day access to materials and plant and equipment that would be in regular use as well as providing better access to emergency and spill containment products and measures in the event of an incident.

For both site compound locations, there is generally suitable access onto the major road network to ensure heavy vehicle transport routes minimise impacts on local roads in particular. While some local roads are required to be used for access to work sites, it has been acknowledged that preparation of suitable traffic management plans (TMPs) and traffic control plans (TCPs) to appropriate standards would be undertaken.

While partial road closures would potentially be required during the course of the construction period, these would be staged so as to allow priority for traffic movements in the peak direction, and alternate diversion routes provided.

Cumulative construction impacts to the Concept Proposal have been acknowledged as

construction for the Northern Beaches Hospital and for Mona Vale Road Upgrade project. While some potential mitigation measures have been detailed, the assessment relies on a Project Construction Traffic Management Plan (CTMP) to further identify impacts and develop mitigation measures.

The general objectives for traffic management of construction activities are considered to be reasonable and adequate. These should be fully met by a CTMP to be prepared by the chosen contractor in conjunction with the proponent (RMS), Councils and other stakeholders.

The following miscellaneous construction-related comments are provided:

- For any temporary complete road closures during construction, it is assumed that detour routes would be determined by a CTMP to the satisfaction of Councils, RMS, etc.

An appropriate CTMP would be developed to cover the above situation. This is a core requirement of the design and construct tender procurement being managed by RMS.

- Any proposed permanent decreases in parking during the construction stage should be quantified and assessed as part of final stage operations.

It is expected that the vehicles on Naree Road could potentially be accommodated within the unrestricted kerbside car parking on Rabbett Street (between Frenchs Forest Road and Adams Street). It is expected that the vehicles currently parking along Frenchs Forest Road could potentially be accommodated within the unrestricted kerbside car parking on the northern side of Frenchs Forest Road (between Rabbett Street and Patanga Road) as well as along Rabbett Street.

- As part of the cumulative impacts, during the construction of the Mona Vale Road upgrade, a portion of Mona Vale Road traffic is anticipated to divert via Warringah Road. It is unclear whether an estimate of this has been made and included as part of the cumulative assessment.

An estimate of the potential diversion to Warringah Road due to the construction of the Mona Vale Road upgrade was not known at the time of the Stage 1 report.

[It is acknowledged that this level of detail would need to be determined and detailed during preparation of the Project CTMP.]

- For impacts to traffic operations of the Forest High School during the construction stage, there will be restricted vehicular access for school staff to access the off-street car parking areas – it is unclear what 'restricted' means. Will parking areas not be available or will just some access points be available but all of the parking spaces?

The construction of the Stage 1 road works would be expected to result in altered arrangements for staff accessing the two off-street car parking areas. It is expected that access would be maintained to both car parks, however, during the construction period, there may be temporary changes to access arrangements (ie. alternative access locations into the car park) or minor delays accessing the car park.

- For the school 'kiss'n'ride' facilities during construction, how will drop-off / pick-up be managed if a reduced area is available.

This should be addressed in the CTMP. It may be necessary to allocate kerbside parking on one of the side streets (ie. Bluegum Crescent or Gladys Avenue) for school drop-off and pick-up.

- The cumulative construction impacts identified in *Table 8.1* of the revised TTA, do not make any specific mention of the Mona Vale Road Upgrade Project, which together with the NBH construction is likely to provide the main cumulative impacts for this project.

3.7 Summary of Submissions

A total of 45 submissions were received in response to the exhibition of the EIS. Five (5) were from government agencies (or advisory bodies), one from Warringah Council and the remaining 39 submissions were from members of the community and interest groups.

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

- Changes to local traffic arrangements including provision of a suitable way-finding strategy.
- Poor operational performance of specific intersections.
- Lack of pedestrian path and cycleway connectivity.
- Provision for public transport services to cater to all areas including consideration of future public transport initiatives.
- Provision of suitable bus bays / bus stops.
- On-street car parking issues including retail parking at Skyline shops.
- Road safety issues including road and pedestrian path crossfalls, street lighting.
- Alternative transport routes during construction including the potential increase of 'rat-runs' along the local road network.

4. Conclusions & Recommendations

4.1 Conclusions

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

- In general, it is considered that the methodology and analysis of traffic and transport impacts has been undertaken quite rigorously and in adequate detail. Moreover, it is considered that the SEARs have generally been addressed adequately.
- The staged assessment process offers the opportunity to defer project details and corresponding assessment to later stages of the Project, ie. Stage 2 assessment, which will provide greater detail on the Concept Proposal.
- The main issues of note include the following:
 - Due to the timeframe between Stage 1 works being completed and Stage 2 works starting, consideration should be given to providing flexibility with the 12-month 'waiting' period to undertake the operational traffic review. Moreover, it is unclear who would be responsible for implementation of any actions arising from the review, what timeframe would be agreed to and how any works would be funded.
 - Some proposed road widths are less than 3.5 m (general urban standard), which has the potential to adversely affect road safety and traffic operations.
 - Besides monitoring, there are no specific mitigation measures proposed to address 'rat-running'.
 - The perpendicular parking proposed opposite the Skyline shops, does not have a suitable connection between the shops and parking. This may cause shop users to cross the road in an uncontrolled manner away from the traffic signals at Allambie Road, which creates a road safety issue. It is acknowledged that the design will be subjected to 'safety in design audit' and further road safety audits would be undertaken at detailed design stage and prior to the opening of the works.
 - Bus travel times along the corridor have been predicted to operate below the target average operating speed sought by TfNSW.
 - The proposed shared paths highlight a significant gap in connectivity between Forest Way and Wakehurst Parkway until future cycleways (shown to be undertaken by others) are provided.
 - There are a number of 'missing' pedestrian crossings at signalised intersections. This creates pedestrian connectivity issues, which may potentially result in unsafe (uncontrolled) pedestrian movements across busy roads.
 - The cumulative construction impacts identified do not make any specific mention of the Mona Vale Road Upgrade Project, which together with the NBH construction is likely to provide the main cumulative impacts for this project.

4.2 Recommendations

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

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

1. Prior to Project construction, the preparation of a Construction Traffic Management Plan (CTMP) would need to be undertaken by the chosen contractor in consultation with, and to the satisfaction of relevant local councils and RMS. As well as typical issues such as construction access, haul routes, traffic impacts, pedestrian / cyclist impacts and road safety, the CTMP should specifically address impacts on affected schools, on-street parking impacts and cumulative impacts with other nearby projects.

The CTMP would need to be either a Condition of Consent or included within the Statement of Commitments.

2. At Project completion and during operations, undertake regular monitoring of local streets that are likely to exhibit increases in traffic and rat-running and consult with Council with regard to temporary measures that could be implemented to manage safety and related issues. Potential strategies and activation points should be identified to construct or manage traffic by RMS in conjunction with Council.
3. Post Project implementation, undertake a detailed traffic operations review within six (6) months of the project completion to identify traffic performance impacts and develop mitigation measures, as required. This should include an assessment of the impacts of any measures and whether there are 'downstream' impacts and/or cumulative impacts of the measures. In addition, responsibilities for the post-operations review should be detailed including (as a minimum) who would be responsible for the review assessment, who would be responsible for implementation of any actions arising from the review, what timeframe would be agreed to and how any works would be funded.
4. Independent road safety audits are to be undertaken for all stages of further design development and at pre-opening stage. Any issues identified by the audits will need to be closed out to the satisfaction of the relevant authorities including RMS and/or Councils.