Issue History

File Name	Prepared	Reviewed	Issued by	Date	Issued to
P4556.001T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	SP. Power	02/04/2020	nadia.nemati@planning.nsw.gov.au
P4556.002T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	S. Daizli	12/03/2021	Aditi.Coomar@planning.nsw.gov.au
P4556.003T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	S. Daizli	26/03/2021	Tahlia.Alexander@planning.nsw.gov.au
P4556.004T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	A. Finlay	S. Daizli	17/06/2021	Tahlia.Alexander@planning.nsw.gov.au

Loreto Normanhurst School

Environmental Impact Statement Traffic Peer Review

1. Introduction

1.1 Background

A State Significant Development Application (SSD-8996) for the redevelopment of Loreto Normanhurst School at 91-93 Pennant Hills Road is currently being assessed by the Department of Planning, Industry and Environment (DPIE). The concept proposal includes:

- Building envelopes; reconfiguration and renovation of existing school buildings and facilities; open recreation and landscape concept; increasing maximum student numbers from 1,150 to 2,000; pedestrian and circulation arrangements; and car park provision
- Stage 1 of the development, including a 5-storey boarding house to accommodate 220 boarders and a basement car park; reconfiguration and adaptive reuse of the Mary Ward Building to accommodate 50 boarders; and a 1-storey early learning centre for 70 children and an at-grade short-term car park.

1.2 Peer Reviews

Bitzios Consulting (Bitzios) was previously engaged by the DPIE to undertake an independent peer review (*P4556.001T Loreto Normanhurst School EIS Traffic Peer Review*, dated 3 April 2020) of the transport assessment report prepared by Ason Group (dated 22 January 2019) as part of the initial Environmental Impact Statement (EIS).

Bitzios then reviewed a Response to Submissions (RtS) traffic report prepared by Taylor Thomson Whitting (TTW, dated 15 January 2020) (*P4556.003T Loreto Normanhurst School EIS Traffic Peer Review*, dated 26 March 2021). Both peer reviews identified a number of deficiencies with the methodology and requested further information from the Applicant.

A Supplementary RtS traffic report has been prepared by TTW (dated 7 May 2021). This technical note summarises our review of TTW's traffic report and the Supplementary RtS from Hornsby Shire Council, Transport for NSW and Greys Consulting's peer review (dated 15 March 2021).

Overall, the Applicant has addressed most of our previously raised concerns, with only a small number of items which we consider to have been inadequately addressed and/or need further clarification. These are summarised in the following sections.

2. Supplementary Response to Submissions

Bitzios' responses to relevant public authority Supplementary RtS are provided as follows:

- Hornsby Shire Council in Table 2.1
- Transport for NSW in Table 2.2
- The adequacy of the Applicant's responses to our previous peer review comments are detailed in Table 2.3
- The adequacy of the Applicant's responses to Greys Consulting's previous peer review comments are detailed in Table 2.4.

Table 2.1: Supplementary Responses to Submissions – Hornsby Shire Council

Issue Raised	Applicant's Response	Bitzios' Response
Traffic Safety		
Council has received representations from some members of the community concerning traffic, parking and drop-off/pick-up arrangements associated with the current operation of Loreto Normanhurst School. A number of residents comment that the proposal to significantly increase student numbers will exacerbate these existing problems. In the Department's assessment of the traffic and parking impacts associated with the proposed increase in student population, the Department should be satisfied the following has been adequately addressed: Drop- Off/Pick-Up In the traffic report 6.1.2 it states that 'TTW has collected tube counts of the existing access and egress points into the School and conducted a site visit during a peak morning drop off period to observe current driver behaviour.' The traffic analysis and queuing survey appears to be only conducted during the morning peak, not afternoon peak. It should be noted that drop off behaviour is different from pick up behaviour since in the pick-up, parents often come to the school site early and wait for the children to arrive. Queuing of vehicles on surrounding streets that adjoin the School is an existing issue shared by residents and Council and has been observed to last for a long period of time and is the primary reason for long queues back to Osborn Road during the afternoon peak. The traffic report does not identity or discuss the queueing situation during PM pick up time.	The traffic count survey was also conducted during the afternoon peak as shown in Figure 6.1 of the original Response to Submissions report. As evidenced by the tube count survey, afternoon peak movements through the facility are approximately half of those in the morning peak. Nevertheless, traffic modelling has been conducted of the afternoon peak and detailed results are shown in Appendix B. As part of the ELC development, drone surveys were undertaken in September 2019 of the intersections of Osborn Road and Mount Pleasant Avenue with Pennant Hills Road. These drone surveys indicated a peak queue on Osborn Road of 9 vehicles and showed that queues cleared during each intersection cycle. A summary report has been attached in Appendix B of the Traffic Response to Submission.	This issue has been adequately addressed.

Issue Raised	Applicant's Response	Bitzios' Response
In previous conversations with School representatives, it was established that the School does not currently open their access gate until the afternoon pick-up is about to begin. Prior to this, parents who arrive early sit idle in their vehicles on Osborn Road, queuing to access the School through the gates. This appears to start at least 30 minutes prior to pick-up. Currently the afternoon queuing travels down Osborn Road into the intersection with Pennant Hills Road. On Pennant Hills Road the queuing is in the northbound right turn lane (into Osborn Rd) and in the southbound lane three queuing to turn left into Osborn Road. The current allowance provided by the school is 4 pickup spaces	Loreto is aware of the current issues with the existing pick up and drop off facility accessed by Osborn Road, as such the relocation of this facility has been prioritised to occur in Stage 1 of the development.	We agree with the Applicant's response. For clarity, however, will the relocated pick-up and drop-off facility be open prior to the afternoon pick-up? If so, what time?
The School proposes that as the development stages progress and the School population increases, so will the additional requirement for queuing spaces. However, it is evident from the current operation of the School that the number of vehicles queuing is closer to the proposed allowance of 15 to 16 vehicles as estimated for the Stage 4 of the development and the existing capacity is already insufficient for current demand. As the population of the junior school increases, so will the desire for parents to have access to the School to pick-up primary aged children. The Department should consider bringing any proposal for works to reduce traffic queuing for drop off and pick up to Stage 1 or before any increase in student population is approved that would lead to an increase in vehicles to the School occur.	Vehicles queuing are a result of the lack of recirculation that currently occurs due to geometric constraints reducing use of the recirculation. Allowing for this recirculation and providing additional queuing area within the school site will eliminate the need to queue on the surrounding streets. The relocated Osborn Road pick up and drop off proposed as part of Stage 1 of the works will reduce traffic queuing, which is why it has been prioritised to the beginning of the development works.	We agree with the Applicant's response.

Issue Raised	Applicant's Response	Bitzios' Response
The proposed future road link through the site has the potential to create other traffic and safety issues to the Mount Pleasant Avenue intersection which is not signalised. The through link would send traffic out to Mount Pleasant Avenue and the traffic would use the intersection of Mount Pleasant Avenue with Pennant Hills Road. This intersection is subject to many complaints regarding safety and delays and signalisation of the intersection at Mount Pleasant Avenue and Pennant Hills Road should be required should this application be approved as a condition of consent.	Loreto is aware that right turn movements at the intersection of Mount Pleasant Avenue and Pennant Hills Road have associated safety concerns. As discussed with Hornsby Shire Council during the preparation of the Response to Submissions Loreto is supportive of signalisation of this intersection, however TfNSW does not support this due to its proximity with the signalised intersection of Osborn Road and Pennant Hills Road. To reduce safety concerns, the OTMP provides a management solution such that only left turns will be required out of Mount Pleasant Avenue onto Pennant Hills Road as a result of Loreto traffic.	We agree with TfNSW not supporting the signalisation of the Pennant Hills Road/Mount Pleasant Avenue intersection. We also support the OTMP's stipulation that all drivers exiting via Mount Pleasant Avenue should turn left only at Pennant Hills Road and that the right turn will be audited on a quarterly basis, pending any future works at the intersection.
Increasing or relocating the internal queuing area would not address all traffic issues on Osborn Road at present or in the future. It is recommended that Osborn Road be widened to accommodate two traffic lanes along the School side as well as the proposals from traffic report.	Widening of Osborn Road was discussed with the Department of Planning, Industry and Environment. Widening would result in a significant loss to streetscape amenity along Osborn Road due to the required removal of a number of trees. The traffic issues on Osborn Road are a direct result of the deficiency in queuing area and lack of recirculation currently occurring within the school site. Once vehicles are able to queue internally to the school with the relocated Osborn Road pick up and drop off then improved capacity for the local street traffic will be experienced on Osborn Road.	In addition to streetscape amenity impacts, there are topographical constraints associated with widening Osborn Road and would be extremely difficult. The relocated Osborn Road pick up and drop off, and through site link will assist in relieving queueing on Osborn Road into the school.

Issue Raised	Applicant's Response	Bitzios' Response
On Street Parking		
The initial development plan states the School has approximately 300 members of staff, but only 179 car parking spaces on site. Council has observed that currently, a high proportion of the School staff and students park on the residential side of Osborn Road and Mount Pleasant Avenue. This observation is further confirmed by the Applicant in Section 4.3 Parking Supply document (page 12) whereby it is noted that the School currently has an existing shortfall in parking on campus. The Applicant proposes to manage this parking shortfall in the future through a proposed Green Travel Plan. While the Green Travel Plan is welcome, the proposal states that parking onsite will increase in stages in accordance with rising enrolments and staff numbers. In addition, the Staff Travel Surveys conducted for the initial development proposal in 2019, indicated that 89.1% of staff drive to the School, yet the current proposal does not come close to meeting the need for additional staff parking and would not address existing parking issues on surrounding roads as a result of the school enrolment and staff numbers. Additional parking provision to meet demand should be required prior to any increase in student and staff numbers.	To ensure the school delivers the relevant infrastructure in line with student population growth a condition of consent is proposed that will ensure the infrastructure is in place in line with population growth.	This condition shall be actioned on a stage-by-stage basis as appropriate in line with student and staff population growth.

Issue Raised	Applicant's Response	Bitzios' Response
Footpath capacity		
The increased pedestrian movements will create a situation where the existing 1.2m wide footpath cannot safely accommodate pedestrians. In the Department's Assessment, consideration should be given to upgrading the footpaths adjoining the site to 2m width along the pedestrian desired lines. It is acknowledged that a plan should be submitted to demonstrate how a widened footpath in addition to an extra lane along the Osborn Road frontage of the site could be accommodated within the building setbacks. A plan showing the dedication of part of the site for the purposes of road widening to accommodate the proposal may be required.	The amended proposal seeks to internalise the traffic movements for the school, within the school boundaries which will alleviate demand on the external footpaths. Further a new internal through site link is proposed between Osborn Road and Mt Pleasant Avenue which will take significant pressure off the existing drop off arrangements which make the need for an extra lane and widened footpath on Osborn Road unnecessary. See project description at Section 3.2, 4.0 and Traffic Report at Appendix G of the Amended Concept Plan and Stage 1 DA Report.	Providing an extra lane and widened footpath on Osborn Road would be extremely difficult as there are topographical constraints and there would be a significant loss to streetscape amenity along Osborn Road due to the required removal of a number of trees. Under the OTMP, the majority of pedestrians will enter the school from Pennant Hills Road. Furthermore, Section 5.2.1 of the OTMP states that "no pedestrian pathways enter the School from Osborn Road". The proposed internal through site link between Osborn Road and Mount Pleasant Avenue will also not necessitate the need for an extra lane and widened footpath on Osborn Road.

Table 2.2: Supplementary Responses to Submissions – Transport for NSW

Issue Raised	Applicant's Response	Bitzios' Response
Reference is made to your correspondence dated 18 February 2021, regarding the abovementioned Application which was referred to Transport for NSW (TfNSW) for comment. TfNSW has reviewed the submitted information and requests the following requirements to be included as conditions in the development consent. 2. The existing vehicular access on Pennant Hills Road shall be closed to general traffic between Monday and Friday and will be only allowed use on the weekend for ceremonial vehicles accessing the Chapel.	Noted. The project team will review and respond to the draft conditions of approval provided by the Department at the appropriate time.	This requirement shall be actioned as necessary.
5. School Zones must be installed along all roads with a direct access point (either pedestrian or vehicular) from the school. School Zones must not to be provided along roads adjacent to the school without a direct access point.		This requirement shall be actioned as necessary.
6. There should be suitable pedestrian paths/ facilities within the vehicle accessible areas to corral pedestrians to appropriate crossing locations.		This requirement shall be actioned as necessary.
7. All vehicles are to enter and exit the site in a forward direction. Provision for vehicles to turn around must be provided within the property boundary.		This requirement shall be actioned as necessary.
8. All works/regulatory signposting associated with the proposed development are to be at no cost to TfNSW.		This requirement shall be actioned as necessary.
9. A Construction Traffic Management Plan detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to Council for approval prior to the issue of a Construction Certificate.		A Construction Traffic Management Plan was prepared as part of the original submission (dated 22 January 2019).
10. Prior to the Issue of the Occupation Certificate, the applicant shall update the Green Travel Plan in consultation with TfNSW with an Implementation Strategy that commits to specific management actions, including operational procedures to be implemented along with timeframes. The applicant shall submit a copy of the plan for the endorsement of Transport for NSW via development.sco@transport.nsw.gov.au, prior to the issue of the Occupation Certificate.		This requirement shall be actioned as necessary in conjunction with Requirement 11.

Issue Raised	Applicant's Response	Bitzios' Response
11. The Green Travel Plan should include, but not be limited to: ▪ be prepared by a suitably qualified traffic consultant ▪ analysis of current travel survey data and school postcode data and discussion of how this data has informed the mode share targets and actions of the GTP; ▪ identify the number of staff and students within reasonable walking / cycling distance; ▪ staged mode share targets for staff, students and visitors which reflect a commitment to increase non-car mode share for travel to and from the site; ▪ implementation strategy that commits to specific actions (including operational procedures to be implemented along with timeframes) to encourage the use of public and active transport and discourage the use of single occupant car travel to access the site; ▪ details of bicycle parking and dedicated end of trip facilities including but not limited to lockers, showers and change rooms and e-bike charging station(s) for staff and students to support an increase in the non-car mode share for travel to and from the site; ▪ a Transport Access Guide for staff, students and visitors providing information about the range of travel modes, access arrangements and supporting facilities that service the site; ▪ a communication strategy for engaging with students, staff and visitors regarding public and active transport use to the site and the promotion of the health and wellbeing benefits of active and non-car travel to the site; ▪ include a mechanism to monitor the effectiveness of the measures of the plan; and ▪ the appointment of a Travel Plan Coordinator responsible for implementing the plan and its ongoing monitoring and review, including the delivery of actions and associated mode share targets		We support the recommended updates to the Green Travel Plan where relevant.

Issue Raised	Applicant's Response	Bitzios' Response
The plan shall be reviewed annually for at least the first five years and involve surveys, evaluation and review. The plan (and any updates to the plan), shall be implemented and adhered to at all times by the applicant following the issue of the first occupation certificate. The plan (as reviewed in consultation with TfNSW and updated annually) shall be implemented by the applicant for the life of the development.		
12. Prior to the Issue of any Construction Certificate, the applicant shall prepare the following document and submit to Council for approval: ▪ Road Safety Audit for the school pick-up and drop off areas, through site link, pedestrian and vehicular accesses to the school in accordance with *Austroads Guide to Road Safety Part 6: Managing Road Safety Audits and Austroads Guide to Road Safety Part 6A: Implementing Road Safety Audits* by an independent TfNSW accredited road safety auditor; and ▪ Review the school pick-up and drop off as well as pedestrian and vehicle access arrangements based on the results of the road safety audit, and implement safety measures, if required, in consultation with Hornsby Shire Council and TfNSW.		The required Road Safety Audits have been undertaken and the recommendations shall be implemented as practicable in consultation with Hornsby Shire Council and TfNSW.

Table 2.3: Supplementary Responses to Submissions – Bitzios Consulting's Traffic Peer Review (26 March 2021)

Issue Raised	Applicant's Response	Bitzios' Response
Queuing Analysis		
Queuing length resulting from pickup/drop off facilities should be included in the volumes of Figure 6.1. Determine if there will be any extensive queues line up during sharp peak times (8am-8:20am and 3:15pm-3:30pm). Results should also relate to spill back into Osborn Road The statement "It was observed on site that some queuing can occur during peak periods as a result of the above geometrical constraints and driver behaviour." in s6.1.2 needs to be quantified.	The volumes in Figure 6.1 of the original Traffic Report dated 15 January 2020 included in the first response to submission provide movements into and out of the existing pick up and drop off facility and have been used to project future demands of the pick-up and drop-off facility. The proposed pick up and drop off facility will provide through lanes to enable recirculation and will be marshalled to prevent queuing onto adjacent streets. As stated in the current Traffic RtS Report (Appendix A), the existing pick up and drop off facility is insufficient in terms of length for drop off and has existing geometry that discourages recirculation by drivers. For this reason the relocation of this drop off is proposed as part of the Stage 1 works. Refer to **Appendix A** for proposed queuing locations. As part of the ELC approval process, drone surveys were undertaken in September 2019 of the intersections of Osborn Road and Mount Pleasant Avenue with Pennant Hills Road to review queue lengths within Osborn Road. These surveys identified a 9 vehicle queue, refer to Appendix B in the Traffic RtS Report for a copy of this report.	This issue has been adequately addressed.
SIDRA Modelling		
Traffic Report needs to include PM peak results	As part of the ELC approval process, drone surveys were undertaken in September 2019 of the intersections of Osborn Road and Mount Pleasant Avenue with Pennant Hills Road to validate the intersection model. Refer to Appendix B in the Traffic RtS Report for a copy of this report. Refer to revised SIDRA model results in Appendix C of the Traffic RtS Report that include the 95th percentile queue.	This issue has been addressed to some extent.
Reports need to include 95th percentile queues (in metres) and a discussion should be created to identify congested approaches and the extent of queueing as well as potential spill back to adjacent intersections/driveways		This issue has been adequately addressed.

Issue Raised	Applicant's Response	Bitzios' Response
Provide a calibration and validation report for SIDRA modelling and evidence of observed vs. modelled queue length comparisons to ascertain any existing issues, considering site observations was undertaken. The *Transport for NSW Traffic Modelling Guidelines (2013)* lists the 95th percentile queue as a core performance element that should be assessed for any intersection modelling using SIDRA Intersection. This also ensures that the base models are fit for the purpose of assessing future scenarios		While there is no evidence of observed vs. modelled queue length comparisons in line with the *Transport for NSW Traffic Modelling Guidelines (2013)*, we are satisfied that the models have been calibrated and validated based on the site observations.
Include modelling of a future year scenario to identify impacts on Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic. This should be based on Section 5.6.3 of the traffic report which states that there is no timeframe for the installation of the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east)	While there is no timeframe for the installation of the No Right Turn, the Operational Traffic Management Plan details how right turns will be restricted for traffic associated with the pick up and drop off: ▪ Vehicles using the through site link will only be from addresses that are to the west of the School. ▪ Parents/carers/other drivers will be instructed to only turn left onto Pennant Hills Road. ▪ An audit of the above instruction will be conducted quarterly to ensure this instruction is followed. ELC traffic that is required to travel east from Mount Pleasant Avenue has been modelled to travel through the proposed egress route via Normanhurst Road. Vehicles using the Osborn Road pick up and drop off (those travelling to the east of the School) have been modelled in the future year scenario to turn right onto Pennant Hills Road. As the through site link is one-way in an east direction only, no vehicles will travel from Mount Pleasant Avenue to Osborn Road.	The SIDRA volumes in the Supplementary Traffic RtS appear to differ from the SIDRA volumes in the Supplementary RtS traffic report. However, it is not clear whether the future year scenarios considered the rerouted east traffic via Normanhurst Road and whether there any associated impacts. In addition to the above, it is likely that if the No Right Turn was to be installed (or any other changes), TfNSW will require SIDRA modelling. This means that any impacts to Normanhurst Road as a result of rerouted traffic must be identified in the interim.

Issue Raised	Applicant's Response	Bitzios' Response
The Pennant Hills Road/Normanhurst Road/Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue	Refer to revised SIDRA model results in Appendix C of the Traffic RtS Report with the intersections modelled as a network model. While the westbound queues extend past Mount Pleasant Avenue, this is an existing issue shown in the 2019 existing model and evidenced by the installation of signage to prevent queuing over the intersection. Queues are shown to reduce in the future due to reduced vehicle volumes as a result of Northconnex.	This issue has been adequately addressed.
Existing models should incorporate User-Given Phase Times using the Transport for NSW Intersection Diagnostic Monitor data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary	User given phase times have been applied based on SCATS data received for Thursday the 7th of November 2019.	This issue has been adequately addressed.
Surveyed pedestrian volumes should be used for assessing the overall impact, rather than default pedestrian volumes.	The north and south intersection legs on the Pennant Hills Road/Osborn Road/Normanhurst Road intersection provide signalised pedestrian crossings. These crossings experience low volumes of pedestrians during school peak times as train and bus connections are located to the east of Normanhurst Road. The traffic counts completed as part of the original submission found low pedestrian volumes of 1 pedestrian across Normanhurst Road and 21 pedestrians across Osborn Road. As such, the default of 50 pedestrians across both crossings allows for a more conservative approach than applying the existing pedestrian volumes experienced at the site.	We agree with the outcomes.

Issue Raised	Applicant's Response	Bitzios' Response
Operational Traffic Management		
The Operational Traffic Management Plan (OTMP) indicates drivers are instructed to 'recirculate' if spaces are available or children aren't ready. Confirm what is the extent of queueing as a result of circulating and whether it would spill back to the exit driveway and/or impact through vehicles on Osborn Road and parking	Recirculation of vehicles is to prevent cars from stopping internally and queuing back onto external roads. By having a through lane adjacent to the pick up and drop off areas, vehicles will not be required to stop to wait for a location to pull into a drop off bay. As such vehicles will be moving in free flow without queuing.	We agree with the Applicant's response. The through lane will need to be appropriately monitored by traffic marshals to ensure vehicles do not stop to wait for a location to pull into a drop-off bay.
Confirm how management measures will ensure that drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. E.g. traffic marshals, No Stopping restrictions.	As stated in the Operational Traffic Management Plan, traffic marshals will be used on site to direct vehicles to continue circulating. No stopping restrictions will also be in place along the internal roadways.	This issue has been adequately addressed.

Table 2.4: Supplementary Responses to Submissions – Greys Consulting' Traffic and Parking Peer Review

Issue Raised	Applicant's Response	Bitzios' Response
There is no evidence of queuing analysis in the traffic report. A detailed microsimulation analysis or numerical queuing assessment would be required to clarify queuing issues. Inappropriate modelling platform has been used for the purposes of the assessment. A microsimulation platform would be recommended for further traffic modelling and assessment.	In accordance with Austroads Guide to Traffic Modelling, microsimulation models are generally appropriate for large scale analysis (refer to Section 8.3 of Austroads Guide to Traffic Management art 3 Traffic Study and Analysis Methods). The proposed development is not of a significant scale such as to warrant development of a microsimulation model. Further, this has not been requested during consultation with both Transport for New South Wales and Hornsby Shire Council.	We agree with the Applicant's response.
SIDRA traffic model has not been validated in terms of queue length at both intersections, and should be undertaken in a network arrangement rather than isolated intersection modelling	Drone surveys were undertaken to validate intersection modelling during the preparation of the ELC development approval (refer to Appendix B in the Traffic RtS Report).	This issue has been adequately addressed.
A pedestrian survey at the intersection due to numerous students crossing the signalised intersection should be undertaken	There are no crossings provided across Pennant Hills Road. Previous surveys of the intersection indicated that low pedestrian volumes were experienced at the signalised crossings due to the availability of the pedestrian overpass and the location of bus and train connections.	This issue has been adequately addressed.
TTW traffic engineers have not undertaken a site observation to determine the local background traffic issues associated with Loreto	As stated in the previous traffic report TTW dated 15 January 2020 we were on site to observe the current pick up and drop off arrangement and also attended site numerous times during the preparation of the Response to Submissions reporting.	This issue has been adequately addressed.

Issue Raised	Applicant's Response	Bitzios' Response
The GTP mode targets are aspirational and impractical and COVID has not been taken into account	Hornsby Shire Council's Community Plan 2013-2023 provides reference for travel targets within the Hornsby Shire Council Local Government Area for the year 2023. The 10 year goals dictated within the plan provided targets related to sustainable travel that Council aims to achieve (refer to Transport RtS Report Figure 3). These targets are more aspirational than those detailed in the Green Travel Plan. As part of Hornsby Shire Council's Integrated Land Use Traffic Study, a Car Parking Management Study was developed that addressed parking management within the Shire. Identified within this Car Parking Management Study was a trend away from vehicle usage, with public transport use growing 30% and car driver/passenger modes reducing by 4% over a five-year period from 2011 to 2016. This is also in line with the targets proposed within the Green Travel Plan. At this time, it is unclear what the lasting impact of COVID will be to transport in the future. The Green Travel Plan is a dynamic document that is continually updated per year to adjust to changing travel behaviours and therefore will be able to adjust to changing behaviour that may occur post-COVID.	We agree with the Applicant's response.
A holistic Road Safety Audit of the surrounding road network during school time has not been undertaken	We note that a previous Road Safety Audit was conducted of the pick up and drop off as part of the ELC response to the Sydney Northern Planning Panel and has been attached in the RtS Report Appendix B.	This issue has been adequately addressed.

3. Conclusions

Bitzios Consulting has reviewed the Supplementary Traffic Response to Submissions prepared by Taylor Thomson Whitting (dated 7 May 2021) and supplementary documents.

While most of the previously raised issues have been addressed, a number of concerns remain outstanding and/or need further clarification, including:

- Whether the relocated pick-up and drop-off facility be open prior to the afternoon pick-up to address current issues with early queuing. If so, what time?
- Proposing a condition to ensure the school delivers the relevant infrastructure on a stage-by-stage basis as appropriate in line with student and staff population growth
- Updates to the Green Travel Plan where relevant as required by Transport for NSW
- Whether the future year SIDRA modelling scenarios considered the rerouted east traffic via Normanhurst Road and whether there any associated impacts
- SIDRA modelling of the No Right Turn (or any other changes) from Mount Pleasant Avenue (south) into Pennant Hills Road (east) in the event it is installed and identifying any impacts to Normanhurst Road as a result of rerouted traffic.

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P4556.002T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	S. Daizli	12/03/2021	Aditi.Coomar@planning.nsw.gov.au
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Loreto Normanhurst School

Environmental Impact Statement Traffic Peer Review

1. Introduction

1.1 Background

A State Significant Development Application (SSD-8996) for the redevelopment of Loreto Normanhurst School at 91-93 Pennant Hills Road is currently being assessed by the Department of Planning, Industry and Environment (DPIE). The concept proposal includes:

- Building envelopes; reconfiguration and renovation of existing school buildings and facilities; open recreation and landscape concept; increasing maximum student numbers from 1,150 to 2,000; pedestrian and circulation arrangements; and car park provision
- Stage 1 of the development, including a 5-storey boarding house to accommodate 220 boarders and a basement car park; reconfiguration and adaptive reuse of the Mary Ward Building to accommodate 50 boarders; and a 1-storey early learning centre for 70 children and an at-grade short-term car park.

1.2 Environmental Impact Statement Peer Review

Bitzios Consulting was previously engaged by the DPIE to undertake an independent peer review of the transport assessment report prepared by Ason Group (dated 22 January 2019) as part of the initial Environmental Impact Statement (EIS). That peer review (*P4556.001T Loreto Normanhurst School EIS Traffic Peer Review*, dated 3 April 2020) identified a number of deficiencies with the methodology and requested further information from the Applicant.

1.3 Response to Submissions Peer Review

A supplementary Response to Submissions (RtS) traffic report has been prepared by Taylor Thomson Whitting (TTW, dated 15 January 2020). This technical note summarises our review of TTW's traffic report, as well as a further independent peer review undertaken by Greys Consulting on behalf of the Residents' Action Groups from Mount Pleasant Avenue, Osborn Road and Surrounding Streets (dated 15 March 2021), and the RtS from Hornsby Shire Council (Council), Roads and Maritime Services (now Transport for NSW) and Transport for NSW.

Overall, the Applicant has addressed a portion of our initial concerns. However, there are a number of items which we consider to have been inadequately addressed. These are summarised in the following sections.

2. Supplementary Traffic Response to Submissions

2.1 Queueing Analysis

- TTW's report does not provide queue length results for the pick-up/drop-off facility to supplement the volumes in Figure 6.1 and determine whether any extensive queues line up with the sharp peak times (8am-8:20am and 3:15pm-3:30pm). The results should also be discussed in relation to spill back onto Osborn Road
- Section 6.1.2 of TTW's report states that, “It was observed on site that some queuing can occur during peak periods as a result of the above geometrical constraints and driver behaviour.” This needs to be quantified.

2.2 SIDRA Modelling

- The PM peak results should also be reported and discussed in TTW's report
- The 95th percentile queues (in metres) should also be reported in all report tables and discussed below them to identify congested approaches and understand the extent of queueing and potential spill back to adjacent intersections/driveways
- No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons to ascertain any existing issues, considering site observations was undertaken. The *Transport for NSW Traffic Modelling Guidelines (2013)* lists the 95th percentile queue as a core performance element that should be assessed for any intersection modelling using SIDRA Intersection. This also ensures that the base models are fit for the purpose of assessing future scenarios
- While Section 5.6.3 of TTW's report states that there is no timeframe for the installation of the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east), this should still be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic
- There is no indication of the timing of each stage of the development nor has any modelling of each stage been undertaken to determine any progressive impacts and need for design modifications prior to the full development being realised.

2.3 Response to Submissions

The RtS from relevant public authorities and the adequacy of the Applicant’s responses to each issue raised are provided in **Attachment A** as follows:

- Hornsby Shire Council in Table A.1
- Transport for NSW in Table A.2
- Roads and Maritime Services in Table A.3.

The adequacy of the Applicant’s responses to our original peer review comments are detailed in Table A.4 of **Attachment A**.

3. Operational Traffic Management Plan

3.1 Existing Pick-up/Drop-off Facility

Section 2.2.2 of the Operational Traffic Management Plan (OTMP) states that, “During drop off times, vehicles are marshalled into drop off bays where students disembark and cross the through road to access the School. If no spaces are available, drivers are instructed to recirculate. Similarly, during pick up drivers are instructed to continue to recirculate if their child is not yet ready. This recirculation is intended to reduce queuing from the PUDO into Osborn Road.” Additional analysis is needed on the extent of queueing as a result of circulating (i.e. any spill back to the exit driveway and/or impact through vehicles on Osborn Road and parking).

3.2 Ingress Route Management

Section 4.2.3 of the OTMP states that, “As the vehicles arrive, traffic marshals will be in place to direct vehicles through the pick up and drop off bays. Should all the bays be full, the traffic marshal will direct vehicles to continue through the bay to recirculate through the drop off. For the Osborn Road drop off, vehicles will be directed to exit back onto Osborn Road and re-enter the entry driveway. For the through site link, vehicles will be required to continue out of the link onto Mount Pleasant Avenue, Pennant Hills Road and Osborn Road.”

The above measures will need to be appropriately managed to ensure that:

- Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link and a No Stopping restriction should apply along it
- The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review.

4. SIDRA Models

A high-level review of the SIDRA model outputs was undertaken and the following were noted:

- As stated in our original peer review, the Pennant Hills Road/Normanhurst Road/ Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue
- As stated in our original peer review, the base models should use User-Given Phase Times incorporating the Transport for NSW SCATS data to reflect actual traffic signal timings. The future models can use optimised signal timings although this should give due consideration to Transport for NSW signal timing strategies
- Capturing the effects of pedestrians on traffic signal timings by accurately modelling the demand-dependent nature of the pedestrian phases and pedestrian protection times (late starts) if applicable.

5. Traffic and Parking Impact Assessment Peer Review

5.1 3 Technical Assessment of Traffic Report

5.1.1 3.1.2 Validation of SIDRA Model

Bitzios Consulting agrees that evidence of SIDRA model validation (i.e. back-of-queue surveys) needs to be provided in TTW's report to ensure that the base models are fit for the purpose of assessing future scenarios.

5.1.2 3.1.3 SIDRA Network Assessment

Bitzios Consulting agrees that the Pennant Hills Road/Normanhurst Road/ Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/ Osborn Road spill back beyond Mount Pleasant Avenue.

5.1.3 3.1.5 PM Peak Assessment

Bitzios Consulting agrees that PM school peak results and discussion are missing from TTW's report and are required irrespective of the network PM peak for relevance pf assessing the impacts of the school development.

5.1.4 3.1.8 Site Observation

Section 5.1.1 of TTW's report states that additional traffic count data was collected at the access driveways to the School on 25 June 2020 to determine existing traffic flows in and out of the school throughout the day. However, no queueing analysis was undertaken to determine whether any extensive queues occur and whether they spill back onto Osborn Road. Furthermore. any safety and operational issues on Mount Pleasant Avenue will need to be reviewed and rectified given the existing parking situation (reduces travel width), topography and sight distances.

6. Conclusions

Bitzios Consulting has reviewed the Supplementary Traffic Response to Submissions prepared by Taylor Thomson Whitting (dated 15 January 2020) and supplementary documents.

While most of the previously raised issues have been addressed, a number of concerns remain outstanding, including:

- Additional analysis on the queue length results for the existing pick-up/drop-off facility and discussion in relation to spill back onto Osborn Road
- Additional analysis on the potential extent of queueing as a result of circulating (i.e. any spill back to the exit driveway and/or impact through vehicles on Osborn Road and parking) under the proposed ingress route management measures
- Managing the proposed ingress route measures to ensure that:
    - Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link and a No Stopping restriction should apply along it
    - The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement.

- Addressing the following deficiencies with the SIDRA modelling:
  - Modelling the Pennant Hills Road/Normanhurst Road/Osborn Road and Pennant Hills Road/ Mount Pleasant Avenue intersections as a network
  - Using User-Given Phase Times incorporating the Transport for NSW SCATS data in the base models
  - Capturing the effects of pedestrians on traffic signal timings by accurately modelling the demand-dependent nature of the pedestrian phases and pedestrian protection times (late starts) if applicable
  - Reporting and discussing the PM peak results in TTW's report, as well as the 95th percentile queues (in metres) in all tables
  - Provision of a validation report and evidence of observed vs. modelled queue length comparisons in accordance with the *Transport for NSW Traffic Modelling Guidelines (2013)*
  - Modelling the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east) as a future year scenario
  - Providing indication of the timing of each stage of the development and modelling of each stage prior to the full development being realised.

Attachment A: Response Matrix

Table A.1: Responses to Submissions – Hornsby Shire Council

Issue Raised (31 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
Existing pick up operation is to be reviewed and improved.	Agreed, the existing pick up operation should be monitored and reviewed to determine if any improvements can be made.	Since the original Transport Assessment Report, the existing pick up and drop off arrangement at Osborn Road has been reviewed in its current operation and for its adequacy for the future operations at the School. To address the pick up and drop off issues and future demands Loreto has proposed a relocation of the existing facility and an additional through site link to further increase on site capacity.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. The Green Travel Plan and Operational Traffic Management Plan (OTMP) prepared as part of the Response to Submissions will be key strategies to reducing traffic congestion and promoting public and active transport in order to manage safety and operations in and around the school in the future.
With a 42.5% increase in students it can be argued that there will be a significant increase in queue length, this is not acceptable to the Branch as it would result in the pickup queue extending onto Osborn Road. Council has received many complaints from local residents regarding queuing onto Osborn Road issue during pickup time.	An analysis of the existing pick-up/drop-off facility should be undertaken to determine its suitability to accommodate the future school population. It should include, but not be limited to, number of vehicles using the facility, number of vehicle occupants, time between entering and the exiting the facility, queue lengths, including within the facility and spill back onto Osborn Road and queueing impacts at the entry and exit.	The relocated Osborn Road pick up and drop off and proposed additional through site link facility will increase the queuing capacity on site by five times what it is currently. Shifting the Osborn Road facility further south will also provide greater departure length from the Osborn Road/Pennant Hills Road intersection which will prevent queues from locking vehicles entering Osborn Road. These works have been proposed as part of Stage 1 to help ameliorate existing impacts that are experienced by the residents of Osborn Road.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, the proposed ingress route measures detailed in Section 4.2.3 of the OTMP will need to be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link And a No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review.

Issue Raised (31 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
ELC Operational Traffic Management Plan will be impacted by the Master Plan of Loreto. Although the Master Plan excludes the DA of ELC, staff of ELC will rely on car parking areas in Loreto. The TAR needs to have a discussion regarding the future impact to ELC staff parking.	Agreed.	An Operational Traffic Management Plan has been prepared that includes the operation of the ELC, in particular car parking requirements. Car parking demand projections have accounted for demands generated by the ELC and future staff at Loreto.	This has been adequately assessed in the traffic report.
Will there be dedicated bus services for Loreto Normanhurst students? If so how are the buses to be catered for?	-	Loreto currently operates 6 bus services and will include additional services as required as stages of the master plan are constructed. By relocating the Osborn Road pick up and drop off, additional capacity for these bus services will be provided at the Osborn Road slip road.	This has been adequately assessed in the traffic report.
Date of traffic counts has not been provided and is required.	Agreed. This is essential in assessing the currency of the base model and will impact the future case modelling also.	Updated SIDRA models have been prepared with traffic volumes from the Ason report. The volumes within this report have been reviewed against SCATS volumes from Thursday the 7th of November 2019 to ensure they reflect the school during normal operations.	The date of the traffic counts has been provided.

Table A.2: Responses to Submissions – Transport for NSW

Issue/Recommendation (29 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
Trip distribution and assignment of additional traffic The Applicant should consider the existing travel preferences and availability of on-street parking, pick-up or drop-off in the surrounding local road network to estimate trip assignment. Intersection analysis of all impacted intersections should be revised or undertaken accordingly.	A survey of where students and staff travel from and by what travel mode should be undertaken to obtain more accurate trip distributions and identify any additional intersections to be assessed.	Traffic distribution has been revised to address the various vehicular access points around the site, with trips proportioned to available parking spaces. Increase provision of pick up and drop off will reduce the incidence of pick up and drop off occurring on local roads.	Taylor Thomson Whitting were provided with current student postcode data to project potential trip distribution across the two pick-up and drop-off areas. This data indicated a split of 52% approaching the School from the east and 48% approaching from the west.
Managing school traffic volumes at Pennant Hills Road with Mount Pleasant Avenue DPIE should consider requesting an investigation into traffic management measures or development design to mitigate potential increases in the occurrence of crashes due to existing and additional pick-up/drop-off movements and on-street parking on Mount Pleasant Avenue associated with the school.	The arrival period between 7:30am and 8:00am has the highest number of students and staff outside of school zone periods based on the travel surveys, while all other periods have less than 100. Considering classes don't start until 8:30am (aside from possibly early classes or sports training), it is not clear why a high number of students are arriving between 7:30am and 8:00am. Is this a regular occurrence? On the other hand, if more students were required to arrive after 8:00am (considering the additional students), this would exacerbate existing traffic issues and queueing in the area, and potentially increase the occurrence of crashes.	The Operational Traffic Management Plan submitted with this proposal indicates that those traveling via Mount Pleasant Avenue will be restricted to left out movements only. Future signalisation of this intersection would be of benefit for the community and Loreto, however with the current use of Pennant Hills Road and proximity of the Osborn Road signalised intersection, it is not desirable from Roads and Maritime Services.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, the proposed ingress route measures detailed in Section 4.2.3 of the OTMP will need to be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link And a No Stopping restriction should apply along it

Issue/Recommendation (29 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
	If avoiding this scenario is desirable, then traffic management measures should be investigated, such as operating the AM school zone period between 7:30am and 9:30am, undertaking an analysis of the existing pick-up/drop-off facility, providing an additional drop-off/pick-up facility, redesigning the facility in future stages of development design, identifying safe and practical on-street drop-off/pick-up points near the school, extending No Parking restrictions and providing pedestrian crossings.		▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review. Also, the OTMP stipulates that all drivers exiting via Mount Pleasant Avenue should turn left only at Pennant Hills Road and that the right turn will be audited on a quarterly basis, pending any future works at the intersection. The No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east) should be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic.

Issue/Recommendation (29 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
Pick up and drop off analysis required The TA should include analysis to determine the suitability of the existing pick-up/drop-off facility to accommodate the future school population. Should it be determined that the existing facility is deemed inadequate to manage the incoming demand, the Applicant should consider provisions to redesign the facility in future stages of the development.	An analysis of the existing pick-up/drop-off facility should be undertaken to determine its suitability to accommodate the future school population. It should include, but not limited to: ▪ Number of vehicles using the facility ▪ Number of vehicle occupants ▪ Time between entering and the exiting the facility i.e. dwell time ▪ Queue lengths, including within the facility and spill back onto Osborn Road ▪ Queueing impacts at the entry and exit.	Since the original Transport Impact Assessment, the existing pick up and drop off arrangement at Osborn Road has been reviewed in its current operation and for its adequacy for the future operations at the School. To address the pick up and drop off issues and future demands Loreto has proposed a relocation of the existing facility and proposed an additional through site link to further increase on site capacity. These works have been proposed as part of Stage 1 to help ameliorate existing impacts that are experienced by the residents of Osborn Road.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, the proposed ingress route measures detailed in Section 4.2.3 of the OTMP will need to be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link And a No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review.

Table A.3: Responses to Submissions – Roads and Maritime Services

Issue/Recommendation (24 July 2019)	Bitzios' Initial Response (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
The existing access on Pennant Hills Road shall be removed and replaced with kerb and gutter to match existing.	Agreed, also considering the Pennant Hills Road environment, forecast traffic generation and location of bus stop 207667 before the driveway.	Loreto notes the safety concerns regarding the existing access point from Pennant Hills Road. During the consultation process, it was discussed that this access point could be maintained for occasional ceremonial use and when a traffic management plan is in place. This was agreed with RMS in principle. To close the access driveway to general vehicular movements, removable bollards will be installed to prevent access when ceremonial events are not occurring.	This has been incorporated into the revised design.
School Zones must be installed along all roads with a direct access point (either pedestrian or vehicular) from the school. School Zones must not be provided along roads adjacent to the school without a direct access point.	Agreed.	School zones are currently in place on roads with a direct access point.	No further action required.
There should be suitable pedestrian paths/facilities within the vehicle accessible areas to corral pedestrians to appropriate crossing locations.	Agreed, designated pedestrian paths should be provided in accordance with AS2890.1.	Where pedestrian movements are encouraged, pedestrian pathways and crossings have been provided. In the Operational Traffic Management Plan, it has been specified that the main pedestrian crossing areas are marshalled within the site.	This has been incorporated into the revised design..
All vehicles are to enter and exit the site in a forward direction. Provision for vehicles to turn around must be provided within the property boundary.	Agreed.	All vehicles are able to enter and exit the site in a forward direction. This has been shown in the attached swept path analysis.	This has been incorporated into the revised design.

Table A.4: Responses to Submissions – Bitzios Consulting's Original Traffic Peer Review

Issue/Recommendation (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
An assessment of existing parking provisions against DCP requirements should be provided in the amended report. It seems that parking has only been assessed for the development traffic. Should the existing parking provision be non-compliant then this should be rectified in future development planning.	The proposed parking provision is based on a staged increase in supply in accordance with the DCP for the initial Detailed Design Approval, with the shortfall of parking to be addressed through a reduction in private vehicle trips and a future expanded car park as part of the Concept Plan. This approach has been proposed due to the constrained access of the site and public sentiment that focus should be on reducing vehicle trips.	Also, the Green Travel Plan should be regularly reviewed to ensure that the estimated model share targets are being met to ensure that there is no actual parking shortfall.
Trip origin and destination information for students and staff travel should also be included as part of the travel survey. All data to be included in relevant report appendix for verification.	TTW has been provided with postcode data for existing students at the School to validate and verify the origin and destination of vehicle trips. For security reasons these have not been attached to this report, however information has been provided in Section 5.5.1.	This has been adequately assessed in the traffic report.
Confirmation of the date that traffic surveys were undertaken to ascertain currency and validity of modelling outputs. All data to be included in relevant report appendix for verification.	While the original traffic counts were conducted by Ason Group, TTW has obtained SCATS data to verify that the traffic volumes are in line with typical operations (SCATS data was sourced from pre- COVID-19).	The date of the traffic counts has been provided.
A calibration and validation report for the SIDRA modelling should be included to help determine if modelling is fit for purpose.	A comparison of the base traffic and SCATS data signal phase times has been completed to verify the model results. As the timing in the model and the SCATS timing correlates, the model is considered to be validated.	No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons in line with the *Transport for NSW Traffic Modelling Guidelines (2013)* to ascertain any existing issues, considering site observations was undertaken. This also ensures that the base models are fit for the purpose of assessing future scenarios.

Issue/Recommendation (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
Authentication of any outputs from the strategic model should be provided	The strategic model was provided from RMS to Ason Group during the original submission. The intent is that future development applications in the Concept Plan will reassess these intersections to verify the strategic model findings.	Any future intersection reassessments should use the latest available strategic model outputs and verified as necessary.
The traffic report should confirm whether the Pennant Hills Road/Mount Pleasant Avenue intersection operates as a seagull intersection or justification of why it has been modelled this way.	The Pennant Hills Road/Mount Pleasant Avenue intersection does not operate as a seagull intersection. The revised traffic modelling completed as part of this report has modelled this intersection as a sign controlled intersection.	This has been adequately addressed, however, as stated in our original peer review, the Pennant Hills Road/Normanhurst Road/ Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue.
The report should confirm whether the IDM data to derive signal timings for the SIDRA models	SCATS IDM data was used to calibrate the signal timings for the SIDRA models.	This has been adequately assessed in the traffic report, however, as stated in our original peer review, the existing models should use User-Given Phase Times incorporating the Transport for NSW Intersection Diagnostic Monitor (IDM) data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary.
Confirmation of the methodology used to calculate future traffic growth rates and calibration of the strategic model outputs	Future traffic growth rates have been based on RMS/TfNSW projections within their Strategic Traffic Forecasting Model.	This has been adequately assessed in the traffic report. Additionally, any future intersection reassessments should use the latest available strategic model outputs and verified as necessary.
Modelling of the ultimate 2047 master plan scenario with 2047 full development and future background traffic growth	A Concept Plan model has been developed for this report with full development and background growth.	There is no indication of the timing of each stage of the development nor has any modelling of each stage been undertaken to determine any progressive impacts and need for design modifications prior to the full development being realised.

Issue/Recommendation (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
The following key issues as per the Transport for NSW Guide to Traffic Generating Developments (2002) should be addressed: ▪ Current parking demand, including parking occupancy by time of day and turnover rates ▪ Review of potential pedestrian conflicts with vehicles which cause capacity constraints on either vehicular or pedestrian movements ▪ Analysis of projected queuing at entrances ▪ Assessment of road safety impacts on surrounding roads and at critical intersections ▪ Provision of Local Area Traffic Management measures (may be addressed in later stages).	Tube count data was collected of all driveway entries of the School to review traffic flow into and out of each area. As is typical for a School, parking experiences low turnover throughout the day. The proposed Concept Plan aims to reduce the instance of pedestrian conflict points and provide marshalled crossing points to control the pedestrian crossings. A queuing analysis has been completed for the proposed pick up and drop off facilities that shows sufficient queuing capacity is provided within the site such that no queuing will occur on local roadways. The Operational Traffic Management Plan details actions to be undertaken by Loreto to ensure safe operation of vehicle traffic associated with the School.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, the proposed ingress route measures detailed in Section 4.2.3 of the OTMP will need to be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link And a No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review.
Development traffic generation and volumes in residential streets	Development traffic generation has been based on future travel mode and enrolments/staff projections. These are discussed in detail in Section 5.3	Development traffic generation has been adequately assessed in the traffic report, however, estimated future traffic volumes on Osborn Road and Normanhurst Road have not been provided or discussed.
Safety concerns at the Pennant Hills Road/ Mount Pleasant Avenue intersection	Noting the safety concerns at Pennant Hills Road/Mount Pleasant Avenue, the Operational Traffic Management Plan has limited movements associated with the School to left in and left out of Mount Pleasant Avenue. Students will be allocated a pick up and drop off location based on their approach direction such that right turns are not required at this unsignalised intersection.	This has been stipulated in the OTMP. Also, the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east) should be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic.

Issue/Recommendation (2 April 2020)	Applicant's Response (15 March 2021)	Bitzios' Revised Response (26 March 2021)
A review and analysis of the existing pick-up/drop-off facility	The existing pick up and drop off facility has been reviewed through site observation and tube count data collection. As a result of this review, the existing pick up and drop off facility is proposed to be relocated and an additional facility is proposed as part of the through site link.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, the proposed ingress route measures detailed in Section 4.2.3 of the OTMP will need to be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road. Additional/reallocated traffic marshals should monitor this link And a No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review.
The masterplan should consider cumulative impact of the subject DA and The Early Learning Centre DA as these are closely related	This report includes the Early Learning Centre in projections of traffic generation and parking demands.	This has been adequately assessed in the traffic report.
As this development impacts on the State road network all modelling should be in accordance with RMS Modelling Guidelines and approved by RMS/TfNSW.	Modelling is in accordance with RMS Modelling Guidelines.	No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons in line with the *Transport for NSW Traffic Modelling Guidelines (2013)* to ascertain any existing issues, considering site observations was undertaken. This also ensures that the base models are fit for the purpose of assessing future scenarios. Furthermore, as stated in our original peer review: ▪ The Pennant Hills Road/Normanhurst Road/Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue ▪ The existing models should use User-Given Phase Times incorporating the Transport for NSW IDM data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary.

Issue History

File Name	Prepared	Reviewed	Issued by	Date	Issued to
P4556.001T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	SP. Power	02/04/2020	nadia.nemati@planning.nsw.gov.au
P4556.002T Loreto Normanhurst School EIS Traffic Peer Review	S. Daizli	SP. Power	SP. Power	12/03/2021	nadia.nemati@planning.nsw.gov.au

Loreto Normanhurst School

Environmental Impact Statement Traffic Peer Review

1. Introduction

A State Significant Development Application (SSD-8996) for the redevelopment of Loreto Normanhurst School at 91-93 Pennant Hills Road is currently being assessed by the Department of Planning, Industry and Environment (DPIE). The concept proposal includes:

- Building envelopes; reconfiguration and renovation of existing school buildings and facilities; open recreation and landscape concept; increasing maximum student numbers from 1,150 to 2,000; pedestrian and circulation arrangements; and car park provision
- Stage 1 of the development, including a 5-storey boarding house to accommodate 220 boarders and a basement car park; reconfiguration and adaptive reuse of the Mary Ward Building to accommodate 50 boarders; and a 1-storey early learning centre for 70 children and an at-grade short-term car park.

Bitzios Consulting was previously engaged by the DPIE to undertake an independent peer review of the transport assessment report prepared by Ason Group (dated 22 January 2019) as part of the initial Environmental Impact Statement (EIS). That peer review (*P4556.001T Loreto Normanhurst School EIS Traffic Peer Review*, dated 3 April 2020) identified a number of deficiencies with the methodology and requested further information from the Applicant.

A supplementary Response to Submissions (RtS) traffic report has been prepared by Taylor Thomson Whitting (TTW, dated 15 January 2020). This technical note summarises our review of TTW's traffic report, as well as the RtS from Hornsby Shire Council (Council), Roads and Maritime Services (now Transport for NSW) and Transport for NSW.

Overall, the Applicant has addressed a portion of our initial concerns. However, there are a number of items which we consider to have been inadequately addressed. These are summarised in the following sections.

2. Supplementary Traffic Response to Submissions

2.1 Overview

The RtS from relevant public authorities and the adequacy of the Applicant's responses to each issue raised are provided in **Attachment A** as follows:

- Hornsby Shire Council in Table A.1
- Transport for NSW in Table A.2
- Roads and Maritime Services in Table A.3.

The adequacy of the Applicant's responses to our original peer review comments are detailed in Table A.4 of **Attachment A**.

2.2 Queueing Analysis

- The traffic report does not provide queue length results for the pick-up/drop-off facility to supplement the volumes in Figure 6.1 and determine whether any extensive queues line up with the sharp peak times (8am-8:20am and 3:15pm-3:30pm). The results should also be discussed in relation to spill back onto Osborn Road

- Section 6.1.2 of the traffic report states that, “It was observed on site that some queuing can occur during peak periods as a result of the above geometrical constraints and driver behaviour.” This needs to be quantified.

2.3 SIDRA Modelling

- The PM peak results should also be reported and discussed in the traffic report
- The 95th percentile queues (in metres) should also be reported in all report tables and discussed below them to identify congested approaches and understand the extent of queueing and potential spill back to adjacent intersections/driveways
- No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons to ascertain any existing issues, considering site observations was undertaken. The *Transport for NSW Traffic Modelling Guidelines (2013)* lists the 95th percentile queue as a core performance element that should be assessed for any intersection modelling using SIDRA Intersection. This also ensures that the base models are fit for the purpose of assessing future scenarios
- While Section 5.6.3 of the traffic report states that there is no timeframe for the installation of the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east), this should still be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic
- There is no indication of the timing of each stage of the development nor has any modelling of each stage been undertaken to determine any progressive impacts and need for design modifications prior to the full development being realised.

3. Operational Traffic Management Plan

3.1 Existing Pick-up/Drop-off Facility

Section 2.2.2 of the Operational Traffic Management Plan (OTMP) states that, “During drop off times, vehicles are marshalled into drop off bays where students disembark and cross the through road to access the School. If no spaces are available, drivers are instructed to recirculate. Similarly, during pick up drivers are instructed to continue to recirculate if their child is not yet ready. This recirculation is intended to reduce queuing from the PUDO into Osborn Road.” What is the extent of queueing as a result of circulating? Does it spill back to the exit driveway and/or impact through vehicles on Osborn Road and parking?

3.2 Ingress Route Management

Section 4.2.3 of the OTMP states that, “As the vehicles arrive, traffic marshals will be in place to direct vehicles through the pick up and drop off bays. Should all the bays be full, the traffic marshal will direct vehicles to continue through the bay to recirculate through the drop off. For the Osborn Road drop off, vehicles will be directed to exit back onto Osborn Road and re-enter the entry driveway. For the through site link, vehicles will be required to continue out of the link onto Mount Pleasant Avenue, Pennant Hills Road and Osborn Road.”

How will the above measures be managed to ensure that:

- Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it
- The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review?

4. SIDRA Models

In the absence of receiving the SIDRA models (which need to be reviewed as part of our scope), a high-level review of the outputs was undertaken and the following were noted:

- As stated in our original peer review, the Pennant Hills Road/Normanhurst Road/ Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue
- As stated in our original peer review, the existing models should use User-Given Phase Times incorporating the Transport for NSW Intersection Diagnostic Monitor data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary
- Default pedestrian volumes have been used in all models. Particularly being a school development, surveyed pedestrian volumes are crucial for model calibration and assessing overall impacts.

5. Conclusions

Bitzios Consulting has reviewed the Supplementary Traffic Response to Submissions prepared by Taylor Thomson Whitting (dated 15 January 2020) and supplementary documents.

While most of the previously raised issues have been addressed, a number of concerns remain outstanding, revolving around queue length analysis, ingress route management and deficiencies with the SIDRA modelling and reporting.

Attachment A: Response Matrix

Table A.1: Responses to Submissions – Hornsby Shire Council

Issue Raised	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
Existing pick up operation is to be reviewed and improved.	Agreed, the existing pick up operation should be monitored and reviewed to determine if any improvements can be made.	Since the original Transport Assessment Report, the existing pick up and drop off arrangement at Osborn Road has been reviewed in its current operation and for its adequacy for the future operations at the School. To address the pick up and drop off issues and future demands Loreto has proposed a relocation of the existing facility and an additional through site link to further increase on site capacity.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. The Green Travel Plan and Operational Traffic Management Plan (OTMP) prepared as part of the Response to Submissions will be key strategies to reducing traffic congestion and promoting public and active transport in order to manage safety and operations in and around the school in the future.
With a 42.5% increase in students it can be argued that there will be a significant increase in queue length, this is not acceptable to the Branch as it would result in the pickup queue extending onto Osborn Road. Council has received many complaints from local residents regarding queuing onto Osborn Road issue during pickup time.	An analysis of the existing pick-up/drop-off facility should be undertaken to determine its suitability to accommodate the future school population. It should include, but not be limited to, number of vehicles using the facility, number of vehicle occupants, time between entering and the exiting the facility, queue lengths, including within the facility and spill back onto Osborn Road and queueing impacts at the entry and exit.	The relocated Osborn Road pick up and drop off and proposed additional through site link facility will increase the queuing capacity on site by five times what it is currently. Shifting the Osborn Road facility further south will also provide greater departure length from the Osborn Road/Pennant Hills Road intersection which will prevent queues from locking vehicles entering Osborn Road. These works have been proposed as part of Stage 1 to help ameliorate existing impacts that are experienced by the residents of Osborn Road.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, how will the proposed ingress route measures detailed in Section 4.2.3 of the OTMP be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review?

Issue Raised	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
ELC Operational Traffic Management Plan will be impacted by the Master Plan of Loreto. Although the Master Plan excludes the DA of ELC, staff of ELC will rely on car parking areas in Loreto. The TAR needs to have a discussion regarding the future impact to ELC staff parking.	Agreed.	An Operational Traffic Management Plan has been prepared that includes the operation of the ELC, in particular car parking requirements. Car parking demand projections have accounted for demands generated by the ELC and future staff at Loreto.	This has been adequately assessed in the traffic report.
Will there be dedicated bus services for Loreto Normanhurst students? If so how are the buses to be catered for?	-	Loreto currently operates 6 bus services and will include additional services as required as stages of the master plan are constructed. By relocating the Osborn Road pick up and drop off, additional capacity for these bus services will be provided at the Osborn Road slip road.	This has been adequately assessed in the traffic report.
Date of traffic counts has not been provided and is required.	Agreed. This is essential in assessing the currency of the base model and will impact the future case modelling also.	Updated SIDRA models have been prepared with traffic volumes from the Ason report. The volumes within this report have been reviewed against SCATS volumes from Thursday the 7th of November 2019 to ensure they reflect the school during normal operations.	The date of the traffic counts has been provided.

Table A.2: Responses to Submissions – Transport for NSW

Issue/Recommendation	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
Trip distribution and assignment of additional traffic The Applicant should consider the existing travel preferences and availability of on-street parking, pick-up or drop-off in the surrounding local road network to estimate trip assignment. Intersection analysis of all impacted intersections should be revised or undertaken accordingly.	A survey of where students and staff travel from and by what travel mode should be undertaken to obtain more accurate trip distributions and identify any additional intersections to be assessed.	Traffic distribution has been revised to address the various vehicular access points around the site, with trips proportioned to available parking spaces. Increase provision of pick up and drop off will reduce the incidence of pick up and drop off occurring on local roads.	Taylor Thomson Whitting were provided with current student postcode data to project potential trip distribution across the two pick-up and drop-off areas. This data indicated a split of 52% approaching the School from the east and 48% approaching from the west.
Managing school traffic volumes at Pennant Hills Road with Mount Pleasant Avenue DPIE should consider requesting an investigation into traffic management measures or development design to mitigate potential increases in the occurrence of crashes due to existing and additional pick-up/drop-off movements and on-street parking on Mount Pleasant Avenue associated with the school.	The arrival period between 7:30am and 8:00am has the highest number of students and staff outside of school zone periods based on the travel surveys, while all other periods have less than 100. Considering classes don't start until 8:30am (aside from possibly early classes or sports training), it is not clear why a high number of students are arriving between 7:30am and 8:00am. Is this a regular occurrence? On the other hand, if more students were required to arrive after 8:00am (considering the additional students), this would exacerbate existing traffic issues and queueing in the area, and potentially increase the occurrence of crashes.	The Operational Traffic Management Plan submitted with this proposal indicates that those traveling via Mount Pleasant Avenue will be restricted to left out movements only. Future signalisation of this intersection would be of benefit for the community and Loreto, however with the current use of Pennant Hills Road and proximity of the Osborn Road signalised intersection, it is not desirable from Roads and Maritime Services.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, how will the proposed ingress route measures detailed in Section 4.2.3 of the OTMP be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it

Issue/Recommendation	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
	If avoiding this scenario is desirable, then traffic management measures should be investigated, such as operating the AM school zone period between 7:30am and 9:30am, undertaking an analysis of the existing pick-up/drop-off facility, providing an additional drop-off/pick-up facility, redesigning the facility in future stages of development design, identifying safe and practical on-street drop-off/pick-up points near the school, extending No Parking restrictions and providing pedestrian crossings.		▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review? Also, the OTMP stipulates that all drivers exiting via Mount Pleasant Avenue should turn left only at Pennant Hills Road and that the right turn will be audited on a quarterly basis, pending any future works at the intersection. The No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east) should be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic.

Issue/Recommendation	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
Pick up and drop off analysis required The TA should include analysis to determine the suitability of the existing pick-up/drop-off facility to accommodate the future school population. Should it be determined that the existing facility is deemed inadequate to manage the incoming demand, the Applicant should consider provisions to redesign the facility in future stages of the development.	An analysis of the existing pick-up/drop-off facility should be undertaken to determine its suitability to accommodate the future school population. It should include, but not limited to: ▪ Number of vehicles using the facility ▪ Number of vehicle occupants ▪ Time between entering and the exiting the facility i.e. dwell time ▪ Queue lengths, including within the facility and spill back onto Osborn Road ▪ Queueing impacts at the entry and exit.	Since the original Transport Impact Assessment, the existing pick up and drop off arrangement at Osborn Road has been reviewed in its current operation and for its adequacy for the future operations at the School. To address the pick up and drop off issues and future demands Loreto has proposed a relocation of the existing facility and proposed an additional through site link to further increase on site capacity. These works have been proposed as part of Stage 1 to help ameliorate existing impacts that are experienced by the residents of Osborn Road.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, how will the proposed ingress route measures detailed in Section 4.2.3 of the OTMP be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review?

Table A.3: Responses to Submissions – Roads and Maritime Services

Issue/Recommendation	Bitzios' Initial Response	Applicant's Response	Bitzios' Revised Response
The existing access on Pennant Hills Road shall be removed and replaced with kerb and gutter to match existing.	Agreed, also considering the Pennant Hills Road environment, forecast traffic generation and location of bus stop 207667 before the driveway.	Loreto notes the safety concerns regarding the existing access point from Pennant Hills Road. During the consultation process, it was discussed that this access point could be maintained for occasional ceremonial use and when a traffic management plan is in place. This was agreed with RMS in principle. To close the access driveway to general vehicular movements, removable bollards will be installed to prevent access when ceremonial events are not occurring.	This has been incorporated into the revised design.
School Zones must be installed along all roads with a direct access point (either pedestrian or vehicular) from the school. School Zones must not be provided along roads adjacent to the school without a direct access point.	Agreed.	School zones are currently in place on roads with a direct access point.	No further action required.
There should be suitable pedestrian paths/facilities within the vehicle accessible areas to corral pedestrians to appropriate crossing locations.	Agreed, designated pedestrian paths should be provided in accordance with AS2890.1.	Where pedestrian movements are encouraged, pedestrian pathways and crossings have been provided. In the Operational Traffic Management Plan, it has been specified that the main pedestrian crossing areas are marshalled within the site.	This has been incorporated into the revised design..
All vehicles are to enter and exit the site in a forward direction. Provision for vehicles to turn around must be provided within the property boundary.	Agreed.	All vehicles are able to enter and exit the site in a forward direction. This has been shown in the attached swept path analysis.	This has been incorporated into the revised design.

Table A.4: Responses to Submissions – Bitzios Consulting's Original Traffic Peer Review

Issue/Recommendation	Applicant's Response	Bitzios' Revised Response
An assessment of existing parking provisions against DCP requirements should be provided in the amended report. It seems that parking has only been assessed for the development traffic. Should the existing parking provision be non-compliant then this should be rectified in future development planning.	The proposed parking provision is based on a staged increase in supply in accordance with the DCP for the initial Detailed Design Approval, with the shortfall of parking to be addressed through a reduction in private vehicle trips and a future expanded car park as part of the Concept Plan. This approach has been proposed due to the constrained access of the site and public sentiment that focus should be on reducing vehicle trips.	Also, the Green Travel Plan should be regularly reviewed to ensure that the estimated model share targets are being met to ensure that there is no actual parking shortfall.
Trip origin and destination information for students and staff travel should also be included as part of the travel survey. All data to be included in relevant report appendix for verification.	TTW has been provided with postcode data for existing students at the School to validate and verify the origin and destination of vehicle trips. For security reasons these have not been attached to this report, however information has been provided in Section 5.5.1.	This has been adequately assessed in the traffic report.
Confirmation of the date that traffic surveys were undertaken to ascertain currency and validity of modelling outputs. All data to be included in relevant report appendix for verification.	While the original traffic counts were conducted by Ason Group, TTW has obtained SCATS data to verify that the traffic volumes are in line with typical operations (SCATS data was sourced from pre- COVID-19).	The date of the traffic counts has been provided.
A calibration and validation report for the SIDRA modelling should be included to help determine if modelling is fit for purpose.	A comparison of the base traffic and SCATS data signal phase times has been completed to verify the model results. As the timing in the model and the SCATS timing correlates, the model is considered to be validated.	No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons in line with the *Transport for NSW Traffic Modelling Guidelines (2013)* to ascertain any existing issues, considering site observations was undertaken. This also ensures that the base models are fit for the purpose of assessing future scenarios.

Issue/Recommendation	Applicant's Response	Bitzios' Revised Response
Authentication of any outputs from the strategic model should be provided	The strategic model was provided from RMS to Ason Group during the original submission. The intent is that future development applications in the Concept Plan will reassess these intersections to verify the strategic model findings.	Any future intersection reassessments should use the latest available strategic model outputs and verified as necessary.
The traffic report should confirm whether the Pennant Hills Road/Mount Pleasant Avenue intersection operates as a seagull intersection or justification of why it has been modelled this way.	The Pennant Hills Road/Mount Pleasant Avenue intersection does not operate as a seagull intersection. The revised traffic modelling completed as part of this report has modelled this intersection as a sign controlled intersection.	This has been adequately addressed, however, as stated in our original peer review, the Pennant Hills Road/Normanhurst Road/ Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue.
The report should confirm whether the IDM data to derive signal timings for the SIDRA models	SCATS IDM data was used to calibrate the signal timings for the SIDRA models.	This has been adequately assessed in the traffic report, however, as stated in our original peer review, the existing models should use User-Given Phase Times incorporating the Transport for NSW Intersection Diagnostic Monitor (IDM) data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary.
Confirmation of the methodology used to calculate future traffic growth rates and calibration of the strategic model outputs	Future traffic growth rates have been based on RMS/TfNSW projections within their Strategic Traffic Forecasting Model.	This has been adequately assessed in the traffic report. Additionally, any future intersection reassessments should use the latest available strategic model outputs and verified as necessary.
Modelling of the ultimate 2047 master plan scenario with 2047 full development and future background traffic growth	A Concept Plan model has been developed for this report with full development and background growth.	There is no indication of the timing of each stage of the development nor has any modelling of each stage been undertaken to determine any progressive impacts and need for design modifications prior to the full development being realised.

Issue/Recommendation	Applicant's Response	Bitzios' Revised Response
The following key issues as per the Transport for NSW Guide to Traffic Generating Developments (2002) should be addressed: ▪ Current parking demand, including parking occupancy by time of day and turnover rates ▪ Review of potential pedestrian conflicts with vehicles which cause capacity constraints on either vehicular or pedestrian movements ▪ Analysis of projected queuing at entrances ▪ Assessment of road safety impacts on surrounding roads and at critical intersections ▪ Provision of Local Area Traffic Management measures (may be addressed in later stages).	Tube count data was collected of all driveway entries of the School to review traffic flow into and out of each area. As is typical for a School, parking experiences low turnover throughout the day. The proposed Concept Plan aims to reduce the instance of pedestrian conflict points and provide marshalled crossing points to control the pedestrian crossings. A queuing analysis has been completed for the proposed pick up and drop off facilities that shows sufficient queuing capacity is provided within the site such that no queuing will occur on local roadways. The Operational Traffic Management Plan details actions to be undertaken by Loreto to ensure safe operation of vehicle traffic associated with the School.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, how will the proposed ingress route measures detailed in Section 4.2.3 of the OTMP be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review?
Development traffic generation and volumes in residential streets	Development traffic generation has been based on future travel mode and enrolments/staff projections. These are discussed in detail in Section 5.3	Development traffic generation has been adequately assessed in the traffic report, however, estimated future traffic volumes on Osborn Road and Normanhurst Road have not been provided or discussed.
Safety concerns at the Pennant Hills Road/ Mount Pleasant Avenue intersection	Noting the safety concerns at Pennant Hills Road/Mount Pleasant Avenue, the Operational Traffic Management Plan has limited movements associated with the School to left in and left out of Mount Pleasant Avenue. Students will be allocated a pick up and drop off location based on their approach direction such that right turns are not required at this unsignalised intersection.	This has been stipulated in the OTMP. Also, the No Right Turn from Mount Pleasant Avenue (south) into Pennant Hills Road (east) should be modelled as a future year scenario to ascertain the indicative impacts on the Mount Pleasant Avenue approach, right turn from Osborn Road and the proposed egress route via Normanhurst Road for drivers travelling east due to redistributed traffic.

Issue/Recommendation	Applicant's Response	Bitzios' Revised Response
A review and analysis of the existing pick-up/drop-off facility	The existing pick up and drop off facility has been reviewed through site observation and tube count data collection. As a result of this review, the existing pick up and drop off facility is proposed to be relocated and an additional facility is proposed as part of the through site link.	Queue length results and analysis have not been provided to supplement the volumes in Figure 6.1 of the traffic report, including any spill back onto Osborn Road and recirculation. Furthermore, how will the proposed ingress route measures detailed in Section 4.2.3 of the OTMP be managed to ensure that: ▪ Drivers do not stop within the through site link to pick up and drop off to avoid recirculating via Mount Pleasant Avenue, Pennant Hills Road and Osborn Road? Will traffic marshals monitor this link? A No Stopping restriction should apply along it ▪ The impacts (if any) of drivers using the Osborn Road pick-up/drop-off facility requiring to recirculate are not exacerbated by the existing recirculation arrangement as per Section 3.1 of this review?
The masterplan should consider cumulative impact of the subject DA and The Early Learning Centre DA as these are closely related	This report includes the Early Learning Centre in projections of traffic generation and parking demands.	This has been adequately assessed in the traffic report.
As this development impacts on the State road network all modelling should be in accordance with RMS Modelling Guidelines and approved by RMS/TfNSW.	Modelling is in accordance with RMS Modelling Guidelines.	No validation report was submitted since our original peer review and there is no evidence of observed vs. modelled queue length comparisons in line with the *Transport for NSW Traffic Modelling Guidelines (2013)* to ascertain any existing issues, considering site observations was undertaken. This also ensures that the base models are fit for the purpose of assessing future scenarios. Furthermore, as stated in our original peer review: ▪ The Pennant Hills Road/Normanhurst Road/Osborn Road and Pennant Hills Road/Mount Pleasant Avenue intersections should be modelled as a network as the outputs show that westbound queues on Pennant Hills Road at Normanhurst Road/Osborn Road spill back beyond Mount Pleasant Avenue ▪ The existing models should use User-Given Phase Times incorporating the Transport for NSW IDM data to reflect actual traffic conditions on the individual approaches. The future models can use Practical or Optimal Cycle Time where necessary.