St Catherine's School Master Plan (SSD 6339)

Independent Traffic & Transport Review

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Contents

1. Introduction

The St Catherine's School Master Plan is seeking approval for a concept proposal for the staged redevelopment of the school campus over 15 years comprising demolition works, new buildings, alterations and additions, revised access arrangements, revised circulation system, additional car parking and landscaping works to support an additional 230 students. Approval is also sought for the construction of Stage 1 of the works for the Research, Performing Arts and Aquatic Centre (RPAC).

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

1.1 Objectives & Scope of Work

The D&PE requires an independent peer review of the traffic and transport impact assessment of the St Catherine's School Master Plan and Stage 1 – Research, Performing Arts and Aquatic Centre (RPAC). The Department seeks independent advice on:

- applicant's assessment of the traffic and transport impacts;
- appropriateness and effectiveness of management and mitigation measures that have been recommended for the Project;
- appropriateness of conditions recommended by Council and other government agencies; and
- recommendations for conditions for operation of the project should the Department recommend approval of the development.

The review includes the following tasks.

Preliminary Review

- Site familiarisation visit of the Project area to observe and assess pertinent traffic and transport issues.
- Review the traffic and transport assessment in the Environmental Impact Statement (EIS) and the submissions made by the Councils and relevant government agencies regarding the transport and traffic assessment. The review includes:
  - the adequacy of the surveys and modelling that have informed the assessment;
  - the development's transport impacts for both the concept proposal and Stage 1 RPAC development, including but not limited to the impacts on the operation of the surrounding intersections with the goal of maintaining existing levels of service, safe access to and around the site and on-street car parking within close proximity to the site; and
  - consideration of the adequacy of the information presented and whether it is sufficient to enable an assessment of the impacts of the proposal to be made.

- Consider whether additional information is required to address gaps in the traffic and transport impact assessment.
- Advise the Department of the findings of the Preliminary Review.
- Advise the Department on the appropriateness and effectiveness of the options generated by the applicant to respond to issues raised in the submissions.

Response to Submissions Report Review

- Review the appropriateness and effectiveness of the final management and mitigation measures recommended for the concept proposal and Stage 1 of the development, to address the impacts on the operation of the surrounding intersections with the goal of maintaining existing levels of service, safe access to and around the site and on-street car parking within close proximity to the site.
- Review any further agency, Council and public submissions on the revised traffic and transport impact assessment.
- Prepare a report on the findings of the Review, including:
  - adequacy and completeness of the traffic and transport impact assessment;
  - compliance of the development with applicable legislation, guidelines and best practice;
  - adequacy and appropriateness of the management and mitigation measures recommended for the Concept Proposal and Stage 1 of the project; and
  - recommended actions and Conditions of approval that could be applied to avoid, minimise, mitigate, and/or manage the residual traffic and transport impacts (should the department recommend approval of the project).

In undertaking the review, the main documents that were referenced / reviewed are as follows:

- Arup "*St Catherine's School, Waverley – Traffic and Transport Assessment (TTA): Rev A*", 18 August 2014
- Arup "*St Catherine's School – Travel Strategies, Transport Report (TST)*", 1 July 2015
- Arup "*St Catherine's School – Travel Strategies, Transport Report*", 23 September 2015 (TST September 2015)
- Robinson Urban Planning "*St Catherine's School Waverley, Campus Master Plan and Detailed Design of Stage 1 – RPAC (SSD 6339), Environmental Impact Statement (EIS)*", 23 September 2014
- Robinson Urban Planning "*St Catherine's School Waverley, Campus Master Plan and Detailed Design of Stage 1 – RPAC (SSD 6339), Submissions Report*", 25 June 2015
- Director General's Environmental Assessment Requirements (DGRs), 29 January 2014
- Submissions received from the general community including the Charing Cross Village and Bronte Beach Precinct Committees, government agencies (Roads & Maritime Services, Randwick City Council and Waverley Council) and other organisations.

1.2 Report Structure

The remainder of this report is presented as follows:

Chapter 2 describes the proposed Project and amendments as well as providing a summary of Submissions.

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

Chapter 4 presents conclusions and recommendations.

2. Project Details

2.1 Background

The applicant, St Catherine's School, has submitted a staged State Significant Development application (SSD 6339) for the St Catherine's School Master Plan, under *Part 4.1* of the *Environmental Planning and Assessment Act 1979*.

The applicant seeks consent for the following proposal on the site:

- Part 1: Conceptual approval for a Campus Master Plan that comprises demolition works, new buildings, alterations and additions, access arrangements, circulation and landscaping.
- Part 2: Detailed design approval for Stage 1 of the Campus Master Plan comprising construction of the new RPAC.

The D&PE issued environmental assessment requirements for the project on 29 January 2014. The environmental assessment requirements identify traffic and transport as one of the key environmental issues associated with the proposal. The EIS was exhibited between 20 November 2014 and 19 December 2014. The Department received a number of submissions including from Waverley and Randwick Councils, Government agencies and the public regarding traffic and transport impacts.

2.2 Project Description

CAMPUS MASTER PLAN (PART 1)

The Campus Master Plan comprises the following elements:

- Demolition of Jane Barker Hall (JBH), existing swimming pool, change rooms and other minor demolition works throughout the site.
- Master Plan building envelopes to accommodate:
  - Total gross floor area (GFA) of 22,958 sqm, which equates to a floor space ratio (FSR) of 1:1 (existing / approved / commenced GFA on the site is 20,274 sqm, which equates to a FSR of 0.9:1).
  - Total of 75 car spaces (net increase of 19 car spaces).
  - New buildings, alterations and additions comprising:
    - New RPAC forming Stage 1 of the Campus Master Plan (to be completed in two stages : Stage 1A and Stage 1B).
    - Creation of educational based precincts throughout the site.
    - New three storey building on the former JBH footprint.
    - Infill of the undercroft beneath the Boarding House and other internal renovations and alterations throughout the site.
    - New entry points, circulation networks, wet weather and disabled access arrangements.
- Tree removal and a landscape master plan.

- Capacity to accommodate up to:
  - 230 additional students to be introduced progressively over a 15-year period (ie. total 1,200 students)
  - 10 additional employees (total of approximately 212 employees).
- Completion of the Campus Master Plan in five stages.

The proposed school campus master plan is shown in *Figure 2.1* below.

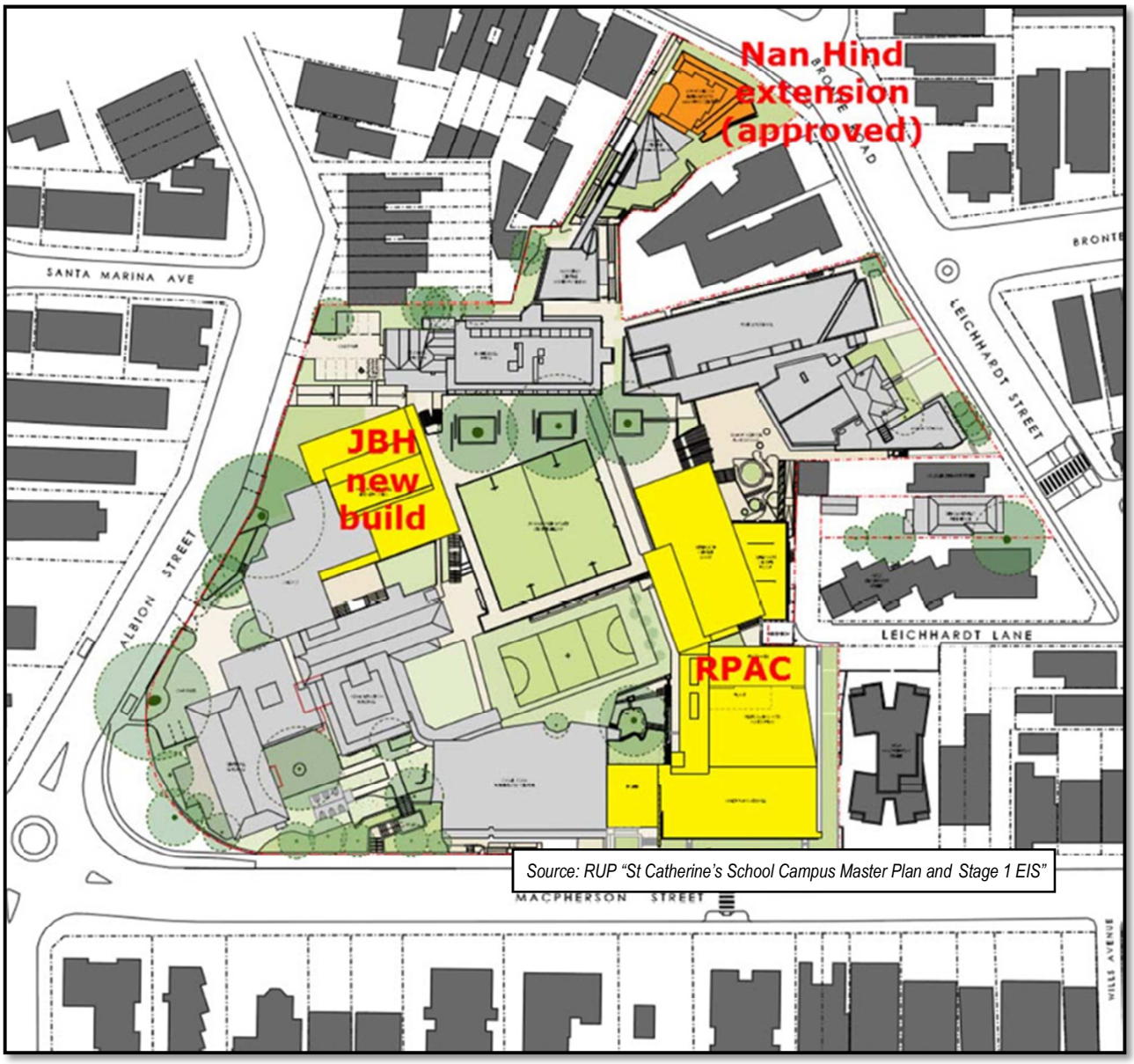

Figure 2.1: Proposed Campus Master Plan

STAGE 1 – RPAC (PART 2)

The detailed design for RPAC (Stage 1 of the Campus Master Plan) comprises the following elements:

- Demolition of the existing swimming pool, change rooms, portable classroom.
- Tree removal / replacement (20 trees to be removed / replaced).
- Construction and use of RPAC in the location of existing swimming pool and the approved commenced Indoor Sports Complex (DA 258/89) to include basement car parking, an aquatic centre with associated amenities, multi-purpose hall, auditorium accommodating 489 attendants with associated amenities and research centre.
- Landscaping of the site.

2.3 Summary of Submissions

The main issues raised in the agency, group and individual submissions included:

- Traffic and parking impacts from the proposed intensification of uses on the site.
- Transport management and measures to reduce use of private cars.
- Campus population increases.
- Environmental and residential amenity.

A total of 223 submissions were received in response to the exhibition of the EIS. These included seven (7) agency submissions and 216 resident, precinct group and business community submissions.

The major issues raised in the submissions related to increased car parking requirements from the increased school population and activities in the RPAC, transport management and on-site pick-up / drop-off operations. Construction impacts including traffic-related impacts were also raised in submissions.

2.4 Project Amendments

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

Traffic and transport-related amendments include the following:

1. Introduction of a range of behavioural and travel strategies to reduce private car usage by both students and staff including car pooling, promoted public transport and a minibus service for students and car pooling, subsidised public transport, active transport and encouraging cycling for staff. As part of the Submissions Report, a survey of students and staff was carried out assessing their willingness to take up the above behavioural and travel strategies. This indicated favourable results with respect to take-up of the proposed strategies, indicating that a reduction in private car usage is attainable and potentially sustainable.
2. Deletion of all additional external events in the Performing Arts Auditorium and scheduling to avoid overlapping of large performing arts events and peak Aquatic

Centre activities. These changes aim to reduce traffic generation and demand for on-street parking.

3. Promote before and after school activities to reduce school peaks, eg. before school activities and the first activity within the Aquatic Centre following completion of a typical school day are to be offered to St. Catherine's School girls only to assist with distribution of morning drop-off and afternoon pick-up times.
4. Learn to swim lessons are to be scheduled between 9.30 am and 2.00 pm to avoid school and commuter peaks and to coincide with the period of low resident demand for on-street parking.
5. Introduction of staggered finish times for students in different school years to achieve operational efficiency.
6. On-site car parking (up to 75 spaces) is to be made available for attendees to events in the Performing Arts Auditorium when the Auditorium is operating at capacity, as well as up to 47 on-site parking spaces are to be made available for Aquatic Centre use on the weekend.
7. Consideration is to be given to restricting car park entry / exit to the RPAC driveway on Macpherson Street to left-in and left out.
8. A commitment to prepare an Operational Transport Management Plan which would address travel strategies, monitoring and reporting and operational traffic management.
9. A shuttle bus service for attendants to events in the Performing Arts Auditorium, as mentioned in the EIS, is no longer proposed.
10. The provision of an off-street drop-off / pick-up zone was not feasible or desirable within the school site.

Further traffic and transport-related investigations and amendments were made to the proposal following the Response to Submissions notification period. These included the following:

1. Additional assessment of on-site drop-off / pick-up zones was undertaken. Options that were assessed were 'car lines' off Macpherson Street within a 'lay-back' area adjacent to the basement car park as well as an alternative option within the basement car park itself. Both options were found to be unfeasible.
2. The Leichhardt Street bus stop was re-located north of the pedestrian crossing as part of a trial undertaken during 2014. This is now considered to be a suitable location and the school has adjusted its pick-up / drop-off operations to suit the new bus stop, ie. drop-off / pick-up for the St Catherine's School junior school students now occurs to the south of the pedestrian crossing on the western side of Leichhardt Street.
3. A case study was provided of a successful implementation of similar travel strategies by another school / organisation, ie. Brisbane City Council School Travel Programme.
4. Some minor operational changes were made to the use of the school pool by the various proposed users.

3. Review of Traffic & Transport Assessment

3.1 Director General's Environmental Assessment Requirements

The environmental assessment requirements for the assessment of traffic and transport impacts for the Project (issued by the then Director General of the D&PE) include the following.

Construction

- Detail access arrangements at all stages of construction and measures to mitigate any associated pedestrian, cycleway, public transport or traffic impacts.
- Details regarding car parking arrangements during construction, including the displacement of visitor and staff car parking. Alternative off-site arrangements should be made for staff and construction workers.

Operational

- Detail how the development has taken into consideration student and visitor travel patterns and contributes to the achievement of transport objectives contained in NSW 2021 and the draft Metropolitan Strategy for Sydney 2031, and Sydney's Bus Future (2013).
- Provide details of the trip generation of the development by new staff and students at key stages of the development.
- Assess the implications of the proposed development at key stages for non-car travel modes, including the accessibility of the site by public transport and potential implications from the proposed development for bus travel times and bus stop operation. Identify facilities or measures to increase non-car mode share for travel to and from the site, such as implementing a location-specific sustainable travel plan.
- Provide details of the daily and peak vehicle movements likely to be generated by the development at the key stages of the development including the impact on nearby intersections and the need and associated funding for upgrading or road improvement works (if required).
- Detail the proposed access and parking provisions associated with the proposed development, including compliance with the requirements of the relevant parking codes and Australian Standards (ie. turn paths, sight distance requirements, aisle widths, etc).
- Detail the proposed service vehicle movements (including vehicle type and the likely arrival and departure times).

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

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

3.2 Assessment Methodology

In general, it is considered that the methodology and analysis of traffic and transport impacts has been undertaken adequately and in sufficient detail. Moreover, it is considered that the DG's environmental assessment requirements have generally been addressed adequately.

There is some ambiguity with respect to the wording used in the assessment, which is considered to be non-committal for certain measures. This is mainly used for proposed travel strategy measures, which form the basis in resolving traffic, on-street parking and access (drop-off / pick-up) issues for the school. It is considered that firm and positive commitments are desirable including associated timeframes and responsibilities for the various travel strategy measures. Moreover, post-development monitoring is considered to be prudent so that greater confidence can be made in the assessment and implementation of the proposal.

The following miscellaneous comments are provided:

- In *Table 10* and *Table 13* of the TST report (pages 23 and 25 respectively), there appear to be a few anomalies with respect to the numbers, which appear to be too high, possibly caused by the inclusion of Kindergarten students using the drop-off zone rather than being walked in by parents / carers after parking on-street in the surrounding area.

  [Noted – these result in a conservative assessment and therefore are considered to be acceptable.]

- In *Table 10* and *Table 13* of the TST report (pages 23 and 25 respectively), for the existing drop-off and pick-up locations and operations, it is unclear what the Albion Street / Macpherson Street location split is based on (approximately 33%-36% Albion / 64%-67% Macpherson) considering there are split uses from different years at different locations.
- There appear to be a few anomalies in *Table A1* in the TST report (page A1) with respect to school mini-bus users and the use of all students in the calculations even though there are 70 boarders who should not be considered.

  [Noted – these result in a conservative assessment and therefore are considered to be acceptable.]

3.3 Road Network / Traffic Operations

In general, the assessment of road network and intersection operations has been undertaken thoroughly. The adjacent roundabout intersections along Macpherson Street were analysed for existing as well as future scenarios.

Future traffic impacts have largely been acknowledged. The main mitigation measure relies on the reduction of private vehicle use via the implementation of proposed travel strategies, for which there are limited commitments (refer to commentary in *Section 3.2* above).

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

- The traffic study for the proposal indicates the intersections of Macpherson Street / Albion Street and Macpherson Street / Leichhardt Street are presently at capacity and will perform poorly in the future with levels of service reducing. However, there are no

mitigation measures proposed. There needs to be further investigation on the operation of these intersections, with a view to maintaining or improving the current levels of service. Consider some form of traffic and parking review undertaken say, 6 months after project completion or to be instigated by Council.

Covered by reducing traffic generation through the intersections as a result of travel method alternatives. Discussion within Section 7.3 of TST Report.

[Noted, however there is no commitment to undertaking any of the travel method alternatives. It is unclear of the timeframe for implementation, responsibility, and how these would be monitored to ensure that the alternative travel method strategies are performing as intended.]

- The assumed car mode of 80% and car occupancy of 2.5 people during events at the Performing Arts Auditorium (*Section 6.2.2* of the TTA) seems reasonable but there is no information / discussion on what these assumptions are based on (traffic engineering judgement?). Similarly, for the car mode / occupancy for the Aquatic Centre assessment – refer to *Table 11* on *page 43* of the TTA.

  This assumption of car mode is supported by the Journey to Work car mode of 64% and large number of staff (30%) and students (60%) that live close enough to walk to the site.

- For the arrival and departure traffic generation analysis (*Section 6.3.1* and *Table 12* and *Table 13* of the TTA), the student drop-off / pick-up movements are single direction only. There would also be a return movement by the driver after dropping-off or before picking up students. Therefore, the traffic generation has been under-estimated. This has been exacerbated by the use of a 30% discount factor for traffic generation due to a number of factors such as extracurricular activities, early drop-offs / late pickups, vehicles using nearby streets and varying day-to-day travel patterns. It is considered the 30% discount factor requires additional justification / clarification.

  Covered in Section 6.3.3 of TTA – additional cars are applied twice onto the existing flows. The justification for the 30% discount factor has been explained as a comparison of Arup traffic generation against the Lyle Marshall surveys. It is understood that further information is to be provided from an additional travel questionnaire.

  [Noted – additional information provided is considered satisfactory.]

- In the traffic distribution assessment (*Section 6.3.3* of the TTA), student car trips to the School were assumed to travel to the nearest drop-off / pick-up zone from a vehicle's approach route. In reality, this may not be the case as the destination drop-off / pick-up zone depends also on which school year each student passenger is using for drop-off / pick-up, ie. generally, Junior School uses Leichhardt Street and Senior School uses Macpherson Street / Albion Street.

  Figures 16 and 17 have been prepared in the TST Report to show traffic distribution.

  [Noted, however Figure 16 does not show vehicles from the west or south accessing Leichhardt Street, from the north accessing Macpherson Street and from the east accessing Albion Street. While the traffic generation would not change, it may re-distribute the traffic to other parts of the local road network, thus lowering traffic along some streets and raising traffic in others.]

- The TTA discusses school drop-off / pick-up periods as generally being quite concentrated before the indicative start and finish times for the school day and that some congestion is experienced over the course of approximately 15 minutes. Based on site observations for this review, the 15 minutes is optimistic (low). The school drop-off / pick-up process and the resultant congestion were observed to last for at least half an hour, which is also consistent with experience from other school zone operations.

  15-minute peak reiterated in the TST Report based on site observations.

- The suggestion (by the Precinct Committees and Councils) that an increase of on-site car parking (up to 200 additional parking spaces) is required for the development to help resolve potential on-street parking issues is considered to be potentially problematic because additional parking would also generate additional concentrated traffic as well as encourage private vehicle use. Travel demand and mode-shift measures are considered to be better mitigation options than increasing on-site parking.

- Cumulative traffic / transport-related impacts have had minimal discussion and assessment. The Precinct Committees have identified the nearby developments that may create cumulative impacts, which include two adjacent child-care centres, proposed redevelopment of Bronte RSL, proposed rezoning and redevelopment of Waverley Bowling Club and redevelopment of Loretto Nursing Home.

  [Noted – some discussion updated but not construction-related, which should be covered / assessed by a CTMP.]

- Previous experience with school-related traffic studies as well as site observations indicate that there is illegal (and potentially unsafe) manoeuvring and parking occurring during school drop-off and pick-up periods, especially the latter. This includes three-point U-turns, 'double parking', parking across residential driveways on surrounding streets, etc. This should be acknowledged and consideration should be given to developing measures to manage driver behaviour.

  [Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate this concern.]

- There is an existing potential road safety issue for the car park exit onto Macpherson Street with sight distance being restricted to the east by street trees. This has not been mentioned / acknowledged by the assessment and would be exacerbated by an increase in parking spaces to be accessed via the same car park driveway. The NSW Police submission has suggested that the car park access should become left-in / left-out to prevent obstructing following vehicles when turning right into the car park off Macpherson Street and right-turning exiting vehicles from 'forcing' their way into the westbound traffic stream. This measure could potentially operate well because of the roundabouts at either end of Macpherson Street, which would allow cars to access the car park from the west and exit to the east. However, this measure may require some form of physical traffic control to enforce the left-turn only movements.

  A restricted left-in / left-out movement restriction for the car park access may be considered, but a central median would not be supported as this may open possibilities for unsafe pedestrian storage in the centre of the road as well as considerably impacting road width.

  [Noted, however, there is no specific commitment and timeframe for when this measure would be determined and implemented.]

- In *Section 6.2.1* of the TST report (page 58), the proposed timetable changes for pool activities in the morning recommends activities as early as 6 am before student start school classes. This assumes that students complete their swim activities and can have breakfast / be prepared for school without needing to go back home and then travel back to school again.
- Additional assessment of on-site drop-off / pick-up zones was undertaken. Options that were assessed were 'car lines' off Macpherson Street within a 'lay-back' area adjacent to the basement car park as well as an alternative option within the basement car park itself. Both options were found to be unfeasible.

3.4 Parking Issues

Although the assessment of parking issues has been undertaken with a generally suitable methodology, there were a number of anomalies / inadequacies, especially with the initial parking survey information provided by a third party (Lyle Marshall parking survey).

The third party parking surveys were considered to be inadequate with respect to the sampling of parking availability on single days only. Because parking demand is considered to be variable day-to-day, the conclusion that there is adequate parking available in surrounding streets may be unreliable. This flaw was somewhat mitigated by additional surveys being undertaken by the consultant on a number of days.

On-street parking impacts were reported to be insignificant due to the abundance of parking in the streets within a short walk from the school. The main mitigation measure in controlling on-street parking relies on the reduction of private vehicle use via the implementation of proposed travel strategies, for which there are limited commitments (refer to commentary in *Section 3.2* above).

For off-street parking within the RPAC car park, there has been a change to the usage profiles for the RPAC and Aquatic Centre to mitigate parking impacts associated with users not finding a parking space on-site and searching for an on-street space in the surrounding streets.

The following are specific comments relating to parking issues:

- It is unclear whether service vehicles accessing the site off Albion Street are able to enter and exit the site in a forward direction at all times. There has been minimal assessment / discussion of service vehicle requirements including access to/from the site and loading bay areas. The current practice of Council trucks reversing in off Leichhardt Street has potential road safety implications, especially as there is resident parking along the side of Leichhardt Lane. The applicant should provide details of the type and size of service vehicles expected at the site and include details of their swept wheel paths and location and dimensions of the loading bay(s). Further information / discussion are required.

  Negligible amendments are proposed to the current waste collection arrangement conducted at the School. Independent of this application, Waverley Council may wish to assess the feasibility of adjusting their assets to provide a turning circle within Leichhardt Lane to accommodate Council's waste removal trucks.

  All deliveries by small trucks and vans are proposed to occur at Gate 1. A loading zone will be allocated adjacent to the bus parking area. Only vans will use Gate 3 for access

to a timed parking space for deliveries.

The proposed bin storage area is to be located immediately adjacent to the substation with gate access to the corner of Leichhardt Lane for collection.

- The parking assessment has potentially under-estimated the parking demand during the combined use of the Aquatic Centre and Performing Arts Auditorium. Only scenarios where each of the areas is being used in isolation have been assessed. On average, there is a major community event once every fortnight that would be held in conjunction with the Aquatic Centre use. During these concurrent events, there would be an on-site parking shortfall of approximately 226 cars (based on assumptions used for parking demand in the Arup report), which would need to park on-street.

  During the occurrence of larger events, on-site car parking for 78 cars may be available and managed under a school generated operational management plan, resulting in a total of approximately 82 cars parking on-street, which is an extra two cars compared to the existing situation.

  [Amendments to the combined use of the Aquatic Centre and Performing Arts Auditorium have been proposed and will further alleviate on-street parking. Outline of operational transport management plan has been proposed.]

- The available on-street parking spaces determined by Arup's surveys appear to be exaggerated (based on a 5-min walk radius from school entries) – refer to *Figure 11* on *page 16* of the TTA. This is because some of the area covered by the survey is greater than the 5-minute walk specified, especially to the south and south-east of the school. It is unclear why Arup did not adopt the same survey area as the Lyle Marshall survey area. Moreover, the on-street parking availability appears to be reasonable when observed globally (such as on a map) but in reality drivers search for parking spaces on a street-by-street basis. If drivers can't find a space along a street or in a certain area they will continue to circulate, which exacerbates traffic generation.

  [Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- TTA states that with effective traffic management, the existing drop-off / pick-up zones have sufficient queuing spaces for the busiest period, which is 625 cars in AM and 497 in PM (this would be reduced by some parking in surrounding streets and drivers walking rather than using the drop-off / pick-up zones). There would be approximately 48 car space lengths within the future drop-off / pick-up zones along Macpherson, Albion and Leichhardt Streets. Assuming an average 1 minute stay per car, this would require approximately 13 mins for all cars to access the drop-off / pick-up zones. This is considered to be a best case scenario and unlikely to occur in practice as it would require strict enforcement and management of movements, efficient loading / unloading of students and minimal on-street traffic congestion.

  [It is noted that while the above has not been addressed specifically, there has been a significant reduction in school car drop-off / pick-up generation.]

- For the parking assessment of events at the Performing Arts Auditorium (*Section 6.2.2* of the TTA), the demand appears to be based on attendees only and there is no additional parking demand that may result from organisers / staff, etc. Therefore, the parking demand may be under-estimated.

  Attendance at events is assumed to be inclusive of organisers, performers and staff.

- For the parking assessment of events at the Performing Arts Auditorium (*Section 6.2.2* of the TTA), it is unlikely that on-street parking would be able to be used by residents returning home in the evening prior to the event / school users parking on-street, especially as all evening events start before 6:30 pm. Similarly, this applies to on-street parking related to the Aquatic Centre, which operates all day.

  During the occurrence of events at the Performing Arts Auditorium, on-site car parking for 78 cars may be available and managed under a school generated operational management plan, resulting in a maximum total of approximately 82 cars parking on-street, which is an extra two cars compared to the existing situation.

  [Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- The Lyle Marshall report for the parking survey states it determined the availability and existing utilisation of on-street parking spaces within 5 mins to 7 mins walk of the school. It is assumed that this means within 7 mins walk of the school and that spaces less than 5 mins walk from the school were included in the survey.

- With respect to the availability of on-street parking for residents, it is considered that if the short-term drop-off / pick-up parking is along school frontage (eg. along Macpherson Street and the eastern side of Albion Street), then that could be considered to be generally reasonable for school use. Greater impacts result where the school parking zone is located along street frontages that also serve residents, eg. along Leichhardt Street.

- While being undertaken with a generally sound methodology, the parking studies were inadequate (flawed) with respect to the sampling of parking availability on single days only. Because parking demand is considered to be variable day-to-day, the conclusion that there is adequate parking available in surrounding streets may be unreliable. This results in the surrounding on-street parking availability potentially not having the capacity to absorb the school's additional parking load. This is backed up somewhat by anecdotal evidence (parking surveys undertaken by Precinct Committees) and by this review's observations during various periods of the day when on-street parking was quite highly utilised and spare spaces were minimal.

  The CCV&BBP parking survey shows significant parking impact from the school on residential on-street parking beyond its immediate periphery streets, eg. Pine Street, Hooper Street, Fern Street, Wallace Street, Varna Street and Douglas Street to west and south, and Bronte Road, Gipps Street, Henrietta Street and Prospect Street to the north-east are all potentially affected by parking impacts associated with the schools operations. During school holidays the surrounding streets have ample parking availability but during the school term, on-street parking is heavily utilised by school-related cars. The parking survey also shows quite large differences (up to 40% or more) in parking availabilities between the pairs of days sampled, which confirms the variable

parking demand.

The CCV&BBP parking survey methodology consisted of obtaining parking availability profiles by counting the available spaces in each surveyed street at four times in the morning between 7:30 am and 9:00 am, five times in the afternoon from 2:30 pm to 4:30 pm, and four times in the evening from 5:00 pm to 8:00 pm. The variability of parking availability was observed by taking profiles on two days, within a few days of each other. The current impact of the school was demonstrated by comparing averaged parking profiles from two days during school term to profiles taken during school holiday periods.

Consideration should be given to the applicant undertaking a more comprehensive parking survey to fully understand and document on-street parking in the surrounding area and consequently be able to determine an accurate assessment of impacts on on-street parking.

ARUP undertook separate parking surveys over two days from 7:30 pm to 8:30 pm in 2014.

[Noted, however, these would only provide information on evening parking specifically related to parking impacts from large school events and the Aquatic Centre activities. The reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- The CCV&BBP indicate in their submission that there are an additional eight (8) unmarked (informal) car parking spaces currently used between the Albion Street gates and that these additional spaces are not included in the current total of 55 on-site parking spaces. Most of these unmarked parking spots will be eliminated by the proposed development and reduced landscape areas and thus, the real net decrease in on-site parking will be greater than outlined in the report.

  [Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- The TTA states that the current utilisation of on-street parking is between 80% to 90%, which does not correlate (is lower) than the minimum 90% found by the Lyle Marshall parking survey. Therefore, the TTA may be underestimating the parking availability. Clarification is required.

  [Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- The TTA acknowledges that some drivers / parents currently park in surrounding streets when dropping off and picking up students. This may indicate that the drop-off / pick-up zones are either at capacity already or are not operating efficiently.

  [Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies and Operational Transport Management Plan would largely alleviate on-street parking issues.]

- In the recommended transport actions (*Chapter 8* on *page 53* of the TTA), the description of the 'Management of School Zones' action provides no detail on what 'controllers' would be briefed and given written instructions on to 'effectively' manage the drop-off / pick-up zone traffic.

  A detailed Operational Transport Management Plan will need to be prepared to determine key aspects of drop-off and pick-up operation.

- The RPAC car park does not comply with 'blind aisle' guidelines set-out within Australian Standard *AS 2890.1: 2004*, *Clause 2.4.2 (c)* and *Figure 2.3*. This creates potential manoeuvring issues whereby cars may be forced to reverse back towards the entry / exit if a parking space is not available. Moreover, some of the parking spaces would require multi-point turn manoeuvres for entry / exit, which is undesirable for a car park that is to be used by public visitors.

  A car park of some 47 parking spaces is unlikely to have significant queues. If required, a bay occupancy system or equivalent management system may be considered to monitor the level of use and allow a "car park full" sign to be installed at the entry. If vehicles are observed to queue into the entry, vehicles will likely drive around to find a parking space on-street rather than block Macpherson Street.

  The new car park has turnaround provision in front of the internal ramp.

- During larger events when there may be a relatively large and sudden arrival of cars, how will the car park be managed with respect to on-street queuing caused by cars waiting to access the car park and/or when the car park is full. The car park ramp length appears to only allow for approximately a maximum of two (2) cars to queue.

  A SIDRA intersection analysis was undertaken, which indicated average queuing of less than one car within the site.

  [Noted, however it is considered that this parking function should fall under an Operational TMP that is to be prepared for larger event management.]

  The driveway is within the existing building and cannot be widened. A car park of some 47 parking spaces is unlikely to have significant queues. If required, a bay occupancy system or equivalent management system may be considered to monitor the level of use and allow a "car park full" sign to be installed at the entry. If vehicles are observed to queue into the entry, vehicles will likely drive around to find a parking space on-street rather than block Macpherson Street. The new car park has a turnaround provision in front of the internal ramp. An electronically operated traffic control system and adjustments to the internal driveway will be considered during detail design.

  [Noted, however there is no firm commitment that this measure would be implemented. If this measure is to be "considered" during detail design, it leaves open the option that it may not be implemented. Monitoring of the operations is required.]

- In *Table 11* of the TST report (page 24), the proposed adjustments to the pick-up zone allocation concentrate Macpherson Street pick-ups for Years 5 through 10 (Years 5 to 7 at 3:15 pm and Years 8 to 10 at 3:20 pm). This seems like a large concentration of pick-ups over a relatively narrow overlap period.

- In *Section 2.2.4* of the TST report (at the bottom of page 26), it is stated that the proposed upgrades to the Macpherson Street drop-off / pick-up zone will increase kerbside capacity of approximately three cars with no break due to the relocated marked pedestrian crossing. While this may be true, it is noted that Macpherson Street will have

almost double the drop-off and more than double the pick-up numbers in the new arrangement, albeit with some minor time year allocation change. The existing has 80 cars arriving at the 3 pm allocation and the future has a slight reduction to 75 cars. Next, the existing has say, half (shared with Albion St) of senior school arriving at 3:20, which is 72 cars. The future would have 106 cars arriving at 3:15 pm followed closely by another 140 cars arriving at 3:20 pm, despite there being only an additional three space capacity.

[Noted. Reduction of vehicle traffic via proposed behavioural and travel strategies would reduce drop-off / pick-ups and alleviate parking issues.]

3.5 Alternative Transport Options

Alternative transport options were developed as a range of behavioural and travel strategies to reduce private car usage by both students and staff. The strategies included such measures as car pooling, promoted / subsidised public transport, school mini-bus service (for students), and the encouragement of active transport options.

The potential for the subject strategies to be adopted was tested by surveys of students / parents and staff, which assessed their willingness to use non-private vehicle transport. The surveys indicated favourable results with respect to take-up of the proposed strategies, indicating that a reduction in private car usage is attainable and potentially sustainable.

While the survey results were a positive, there is a lack of detail and commitment to undertaking any of the proposed measures to ensure mode shift, eg. no timings, responsibilities, post-implementation monitoring, etc.

The following are specific comments relating to alternative transport options:

- The proposed measures to encourage non-private car transport modes are supported. The EIS notes that a Work Place Travel Plan (WPTP) could be developed to reduce the need to travel, improve non-private car travel methods and make efficient use of car parking spaces.

  In conjunction with developing an appropriate WPTP, the School should be required to set up an associated independent monitoring scheme to check that the WPTP objectives are being met, eg. consider a target objective of having no net increase in private car trips when the school is fully developed. As a minimum, a transport mode shift to maintain current private car traffic generation should be targeted. A Draft Condition could be issued so that a WPTP is to be prepared in conjunction with local Councils.

  The Applicant proposes to develop an Operational Transport Management Plan that will cover a number of operational aspects associated with traffic at the School and the travel strategies being implemented. The plan is proposed to include:

  - *Travel strategies adopted and management requirements for each strategy*
  - *Monitoring and reporting requirements for the travel strategies*
  - *Operational traffic management plans specific to:*
    - School pick-up / drop-off zones
    - School bus access
    - Use of the Aquatic Centre
    - Major events held within the auditorium

  The Operational Transport Management Plan defines the roles and responsibilities of

the School, Waverley Council, parents and carers of students attending the School and the various government agencies for management of access to the School for all modes of transport.

The monitoring and reporting for the proposed travel strategies would be by maintaining an annual questionnaire survey to be completed by staff and students to enable a travel report to be prepared for submission to Council.

[Noted, however there is no detail on the timing of this measure and specifics as to how it would be implemented. Moreover, the proposed monitoring does not include any area-wide assessment of actual operations, eg. assessments of on-street parking, pick-up / drop-off operations, etc.]

- There are opportunities for 'mode-shift' to non-private car forms of transport to and from school but there is no commitment in the Master Plan to any such program. The school should develop and implement a 'mode-shifting' transport strategy that encourages the use of public transport (eg. 'walk to school' program, incentives for students, staff and visitors to catch public transport and encourage non-private vehicle transport modes, etc.) in conjunction with a monitoring framework with specific performance indicators aimed at minimising traffic volumes and parking capacity issues.

  [Noted – see Operational TMP and travel strategies response above.]

- The operation of a shuttle bus loop service within the Eastern Suburbs on a route with designated pick-up points has been suggested as an option for events at the school. Such an operation may be problematic with respect to the wider spread of arrival times and the more condensed departure times from events. More detail is needed on how such a service may operate effectively.

  [It is noted that this measure has been assessed and considered to not be viable.]

- The TTA suggests that there are opportunities for a mode shift away from private vehicle travel, with the site located along key bus routes to Bondi Junction, and walking and cycling available. This is also supported by the relative proximity of the majority of the school student and staff population. However, the TTA provides minimal discussion on how buses, walking and cycling opportunities may be encouraged / managed.

  [Noted – see Operational TMP and travel strategies response above.]

- The EIS states that "opportunities to promote car travel could be explored", which indicates a lack of commitment to undertake the subject measure. There should be firm commitments to undertaking measures and where possible, recommendations made for implementation.

  [Noted – see Operational TMP and travel strategies response above.]

- The TST report discusses a number of options for alternative transport including car pooling, school mini-buses, bus pass incentives (students), public transport subsidies (staff) and active transport incentives. These are all potentially valid and useful strategies. However, there is minimal commitment to any of the strategies including the timing, responsibility, funding, etc.

  [Noted – see Operational TMP and travel strategies response above.]

- In *Section 3.1.1* of the TST report (page 28), it is unclear how there would be a net reduction of 42 cars using the two mini-buses with 25-seat capacity at 75% occupancy. It is calculated that there may be a reduction of 38 cars.

  Based on the use of two additional mini-buses making a total of three mini-buses.

- The Conclusion section of the TST report outlines a number of possible measures that would reduce car traffic generation by using other transport modes or at least undertaking further assessment to determine what measures may work best. While this is admirable, there is a lack of firm commitment to any of these measures in terms of details, timing, responsibility and implementation. Also, for some of the physical measures, there would need to be some form of review post-operation to assess how the measures are working and what amendments may be required.

  [Noted – see Operational TMP and travel strategies response above.]

- From the May 2015 school survey data (undertaken as part of the Submissions Report), the mode shift potential from students and staff is considered to be attainable with car pooling considered the most favourable form of mode shift.

  [The survey indicated favourable results with respect to take-up of the proposed strategies, indicating that a reduction in private car usage is attainable and potentially sustainable.]

3.6 Pedestrian / Cyclist Issues

In general, the assessment of pedestrian and cyclist issues has been adequately assessed taking into account the existing conditions and linkages between the school site and external routes.

The integration of pedestrian links to public transport, drop-off / pick-up zones and the surrounding pedestrian path network is considered an important issue, especially if the previously mentioned travel strategies promote and develop an increase in pedestrian travel to/from school.

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

- The provision of 15 bicycle parking spaces is only approximately 1% of the school population, which seems too low to encourage bicycle use and produce any meaningful transport mode shift.

  Bicycle parking locations and demand for staff and students will be monitored by the school to ensure adequate facilities are provided so that this active mode can be promoted.

- The proposed relocated pedestrian access flows to/from Macpherson Street may introduce conflicts between pedestrians and cars because the pedestrian access is adjacent to the RPAC car park. The Arup report does not assess this potential road safety issue.

- The EIS states that the school is around 1.2 km from the Bondi Junction Transport Interchange (refer *Section 2.2.1* on *page 15*). This slightly understates the distance to the interchange, which is at least 1.5 km to the closest school access point on Albion Street.

3.7 Public Transport Operations

No specific issues identified.

3.8 Construction Phase Issues

The Applicant acknowledges that details of construction activities are not yet fully known in detail and will be refined as the project progresses. However, the assessment appears to cover construction impacts adequately and the general objectives for traffic management of construction activities are considered to be reasonable and adequate. These should be fully met by a CTMP to be prepared by the chosen contractor in conjunction with the Applicant, Councils and other stakeholders.

The following miscellaneous construction-related comments are provided:

- The TTA suggests that there would be up to 75 additional on-street parking spaces required for construction staff with no on-site parking available. This is likely to have a significant impact on on-street parking but there is minimal assessment of this potential impact. Related to construction operations and parking requirements, it may not be practical for some construction staff ('tradies') to park any distance from the school due to tools and other equipment that they require to undertake the work.

  To be addressed by the Construction Traffic Management Plan.

- As mentioned in the assessment, the chosen contractor(s) would need to prepare a CTMP in consultation with, and to the satisfaction of relevant local councils and RMS. As well as typical issues such as construction access, haul routes, traffic impacts, pedestrian / cyclist impacts, cumulative impacts with other nearby projects and road safety, the CTMP should specifically address on-street parking impacts and how local road routes (in particular) will be protected from construction vehicle traffic impacts.

  The Construction Traffic Management Plan will be developed with key routes for access avoiding local streets.

- For the construction stage assessment, the EIS states that there would be 2,700 heavy vehicle trips generated during the excavation and demolition periods (refer to *Section 6.7.1* on *page 72*). It is assumed that this trip generation includes return trips rather than just loads. Based on this assumption, it is envisaged that the excavation and demolition period would continue for approximately 65 days (3 months assuming an average five-day working week) based on the average 42 truck movements per day. The hourly trip generation of four trips per hour seems low based on 42 trips per day. It is likely that there would be some peaking of movements within any hour resulting in at least double that generation per hour, ie. 8 trips per hour maximum.

  [Noted – the Construction Traffic Management Plan would further elaborate on projected daily and peak construction movements with appropriate management measures.]

4. Conclusions & Recommendations

4.1 Conclusions

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

- In general, it is considered that the methodology and analysis of traffic and transport impacts has been undertaken adequately and in sufficient detail. Moreover, it is considered that the DG's environmental assessment requirements have generally been addressed adequately.
- In the assessment of parking issues, there were a number of anomalies / inadequacies, especially with the initial parking survey information provided by a third party.
- The main mitigation measure in minimising traffic impacts and controlling on-street parking and drop-off / pick-up operations, relies on the reduction of private vehicle use via the implementation of a range of proposed behavioural and travel strategies, for which there are limited commitments.
- The main issues of note include the following:
  - While the proposed behavioural and travel strategies to reduce private car usage are encouraged and appear to be attainable and potentially sustainable, there is a lack of detail and commitment to undertaking any of the proposed measures to ensure mode shift, eg. no timings, responsibilities, post-implementation monitoring, etc.
  - A detailed Operational Transport Management Plan and traffic operations is proposed to manage drop-off / pick-up operations and on-site car parking for larger events. However, further detail is required in addition to a commitment in preparing and implementing the plan and its operations.
  - The assessment indicates the intersections of Macpherson Street / Albion Street and Macpherson Street / Leichhardt Street are presently at capacity and will perform poorly in the future with levels of service reducing. Mitigation measures rely on reducing traffic generation via the implementation of behavioural and travel strategies (see above).
  - A restricted left-in / left-out movement restriction for the RPAC car park access may be considered, but there is no specific commitment and timeframe for when this measure would be determined and implemented.

4.2 Recommendations

Based on the areas of concern described above, a number of Conditions of Consent are proposed to be required to be undertaken by the Applicant to appropriately determine final impacts and provide suitable mitigation measures.

The following Draft Conditions of Consent to be undertaken by the Applicant are recommended:

1. Prior to Project construction, the preparation of a Construction Traffic Management Plan (CTMP) would need to be undertaken by the chosen contractor in consultation with, and to the satisfaction of relevant local councils and RMS. As well as typical issues such as construction access, haul routes, traffic impacts, pedestrian / cyclist impacts and road safety, the CTMP should specifically address impacts on school operations (especially during drop-off / pick-up periods), affected on-street parking and cumulative impacts with other nearby projects.
2. Prior to future operations of RPAC or any student / staff increases, details are required for the range of proposed behavioural and travel strategies. This should include details on the timing, responsibility, funding and implementation of the various measures. Moreover, the Condition should include a monitoring regime to be established to evaluate each strategy and whether the overall range of strategies is meeting objectives and targets. Consideration should also be given to including independent traffic and on-street parking reviews as part of the Condition. These should be undertaken say, six (6) months after determination and then annually after that. This would also provide the school with feedback on their transport operations as well as time to fine-tune operations prior to Stage 1 of the Master Plan being operational in approximately 2019.

   As part of the detailing / development of the proposed behavioural and travel strategies, it is recommended that a target objective could be to have no net increase in private car trips, post school development and population increase. As a minimum, there should be a level of mode shift to maintain current private car generation (trips) for the increase in users (school population) and if possible a reduction.
3. Prior to future operations of RPAC or any student / staff increases, details are required to develop and implement the Operational Transport Management Plan including details on the timing, roles and responsibilities, and funding. In conjunction with proposed behavioural and travel strategies, there should be a monitoring regime with independent traffic and parking reviews undertaken.
4. Prior to future operations of RPAC or any student / staff increases, the design development and timeframe for the establishment of a left-in / left-out movement restriction for the RPAC car park access off Macpherson Street needs to be determined. This may be 'triggered' by undertaking a road safety audit of the development area – refer to discussion below.
5. Independent road safety audits are to be undertaken for all stages of further design development and at pre-opening stage, especially for the RPAC car park access, drop-off / pick-up zones and pedestrian facilities. Any issues identified by the audits will need to be closed out to the satisfaction of the relevant authorities including RMS and/or Councils.