Graythwaite

Part 3A Concept Application & Stage 1 Project Application

Transport & Accessibility Impact Assessment

4 October 2011

Prepared for

Sydney Church of England Grammar School (Shore)

Halcrow

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This report has been issued and amended as follows:

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1 Introduction

This report forms part of a Revised Environmental Assessment Project Report (REA) prepared on behalf of the Sydney Church of England Grammar School (Shore) in respect to the Concept Application and Stage 1 Project Application made under Part 3A of the NSW Environmental Planning and Assessment Act 1979 for the proposed redevelopment of the site referred to as "Graythwaite" in North Sydney.

In 2009 the Sydney Church of England Grammar School (Shore) purchased the site known as Graythwaite in North Sydney. The Graythwaite site is located adjacent to the Shore's North Sydney Campus which forms the Senior and Preparatory Schools.

The Graythwaite site was purchased by Shore with the objective of integrating the site with the existing Shore site into a single school campus for both existing and future educational uses.

In November 2010 a transport assessment report[1] was prepared by Halcrow on behalf of Shore as part of the Concept Application and Stage 1 Project Application to conserve and restore existing buildings and develop new educational facilities. These applications were lodged with the Department of Planning in December 2010.

The Concept Application for the Graythwaite site as submitted in December 2010 included the potential to accommodate an additional 500 students and some 50 staff within new buildings to be constructed on the Graythwaite site.

It was proposed that development will be staged over some 10 – 15 years as follows:

- Stage 1 : conservation and restoration of Graythwaite House and associated buildings (no additional students or staff);
- Stage 2 : new buildings accommodating an additional 100 students and 10 staff; and
- Stage 3 : a new building accommodating an additional 400 students and 40 staff.

[1] *Graythwaite Part 3A Concept Application & Stage 1 Project Application, Transport and Accessibility Impact Assessment*, prepared by Halcrow Pacific Pty Ltd (24 November 2010)

The Concept Application and Stage 1 Project were placed on exhibition and public and authority submissions received. Further community and authority consultation was undertaken following exhibition.

In response to submissions received and the consultation process undertaken a number of modifications to the concept application have been made.

With regard to transport the modified concept application includes the following key amendments to the original proposal:

- Reduction in the size of the proposed new buildings. This reduction will reduce the potential additional School population from 500 children to 450 children and 50 staff to 45 staff;
- Proposals to increase the capacity of the "pick up" facilities at the School; and
- Proposal to improve existing and future school bus operations.

This report describes and assesses these changes with regard to transport aspects and responds to submissions made to the applications by authorities and other parties.

This report has been prepared to assess the traffic, parking and transport implications of the modified concept application and forms part of the Revised EA (REA). The report sets out how the proponent responds to and addresses the issues raised by the submissions to the EA such that the modified Concept Application minimises the potential environmental impacts of the proposal.

It is noted that this report also considers and assesses the traffic and transport issues relating to the proposed Concept Plan and Stage 1 development as identified in the Director Generals' Requirements (MP 10_0149 and MP 10_0150).

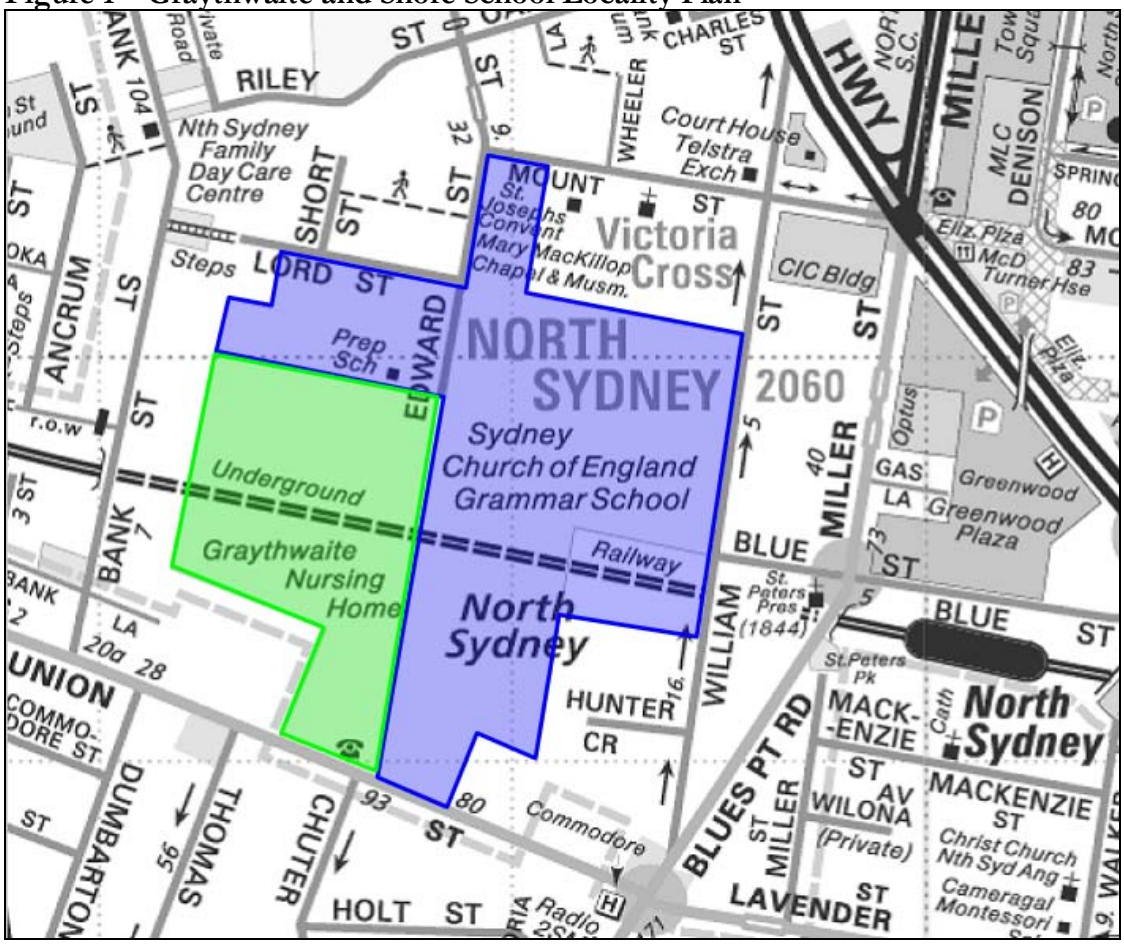
2 Existing Traffic and Transport Conditions

2.1 Graythwaite Site

The site referred to as Graythwaite is located in North Sydney adjacent to the Shore School. Graythwaite has its primary road frontage to Union Street. A secondary frontage exists to Edward Street.

The location of the Graythwaite site relative to the Shore School is shown in Figure 1.

Figure 1 – Graythwaite and Shore School Locality Plan



Prior to the purchase of Graythwaite by the Shore School, the site was most recently used as a nursing home operated by Hope Healthcare under the ownership of the NSW Department of Health.

A comprehensive history of Graythwaite's other earlier uses are identified in the Conservation Management Plan (CMP) prepared in conjunction with the endorsed Concept Application by Tanner Associates (2010).

Vehicle access to Graythwaite is provided via the main driveway at Union Street. This driveway is approximately 5 metres wide along its length between Union Street and Graythwaite House. The driveway is lined with trees and is understood to be an important historical feature of the site.

A secondary vehicle access to the site is available from Edward Street.

A number of separate hardstand (asphalt) areas are located adjacent to Graythwaite House and the associated site buildings. These hard stand areas have been used in the past to accommodate on site parking in an informal parking arrangement.

Some 7 marked parking spaces are provided at the rear of Graythwaite House with space for an additional 16-20 spaces within the hard stand areas around the House.

In total, it is estimated that the Graythwaite site has the potential to accommodate in the order of 25 parked vehicles on the site under existing conditions and that this capacity has existed for some time.

2.2 Shore School Site

The location of the Shore School relative to Graythwaite and the surrounding locality is shown in Figure 1.

The School has road frontages to William Street, Mount Street, Edward Street, Lord Street and Union Street.

The School is separated into the Senior School and the Preparatory School. While there are two separate sites, pedestrian linkages are provided along the Edward Street frontages. These linkages are important as the Preparatory School and Senior School share the use of a number of school facilities.

The Shore School site is located within close proximity to the North Sydney transport interchange which provides good access to major rail and bus public transport networks. The main access to the School on William Street is located some 150 metres from the entrance / exit of the North Sydney railway station.

In the afternoon Preparatory School students who leave the school by public transport are escorted by a member of staff through the Senior School to the North Sydney rail and bus services. There is a turning circle in the front of the Preparatory School that allows car delivery and pick-up via Edward Street. Preparatory students are supervised until such time as private and public transport services have picked up all students.

Other School management activities include:

- Staff supervision and management of the Edward Street pick up / drop off area; and
- Staff supervision of boys waiting for buses at Mount Street
- Staff supervision of boys waiting for buses at Miller and Blue Streets
- Staff supervision of boys waiting for trains at North Sydney station.

The School currently accommodates the following number of students and staff:

- Senior School = 1,190 students
- Preparatory School = 240 students
- Staff = 240 full-time staff members
- Part-time Staff = 150 staff members (based on travel survey distribution to some 390 staff)

The School site currently provides a total of 151 formal car parking spaces[2]. This includes:

- Centenary Building Car Park = 50 spaces (accessed via William Street)
- Bishops Gate Car Park = 68 spaces (accessed via Union Street)
- Adjacent to Hodges House = 23 spaces (at grade accessed via Union Street)
- Other at grade spaces spread throughout the school campus

[2] Source: Email provided by WSP dated 27/5/2010

Loading and service vehicle access is provided via:

- Edward Street – maintain vehicle gate near maintenance building;
- Union Street – via Bishops Gate access (access to Dining Hall)
- William Street – access to Drama Theatre loading dock.

A plan showing the existing vehicle access arrangements to on site parking and service vehicle areas is provided in Appendix A.

A formal vehicle drop off / pick up facility is provided on the Preparatory School site. This facility is accessed via separate entry and exit driveways at Edward Street.

Shore school buses transport students between the School site and the School's sporting facilities located at Northbridge. These buses load and unload students from the southern side of Mount Street between Edward Street and Wheeler Lane from a designated time enforced bus zone.

2.3 Surrounding Road Network Operation

2.3.1 Traffic and Pedestrian Surveys

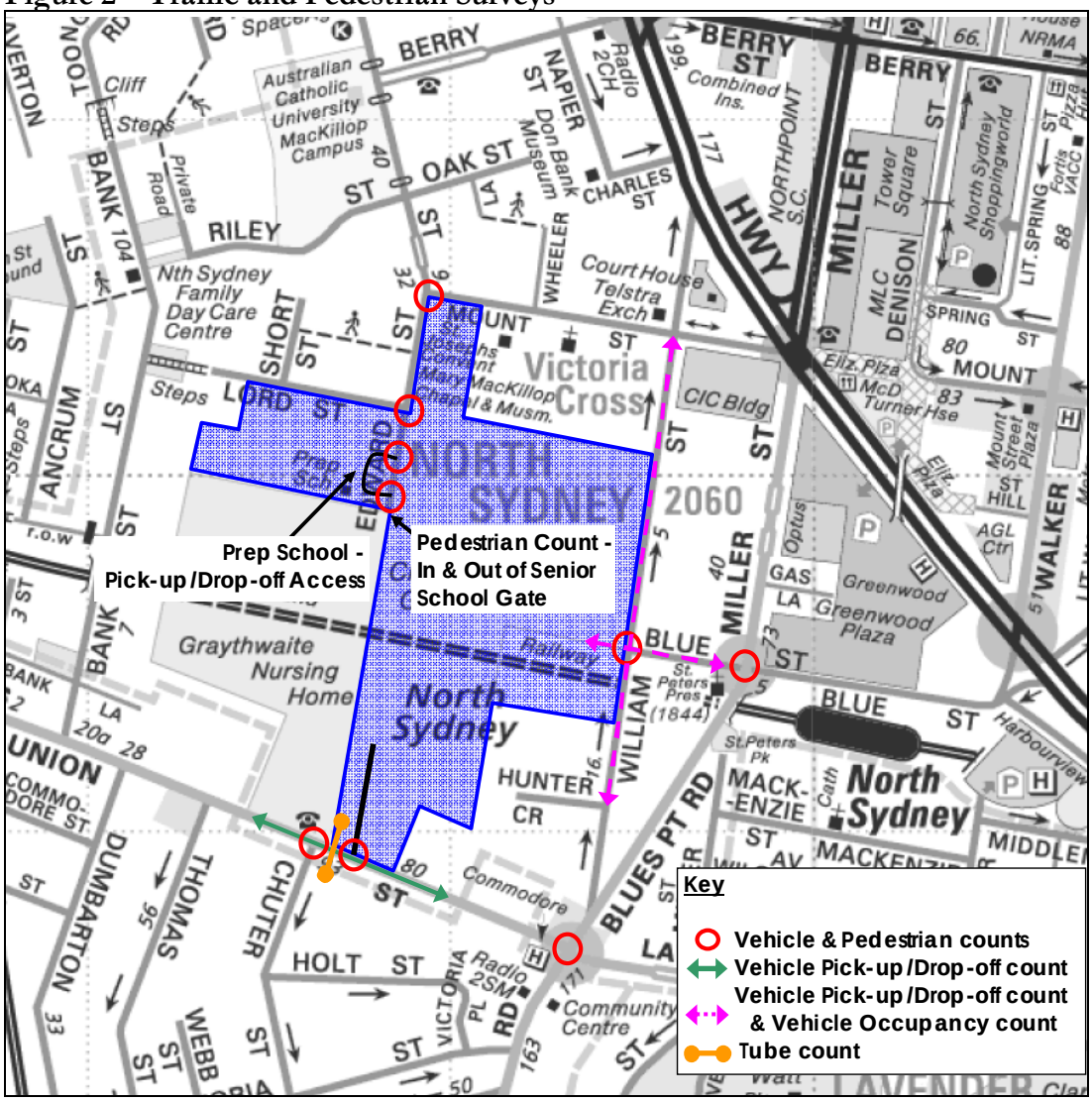
As part of the traffic assessment for the Graythwaite site concept plan, traffic and pedestrian counts were undertaken at key intersections within the surrounding road network on a typical school weekday (20 May 2010).

Traffic and pedestrian counts undertaken included:

- Intersection vehicle turning movements counts at key road network intersections;
- Vehicle drop off and pick up activities;
- Pedestrian flows; and
- Union Street (weekly traffic flow).

The extent of the traffic and pedestrian surveys are shown in Figure 2.

Figure 2 – Traffic and Pedestrian Surveys



2.3.2 *Traffic Count Survey Results*

The surveys indicated that the peak hour traffic flows occurred between 7:30am - 8:30am and 3:00pm - 4:00pm for the morning and afternoon peak hours, respectively.

The mid block two-way peak hours flows are summarised in Table 2-1 and intersection turning movement flows are presented in Figure 3 and Figure 4 for the morning and afternoon peak hours, respectively.

Figure 3 – Surveyed Vehicle Flows (7:30am-8:30am)

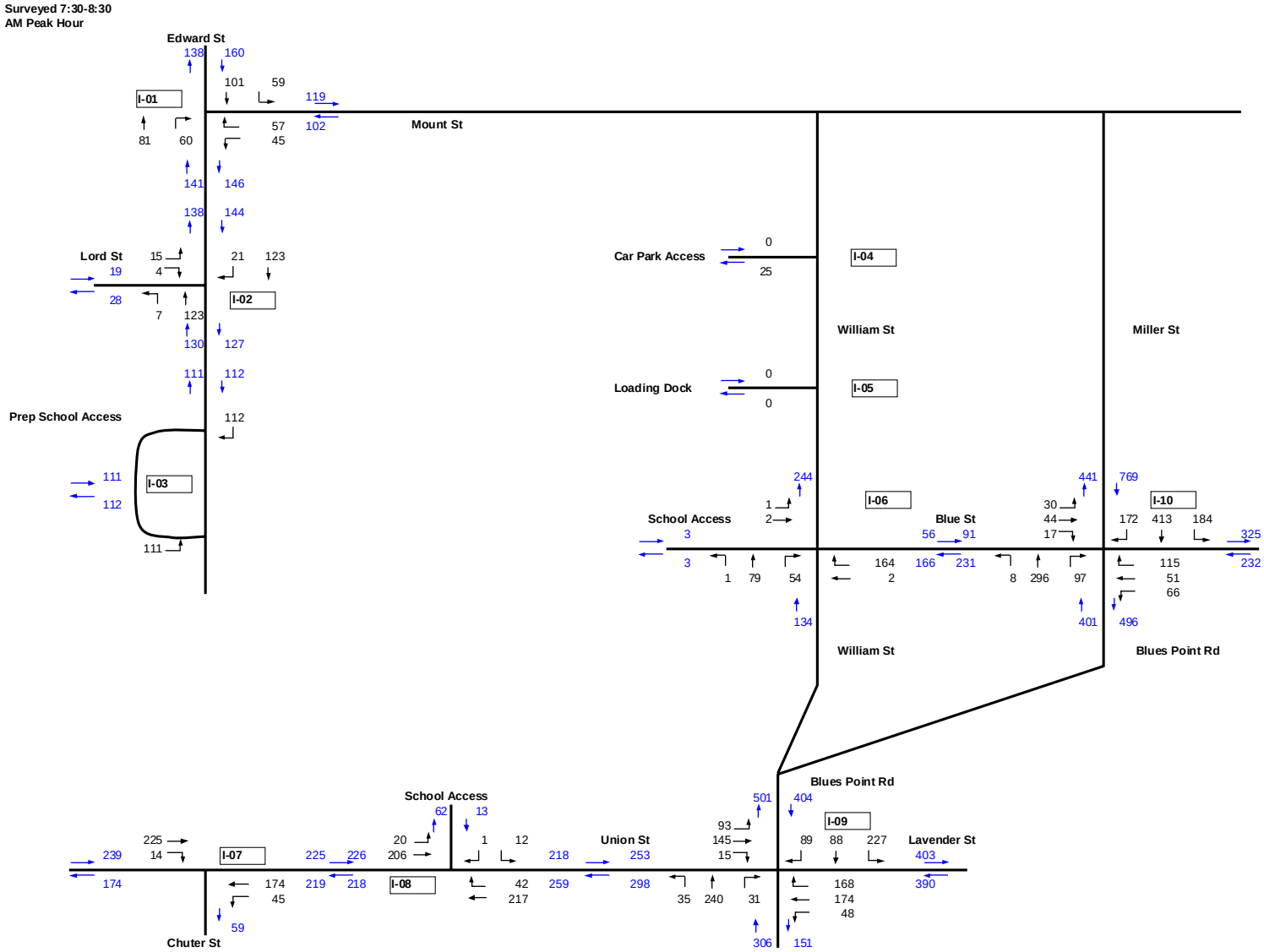


Figure 4 – Surveyed Vehicle Flows (3:00pm-4:00pm)

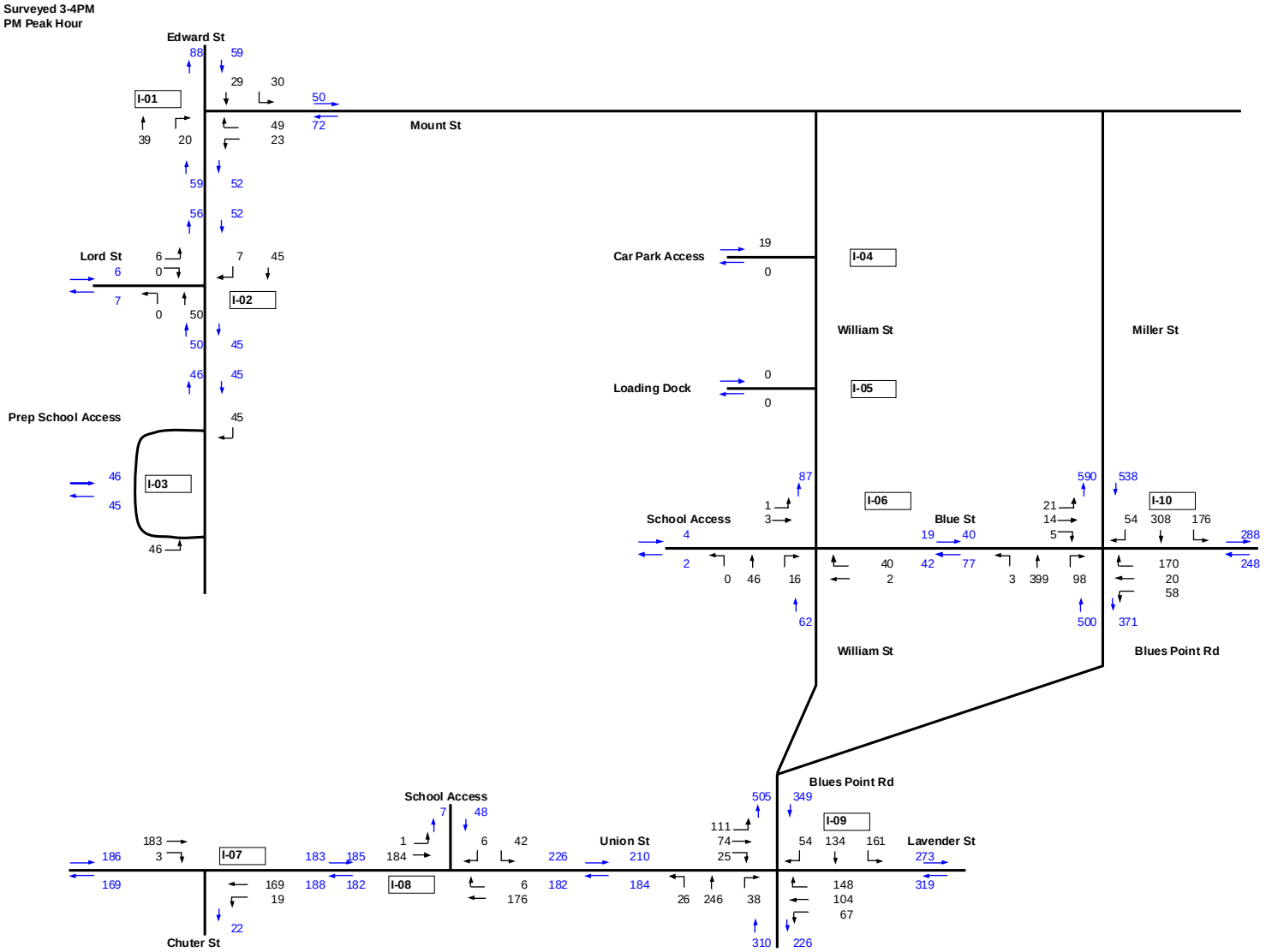


Table 2-1 – Two-way Peak Hours Flows (Vehicles/Hour)

Locations	AM Peak Hour Vehicles/hr 7:30-8:30am	PM Peak Hour Vehicles/hr 3:00-4:00pm
William St, south of Blue St/School Access	134	62
William St, north of Blue St/School Access	244	87
Miller St, south of Blue St	897	871
Miller St, north of Blue St	1,210	1,128
Blue St, east of William St	222	61
Blue St, east of Miller St	557	536
Union St, west of Chuter St	413	355
Union St, east of School Access	477	408
Blues Point Rd, south of Union St	457	536
Blues Point Rd, north of Union St	905	854
Lavender St, east of Blues Point Rd	793	592
Chuter St, south of Union St	59	22
School Access, north of Union St	75	55
Edward St, south of Lord St	257	95
Edward St, south of Mount St	287	111
Edward St, north of Mount St	298	147
Lord St, west of Edward St	47	13
Mount St, east of Edward St	221	122

The results shown in Table 2-1 indicate that these roads typically carry considerably more traffic during the morning peak hour compared to the afternoon peak hour. This is a function of the School's morning peak period coinciding with general commuter morning peak. In the afternoon the School's peak occurs prior to the commuter peak.

Union Street, which is a collector road, carries less than 500 vehicles per hour. The volume of 500 vehicles is the upper limit for the collector type road.

With the exception of Union Street all of the surveyed roads carry less than 300 vehicles during the peak hour. The volume of 300 vehicles per hour is considered to be the upper limit for the Environmental Capacity performance standard for local streets.

It is important to note that Environmental Capacity guidelines are not absolute thresholds nor are they reflective of the carrying capacity of roads. The Environmental Capacity guidelines provide an indication of the level of traffic beyond which amenity may be affected and where measures such as local traffic calming are to be considered.

Other notable findings of the traffic surveys include:

- Edward Street – traffic flows are principally associated with the School. Traffic flows south of Lord Street are exclusively School traffic.
- William Street (south) is the primary route to the School's main gate (i.e. Drop off area). Blue Street is a secondary route.

Generally the roads within the surrounding road network operate with traffic flows consistent with their function (i.e. local access road, collector roads etc. are carrying traffic flows below the thresholds that would be expected for the various types of road).

The tube count survey was conducted on Union Street between Chuter Street and the School driveway access for a continuous seven days. The data collected includes vehicles counts by 12 classifications according to the Austroad and speed data.

Figure 5 below shows the 24-hour profile of hourly flows on Union Street for the weekday peak (i.e. Thursday during this measured period), 5-day weekday average and 7-day average.

Figure 5 – Union Street surveyed Traffic Flows - 24 Hour Daily Profile

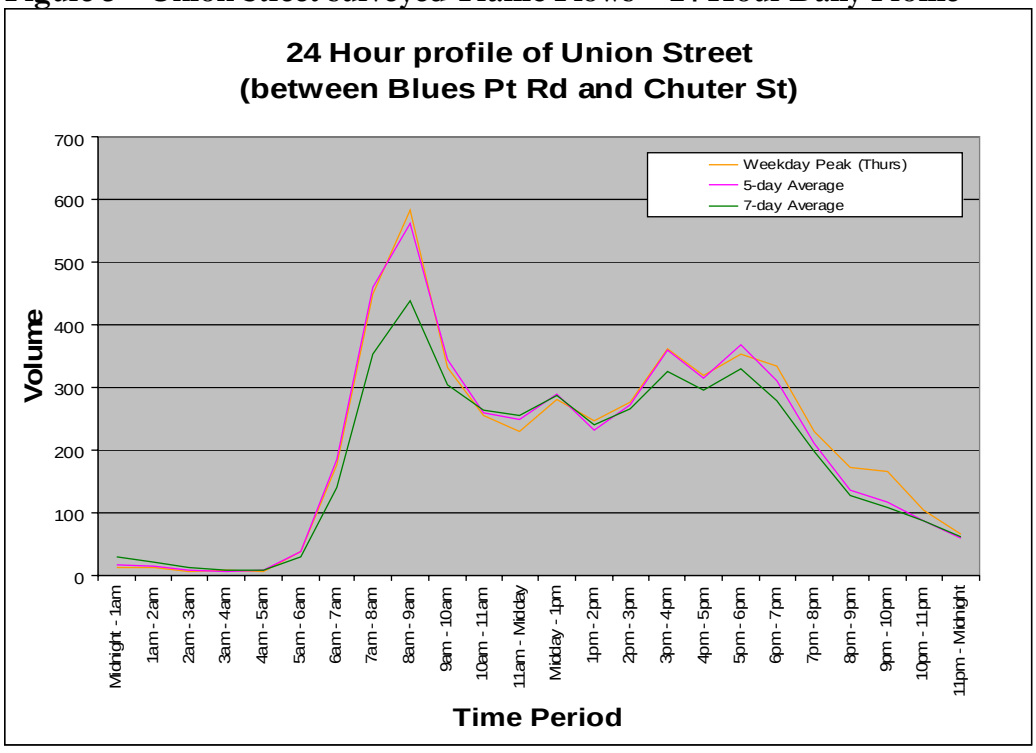


Table 2-2 summarises the 85th percentile speed for the weekday during the School Zone periods by direction.

Table 2-2 – Weekday the 85th percentile Speed on Union Street by Direction during School Zone Periods

Period	85th Percentile Speed (km/hr)	
	Eastbound	Westbound
8-9AM	48	42
9-10AM	50	43
2-3PM	50	47
3-4PM	49	45
4-5PM	51	47

Table 2-2 indicates that the 85th percentile speed on Union Street are higher than the school zone speed of 40km/hr for both directions during the morning and afternoon school zone periods.

The results indicate that the eastbound traffic generally travels with a higher speed than the westbound traffic.

2.3.3 Existing Intersection Operation

The operation of the surrounding local intersections was analysed using the SIDRA modelling software.

SIDRA determined the average delay that vehicles encounter and the corresponding level of service. SIDRA provides intersection performance measures which can be compared to the performance criteria set out in the following Table 2-3.

The surveyed traffic flows as presented in Figures 3 and 4 have been used in SIDRA analysis. The results of the SIDRA analysis are presented in Table 2-4.

Table 2-3 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.

Table 2-4 – Existing Intersection Operation

	AM Peak Hour		PM Peak Hour	
	Ave Delay (sec/veh)	Level of Service (LoS)	Ave Delay (sec/veh)	Level of Service (LoS)
Edward St – Mount St	6	A	8	A
Edward St – Lord St	5	A	6	A
William St – Blue St	6	A	6	A
Union St – Chuter St	6	A	6	A
Union St – School Access	6	A	6	A
Union St-Blues Point Rd	26	B	25	B
Blue St-Miller St	27	B	17	B

The results of the SIDRA analysis indicate that each of the intersections is currently operating satisfactorily with good levels of service.

2.4 Existing School Travel Demand

In May 2010 Shore commissioned Halcrow to undertake an analysis of the School's existing travel demands and travel behaviour.

The purpose of this analysis was to develop an understanding of the School's existing travel demands and travel behaviours of Shore School and its interaction with the surrounding transport networks.

Furthermore the analysis would provide suitable baseline data upon which an assessment of potential future development of the School and Graythwaite could be assessed.

The analysis included traffic and pedestrian surveys of the School and the surrounding road network as well as a travel questionnaire for students and staff.

The results of the existing School travel demand analysis have been documented in a stand alone report. This report is provided in Appendix B. The following sections of this report present a summary of the analysis findings.

2.4.1 Travel Questionnaire

(a) Survey Methodology

Travel survey questionnaires were sent out to 1,426 students and 393 staff members (permanent and part-time staff) asking a range of questions about how they travel to and from the School each day. A copy of the questionnaire and the results is presented in Appendix B.

About 830 people responded to the survey (i.e. 667 students and 163 staffs), which is about a 46% survey response. This is considered to be a reasonable response rate and appropriate for use in planning purposes. What the travel survey does do is provide a very definite picture of typical travel patterns.

The survey day (Thursday 29 July 2010) was considered to be a typical school day, with normal classes (ie. no holidays or study leave) and no major events.

There are variations to the daily activities at the School. It was not the purpose of the Travel Survey to capture each and every detail of travel to and from the School. The travel survey has been used and will be used further as a planning tool to assess, manage and modify travel patterns associated with the School.

(b) Survey Findings

The following is a summary of the key findings.

i. Arrival & Departure Times at School

Figure 6 and Figure 7 show the distribution of respondents by arrival and departure times at the School.

Figure 6 shows that about 75% of students/staffs arrive between 7:30 and 8:30AM with some 20% of students/staffs arriving before 7:30AM.

Figure 7 shows that a significant number of respondents (i.e. 53%) leave school during the 20 minute period between 2:55 and 3:15PM.

Figure 6 – Arrival Time at Shore School (Students and Staff)

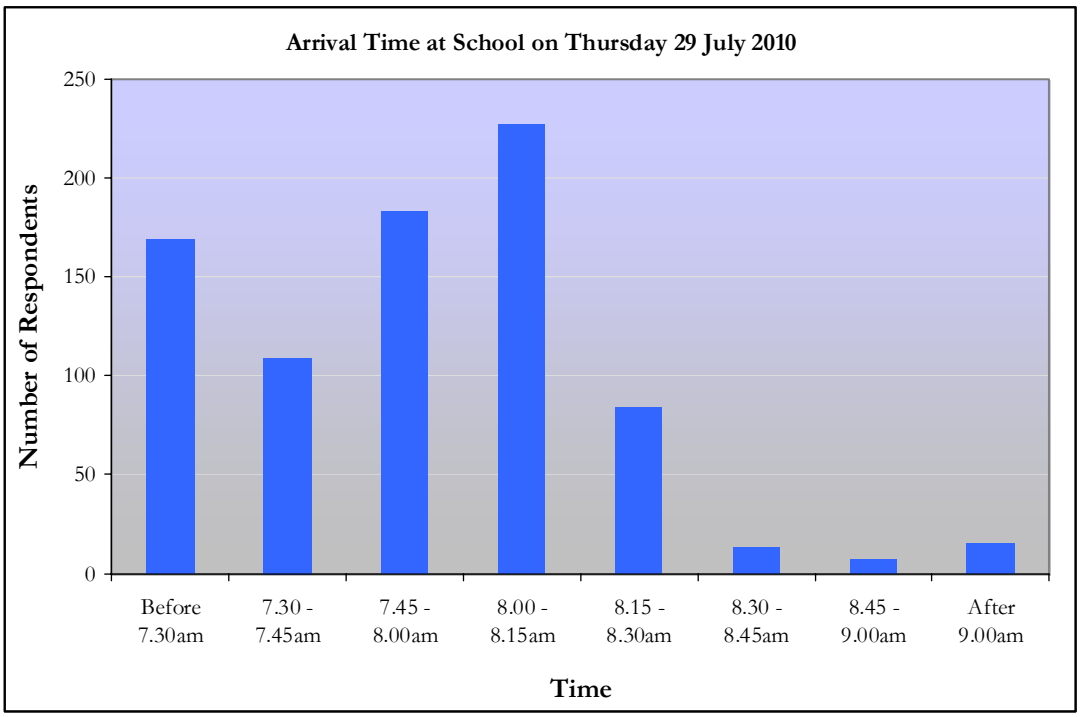
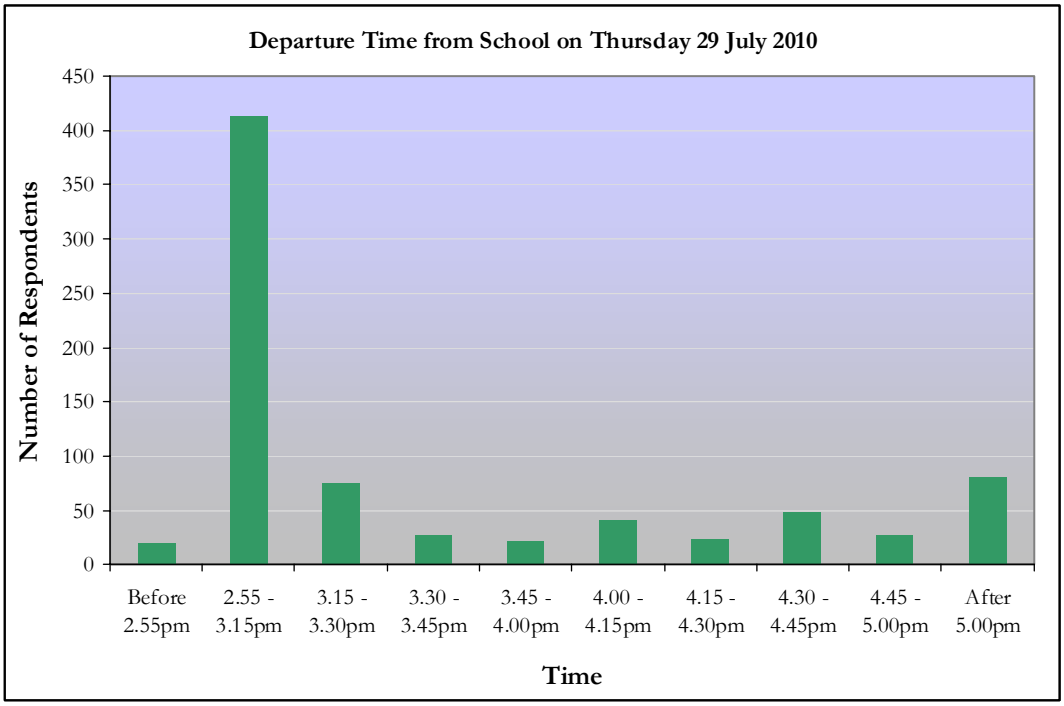


Figure 7 – Departure Times from Shore School (Students and Staff)



These arrival and departure times have implications for the traffic flow loadings on the surrounding road network, particularly in the PM peak with the concentration of departures in one short period.

However as noted below the amount of traffic generated by the School in PM peak is significantly lower than the AM with a mode shift to public transport.

ii. Mode of Travel

Table 2-5 shows the travel mode for students/staffs to and from the School.

Table 2-5 – Travel Mode for Students/Staff

Travel Mode	To School Trips (% of Mode Share)	From School Trips (% of Mode Share)
Car driver	113 (14%)	102 (13%)
Car passenger	259 (32%)	163 (20%)
Train	142 (18%)	143 (18%)
Bus	179 (22%)	215 (27%)
School bus to Northbridge for Sports	-	57 (7%)
Cycle	4 (1%)	3 (0%)
Walk	26 (3%)	24 (3%)
Live on site	84 (10%)	73 (9%)
Others	-	20 (3%)
Total	807	800 (100%)

The results indicate that the highest mode choice is by private vehicle. The percentage of the students/staffs travelling to school by private vehicle is about 46% and from school is about 33%.

The results shown in Table 2-5 also indicate that there is a difference in the mode choice for the travel to and from school. The percentage of car travel is approximately 13% higher for travelling to school in the morning (46%) compared to the travelling from school in the afternoon (33%). This difference is contributed to by the increase in bus usage for the return journey home or to Northbridge for sports.

iii. Vehicle Occupancy

The stated average vehicle occupancy of students/staffs being dropped off at school is approximately 1.24 persons per vehicle.

This is consistent with observational surveys conducted in May 2010 which indicated the vehicle occupancy of 1.21 and 1.23 students per car for the morning and afternoon peak periods, respectively.

iv. Drop-off and Pick-up Locations

Table 2-6 presents the stated percentages of drop-off and pick-up occurring at different locations near the School.

Table 2-6 – Drop-off and Pick-up Locations

Locations	Drop-off locations	Pick-up locations
Blue Street	17%	10%
William Street	7%	7%
Edward Street	7%	7%
Prep School Drop Off (Edward Street)	56%	65%
Lord Street	1%	0%
Union Street	3%	3%
Mount Street	5%	2%
Others	4%	5%

The results indicate that the Preparatory School drop-off at Edward Street is the most popular location with 56% and 65% of total drop-off and pick-up occurring at this location. Blue Street and William Street are also commonly used with totals of about 17% to 24% using these streets.

v. Parking Locations

Table 2-7 presents the percentages of where students/staff park their vehicles near the School.

The results above show that about 65% of cars are parked in the William Street or Union Street on site car parks. About 13% of vehicles are parked on streets near the school and about 23% of vehicles are parked on streets at some distance away from the school.

Table 2-7 – Parking Locations

Locations	Number of Parked Cars	Percentages
William Street car park	33	30%
Union Street car park	39	35%
Blue Street	3	3%
William Street	2	2%
Edward Street	3	3%
Lord Street	1	1%
Union Street	3	3%
Mount Street	2	2%
Other (please specify)	26	23%

2.4.2 Vehicle Drop Off / Pick Up and Pedestrian Surveys

Traffic and pedestrian surveys were undertaken of the road network surrounding the School. These surveys included counts of School activity, namely vehicle drop offs / pick ups and pedestrian flows.

Further details are provided above in Section 2.3 of this report regarding traffic flows and intersection operation.

i. Pedestrian Surveys

The key findings of the pedestrian surveys were:

- William Street via Blue Street is the principal pedestrian access to the School (742 pedestrians in the AM peak)
- Edward Street is a secondary access with minimal walk in flows other than between the Senior and Preparatory School sites
- Higher pedestrian flows were recorded in PM peak than AM peak reflecting the shift to public transport modes in the afternoon.
- Union Street is an under utilised pedestrian access with very low pedestrian flows recorded at these gates (i.e. 16 pedestrians in the AM peak and 56 pedestrians in the PM peak)

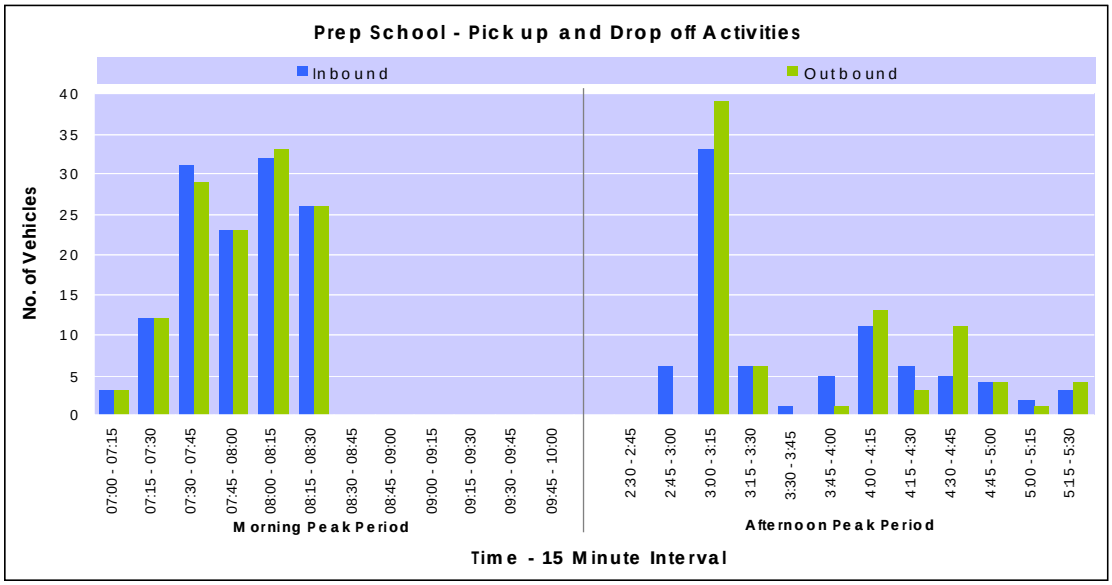
ii. Preparatory School Drop Off / Pick Up Facility

The key findings of the Preparatory School drop off / pick up facility were:

- Relatively similar total volumes of traffic movements over the surveyed AM and PM periods
- AM – even dispersal of traffic over 1 hour
- PM – Concentration of traffic in one 15 minute period
- Concentration of traffic will adversely impact on the capacity of the drop off facility.
- Observations indicate that some congestion occurs during the peak PM pick up period. This suggests that the facility is approaching capacity under its current operation management.

The distribution of drop off and pick ups are shown in Figure 8.

Figure 8 – Preparatory School Drop Off / Pick Up Vehicle Movements



iii. Senior School Drop Off / Pick Up - On Street

Senior School drop offs and pick ups occur on street. The extent of drop of and pick ups is shown in Figure 9 and 10.

Figure 9 – William Street Drop Off/Pick up Vehicle Movements

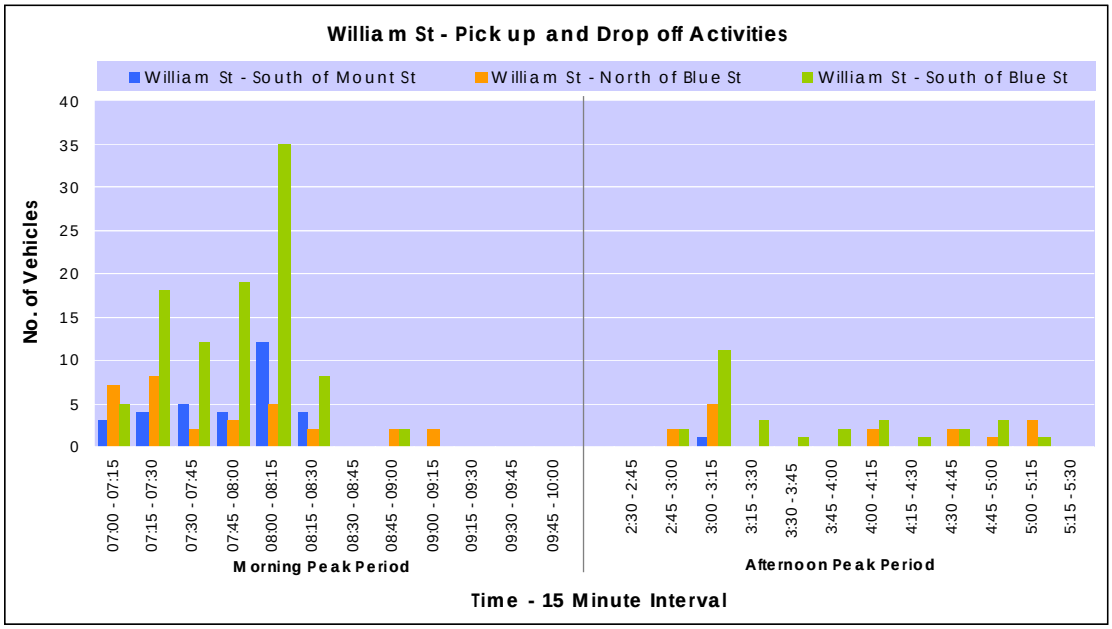
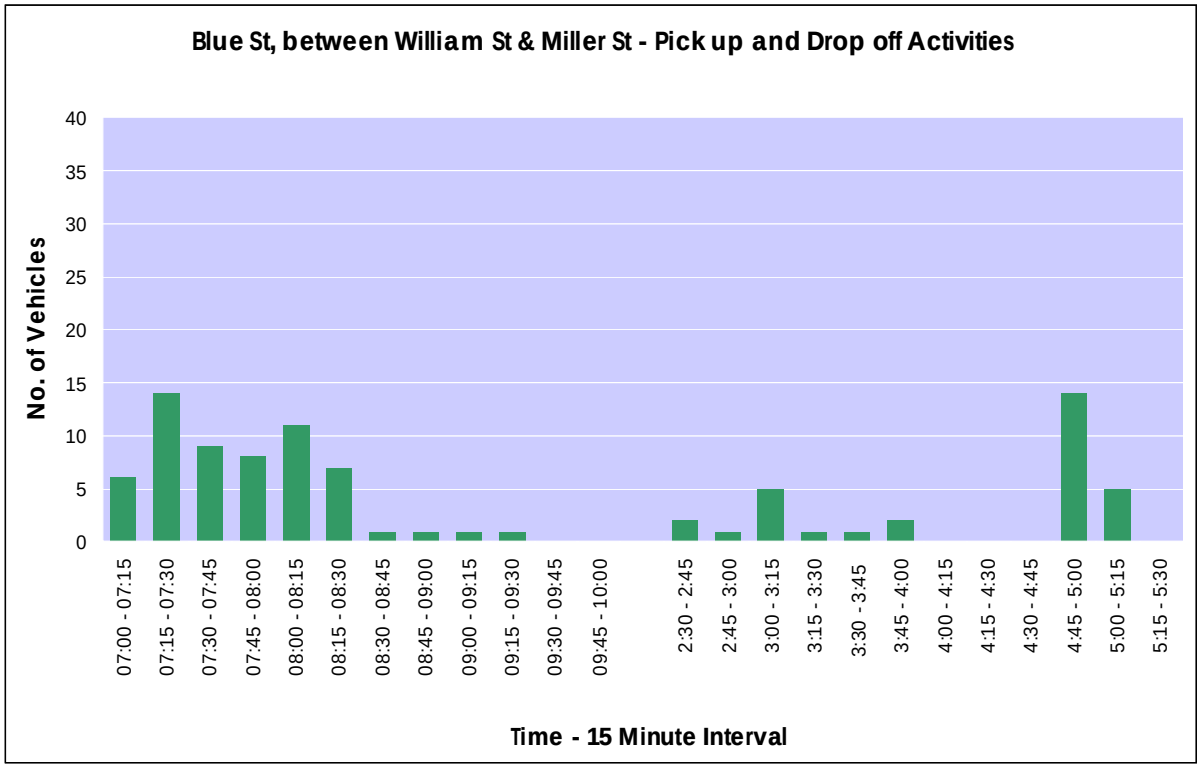


Figure 10 – Blue Street Drop Off/Pick up Vehicle Movements



iv. School Bus Operation

Designated Shore School buses operate from the marked kerb side "bus zone" on the southern side of Mount Street. This bus area is only used for the afternoon transportation of boys to the School's sporting fields at Northbridge. All other regular bus transport is via Blue and Miller Street.

Pedestrian access from the School to the Mount Street bus zone is provided via a pedestrian gate and path along the School's Mount Street frontage.

Typically the School runs up to 8 buses per afternoon between the School and the Northbridge sporting facilities.

Halcrow has been advised by Shore that the School currently operates a maximum fleet of 5 buses at any one time, providing some 8 trips in the peak afternoon (ie. some buses make take two trips over the afternoon). .

3 Strategic Context

3.1 State Strategic Planning Policy and Plans

This section outlines government plans and strategies which provide a transport context within which this proposed development should be considered including the various transport related environmental planning instruments and guidelines referenced in the DGRs.

3.1.1 NSW State Plan

The NSW State Plan 2006 defines the NSW Government's overarching goals and priorities for action. It is intended to set a framework for linking the various other NSW Government plans and policies, including the Metropolitan Strategy.

Transport-relevant goals include:

- A high quality transport system
- Practical environmental solutions
- Improved urban environments

Beneath these goals are a number of transport-relevant priorities with associated targets.

The priorities are:

- Increasing share of peak hour journeys on a safe and reliable public transport system
- Safer roads
- Cleaner air and progress on greenhouse gas reduction
- Jobs closer to home
- Improve the efficiency of the road network

3.1.2 Metropolitan Strategy and Metropolitan Transport Plan

The Metropolitan Strategy (December 2005) outlined a broad framework vision for the future growth of the Sydney metropolitan area to 2031. The strategy proposed the concentration of growth in centers by identifying housing and employment capacity targets for Sydney's sub regions and strategic centres.

The Metropolitan Strategy and Transport Plan has been reviewed and superceded by the Metropolitan Plan for Sydney (2036).

3.1.3 The Metropolitan Plan (2036)

In December 2010, the NSW Government released its Metropolitan Plan for Sydney 2036. This document supercedes the Metropolitan Strategy for Sydney to 2031.

This Metropolitan Plan draws on the strengths and principles of 2005's Metropolitan Strategy - City of Cities: A Plan for Sydney's Future, and the Metropolitan Transport Plan 2010: Connecting the City of Cities. It incorporates public feedback on the Metropolitan Transport Plan and the first five-yearly review of the Metropolitan Strategy to form a single, integrated Metropolitan Plan for Sydney 2036.

The Metropolitan Plan's transport vision for Sydney includes:

- radial public transport links feeding into each city
- cross regional transport connections, linking more subregions to the Global Economic Corridor; and
- a developing network of transport connections serving a range of different trips and strategic centres that support economic activity across more locations

3.1.4 Metropolitan Transport Plan

This was released in February 2010 and provides a 25 year vision for the linking of Sydney's land use planning with its transport network. It is intended that this plan be merged with the updated Metropolitan Strategy when it is completed. The plan includes a 10 year funding guarantee for essential transport infrastructure and services.

The plan includes:

- The $4.5 billion Western Express City Rail Service – a separate dedicated rail track to slash travelling times from Western Sydney to the city.
- Start of work on the $6.75 billion North West rail link from Epping to Rouse Hill.
- A $500 million expansion of the current light rail system with an extension from Lilyfield to Dulwich Hill.

- Improvement to bus services – including 1000 new buses in strategic bus corridors.
- New trains – addition of 626 rail carriages.
- $158 million for cycleway.
- $400 million for commuter car park.
- $225 millions for ferries.
- $536 million for motorway planning, transit corridor reservations and land acquisition.
- $483 million to deliver important freight works in Sydney.
- $21.9 million of State and Federal Funded road projects.

3.1.5 Inner Northern Sub-region Draft Sub-regional Strategy (Draft)

This draft policy sets key directions for transport namely:

- Improve access to Macquarie Park;
- Integrate transport and land use opportunities;
- Manage traffic and improve key corridors; and
- Manage growth of commercial vehicle movements.

3.1.6 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (the SEPP) was introduced to facilitate the delivery of infrastructure across the State by improving regulatory certainty and efficiency. Prior to the SEPP being introduced, planning for infrastructure was regulated through a complex array of local, regional and State statutory planning instruments and overlapping legislation.

The new Infrastructure SEPP provides a consistent planning regime under the Environmental Planning and Assessment Act 1979 (the Act) that outlines the approval process and assessment requirements for infrastructure proposals.

Infrastructure is defined to included hospitals, schools, railways, roads, power and water supplies, and other services necessary to maintain the State's economy and the wellbeing of its communities.

In essence the Infrastructure SEPP establishes the assessment and consultation framework for infrastructure developments, including educational establishments, to be considered under the Part 3A process.

3.1.7 Planning Guidelines for Walking and Cycling, NSW Department if Infrastructure, Planning and Natural Resources, Roads and Traffic Authority (2004).

These guidelines aim to assist land-use planners and related professionals to improve consideration of walking and cycling in their work. It is anticipated that improving practice in planning for walking and cycling will create more opportunities for people to live in places with easy walking and cycling access to urban services and public transport. This will help reduce car use and create healthier neighbourhoods and cities.

This planning at a local level, and to some degree regional level, has been undertaken and incorporated into the North Sydney Bike Strategy (2009). This strategy was considered as part of the Concept Application and Stage 1 Project Application Transport and Accessibility Impact Assessment.

The integration of on site cycle facilities with the local bicycle network will be considered as part of the Workplace (Green) Travel Plan to be prepared for the School as discussed in Section 4.9 of this report. It is noted that the School currently provides shower and change facilities for cyclists. Improvements will be made to bicycle parking facilities and storage arrangements.

3.1.8 Integrating Land Use and Transport Policy Package, Department of Urban Affairs and Planning, Transport NSW (2001)

In September 2001, the State Government released the Integrating Land Use and Transport (ILUT) Planning Policy Package. The package provides a framework for State Government agencies, councils and developers to integrate land use and transport planning at the local and regional level.

More specifically, it aims to:

- improve access to housing, jobs and services by walking, cycling and public transport
- increase the choice of available transport and reduce reliance on cars
- encourage people to travel shorter distances and make fewer trips

- support the viable operation of public transport services
- provide for the efficient movement of freight.

It is noted that the major centres mentioned in the ILUT package are now superseded by the strategic centres identified in the Government's Metropolitan Strategy. These centres include North Sydney. Reference to the Metropolitan Strategy was provided in the Concept Application and Stage 1 Project Application Transport and Accessibility Report for the Graythwaite site.

Notwithstanding the above, the principles of managing transport demand and providing transport choices have been considered as part of the Concept Application plan and Preferred Project for Graythwaite. The implementation of a Workplace (Green) Travel Plan for the School will embody the principles set out in the ILUT policy.

3.1.9 NSW Bikeplan NSW Government (2010)

The NSW BikePlan builds on the Metropolitan Transport Plan's $158 million commitment to cycling infrastructure.

The NSW BikePlan will encourage more bike-riding by:

- creating connecting cycling networks;
- making bike-riding safe for all;
- planning cycling-friendly;
- neighbourhoods;
- growing jobs in cycling; and
- getting organisations working together to support bike-riding.

With regard to North Sydney, the NSW BikePlan has identified the missing cycle link between Naremburn to the Harbour Bridge as a priority metropolitan link to be provided as part of the plan. The implementation of this link will improve cycle accessibility to and from North Sydney generally.

The NSW BikePlan also seeks to deliver programme and resources specifically directed to school communities namely:

- Ride2School Programme; and

- School Road Safety Education Programme.

The programmes will be considered as part of the development and implementation of the School's Workplace (Green) Travel Plan.

3.1.10 RTA Guide to Traffic Generating Developments

While not explicitly stated in the Transport and Access Report, the traffic assessment undertaken of the Concept Application and Stage 1 Project Application was undertaken in accordance with the RTA guidelines, including the use of traffic generation principles, road network operation assessment standards and local amenity measures.

Similarly the assessment principles set out in the RTA guide have been applied to the modified concept application and Stage 1 project application presented in this report.

3.2 Local Planning and Policy

3.2.1 North Sydney Local Environmental Plan 2001 and North Sydney Development Control Plan 2002

North Sydney Council is undertaking a major review of its LEP and DCP. This review responds to the NSW State Government's planning reform program.

The review will result in the preparation of a new comprehensive local environmental plan (LEP) and consolidated development control plan (DCP) for the North Sydney local government area.

However the North Sydney LEP 2001 and North Sydney DCP are the current documents.

The DCP seeks to achieve:

- Existing levels of traffic generation are contained and reduced
- Public transport, including walking and cycling, is the main form of access
- Parking is adequate and managed in a way that maintains pedestrian safety and the quality of the public domain and minimises traffic generation

- Parking is limited to minimise impacts on surrounding areas
- Parking is accessible to all.

In essence the DCP has used parking rates (restrictions to over provision of parking) as a measure to control traffic generation of development.

3.2.2 North Sydney Council 2020 Vision – Strategic Plan

The 2020 Vision seeks to establish the principles for achieving the long term vision for North Sydney. The vision states that the use of public transport and other alternatives to the private car will be encouraged through the improvement and expansion of sustainable transport options and seeking to make North Sydney a pedestrian friendly environment.

In particular the plan states that:

For a reliable, and accessible and sustainable transport system, we will:

- *Promote equity of access to public and community transport.*
- *Incorporate true environmental and social costs in our transport planning.*
- *Pursue improvement and expansion of sustainable transport options.*
- *Encourage the use of alternative modes of transport to the private car.*

Some of the stated aims with regard to transport include:

- *The impact of the private car on our community and environment is dramatically reduced.*
- *The frequency, quality and diversity of public transport throughout North Sydney is increased.*
- *Pedestrians and cyclists enjoy easy and safe access throughout North Sydney.*
- *Transport management is coordinated at a regional level.*

3.2.3 North Sydney Bike Strategy (2009)

The North Sydney Bike Strategy identifies a local on road cycle route along Mount Street west of Miller Street and on to Edward Street north of Mount Street. This local on road route connects North Sydney station with Wollstonecraft station and on to St Leonards Station.

This on road route is maintained as part of the Strategy's recommendation however it is noted that no specific improvements along this section are proposed.

3.3 Comment on Strategic Context

Many of the underlying themes of the plans and strategies have relevance to the proposal. Current State policies provide a good framework to support local strategies to improve the level of accessibility and sustainable transport for the North Sydney Area.

A list of objectives has been developed for the assessment of the proposed Shore master plan development including the Graythwaite site which aim to support the State and local transport strategies.

3.3.1 Objectives

The objectives for achieving sustainable travel for Shore would include:

- Reduce the rate of growth of car based trips;
- Support and improve sustainable transport facilities for existing users of public transport, walking and cycling to the site; and
- At the same time ensure that appropriate provisions are made for car parking and for traffic travelling to and from the centre to minimise the impacts to surrounding residents.

3.3.2 Considerations

The Shore School site (including Graythwaite) and the nature of site uses as an educational establishment has a number of advantages in relation to the achievement of above objectives, namely:

- Close proximity to rail and bus services (ie. North Sydney station) providing good walkable access to public transport;
- there are existing good levels of public transport modes by students at the school;
- the peak PM period traffic generating activity of the School occurs prior to the normal commuter PM peak period; and
- As an institution there is the ability to efficiently manage travel demands (ie. students walking to North Sydney station and waiting for bus transport in Miller, Blue and Mount Streets are supervised by staff).

4 Overview of Proposed Development

4.1 Review of Submissions and Community Consultation

4.1.1 Review of Public and Authority Submissions

Just over 150 public submissions were received by the Department of Planning with regard to the Concept Application and Stage 1 Project Application for the Graythwaite site. Over 50% of these public submissions raised issues related to traffic, parking and transport.

The key issues raised in the public submissions were summarised to be:

- Impacts on local traffic network operation;
- Impacts on local on street parking and under provision of on site car parking;
- Operation of drop off / pick up facility;
- Bus parking;
- Traffic safety;
- Traffic assessment methodology;
- Student driver behaviour; and
- Construction traffic.

A breakdown of the submissions received and the traffic and transport issues identified is provided in Appendix C.

Authority submissions which raised traffic and transport issues were also received from:

- North Sydney Council;
- Transport NSW; and
- NSW Roads and Traffic Authority.

Authority submissions related to:

- Provision of on site car parking;
- Workplace travel planning;
- Construction traffic management; and
- Addressing all transport policies referred to in the DGRs.

A response to each of these issues is provided in the following sections of this report.

4.1.2 Community Consultation

A community open day was held at the Shore School on Saturday 30 July 2011. The purpose of the community open day was to provide information to the local community regarding the proposed Concept Application for Graythwaite, including proposed modifications to the concept as envisaged at that time, and to receive community feedback such that the Concept could be further refined to address community concerns.

Various options for the provision of an additional student pick up facility via vehicle link between Union Street and Hunter Crescent were presented to the community. Feedback received at the community day led to the consideration of additional options.

The key issues raised at the open day with regard to traffic and parking were:

1. On Site Parking
    - The provision of more rather than less on site car parking was generally supported.
    - On site car parking to include student parking to stop students parking on surrounding streets (particularly Bank Street).
    - Council to consider 1 hour parking restriction rather than 2 hour parking to discourage student use and moving of cars every couple of hours.

2. Edward Street / Lord Street Traffic Congestion
    - Comments generally focused on existing congestion problems and concerns about it getting worse.
    - Suggestions included consideration of:
        i. removing some on street parking in Edward Street (south of Mount St) during School drop off and pick up times to increase effective road widths.
        ii. staggered drop off / pick up times for prep school.

3. Vehicle Access to School via Union Street
    - Potential vehicle queues along Union Street (westbound) caused by vehicles stopping to turn into the School access (either Graythwaite Drive, the existing car park and / or potential new pick up driveway.
    - Safety issues need to be considered.

4. Union Street Pick Up zone
    - Principle of providing pick up zone accessed via Union Street / Hunter Crescent generally supported.
    - Union St, Bank St and Chuter St residents generally saw merit in the facility but were concerned about increased traffic flows – mainly increased flows along Union St west of Chuter, Bank Street, Bay Road.
    - Alternative Option for Pick Up was developed which reversed the direction of the traffic flow through the School, ie. Entry via Hunter Crescent and Exit via Union Street and the broader consideration to reversing the direction of William Street between Blues Point Road and Blue Street (community acknowledged this was a matter for Council / RTA to approve).
    - Preference for the zone to be also used for drop off as well as pick up was expressed.

5. Mount Street v William Street Bus Stops
    - The issue of congestion associated with School and Mary MacKillop buses in Mount Street was raised.
    - The provision of additional School bus stops in William Street (subject to Council approval) was generally supported and accepted as a sound mitigation measure for both the existing and future operations of the School.
    - Suggested that William Street bus stop be used for existing conditions ie. don't wait until Stage 1 or Stage 2.

6. Mount Street / William Street Pedestrians
    - Numerous people raised traffic congestion at William St / Mount St intersection associated with pedestrian flows at crossings. Pedestrian flows have increased significantly since the Coca Cola building opened making traffic delays worse.

- It was acknowledged that this was not necessarily a result of Shore School but the concern was that additional traffic with Stage 2 would further exacerbate the situation.
- The provision of the Union St / Hunter Cres pick up facility with the William Street buses was seen as a good approach to address the Mount St congestion issues.

4.1.3 Consultation with North Sydney Council

Following the Community Open Day a meeting was held between North Sydney Council officers and Shore School representatives regarding traffic and transport issues.

Key issues discussed at the meeting were:

- Provision of an on site school bus facility;
- Reduced on site parking provision; and
- Developing options to increase the capacity of on site drop off / pick up facilities.

The discussions confirmed that Council's view expressed in their submission to the DoP with regard to on site parking and on site bus facilities would remain unchanged by the modified proposal.

That is, Council would still wish to see a reduced on site parking provision in the new applications and the existing Mount Street school bus zone to be replaced with an on site bus facility.

The discussions indicated that Council was generally supportive of the principle of providing an additional pick up area for students on the site with a new internal road between Union Street and Hunter Crescent. Issues to be address included the potential for queues at the pick up facility to extend onto the external road network. Council also indicated a desire for the area to also be used for drop off as well.

4.1.4 Response to Submissions

(a) On Site Car Parking Provision and Impacts on Local On Street Parking

Over 50% of the public submissions raised issues regarding traffic and parking relating to an under provision of on site parking both for the existing School operations and for the anticipated growth as set out in the Concept Application (ie. Stage 2 and Stage 3).

The general public view is contrasted with the submissions of both North Sydney Council and Transport NSW which are seeking to reduce the proposed on site parking provision, namely the proposed 41 basement parking spaces to be constructed as part of Stage 2.

The School Travel Survey indicated a relatively high reliance on private motor vehicle for staff travel to and from School. This occurs despite the proximity to good public transport and short supply of on site and on street parking.

It is acknowledged that a shift in travel behaviour is required for the existing and future School populations. This will be achieved through the Workplace (Green) Travel Plan to be developed and implemented by the School.

However, the proposed parking provision, namely retaining the 7 existing spaces on Graythwaite and 41 additional spaces for Stage 2, represents a fair balance between restrictive on site parking policies and the reduction of impacts to the Shore's neighbours associated with demand for on street parking.

(b) Impacts on Local Traffic Network Operation

Submissions received which related to implications of the Concept Application to the operation of the local traffic network generally raised issues with the operation of the School's drop off /pick up facility in Edward Street and the bus stop operation in Mount Street. Both these issues are addressed separately below.

With regard to the other local traffic implications, it is noted that the Stage 1 Project Application would not increase student or staff numbers. Any future increase in School population on the Graythwaite site (ie. Stage 2 and Stage 3) will be considered in detail as part of future development applications. This is considered appropriate as the timing of Stage 2 and Stage 3 development is still conceptual, and the detailed proposal will need to consider the traffic and parking conditions at that future time.

Notwithstanding the above, the Concept Application traffic assessment attempted to consider a worst case scenario for the School development based on current known traffic conditions.

Council's Officers Report (8 March 2011) indicated that Council agreed that the surrounding road network could physically accommodate the additional traffic but highlighted the amenity implications associated with a sudden significant increase in the percentage of traffic flows along local streets.

The traffic assessment has considered the growth of school population in two distinct stages. However this is unlikely to occur but rather the new buildings will be constructed to accommodate a nominated future population. Actual enrolments and hence School populations will increase gradually over numerous years rather than on Day 1 of the new stage.

The revised Concept application has included the identification of alternative and additional pick up and bus stop arrangements which could be implemented as part of Stage 2 or Stage 3 works, depending on the nature of the future School population (ie. proportion of Senior and Preparatory School students).

(c) Operation of Drop Off / Pick Up Facility

The operation of the Preparatory School drop off / pick facility in Edward Street for existing conditions and with an additional student population has been raised in numerous public submissions and that of North Sydney Council.

It is noted that any proposal to increase student numbers associated with development of the Graythwaite site will need to be approved via a Stage 2 and Stage 3 project application. The current Stage 1 project application does not seek to increase student numbers.

The Concept Application traffic report noted that detailed consideration of the capacity and operation of drop off / pick up facilities will need to be undertaken as part of the Stage 2 and Stage 3 project applications.

While this detailed assessment will need to occur at those stages, the revised Concept Plan application has identified a number of options to provide additional pick up capacity within the School site. These options have been highlighted in Section 4.4 of this report.

(d) Bus Parking

The existing and proposed School bus operations in Mount Street has been discussed and clarified in 4.7 of this report.

However, through the submissions, the issue of a future intensification of the vehicle activity and in particular bus movements associated with the Mary MacKillop Place Museum has been highlighted.

This indicates that alternative bus stop locations for the School and associated management measures should be considered regardless of the proposed Concept and Stage 1 Project Applications for Graythwaite.

Alternative arrangements have been identified in Section 4.7.

(e) Traffic Safety

Matters relating to traffic and pedestrian safety were raised in numerous submissions. Principally, these relate to the operation of and conflicts at the drop off / pick up facility and the Mount Street bus stops. The options to address these conflicts have been discussed above.

(f) Traffic Assessment Methodology

Of the 151 public submissions received by the Department of Planning some 6 submissions raised issues regarding the "flawed" assessment methodology used in the traffic assessment. In particular the use of and results from the School Travel Survey.

The traffic and parking assessment undertaken as part of the Concept Application and Stage 1 Project application was undertaken in accordance with the RTA's *Guide to Traffic Generating Developments* as specified in the Director General's Requirements.

It is also noted that in the North Sydney Council Officer's Report on the matter (8 March 2011), Council's traffic engineers generally agreed with the various traffic generation assumptions used in the project assessment.

Several public submissions commented that the use of the Shore Travel Survey was flawed. We strongly disagree with these comments.

The undertaking of the School Travel Survey is considered to provide good baseline information on existing School travel behaviour, and more importantly providing some insight into the reasons behind such behaviours.

Specifically in response:

- The return rate of nearly 50% is considered to be a good response rate and appropriate for use in planning purposes.
- The survey day was considered to be a typical school day, with normal classes (ie. no holidays or study leave) and no major events. There are variations to the daily activities at the School. It was not the purpose of the Travel Survey to capture each and every detail of travel to and from the School. The travel survey has been used and will be used further as a planning tool to assess, manage and modify travel patterns associated with the School.
- Bank Street parking was not specifically included in the parking locations but was picked up as part of the "other locations".
- The "skipped question" references reflect that the question was not relevant to the particular respondent. For example, if a student arrived at school by train, as many do, it is not relevant to answer a question about where they parked their car, hence the skipped question. The online survey instructed respondents to skip particular following questions based on their response to a particular question.

(g) Student Driver Behaviour

Several submissions raised issues relating to existing student driver behaviour and use of on street parking.

It is noted that students with drivers licenses, like other members of the community, are entitled to drive on the public road and park on local streets where legally permitted.

Notwithstanding the above, inappropriate behaviour should be reported to the School via the establish lines of communication.

Furthermore, the School should review and amend if necessary student driver policies and management measures.

(h) Construction Traffic Management

As noted in the Concept Application and Stage 1 Project Application traffic report, detailed planning for, assessment of and development of impact mitigations for construction traffic during construction stages will be undertaken prior to construction activities.

It is noted that North Sydney Council have provided a list of draft consent conditions as part of their submission which includes the requirement for the preparation of a Construction Traffic Management Program for Council approval prior to the issue of the Construction Certificate for each stage.

To address in detail the construction traffic implications of the development is considered an appropriate condition.

(i) Workplace Travel Planning

The School has committed to prepare, implement and maintain a Green (Workplace) Travel Plan for the overall School whether development of Graythwaite proceeds in the immediate term or not.

It is noted that North Sydney Council have provided a list of draft consent conditions as part of their submission which includes the requirement for a Workplace Travel Plan to be prepared prior to the occupation certification for Stage 2.

While the preparation of a Workplace Travel Plan is not necessarily linked to an approval of a particular stage of development, the inclusion of this condition and associated timing is considered appropriate.

4.2 Overview of Revised Concept Plan and Staged Development

4.2.1 Modified Master Plan Concept

Tanner Architects and P D Mayoh Pty Ltd have completed extensive site analysis and master planning work for the site (contributing in part to a new Conservation Management Plan (CMP) for the site).

The Modified Master Plan for Graythwaite as proposed in the revised Concept Application is shown in Appendix D.

It is noted that Shore is seeking approval for the proposed works under Part 3A of the EP&A Act as represented by the revised Concept Application and a Stage 1 Project Application. Stages 2 and 3 will be the subject of separate Project Applications.

The development is proposed to be completed over 10 to 15 years, comprising:

Stage 1

- Conservation and refurbishment of Graythwaite House (the House), Coach House, Tom O'Neill Building and associated garden area (the House will not be used for school classes but rather for administrative support and other activities, including perhaps the school archives).
- Drainage and storm water improvements, site levelling and landscaping of the site (particularly on the middle and lower terraces).
- Formalisation of car parking to provide 6 designated visitor car parking spaces adjacent to Graythwaite House and one adjacent to the Coach House for use by the site's caretaker.
- Improvements to existing internal access road between Union Street and Graythwaite House.
- Miscellaneous works including site fencing.
- No anticipated increase in student or staff population.

Stage 2

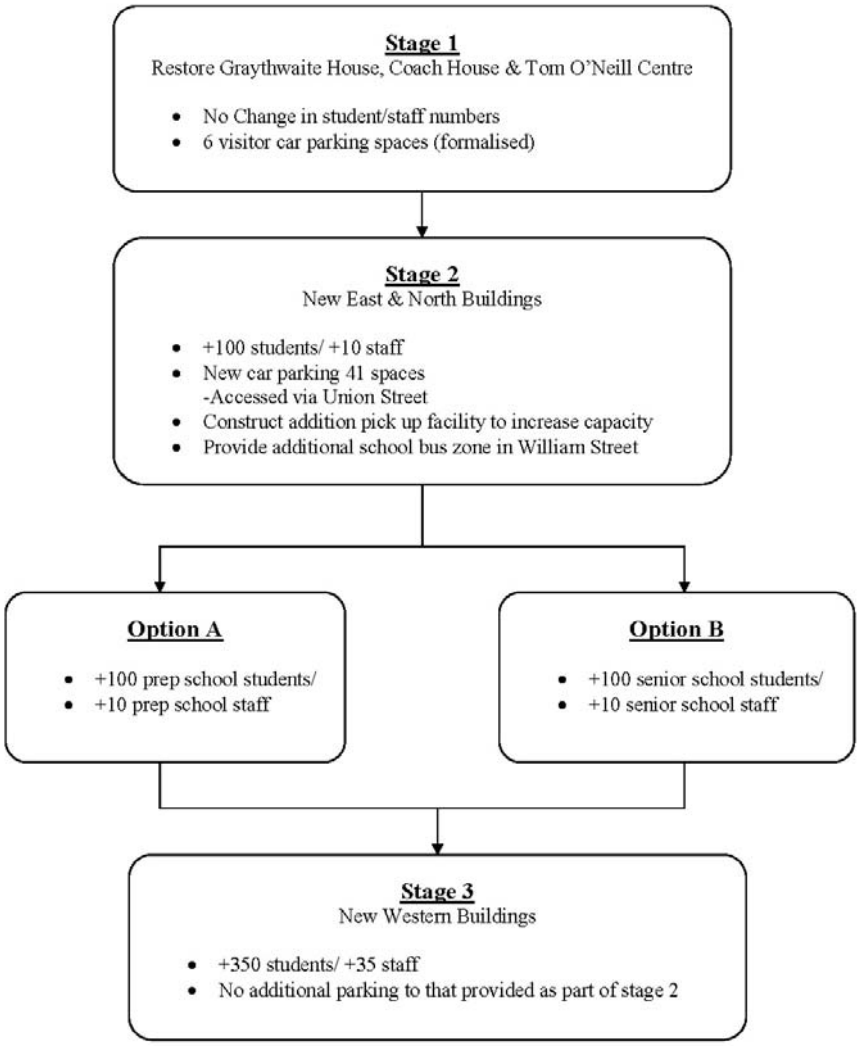
- Development of a new building to the north of the House which may be used for education or administration purposes.
- Demolition of the Ward building to the east of the House.
- Construction of two new buildings to the east of the House for additional classrooms, teaching or other educational facilities.
- Construction of a basement car parking facility under the new east building (approx. 41 spaces) with access via the Graythwaite driveway.
- Up to 100 additional students and 10 additional staff.

Stage 3

- Construction of two new buildings to the west of the House for additional classrooms, teaching or other educational facilities.
- Up to 350 additional students and 35 additional staff

A summary of the development staging for the above Master Plan concept is provided in Figure 11.

Figure 11 – Concept Plan Development Staging



For Stage 2 it is currently not known whether the additional 100 students and 10 staff will be associated with the Senior School or the Preparatory School or a combination of both.

The assessment presented in this report has considered the implications of two Stage 2 options, namely all 100 students and 10 staff being associated with the Senior School and all 100 students and 10 staff associated with the Preparatory School. As the Preparatory School and Senior School have quite different travel demands, assessment of these two options allows the worst case transport impact for each situation to be assessed for this stage.

It is envisaged as part of the revised Concept Application for Graythwaite that of the additional 450 students to be accommodated on site for the total project scope, up to 100 students could be Preparatory School students.

4.2.2 Reduction in Potential Additional Student & Staff Number

The Concept Application sought to set out a vision for the integration and development of the Graythwaite site as part of the Shore School site. This vision is retained in the revised Concept Application.

The original Concept Plan for the Graythwaite site included the potential to accommodate an additional 500 students and some 50 staff within new buildings to be constructed on the Graythwaite site.

The modified Concept Plan proposal would reduce the proposed new building floor area and thus reduce the potential additional student and staff numbers that could be accommodated at the School (ie. the integrated existing Shore School site and Graythwaite).

The modified Concept Plan proposal would continue to be staged over some 10-15 years as follows:

- Stage 1: Conservation and restoration of Graythwaite House and associated buildings (**no additional students or staff**);
- Stage 2 : new buildings accommodating an additional 100 students and 10 staff;
- Stage 3 : new building accommodating an additional 350 students and 35 staff.

The proposed changes to potential additional students are summarised in Table 4-1.

Table 4-1 Summary of Modified Additional Student & Staff Numbers

Concept Plan Stage	Concept Application (Original)		Modified Concept Project Proposal (Current)	
	Students	**Staff**	**Students**	**Staff**
Stage 1	0	0	0	0
Stage 2	100	10	100	10
Stage 3	400	40	350	35
Total	500	50	450	45

4.2.3 Reduced Traffic Generation Potential of Additional Students and Staff

As a result of the reduced proposed building floor areas, there will be a reduction to the additional traffic generation potential of the future School site under the revised Concept Application compared with the Concept Application submitted in December 2010.

As noted in the Concept Application and Stage 1 Project Application transport assessment report[3] the proportion of new senior school and preparatory school students is not known. However, it is known that the preparatory school additional population would not exceed 100 students.

[3] Graythwaite Part 3A Concept Application and Stage 1 Project Application Transport and Accessibility Impact Assessment Report (Halcrow, 24 November 2010).

The traffic generation potential of the Project has been estimated on the worst case scenario of:

- Senior School : + 350 students
- Preparatory School : + 100 students
- Staff : + 45 staff

The estimated traffic generation for the Project is summarised in Table 4-2

Table 4-2 – Stage 3 Traffic Generation (Cumulative of Stages 1, 2 and 3)

	Prep School	Senior School	Total
Student No. Increase	100	350	450
Rate of Vehicle Drop Off / Pick Up per student (One Way)	0.48 trips per student	0.24 trips per student	
Number of Student One Way Trips	48	84	132
Total Number of Student Trips (Inbound + Outbound)	96	168	264
Staff Trip Rate	0.5 trips / parking space	-	
No. of Staff Parking Spaces	41	-	
No. of Staff Trips	21	-	21
Total Vehicle Trips / Peak Hour	117	168	285

This represents a reduction in potential traffic generation of some 8% compared with the Concept Application proposal. Should the proportion of Senior School students be greater than estimated above, then the estimate traffic flows of the revised Concept Plan would be less than the estimated 285 vehicle trips per peak hour. Similarly the estimated traffic generation present above does not account for any reductions in private vehicle travel resulting from green (workplace) travel plan implementation (see Section 4.9).

4.3 On Site Car Parking Provisions

The revised Concept Plan makes no changes to the proposed Concept Application with regard to on site parking provisions.

It is proposed to provide additional formalised on site car parking on Graythwaite as part of the proposed Concept Plan Application.

As part of Stage 1, it is proposed that the existing ad hoc parking on the Graythwaite site be formalised with the provision of 6 visitor parking spaces in front of Graythwaite House including one accessible car space and one parking space outside the Coach House for use by the site's caretaker. It is intended that the 6 visitor spaces will be available for short-term use by visitors to the administration offices within Graythwaite House. During Stage 1 the primary parking area for visitors will remain along William and Union Streets.

It is proposed to provide some 41 car parking spaces in two levels of the basement space under the new East Building which will be constructed during the Stage 2 works. These 41 parking spaces would service both Stage 2 and Stage 3 developments as no further parking is proposed as part of the Stage 3 works.

The proposed Stage 2 parking spaces would be typically allocated for staff or visitor parking during school days, and would also be available at other times for meetings in the meeting rooms in Graythwaite House outside of school hours. This would be particularly useful for night-time meetings as it offers not only convenience but also safety by reducing an amount of pedestrian travel from distant street parking. Use of the car park would also relieve existing and potential pressure on local street parking spaces which otherwise may be used by adjacent residents or visitors.

4.4 Additional On Site Pick Up Facilities

4.4.1 Overview of Options

The Transport Assessment[4] prepared as part of the original Concept Application EA identified that the existing Preparatory School drop off / pick up facility at Edward Street is operating near capacity at peak afternoon periods.

The assessment concluded that should Stage 2 or Stage 3 include additional Preparatory School students then there would be a need for either additional pick up facility capacity

[4] Graythwaite Part 3A Concept Application and Stage 1 Project Application, Transport & Accessibility Impact Assessment prepared by Halcrow (24 November 2010)

or implementation of management measures to reduce the potential peak traffic loads to Edward Street.

Following a review of the submissions to the original Concept Application, the School undertook to undertake investigations into the provision of an additional on site pick up facility.

Cardno Pty Ltd was commissioned by the Shore School to investigate feasible design concept options for an additional on site pick up facility.

A copy of the Cardno options report is provided in Appendix E. This report includes detailed drawings of each option.

These concept options include:

- A pick up area adjacent to the southern existing tennis court / car park with various alternate vehicle access arrangements for a new link between Union Street and Hunter Crescent.
- A pick up area on the existing Mount Street tennis courts with vehicle access to and from Mount Street.
- A loop connection using the existing School Union Street access and the Graythwaite Union Street access.

The advantages of providing an additional on site student pick up facility will include:

- Additional capacity provided away from Edward Street / Lord Street / Mount Street intersections (not applicable to the Mount Street option);
- One traffic way flow (either way) would negate passing vehicle conflicts in either William Street / Hunter Street or Union Street. This is currently an issue affecting the Edward Street drop off / pick up facility;
- The length of the internal road would provide a vehicle waiting within the site; and
- Would provide a pick up facility for the Senior School.

It is noted that the provision of an additional pick up facility is not proposed as part of the Stage 1 Project Application. It is intended that the pick up facility would be proposed as part of either Stage 2 or Stage 3 depending upon when there is an increase in Preparatory School student numbers.

As such detailed assessment of the pick up facility options, including selection of a preferred option, would be undertaken as part of a Stage 2 or Stage 3 Project Application.

Notwithstanding the above the following section provides a comparative traffic related assessment of the concept options.

4.4.2 Comparative Assessment of Concept Options

Table 4-3 sets out a summary of the traffic related positives and negatives of the various concept options developed by Cardno.

Each option has been assessed relative to the other options against a set of traffic criteria including sight distances, available on site queuing capacity and geometric conditions.

It is noted that Option 5 (ie. Mount Street tennis court) while feasible from an engineering outlook is not considered a practical option to address traffic issues in Mount Street and the operation of the existing School drop off / pick up facility in Edward Street.

Based on available sight distances at the various vehicle access locations, the preferred options are to provide an entry at the existing Union Street car park access.

The use of Union Street as an ENTRY is dependent upon providing sufficient on site queuing between entry and the pick up zone such that vehicles queue on site rather than on the street.

On this basis the comparative assessment shown here indicates the preferred option with regard to traffic related matters is **Option 2.** Note that Option 4 while satisfying traffic requirements is not feasible due to the level differences between the Graythwaite and School sites and heritage issues (road and trees).

Notwithstanding the above, it is recommended that all feasible options be evaluated and assessed in detail as part of the development application Stage 2 works.

Table 4-3 - Summary of Relative Positive (✓) and Negative (X) Aspects of Pick Up Facility Options

	Option 1	Option 1A	Option 2	Option 2A	Option 3	Option 3A	Option 4
	Union Street Entry – East of car park	Union Street Exit east of car park	Union Street Entry – Existing Car Park Access through Car Park	Union Street Exit – at existing car park exit – through car park	Union Street Entry – Existing Car Park access new road	Union Street Exit – Existing Car Park access new road	Entry & Exit to Union Street – link between School and Graythwaite
Pick Up from Left Side of Vehicle for proposed Waiting Area	✓	X	✓	X	✓	X	✓
Available Vehicle Queuing area between entrance (street) and pick up area. This is a key Council Issue to minimise on street queuing.	X	XX	✓ ✓	XX	✓	XX	✓ ✓ ✓
Ability to Turn Left out of Access to Union Street – Geometric Constraint	N/A	✓	N/A	✓	N/A	X	✓
Sight Distance from Exit to Union Street	N/A	X	N/A	✓	N/A	✓	✓

	Option 1	Option 1A	Option 2	Option 2A	Option 3	Option 3A	Option 4
Sight Distance from Union Street to Car Park Exit (see note below)	N/A	XX	N/A	✓	N/A	✓	✓
Sight Distance from Union Street to Vehicle Queuing on street to turn into the site	XX	N/A	✓✓	N/A	✓✓	N/A	✓

Note: The sight distance of vehicles approaching the site to a vehicle stopped in Union Street waiting to turn right or left into the site at the existing car par access is greater than the sight distances from the exit to approaching vehicles on Union Street.

4.5 Vehicle Access Arrangements

The proposed vehicle access arrangements are shown in the Concept Plan drawings provided in Appendix D. These arrangements may need to be revised with respect to the additional pick up facility as part of the Stage 2 or Stage 3 development applications.

There are adequate width travel paths around the Graythwaite School site (including access to the proposed new buildings) from the Union and Edward Street entrances for use by emergency vehicles (i.e. ambulance, fire) and service/delivery vehicles (cleaning, maintenance, security), but regular vehicle entry to the Graythwaite buildings will principally be via the existing entry / exit driveway at Union Street.

Car parking on the Graythwaite site will be accessed via the existing entry / exit driveway at Union Street. It is proposed that the existing internal road from the Union Street driveway will be widened locally with reinforced grass verges to allow vehicles to pass. This limited amount of roadwork will not adversely affect the heritage values of the driveway. New signage will be provided at the top and bottom of the Graythwaite driveway advising of the two way traffic arrangement.

4.6 Pedestrian Access Arrangements

The revised Concept Plan makes no changes to the proposed Concept Application with regard to pedestrian access arrangements apart from detailing the access approaches to the new pick-up area.

The proposed pedestrian access arrangements are shown in Appendix D. While pedestrian access will be possible from Union Street, the School will control student pedestrian access to be only via Edward Street and the Senior School campus via a number of pedestrian linkages.

The primary pedestrian access to the School (including Graythwaite) will continue to be via the main entrance on William Street.

4.7 School Bus Facilities

The Concept Application submitted in December 2010 proposed to maintain the existing school bus operations for transporting boys to Northbridge sporting fields in the afternoon from the bus stops in Mount Street. All other bus transport to and from School is from Miller and Blue Streets North Sydney.

Halcrow has been advised by Shore that the School currently operates a maximum fleet of 5 buses at any one time, providing some 8 trips in the peak afternoon (ie. some buses make take two trips over the afternoon).

It is estimated that the additional student numbers envisaged with the revised Concept Plan would increase the demand from 8 trips to 10 trips per afternoon however there is unlikely to be a need to increase the number of buses used (ie. 5 buses) with each bus undertaking two trips.

In practice there is unlikely to be an additional demand for kerb side bus parking at any one time during Stages 1, 2 or 3.

However, through the submissions, the issue of a future intensification of the vehicle activity and in particular bus movements associated with the Mary MacKillop Place Museum has been highlighted.

Council has indicated that the number of bus stops currently utilised by the School may be reduced to accommodate the demands of the Mary MacKillop Place Museum.

Given the above, it is considered that alternative bus stop facilities should be considered for Stages 2 and Stage 3 of the concept plan when student and staff numbers are envisaged to increase. Furthermore in submissions to the Concept Application, Council and residents requested consideration of on site bus loading and unloading facilities.

4.7.1 On Site Bus Facilities

As part of the development of the concept plan for Graythwaite the provision of on site bus and coach loading / unloading areas was considered.

It is noted that it is not standard practice to bring school buses onto any School site due to safety concerns but rather to utilise kerb side road space.

However, while the School has a significant length of street frontages, the practicalities of providing bus access and associated turning and circulation areas within the School are not considered to be feasible.

In particular:

- there are understood to be heritage constraints associated with providing a satisfactorily compliant entrance / exit width and internal road on the Graythwaite site;
- it is considered inappropriate to bring buses along Edward Street;
- the extent of Mount Street frontage is limited and would require the permanent removal of existing car parking and bus stops;
- existing School buildings are located along the William Street frontage; and
- Union Street car park access and inability to separate bus and car flows at this location.

To demonstrate the implications of providing an on site bus facility on the Graythwaite site an Autoturn vehicle simulation was undertaken. The results for various alternatives are presented in Appendix F. None of the options shown consider the level differences between the School and the Graythwaite sites.

As shown by the turning path analysis in Appendix E, the provision of on site bus facility will require significant areas of hard stand to be constructed on the gardens / terraces of Graythwaite or removal of heritage trees and heritage driveways (and impacts on an existing building in one option). None of the options shown are acceptable heritage or School outcomes and accordingly the traffic issues associated with the Union Street entry/egress were not assessed.

4.7.2 On Street Bus Facilities

Notwithstanding the above, it is recognised that improvements to the existing situation can be made. These improvements would include:

- management of buses and students; and
- an alternate bus stop location.

Subject to Council approval it is considered that an additional bus stop facility could be provided in William Street, north of Blue Street. This would require the temporary removal of some time restricted metered on street parking spaces during the afternoon operation of the bus stops.

It is noted that an alternative bus stop location (ie. William Street) for the School and associated management measures could be considered regardless of the proposed Concept and Stage 1 Project Applications for Graythwaite.

4.8 Service Vehicle Arrangements

The revised Concept Plan makes no changes to the proposed Concept Application with regard to service vehicle access arrangements.

Service vehicle access arrangements and facilities will remain unchanged by the Master Plan. Service vehicles will continue to utilise the existing service vehicle facilities from Edward Street and the existing School's Union Street entrance/exit. It is noted that service/delivery vehicles usually visit the site outside of peak student arrival and departure times.

4.9 Green (Workplace) Travel Plan

Shore School has made a commitment to prepare and implement a Workplace Travel Plan for the existing School population, namely staff and student.

Any future development of the School, as envisaged by the current Concept and Project applications for Graythwaite, will need to be incorporated into this overall plan for the School.

The information obtained from the 2010 student and staff travel survey (as reported in the Concept Application and Stage 1 Project Application transport report [5] has provided the initial baseline data from which to develop a Workplace Travel Plan.

[5] Graythwaite Part 3A Concept Application and Stage 1 Project Application Transport and Accessibility Impact Assessment Report (Halcrow, 24 November 2010)

Based on the travel survey it is estimated that some 70% of all staff currently drive to School and park either on site or on street. The demand for parking occurs despite the proximity of the School to good public transport.

The demand for parking reflects the travel needs of staff which include early starts, late finishes, flexible / part time hours and multiple trips within a given day, ie. teaching at the School then travel to outside locations for extra curricular activities. It is noted that each teaching staff member is involved with at least two extra curricular activities outside of normal teaching hours.

These factors need to be considered when developing an effective Workplace Travel Plan. The simplistic notion of restricting the provision of on site car parking may not necessarily be the most effective mechanism to achieve a shift in travel behaviour.

The Shore School is currently considering a range of travel demand measures that maybe implemented as part of a School Workplace Travel Plan.

These measures may include:

- Public Transport:
  - Provision of clear public transport information to staff and students
  - Collaboration with local public transport providers to improve services

- Car Sharing:
  - Introduction of a car sharing scheme with preferential on site parking space allocation for car share users
  - Subsidisation of costs associated with membership to privately operated car share companies (ie. Go-Get).

- Walking:
  - Promotion of safe local walking routes including the provision of route maps
  - Improved access to showers, changing facilities and lockers for storing clothes

- Cycling:
  - Provision of cycle route maps and improvements to signage
  - Secure, well lit, covered cycle storage include pumps, showers, changing facilities and lockers
  - Formation of a bicycle users group (BUG)
  - Assistance to staff in accessing information about safe cycling, appropriate clothing, local cycle routes etc
  - Pool bikes for use for short trips

- Car Park management:
  - Review of car parking policy and introduction of a management strategy
  - Review of the issuing of car park permits to ensure a fair system , based on agreed criteria e.g. operational need
  - Consider restrictions of parking allocation to staff. The needs of staff, visitors and event parking demands need to be considered with the objective of reducing the impacts of School parking on local surrounding streets.

- Marketing and promotion:
  - Provision of information to students, staff and visitors on how to access the site by means other than the car.
  - Dissemination of information via notice boards, Shore newsletters, website links and information packs for new students and staff (incorporate into the orientation process).

5 Transport Assessment of Proposed Graythwaite Master Plan

5.1 Stage 1 – Project Application for Graythwaite House Conservation and Refurbishment

5.1.1 Changes to Travel Demand

As documented above, there is no increase in student or staff numbers proposed to occur as part of the Stage 1 works.

As such there would be no change to the existing travel demands associated with the combined Shore School / Graythwaite House site.

5.1.2 Car Parking Provisions and Traffic Generation

It is proposed that on site parking in the front of the Graythwaite House building will be formalised to provide a total of 6 on site visitor parking spaces and one space at the Coach House.

It is noted that the 6 Graythwaite House parking spaces will not be utilised for the drop off and pick up of students or staff. These activities will continue to occur at the Preparatory School drop off / pick area accessed via Edward Street and along William Street for the Senior School. The School intends to employ a caretaker who will reside in the refurbished Coach House with that parking space specifically allocated to the caretaker role.

The proposed provision would reduce the existing on site parking capacity on Graythwaite from some 25 spaces (as estimated in Section 2.1) to 7 spaces.

It is noted that this provision of 7 spaces for the School uses does not arise from any change with regard to student or staff numbers during Stage 1.

However, the Stage 1 proposal would represent a reduction in land use intensity compared with previous uses of Graythwaite, namely the former nursing home with staff, visitor and service vehicle deliveries.

On this basis the proposed Stage 1 development of Graythwaite with the provision of 7 on site visitor parking spaces is not considered to have an adverse impact on traffic generation and parking provision compared with the previous use of the site.

5.1.3 Site Access Arrangements

Site access will be provided via the existing site driveway at Union Street. Vehicle access to the Graythwaite site via Edward Street would be restricted to emergency and service vehicles.

Union Street is a higher order road within the surrounding road network and is suitable to accommodate direct vehicle access to and from properties.

The current surveyed traffic flows along Union Street indicate that there would be sufficient capacity to accommodate the additional traffic associated with the 6 formalised visitor car parking spaces and the caretaker space.

The existing Union Street access can accommodate two vehicles passing each other on the driveway at the street frontage. As such a vehicle waiting to exit the site would not block access for a vehicle entering the site from Union Street.

The available sight distances at the existing Graythwaite site access have been reviewed and found to be satisfactory with regard to AS289.1-2004 requirements for safe vehicle entering and exiting movements.

5.1.4 Service and Emergency Vehicle Access Arrangements

No changes to the existing service vehicle access or on site facilities are proposed as part of the Stage 1 project application. Furthermore there is no expected increase in demand for service vehicle facilities since the occupants of the heritage buildings will be relocations from the existing School. Therefore there will be no impacts of the Stage 1 proposal in service vehicle access.

Emergency vehicle access to Graythwaite will be retained via Edward Street and Union Street at the completion of Stage 1 works. Existing emergency vehicle access to the School campus will remain unchanged by Stage 1 works.

5.2 Stage 2 / 3 New East, North and West Buildings

The Traffic and Transport Accessibility Report[6] prepared for the Concept Application submitted to the Department of Planning in December 2010 considered the traffic implications of a higher School population than is currently proposed by the revised Concept Plan.

Extracts from the traffic assessment regarding road network operation are presented in Appendix F.

The assessment generally concluded that the surrounding road network could satisfactorily accommodate the additional traffic flows associated with Stage 2 and Stage 3 population scenarios.

As the population and associated traffic generation potential of the revised Concept Plan is less than originally perceived then same general conclusions can be made.

This section of the assessment considers the traffic implications associated with the changes to vehicle access, namely the potential for the additional pick up facility between Union Street and Hunter Crescent.

5.2.1 Traffic Generation

The traffic generation potential of the Preferred Project has been estimated on the worst case scenario of:

- Senior School : + 350 students
- Preparatory School : + 100 students
- Staff : + 45 staff

[6] *Graythwaite Part 3A Concept Application & Stage 1 Project Application, Transport and Accessibility Impact Assessment*, prepared by Halcrow Pacific Pty Ltd (24 November 2010)

The estimated traffic generation for the Preferred Project is summarised in Table 5-1.

Table 5-1 – Stage 3 Traffic Generation (Cumulative of Stages 1, 2 and 3)

	Prep School	Senior School	Total
Student No. Increase	100	350	450
Rate of Vehicle Drop Off / Pick Up per student (One Way)	0.48 trips per student	0.24 trips per student	
Number of Student One Way Trips	48	84	132
Total Number of Student Trips (Inbound + Outbound)	96	168	264
Staff Trip Rate	0.5 trips / parking space	-	
No. of Staff Parking Spaces	41	-	
No. of Staff Trips	21	-	21
Total Vehicle Trips / Peak Hour	117	168	285

5.2.2 Operation of the Additional Pick Up Facility

As described in Section 2 of this report the existing Edward Street pick up facility generates some 39 vehicle entries within a peak 15 minute period. These movements are generated by 240 Preparatory School students.

Thus should an additional 100 preparatory students attend the School either as part of Stage 2 or Stage 3, then it is estimated that some 16 additional trips would be generated during the peak 15 minute pick up period.

For the purpose of this assessment it is assumed that the School would operate the pick up facility such that the loads are evenly split between the existing Edward Street facility and the proposed Union Street / Hunter Crescent facility.

Thus it is expected that some additional 28 vehicle trips would either enter or exit the proposed pick up facility via Union Street in the peak 15 minute period.

The capacity of Union Street to accommodate these flows has been assessed using the Sidra intersection analysis modelling tool.

The results are presented in Table 5.2 below.

Table 5.2 – Union Street / Pick Up Access Operation (Stage 2/3)

	Pick Up Exit to Union Street (Options 1A, 2A, 3A	**Pick Up Entry from Union Street (Options 1,2,3,4)**
Level of Service (LoS)	A	A
Ave Delay to Worst Movement sec/veh	7.4	6.4
95th percentile Queue Length for Worst movement	6 metres Inside the School on access road	9 metres In Union Street waiting to turn right

The results indicate that during the peak pick up period (15 minute peak) that the Union Street / School access intersection would operate satisfactorily.

5.2.3 Parking Provisions

i. Proposed Parking Provision

It is proposed to provide an additional 41 staff car parking spaces under the East Building. These spaces would be constructed as part of Stage 2 works but are provided to accommodate parking demand for both Stage 2 and Stage 3.

In parallel with the Stage 1 works, the School is intending to provide an area for bicycle parking for students on the existing site. While this is not a direct part of the application, it nevertheless represents a combined sites School contribution to the Government's transport policy initiatives.

The advantages of providing a single consolidated parking area for Stage 2 and Stage 3 include:

- East Building proximity to vehicle access (i.e. Union Street);
- Reduces the number of vehicle paths within the site thereby allowing additional space for pedestrian areas;
- Convenience and safety for special meetings at Graythwaite House particularly at night benefiting both School and Community users; and
- Cost savings and efficiencies associated with building form.

ii. Application of North Sydney Council DCP 2002

North Sydney Council DCP 2002 specifies the maximum parking rates for "educational establishments" to be 1 space / 6 staff.

For the proposed additional increase of 45 staff by the completion of Stage 3 this would represent a maximum provision of 7 parking spaces. Therefore without other considerations, the proposed development parking provision would exceed Council's maximum allowable spaces.

As highlighted earlier in this report, the previous uses of Graythwaite had space provision for up to 25 parking spaces. The Stage 1 of the proposed project occupies 7 of those spaces so that there is a theoretical unused "existing use right" to a further 18 spaces. The DCP 2002 allows for a further 7 spaces making the total new spaces permissible for the site to be 25 (based on staff numbers). On this basis, the exceedance of the proposed 48 total parking spaces over the DCP requirement is 23 spaces.

In addition to the specified parking rates the DCP 2002 sets out the objectives for parking provision which include:

- Existing levels of traffic generation to be retained and reduced
- Public transport, including walking and cycling is the main form of access
- Parking is adequate and managed in a way that maintains pedestrian safety and the quality of the public domain and minimises traffic generation
- Parking is limited to minimise impacts on surrounding areas
- Parking below the maximum rates will not generally be accepted due to the impact that additional parking may have on surrounding residential streets.

Based on the travel questionnaire it is estimated that some 70% of all staff drive to School and park either on site or on street. This reflects the travel needs of staff which include early starts, late finishes and flexible / part time hours. This demand occurs despite the proximity of the School to good public transport.

The existing School on site parking provision equates to a parking rate of 1 space per 1.59 full-time staff (151 spaces for 240 full-time staff). (Note this ratio does not consider the additional part-time staff which brings the combined staff total up to about 390).

At the completion of Stage 3 parking provisions would provide parking at a ratio of 1 space / 1.43 staff members across the entire Shore School campus (including Graythwaite) (199 car spaces for 285 full-time staff across both sites). Note that the 6 spaces outside Graythwaite are for visitors only and are therefore not related to staff numbers.

In addition to the advantages of the proposed parking described above, there are local traffic benefits to be obtained by providing on site parking, namely that traffic that would otherwise circulate on local streets searching for on street parking can be accommodated on site with access for a local collector road (i.e. Union Street).

In summary, the proposed parking provision will not accommodate all existing and proposed parking demand on site, but will however reduce the potential demand for on street parking by staff of the Shore School.

The combination of a reliance on public transport for students and on site parking provision for staff and visitors is considered to be a responsible balance to encouraging public transport use, minimising the intrusion of staff related parking on the surrounding residential streets, and providing the benefits for staff and visitor efficiency within a densely occupied city location.

5.2.4 School Bus Operations

As described in Section 4 of this report it is proposed that, subject to Council approval, additional school bus stops be located in William Street, immediately north of Blue Street as part of Stage 2 or Stage 3 works.

These stops would only need to function as school bus stops during the afternoon pick up period and would thus be available to car parking outside side of this period.

The provision of buses in William Street would reduce the potential implications of additional bus movements in Mount Street associated with the School and the increasing demands associated with the Mary MacKillop Museum.

5.2.5 Service and Emergency Vehicle Access Arrangements

No changes to the existing service vehicle access or on-site facilities are proposed as part of Stage 2 or Stage 3.

Emergency vehicle access to Graythwaite will be retained via Edward Street and Union Street at the completion of Stage 1 works and maintained for Stage 2 and Stage 3.

Existing emergency vehicle access to the School campus will remain unchanged by Stage 2 or Stage 2 works.

5.3 Construction Traffic Management

The purpose of the following section of this report is to provide an overview of the likely construction methodology, identify issues which will need to be considered in detailed construction planning and general principles for vehicle and pedestrian management during construction.

It is noted that formal Construction Traffic Management Plans (CTMP) will be submitted for each development stage as part of the Construction Certification following Project Application approval. It is understood that the preparation of a CTMP for each stage is likely to be a condition of consent.

5.3.1 Overview of Construction Methodology

A Construction Management Plan (CMP) has been prepared by WSP Fitzwalter on behalf of the School as part of the Project Application for Stage 1 works.

Details of the construction arrangements for Stages 2 and 3 of the project are yet to be determined. The methodology would be finalised once Project Applications are submitted (and approved) and a contractor is appointed prior to construction certification.

Notwithstanding the above, it is proposed that construction will occur in stages, namely:

- Stage 1 – conservation of Graythwaite House, Coach House, Tom O'Neill building and associated garden area;
- Stage 2 – North and Eastern buildings
- Stage 3 – West building

It is estimated that during of construction activities for each stage would be in the order of:

- Stage 1: 12 months;
- Stage 2: 18 months; and
- Stage 3: 18 months.

It is estimated that the average construction work force during any of the stages would be in the order of 50 construction workers, peaking in the order of 90 workers.

During individual stages the volume of construction traffic generation will vary depending upon the activities being undertaken at any particular time. Peak construction traffic generation will occur during concrete pours and bulk excavation should material be required to be exported from the site.

5.3.2 Construction Vehicle Access

i. Stage 1 Works

It is proposed that all unloading and loading of construction vehicles will occur on site.

Vehicle access to building conservation works will be provided via Edward Street. However access via Edward Street would be restricted during the operating periods of the drop off / pick up facility at the Preparatory School (ie. 7:50am – 8:40am and

2:40pm – 3:20pm). During these periods access would be available via the Union Street access.

Construction vehicles associated with the drainage works would access the site from Union Street.

All vehicles would exit the site from Union Street. The site would have the ability to turn vehicles around such that all vehicles would enter and exit the site in a forward direction.

ii. Stage 2 and 3 Works

It is envisaged that construction vehicle access to and from Stages 2 and 3 works will be provided via Union Street.

5.3.3 Potential Construction Traffic Impacts

The potential impacts of construction activities and construction traffic with regard to traffic and parking include:

- Construction vehicle access arrangements:
  - Impact on adjacent properties and land uses
  - Impact on pedestrian access
  - Impact on typical School operations (travel demand)
- Degradation of amenity via construction traffic noise;
- Road network operation – loss of intersection capacity with additional construction vehicles;
- Safety implications for all road users as a result of additional heavy vehicle flows and new construction vehicle access arrangements; and
- Potential loss of available on street parking due to additional parking demand by construction workers.

5.3.4 Detailed Construction Traffic Management Plan

Detailed construction traffic management plan (CTMP) will need to be prepared and approved prior to construction works to address the potential impacts identified above. Essentially the CTMP sets out a plan to manage construction activities such that the potential implications are mitigated or appropriately managed.

This CTMP will need to include:

- Details of proposed works;
- Timing of proposed works;
- Hours of construction activities;
- Number of construction vehicles, particularly heavy vehicles to be used;
- Mitigation and management measures including use of stop / go signals, construction vehicle access arrangements and circulation; and
- Contact details for on site construction personnel.

The CTMP shall be prepared in accordance with RTA guidelines.

5.3.5 Construction Vehicle Routes

Vehicle access to and from the site will be generally restricted to the proposed access routes to and from the site.

It is recommended that, to the maximum extent possible, materials delivered to or extracted from the site with larger vehicles be undertaken via Union Street which is a higher order road than Edward Street.

5.3.6 Amenity Impacts

The amenity impacts associated with construction traffic are principally associated with noise, vibration and safety issues.

It is suggested that the hours of operation for construction vehicle movements be restricted to agreed hours so that the impacts of construction vehicle noise on amenity can be mitigated for sensitive times (ie. night time, weekends).

Safety issues will need to be addressed with the implementation of appropriate Traffic Control Plans (TCPs) which will need to be developed in accordance with RTA guidelines. The TCP's will include details of advance warning signage, traffic flow management and pedestrian management measures.

5.3.7 On Street Parking Impacts

To further mitigate on street parking implications, dedicated temporary parking spaces should be provided on site (where possible) for construction workers vehicles. Contractors shall be encouraged to utilise public transport or car share arrangements.

5.4 Other Issues

5.4.1 Student Driver Behaviour

Several submissions raised issues relating to existing student driver behaviour and use of on street parking.

It is noted that students with drivers licenses, like other members of the community, are entitled to drive on the public road and park on local streets where legally permitted.

Notwithstanding the above, inappropriate behaviour should be reported to the School via the establish lines of communication.

Furthermore, the School should review and amend if necessary student driver policies and management measures.

5.5 Assessment of Specific DGR Transport Issues

The DGRs for both the Concept Application and the Stage 1 Project Application have identified a number of specific assessment requirements. While these have been generally considered in the above assessment of the proposed development, specific consideration of the issues is provided below with regard to the revised Concept Application.

A summary of the specific transport issues associated with the revised Concept Application and the Stage 1 Project Application assessment of the proposal with regard to these issues is provided in Table 5.3.

Table 5.3 - Response to DGR – Specific Transport Issues

	Transport Issue to be Assessed	Response
	Concept Application	
1.	As part of the Transport and Accessibility Impact Assessment demonstrate a minimal approach to on-site car parking having regard to the site's accessibility to public transport (note: The Department supports reduced parking provisions, if adequate public transport is available to access the site).	Shore has an existing high utilisation of public transport, particularly amongst the senior school students which is anticipated to potentially grow by 450 students at the completion of Stage 3. Existing non-private car modes of travel for all School uses varies between 54% and 67% (for AM and PM peak). These levels will increase with additional senior school students. The revised Concept Plan application seeks to provide a net increase in the number of on site parking spaces on the combined Shore School and Graythwaite site by 23 spaces. This net increase includes the removal of existing parking on the Graythwaite site (net loss of 18 spaces) and the construction of new basement parking (41 new spaces). Shore School proposes to increase the number of parking spaces available for School uses (ie. its on site parking supply) by 31% (151 to 199 spaces) compared with an increase student population of 31% (1430 to 1880 students). It is considered that this provision reflects the various state and local planning objectives of minimising parking provision for new development.

		The combination of a reliance on public transport for students and on site parking provision for staff and visitors is considered to be a responsible balance to encouraging public transport use, minimising the intrusion of staff related parking on the surrounding residential streets, and providing the benefits for staff and visitor efficiency within a densely occupied city location.
2	Details of the proposed access, parking provisions and service vehicle movements associated with the development.	The proposed access, parking provisions and service vehicle movements has been addressed in this report.
3	Provide an estimate of the total trips anticipated by the proposed development and identify measures to manage travel demand, increase use of public and non-car transport modes, and assist in achieving the objectives and targets set out in the NSW State Plan 2010.	The traffic generation potential of the various stages of the revised Concept Plan have been detailed and assessed in this report in accordance with the RTA's Guide to Traffic Generating Developments. A detailed travel survey of Shore's student and staff travel behaviour has been undertaken as part of the EA process. This travel demand survey provides details of existing travel modes. The existing travel behaviour is not expected to change significantly however the increase in student numbers (proposed) will predominantly be from Senior School students which will have the effect of increasing the total number and proportion of non private vehicle trips made to and from the School compared to the existing conditions. This outcome is

		consistent with the various state and local transport planning policies listed in the DGRs.
4	Identify daily and peak traffic movements likely to be generated by the proposed development, including the impact on nearby intersections and the need for associated upgrading of the network (if required).	The traffic generation of the proposed development have been estimated and assessed in accordance with the RTA's Guide to Traffic Generating Developments. The assessment indicated that additional site traffic flows can be adequately accommodated without the need for upgrading or improvement works to the surrounding road network.
5	The EA should examine opportunities to improve access for pedestrians between the site and the North Sydney Rail Station to the east, and nearby bus services. The study should address bicycle connections from the site to the surrounding bicycle network and bicycle parking in the proposed development (if relevant).	Shore is located within close proximity to the North Sydney railway station and bus interchange. The pedestrian linkages to these services is convenient and of a good standard. No physical works to improve the connections are proposed. The incorporation of the Graythwaite site into the School will improve pedestrian access and linkages within the site. It is noted that the School currently supervises and manages student flows to and from the railway station and bus stops. This will continue to occur. It is also noted that the School is planning to install bicycle parking facilities within the existing School site and thus do not form part of the revised Concept Application for Graythwaite.

Stage 1 Project Application		
6	Demonstrate how users of the development will be able to make travel choices that support the achievement of relevant State Plan targets, if the proposal will generate any additional staff or students	The Stage 1 Project Application involves the restoration of Graythwaite House. No additional student or staff numbers will be associated with Stage 1 works.
7	Detail the existing pedestrian and cycle movements within the vicinity of the site and determine the adequacy of the proposal to meet the likely future demand for increased public transport and pedestrian and cycle access, if the proposal will generate any additional staff or students	The site is located within close proximity to the North Sydney railway station and bus stops with good pedestrian linkages. There is an existing cycle route along the School's Mount Street frontage. Cycling as a mode of transport to and from the School is relatively low (4%) however the provision of additional on site bicycle parking has the potential to encourage increased cycle use. No upgrades are proposed to the external pedestrian or cycle facilities as part of the application nor are upgrades considered to be necessary.
8	Identify potential traffic impacts during the construction stage of the project, and measures to mitigate these impacts	As detailed in the RTA's correspondence in response to the request for DGRs, a detailed construction traffic management plan will need to be prepared prior to construction activities. It is considered that the appropriate time to prepare the CTMP is prior to the construction certification (ie. condition of consent).

		Notwithstanding the above, the principles for construction management have been detailed in this report.
9	Describe the measures to be implemented to promote sustainable means of transport including public transport usage and pedestrian and bicycle linkages in addition to addressing the potential for implementing a location specific sustainable travel plan, if the proposal will generate any additional staff or students.	The Stage 1 proposal will not increase student or staff numbers.
10	Daily and peak traffic movements likely to be generated by the proposed development, including the impact on nearby intersections and the need / associated funding for upgrading or road improvement works (if required)	The Stage 1 proposal will not increase student or staff numbers. Consideration of the traffic implications associated with modified site access arrangements (ie. use of the Graythwaite site driveway) have been considered in this report).
11	Details of the proposed access, impacts on the existing parking provisions of the school.	The proposed access and parking provisions have been detailed in this report.

12	Minimal levels of on site car parking for the proposed development having regard to the public transport accessibility of the site, opportunities for car sharing, local planning controls and RTA guidelines (note: The Department supports reduced parking provisions, if adequate public transport is available to access the site), if the proposal will generate any additional staff or students.	The Stage 1 proposal will not increase student or staff numbers. However it is noted that the Stage 1 development will reduce the overall on site parking provision from 25 to 7 spaces.

6 Conclusions

This transport report has considered the transport implications associated with the proposed revised Concept Application and Stage 1 Project Application for the Graythwaite site at North Sydney.

Graythwaite which was purchased by the adjacent Shore School will be incorporated into a combined campus. It is proposed that the campus will be developed in stages to provide capacity to accommodate an additional 450 students and 45 staff within the combined Shore School / Graythwaite site.

The Project Application for Stage 1 will not include additional student or staff on the site but essentially allow the existing Graythwaite buildings to be conserved and restored to allow the relocation of existing administrative roles to be relocated to the Graythwaite building. The traffic and parking implications of the Stage 1 works will not adversely impact on the existing conditions of the surrounding road network.

It is noted that Project Applications for Stages 2 and 3 of the Master Plan for Graythwaite will be submitted for approval at a later date.

However the assessment provided in this report has concluded that the proposed Master Plan as represented in the revised Concept Application can be adequately accommodated with regard to traffic and parking implications to the surrounding road network.

It is noted that management measures will need to be enhanced if the Stage 2 and Stage 3 development includes expansion of the Preparatory School enrolment as this may have an impact on the drop off / pick up facility in Edward Street.

These measures will need to consider appropriate measures to reduce peak loads on the existing capacity of the facility and potential congestion at local intersections.

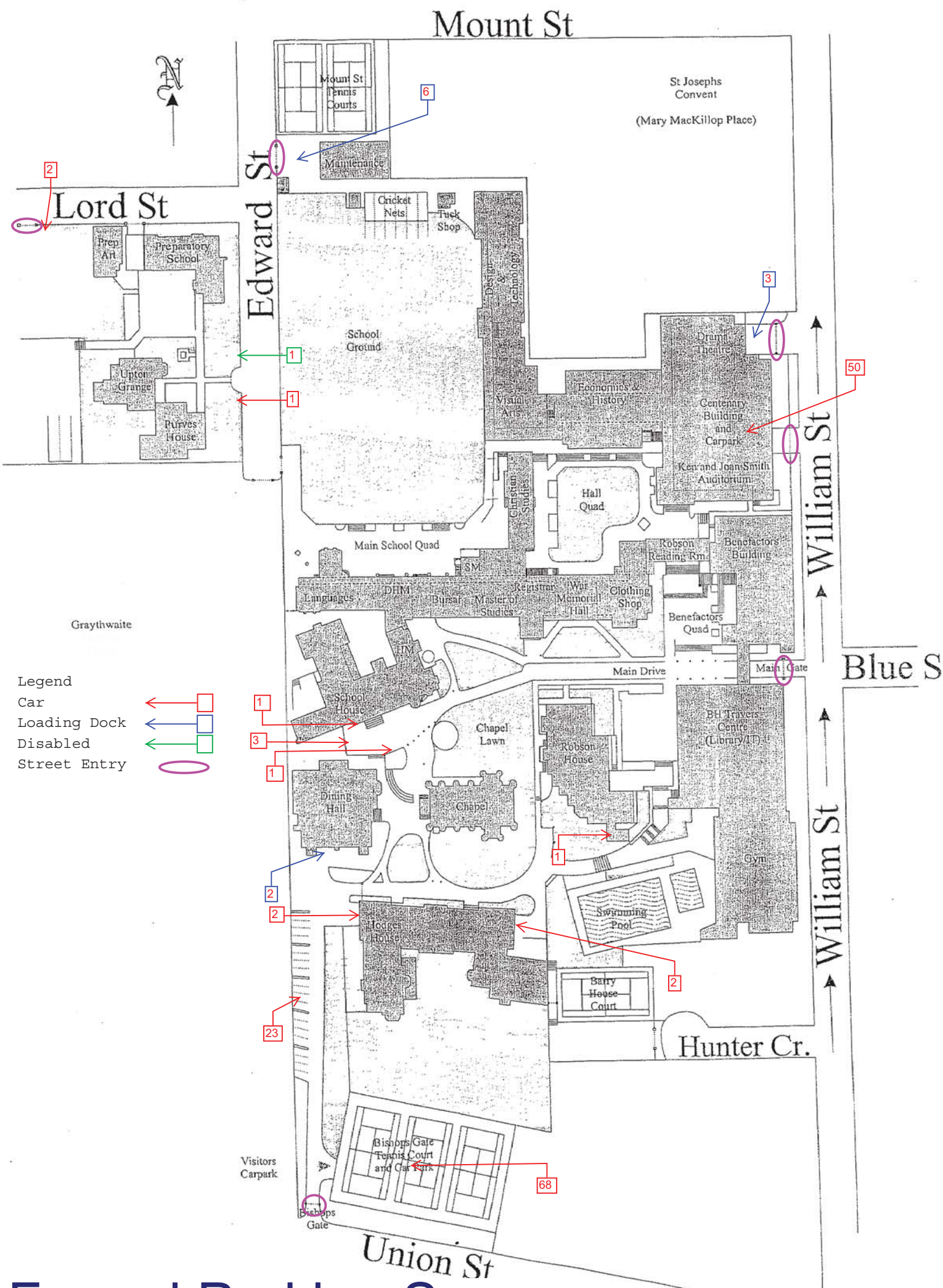
As part of the Revised Concept Application, it is proposed to provide:

- an additional on site vehicle pick up facility accessed via a new internal road linking Union Street and Hunter Crescent; and
- additional school bus stops located in William Street.

Both these proposed improvement works would be provided as part of Stage 2 or Stage 3 works and thus would be the subject of a subsequent project application.

Appendix A Existing School Access and Parking

Source: WSP Environment and Energy



Formal Parking Spaces

Appendix B Shore School Travel Demand Analysis (2010)

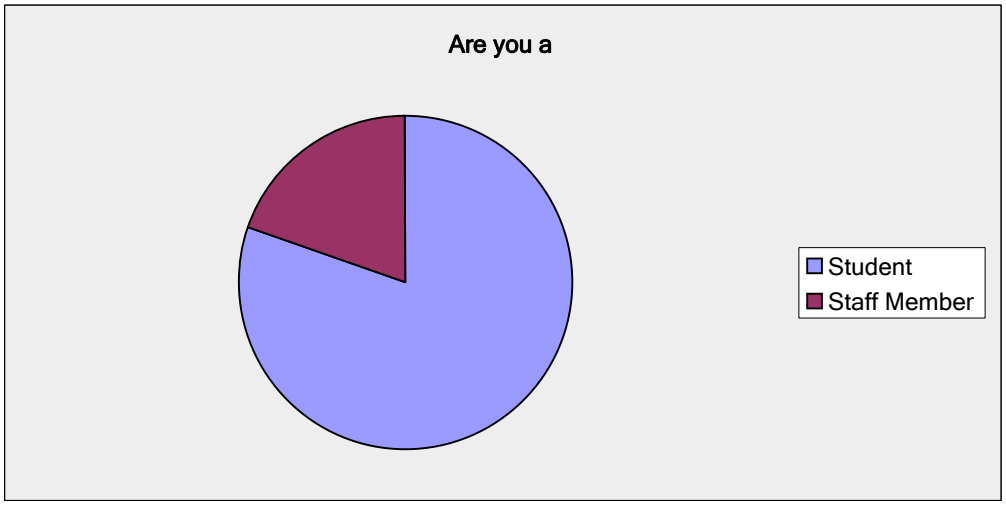
Notes:

1. Survey undertaken for travel on Thursday 29 July 2010

2. "Skipped Question" references in the response data reflect that the question was not relevant to the particular respondent. For example, if a student arrived at school by train, as many do, it is not relevant to answer a question about where they parked their car, hence the skipped question. The online survey instructed respondents to skip particular following questions based on their response to a particular question.

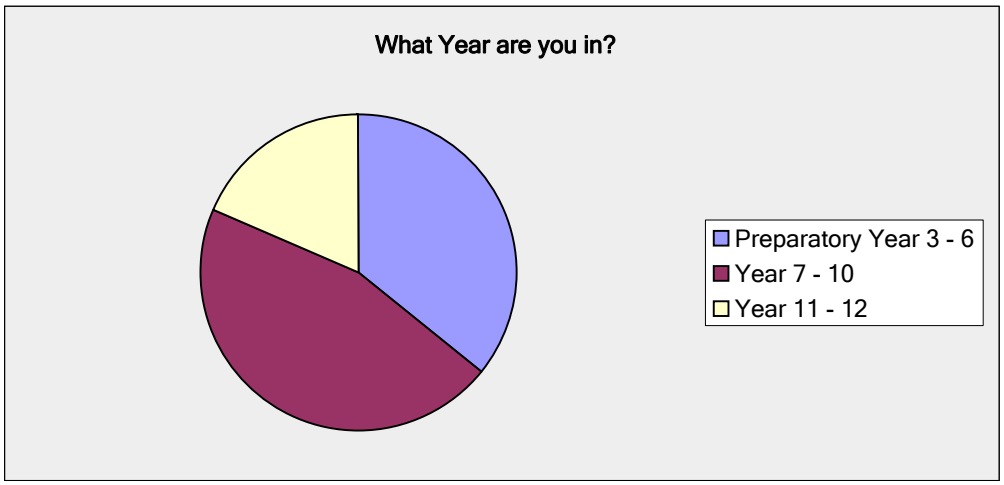
Travel Survey

Are you a		
Answer Options	**Response Percent**	**Response Count**
Student	80.4%	667
Staff Member	19.6%	163
	answered question	830
	skipped question	0



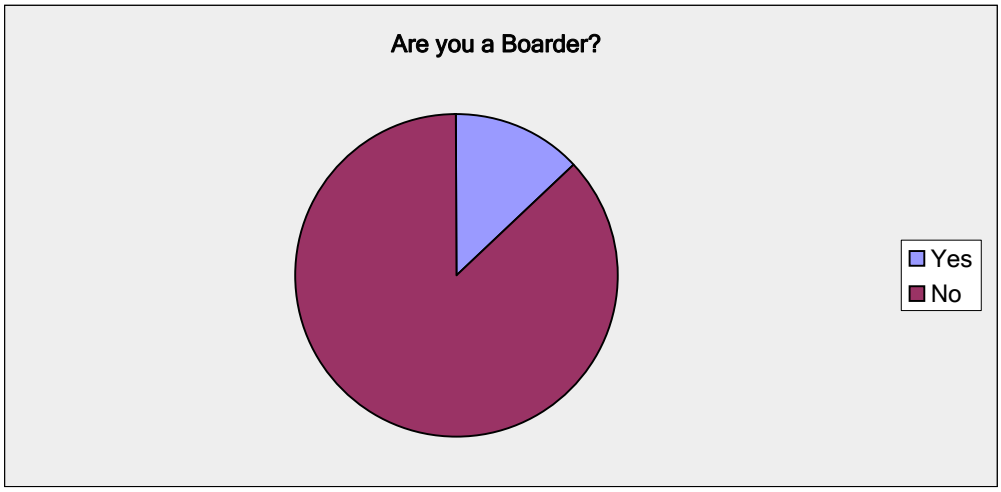
Travel Survey

What Year are you in?		
Answer Options	**Response Percent**	**Response Count**
Preparatory Year 3 - 6	35.8%	235
Year 7 - 10	45.6%	299
Year 11 - 12	18.6%	122
	answered question	**656**
	skipped question	**174**



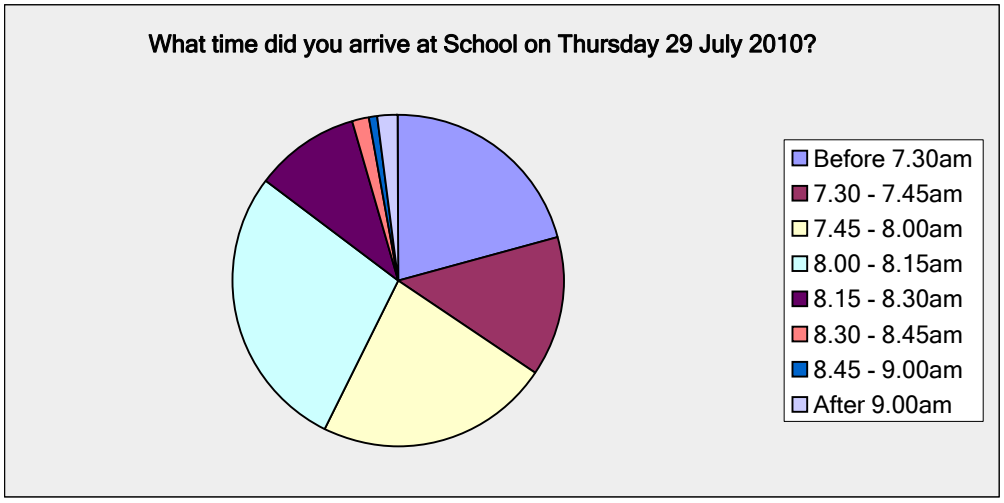
Travel Survey

Are you a Boarder?		
Answer Options	**Response Percent**	**Response Count**
Yes	13.1%	86
No	86.9%	570
	answered question	**656**
	skipped question	**174**



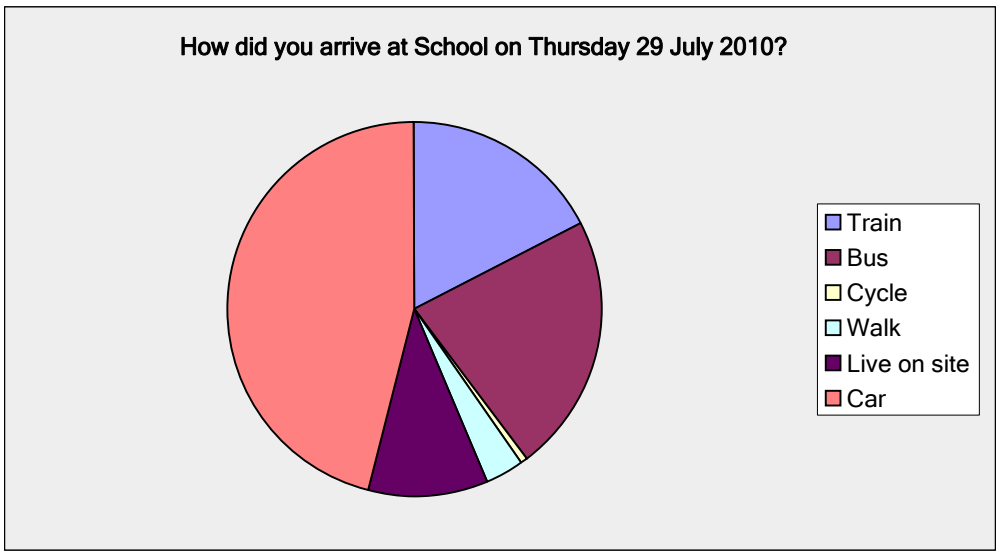
Travel Survey

What time did you arrive at School on Thursday 29 July 2010?		
Answer Options	**Response Percent**	**Response Count**
Before 7.30am	20.9%	169
7.30 - 7.45am	13.5%	109
7.45 - 8.00am	22.7%	183
8.00 - 8.15am	28.1%	227
8.15 - 8.30am	10.4%	84
8.30 - 8.45am	1.6%	13
8.45 - 9.00am	0.9%	7
After 9.00am	1.9%	15
answered question		**807**
skipped question		**23**



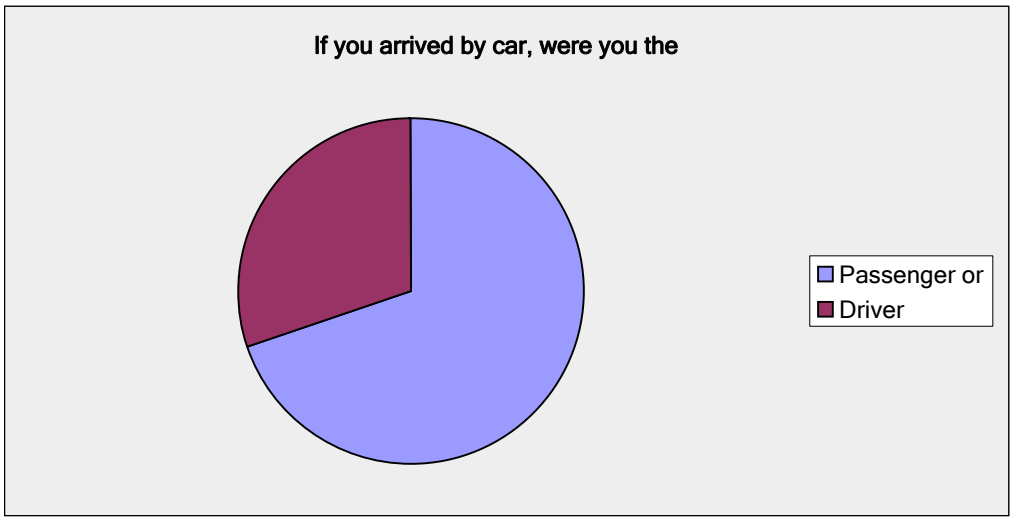
Travel Survey

How did you arrive at School on Thursday 29 July 2010?		
Answer Options	**Response Percent**	**Response Count**
Train	17.6%	142
Bus	22.2%	179
Cycle	0.5%	4
Walk	3.2%	26
Live on site	10.4%	84
Car	46.1%	372
	answered question	**807**
	skipped question	**23**



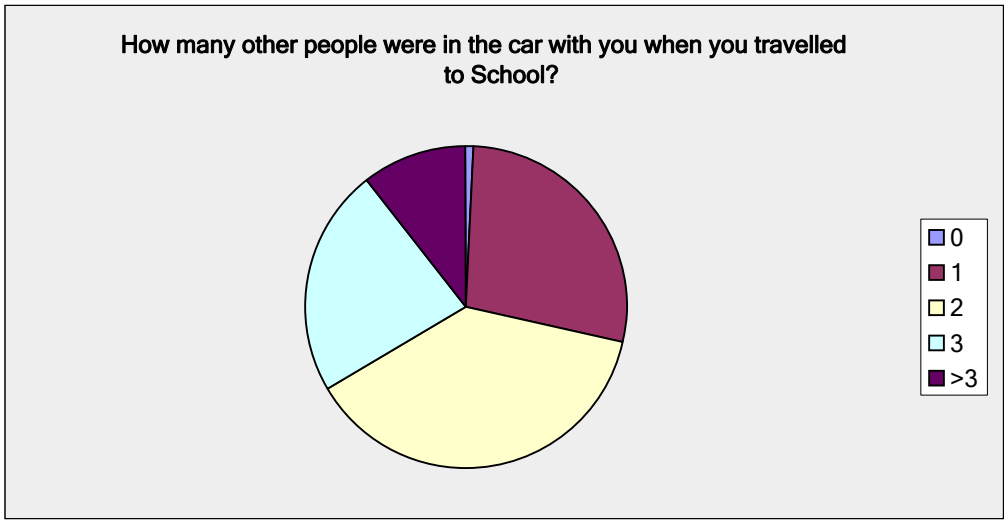
Travel Survey

If you arrived by car, were you the		
Answer Options	**Response Percent**	**Response Count**
Passenger or	69.6%	257
Driver	30.4%	112
	answered question	**369**
	skipped question	**461**



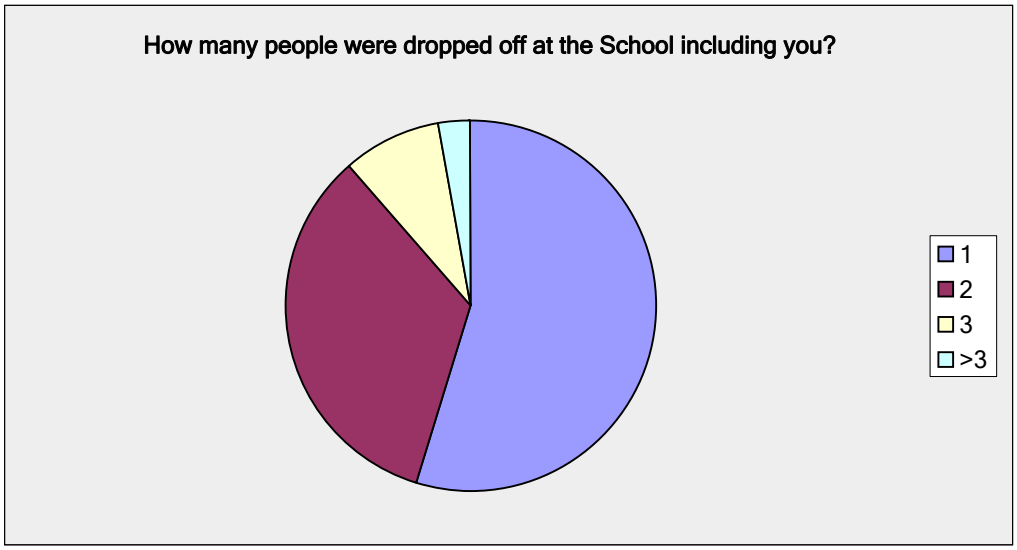
Travel Survey

How many other people were in the car with you when you travelled to School?		
Answer Options	**Response Percent**	**Response Count**
0	0.8%	2
1	27.7%	71
2	37.9%	97
3	23.0%	59
>3	10.5%	27
	answered question	**256**
	skipped question	**574**



Travel Survey

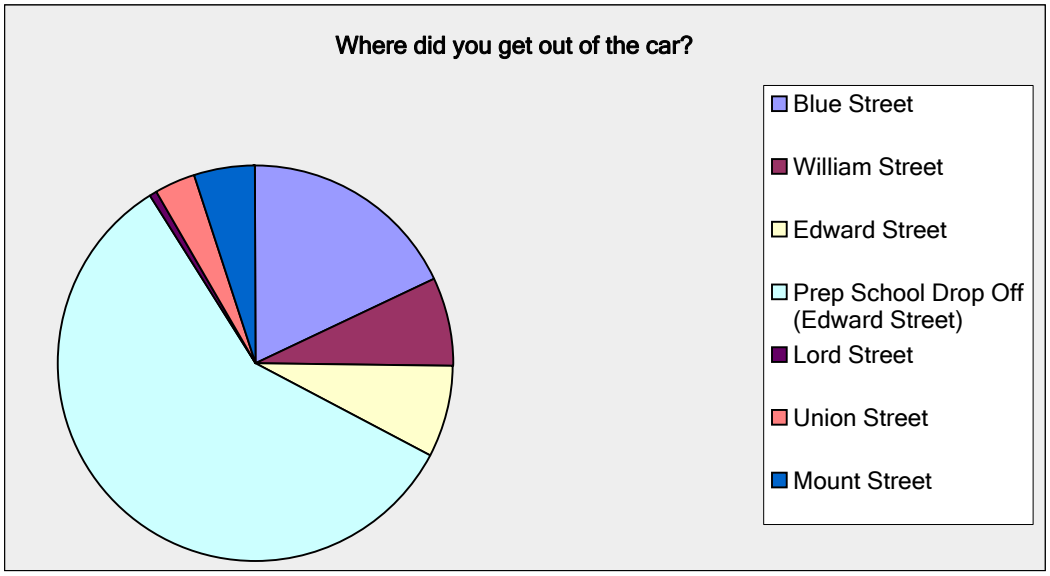
How many people were dropped off at the School including you?		
Answer Options	**Response Percent**	**Response Count**
1	54.7%	140
2	34.0%	87
3	8.6%	22
>3	2.7%	7
	answered question	256
	skipped question	574



Travel Survey

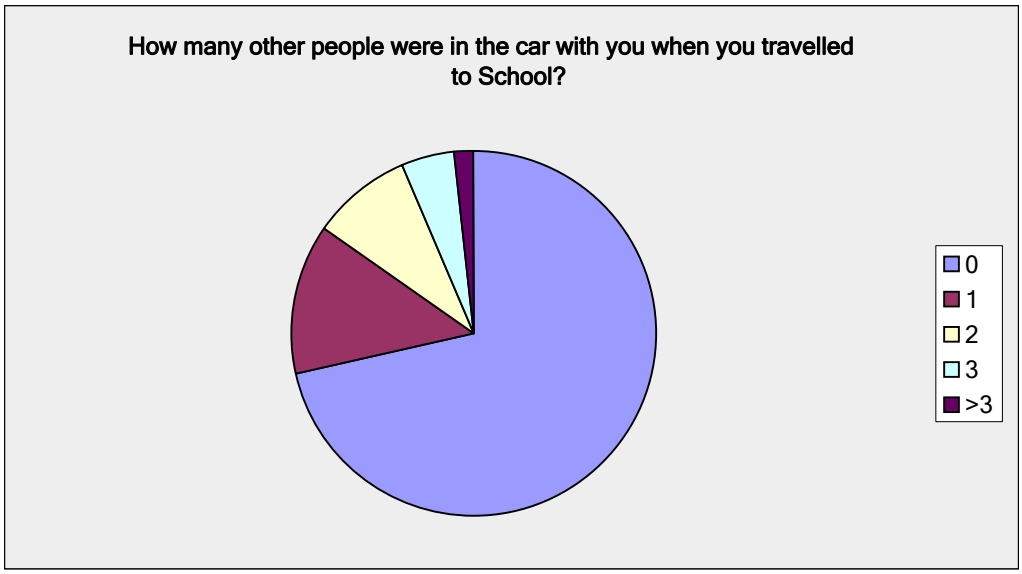
Where did you get out of the car?		
Answer Options	**Response Percent**	**Response Count**
Blue Street	18.0%	46
William Street	7.4%	19
Edward Street	7.4%	19
Prep School Drop Off (Edward Street)	58.2%	149
Lord Street	0.8%	2
Union Street	3.1%	8
Mount Street	5.1%	13
Other (please specify)		12
	answered question	256
	skipped question	574

Number	Response Date	Other (please specify)
1	Jul 29, 2010 3:18 AM	In the staff car park
2	Jul 29, 2010 3:44 AM	Arthur St, North Sydney
3	Jul 29, 2010 9:10 AM	Inside the school, through the main gates and
4	Jul 29, 2010 10:03 PM	waverton
5	Jul 30, 2010 1:41 AM	Post Office (Corner of William and Edward)
6	Aug 1, 2010 12:56 AM	Centenary Car Park
7	Aug 1, 2010 4:31 AM	Miller Street
8	Aug 1, 2010 7:13 AM	Staff parking under music Dep.
9	Aug 2, 2010 2:53 AM	miller st
10	Aug 2, 2010 3:05 AM	Senior Staff Carpark
11	Aug 2, 2010 4:04 AM	Miller Street
12	Aug 2, 2010 5:20 AM	turning circle



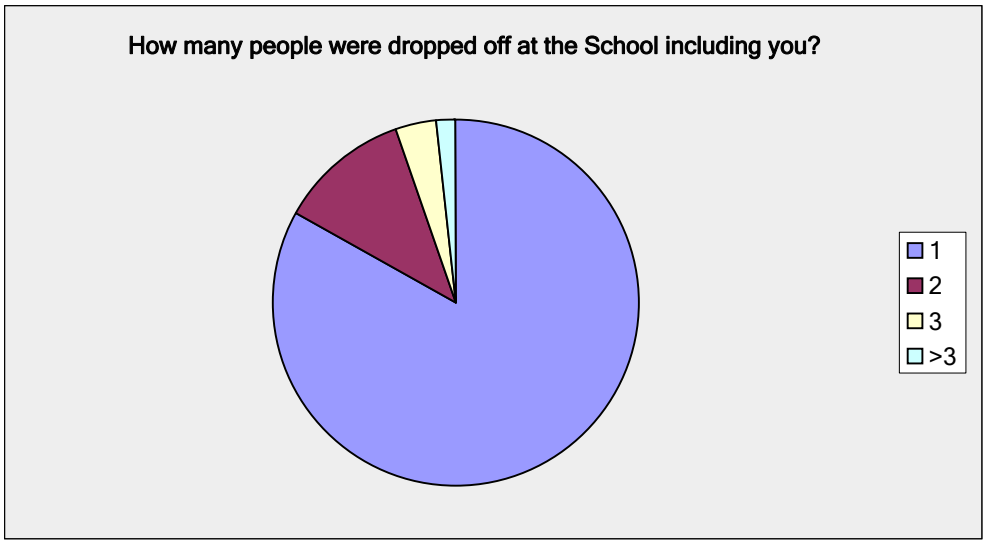
Travel Survey

How many other people were in the car with you when you travelled to School?		
Answer Options	Response Percent	Response Count
0	71.4%	80
1	13.4%	15
2	8.9%	10
3	4.5%	5
>3	1.8%	2
	answered question	112
	skipped question	718



Travel Survey

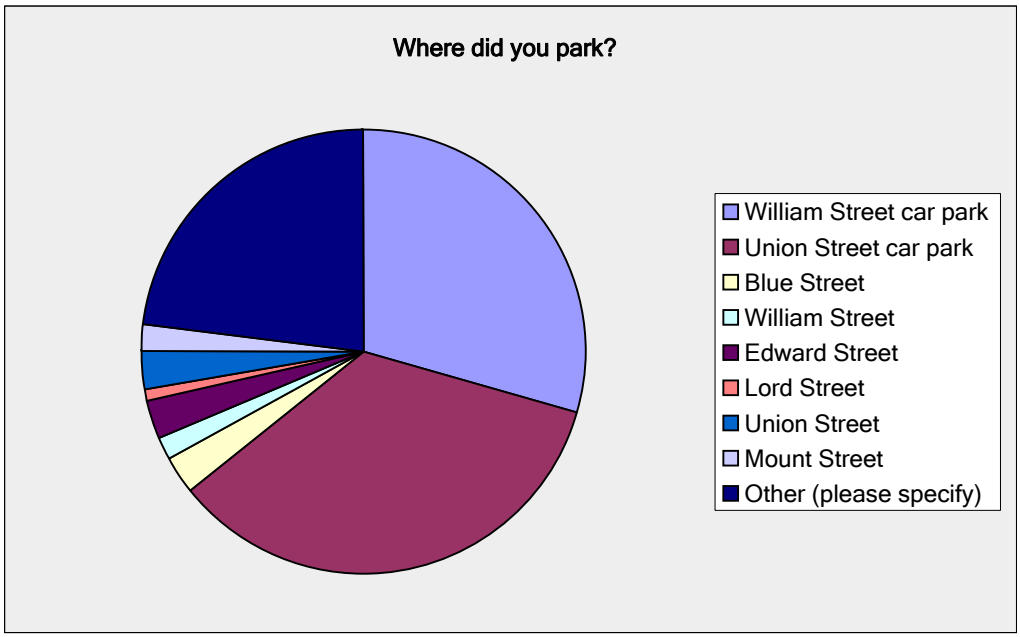
How many people were dropped off at the School including you?		
Answer Options	Response Percent	Response Count
1	83.0%	93
2	11.6%	13
3	3.6%	4
>3	1.8%	2
	answered question	112
	skipped question	718



Travel Survey

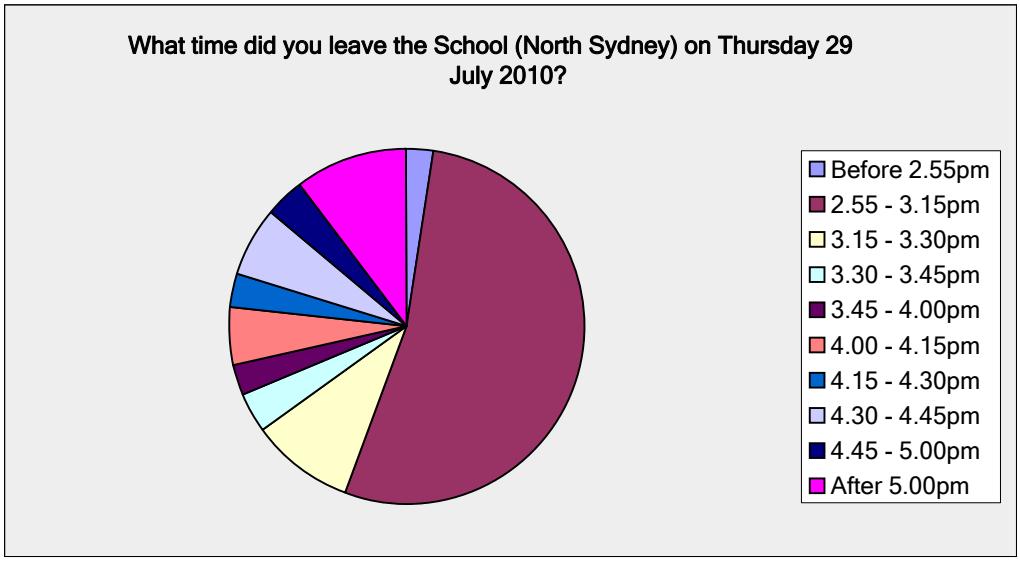
Where did you park?		
Answer Options	**Response Percent**	**Response Count**
William Street car park	29.5%	33
Union Street car park	34.8%	39
Blue Street	2.7%	3
William Street	1.8%	2
Edward Street	2.7%	3
Lord Street	0.9%	1
Union Street	2.7%	3
Mount Street	1.8%	2
Other (please specify)	23.2%	26
	answered question	**112**
	skipped question	**718**

Number	Response Date	Other (please specify)
1	Jul 29, 2010 1:47 AM	Adjacent Maintenance Workshops off Edward
2	Jul 29, 2010 1:52 AM	Prep Grounds (Head of Prep)
3	Jul 29, 2010 1:53 AM	Waverton
4	Jul 29, 2010 1:54 AM	school car park under the auditorium
5	Jul 29, 2010 2:11 AM	Grass verge - Union Street entrance
6	Jul 29, 2010 2:23 AM	grassed area near the tennis courts
7	Jul 29, 2010 2:48 AM	Prep school
8	Jul 29, 2010 3:04 AM	school
9	Jul 29, 2010 3:05 AM	Bishopsgate Driveway grass verge
10	Jul 29, 2010 4:11 AM	Learner Dropped Off
11	Jul 29, 2010 4:39 AM	Thomas Street
12	Jul 29, 2010 4:41 AM	Bank Street
13	Jul 29, 2010 4:50 AM	bank
14	Jul 29, 2010 6:51 AM	Commodore Lane
15	Jul 29, 2010 8:31 AM	school drive
16	Jul 30, 2010 5:49 AM	thomas street
17	Jul 30, 2010 5:49 AM	Thomas Street
18	Jul 30, 2010 6:01 AM	Did nto park changed drivers
19	Jul 30, 2010 6:48 AM	Commodore Crescent
20	Jul 30, 2010 11:50 PM	john st
21	Aug 1, 2010 1:04 AM	John Street
22	Aug 1, 2010 12:38 PM	Commodore Crescent
23	Aug 1, 2010 11:41 PM	Larkin street
24	Aug 2, 2010 1:11 AM	bank street
25	Aug 2, 2010 3:26 AM	waverton
26	Aug 2, 2010 5:21 AM	Commodore Close


Where did you park?
William Street car park
Union Street car park
Blue Street
William Street
Edward Street
Lord Street
Union Street
Mount Street
Other (please specify)

Travel Survey

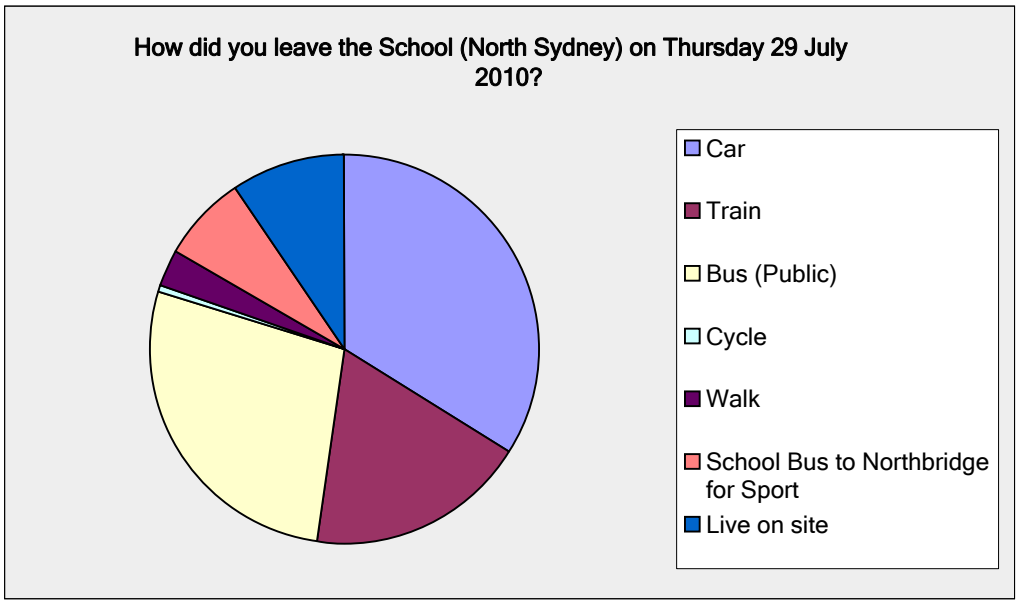
What time did you leave the School (North Sydney) on Thursday 29 July 2010?		
Answer Options	**Response Percent**	**Response Count**
Before 2.55pm	2.6%	20
2.55 - 3.15pm	52.9%	413
3.15 - 3.30pm	9.6%	75
3.30 - 3.45pm	3.5%	27
3.45 - 4.00pm	2.8%	22
4.00 - 4.15pm	5.3%	41
4.15 - 4.30pm	3.1%	24
4.30 - 4.45pm	6.3%	49
4.45 - 5.00pm	3.6%	28
After 5.00pm	10.4%	81
	answered question	**780**
	skipped question	**50**



Travel Survey

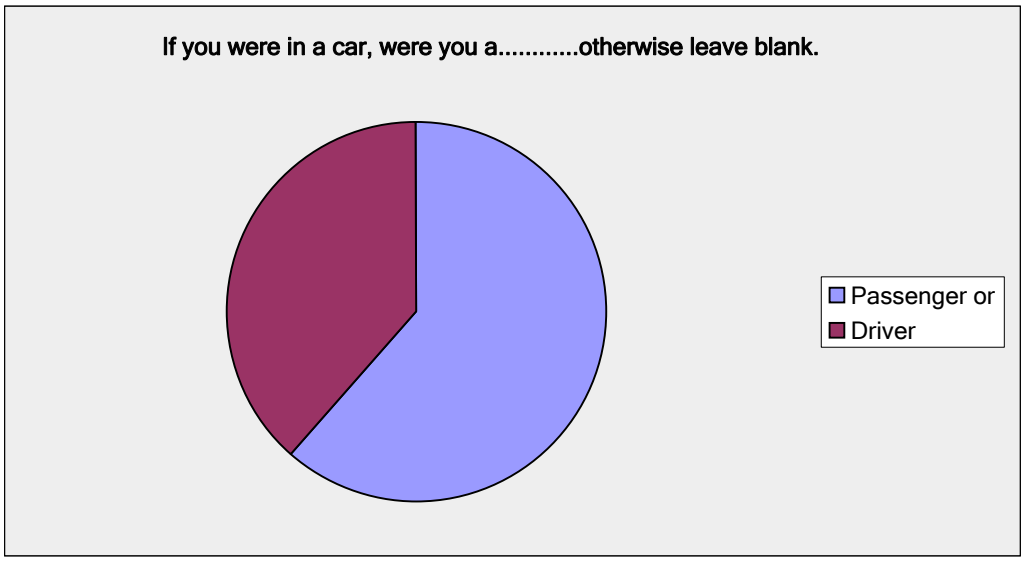
How did you leave the School (North Sydney) on Thursday 29 July 2010?		
Answer Options	**Response Percent**	**Response Count**
Car	34.0%	265
Train	18.3%	143
Bus (Public)	27.6%	215
Cycle	0.4%	3
Walk	3.1%	24
School Bus to Northbridge for Sport	7.3%	57
Live on site	9.4%	73
Other (please specify)		20
	answered question	**780**
	skipped question	**50**

Number	Response Date	Other (please specify)
1	Jul 29, 2010 2:04 AM	Left car in garage and travelled to Narrabri Bc
2	Jul 29, 2010 2:08 AM	bus to koola
3	Jul 29, 2010 2:09 AM	school bus to koola for sport
4	Jul 29, 2010 3:22 AM	Train to Turramurra, then car
5	Jul 29, 2010 3:45 AM	Shore Vehicle to Rock Climbing training
6	Jul 29, 2010 4:02 AM	mosman
7	Jul 29, 2010 4:27 AM	School bus
8	Jul 29, 2010 4:52 AM	I have a lot of mates
9	Jul 29, 2010 10:43 PM	School Bus Home
10	Jul 29, 2010 11:47 PM	School bus to st lennards for rockclimbing
11	Jul 30, 2010 12:03 AM	School Bus
12	Jul 30, 2010 1:53 AM	school bus to Koola for sport
13	Jul 30, 2010 3:46 AM	School Bus
14	Jul 30, 2010 4:16 AM	School Bus to Mosman
15	Aug 1, 2010 7:14 AM	Sport Bus
16	Aug 1, 2010 12:39 PM	Car to Northbridge for sport
17	Aug 2, 2010 3:41 AM	and public bus
18	Aug 2, 2010 4:03 AM	ferry
19	Aug 2, 2010 4:28 AM	GETS BUS TO SCHOOL AND DROPPED AT
20	Aug 2, 2010 5:35 AM	Plus ferry both to and from school


How did you leave the School (North Sydney) on Thursday 29 July 2010?
Car
Train
Bus (Public)
Cycle
Walk
School Bus to Northbridge for Sport
Live on site

Travel Survey

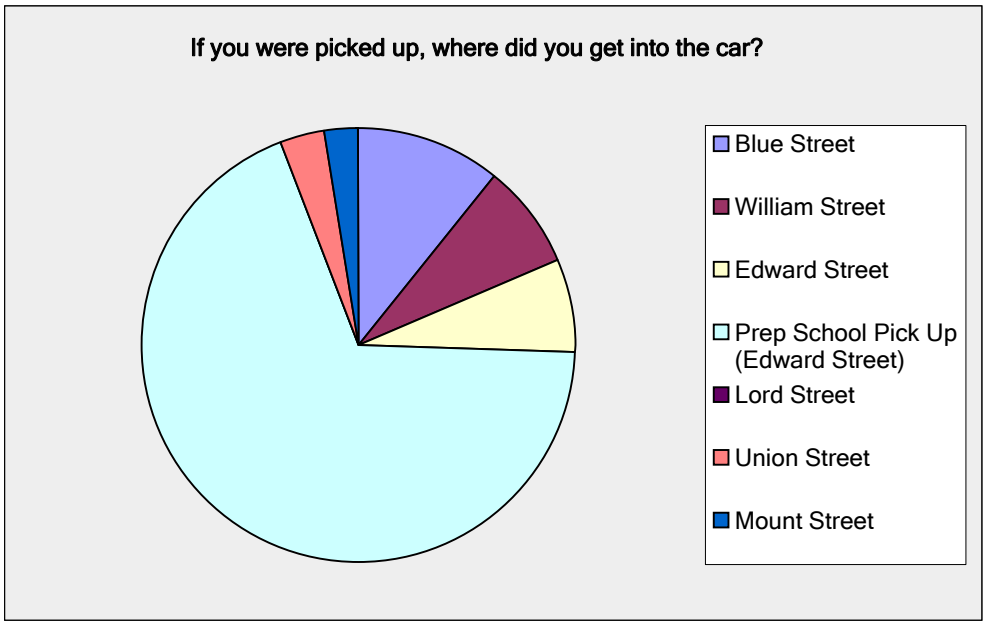
If you were in a car, were you a.....otherwise leave blank.		
Answer Options	**Response Percent**	**Response Count**
Passenger or	61.5%	185
Driver	38.5%	116
	answered question	301
	skipped question	529



Travel Survey

If you were picked up, where did you get into the car?		
Answer Options	**Response Percent**	**Response Count**
Blue Street	10.9%	17
William Street	7.7%	12
Edward Street	7.1%	11
Prep School Pick Up (Edward Street)	68.6%	107
Lord Street	0.0%	0
Union Street	3.2%	5
Mount Street	2.6%	4
Other (please specify)		8
	answered question	156
	skipped question	674

Number	Response Date	Other (please specify)
1	Jul 29, 2010 1:42 AM	William St Car Park
2	Jul 29, 2010 1:49 AM	Staff carpark
3	Jul 29, 2010 3:45 AM	Arthur St, North Sydney
4	Jul 29, 2010 6:25 AM	Bishopgate Carpark
5	Jul 29, 2010 11:29 AM	Bank Street
6	Aug 2, 2010 3:06 AM	Senior Staff Carpark
7	Aug 2, 2010 5:20 AM	turning circle
8	Aug 2, 2010 5:46 AM	Riley Street



Appendix C Summary of Public Submissions

For both **MP10_0149 Graythwaite Concept Plan** & **MP10_0150 - Graythwaite Project Application**

- Out of **151** Public Submissions from department of planning website, **76** submissions have raised concerns on traffic related issues.

- 6 category of traffic related concerns has been found from the 76 Submissions

	Related Submission	**Total**
Impacts on local traffic The traffic generation of the development impacts on the local traffic	1,2,3,5,6,8,9,10,11,12,14,15,19,25,26,27,30,31,32,34,35,36,40,41,42,43,44,45,46,49,50,58,62,71,74,79,80,82,84,86,87,89,91,98,101,102,105,108,109,110,111,113,115,121,129,132,134,135,137,142	61
Impacts on local street parking The traffic generation of the development impacts on the local street parking	1,2,3,4,5,6,8,9,10,11,12,14,15,16,17,18,20,21,22,23,24,27,30,32,34,35,36,40,41,43,44,45,46,49,50,62,75,76,82,89,91,98,110,115,125,128,132,134,142,151	51
Increase of pick up/ drop off/ coach activities The traffic generation of the development increase the parent pick up/drop off/ coaches activities and congest/block the traffic and affects the local residents/visitors	1,3,5,6,7,9,10,11,12,14,15,18,22,27,30,32,84,98,134,142,151	21
Traffic safety issues The traffic generation of the development creates safety issues	1,5,6,7,8,9,10,11,12,16,20,21,23,24,25,26,32,58,71,128,129,142	22
Public accessibilty to/through the site The development limited the public to access the site, for commute to enjoy the area for leisure or road	8,9,10,12,13,14,15,30,32,42,43,82,102,109,111,113	16
Concerns on Traffic survey and report There is public concern on the traffic survey and report were prepared for the application	5,12,26,35,43,58	6
Others		
Student driver behaviour - abuse parking,speeding, radio blaring etc	12,18,32,50,134	5
Traffic plans during construction	43	1
Traffic generation leads to pollution, greenhouse gas	58,142	2