Australian Catholic University

Australian Catholic University (Strathfield Campus)

Preferred Project Report Concept Plan Application MP10_0231 - Transport and Accessibility

Issue | 9 July 2012

Job number 221872

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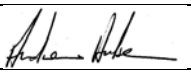
		Signature			
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Contents

1 Introduction

An Environmental Assessment (EA) report for Concept Plan approval for the Australian Catholic University (ACU) Strathfield Campus at 167-169 and 179 Albert Road, Strathfield was lodged with the Department of Planning and Infrastructure (the Department) 22 December 2011 and publicly exhibited 18 January – 14 March 2012.

The Concept Plan seeks approval for a masterplan for the site to accommodate student growth over the next 10 years. In summary, this will involve:

- new buildings
- an increase in on-site parking from the current 346 spaces up to 717 spaces
- new and improved pedestrian and vehicular circulation into and within the site, and
- improved site landscaping and public domain.

Arup undertook a Transport and Accessibility study in 2011 and Revision B of the report dated 14 December 2011 was exhibited. The report described the existing site access, traffic situation, road network performance and transport facilities in the vicinity of the site. It provided an assessment of the transport requirements for the building occupants including pedestrian, cyclist and public transport facilities and analysed the proposed development's effect on the nearby residential streets and road network. An outline construction traffic management plan was also provided.

The Department of Planning has now provided the proponent with the Key Issues that need to be addressed following receipt of public submissions and local and state government agency comments on the concept plan application.

This Preferred Project Report (PPR) addresses these Key Issues relevant to traffic, access, parking and sustainable transport which are summarised in Table 1.

The other key issue that is a key determinant of the traffic and transport assessment is the student numbers. The existing student attendance numbers and proposed future attendance numbers require clarification. A detailed description of this is provided in the Preferred Project Report and response to Submissions document. A brief summary is provided in Section 2 of this report.

Arup has collected additional traffic flow data, parking data and shuttle bus patronage data to inform the PPR assessment.

Table 1 Traffic, Access, Parking and Sustainable Transport Issue

Subject	Issue	Response
Traffic	Local road network cannot handle increase in capacity	Expected increase in traffic on Barker Road is 3% - Section 5.2
	Traffic changes (parking, bus stops, road widths) and impacts on Barker Road, South Street, Wilson Street, Marion Street and Newton Road	Reduced on-street car parking will remove traffic from these local streets – Section 5.2.
Access	Increase in number of site access points will worsen traffic situation/not required/ safety issues	New Concept Plan retains the existing number of site access points and deletes the South Street intersection – Section 4.0
	Signalised intersection at South Street not supported	No longer proposed
Parking	On site number of spaces inadequate	The number of on-site car parking spaces will double when all buildings are completed – section 4.2
	On street parking: - extent and impact - cumulative impact of other institutions - proposed 2-hour restriction on-street not supported - resident driveways blocked	Section 3.3.2 - reduced on-street impact - there is very little overlap between institution on-street car parking - no longer proposed - ACU Management Plan
Sustainable Transport	Site poorly served by public transport	Two public route bus services and the free ACU Shuttle Bus provide excellent public transport service connecting with Strathfield Railway Station.
	Not enough detail on current use of shuttle bus and how future needs will be met	Shuttle bus patronage data collected - Section 3.2.3
	Not enough detail how other forms of transport (walking, cycling) will be encouraged	Section 6.0

2 Student Numbers

2.1 Existing consents

ACU and its predecessor Colleges have occupied the site at 179 Albert Road, Strathfield since 1908. This site is also known as the Barker Road site, as the campus has both frontage to and the main entrance is from Barker Road. In 2002 the University acquired a second site at 163-167 Albert Road, Strathfield, known as the Clancy site. Conditions of use for the two sites were established separately, in 1994 for the original Albert Road site (DA 93/164) and in 2002 for the additional Clancy site (DA 0102/252). The two sites form the ACU Strathfield Campus ('the campus') and students move between them for classes, services etc.

The Albert Road site is limited 'at any one time' to having 1,100 day and 700 night enrolled students. The Clancy site has no such limit.

The Albert Road site is limited to having 510 students in attendance at any one time between 8.00 am and 5.00 pm, Monday to Friday and 247 students between 5.00 pm and 9.00 pm Monday to Friday on site. The Clancy site is limited to having 240 students at any one time on site.

Therefore across both sites ('the campus'), student numbers are limited 'at any one time' to 750 (510 + 240) between 8.00 am and 5.00 pm, Monday to Friday and 487 (247 + 240) between 5.00 pm and 9.00 pm Monday to Friday.

Notwithstanding the absence of definitive limits on the number of enrolled students, it is the number of students present on site at any one time that is the important figure on which to base an environmental assessment. This is because, irrespective of the total number of students enrolled, it is the students on site who generate the requirements for car parking and public transport access.

2.2 Current Student Numbers

The following explains the distinction between the number of students on site 'at any one time' and the number of enrolled students.

2.2.1 Site Attendance Audit

In early 2009 Strathfield Council sought confirmation from ACU that they were complying with Conditions 30 and 32 of the Albert Road DA (student numbers and hours of operation).

ACU therefore commenced biannual detailed audits of student attendance during the first week after each semester's census date in 2009. This is the most accurate time to count student numbers as after this date students are penalised for discontinuing subjects and timetabling issues have been resolved. It should be noted that the audits were completed for the entire campus, ie Albert Road and Clancy sites to also show compliance with Condition 24(d) of the Clancy DA.

The first audit completed was of Semester 2, 2009 of which the results were provided to Council and the results can be seen in Table 2.

For example, it shows during 2009 the maximum number of students on site at any one time was 641 on a Tuesday between 10.00 and 11.00 am. In 2010 the

maximum number was 686 on a Tuesday between 12 midday and 1.00pm. In 2011 the maximum number was 522 on a Monday between 10.00 and 11.00 am.

The table shows compliance with the relevant conditions in that across the campus, student numbers did not exceed a total of 750 during the day or 487 in the evening.

Table 2 Comparison of Semester 2 audits 2009-2011 and Equivalent Full Time Student Load (EFTSL)

Day	Monday			Tuesday			Wednesday			Thursday			Friday		
Year	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011	2009	2010	2011
EFTSL	2744	3112	3601	2744	3112	3601	2744	3112	3601	2744	3112	3601	2744	3112	3601
8.00-9.00	169	358	464	376	514	246	0	467	266	307	264	170	350	197	317
9.00-10.00	324	399	378	488	553	280	492	546	126	377	368	155	417	294	134
10.00-11.00	374	568	522	641	381	192	621	427	293	475	552	374	410	318	242
11.00-12.00	503	668	191	548	533	81	530	481	223	506	609	256	481	272	157
12.00-13.00	515	520	344	602	686	320	200	550	286	345	503	208	345	448	339
13.00-14.00	395	489	391	499	648	236	402	453	192	585	504	279	293	251	157
14.00-15.00	451	525	386	439	485	259	488	398	407	401	548	282	234	245	278
15.00-16.00	507	461	447	361	464	104	517	346	247	379	291	266	92	154	171
16.00-17.00	277	490	170	138	461	370	108	340	190	173	347	187	54	143	42
17.00-18.00	348	411	144	294	379	131	246	281	185	166	251	101	55	128	23
18.00-19.00	289	250	20	168	126	24	205	163	130	168	205	63	0	51	0
19-00-20.00	165	41	22	44	86	0	134	50	29	57	95	22	0	3	0
20.00-21.00	0	0	0	0	0	0	0	0	0	35	0	53	0	0	0

2.2.2 Equivalent Full Time Student Load

The Equivalent Full Time Student Load (EFTSL) gives the best figure for enrolments and is a common approach at all tertiary institutions to be able to assess resourcing and funding needs. The actual number of students enrolled will therefore be higher because not all students are full time. The EFTSL counts in Table 2 for each year and day include undergraduate, postgraduate, online and Away from Base/Residential indigenous program students. Students in these programs attend the campus for four weeks a year. The counts also include a number of students enrolled in programs based at ACU's North Sydney campus

who may study individual units that are part of programs based at the Albert Road site or Clancy site. Also, some students, who are enrolled at other universities, attend the campus for cross institutional study and some cohorts of students enrolled at the University are taught off site throughout Australia.

Table 2 shows that while there has been an increase in the number of enrolled students over the past three years, there has generally been a decrease in number of students on site.

The number of enrolled students 'at any one time' varies day to day and includes students that may never attend campus or attend campus for short defined periods within the year. As mentioned above, the number of students actually on site each day is the best indicator, for example to assess car parking needs or other services.

2.2.3 Future Student Numbers

The proposed 2016 figure of 4,800 students is also the EFTSL for enrolled students. Students on site at any one time is proposed at a maximum of 2,000 based on two teaching sessions per day (8.00 am – 2.00 pm and 2.00 pm – 8.00 pm) shown in Table 3.

Table 3 Timetable Rubric for 4800 EFTSL students

Monday		Tuesday		Wednesday		Thursday		Friday	
8.00-14.00	14.00-20.00	8.00-14.00	14.00-20.00	8.00-14.00	14.00-20.00	8.00-14.00	14.00-20.00	8.00-14.00	14.00-20.00
A1	A1	B1	B1	C1	C1	D1	D1	C2	C3
A2	A2	B2	B2	C2	C2	D2	D2	D1	D2
A3	A3	B3	B3	C3	C3	D3	D3	D3	A1
B1	B2	C2	C3	D3	A1	B1	B2	A2	
B3	C1	D1	D2	A2	A3	B3	C1	A3	

Twelve groups of up to 400 students (A1, A2, A3, B1, B2, B3, C1, C2, C3 and D1, D2, D3) would be on campus per session. Each group would have up to 1 full day and 2 half days, so per session there would be up to 2,000 students on site at any one time with a maximum of 2,800 students per day. For example, Group A1 are on site all day Monday and half of Wednesday and Friday. As groups are on site for whole or half days at a time, the majority of students will only come and go from the site up to three days per week.

3 Existing Conditions

3.1 Traffic Assessment

3.1.1 Data Collection

The Environmental Assessment (EA) Transport and Access report described the traffic volumes at the site access driveways and at two key intersections in the road system based on surveys undertaken in May 2011. Additional traffic surveys have been undertaken over a 15 day period in the week ending 18 May 2012 to week ending 1 June 2012 to determine the traffic volumes on key roads in the vicinity of the site and to update the traffic volumes entering and leaving the site.

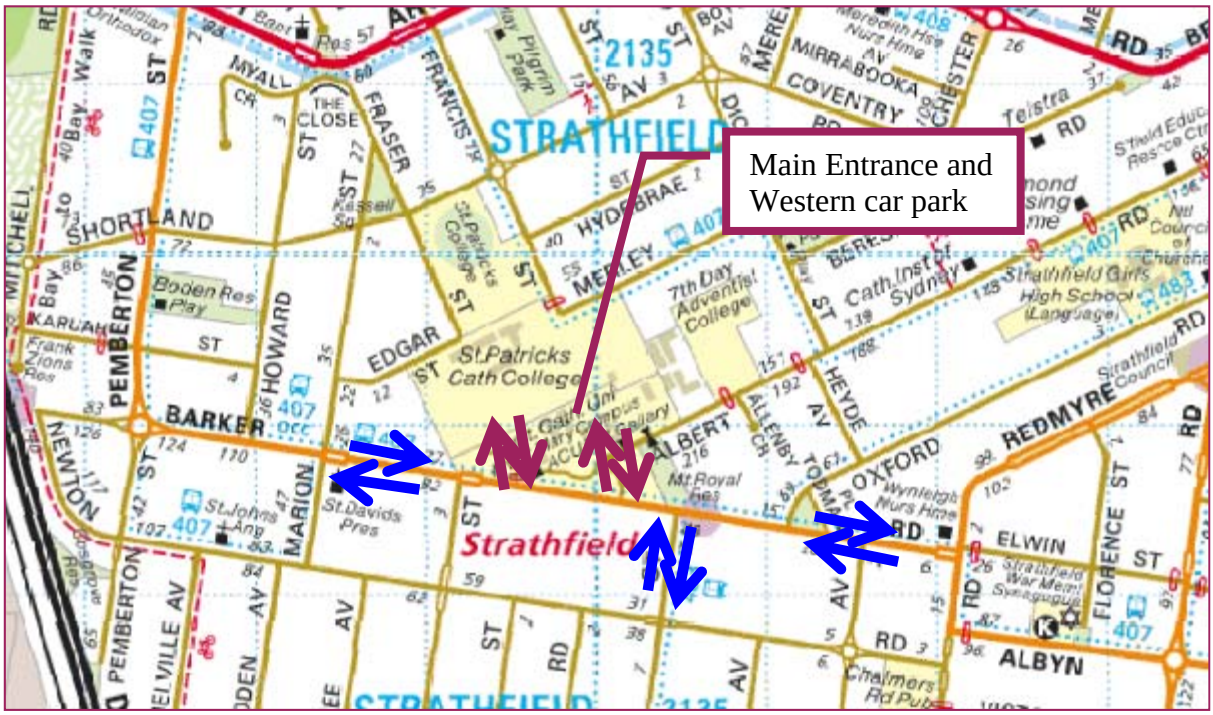
Tube counters were installed at three on-road locations and at the campus driveways as shown in Figure 1 for a two week period to collect the following data:

- Vehicle movements in each direction
- Vehicle type (car, bus, truck, motorcycle, etc)
- Vehicle speed

The streets surveyed were:

- Barker Road (East of Oxford Road)
- Barker Road (West of Wilson Street)
- South Street (South of Barker Road)

Figure 1 Traffic Survey Locations



3.1.2 Updated Traffic Volume Data

The average daily traffic volumes on the weeks surveyed are shown in Table 4. Week A is the average daily traffic for the last two days of term. Week B is the break week and Week C is the first week of exams. The traffic is highest at all counts in the last week of term, reduced during the break week with traffic increasing again when exams are on. It should be noted that the university generated traffic in the break week would have been for students studying for exams and would not represent typical non-teaching weeks.

Table 4 Average Weekday two-way traffic volumes

	Week A	Week B	Week C
Road			
Barker Road East of Oxford Road	7,413	6,295	6,619
Barker Road West of Wilson Street	5,715	5,049	5,172
South Street	1,843	1,571	1,701
Access Driveway			
Western Access	250	96	154
Main Access	1,438	831	1,237
Total Uni Access Traffic	1,688	927	1,391

The results of the traffic surveys for the teaching week can be summarised as:

- Barker Road near South Street carries 7,413 vehicles per day (two-way weekday average)
- Barker Road near Wilson Street carries 5,715 vehicles per day (two-way weekday average)
- South Street carries 1,843 vehicles per day (two-way weekday average)

The RMS Road Design Guide provides guidance on the expected traffic usage according to the function of a road and for a collector road recommends a maximum of 10,000 vehicles per day where there are residential and other land uses. Local streets usually carry up to 2,000 vehicles per day in residential areas. Barker Road is busiest to the east of South Street where both the South Street traffic and the ACU traffic joins Barker Road to travel towards Strathfield. The daily traffic volume of 6,751 vehicles is consistent with a road with a collector road function. South Street is currently carrying a traffic volume consistent with a local street.

At the site access driveways:

- Western access 250 vehicles per day two-way
- Main access 1,438 vehicles per day two-way
- Total 1,688 vehicles per day two-way

At the main access gate there were 190 bus movements two-way per day. This means that 1,498 car movements occurred over the day.

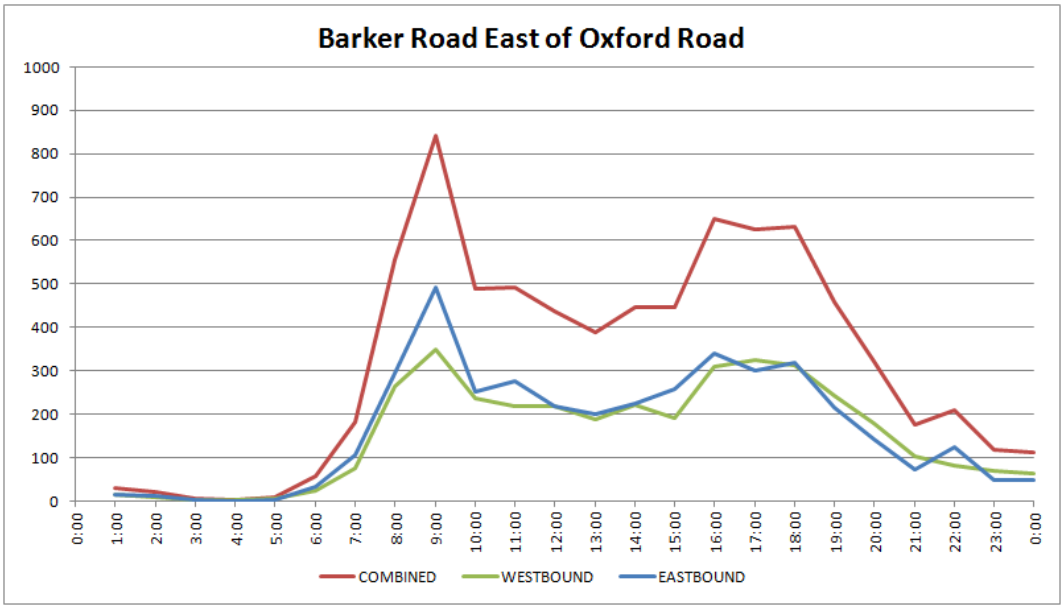
The ACU car traffic generation of 1,498 cars per day on campus with the addition of 500 cars parked on street (see Section 3.3.2), which would turnover at a rate of approximately 1.5 times per space, results in a total ACU car traffic generation of 1,498 + 1.5x500 = 2,248 car movements per day. With buses the total traffic generation is 2,438 vehicles per day.

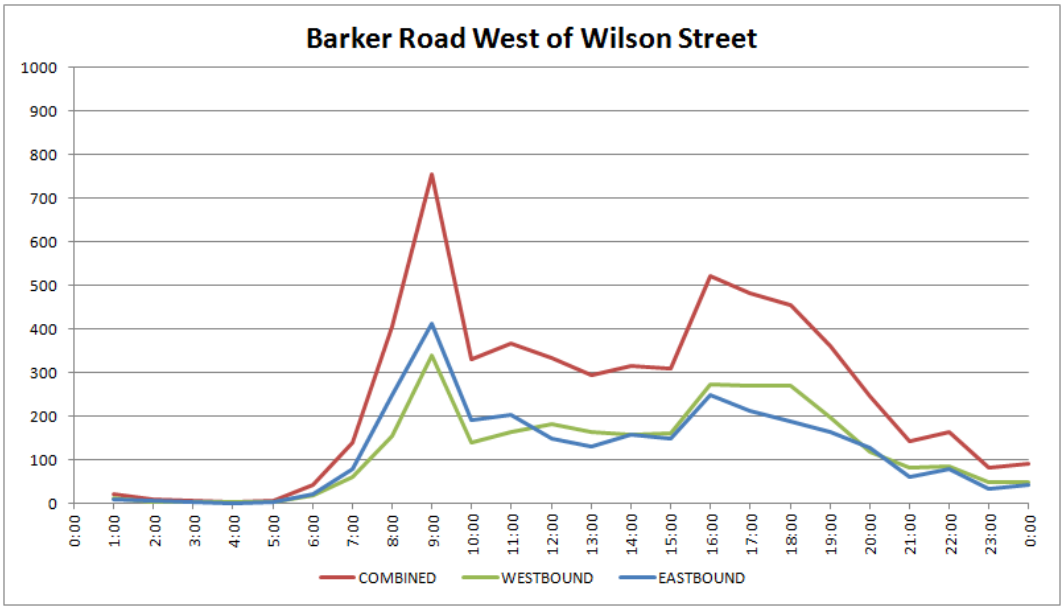
The traffic report submitted with the EA included traffic surveys at the campus driveways which indicate that 65% of vehicles entering or leaving the ACU campus travel to and from the east and 35% to and from the west. The proportion of traffic on Barker Road attributed to ACU can therefore be determined as follows:

Barker Road east – 65% x 2,438 = 1,585. This is 20% of the 7,413 total traffic.

Barker Road east – 35% x 2,438 = 853. This is 15% of the 5,715 total traffic.

The hourly profile of traffic movement over the day has been plotted for a teaching day at each survey location as shown in the following graphs. The Barker Road profile indicates the morning and afternoon peak activity in both directions generated by through traffic on this route as well as the local traffic generated by residents, the ACU and other institutions in the area. South Street has a much flatter profile consistent with a local street. The two ACU campus driveways have also been plotted showing similar profiles during the morning and afternoon peak road periods as students arrive and depart the campus.

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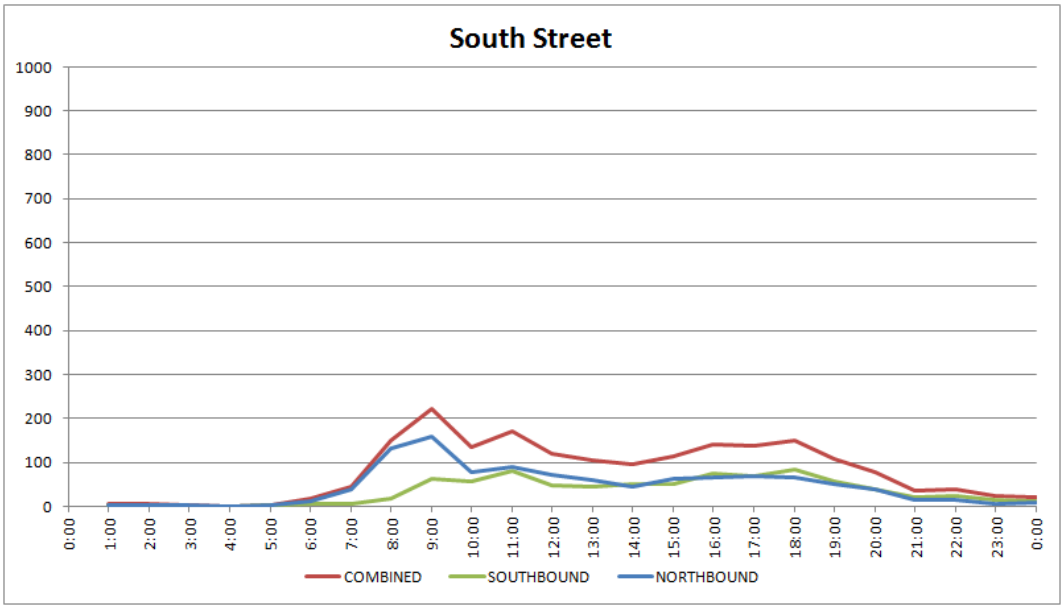
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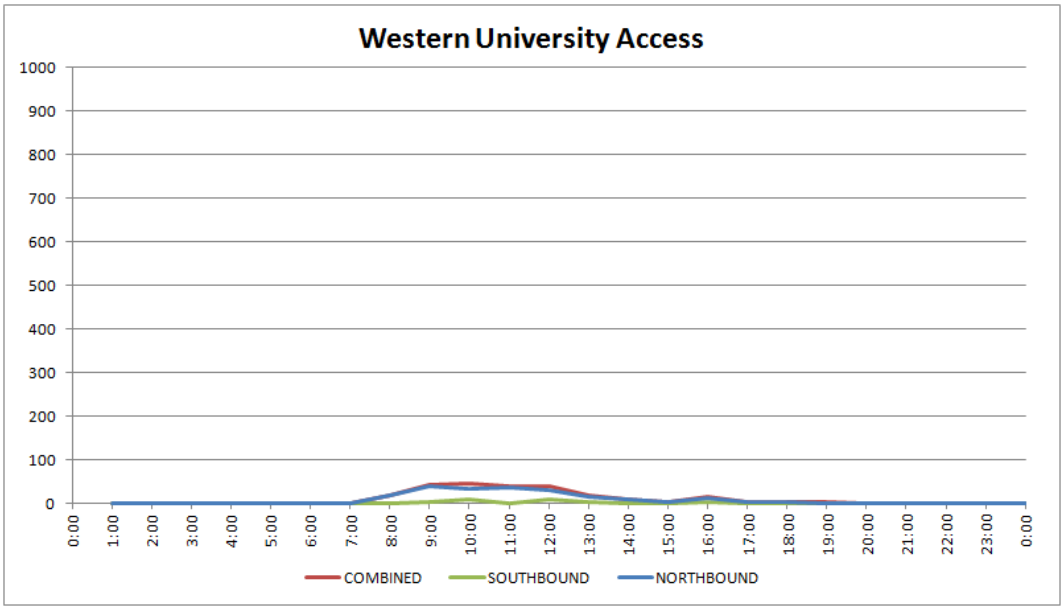
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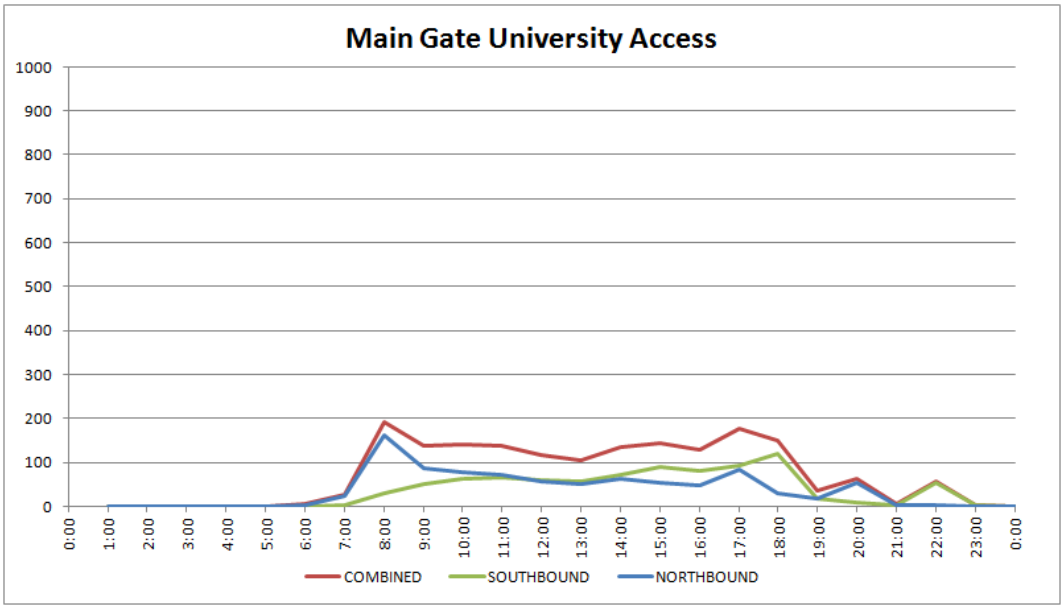
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3.1.3 Vehicle Classification and Speed

The vehicle classification at each of the count locations is presented in Table 5 for cars, buses/trucks and articulated trucks. The majority of vehicles classified as bus/truck would be a route bus or the ACU shuttle bus. Cars make up approximately 95% of the vehicles using these roads which is typical for local and collector roads such as these.

Table 5 Vehicle classification

Week A					
Location	Car	Bus/ Truck	Articulated Truck	Unclassified	Total
Barker Road East of Oxford Road	7,003	392	11	7	7,413
Barker Road West of Wilson Street	5,573	132	5	5	5,715
South Street	1,729	99	1	14	1,843

Week B					
Location	Car	Bus/ Truck	Articulated Truck	Unclassified	Total
Barker Road East of Oxford Road	5,968	310	6	11	6,295
Barker Road West of Wilson Street	4,893	153	3	0	5,049
South Street	1,454	102	1	14	1,571

Week C					
Location	Car	Bus/ Truck	Articulated Truck	Unclassified	Total
Barker Road East of Oxford Road	6,240	352	9	18	6,619
Barker Road West of Wilson Street	5,028	134	3	7	5,172
South Street	1,579	104	1	17	1,701

The vehicle speed at each of the count locations is presented in Table 5 for the 85th percentile, which should represent the sign posted speed for the road. The speed limit on these roads is 50km/h which indicates that vehicles are exceeding the speed limit on Barker Road by about 8 km/hr and only slightly in excess of the signposted speed on South Street.

Table 6 Vehicle Speed (85th percentile)

Location	**Week A (km/h)**	**Week B (km/h)**	**Week C (km/h)**
Barker Road East of Oxford Road	59	59	58
Barker Road West of Wilson Street	58	57	57
South Street	52	54	52

3.2 Public Transport

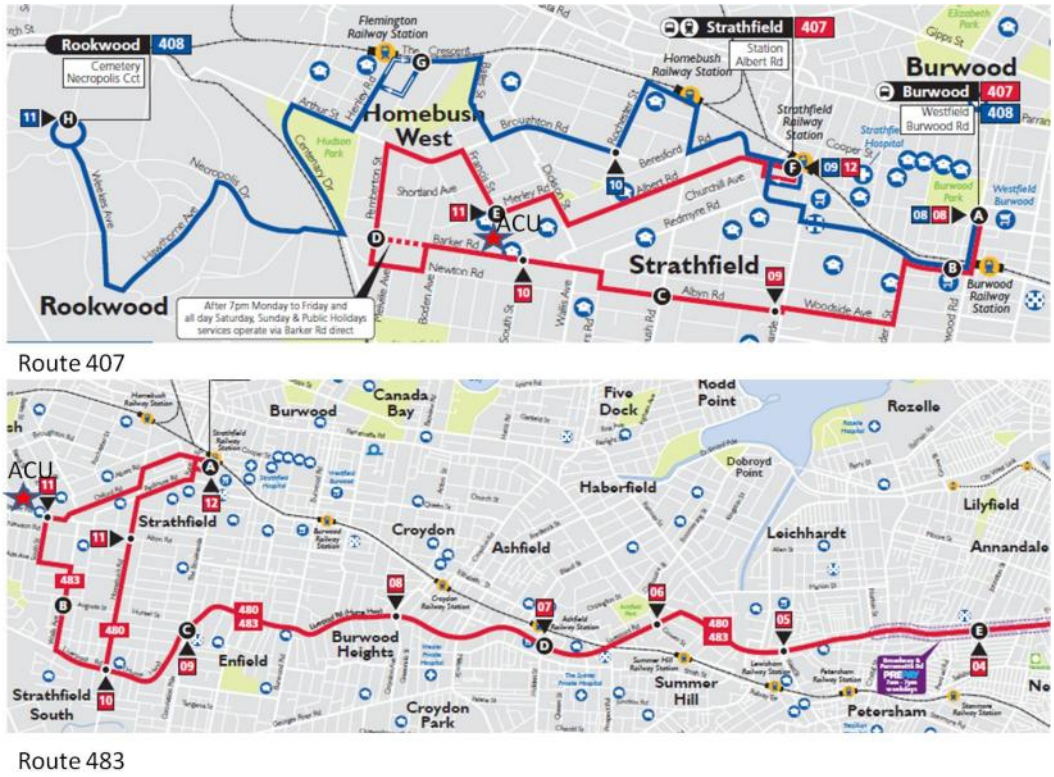
3.2.1 Bus

Bus route 407 between Burwood and Strathfield stations operates along Barker Road (refer to Figure 2). Service frequency is approximately 20 minutes in both directions in the peak hour.

Route 483 operates between Strathfield Station and the city. This route operates along South Street – a small section of Barker Road – Oxford Street. Service frequency is approximately 20 minutes in the peak period.

A number of bus stops are located near the main campus entrance.

Figure 2: Bus Route along Barker Road



3.2.2 Train

Strathfield station is located about 2km north – east of the campus which is about a 20 minute walk. As a major transport hub, all trains on the Northern, Inner West, Western and South railway lines and CountryLink services stop at Strathfield resulting in one of the highest frequency station in Sydney. The high frequency trains are connected by bus services in various directions including the two routes mentioned above. There is a large interchange at the station which services route buses, shuttle and community buses, taxis and private vehicle drop-off and pick up activity.

3.2.3 Shuttle Bus Services

The university has a free shuttle bus operating between the main campus and Strathfield station (Strathfield Square). Timetable information and maps are provided on the university website:

- Bus leaves every 10 minutes from Strathfield Station beginning 7:30am and leaves every 10 minutes from Strathfield Campus beginning 7:40am;
- Bus leaves every 30 minutes from Strathfield Station beginning 10:30am and leaves every 30 minutes from Strathfield campus beginning 10:45am; and
- Last bus leaves Strathfield Station at 8:30pm (5:45pm during exams, study week and out of semester) and last bus leaves Strathfield Campus at 8:45pm (6:00pm during exam week, study week and out of semester).

The shuttle bus service is flexible to meet fluctuations in demand. During school holiday and exam periods, for example, services are adjusted to ensure an efficient transport service is provided.

The shuttle bus service commenced in 2010 when one bus carried approximately 450 students per day. In 2011 services were increased with up to 3 buses running at peak times carrying approximately 1,000 students per day. In 2012 there are now 5 shuttle buses running at peak times.

Recent shuttle bus patronage surveys have been undertaken as shown in Table 7. These show that on the busier early weekdays some 1,650 students per day use the shuttle bus to travel from Strathfield Station to the campus. Slightly less use the shuttle bus on the return journey as some students choose to car share with another student at the end of a study period.

Table 7 Shuttle Bus Patronage Week Starting 5 March 2012

Direction	**From Station**						**Daily Proportion**
Bus	1	**2**	**3**	**4**	**5**	**Total**	
Monday	378	300	323	367	287	**1,655**	22%
Tuesday	368	306	320	358	268	**1,620**	22%
Wednesday	372	300	310	343	279	**1,604**	22%
Thursday	363	310	311	264	236	**1,484**	20%
Friday (up to 2.45pm)	280	198	201	187	190	**1,056**	14%
Total Week						**7,419**	100%
	To Station						
Bus	1	**2**	**3**	**4**	**5**	**Total**	
Monday	297	259	254	302	216	**1,328**	23%
Tuesday	280	245	262	295	215	**1,297**	22%
Wednesday	259	263	283	376	240	**1,421**	25%
Thursday	273	283	235	223	209	**1,223**	21%
Friday (up to 2.45pm)	145	85	120	90	72	**512**	9%
Total Week						**5,781**	100%

3.3 Car Parking

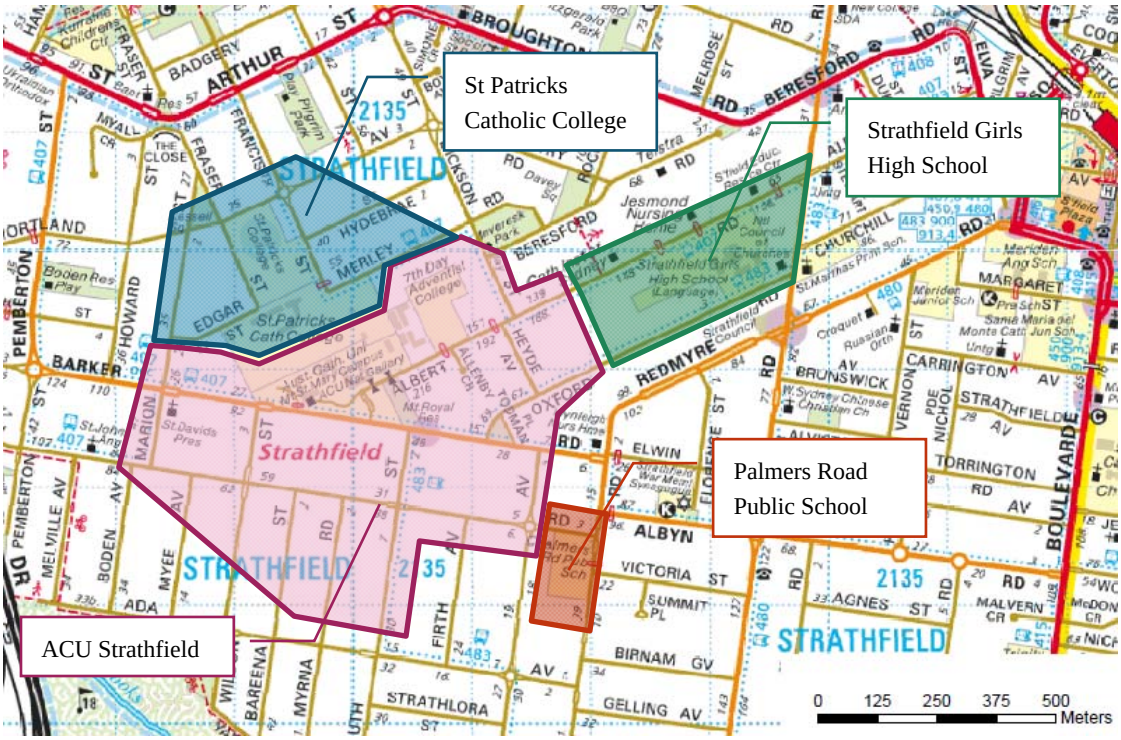
3.3.1 On-site Car Parking

The university currently has 346 parking spaces with 308 spaces on the main campus and 38 spaces on the Edward Clancy campus. There is a staff car park which accommodates 99 cars. All spaces are fully utilised on normal teaching days with some additional cars parked on the campus in areas not marked as parking spaces.

3.3.2 On-street Car Parking

There are a number of teaching institutions that utilise on-street car parking in this area of Strathfield. Parking is generally unrestricted on Barker Road and all other residential streets. From on-site observations, the extent of the car parking for each teaching institution is shown in Figure 3.

Figure 3 On-street car parking utilisation by adjacent schools



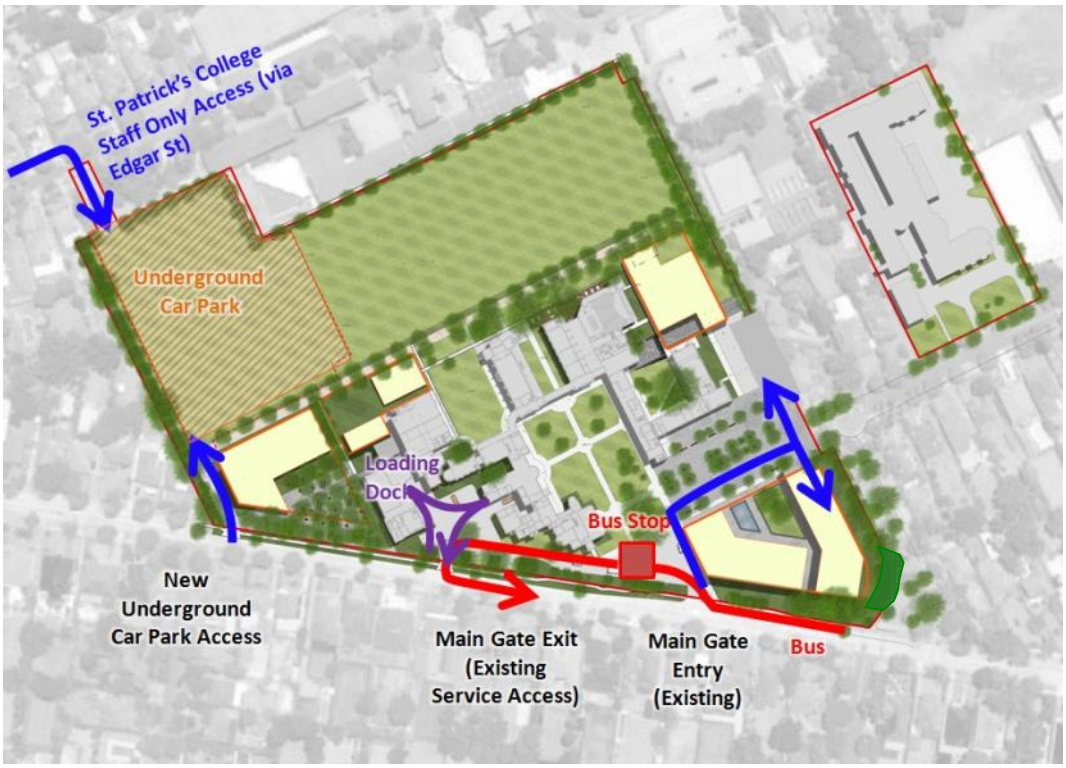
Arup undertook on – street parking surveys in the nearby residential streets in May 2011 in accordance with the extent shown in Figure 3. Earlier parking surveys had been undertaken by Colston Budd Hunt & Kafes Pty Ltd (CBHK) in 2009.

Arup has recently undertaken on-street car parking surveys on a typical teaching day in March 2012. These three parking survey periods provide information on the change over time in on-street parking utilisation. In 2009, CBHK observed 329 cars parked on streets surrounding the campus. In 2011, Arup observed 407 cars parked and more recently in 2012, 506 cars were observed on-street. During the 2012 survey there were 40 less car parking spaces on campus due to building works which would have overflowed to on-street parking.

4 Concept Plan

The Concept Plan, shown in Figure 4, includes a series of new buildings (marked yellow) including two with basement car parks and an underground car park beneath the playing fields. The existing main gate and the service access gate are retained for vehicle access. A new western vehicle driveway is proposed for access to the underground car park which will replace the existing driveway to the surface car park which is to be removed. A secondary access driveway is proposed to the underground car park from Edgar Street to provide access to 30 car spaces to be used by St Patrick's College staff members.

Figure 4 Concept Plan



4.1 Vehicular Access

4.1.1 Main Gate Entry and Exit

The Main Gate Entry and Exit driveways will be maintained as shown in Figure 5. There will be no change to the Main Gate Entry which will continue to provide access to student and staff car parks as well as the ACU shuttle bus and private vehicle drop-off and pick up. The width of the Main Gate Exit driveway will be adjusted to suit two-way movement and the configuration of the internal road arrangements.

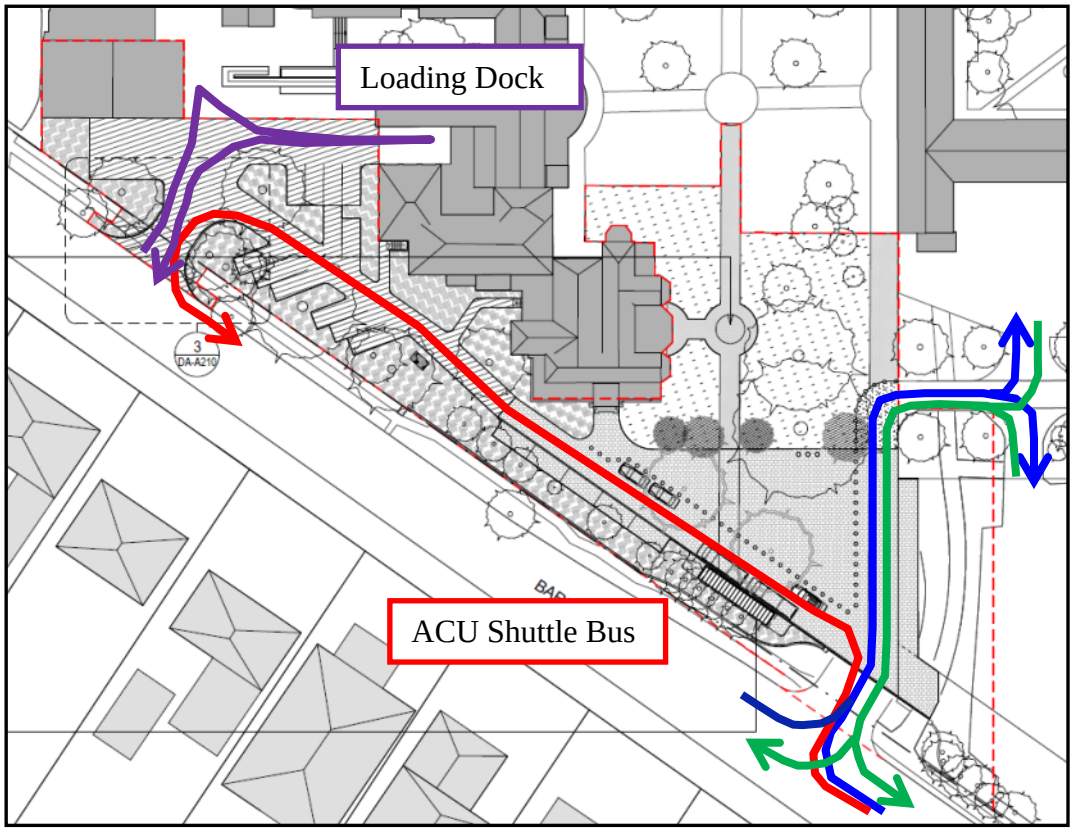


Figure 5: Proposed Main Gate Access Arrangements

4.1.2 Underground Car Park Access

The new underground car park in the north western corner of the campus will have an access driveway from Barker Road to provide access for ACU staff and students. A secondary access driveway is proposed from Edgar Street to provide access to 30 car spaces to be used by St Patrick's College staff members. Vehicular access to the underground car park from Barker Road will be controlled by a roller shutter which will require swipe card for after hours access but will be open to both ACU staff and students during university hours. Vehicular access from Edgar Street will also be controlled by a roller shutter however access will be restricted by swipe card both day and night. Whilst St Patricks College is not increasing staff numbers, it currently has an undersupply of staff parking spaces on their site leading to double parking on-site and overflow parking on-street. The 30 staff spaces will improve parking conditions for St Patricks but will generate no new vehicle trips on the local street system.

As part of the new access arrangement on Barker Road, five on-street parking spaces on the northern kerb and eight on the southern kerb require removal. The existing pedestrian refuge island will be retained to provide safe pedestrian crossing. The bus stops on each side of Barker Road will also need to be relocated towards the east to accommodate a new right turn bay from Barker Road on the eastern approach (Figure 6). When the at-grade car park is closed, 4 on-street car spaces can be reinstated.

The Barker Road driveway will be configured with one entry lane and two exit lanes for right and left turn vehicles exiting the car park. This will require a power pole to be relocated a short distance to the east.

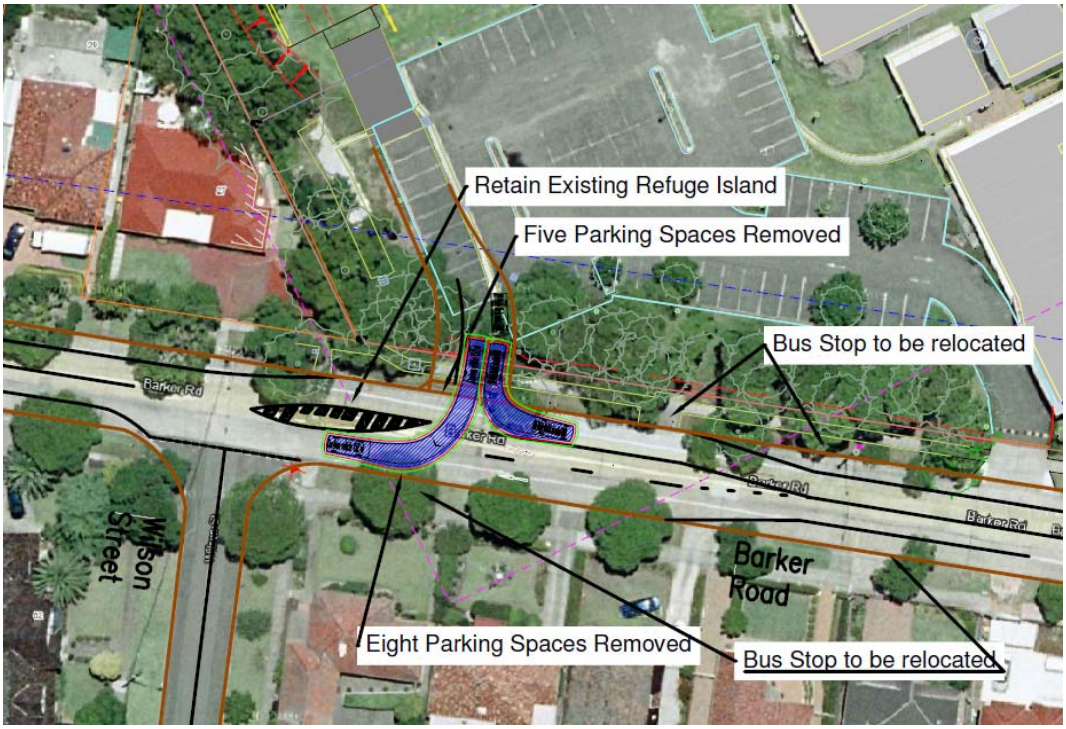


Figure 6: Proposed Right Turn Bay at Underground Car Park Access

The 407 bus route is affected by the bus stop relocation. The proposed new bus zone locations are illustrated in Figure 7. The relocation of the bus stops is minimal and will not change the overall operation of this bus route.

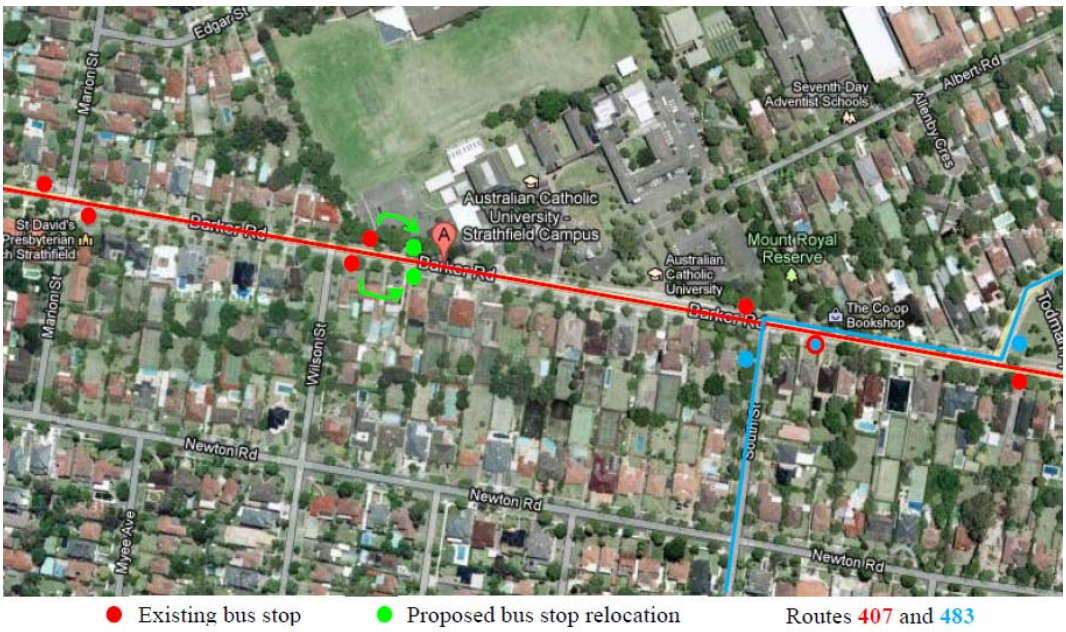


Figure 7 Proposed Bus Stops Relocation along Barker Road

4.2 Parking Provision

The Concept Plan for the campus proposes a number of new buildings to be built on existing surface car parks. The new car parking provision will expand parking facilities on the campus as shown in Table 8. This represents a doubling of spaces on the campus from 346 existing to 717 when all of the proposed buildings in the Concept Plan are completed. The location of these car parks is shown in Figure 8. There has been an increase in the proposed car parking provision from the Environmental assessment report from 644 spaces to 717 due to the retention of part of the existing staff car park.

Table 8 Existing and Proposed Car Parking

	Existing Spaces	Concept Plan
Western Car Park	75	0
Staff Car Park	99	70
Eastern Car Park	107	0
Edmund Clancy	38	38
Main entry	22	10
Visitor	5	5
Underground Car Park	0	292
St Patrick's College	0	-30
Building 01 Basement	0	174
Building 03 Basement	0	158
Total	**346**	**717**

Figure 8 Concept Plan Car Parking On-Campus

4.3 Service Vehicle Provision

The existing loading area will be retained. Parking for 8.8m Medium Rigid Truck, 6.4m Small Rigid Truck and courier vans will be available.

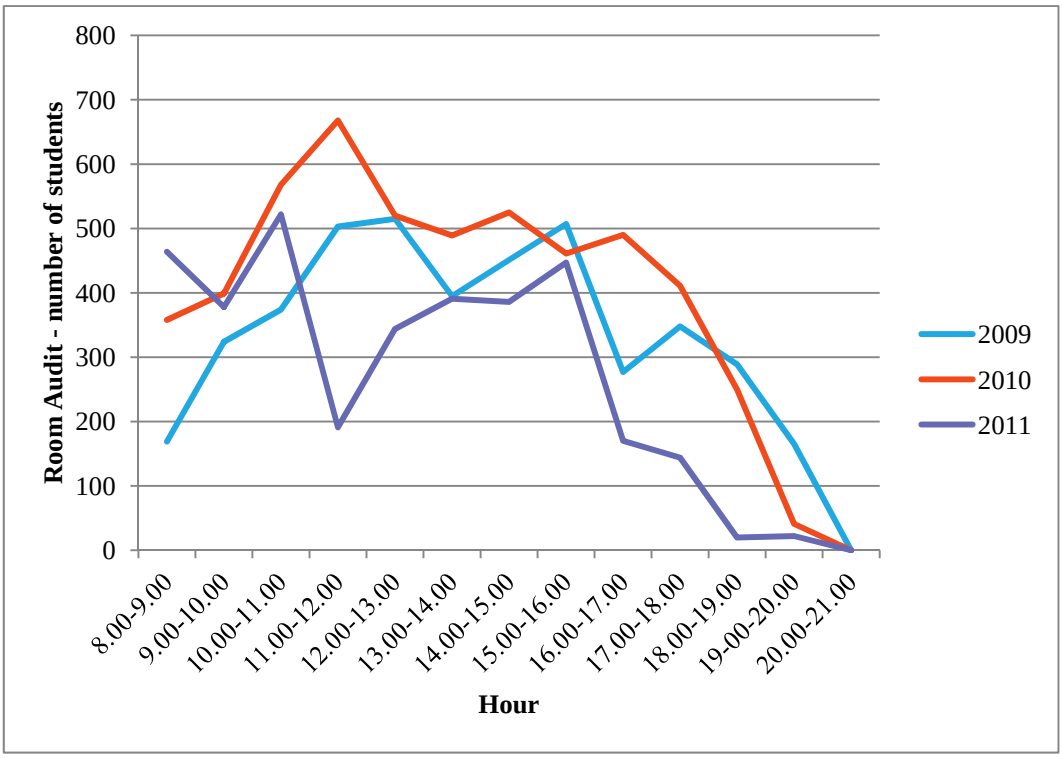
The loading docks will be designed to accommodate a MRV with swept paths in accordance with AS 2890.2 – 2002 – Part 2: Off-street commercial vehicle facilities. All delivery vehicles will be able to enter and exit the site in a forward direction.

5 Student attendance and travel characteristics

5.1 Recent trend

The peak room attendance described in Table 2 occurs in the morning between 10am and 1pm. The daily profile has been plotted for Monday as the busiest day of the week as shown in Figure 9. The peak attendance varies between 515 and 668 students. The profile over the 3 years is fairly consistent.

Figure 9 Monday room audit comparison



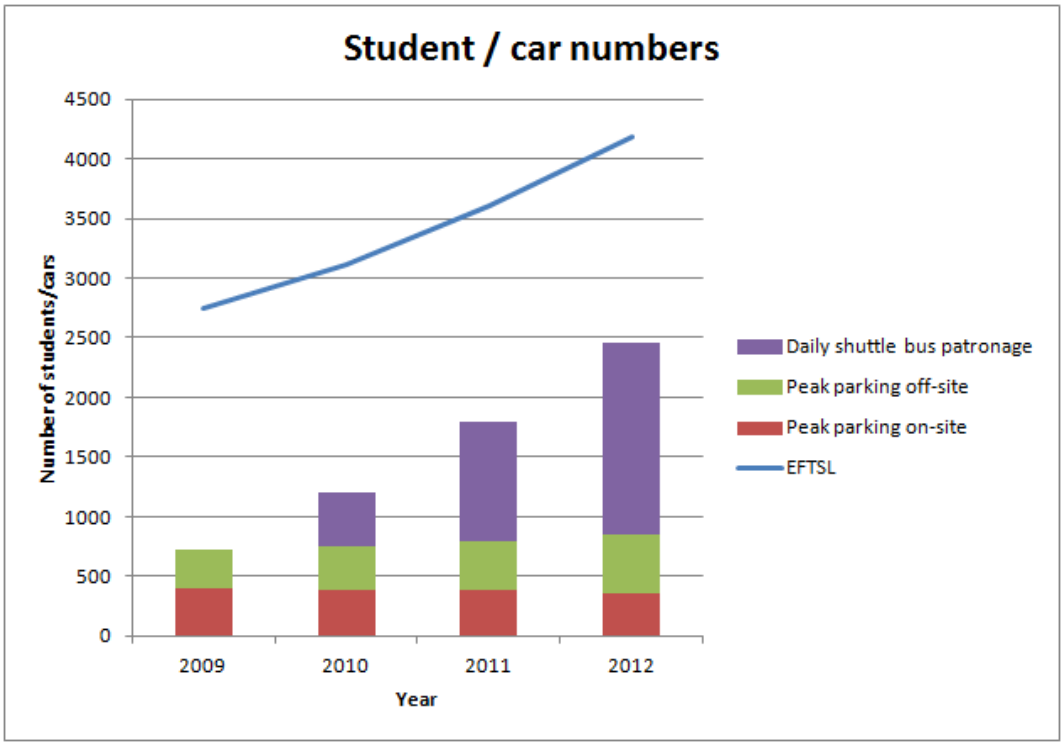
Based on the shuttle bus patronage and car parking data, the trend in travel characteristics for students can be derived. The data for each year from 2009 to 2012 is presented in Table 9 and plotted graphically in Figure 10.

Table 9 Travel characteristic data

Year	2009	2010	2011	2012
EFTSL	2,744	3,112	3,601	4,060
Peak parking on-site	395	390*	384	350
Peak parking off-site	329	368*	407	506
Total parking (staff + students)	724	758*	791	856
Daily shuttle bus patronage	0	450	1,000	1,600
Number of buses running	0	1	3	5

* Car parking data for 2010 not available therefore extrapolated from 2009 and 2011 data for graphing purposes.

Figure 10 Existing travel characteristics



The peak parking (on-site + on-street) has risen slowly from 724 cars in 2009 to 856 cars in 2012, representing a 20% increase over the 4 year period. Over the same period the EFTSL count has climbed constantly from 2,744 to 4,060 which is a 48% increase.

The use of the shuttle bus has climbed at the same rate as the EFTSL growth which is clearly shown in Figure 10. Prior to 2010, students arriving by public transport needed to use the route bus or walk from the railway station. The shuttle bus commenced in 2010 providing students with a free connection to Strathfield Railway Station. In 2012, there are 1,600 students arriving by shuttle bus per day which is 67% of students arriving by shuttle bus per day if up to 2,400 students are currently attending in one day.

5.2 Future trend

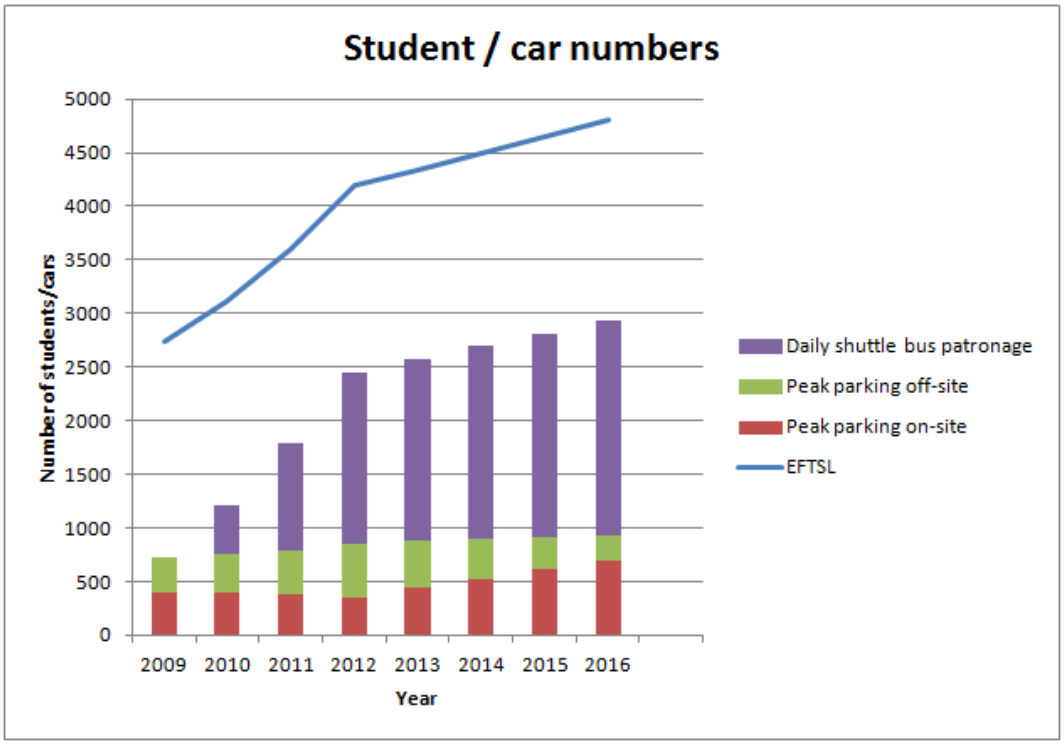
5.2.1 Car Parking

By 2016 the proposed figure of 4,800 EFTSL for enrolled students will result in a maximum of 2,800 students on site on any one day. This represents a 15% growth in student numbers. With a minor increase in shuttle bus services to match the student growth, the shuttle bus could be expected to carry up to 2,000 students per day which represents a public transport mode of 70%.

With this very high public transport utilisation, the current level of student and staff car parking of 856 cars could be expected to increase only marginally to about 950 cars. The future provision of car parking on the campus is proposed at 717 spaces. This reduces on-street car parking from 500 now to approximately 230 cars which is a 120% decrease from existing levels. The forecast student and

travel characteristics are shown in Figure 11. The new Timetable Rubric developed for 4,800 EFTSL students will result in the growth in student numbers over the 4 year period from 2012 to 2016 being much more gradual than has recently occurred and this has been represented as linear growth.

Figure 11 2016 Forecast travel characteristics



The reduction in on-street car parking means that parking restrictions as previously proposed are not required.

5.2.2 Traffic

The growth in traffic as a result of the 4,800 EFTSL in 2016 can be derived from the additional 100 cars parked. The remainder of the growth in transport access occurs on the shuttle bus. Based on the assumption that the additional 100 car parking spaces will generate 1.5 car movements, ie. half of the spaces are used twice in the same day, there will be an additional 300 two-way vehicle movements per day.

The proportion of traffic on Barker Road attributed to growth in ACU attendance up to 2016 can therefore be determined as follows:

Barker Road east – 65% x 300 = 195. This is 3% growth of the 7,413 total traffic.

Barker Road east – 35% x 300 = 105. This is 2% of the 5,715 total traffic.

6 Sustainable Transport Initiatives

To promote the use of public and active transport to the campus, the following sustainable transport measures will be undertaken:

6.1 Pedestrian Facilities

- Students living within 2km of the campus will be targeted to walk to the campus;
- A working partnership will be established with Strathfield Council to provide a direct, comfortable and safe pedestrian access between the campus and Strathfield station as per DDA requirements. Initiatives such as the "10,000 steps a day to improve health initiative" will be considered for students and staff of the university; and
- On campus speed limit will be a maximum of 10 km/h which will provide pedestrians with the right of way.

6.2 Bicycle Facilities

- Bike parking spaces will be visible and properly signposted. Bicycle lockers and separate male and female shower facilities will be considered.
- A working partnership will be established with Strathfield Council and the RMS to build the cycling infrastructure after a bicycle network study in the locality. This will include a bike route between the campus and Strathfield railway station;
- A fully featured Cycling Map will be published for the university;
- A bicycle buddy scheme will be considered to assist new cyclists taking up cycling to and from the university; and.
- A connected bicycle link will be considered between the campus and Bay – to Bay route (west along Barker Road). Bicycle symbols could be inserted in the pavement with some associated signage.

6.3 Public Transport Facilities

- Students who live within 1km of existing train stations will be targeted as potential public transport users;
- A working partnership will be established with Transport for NSW to improve the bus routes and facilities to and from the campus; and
- Introduction and encouragement of university wide walk/ride/catch public transport to Uni Day in conjunction with "National walk to work day, National ride to work day" etc.

6.4 Car Pooling

Introduction of a car pooling system to the university to encourage car sharing amongst the students and staff, especially those who located outside the 10km radius but within close geographic location to each other. Designated car pooling spaces will be provided for these students and staff.

6.5 Small Car and Hybrid/Electric Car Parking

Some parking spaces will be allocated for small and hybrid cars to encourage low carbon emission vehicles into the campus. This could be extended to electric car charging points as demand increases.

6.6 ACU Travel Information

The university website provides comprehensive travel information for its future students, staff, and the visitors. It will be emphasized that the on – campus parking is extremely limited and alternatives to driving, including the frequent shuttle service between the campus and Strathfield Station are readily available. Information about the bicycle and motorbike parking inside the campus will be highlighted.

7 Conclusions

This Preferred Project Report (PPR) addresses these Key Issues relevant to traffic, access, parking and sustainable transport raised by respondents to the Environmental Assessment (EA) report for the ACU Concept Plan.

The other key issue that is a key determinant of the traffic and transport assessment is the student numbers. The existing student attendance numbers and proposed future attendance numbers have been clarified in the Preferred Project Report and response to Submissions document with a brief summary provided in this report.

Arup has collected additional traffic flow data, parking data and shuttle bus patronage data to inform the PPR assessment.

The key outcomes for the Concept Plan in 2016 are:

- Daily student attendance to be capped at 2,800 per day
- On-site car parking to double from 350 to 717 spaces
- Public transport patronage will be 70%
- On-street car parking will be more than halved from 500 to 230 spaces
- A very minor 3% increase in traffic on Barker Road is expected.