

**A TRAFFIC AND PARKING
IMPACT ASSESSMENT
FOR
PENRITH HEALTH CAMPUS
STAGE 3**

Prepared for
HASELL

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Report Document Control

<i>Title</i>	A TRAFFIC AND PARKING IMPACT ASSESSMENT FOR PENRITH HEALTH CAMPUS STAGE 3
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1 INTRODUCTION

Report title	A traffic and parking impact assessment for the Penrith Health Campus Stage 3 redevelopment (PHC Stage 3).
Report purpose	<ul style="list-style-type: none"> • assessment of traffic and parking impacts of the proposal • advice on parking and loading/unloading provision • advice on access options
Client	HASSELL
Background information used for preparation of the present report	<ul style="list-style-type: none"> • plans of the proposed development prepared by HASSELL • Penrith Development Control Plan 2006 Part 2 Section 2.11 Car Parking (DCP) • Penrith Integrated Transport & Land Use Strategy (PITLUS) • requirements for the traffic and parking impact assessment report provided by NSW Roads and Traffic Authority (RTA) and Ministry of Transport (MoT) • results of site inspections carried out by TEF Consulting at Penrith Health Campus • results of traffic, parking, staff and visitor surveys carried out by TEF Consulting near Penrith Health Campus in 2008 as an input for Stage 3 Project Definition and Clinical Service Plans. These results were reviewed and updated where necessary. • results of various surveys carried out by TEF Consulting at other hospitals previously • other documentation - refer to Section 6 References of the present report.
Consultation	<ul style="list-style-type: none"> • HASSELL • Penrith Health Campus engineering services • Aurora Projects <p>Assistance of these organisations is greatly appreciated.</p>

2 EXISTING TRAFFIC AND PARKING SITUATION

Basis for analysis	<ul style="list-style-type: none"> • Analysis of information about activities of various PHC facilities obtained from the PHC administration • Results of the site inspection • Intersection traffic volume counts • Counts of vehicles entering and leaving the site • Car parking accumulation and turnover surveys • Analysis of staff rosters • Questionnaire surveys of staff • Patient and visitor accumulation surveys • Questionnaire surveys of outpatients and visitors
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Site	<p>Penrith Health Campus, Derby Street, Kingswood.</p> <p>Site area – approximately 120,000 m²</p> <p>Refer to Figure 1 for the site location.</p>
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Facilities	<p>PHC is a 420-bed major Referral Hospital. Services include</p> <ul style="list-style-type: none"> • maternity • gynaecology • neonatal intensive care • emergency • diagnostics • paediatric • surgical • intensive care 	<ul style="list-style-type: none"> • coronary care • rehabilitation • mental health • Tresillian Family Care Centre • Menopause Service • Nepean Cancer Care Centre • Diabetes Service • the Wentworth Centre for Drug and Alcohol Medicine.
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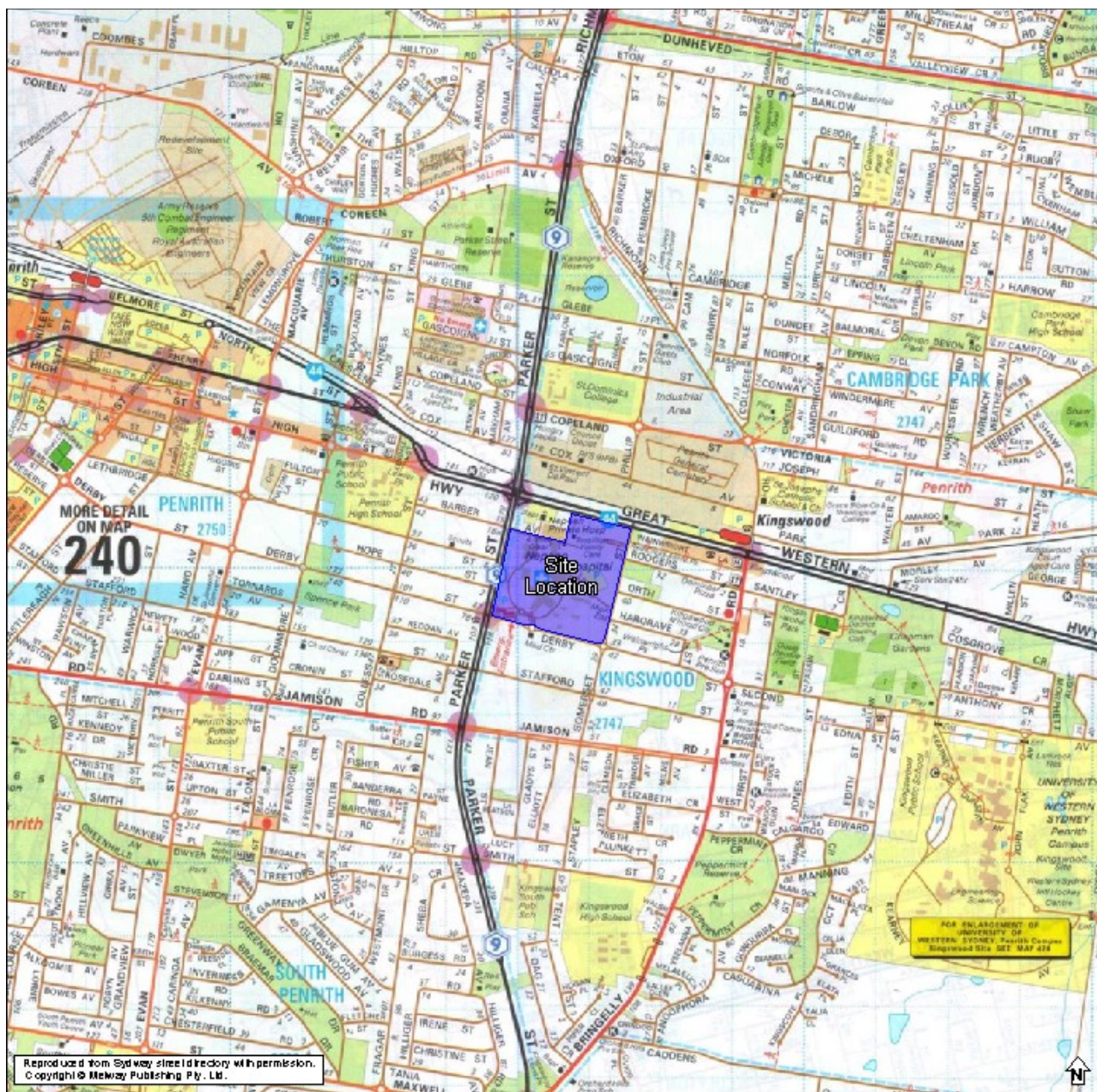


Figure 1. Site location.

2.1 Car parking provision and demand

2.1.1 Surveys of existing car parking situation

Off-street parking provision

- 1,277 marked and de-facto car parking spaces
- some informal areas habitually used for parking
- refer to **Figure 2** for parking locations
- refer to **Table 2.1** for details of individual car parking areas

Table 2.1. Existing of-street car parking areas.

Number	Name	Spaces	Allocation
<i>Pay Car Parks</i>			
1	Barber Avenue	42	staff permit
4	Westblock/ lower	165	staff permit
4	Westblock/ upper	94	visitor/ casual staff
5	Emergency	83	ED visitors/ on call clinical staff
6	Area Office	23	staff permit
8	Derby Street	151	staff permit
9	Clinical Sciences	47	staff permit
9a	Clinical Sciences	13	staff
10	Main Entrance	115	visitor/ casual staff
13	Somerset Street	322	visitor/ staff
13	Somerset Street/ Staff	27	staff (Doctors/ visiting medical officer)
<i>Subtotal</i>		<i>1082</i>	
<i>Not controlled</i>			
1b	Barber Avenue	6	Pialla staff
2	Pialla	10	
2a	Blood bank/ contractors	12	Blood donors / service contractors
3	Transport	6	Fleet cars
4a	Westblock	4	drop off
5a	Derby Street	9	staff
5b	Emergency	10	Emergency/ police/security/VMO
7	Pool vehicles	24	Pool vehicles/ staff
10a	Short-term and disabled	10	
11	Staff Education	6	Reserved staff
12	Somerset Street Entrance	4	Disabled
12a	North Block	3	drop off
14	Child Care	13	Child care staff and pick up/ drop off zone
15	Cancer Care	35	Patient parking only
16	Tresillian	43	Tresillian staff and visitor/ clients only
<i>Subtotal</i>		<i>195</i>	
Total		1277	

Note: refer to **Figure 2** for car parking area number



Figure 2. Existing off-street car parking areas.



Figure 3. On-street parking areas and number of parking spaces

**Parking accumulation
surveys – off-street**

Location(s)

Refer to **Figure 2**

Date

Tuesday 29 April 2009

Time period

08:00 – 18:00

Exclusions

Area 16 was not included in the surveys because access to this area is restricted and this area is only for Tresillian unit staff and clients.

**Important
conclusions**

Survey results are consistent with those obtained by TEF Consulting and other consultants in the previous years

Peak parking demand occurred at approximately 14:00 with 1,100 vehicles present

Practical capacity is approximately 1,100 car parking spaces, equalling some 12% underutilisation of the total car parking provision

Survey results are contained in **Table 2.2** overleaf.

Table 2.2. Existing off-street car parking demand.

Time	CAR PARKING AREAS																				TOTAL
	1	1b	2	2a	4 upper	4 lower	4c	4c amb	5	5a	5a amb	5b	6	7	8	9	9a	10	10a	11	
8:00	16	0	3	4	47	124	4		41	6		7	11	14	86	26	7	58	7	4	654
8:30	21	9	3	5	84	131	3		49	6		8	15	17	108	41	10	79	8	4	825
9:00	23	3	3	8	95	130	4		65	8		7	15	22	117	39	10	97	9	6	962
9:30	25	2	4	9	95	129	5		83	8		9	18	20	120	39	10	114	9	6	1026
10:00	28	2	4	11	95	132	5		83	7		8	17	20	122	42	10	113	10	4	1058
10:30	29	2	5	10	95	133	6		83	7		8	18	21	119	42	11	115	10	6	1081
11:00	31	4	9	10	95	131	5		83	6		9	18	19	118	42	11	113	10	8	1087
11:30	29	5	11	9	95	137	4		83	7		8	18	20	118	37	11	113	10	5	1075
12:00	31	5	7	9	95	141	3	2	83	7		9	18	19	121	40	11	114	10	4	1078
12:30	32	4	6	10	92	140	3	3	79	6		6	17	19	121	34	11	111	10	4	1048
13:00	33	5	4	8	93	142	5		83	7		6	19	23	123	39	11	115	9	5	1068
13:30	35	6	5	9	95	156	6	1	83	7		9	19	21	127	39	12	110	9	5	1100
14:00	36	6	6	9	95	164	7		83	7		7	19	22	127	42	12	115	9	6	1135
14:30	36	6	4	7	91	157	4	2	78	7		5	19	21	126	41	12	110	10	6	1117
15:00	34	6	7	7	77	152	8		78	7		7	20	21	126	40	12	107	6	4	1074
15:30	35	6	8	7	81	147	4		75	7		6	17	21	125	39	13	99	8	5	1032
16:00	28	5	11	9	68	106	3	2	76	4	3	6	16	18	114	36	13	93	10	5	921
16:30	26	5	10	6	52	88	3		66	3	3	8	13	11	98	32	11	82	7	5	790
17:00	17	5	5	7	34	68	2		68	3	3	7	13	9	78	23	7	75	6	3	640
17:30	19	5	6	5	27	59	2		64	4	3	9	11	4	59	13	4	61	6	5	531
18:00	17	6	7	5	24	54	1		60	3	3	8	9	2	55	9	0	61	9	4	474

No. of spaces																				TOTAL
42	6	10	12	94	165	4	83	9	AMB	10	23	24	151	47	13	115	10	6	4	
42	6	10	12	94	165	4	83	9	AMB	10	23	24	151	47	13	115	10	6	4	1234

Time	VACANT PARKING SPACES																				TOTAL
	1	1b	2	2a	4 upper	4 lower	4c	4c amb	5	5a	5a amb	5b	6	7	8	9	9a	10	10a	11	
8:00	26	6	7	8	47	41	0		42	3		3	12	10	65	21	6	57	3	2	574
8:30	21	-3	7	7	10	34	1		34	3		2	8	7	43	6	3	36	2	2	403
9:00	19	3	7	4	-1	35	0		18	1		3	8	2	34	8	3	18	1	0	266
9:30	17	4	6	3	-1	36	-1		0	1		1	5	4	31	8	3	1	1	0	202
10:00	14	4	6	1	-1	33	-1		0	2		2	6	4	29	5	3	2	0	2	170
10:30	13	4	5	2	-1	32	-2		0	2		2	5	3	32	5	3	0	0	0	147
11:00	11	2	1	2	-1	34	-1		0	3		1	5	5	33	5	2	2	0	-2	141
11:30	13	1	-1	3	-1	28	0		0	2		2	5	4	33	10	2	2	0	1	153
12:00	11	1	3	3	-1	24	1	-	0	2		1	5	5	30	7	2	1	0	2	152
12:30	10	2	4	2	2	25	1	-	4	3		4	6	5	30	13	2	4	0	2	183
13:00	9	1	6	4	1	23	-1	-	0	2		4	4	1	28	8	2	0	1	1	160
13:30	7	0	5	3	-1	9	-2	-	0	2		1	4	3	24	8	1	5	1	0	129
14:00	6	0	4	3	-1	1	-3		0	2		3	4	2	24	5	1	0	1	0	93
14:30	6	0	6	5	3	8	0	-	5	2		5	4	3	25	6	1	5	0	0	113
15:00	8	0	3	5	17	13	-4		5	2		3	3	3	25	7	1	8	4	2	154
15:30	7	0	2	5	13	18	0		8	2		4	6	3	26	8	0	16	2	1	196
16:00	14	1	-1	3	26	59	1	-	7	5	-	4	7	6	37	11	0	22	0	1	312
16:30	16	1	0	6	42	77	1		17	6	-	2	10	13	53	15	2	33	3	1	441
17:00	25	1	5	5	60	97	2		15	6	-	3	10	15	73	24	6	40	4	0	591
17:30	23	1	4	7	67	106	2		19	5	-	1	12	20	92	34	9	54	4	1	700
18:00	25	0	3	7	70	111	3		23	6	-	2	14	22	96	38	13	54	1	2	757

Notes: Tresillian Unit and is not included because its operation does not impact on the main campus parking demand/supply
Negative values indicate parking above the formal area capacity

Parking accumulation and turnover surveys – on street

Location(s)

Refer to **Figure 3**

Date

Tuesday 29 April 2009

Time period

06:00 – 18:00

Exclusions

Parking areas along Parker Street and Great Western Highway which are known to be fully utilised by PHC staff from early morning.

Survey type

Number plate survey to enable identification of vehicle arrivals and departures

Important conclusions

Vehicles likely belonging to the local residents comprised a rather low number, some 50 vehicles in the early morning hours. The majority of these vehicles left the study area by 9:00 am.

Peak parking demand occurred between approximately 09:00 and 15:00 with 500 to 550 PHC related vehicles present. Before 07:00 and after 15:00 on-street parking demand is low.

There was a certain pattern of vehicle arrivals which could be associated firstly with the morning nursing shift (6:30-7:30 am) and then with the typical 9:00-5:00 (or 8:00-4:00) business hours.

The peak of parking demand on-street was closely related to the peak of on-site parking accumulation.

Survey results are contained in **Table 2.3**.

Table 2.3 On-street parking demand (excluding Great Western Highway and Parker Street)

Time	6:00	6:30	7:00	7:30	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Day parking	90	167	236	299	376	459	488	490	500	499	498	448	334	205	125
Residential vehicles	53	49	45	27	18	6	2	1	0	0	0	0	0	0	0
Unidentified	2	7	6	10	18	20	18	28	20	14	20	33	36	16	36
Total	145	223	287	336	412	485	508	519	520	513	518	481	370	221	161
Total number of spaces	720														
Available spaces	575	497	433	384	308	235	212	201	200	207	202	239	350	499	559

2.1.2 Surveys of PHC staff, visitors and outpatients

Staff patterns accumulation

Basis for analysis Staff rosters and information regarding staff attendances received from the managers of PHC facilities and from SWAHS.

Analysis outcome A spreadsheet model based on staff attendance information, accounting for staff accumulation overlaps due to various shift times. The model includes staff accumulation by each facility and each staff category by half-hour throughout the day.

Important conclusions The two largest categories of employees are nursing and administration.

Nurses and the majority of the other staff work in three main shifts:

- morning shifts (starting generally between 7:00 am and 8:30 am and finishing between 3:30 pm and 4:30 pm);
- afternoon shifts (starting generally between 1:00 pm and 2:00 pm and finishing between 10:00 pm and 11:00 pm);
- night shifts (starting generally at 10:30 pm and finishing at 7:00 am).

The largest proportion of nurses is engaged in the morning shifts.

The majority of other categories of employees typically start work between 7:00 and 9:00 am and finish between 3:00 and 5:00 pm.

A significant proportion of the staff is not normally in attendance due to being sick or on leave / RDO¹.

Staff survey questionnaire

Survey design

- A questionnaire survey form distributed to all employees
- The respondents were asked questions regarding their status, arrival and departure time, mode of travel, suburb where their trip originated and the approach route and location of parking for car drivers.
- The respondents were also invited to suggest measures to improve car parking provision on the Hospital site.
- A sample questionnaire form is included in **Appendix A**.
- Number of completed questionnaires - 889.
- Sample size - 61% of the total number of morning/day shift employees. It is considered to be a sample of sufficient size to be able to draw conclusions regarding all staff.

Analysis outcome

- Car usage rates for each staff category (refer to **Table 2.4**). Car usage rate of 0.93 cars per person (93% drivers) was calculated and adopted for design purposes.
- Anecdotal information about the current problems with the parking provision.
- Suggestions for improvements of parking provision on site - refer to **Figure 4**.

¹ RDO – Rostered day off

Table 2.4. Car usage of staff by category

	No. of Responses	No. of Drivers	Park in Hospital	Multi answers	% of Drivers	% park in Hospital
Doctors/ VMO	37	35	17	2	0.95	0.51
Managers	38	35	22	1	0.92	0.64
Administrative Staff	157	149	84	9	0.95	0.59
SWAHS	12	12	5	0	1.00	0.42
Scientists	6	6	3	0	1.00	0.50
Pathology	14	12	6	0	0.86	0.50
Allied Health	72	66	25	0	0.92	0.38
Wardperson	8	7	2	0	0.88	0.29
Nursing	379	352	196	32	0.93	0.60
Engineering	8	6	2	0	0.75	0.33
Volunteer	11	7	3	0	0.64	0.43
Student	2	2	1	0	1.00	0.50
Corporate Services	90	68	28	4	0.76	0.44
Other (specify)	55	42	20	4	0.76	0.52
TOTAL	889	799	414	52		



Figure 4. Traffic and parking improvements suggested by PHC staff

Headcounts of visitors and outpatients in all facilities

Locations

All wards and facilities with open access

Date

Tuesday 29 April 2009

Time period

09:30 – 17:00

Inaccessible areas

The number of outpatients in inaccessible areas (e.g. medical suites) was estimated either based on the number of used rooms or on the information obtained from managers of such facilities.

Important

Survey results are consistent with those obtained by TEF

conclusions

Consulting and other consultants in the previous years

Peak person accumulation occurred between 10:30 am and 11:30 am. The number of visitors and outpatients drops substantially after 13:00 and continues to decline for the rest of the day.

Refer to **Table 2.5** for the survey results.

Table 2.5. Visitor and outpatient accumulation (based on survey results)

	9:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00	16:30	17:00
Wards																
N2F	4		3	3	5	4	3	6	5	3	0	2	2	2	6	9
N2G	2	0	5	4	13	3	1	4	9	0	0	2	5	4	3	5
N1F	0	9	0	11	0	0	0	1	3	5	0	0	1	2	5	7
ICU	2	1		10	4	13	5	5	2	4	1	0	8	4	0	0
NEO/CU		11	8	11	7	7	7	7	6	18	10	8	6	2	2	12
S3W		3	2	3	3	2	2	3	4	7	3	6	3	2	1	1
Childrens		9	5	4	6	7	6	9	12	17	7	10	9	10	11	6
S4D		4	10	10	6	11	11	10	8	8	14	10	7	4	6	4
S4E		15	10	10	14	12	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	5	10	10	19	21
W5A		9	7	4	9	14	10	6	6	5	6	6	8	9	7	5
W5B		5	6	6	8	9	8	6	6	6	6	5	5	5	8	10
W5C		10	8	5	5	5	3	1	3	4	4	3	2	0	0	0
W4A		5	6	6	8	9	9	9	10	11	9	7	8	8	8	8
W4B		10	9	8	7	6	8	10	10	9	8	7	7	7	6	5
W4C		10	9	8	10	11	9	7	8	9	11	13	12	11	10	8
Other areas																
Radiation, Cancer	9	14	9	10	18	8	8	8	7	8	12	18	13	7	4	2
Drugs, Alcohol		2	0	0	0	1	0	1	0	0	0	0	0	0	0	0
DAY Surgery	7	0	0	0	0	2	2	0	4	0	1	3	0	0	0	0
Kiosk		10	19	11	31	34	47	25	24	26	19	20	14	4	8	11
MARKET		8	15	22	16	13	22	1	0	3	0	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
MED. IMAGING		4	7	5	3	2	4	6	0	1	3	1	0	0	0	0
NUCLEAR MEDICINE		4	7	10	9	5	8	11	4	3	4	0	0	0	0	0
PHYSIO ETC.		6	12	13	5	3	2	0	2	2	7	5	0	0	0	CLOSED
Woman/children waiting		52	46	31	33	13	13	14	14	14	11	16	5	3	0	CLOSED
Woman/children doctors		9	9	13	8	11	9	6	2	4	5	5	7	4	5	CLOSED
Ultrasound		4	2	6	3	2	2	3	4	5	5	0	6	5	0	CLOSED
Emergency		3	6	2	5	4	5	15	13	3	4	7	11	10	11	12
Outpatients/Pathology FOYER		1	1	4	1	0	4	4	1	0	1	2	0	0	0	0
Endoscopy		4	7	2	3	5	9	5	7	3	0	1	0	0	0	0
Outpatients clinic, med investigation, med investigation, common		9	18	11	9	2	5	6	6	8	8	6	0	0	2	0
OUTPATIENTS West block		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total	24	235	250	247	253	222	226	193	184	190	163	172	153	117	126	130

Questionnaire survey of visitors and outpatients

Survey design

- A questionnaire survey was carried out in all areas listed in **Table 2.5**.
- Visitors and outpatients were asked questions regarding their mode of travel, arrival and departure time, and period of time stayed at the hospital.
- A sample questionnaire form is included in **Appendix A**.
- Number of completed questionnaires – 281 representing 511 people (one form was used for groups of people who arrived together).
- Sample size – difficult to determine due to unknown visitor/outpatient turnover. It is noted, however, that the sample size is double the maximum number of people on site at any one time. This is considered to be a sample of

sufficient size to be able to draw conclusions regarding all visitors and outpatients.

- Analysis outcome**
- Car usage rates for each category of visitors and outpatients (refer to **Table 2.6**).
 - Car usage rate adopted for design purposes
 - 0.76 cars per person (76% drivers) for outpatients
 - 0.45 car per person (45% drivers) for visitors to inpatients
 - Peak periods of parking demand for visitors, outpatients and staff do not coincide.

2.1.3 Estimated typical parking demand

- Basis for estimation**
- Information described in **Section 2.1.2** of the present report, namely
 - Staff accumulation patterns
 - Visitor accumulation patterns, adjusted (increased) for design bed occupancy
 - Outpatient accumulation patterns, factored up to represent a typical busy day, based on information received from facility managers; also factored up to account for visitors in transition between PHC facilities
 - Car usage ratios of staff, visitors and outpatients for calculation of car parking demand, as follows

$$\text{No. of cars} = (\text{Number of people}) \times (\text{car usage rate})$$

Estimated typical busy day parking demand

Refer to **Figure 5**.

Validation

- Based on comparison with actual off-street and estimated on-street demand obtained from the surveys described in **Section 2.1.1** of the present report. Refer to **Figure 6**.
- Based on comparison with the results of the questionnaire survey where the respondents were asked to indicate their parking location. The proportion of those who indicated street as their parking location matched closely the results shown in **Figure 6** for both staff and visitors/patients.

Conclusions

- Estimates based on the two approaches show a very close match.
- The actual pattern of the total parking demand attributed to the PHC is slightly higher and its pattern is smoother than that estimated based on the staff shift times and visitor/outpatient surveys.
- The PHC parking demand is generally stable throughout the peak period at

approximately 1,650 vehicles, including some 550 vehicles in the nearby streets and some 1,100 vehicles in the internal car parking areas.

- The existing off-street parking areas are under-utilised by approximately 12%.

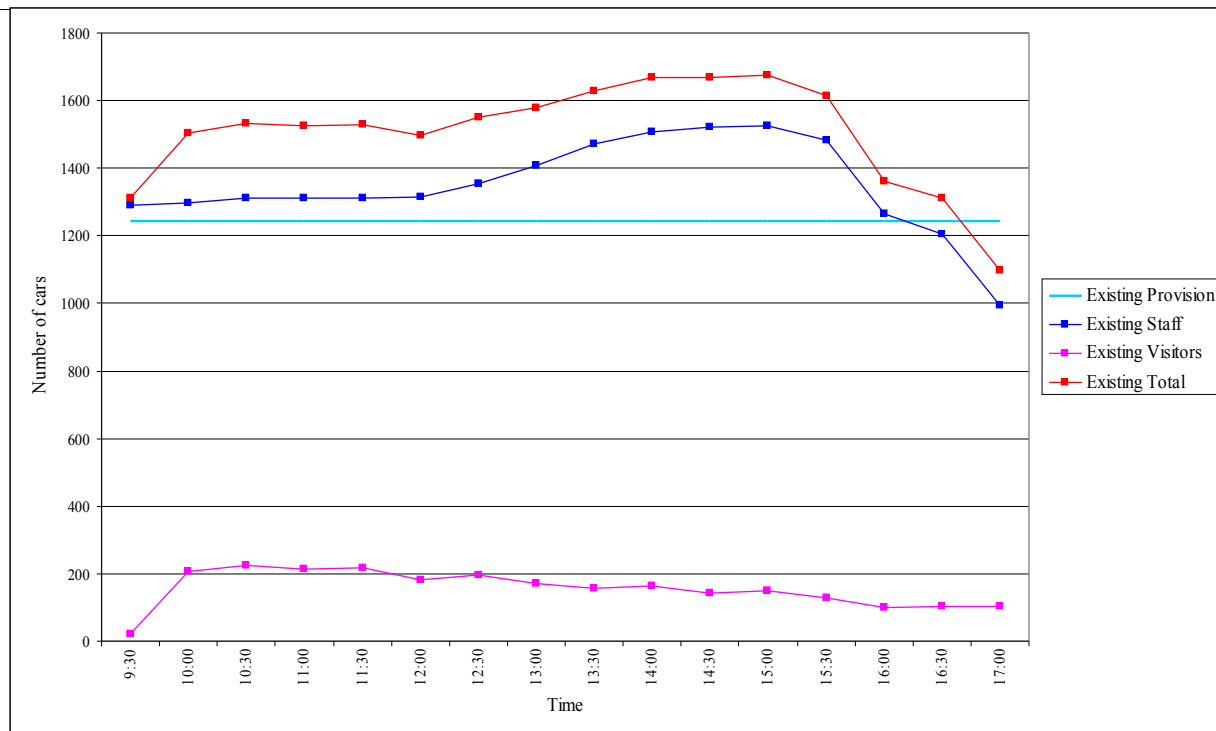


Figure 5. Hospital parking demand and provision (estimated for a typical busy day)

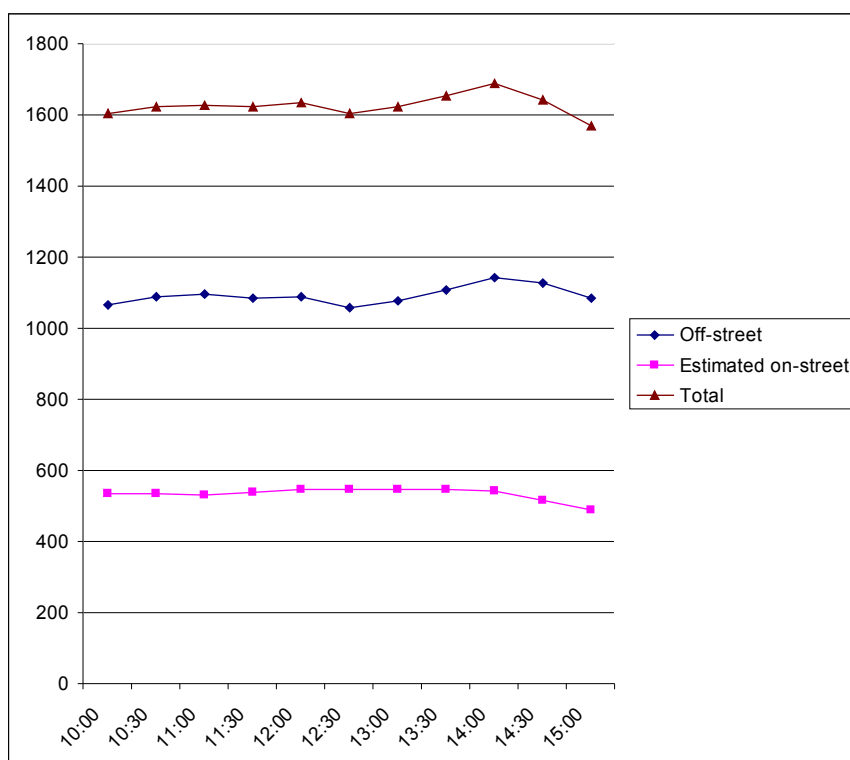


Figure 6. Actual off-street and estimated on-street parking demand generated by PHC

2.2 Street and access conditions

Characteristics of surrounding streets and access locations Refer to Figure 4.

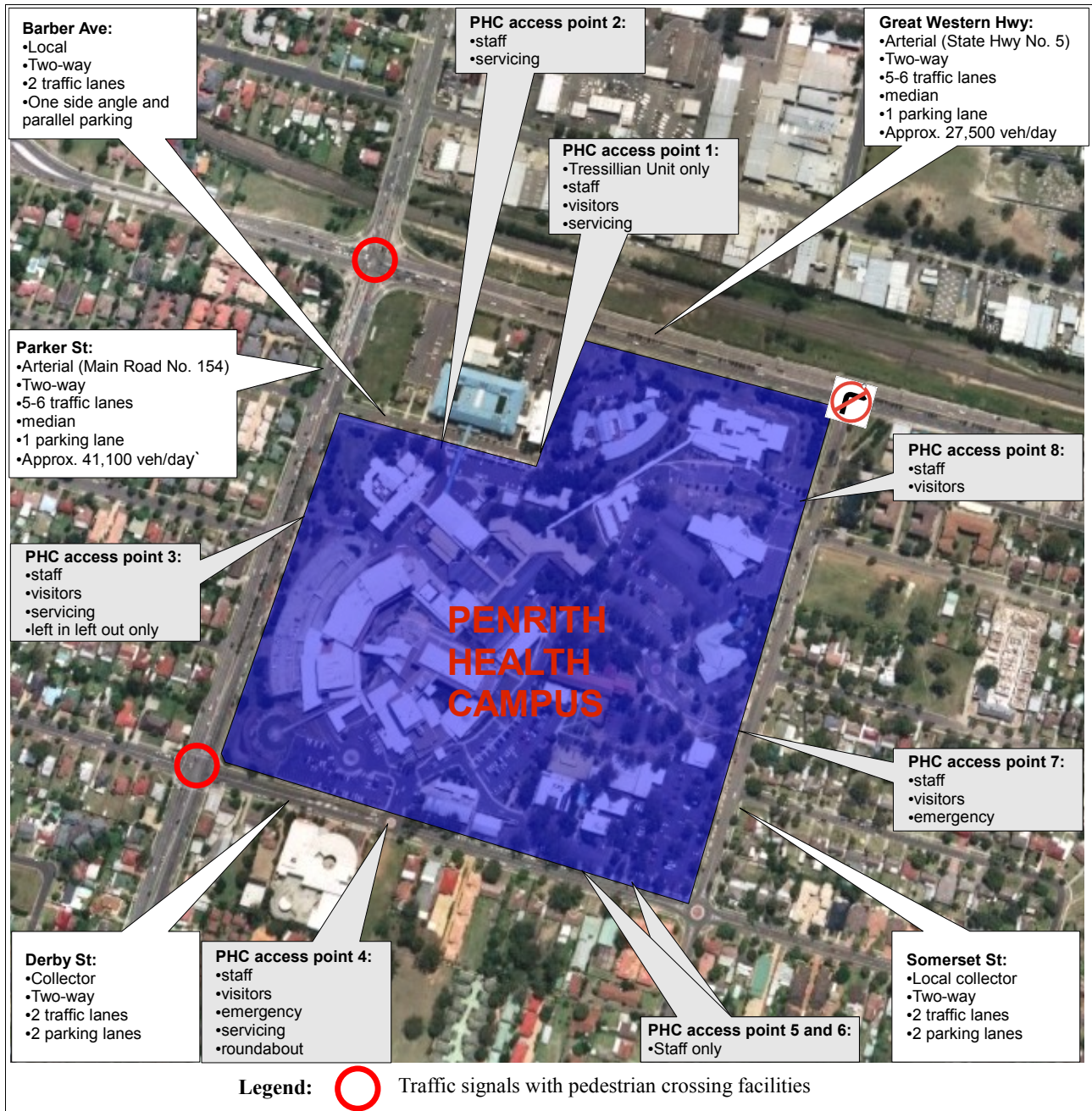


Figure 4. Characteristics of streets, intersections and access locations

Intersection volume counts	traffic	Location(s)	Refer to Figure 4
		Date	29/04/08
		Day of the week	Tuesday
		Time period (AM)	Parker St intersections - 07:00 – 12:30 PHC access points – 06:30 – 10:00 peak hour occurred • 08:15 – 09:15
		Time period (PM)	Parker St intersections - 13:00 – 18:00 PHC access points – 13:00 – 18:00 peak hour occurred • 15:30 – 16:30

Peak hour traffic volumes are shown in **Figure 7**.

Intersection operation	<p>SCATES and SIDRA INTERSECTION software packages were used to analyse the operation of critical intersections.</p> <p>The results are shown in Table 2.4.</p> <p>The results indicate that intersections generally operate at satisfactory Levels of Service with spare capacity, except the intersection of Great Western Hwy and Parker St which operates near capacity in the afternoons.</p>
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2.3 Travel modes other than private car

Sources of information	<ul style="list-style-type: none"> • Penrith Integrated Transport and Land Use Strategy Draft Strategy Report (PITLUS) (Cardno Eppell Olsen et al., June2008) • NSW Government Transport Info web site www.131500.com.au • Results of the site inspection • Results of the questionnaire surveys
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Bus	<ul style="list-style-type: none"> • Refer to Figure 8 for locations bus routes and stops. • Bus services run within 15 to 30 minute intervals during peak hours. • Results of questionnaire surveys indicate very low use of buses by staff (less than 1%) and visitors (3%).
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Train	<ul style="list-style-type: none"> • Refer to Figure 9 for Kingswood station catchment area and footpath provision between the station and PHC. • Train services run at 30 minute intervals in each direction during the peak hours. • Results of questionnaire surveys indicate very low use of trains by staff (2%) and visitors (none).
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Bicycle

- Refer to **Figure 10** for existing and proposed bicycle network.
- Results of questionnaire surveys indicate very low use of trains by staff (less than 1%) and visitors (none).
- Bikeway connections to the PHC are limited and non-continuous, particularly in the north-south direction.



Figure 7. Existing peak hour intersection traffic volumes.

Table 2.4. Results of analysis of intersection operation

Intersection	Existing											
	AM						PM					
	AVD	LOS	DS	Longest queue (m) on			AVD	LOS	DS	Longest queue, m, on		
Parker St - Great Western Hwy	26.8	B	0.9	66	GWH	WB R	42.9	D	0.9	90	GWH	NB T
Parker St - Derby St	22.8	B	0.72	60	PS	SB T	29.1	C	0.91	114	PS	SB T
Derby St - Main hospital entrance	12.8	A	0.33	24	DS	EB T	13.3	A	0.31	22	DS	WB T
Great Western Hwy - Somerset St	20.1	B	0.42	20	GWH	EB R	19.8	B	0.52	22	ST	NB L

Legend:

AVD	Average delay, sec	T	Through movement
LOS	Level of Service	R	Right hand turn
DS	Degree of saturation	L	Left hand turn
GWH	Great Western Hwy	EB	Eastbound
PS	Parker St	WB	Westbound
DS	Derby St	NB	Northbound
HE	Hospital Entrance	SB	Southbound

Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout
A	< 14	Good operation
B	15 to 28	Good with acceptable delays & spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode

Source: RTA (2004)



Figure 8. Existing bus services.

Kingswood RSWC

The streets immediately adjacent to the station and a good proportion of connecting routes have limited footpaths. There are still a considerable number of streets within the Kingswood RSWC with no footpaths.

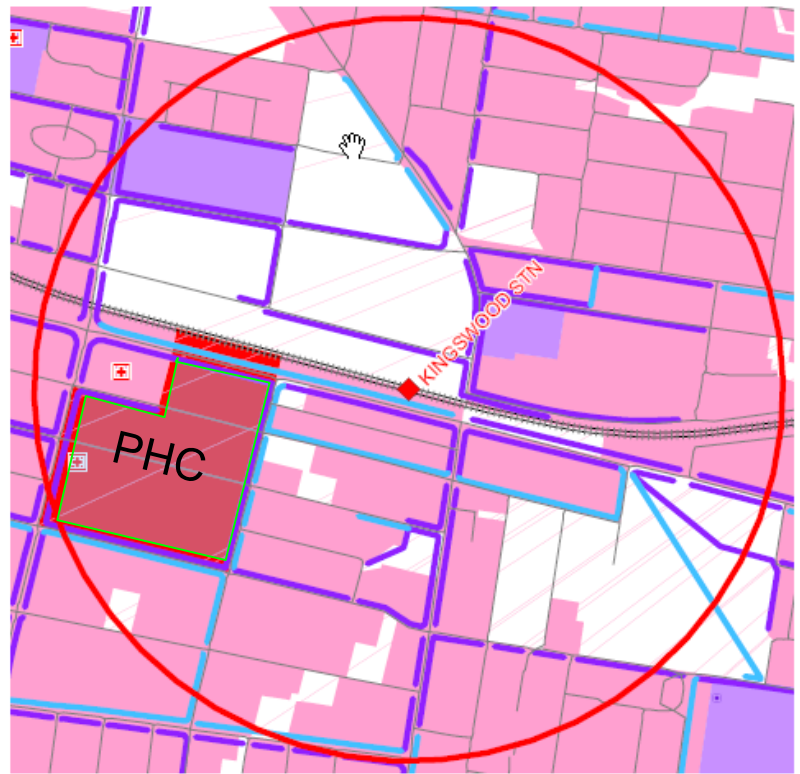
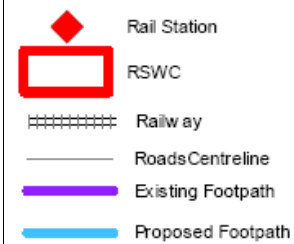


Figure 9. Kingswood station catchment area and footpath provision .
(source: Cardno Eppell Olsen et al., June2008).

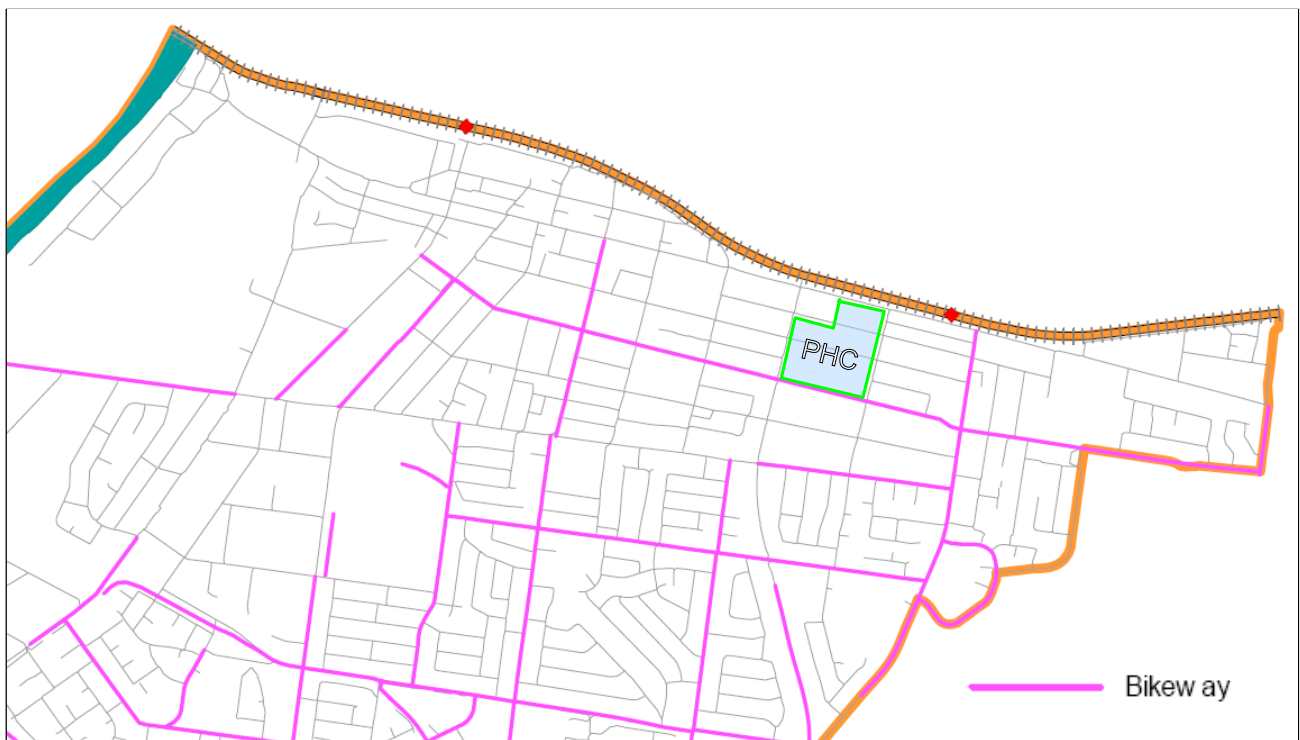


Figure 10. Existing and proposed bicycle network (source: Cardno Eppell Olsen et al., January 2008).

3 PROPOSED STAGE 3 REDEVELOPMENT

Proposed redevelopment

Proposed additional facilities are listed below.

- 16 extended day only beds (focusing on short stay surgery)
- one day only surgical bed
- 16 overnight beds (medical)
- 10 medical assessment unit beds (short stay beds)
- 5 intensive care beds
- 6 in-centre renal spaces
- expansion of CSSD
- 5 additional surgical outpatient clinics
- 6 operating theatres

Total space / bed increase is 54.

The above services are proposed to be similar to those which currently exist at the PHC, with some sharing staff numbers.

Building and car parking area design

Refer to drawings prepared by Hassell.

4 IMPACTS OF THE PROPOSED DEVELOPMENT

4.1 Planning framework

NSW Government's Metropolitan Strategy

DEVELOP PENRITH AS A REGIONAL CITY

- Implement the Cities Taskforce plans for Penrith, and consider the recommendations of the Centres Reinvigoration Report. (NW B3.1.1)
- Investigate opportunities to strengthen connections between the UWS Penrith Campus, Nepean Hospital and Penrith Regional City. (NW B3.3.1)
- Prepare a structure plan for the North Penrith Defence Lands to complement the existing city centre and the draft Penrith City Centre Plan. (NW B2.1.2)

Aims:

- increasing the use of
 - walking
 - cycling
 - public transport
- appropriately co-locating new urban development with existing and improved transport services
- improving the efficiency of the road network

Council's objectives

PITLUS sets out aims and objectives for future land use and transportation system development in Penrith LGA. These include, amongst others, the following

- **Increase public transport use per capita**
 - *Increase opportunity for people to travel by public transport to major destinations*
 - *Increase public transport use by upgrading the viability of public transport as a convenient and safe alternate to the private car*
- **Decrease motorised private vehicle use per capita**
 - *Decrease the use of motorised private vehicles by providing more non-car based opportunities for travel*
 - *Reduce Car Dependency*
 - *Reduce Car Use*
- **Decrease the number and length of trips per capita including those on public transport**
 - *Reduce the need to travel*
 - *Reduce the number and length of trips including those on public transport*
- **Improve access to jobs and other economic activities**
 - *Improve the freight network*
 - *Improve Road Network Efficiency*

4.2 Parking demand and provision

Required provision	parking	May be assessed based on <ul style="list-style-type: none"> • Council requirements • RTA (2002) Guide to Traffic Generating Developments • Results of surveys at the existing facilities
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4.2.1 Council's car parking requirements

Planning document	control	Penrith City Council's Development Control Plan (DCP) Part 2 Section 2.11 Car Parking <ul style="list-style-type: none"> • Hospitals <ul style="list-style-type: none"> ▪ 1 per 3 beds plus 1 per 3 employees
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Number of additional staff	Basis for analysis	<p>Additional staff numbers provided by Aurora Projects at the Concept Planning stage. These were expressed in Full Time Equivalent (FTE) values which do not equal to the number of staff on site at any one time.</p> <p>Analysis of existing staff profiles identified</p> <ul style="list-style-type: none"> • staff by department by FTE; • the proportion of staff working standard hours (generally 8-9am to 4-5pm); • the two largest groups of employees were nurses and administrative staff. • Administrative staff generally work standard hours i.e. starting between 8.00-9.00am and finishing between 4.00-5.00pm. • Nurses and the majority of other staff generally work in three main shifts: <ul style="list-style-type: none"> ▪ morning shifts (generally starting between 7:00-8:30am and finishing between 3:30-4:30pm); ▪ afternoon shifts (generally starting between 1:00-2:00pm and finishing between 10:00-11:00pm); ▪ night shifts (generally starting at 10:30pm and finishing at 7:00am). • for shift workers the general staffing ratio was 0.55 for morning shifts, 0.24 for afternoon shifts, and 0.12 for evening shifts (following discounting of FTE to a factor of 0.9 to account for staff absence due to sick leave, holidays etc)
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Estimated number of staff	actual	<ul style="list-style-type: none"> • Design time period morning (busiest) shift • FTE numbers were converted into the actual number of
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staff on site at any one time using

- existing ratios of nursing staff engaged in morning, afternoon and night shifts
- for staff working normal business hours - factors to account for normal and sick leaves and RDOs
- The total proposed maximum number of staff on site during the morning shift – **182**

Parking requirement 54 beds / 3 = 18 plus
 182 employees / 3 = 61,
 a total of 18 + 61 = **79** car parking spaces.

4.2.2 RTA car parking requirements

RTA (2002) Guide

No requirements for public hospitals.

For **private** hospitals RTA (2002) recommends the following formula for parking provision calculation.

$$PPA = -19.56 + 0.85 B + 0.27 ASDS$$

where PPA is Peak Parking Accumulation;

B is number of beds; and

ASDS is Average number of staff per weekday shift.

For extended hours medical centres (similar to outpatient clinics) – 4 car parking spaces per 100 sq m of Gross Floor Area

Applicability – for comparison purposes.

Application of the above rates for Penrith Health Campus results in the parking provision requirements included in **Table 4.1**.

It is noted that the result obtained using RTA rates for private hospitals is very similar to that calculated using Council's DCP in **Section 4.1.1** of the present report.

Table 4.1. Parking requirements based on the RTA recommendations for private hospitals.

Private Hospital	
Number of Beds	54
Average number of staff per weekday day shift	182
Peak Parking Accumulation	75
Medical Centre	
Gross Floor Area	150
Peak Parking Accumulation	6
TOTAL	81

4.2.3 Proposed car parking provision

Number of car parking spaces

The proposed redevelopment will result in a loss of some parking spaces and construction of the new car parking spaces. The resulting proposed parking provision is detailed in **Table 4.2** and shown in **Figure 11**.

Table 4.2. Summary of parking provision changes

EXISTING		PROPOSED		REQUIRED	
CP10	115	CP9	+ 8	East Block	79
CP10a	10	CP9a	+ 6	Spaces Lost	68
CP9	39	East Block 1 CP	+ 119	TOTAL	147
CP9a	14	East Block 2 CP	+ 12		
CP11	6	Gateway CP	+ 4	BALANCE	+2
TOTAL	184	TOTAL	149		

The total additional parking provision after Stage 3 redevelopment will be **81 car parking spaces**. This provision complies with and exceeds Council's requirement of 79 car parking spaces.

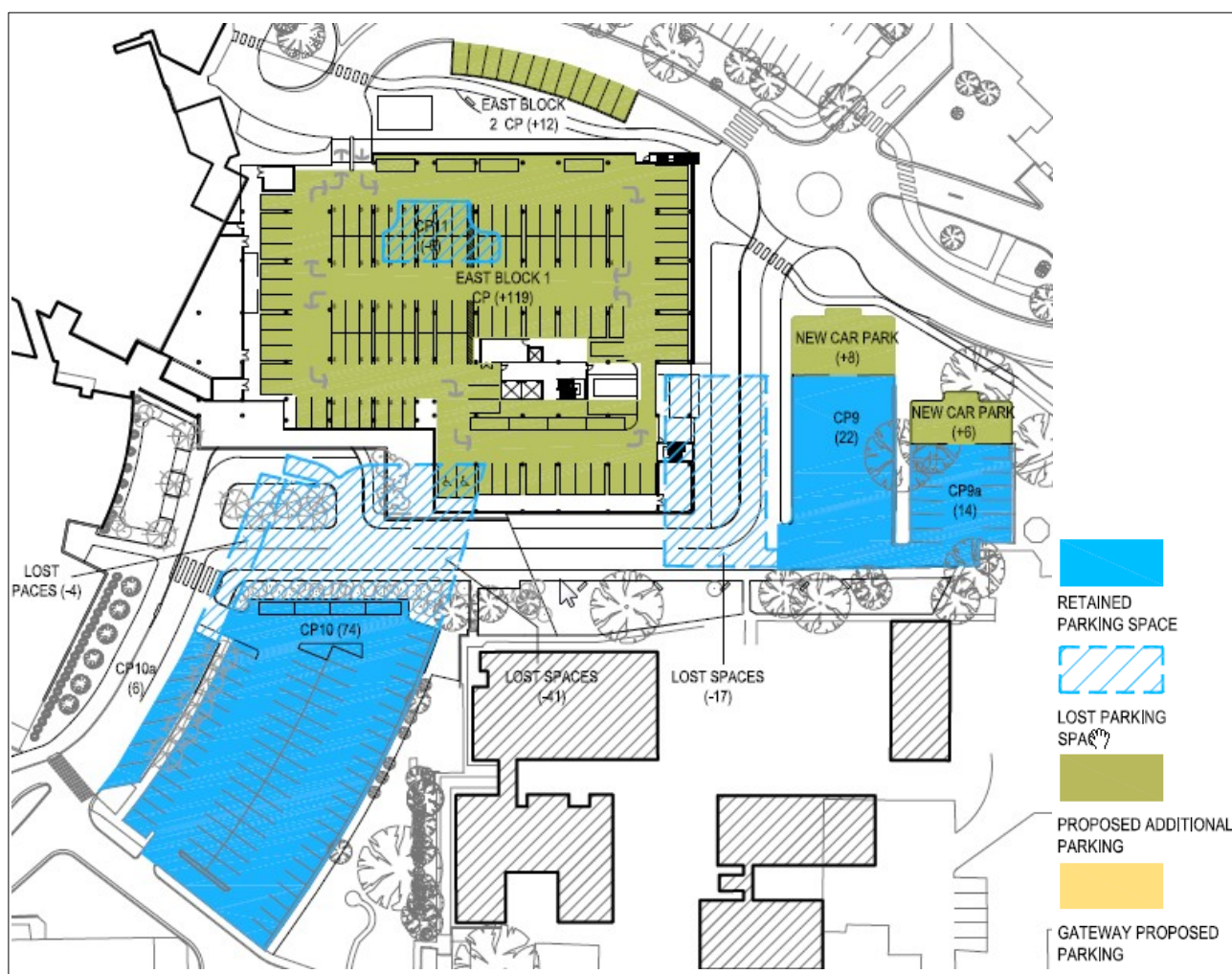


Figure 11. Proposed car parking provision.

Compliance of existing and future car parking provision with parking controls

Parking requirements for the existing numbers of staff and beds are calculated in the table below.

Existing car parking compliance 420 beds / 3 = 140 plus
1,500 employees / 3 = 500,
a total of 140 + 500 = **650** car parking spaces.

Existing total parking provision 1,277 spaces

Specific uses not considered as part of general parking supply	Area Office (WAHS)	23
	Blood donors / service contractors	12
	Fleet cars	6
	drop off	4
	Emergency/ police/security/VMO	10
	Pool vehicles/ staff	24
	Staff Education	6
	Child care	13
	Patient parking only	35
	Tresillian staff and visitor/ clients only	43
	Total	176

Total parking provision for the purpose of DCP calculation 1,277 – 176 = **1,101** car parking spaces

Existing car parking compliance The existing general parking provision of 1,101 parking spaces at PHC fully complies with and exceeds Council's DCP requirements. The existing parking provision exceeds the DCP requirement of 650 spaces by 451 spaces or 69%.

Total parking requirements and supply after Stage 3 Total DCP requirement : 650 + 79 = **729** spaces
Total parking provision : 1,101 + 81 = **1,182** spaces
Total parking provision after Stage 3 will continue to exceed DCP requirements by a substantial number of car parking spaces.

Design checks	Item	Check	Result of assessment
	Dimensions of car parking spaces, driveways and circulation roadways	AS/NZS 2890.1:2004 AS 2890.2-2002	Satisfactory Satisfactory
	Vehicle manoeuvring	using AutoTrack software	8.2 Satisfactory, subject to minor design changes which can be easily accommodated Refer to Appendix B for vehicle turning diagrams.

4.2.4 Parking impacts

Actual demand

Actual parking demand generated as a result of Stage 3 redevelopment may be estimated as 196 spaces (during the periods of peak parking demand, approximately between 9:00 and 15:00). This estimate is based on the survey results detailed in **Section 2.1** of the present report.

There is a separate proposal, not part of Stage 3 redevelopment, that the Blood Bank be relocated from the PHC site in the near future. This will result in a reduction of parking demand by approximately 10 to 20 cars, benefiting the overall parking supply on PHC site.

Additional on street demand

The proposed additional car parking provision is 81 spaces. Reduction of the Blood Bank parking demand is approximately 15 spaces on average.

The on-street parking demand may thus be estimated as
 $196 - 81 - 15 = 100$ cars

Effect on car parking availability

Vacant on-street spaces may be found in local streets east of Somerset St and west of Parker Street. Survey results contained in **Table 2.3** of the present report indicate that at least 200 vacant spaces are available in the surrounding streets.

When distributed on the street network, additional parking demand will be in the order of 12-13 cars per street.

It is noted that the periods of peak parking demand are outside the periods of peak parking demand generated by local residents. There will be little or no direct effect on resident parking.

4.2.5 Measures to reduce car parking impacts

Additional provision

parking

Staff and visitors of PHC as well as residents and businesses in its neighbourhood would benefit from additional off-street parking provision at PHC.

Existing demand by PHC *on-street generated* • Approximately 550 cars

On-street car parking spaces likely to continue to be used even if additional off-street parking is provided

- Approximately 310 spaces, comprising
 - 130 spaces along the PHC boundaries
 - approximately 180 spaces within convenient walking distance

The conclusion about continued use of these spaces is supported by the questionnaire survey results.

Estimated existing parking shortfall

Approximately 240 spaces

Concept plan recommendations

The traffic and parking report for the concept plan recommended provision of some 240 (existing shortfall) plus 196 for Stage 3 (a total of 436 spaces plus 10% margin to cater for typical underutilisation). Note that this provision was designed to improve the existing parking situation. These additional parking spaces are not necessary to comply with DCP requirements. As stated in **Section 4.2.3** of the present report, the total additional parking provision after Stage 3 redevelopment will be 81 car parking spaces, which complies with and exceeds Council's requirement of 79 car parking spaces.

Future parking provision

SWAHS and Health Infrastructure propose to construct a multi-level carpark as part of Stage 4 of PHC redevelopment.

Number of additional parking spaces

Subject to further design development, however it is proposed to increase on-site parking provision to cater, in addition to DCP requirements, for at least part of the current actual parking shortfall and the actual parking demand generated as a result of Stages 3 and 4.

Increase transport use

public

- It is recommended that a booklet be compiled and distributed or made available to the staff with information on bus and train service routes and timetables.
- **Bus**
 - Redirecting the existing bus routes through and installation of additional bus stops within the campus will have no effect. The existing bus stops are within convenient walking distance already.
 - Westbus have advised that they have no plans exist for expanding the network or increasing the frequency of services which run near the Nepean Hospital.
 - To improve staff convenience when using bus services it is recommended that a direct shuttle bus service be introduced between the Hospital and the Penrith bus/rail interchange during the periods of peak staff arrivals and

departures. This service will be run by the PHC. Due to a relatively short route distance it will be possible to achieve 10 minute frequencies using two buses. It is recommended that mini-buses (12- or 20-seaters) be used for greater flexibility and reduced running costs.

- **Train**

- PHC is within the catchment area of Kingswood station (refer to **Figure 9**)
- The above proposed shuttle bus service may encourage some people to use train. Although it was recommended above that the shuttle bus service be a direct route from the Hospital to the Penrith bus/rail interchange, it can be extended to stop at the Kingswood station as well. This is likely to increase the total end-to end trip time from some 8-10 minutes to some 10-13 minutes.

Modes other than private car

- 20 secure staff bicycle spaces and dedicated change facilities will be provided in L1 East Block
- Approach Council with a request to provide more bikeway connections to the PHC

Other measures to reduce private car use and to optimise off-street car parking use

Measures recommended for implementation

- Develop and produce a Transport Access Guide (TAG). TAG shall include information on public transport and cycleways (including nearest bicycle repair services). Distribute TAG to all existing staff. Include TAG into the induction package for all new employees and regular visitors (for example students). Make TAG available at the reception in each facility.
- Make all staff aware and encourage the use of www.131500.com.au by regular emails and by inclusion in TAG.
- Provide interest free loans to staff for purchasing discounted season tickets.
- Introduce a system which would inform staff members about other staff who reside in their neighbourhood, for the purposes of car pooling.
- Prepare and distribute a guide on health benefits of walking and cycling.
- Investigate a possibility of introducing shift times for “9 to 5” staff, increasing the ratio of work starting and finishing times outside commuter peak periods.

Measures recommended for further consideration

- Implement an electronic system of paid parking, enabling multiple entry and exit and use of different car parking areas using the same ticket, to encourage off-street parking of visitors and outpatients.
- Employ a Travel Plan coordinator in charge of monitoring, development and implementation of measures to reduce car use.
- Provide a bicycle repair service on site.
- Develop and implement a system of teleworking, setting a benchmark for minimum teleworking time for each staff member.
- Implement a reverse incentive system of monetary reward, whereby a small amount is added to the staff member's wages on a daily basis but deducted at the end of the day this staff member's car was recorded as exiting the car park.
- Introduce cash based incentives, for example discounted travel passes, for staff.
- Implement a real time electronic display information system informing staff about the nearest times of bus and train departures. The system should

incorporate service disruptions. As an extension, make this system available on the intranet for easy access from each workplace and accessible on mobile/smart phones.

Penrith Commuter Car Park

- The NSW Government has announced that a 1,000 space commuter car park will be constructed near the Penrith rail station.
- It may assist some staff with their travel and parking arrangements, should they choose to drive to and park in the new commuter car park and then take a bus or train to the hospital. The likelihood of such travel arrangements is considered to be very low.
- The likely effect of the Penrith Commuter Car Park on the PHC traffic and parking situation is likely to be very minor.

4.3 Impacts on the road network

Additional generation

traffic

Basis for analysis

- Results of the surveys described in **Sections 2.1** and **2.2** of the present report
 - arrival and departure traffic flows through the PHC access points, including existing proportion of peak hour traffic compared with total number of cars arriving and departing;
 - origins and destinations staff and visitor trips and their directional distribution on the street network from the questionnaire survey results.
- The spreadsheet model based on staff attendance information, accounting for staff accumulation overlaps due to various shift times. The model included **staff arrival and departure patterns** for each facility and each staff category by half-hour throughout the day. It was found that between
- The total additional maximum number of staff cars on site on street during the morning shift (169) and the number of cars belonging to visitors (11). Note that the peak parking demand hours for staff and visitors do not coincide.

Assumptions

- All incoming and outgoing trips use PHC site access points. This represents the worst case scenario in terms of trip concentration at particular intersections. In reality, at least some of the additional vehicles will park in the vicinity of PHC and will not use critical intersections of Parker St / derby St and Derby St / Main Entrance.
- Outpatients typically arrive after the morning peak hour and depart before the afternoon peak hour. Their traffic generation does not impact on the street peak hour conditions.
- **Morning peak hour arrivals** constitute 44% to 56% of total morning arrivals calculated based on the roster analysis and 40% based on the actual traffic counts. For additional traffic generation, the worst case scenario of 56% of 169 staff (96 trips/hr) and 100% of 11 visitors (11 trips/hr) were utilised for traffic impact assessment (a

total of **107 trips/hr**).

- **Morning peak departures** were assumed to be 33% of the incoming traffic (**35 trips/hr**), based on the same proportion of outgoing traffic calculated from the survey results.
- **Afternoon peak hour departures** constitute 41% of total afternoon departures calculated based on the roster analysis and 32% based on the actual traffic counts. For additional traffic generation, the worst case scenario of 41% of 169 staff (69 trips/hr) and 100% of 22 visitors and outpatients (22 trips/hr) were utilised for traffic impact assessment (a total of **91 trips/hr**).
- **Afternoon peak hour arrivals** were assumed to be 63% of the incoming traffic (**57 trips/hr**), based on the same proportion of outgoing traffic calculated from the survey results.
- Morning and afternoon peak hours for PHC traffic generation do not coincide with the street peak traffic hours. For assessment purposes additional peak PHC traffic volumes were superimposed onto the street peak traffic, to represent the worst case scenario.

Validation

- Additional traffic generation estimated above was compared with actual traffic generation based on the survey results.
- Existing morning peak hour traffic volumes at PHC site access points constituted 37% and 12% of the total parking demand for incoming and outgoing traffic respectively. Estimated additional traffic volumes utilised for the present traffic impact assessment were 63% and 21% of the additional parking demand respectively, representing the worst case scenario.
- Existing afternoon peak hour traffic volumes at PHC site access points constituted 18% and 29% of the total parking demand for incoming and outgoing traffic respectively. Estimated additional traffic volumes utilised for the present traffic impact assessment were 34% and 54% of the additional parking demand respectively, representing the worst case scenario.

Traffic distribution on the street network

Assumptions

- Origins and destinations staff and visitor trips and their directional distribution on the street network will be the same as those obtained from the questionnaire survey results.
- Peak hours of PHC arrivals/departures and peak hours on the street network will coincide.
- All trips will have their origin or destination at the PHC site.

Additional traffic volumes on the street network.

- Refer to **Figure 12**.

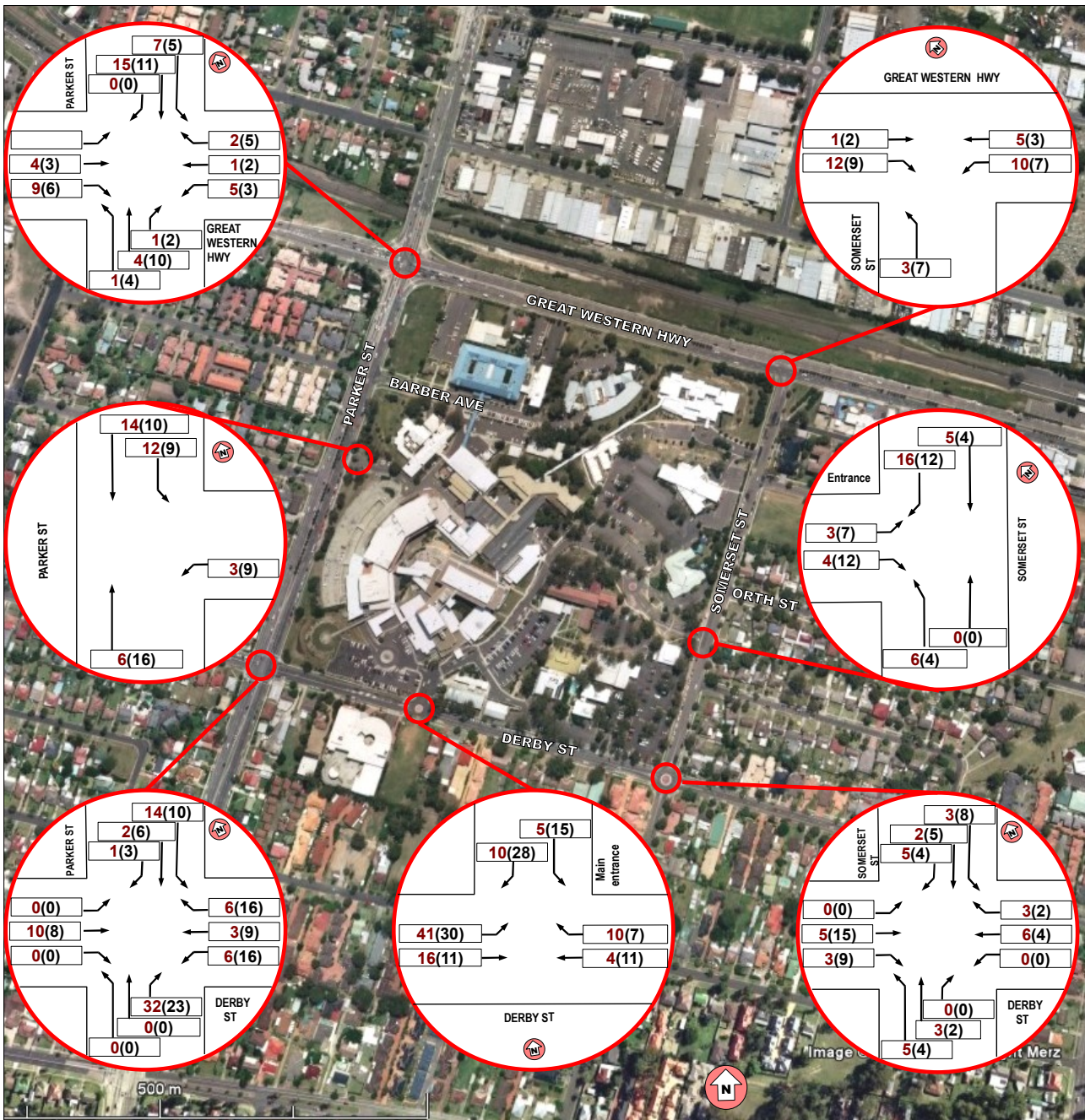


Figure 12. Additional traffic volumes on the street network as a result of Stage 3 redevelopment.

Capacity of streets and intersections

SCATES and SIDRA INTERSECTION software packages were used to analyse the operation of critical intersections after Stage 3 redevelopment.

The results are shown in **Table 4.2**, together with the results of assessment of the existing intersection operation for comparison.

The results indicate that intersections will continue to operate at the same Levels of Service as at present, with minimal increases in average delays and queuing.

Table 4.2. Results of analysis of intersection operation – existing and after Stage 3

Intersection	Existing													
	AM							PM						
	AVD	LOS	DS	Longest queue (m) on				AVD	LOS	DS	Longest queue, m, on			
Parker St - Great Western Hwy	26.8	B	0.9	66	GWH	WB	R	42.9	D	0.9	90	GWH	NB	T
Parker St - Derby St	22.8	B	0.72	60	PS	SB	T	29.1	C	0.91	114	PS	SB	T
Derby St - Main hospital entrance	12.8	A	0.33	24	DS	EB	T	13.3	A	0.31	22	DS	WB	T
Great Western Hwy - Somerset St	20.1	B	0.42	20	GWH	EB	R	19.8	B	0.52	22	ST	NB	L

Intersection	After Stage 3 redevelopment													
	AM							PM						
	AVD	LOS	DS	Longest queue (m) on				AVD	LOS	DS	Longest queue, m, on			
Parker St - Great Western Hwy	27.2	B	0.89	66	GWH	WB	R	44.3	D	0.91	90	GWH	WB	T
Parker St - Derby St	24.3	B	0.67	60	PS	SB	T	28.2	B	0.94	120	PS	WB	T
Derby St - Main hospital entrance	12.9	A	0.38	28	DS	EB	T	13.6	A	0.34	25	DS	WB	T
Great Western Hwy - Somerset St	21.1	B	0.46	19	GWH	EB	R	20.2	B	0.54	23	ST	NB	L

Legend:

AVD	Average delay, sec	T	Through movement
LOS	Level of Service	R	Right hand turn
DS	Degree of saturation	L	Left hand turn
GWH	Great Western Hwy	EB	Eastbound
PS	Parker St	WB	Westbound
DS	Derby St	NB	Northbound
HE	Hospital Entrance	SB	Southbound

Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout
A	< 14	Good operation
B	15 to 28	Good with acceptable delays & spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode

Source: RTA (2004)

Intersections not included in modelling

It is noted that NSW Roads and Traffic Authority requested that the intersection of Great Western Hwy and Bringelly Rd as well as all PHC access points were modelled using appropriate modelling software.

This was considered unnecessary because of very minor increases in traffic volumes due to the proposed PHC redevelopment.

Traffic volumes at the Great Western Highway / Bringelly Rd intersection were counted as part of the WELL Precinct assessment (URS, 2006). The results of these counts are shown in **Figure 13**.

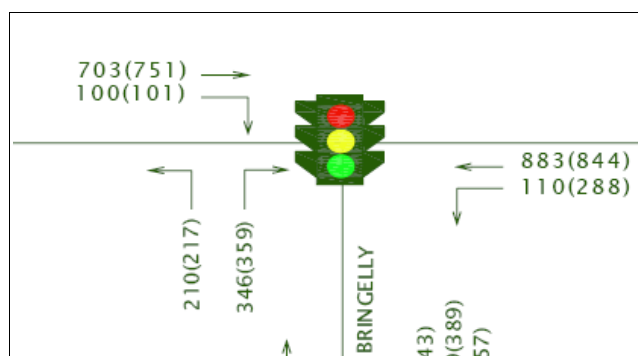


Figure 13. Existing peak hour traffic volumes at the intersection of Great Western Hwy and Bringelly Rd (Source: URS 2006).

As may be seen from the information presented in **Figures 12 and 13**, the likely additional traffic flows generated by PHC as a result of Stage 3 will be in the order of 1% to 2% of the exiting traffic flows in Great Western Hwy at its intersection with Bringelly Rd. This is a very minor, indeed insignificant change, well within typical hourly traffic fluctuations. The operation of the Great Western Hwy /Bringelly Rd intersection will not be affected.

PHC site access driveways, including the main entry from Derby St, operate at Level of Service A with substantial spare capacity. Additional traffic generated as a result of Stage 3 will not affect their operation.

4.4 Servicing requirements

Additional servicing requirements

Stage 3 redevelopment will not result in an increase in servicing needs which would require additional vehicular trips. The likely increases in waste generation and supply of food, linen and medical items will be accommodated within the current services. There will be slight increases of vehicle loads, however the number of servicing vehicular trips will remain the same as at present.

Relocation of the Blood Bank from the PHC site will improve access conditions for the main loading dock.

Effect of internal road design changes

The proposed internal road realignment will not affect the existing routes utilised by delivery vehicles. Refer to **Appendix C** for existing delivery routes and access points.

Emergency vehicles

The existing parking bay for fire brigade vehicles is proposed to be relocated as shown on the plans prepared by Hassell. The new location and the bay design were checked using AutoTrack swept path modelling software and were found to be satisfactory.

5 CONCLUSIONS AND RECOMMENDATIONS

Proposal		New and upgraded existing facilities resulting in <ul style="list-style-type: none"> • additional 54 beds • additional 182 staff
Car requirements	parking	79 car parking spaces in accordance with Council's DCP
Proposed car parking provision		81 additional car parking spaces
Compliance Council's DCP	with	Complies for both Stage 3 separately and PHC site overall.
Parking impacts		Additional approximately 100 cars in the surrounding streets which have existing capacity of at least 200 spaces during the peak demand. This is satisfactory for Stage 3 redevelopment. It is noted that plans exist for Stage 4 redevelopment to improve the existing PHC parking by provision of additional parking spaces over and above DCP requirements.
Traffic impacts		Additional traffic generated as a result of Stage 3 redevelopment will not affect operation of the street network.
Conclusion		The proposal is supported on traffic and parking grounds.
Recommendations		<ul style="list-style-type: none"> • Minor design adjustments for car park design • Additional parking provision as part of Stage 4 redevelopment

6 REFERENCES

- Penrith Development Control Plan 2006. Part 2 Section 2.11 Car Parking.
- Cardno Eppell Olsen, Geoplan and AQ Planning (2008) Penrith Integrated Transport and Land Use Strategy (PITLUS) Draft Strategy Report.
- RTA (2002). Guide to traffic generating developments: Issue 2. RTA, Sydney, NSW.
- Australian/New Zealand Standard 2890.1:2004 Off-street car parking.
- Australian Standard 2890.2-2002 Parking facilities. Part 2: Off-street commercial vehicle facilities
- URS (2006) Supplementary Report – Penrith LGA Arterial Road Study. WELL Precinct Traffic Modelling Summary.
- GTA Consultants (2007) Nepean Public Hospital Traffic and Parking Study

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Appendix A

Questionnaire forms

TRAFFIC AND PARKING SURVEY

A study of existing parking patterns of staff, patients and visitors associated with Nepean Hospital is being completed to adequately plan and design future parking facilities. It is very important that you complete this questionnaire no later than **Wednesday 23 April 2008** and return it to your line manager / nurse unit manager.

Please fill in the appropriate circles completely (HB pencil is preferred option)

Example:

correct



incorrect



Which classification best describes your status?

What time do you normally

start work

finish work

if you work different shifts, please reply for this week's shift

Doctor	<input type="radio"/>	5:00 - 7:00 am	<input type="radio"/>	11:00 am - 1:00 pm	<input type="radio"/>
Manager	<input type="radio"/>	7:00 - 9:00 am	<input type="radio"/>	1:00 - 3:00 pm	<input type="radio"/>
Administrative Staff	<input type="radio"/>	9:00 - 11:00 am	<input type="radio"/>	3:00 - 5:00 pm	<input type="radio"/>
VMO	<input type="radio"/>	11:00 am - 1:00 pm	<input type="radio"/>	5:00 - 7:00 pm	<input type="radio"/>
SWAHS	<input type="radio"/>	1:00 - 3:00 pm	<input type="radio"/>	7:00 - 9:00 pm	<input type="radio"/>
Scientist	<input type="radio"/>	3:00 - 5:00 pm	<input type="radio"/>	9:00 - 11:00 pm	<input type="radio"/>
Pathology	<input type="radio"/>	5:00 - 7:00 pm	<input type="radio"/>	11:00 pm - 1:00 am	<input type="radio"/>
Allied Health	<input type="radio"/>	7:00 - 9:00 pm	<input type="radio"/>	5:00 - 7:00 am	<input type="radio"/>
Wardperson	<input type="radio"/>	9:00 - 11:00 pm	<input type="radio"/>	7:00 - 9:00 am	<input type="radio"/>
Nursing	<input type="radio"/>	11:00 pm - 1:00 am	<input type="radio"/>	9:00 - 11:00 am	<input type="radio"/>
Engineering	<input type="radio"/>	Other (specify)	<input type="radio"/>	Other (specify)	<input type="radio"/>
Security	<input type="radio"/>	_____		_____	
Volunteer	<input type="radio"/>				
Student	<input type="radio"/>				
Catering	<input type="radio"/>				
Cleaning	<input type="radio"/>				
Other (specify)	<input type="radio"/>				

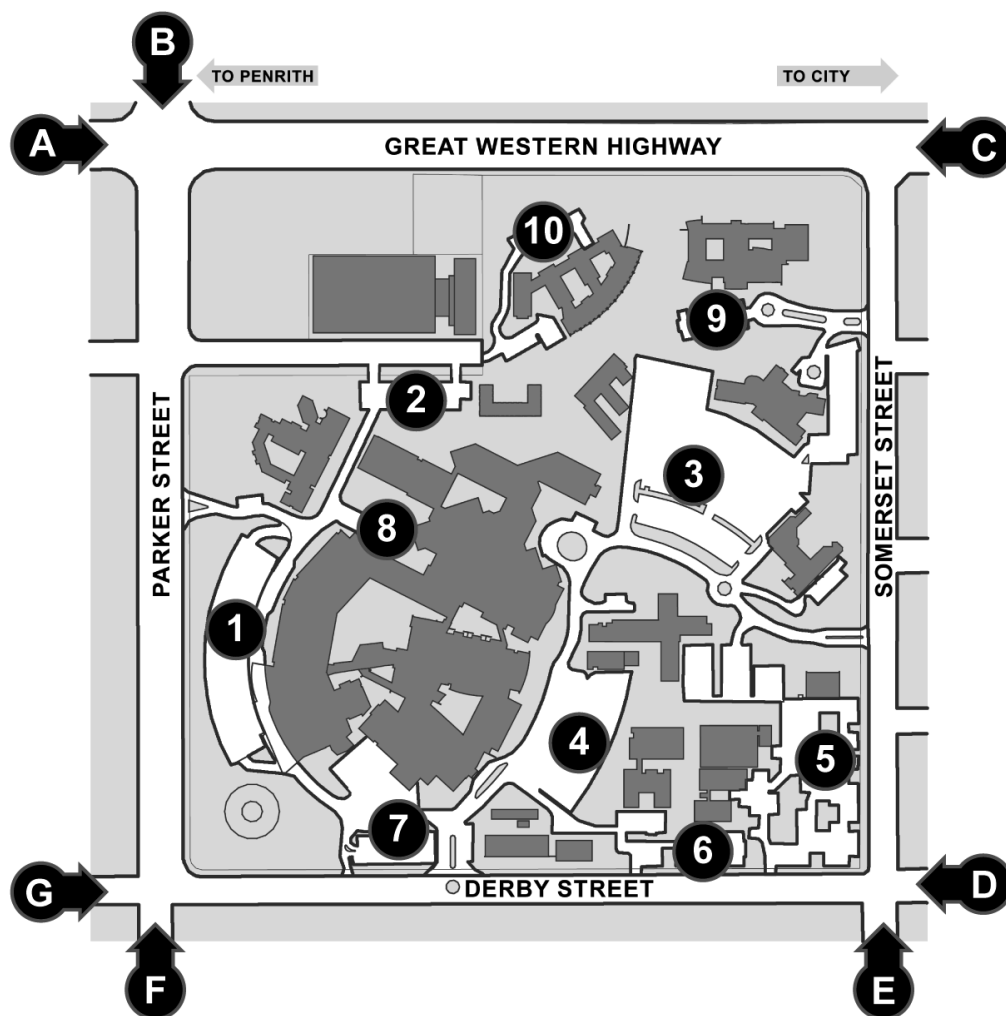
PLEASE REFER TO MAP OVERLEAF FOR QUESTIONS BELOW

If you are a CAR DRIVER, where do you normally park?

If you are a CAR DRIVER, which direction do you normally

				COME FROM		GO TO	
		1	<input type="radio"/>				
		2	<input type="radio"/>	A	<input type="radio"/>	A	<input type="radio"/>
		3	<input type="radio"/>	B	<input type="radio"/>	B	<input type="radio"/>
		4	<input type="radio"/>	C	<input type="radio"/>	C	<input type="radio"/>
		5	<input type="radio"/>	D	<input type="radio"/>	D	<input type="radio"/>
		6	<input type="radio"/>	E	<input type="radio"/>	E	<input type="radio"/>
		7	<input type="radio"/>	F	<input type="radio"/>	F	<input type="radio"/>
		8	<input type="radio"/>	G	<input type="radio"/>	G	<input type="radio"/>
		9	<input type="radio"/>				
		10	<input type="radio"/>				
How do you normally travel to the Hospital?:							
car driver	<input type="radio"/>						
car passenger	<input type="radio"/>	SEE NOTE BELOW					
dropped off	<input type="radio"/>						
bicycle	<input type="radio"/>						
train	<input type="radio"/>						
walk	<input type="radio"/>	Derby Street	<input type="radio"/>				
bus	<input type="radio"/>	Somerset Street	<input type="radio"/>				
Other (specify)	<input type="radio"/>	Other (specify)	<input type="radio"/>				

Note: "Car passenger" means car is parked on site or near, "dropped off" means car leaves the site once you have been dropped off



Please indicate the suburb and its postcode where your trip originates _____

If you DO NOT normally DRIVE to the Hospital please indicate why

If you are a CAR DRIVER, and you prefer not to park on the Hospital site, please state your reasons

If you have any suggestions for parking provision or traffic management improvements, please indicate them below

Thank you very much for your assistance.

TRAFFIC AND PARKING SURVEY

We are conducting a survey of travel modes of patients and visitors and would appreciate it if you could answer a few questions. This will take you less than one minute.

Please fill in the appropriate circles completely (HB pencil is preferred option)

Example:

correct ☐

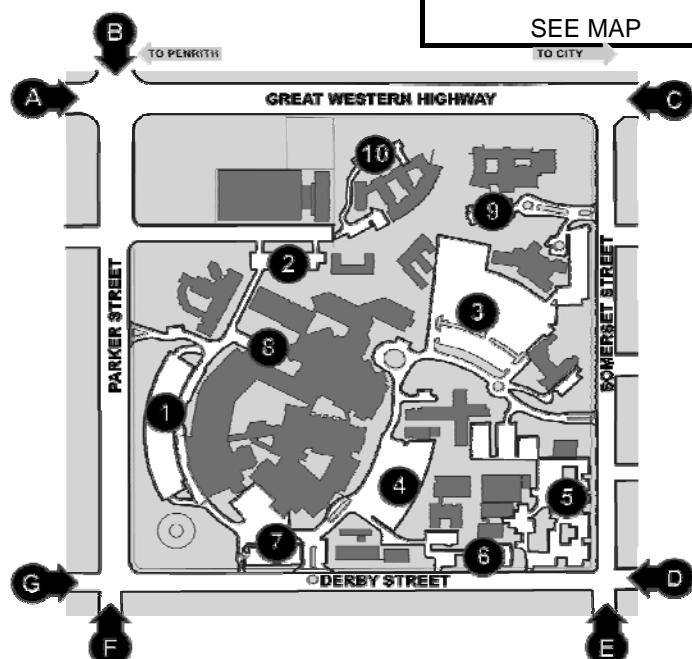
incorrect ☒



If you arrived together as one group, whether as visitors or a patient with accompanying persons, only one person needs to answer. If you arrived by car, the answering person should be the driver					
1. No. of people who arrived as one group	2. What is the purpose of your visit to the Hospital?	3. Time of arrival	4. How long do you think you will stay at the Hospital?		
		7:00 - 7:59 <input type="radio"/>			
		8:00 - 8:59 <input type="radio"/>	less than 30 min <input type="radio"/>		
1 <input type="radio"/>	Ambulatory patient <input type="radio"/>	9:00 - 9:59 <input type="radio"/>	30 min to 1 hr <input type="radio"/>		
2 <input type="radio"/>	Outpatient (e.g. medical clinic) <input type="radio"/>	10:00 - 10:59 <input type="radio"/>	1 hr to 2 hrs <input type="radio"/>		
3 <input type="radio"/>	Day surgery patient <input type="radio"/>	11:00 - 11:59 <input type="radio"/>	2 hrs to 3 hrs <input type="radio"/>		
4 <input type="radio"/>	Allied health (e.g. physiotherapy) <input type="radio"/>	12:00 - 12:59 <input type="radio"/>	3 hrs to 4 hrs <input type="radio"/>		
5 <input type="radio"/>	Pathology <input type="radio"/>	13:00 - 13:59 <input type="radio"/>	more than 4 hrs <input type="radio"/>		
6 <input type="radio"/>	Visitor to a patient <input type="radio"/>	14:00 - 14:59 <input type="radio"/>	specify _____		
7 <input type="radio"/>	Other (please specify) <input type="radio"/>	15:00 - 15:59 <input type="radio"/>			
8 <input type="radio"/>	_____ <input type="radio"/>	16:00 - 16:59 <input type="radio"/>			
9 <input type="radio"/>	Building _____ <input type="radio"/>	17:00 - 17:59 <input type="radio"/>			
10 <input type="radio"/>	WARD _____ <input type="radio"/>	18:00 - 18:59 <input type="radio"/>			
		19:00 - 19:59 <input type="radio"/>			
5. What are your travel arrangements to / from the Hospital today?:		6. If you arrived by car, where did you park?		7. If you are a CAR DRIVER, which direction	
				HAVE YOU COME FROM	WILL YOU GO TO
	IN	OUT	Hospital car park <input type="radio"/>	A <input type="radio"/>	A <input type="radio"/>
car driver	<input type="radio"/>	<input type="radio"/>	On street outside the Hospital <input type="radio"/>	B <input type="radio"/>	B <input type="radio"/>
car passenger	<input type="radio"/>	<input type="radio"/>	Other <input type="radio"/>	C <input type="radio"/>	C <input type="radio"/>
dropped off / picked up	<input type="radio"/>	<input type="radio"/>	Specify _____	D <input type="radio"/>	D <input type="radio"/>
bicycle	<input type="radio"/>	<input type="radio"/>		E <input type="radio"/>	E <input type="radio"/>
train	<input type="radio"/>	<input type="radio"/>		F <input type="radio"/>	F <input type="radio"/>
bus	<input type="radio"/>	<input type="radio"/>		G <input type="radio"/>	G <input type="radio"/>
walk	<input type="radio"/>	<input type="radio"/>			
Other (specify)	<input type="radio"/>	<input type="radio"/>			

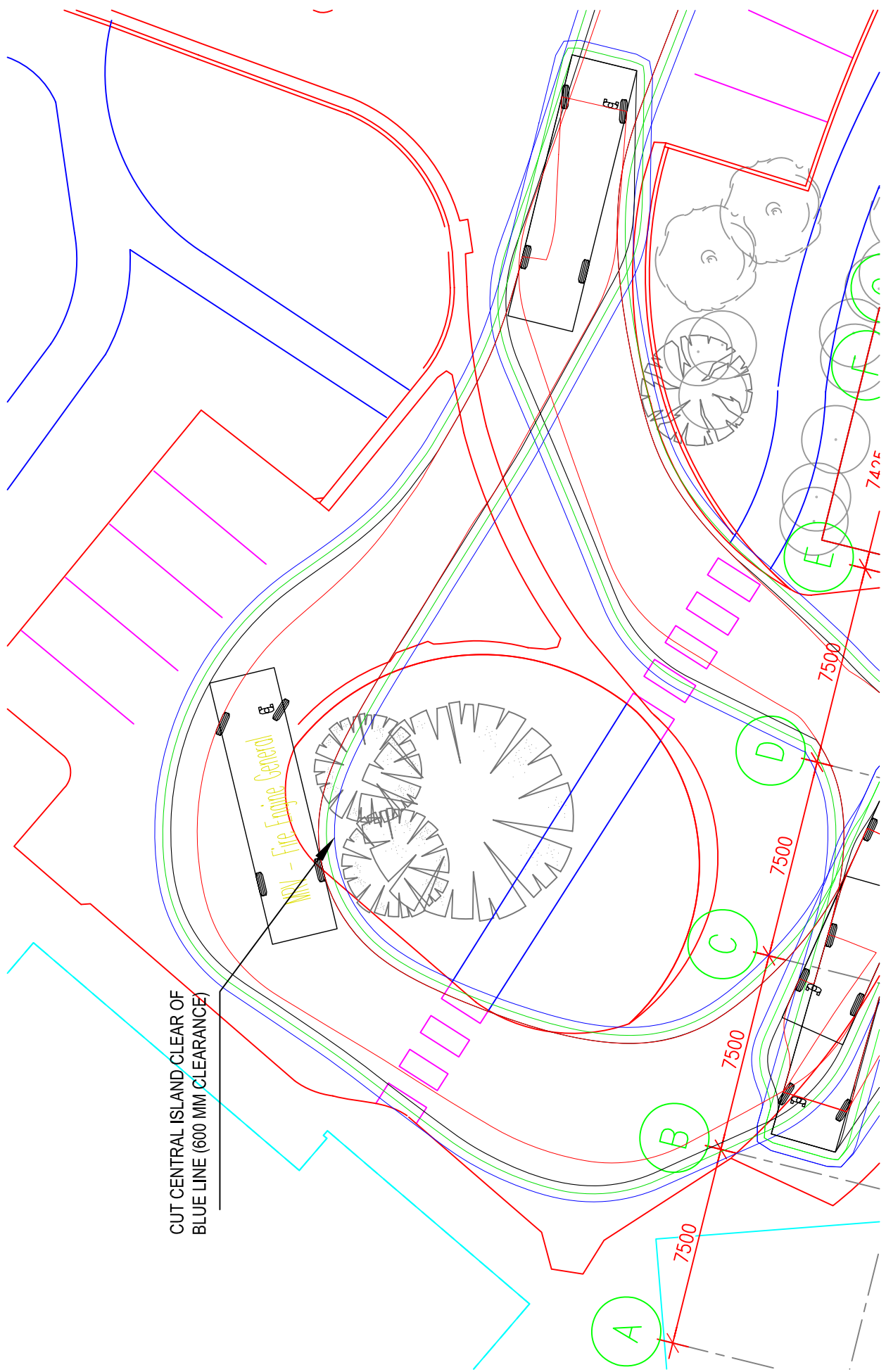
Note: "Car passenger" means car is parked on site or near, "dropped off / picked up" means car leaves the site once you have been dropped off and/or comes back to pick you up

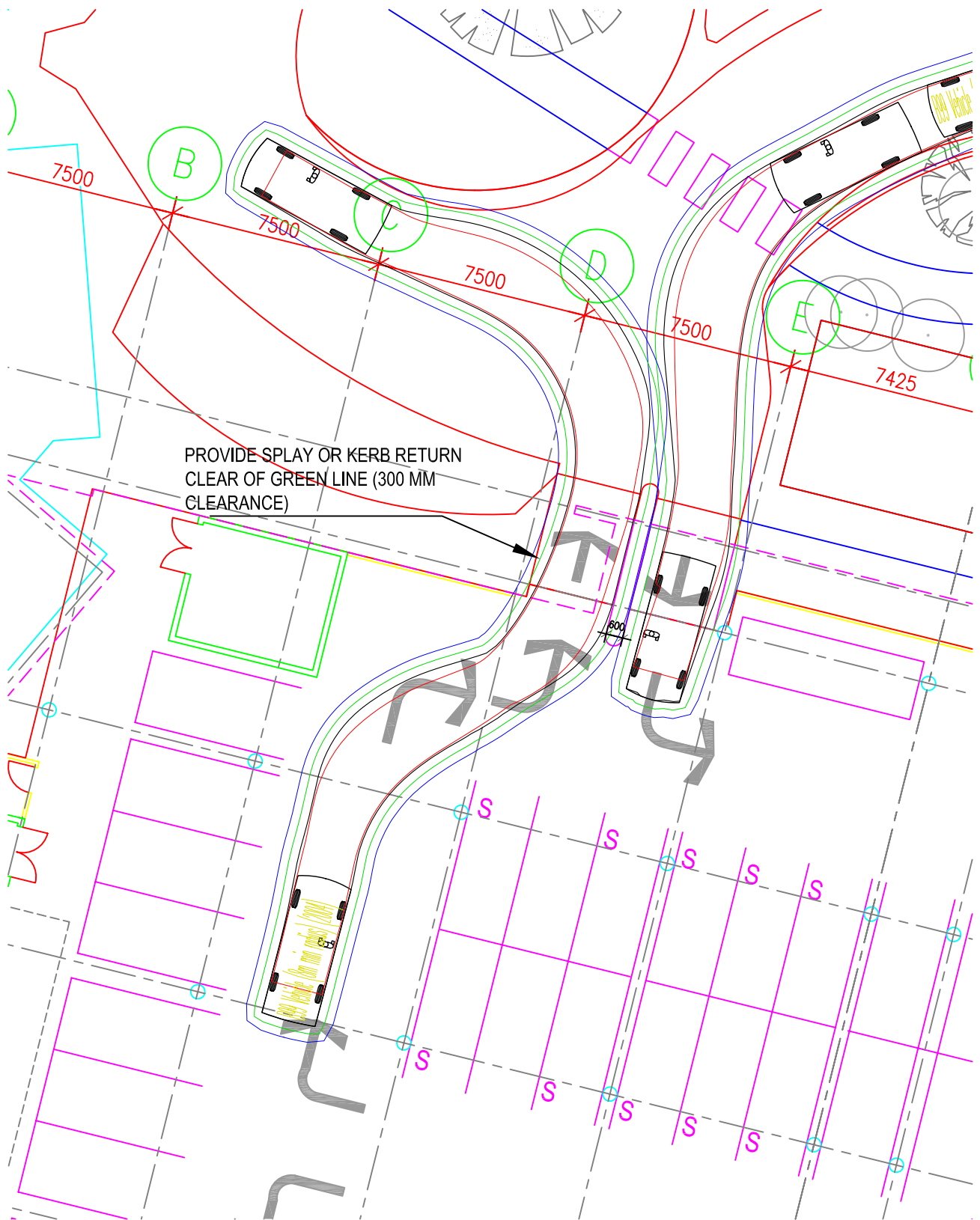
If you have any questions, please direct them to Mr Oleg Sannikov, TEF Consulting, on 02 93322024 or 0414 978 067

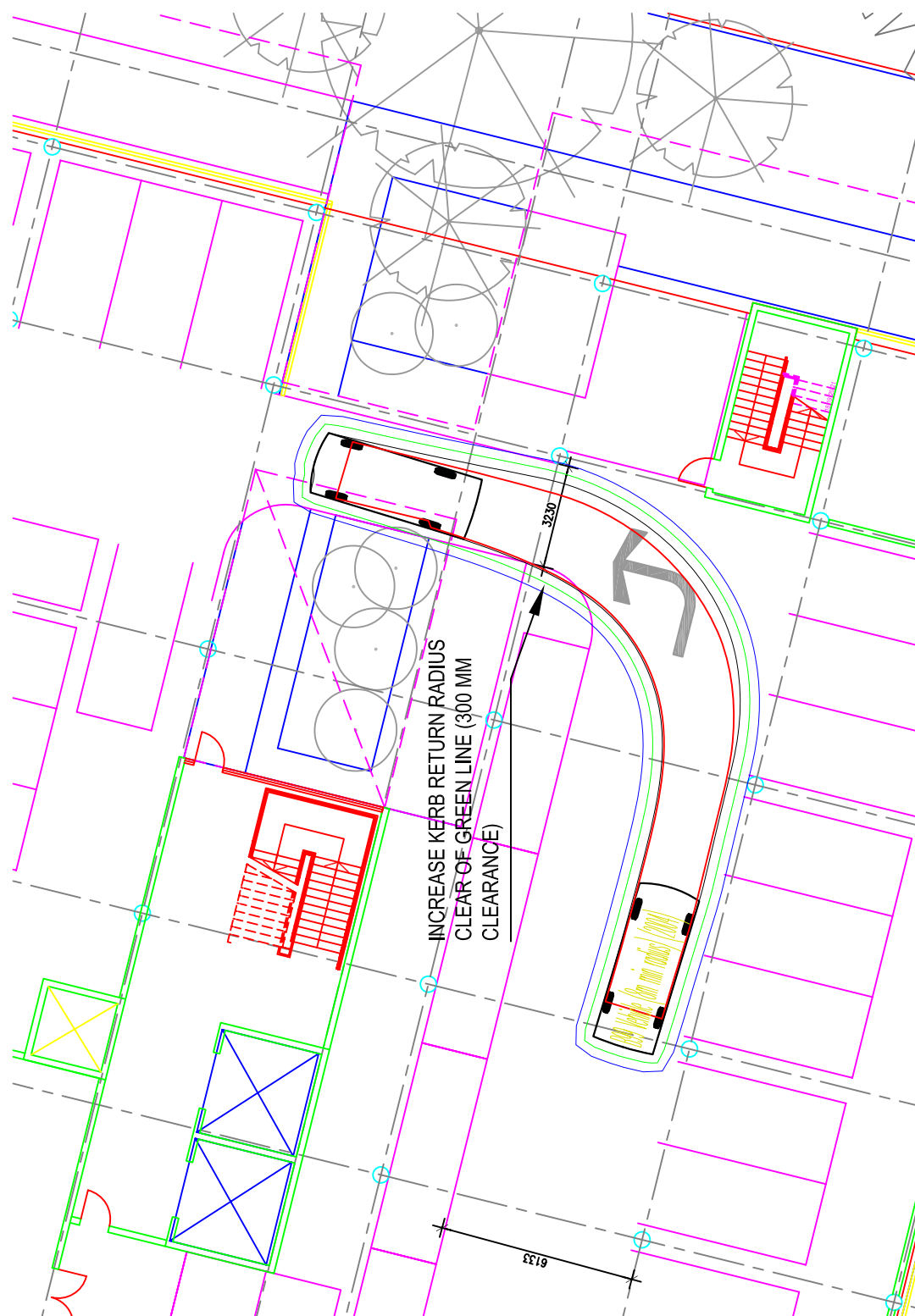


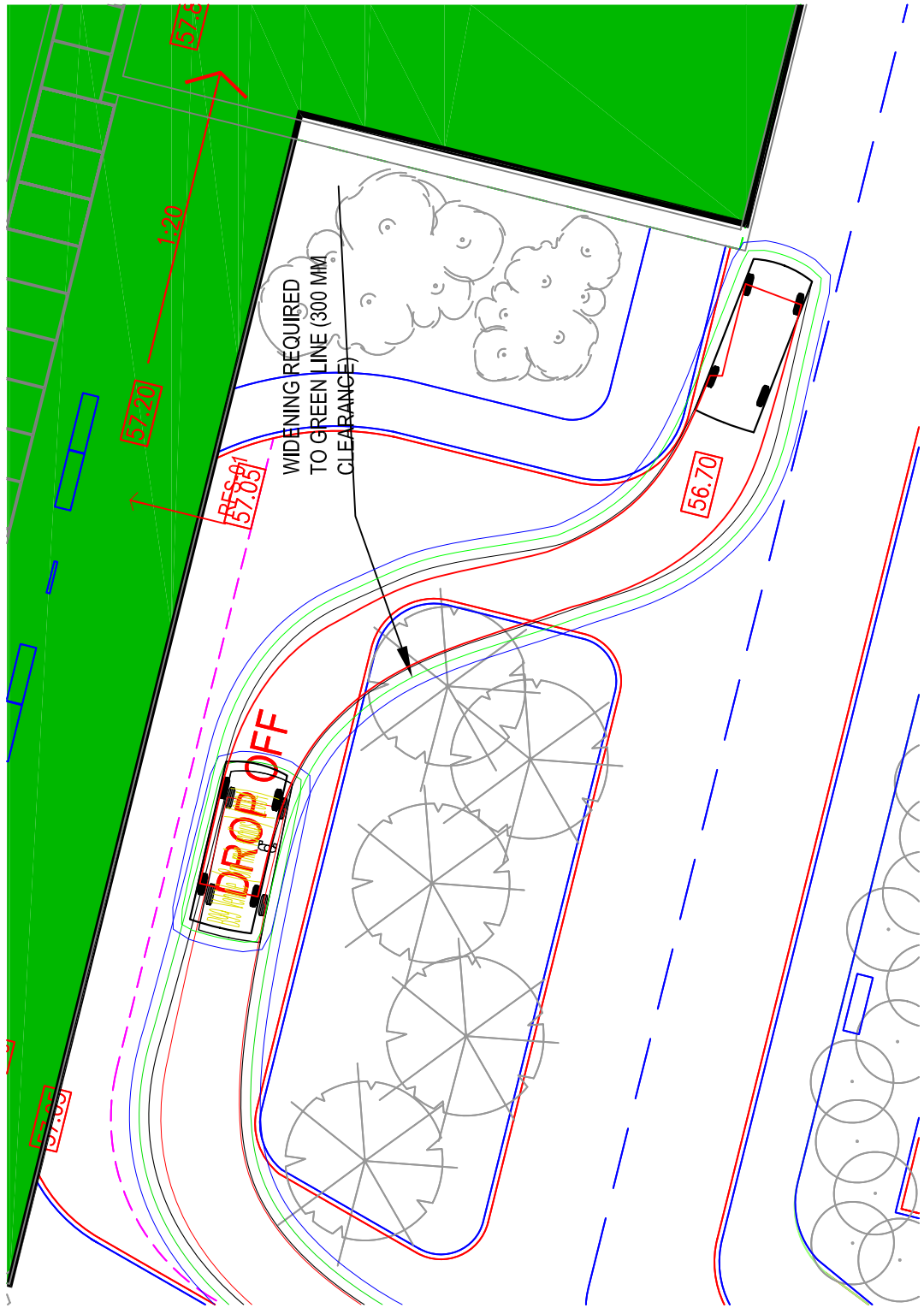
Appendix B

Vehicle manoeuvring diagrams and design recommendations









Appendix C

Service vehicle activities.

Type of Delivery	Vehicle Type	Max Height	Entry Point	Exit Point	Destination Onsite	Frequency	Day and Time
Main Store	MRV Vans	3.5m	Parker St	Parker St	Main	3 - 5 x Day	any time
	forklift				Loading dock		MON-FRI
General Waste Compactor	HRV	3.5m	Barber AV	Various	Loading dock off Barber Av	3 x Week M,W,F	6-7AM MON-FRI
Contaminated Waste	HRV	4.2m	Barber AV	Barber AV	Loading dock Off Barber Av	daily except SAT	outside business hours MON-FRI
Diesel Fuel Engineering supplies generator(blood bank)	HRV or AV	3.2m	Barber AV Parker St	Barber AV Parker St	Loading dock Off Barber Av	1 x3-4 months	VARIOUS rarely
Bottled Gases	HRV	3.5m	Parker St/	Parker St	Main Loading dock	1-2 Week	AM MON-FRI
Pharmaceutical	SRV	3.5m	Parker St/	Parker St/	Main Loading dock	2xDay 9-10m 4pm	MON-FRI
Blood Bank	HRV SRV VANS	4.1m	Parker St/	Parker St	Main Loading dock	1 x Week 3 x Week 2 x Week not MON	not MON MON-FRI
Food	HRV MRV	3.8m	Parker St/ Derby St	Derby St/ Parker St	Food Dock	6-8 x Day	VARIOUS MON-FRI
Liquified Oxygen	HRV or AV	4.0m	Barber Av	Barber Av	next to waste collection collection	1-2 x3-4 Week	VARIOUS MON-FRI
Engineering Supplies	VANS UTES MRV	3.3m	Parker St/ Derby St Derby St	Derby St/ Parker St	Engineering Supplies Building	As Required 1xweek as required	VARIOUS MON-FRI
Hospital	VANS	3.3m	Parker St/	Derby St/	Main	As	VARIOUS
Transport Services	BUSES UTES		Derby St	Parker St	Loading dock	Required	MON-FRI
Medical	HRV VANS	4.0m	Parker St	Parker St	Loading dock Parker St	5-6 x Day	VARIOUS MON-FRI
Linen	HRV	max	Parker St		Loading dock	daily	1x5-6am 2x9-10am