

SYDNEY CATHOLIC SCHOOL

TRAFFIC REPORT FOR
PROPOSED JUNIOR SECONDARY
SCHOOL, GREENACRE ROAD,
SOUTH HURSTVILLE

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I. INTRODUCTION

- I.1 Colston Budd Rogers and Kafes Pty Ltd has been commissioned by Sydney Catholic School to prepare a report examining the traffic implications of a proposed junior secondary school at South Hurstville. The new school will provide a second campus to the existing Marist Catholic College at Penshurst.
- I.2 The site is located within the block bounded by Greenacre Road, Morshead Drive, Rickard Road and King Georges Road, as shown on Figure I. The site was previously occupied by the South Hurstville Bowling Club, which has ceased operation.
- I.3 The site has been rezoned by Kogarah City Council for educational purposes. It is proposed to refurbish the existing heritage listed bowling building as the school administration building and demolish the redundant non heritage listed outbuildings, to allow the construction of the new school buildings with vehicular access via Greenacre Road and Rickard Road. The school will cater for Years 7 and 8, and will have an ultimate total student population of some 430 students across the two years.
- I.4 This report assesses the implications of the proposed development through the following chapters:
- Chapter 2 - describing the existing conditions; and
 - Chapter 3 - assessing the traffic implications of the proposed development.
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2. EXISTING CONDITIONS

Site Location

- 2.1 The site is located within the block bounded by Greenacre Road, Morshead Drive, Rickard Road and King Georges Road, as shown on Figure 1. The site was previously occupied by the South Hurstville Bowling Club, which has ceased operation. Surrounding land-use in the vicinity of the site is primarily residential, comprising detached residential dwellings and townhouses.
- 2.2 Vehicular access to the site is available via two access lanes onto Greenacre Road and one access lane onto Rickard Road. The site has no direct frontage onto these roads.

Road Network

- 2.3 The road network in the vicinity of the site includes King Georges Road to the north, Greenacre Road and Connells Point Road to the east, Morshead Drive to the south and Rickard Road to the west and north-west. King Georges Road is north of the site and provides a six lane divided road east of Connells Point Road and a four lane undivided road to the west of Greenacre Road. It provides traffic signals and additional turning lanes at major intersections. Right turn lanes are provided at the signalised intersection of King Georges Road and Connells Point Road.

- 2.4 Connells Point Road is a four lane undivided road between Woniora Road and Morshead Drive. It provides a 50km/hr speed environment with one traffic lane and one parking lane in each direction, clear of intersections.
- 2.5 Greenacre Road is east of the site. It provides a north-south traffic route between King Georges Road and Homedale Crescent, with a speed limit of 50km/hr. Greenacre Road is a four lane undivided road with one traffic lane and one parking lane in each direction, clear of intersections. The intersection of Greenacre Road and King Georges Road is a priority controlled t-intersection, with turning movements to and from Greenacre Road restricted to left turns only.
- 2.6 Morshead Drive is south of the site. It has a 50km/hr speed limit and provides an undivided road with one traffic lane in each direction and kerbside parking permitted clear of intersections. The intersections of Morshead Drive with Greenacre Road and Rickard Road are priority controlled t-intersections with all movements permitted.
- 2.7 Rickard Road and Truman Street are located to the west and north-west of the site. They are 50km/hr undivided roads with one traffic lane and one parking lane in each direction, clear of intersections. The intersection of Rickard Road and King Georges Road is a priority controlled t-intersection, with turning movements to and from Rickard Road restricted to left turns only. The intersection of Rickard Road and Truman Street is a priority controlled t-intersection with all turning movements permitted.
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Traffic Flows

2.8 In order to establish existing traffic conditions, counts were undertaken during weekday morning and afternoon peak periods at the following intersections:

- ❑ King Georges Road/Connells Point Road;
- ❑ King Georges Road/Greenacre Road;
- ❑ Connells Point Road/Mimosa Street;
- ❑ Greenacre Road/Mimosa Street;
- ❑ Greenacre Road/Morshead Drive;
- ❑ Morshead Drive/Rickard Road; and
- ❑ Rickard Road/Truman Street.

2.9 The surveyed peak flows are set out on Figures 2 and 3 and summarised in Table 2.1.

2.10 Examination of Table 2.1 reveals that:

- ❑ King Georges Road carried traffic flows in the range of some 3,400 to 3,600 vehicles per hour two-way during the morning and afternoon peak periods;
- ❑ traffic flows on Connells Point Road are some 550 to 950 vehicles per hour two-way during the morning and some 700 to 1,000 vehicles per hour two-way during the afternoon peak period;
- ❑ traffic flows on Rickard Road, north of Morshead Drive, on Morshead Drive, east of Rickard Road, and on Truman Street are some 420 to 550 vehicles per hour two-way during peak periods. Traffic flows Rickard Road, east of

Truman Street, and on Morshead Drive, west of Rickard Road, are lower at some 50 to 100 vehicles per hour two-way during peak periods; and

- Greenacre Road and Mimosa Street carried traffic flows of some 250 to 450 vehicles per hour two-way during the morning and afternoon peak periods.

Table 2.1: Existing Peak Hour Two-Way (sum of both directions) Traffic Flows		
Road/Location	Morning	Afternoon
King Georges Road		
– east of Connells Point Road	3555	3505
– east of Greenacre Road	3440	3425
– west of Greenacre Road	3515	3400
Connells Point Road		
– north of King Georges Road	940	985
– north of Mimosa Street	765	910
– south of Mimosa Street	570	735
Greenacre Road		
–north of Mimosa Street	310	305
– south of Mimosa Street	435	440
– south of Morshead Drive	280	260
Mimosa Street		
– east of Greenacre Road	355	315
Rickard Road		
– north of Morshead Drive	485	515
– east of Truman Street	55	70
Morshead Drive		
– west of Greenacre Road	515	550
– west of Rickard Road	80	90
Truman Street		
– north of Rickard Road	420	505

Intersection Operations

- 2.11 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows.
- 2.12 The surveyed intersections have been analysed using the SIDRA computer program with the traffic flows shown in Figures 2 and 3. SIDRA analyses

intersections controlled by traffic signals, roundabouts and signs. SIDRA provides a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle.

2.13 Based on average delay per vehicle, SIDRA estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays Roundabouts require other control mode
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Acceptable delays and spare capacity
29 to 42	=	"C"	Satisfactory but accident study required
43 to 56	=	"D"	Near capacity and accident study required

57 to 70	=	"E"	At capacity and requires other control mode
>70	=	"F"	Unsatisfactory and requires other control mode

2.14 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E, if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.

2.15 The analysis found that:

- ❑ the signalised intersection of King Georges Road and Connells Point Road is currently operating with average delays of less than 35 seconds per vehicle in the morning and afternoon peak periods. This represents level of service C, a satisfactory level of service;
- ❑ the priority controlled intersections of King Georges Road/Greenacre Road and Connells Point Road/Mimosa Street are currently operating with average delays, for the movement with the highest average delay, of less than 20 seconds per vehicle in the morning and afternoon peak periods. This represents level of service B, an acceptable level of service; and
- ❑ the priority controlled intersections of Greenacre Road/Mimosa Street, Greenacre Road/Morshead Drive, Morshead Drive/Rickard Road and Rickard Road/Truman Street are currently operating with average delays, for all

movements through the intersections, of less than 15 seconds per vehicle in the morning and afternoon peak periods. This represents level of service A/B, a good level of service.

Public Transport

- 2.16 Bus services in the area are provided by Transport NSW and Punchbowl Bus Service. These services typically operate along Connells Point Road, King Georges Road and Woniora Road, and provide links to Hurstville Railway Station and bus interchange (located some 1.7 kilometres from the site). Transfers to other bus routes or rail services at Hurstville Railway Station, provide convenient access to surrounding suburbs and to other areas on the Sydney rail system.
- 2.17 Route 953, Hurstville to Oatley and Connells Point, operates along Connells Point Road and connects to Connells Point, Kyle Bay and Hurstville. It operates every 15 minutes during peak periods, every 30 minutes outside of peak periods and on Saturdays, and hourly on Sundays/Public Holidays.
- 2.18 Route 959, Hurstville to Bald Face, passes through the intersection of King Georges Road and Connells Point Road. It operates Monday to Saturday at 30 minute headways during peak periods and hourly outside of peak periods and on Saturdays.
- 2.19 Route 970, Hurstville to Miranda, and route 971, Hurstville to Cronulla, combine to provide regular bus services connecting to Hurstville, Blakehurst, Sylvania, Miranda, Caringbah, Cronulla and South Cronulla. These services pass through the intersection of King Georges Road and Connells Point Road. They operate seven days a week, with combined headways of some 10 minute during peak
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periods and 30 minutes outside of peak periods. Combined services on Saturdays are typically every 15 to 20 minutes and on Sundays/Public holidays every 30 minutes.

- 2.20 The site is therefore located in close walking distance to regular public transport services.

3. IMPLICATIONS OF PROPOSED DEVELOPMENT

3.1 The proposed new school development will include the following:

- ❑ refurbishment of the existing bowling club building to school administration facilities and provision of new classrooms;
- ❑ on-site parking with on-site drop off and pick up of students;
- ❑ separate on-site staff parking;
- ❑ on-site bus drop off and pick up, including turnaround facility; and
- ❑ provision of on-site servicing/deliveries.

3.2 The school will cater for Years 7 and 8, and will ultimately accommodate a total student population of some 430 students across the two years and a total of some 28 staff.

3.3 This chapter assesses the traffic implications of the proposed development through the following sections:

- ❑ public transport, walking and cycling;
 - ❑ parking provision;
 - ❑ access, internal layout and servicing;
 - ❑ traffic effects;
 - ❑ matters raised by council; and
 - ❑ summary.
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Public Transport, Walking and Cycling

- 3.4 As previously discussed, the site currently has access to public transport services (buses) that operate along Connells Point Road, through its intersection with King Georges Road, providing links to Hurstville Railway Station and to surrounding areas. The school will also provide a 20 seat mini bus that will be used by the school to transport students between the new campus and the existing campus at Penshurst. The proposed development is therefore accessible by means other than private car and is consistent with government policy and planning principles of:
- (a) improving accessibility to employment and services by walking, cycling, and public transport;
 - (b) improving the choice of transport and reducing dependence solely on cars for travel purposes;
 - (c) moderating growth in the demand for travel and the distances travelled, especially by car; and
 - (d) supporting the efficient and viable operation of public transport services.
- 3.5 The school will provide convenient pedestrian links within the site and via dedicated pedestrian paths to/from Greenacre Road. The proposed pedestrian connections within the school and footpaths on the surrounding road network provide convenient access to the surrounding area, including access to existing public transport services.
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- 3.6 As part of the orientation for new students to the school, parents/carers would be advised of the available means of travelling to and from the site, including access by means other than car. As noted above, the site has access to existing public transport services in the area. To support accessibility by bicycles, appropriate bicycle parking and end-trip facilities would also be provided within the school.

Parking Provision

- 3.7 Kogarah Council's Car Park DCP sets out the following minimum parking requirements for secondary schools:

- ❑ two spaces per classroom; plus
- ❑ one space per 10 students over 17 years.

- 3.8 Based on the provision of some 20 classrooms, application of these rates would result in a parking requirement of some 40 on-site parking spaces (including staff and visitor parking, and provision for student drop off and pick up spaces). The proposed school will provide a total of some 58 on-site parking spaces which satisfies Council's car parking requirement, and is considered appropriate.

Access, Internal Layout and Servicing

- 3.9 Access to the site will be provided via existing access lanes onto Greenacre Road and Rickard Road. The primary access to the school will be provided via a combined entry/exit driveway onto Greenacre Road, located adjacent to the southern boundary of the site. The driveway will provide access to the main on-site parking area and student set down and pick up facility. It will provide a two lane access for vehicles to circulate within the site.
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- 3.10 The Rickard Road driveway will provide access to the on-site staff parking area and will provide access for service vehicle deliveries. The access driveway will be a single lane two-way driveway that will be controlled by warning lights and signage. A passing area will be provided within the car park to allow for two vehicles to pass.
- 3.11 The Rickard Road driveway is located close to the intersection of Rickard Road and Truman Street. As a result, it is proposed to provide a central mountable median in Rickard Road across the existing driveway to restrict cars and small commercial vehicles to turn left in/left out of the site. As shown in Appendix B, service vehicle access to the rear car park will require larger service vehicles, including 8.8 metre garbage trucks, to cross over the mountable median in order to access the site. In addition it is proposed to modify the boundary fencing either side of the driveway to provide appropriate sight lines for exiting vehicles.
- 3.12 Pedestrian access to the site will be provided at two locations onto Greenacre Road. The northern pedestrian access will be located adjacent to the northern boundary of the site and will provide a convenient and dedicated pedestrian access to the school campus. The southern pedestrian access will be a three metre wide pedestrian footpath on the northern side of the main vehicular access driveway to the site. The proposed vehicular and pedestrian access arrangements will be provided in accordance with the requirements of the Australian Standard AS2890.1-2004 and are considered appropriate.
- 3.13 Car parking arrangements and internal circulation within the on-site car parking areas will be designed to comply with the Australian Standards AS2890.1-2004 with regards to parking bay dimensions, aisle widths, grades and height clearances. Parking bays will be a minimum of 2.4 metres wide by 5.4 metres long for staff parking and 2.5 metres wide by 5.4 metres long for visitor parking. Parking spaces
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located adjacent to structure will be additional 300mm wider to provide an appropriate door opening clearance. Circulation aisles will be a minimum of 5.8 metres wide with parking on both sides of the aisle or 6.1 metres wide with parking on one side and structure on the other.

- 3.14 Disabled car parking spaces will be provided within the visitor and staff parking area. These spaces will be provided in accordance with the Australian Standard AS2890.6-2009 and will be 2.4 metres wide, with an adjacent 2.4 metre wide shared zone for wheelchair access. A convenient accessible footpath will be provided from the disabled parking spaces to the school facilities.
- 3.15 An on-site student set down and pick up facility will be provided on the northern side of the southern car park. The facility has been designed to cater for up to eight cars simultaneously. Outside the morning and afternoon school peak periods, the southern car park and the on-site student set down and pick up facility will be used on occasion by buses to transport students to and from the school during sports events, special events and school excursions. At these times, car parking spaces located on the northern side of the car park will be managed to ensure appropriate access for buses to turn around within the car park and to enter and exit the site in a forward direction.
- 3.16 Service vehicles will be accommodated on-site within the staff car park, with access to and from Rickard Road. The on-site loading/delivery zone will be designed to cater for service vehicles ranging from small commercial vehicles to medium rigid trucks. The service area will cater for service vehicles to turn around within the car park and to enter and exit the site in a forward direction.
- 3.17 Overall, subject to detailed design, access, internal layout and servicing arrangements are considered appropriate.
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Traffic Effects

- 3.18 The proposed new school will have its peak traffic generation at the start of the school day when parents/carers drop off students (7.30am to 8.30am) and at the end of the school day when parents/carers pick up students (3.00pm to 4.00pm).
- 3.19 Surveys undertaken of Years 7 and 8 at the existing Marist Catholic College at Penshurst found that some 60% of students were dropped in the morning and some 45% of students were picked up from school in the afternoon by car. The average car occupancy rate was found to be some 1.8 students per car. Some 95% of staff at the school were found to drive to work.
- 3.20 Taking into consideration before and after school co-curricular activities, sport and absenteeism, some 80% of students travel to and from school during the peak hour period before and after school.
- 3.21 The proposed school with an ultimate total student population of some 430 students across the two years, would therefore be expected to generate some 115 vehicles setting down students in the morning peak period and some 90 vehicles picking up students from the school in the afternoon peak period. With respect to teaching and administration staff vehicles, the proposed school would generate some 25 additional staff vehicles arriving during the morning and departing during the afternoon periods.
- 3.22 The additional traffic generated by the school has been assigned to the road network as shown on Figures 2 and 3, with the results summarised in Table 3.1.
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Table 3.1: Existing Plus Development Peak Hour Two-Way (sum of both directions) Traffic Flows				
Road/Location	Morning		Afternoon	
	Existing	Plus Development	Existing	Plus Development
King Georges Road				
– east of Connells Point Rd	3555	+75	3505	+65
– east of Greenacre Road	3440	+55	3425	+40
– west of Greenacre Road	3515	+60	3400	+40
Connells Point Road				
– north of King Georges Rd	940	+80	985	+55
– north of Mimosa Street	765	+110	910	+80
– south of Mimosa Street	570	-	735	-
Greenacre Road				
–north of Mimosa Street	310	+85	305	+80
– south of Mimosa Street	435	+190	440	+160
– south of Morshead Drive	280	+30	260	+20
Mimosa Street				
– east of Greenacre Road	355	+90	315	+80
Rickard Road				
– north of Morshead Drive	485	+15	515	+25
– east of Truman Street	55	+15	70	+15
Morshead Drive				
– west of Greenacre Road	515	+15	550	+10
– west of Rickard Road	80	-	90	-
Truman Street				
– north of Rickard Road	420	+15	505	+25

3.23 Examination of Table 3.1 revealed that:

- traffic flows on Greenacre Road south of Mimosa Street would increase by some 190 vehicles per hour two-way during the morning and by some 160 vehicles per hour two-way during afternoon peak periods. Traffic flows north of Mimosa Street would increase by some 80 to 85 vehicles per hour two-way during the morning and afternoon peak periods;
- traffic flows on Greenacre Road south Morshead Drive would increase by some 20 to 30 vehicles per hour two-way during peak periods;

- ❑ traffic flows on Mimosa Street and on Connells Point Road north of Mimosa Street would increase by some 90 to 100 vehicles per hour two-way during the morning and by some 80 vehicles per hour two-way during afternoon peak periods;
- ❑ traffic flows on King Georges Road would increase by some 40 to 75 vehicles per hour during peak periods; and
- ❑ traffic flows on Rickard Road and on Truman Street north of Rickard Road would increase by some 15 to 25 vehicles per hour two-way during peak periods.

3.24 The surveyed intersections were reanalysed using SIDRA with development traffic in place (including the site access). The analysis found that:

- ❑ the signalised intersection of King Georges Road and Connells Point Road would continue to operate with average delays of less than 35 seconds per vehicle in the morning and afternoon peak periods. This represents level of service C, a satisfactory level of service;
 - ❑ the priority controlled intersections of King Georges Road/Greenacre Road and Connells Point Road/Mimosa Street would continue to operate with average delays, for the movement with the highest average delay, of less than 20 seconds per vehicle in the morning and afternoon peak periods. This represents level of service B, an acceptable level of service;
 - ❑ the priority controlled intersection of Greenacre Road and Mimosa Street would continue to operate with average delays, for the movement with the highest average delay, of less than 15 seconds per vehicle in the morning and
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afternoon peak periods. This represents level of service A/B, a good level of service;

- the priority controlled intersections of Greenacre Road/Morshead Drive, Morshead Drive/Rickard Road and Rickard Road/Truman Street would continue to operate with average delays, for all movements through the intersections, of less than 15 seconds per vehicle in the morning and afternoon peak periods. This represents level of service A/B, a good level of service; and
- the intersection of the site access and Greenacre Road would operate with average delays of less than 20 seconds per vehicle in the morning and afternoon peak periods. This represents level of service B, an acceptable level of service.

3.25 In summary the traffic analysis found that the road network will accommodate the traffic generated by the proposed school with adjoining intersections operating at their existing levels of service with development traffic.

Matters Raised by Council

3.26 Matters raised by Council in the pre application advisory meeting and our responses are set out below:

- i) *There has been no intersection analysis conducted at Connells Point Road/King Georges Road signals. The intersection analysis shall also include the existing queue lengths along Connells Point Road from the signals in the morning and afternoon peak periods to determine the impact that the proposed school will have on the Level of Service at the signals and queue lengths in nearby streets. As this is the only intersection in close proximity to the site to allow drivers to*

turn south onto King Georges Road or head north towards Hurstville, there may be significant impacts on the capacity of the signals as a result of the development;

- 3.27 Traffic counts were undertaken at the signalised intersection of King Georges Road and Connells Point Road during the weekday morning and afternoon peak periods. The surveyed peak traffic flows through the intersection during these periods are discussed in paragraph 2.10 and shown on Figures 2 and 3.
- 3.28 The SIDRA analysis for the signalised intersection of King Georges Road and Connells Point Road is provided in Appendix A. The analysis found that the intersection with the additional development traffic added to existing peak period traffic flows, would operate with average delays of less than 35 seconds per vehicle in the morning and afternoon peak periods. This represents level of service C, a satisfactory level of service.
- 3.29 The SIDRA analysis also found that 95 percentile back of queue distance for the northbound right turn from Connells Point Road into King Georges Road would increase by some one to two car lengths during peak periods.
- ii) *The traffic report indicates that a survey has been conducted on students at the associated Marist Catholic College at Penshurst to determine the percentage of students that arrive and leave by car. This site cannot be compared to the site on Greenacre Road as the Penshurst Campus is only a 10 minute walk to the Train Station that a lot of students may use. So the percentage of parents driving to Greenacre Road site may be considerably more than the Penshurst Campus;*
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- 3.30 As set out in the traffic report, the site is located in close walking distance to existing bus stops located on Connells Point Road. These bus services provide convenient links to Hurstville Railway Station, provide convenient access to surrounding suburbs and to other areas on the Sydney rail system.
- 3.31 Surveys undertaken of Years 7 and 8 at the existing Marist Catholic College at Penshurst found that some 60% of students were dropped off in the morning and some 45% of students were picked up from school in the afternoon by car. The average car occupancy rate was found to be some 1.8 students per car.
- 3.32 This compares to similar surveys undertaken at Scots College at Bellevue Hill which found that some 44% of students were dropped off in the morning and some 41% of students were picked up from school in the afternoon by car. The car occupancy rate was some 1.7 students per car.
- 3.33 Based on the above, the percentage of students that are expected to travel to and from the school by car and the student occupancy rate per car, as adopted in the traffic report, are considered appropriate.
- iii) *The traffic report has indicated that for 430 students, there will be 115 vehicles setting down in the morning and 90 vehicles picking up in the afternoon based on the survey at Penshurst. As classes finish at the same time in the afternoon, these 90 vehicles would be expected to arrive and depart over a shorter period than 1 hour. The car parking for parents has been designed with 43 spaces at 90 degree with no parallel parking. As noted there will be 90 vehicles arriving in the afternoon parking in the angle parking spaces first, resulting in an additional 47 vehicles requiring to park. As there is a pedestrian path proposed to the north of the site onto Greenacre Road, the 47 vehicles would be presumed to park on the street and pick up the students exiting the gate which*
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will cause an impact on street parking. Any queuing in the carpark will prohibit any vehicles entering or exiting the 90-degree angle parking spaces resulting in traffic queuing back onto Greenacre Road;

- iv) *Whilst the development has designed the number of on-site parking spaces to comply with the DCP requiring 40 spaces and providing 58, these are based on the number of classrooms and not the number of students and hence do not take into account the number of parents driving to drop off/pick up. As there are 90 vehicles expected to pick up in the afternoon, the onsite parking for parents should align closer to this number to prevent spill over parking into the street;*

- 3.34 During the afternoon peak period, the student pick up operation will be managed by school staff from the designated student marshalling area located on the northern side of the southern car park. The pick up zone will cater for up to eight vehicles simultaneously, with a further some 25 to 30 vehicles queued through the car park on approach to the pick up zone. Alternatively, parents/carers can park within the adjacent parking spaces within the car park. Parents/carers will not be permitted to leave or park their vehicle within the designated student pick up zone or within the vehicle pick up queue. The northern aisle within the car park, adjacent to the student pick up area, has been designed to allow access to adjacent parking spaces clear of vehicles within the pick up zone.
- 3.35 Vehicles setting down and picking up students are not all on the site at one time. Pick up operations in the afternoon typically occur over a 20 to 30 minute period.
- 3.36 With 43 on-site parking spaces, plus the set down and pick up area for another eight vehicles, spaces would be used once or twice in that period, by parents/carers picking up students.
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- 3.37 The spaces will readily turnover once or twice in that period. The car parking area will therefore readily cater for pick up operations in the afternoon.
- 3.38 The proposed on-site student set down and pick up arrangements and on-site car parking are considered appropriate.
- v) *The traffic signals and signage proposed on the driveway off Rickard Road mentioned in the traffic report (3.10) shall be Road if a vehicle is existing the site;*
- 3.39 Matter noted. The traffic signal and signage proposed on the Rickard Road access driveway has been included on the architectural plans. The location and design of the traffic signals and traffic measures on the Rickard Road access driveway will be undertaken by specialist consultants, prior to the commencement of construction.
- vi) *The proposed central median island and fence adjustment in Rickard Road mentioned in the traffic report (3.11) shall be indicated on the plans;*
- 3.40 This matter is noted. The proposed central median island and fence in Rickard Road has been included on the architectural plans.
- vii) *The pedestrian crossing on the site shall comply with the RMS site distance requirements to ensure pedestrian safety;*
- 3.41 This matter is noted.
- viii) *The bus bay has not been allocated as car parking and hence drivers will be dropping off and picking up in the bus bay. In the morning period no parents will be parking in the 90 degree parking as they will all be stopping for a short*
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period to allow the student to exit the vehicle before driving off. In the afternoon, the bus bay will be occupied by the 3 buses and cannot be used by parents;

3.42 Bus services will be provided by Transport NSW and Punchbowl Bus Service. These services will operate from bus stops located on Connells Point Road, south of King Georges Road. The on-site student set down and pick up facility will cater for a 20 seat mini bus that will be used by the school outside the morning and afternoon peak periods, to transport students between the new campus and existing Marist Catholic College at Penshurst. School buses will not operate from the on-site facility during the morning and afternoon peak periods.

3.43 Outside the morning and afternoon school peak periods, the southern car park and the on-site student set down and pick up facility will be used on occasion by buses to transport students to and from the school during sports events, special events and school excursions. At these times, car parking spaces located on the northern side of the car park will be managed to ensure appropriate access for buses to turn around within the car park and to enter and exit the site in a forward direction.

ix) The carpark design shall comply with “AS/NZS 2890.1:2004 – Off Street Car Parking” and the Disables Parking Spaces shall comply with “AS/NZS 2890.6:2009 – Off Street Parking for People with Disabilities”;

3.44 As set out in paragraphs 3.13 and 3.14, car parking arrangements and internal circulation within the on-site car parking areas will be designed to comply with the Australian Standards AS2890.1-2004 and AS2890.6-2009, with regards to parking bay dimensions, aisle widths, grades, height clearances and disabled parking spaces.

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- x) *The turning paths of a Medium Rigid Vehicle (MRV) shall be submitted by the applicant and indicated on the plans as defined in “AS/NZS 2890.2:2002 – Off Street Commercial Vehicle Facilities, Section 5” to ensure that a MRV can exit the site in a forward direction from the loading area.*

3.45 The swept paths of service vehicles accessing the site are shown in Appendix B.

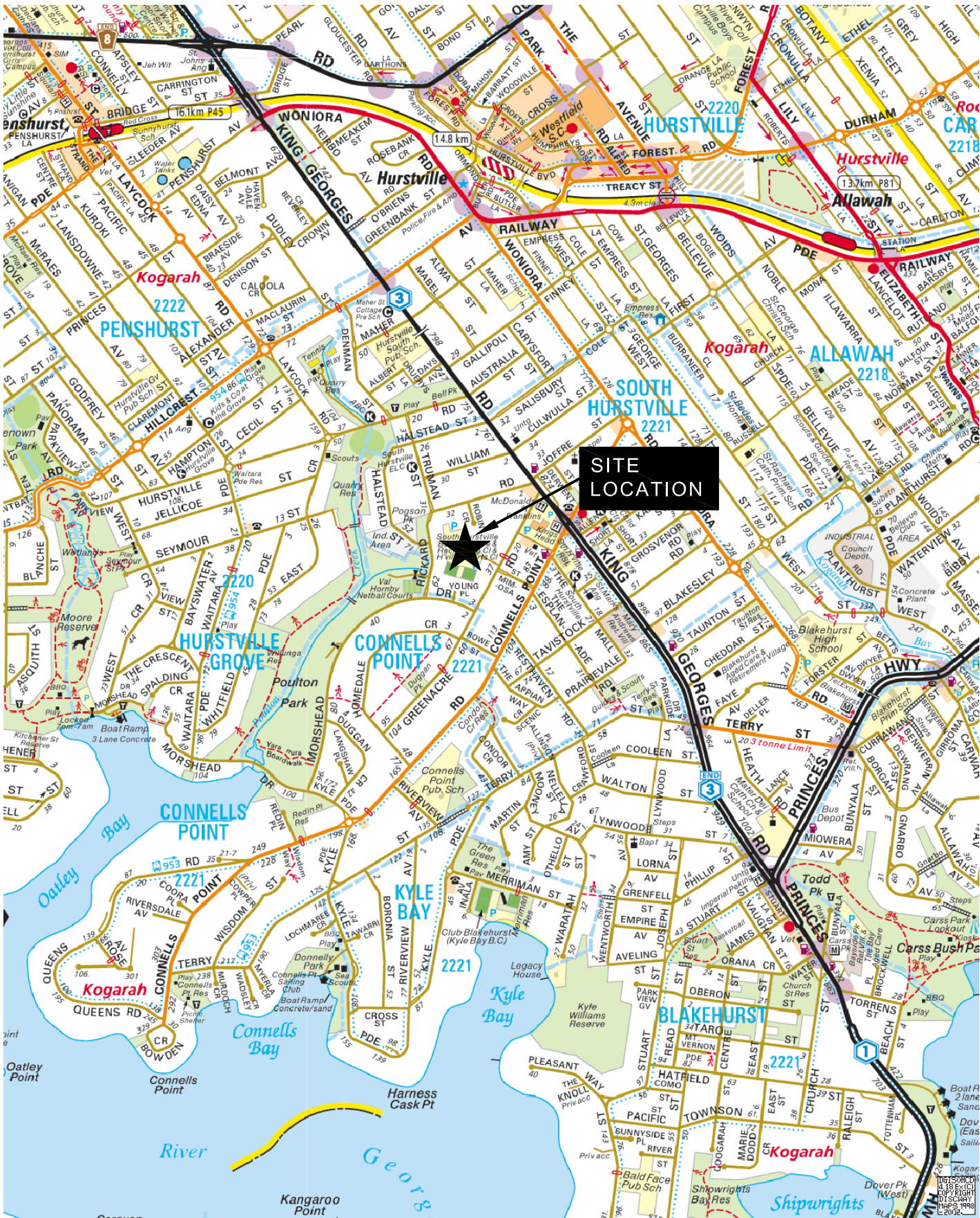
Summary

3.46 In summary, the main points relating to the traffic implications of the proposed school development are as follows:

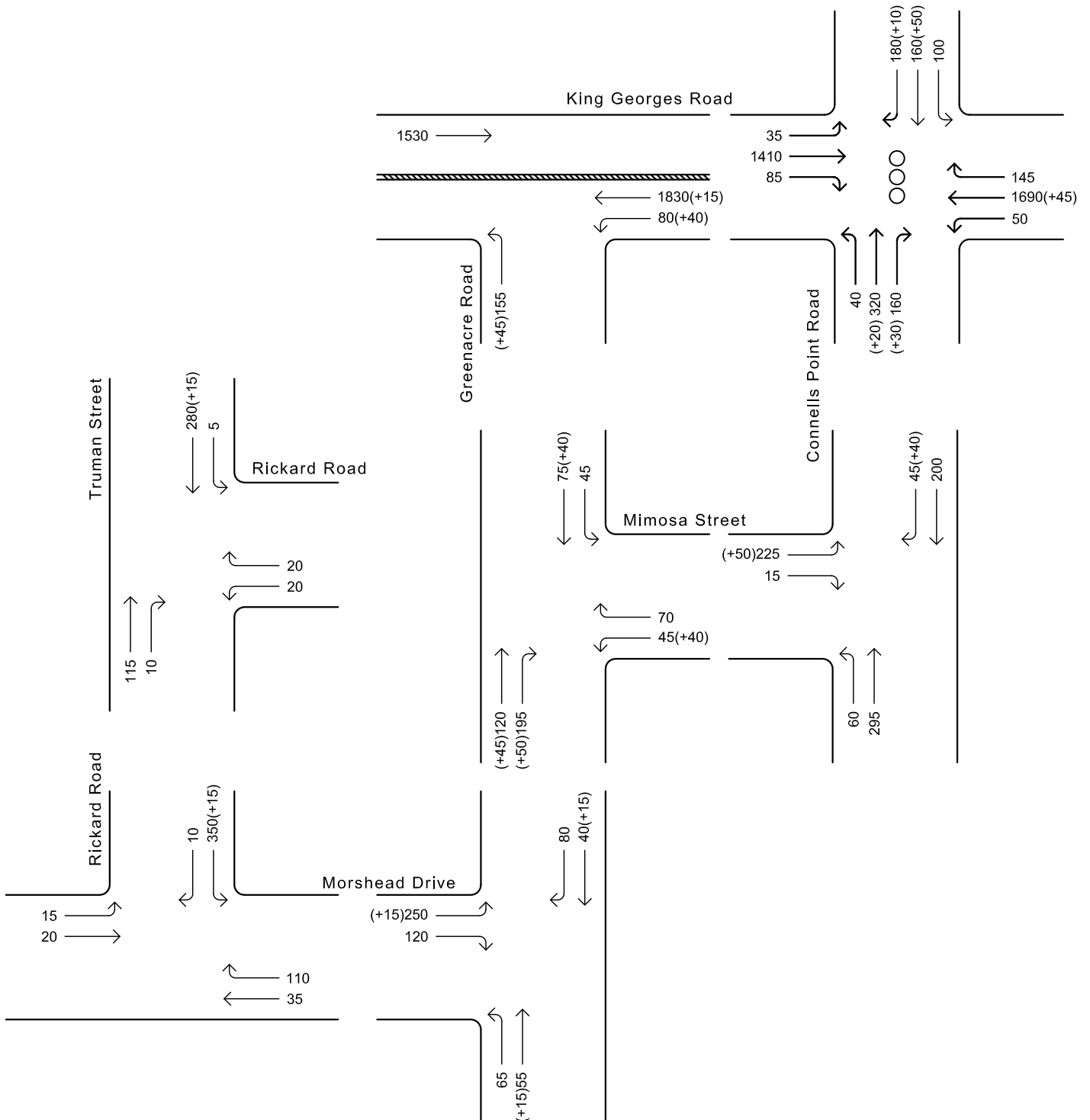
- i) the proposed school will provide a second campus to the existing Marist Catholic College at Penshurst. It will cater for Years 7 and 8, with an ultimately total student population of some 430 students across the two years and a total of some 28 staff;
 - ii) the site is accessible to public transport services (buses) with links to Hurstville Railway Station and to surrounding areas. These services will operate from bus stops located on Connells Point Road, south of King Georges Road;
 - iii) the school will provide an on-site student set down and pick up facility which will be used to assist with the drop off and pick up of students at the start and end of the school day;
 - iv) the proposed parking provision is appropriate;
 - v) access arrangements will utilise the existing access lanes onto Greenacre Road and Rickard Road. The Rickard Road driveway will incorporate a median
-
-

across the driveway restricting turning movements to and from the site to left in/left out;

- vi) access, internal layout, car parking arrangements and servicing will be provided in accordance with Australian Standards AS2890.1:2004 and AS2890.2-2002;
- vii) the road network will be able to cater for the additional traffic from the proposed development; and
- viii) matters raised by council have been addressed in paragraphs 3.26 to 3.45.



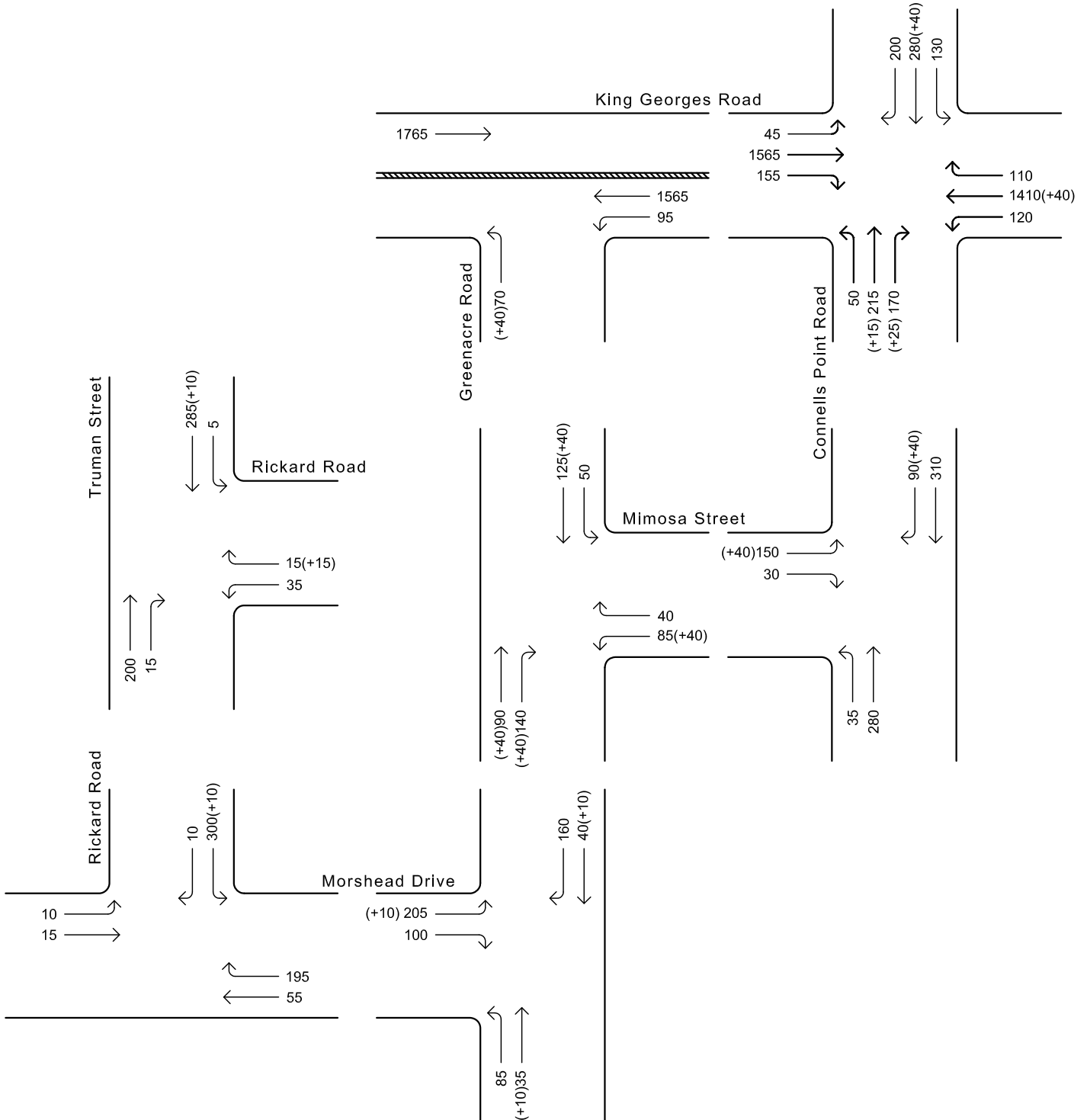
Location Plan



LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic

Existing weekday morning peak hour traffic flows plus development traffic



LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic

Existing weekday afternoon peak hour traffic flows plus development traffic

APPENDIX A
SIDRA ANALYSIS

MOVEMENT SUMMARY

Site: 101 [AM (Ex): King Georges Road - Connolls Point Road]

Existing Weekday Morning Peak Hour

Signals - Fixed Time Coordinated Cycle Time = 113 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connolls Point Road											
1	L2	40	3.0	0.058	28.1	LOS B	1.4	9.9	0.66	0.68	37.7
2	T1	320	3.0	0.906	59.8	LOS E	20.0	143.5	0.97	1.09	27.6
3	R2	160	3.0	0.387	30.8	LOS C	6.1	43.8	0.83	0.76	36.9
Approach		520	3.0	0.906	48.4	LOS D	20.0	143.5	0.91	0.96	30.6
East: King Georges Road											
4	L2	50	3.0	0.855	34.9	LOS C	27.9	200.3	0.88	0.87	37.9
5	T1	1690	3.0	0.855	27.4	LOS B	28.1	201.9	0.89	0.85	41.3
6	R2	145	3.0	0.901	71.7	LOS F	9.1	65.2	1.00	0.97	26.4
Approach		1885	3.0	0.901	31.0	LOS C	28.1	201.9	0.89	0.86	39.5
North: Connolls Point Road											
7	L2	100	3.0	0.145	29.0	LOS C	3.6	25.7	0.69	0.72	37.3
8	T1	160	3.0	0.350	38.7	LOS C	7.4	52.9	0.88	0.72	32.8
9	R2	180	3.0	0.566	33.3	LOS C	7.0	49.9	0.95	0.80	35.9
Approach		440	3.0	0.566	34.3	LOS C	7.4	52.9	0.86	0.75	35.0
West: King Georges Road											
10	L2	35	3.0	0.737	32.3	LOS C	19.5	139.8	0.76	0.71	39.0
11	T1	1410	3.0	0.737	23.2	LOS B	19.9	143.2	0.75	0.68	43.4
12	R2	85	3.0	0.528	61.3	LOS E	4.6	33.3	0.98	0.77	28.6
Approach		1530	3.0	0.737	25.5	LOS B	19.9	143.2	0.77	0.68	42.1
All Vehicles		4375	3.0	0.906	31.5	LOS C	28.1	201.9	0.85	0.80	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped	
P1	South Full Crossing	53	30.5	LOS D	0.1	0.1	0.74	0.74	
P2	East Full Crossing	53	49.8	LOS E	0.2	0.2	0.94	0.94	
P3	North Full Crossing	53	30.5	LOS D	0.1	0.1	0.74	0.74	
P4	West Full Crossing	53	49.8	LOS E	0.2	0.2	0.94	0.94	
All Pedestrians		211	40.2	LOS E			0.84	0.84	

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY



Site: 101 [AM (Ex+D): King Georges Road - Connolls Point Road]

Existing Plus Development Weekday Morning Peak Hour

Signals - Fixed Time Coordinated Cycle Time = 114 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connolls Point Road											
1	L2	40	3.0	0.057	27.8	LOS B	1.4	9.9	0.66	0.68	37.8
2	T1	340	3.0	0.964	77.2	LOS F	24.5	175.7	0.98	1.24	24.5
3	R2	190	3.0	0.492	31.7	LOS C	7.4	53.0	0.88	0.78	36.5
Approach		570	3.0	0.964	58.6	LOS E	24.5	175.7	0.92	1.05	28.3
East: King Georges Road											
4	L2	50	3.0	0.885	38.5	LOS C	31.0	222.5	0.92	0.92	36.5
5	T1	1735	3.0	0.885	30.6	LOS C	31.1	223.1	0.92	0.91	39.9
6	R2	145	3.0	0.909	73.1	LOS F	9.2	66.2	1.00	0.98	26.1
Approach		1930	3.0	0.909	34.0	LOS C	31.1	223.1	0.93	0.91	38.3
North: Connolls Point Road											
7	L2	100	3.0	0.142	28.8	LOS C	3.6	25.6	0.68	0.72	37.4
8	T1	210	3.0	0.458	39.5	LOS C	10.0	71.5	0.90	0.75	32.6
9	R2	190	3.0	0.610	33.6	LOS C	7.4	53.0	0.96	0.80	35.9
Approach		500	3.0	0.610	35.1	LOS C	10.0	71.5	0.88	0.76	34.7
West: King Georges Road											
10	L2	35	3.0	0.743	33.2	LOS C	20.0	143.3	0.77	0.72	38.6
11	T1	1410	3.0	0.743	24.0	LOS B	20.4	146.6	0.76	0.69	43.0
12	R2	85	3.0	0.533	61.9	LOS E	4.7	33.6	0.98	0.77	28.4
Approach		1530	3.0	0.743	26.3	LOS B	20.4	146.6	0.78	0.69	41.7
All Vehicles		4530	3.0	0.964	34.6	LOS C	31.1	223.1	0.87	0.84	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	31.0	LOS D	0.1	0.1	0.74	0.74
P2	East Full Crossing	53	49.4	LOS E	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	31.0	LOS D	0.1	0.1	0.74	0.74
P4	West Full Crossing	53	49.4	LOS E	0.2	0.2	0.93	0.93
All Pedestrians		211	40.2	LOS E			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [PM (Ex): King Georges Road - Connolls Point Road]**

Existing Weekday Afternoon Peak Hour

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connolls Point Road											
1	L2	50	3.0	0.076	28.9	LOS C	1.7	12.4	0.68	0.69	37.4
2	T1	215	3.0	0.657	42.6	LOS D	10.5	75.4	0.94	0.79	31.7
3	R2	170	3.0	0.578	34.9	LOS C	6.7	48.4	0.96	0.80	35.4
Approach		435	3.0	0.657	38.0	LOS C	10.5	75.4	0.92	0.78	33.7
East: King Georges Road											
4	L2	120	3.0	0.712	29.2	LOS C	18.3	131.3	0.73	0.73	39.9
5	T1	1410	3.0	0.712	20.3	LOS B	18.5	132.5	0.73	0.67	44.8
6	R2	110	3.0	0.605	59.3	LOS E	5.9	42.0	0.99	0.79	29.0
Approach		1640	3.0	0.712	23.6	LOS B	18.5	132.5	0.75	0.68	42.8
North: Connolls Point Road											
7	L2	130	3.0	0.197	30.2	LOS C	4.7	34.1	0.72	0.74	36.9
8	T1	280	3.0	0.913	61.9	LOS E	17.4	125.2	0.98	1.11	27.2
9	R2	200	3.0	0.591	34.7	LOS C	8.1	58.2	0.94	0.80	35.5
Approach		610	3.0	0.913	46.3	LOS D	17.4	125.2	0.91	0.93	31.3
West: King Georges Road											
10	L2	45	3.0	0.796	29.7	LOS C	22.9	164.5	0.79	0.76	40.1
11	T1	1565	3.0	0.796	21.9	LOS B	23.4	167.8	0.77	0.71	44.1
12	R2	155	3.0	0.852	65.5	LOS E	9.1	65.1	1.00	0.92	27.6
Approach		1765	3.0	0.852	25.9	LOS B	23.4	167.8	0.79	0.73	41.8
All Vehicles		4450	3.0	0.913	29.0	LOS C	23.4	167.8	0.80	0.75	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	28.4	LOS C	0.1	0.1	0.72	0.72
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	28.4	LOS C	0.1	0.1	0.72	0.72
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	38.9	LOS D			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

 **Site: 101 [PM (Ex+D): King Georges Road - Connolls Point Road]**

Existing Plus Development Weekday Afternoon Peak Hour

Signals - Fixed Time Coordinated Cycle Time = 119 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Connolls Point Road											
1	L2	50	3.0	0.068	27.6	LOS B	1.7	12.6	0.64	0.69	37.9
2	T1	230	3.0	0.641	40.9	LOS C	11.4	81.9	0.90	0.75	32.2
3	R2	195	3.0	0.621	34.5	LOS C	7.9	57.0	0.95	0.80	35.6
Approach		475	3.0	0.641	36.9	LOS C	11.4	81.9	0.89	0.77	34.0
East: King Georges Road											
4	L2	120	3.0	0.790	36.5	LOS C	23.9	171.8	0.84	0.83	37.0
5	T1	1450	3.0	0.790	27.0	LOS B	24.0	172.3	0.84	0.78	41.4
6	R2	110	3.0	0.600	63.2	LOS E	6.3	45.1	0.99	0.79	28.1
Approach		1680	3.0	0.790	30.1	LOS C	24.0	172.3	0.85	0.78	39.8
North: Connolls Point Road											
7	L2	130	3.0	0.177	28.8	LOS C	4.8	34.4	0.68	0.73	37.4
8	T1	320	3.0	0.894	58.8	LOS E	20.3	145.5	0.96	1.05	27.8
9	R2	200	3.0	0.530	33.3	LOS C	8.2	58.7	0.90	0.79	36.0
Approach		650	3.0	0.894	45.0	LOS D	20.3	145.5	0.88	0.90	31.6
West: King Georges Road											
10	L2	45	3.0	0.861	38.4	LOS C	29.3	210.4	0.90	0.88	36.6
11	T1	1565	3.0	0.861	30.2	LOS C	29.5	211.7	0.86	0.83	40.1
12	R2	155	3.0	0.845	69.4	LOS E	9.7	69.6	1.00	0.91	26.9
Approach		1765	3.0	0.861	33.8	LOS C	29.5	211.7	0.88	0.84	38.3
All Vehicles		4570	3.0	0.894	34.3	LOS C	29.5	211.7	0.87	0.82	37.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

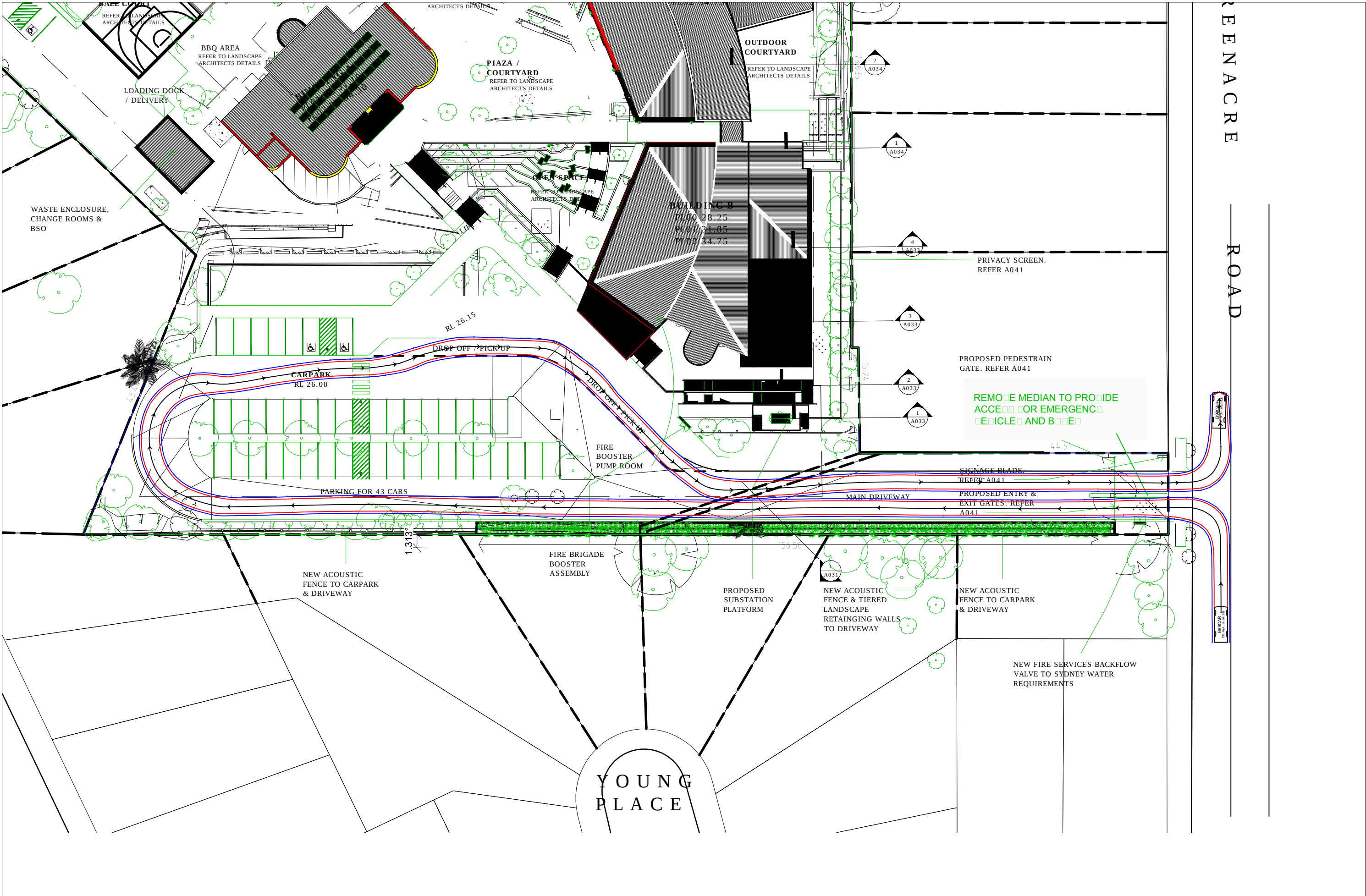
Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	32.6	LOS D	0.1	0.1	0.74	0.74
P2	East Full Crossing	53	50.0	LOS E	0.2	0.2	0.92	0.92
P3	North Full Crossing	53	32.6	LOS D	0.1	0.1	0.74	0.74
P4	West Full Crossing	53	50.0	LOS E	0.2	0.2	0.92	0.92
All Pedestrians		211	41.3	LOS E			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

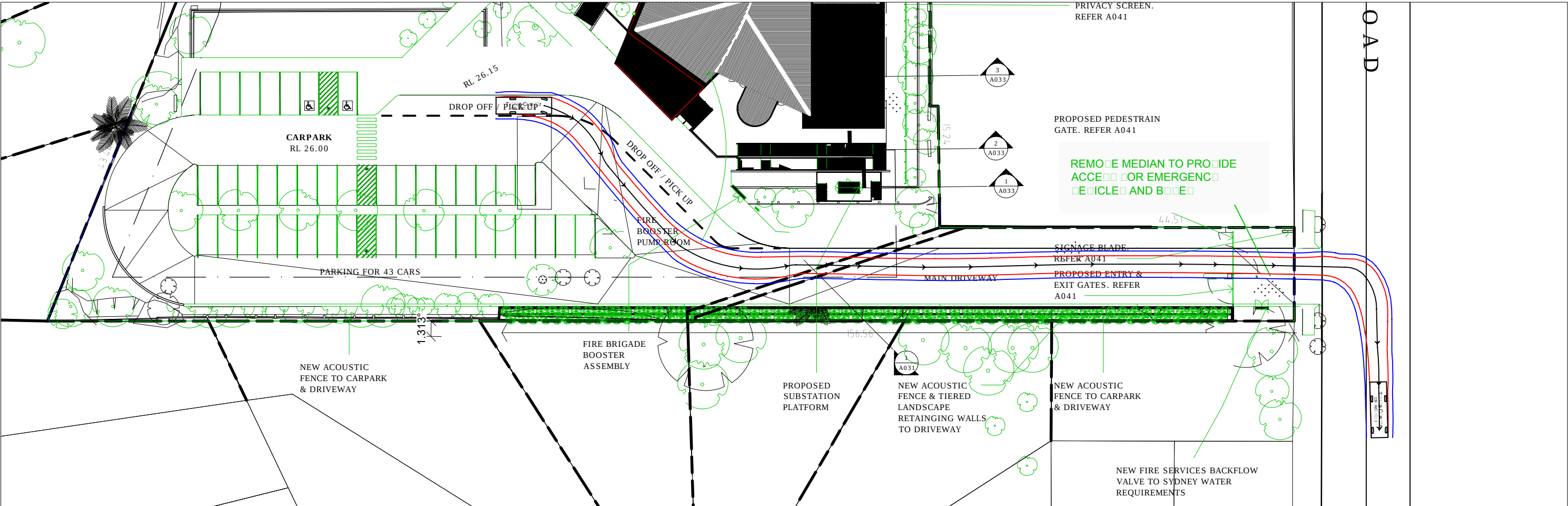
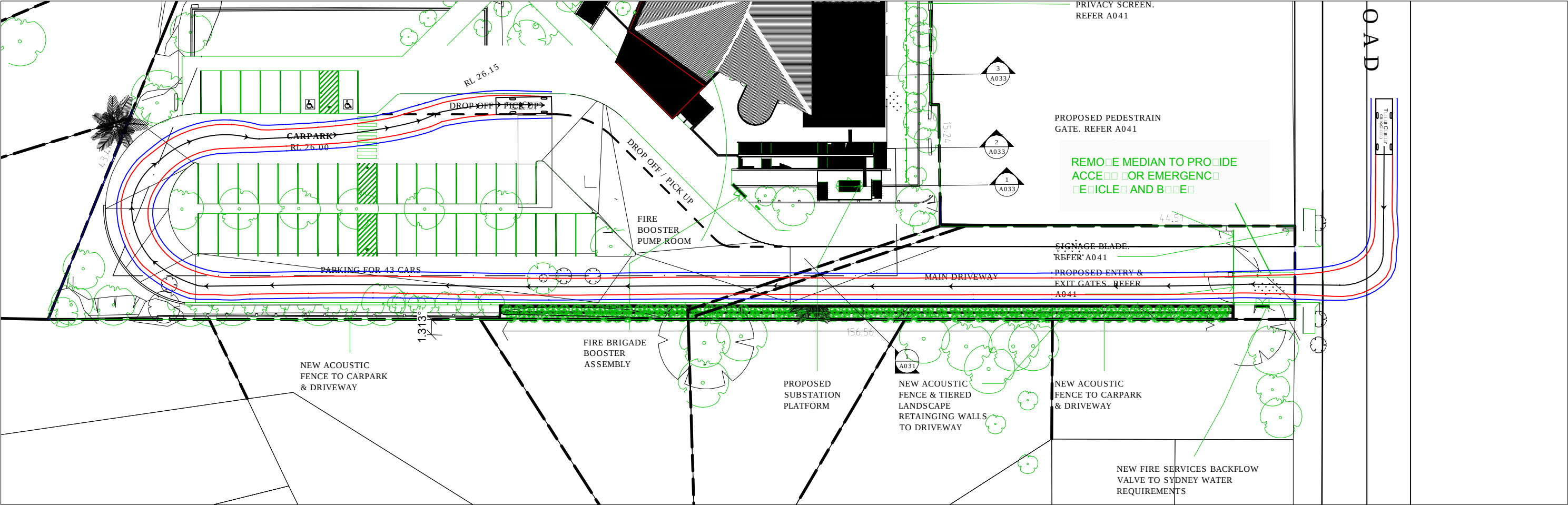
APPENDIX B
VEHICLE SWEPT PATHS

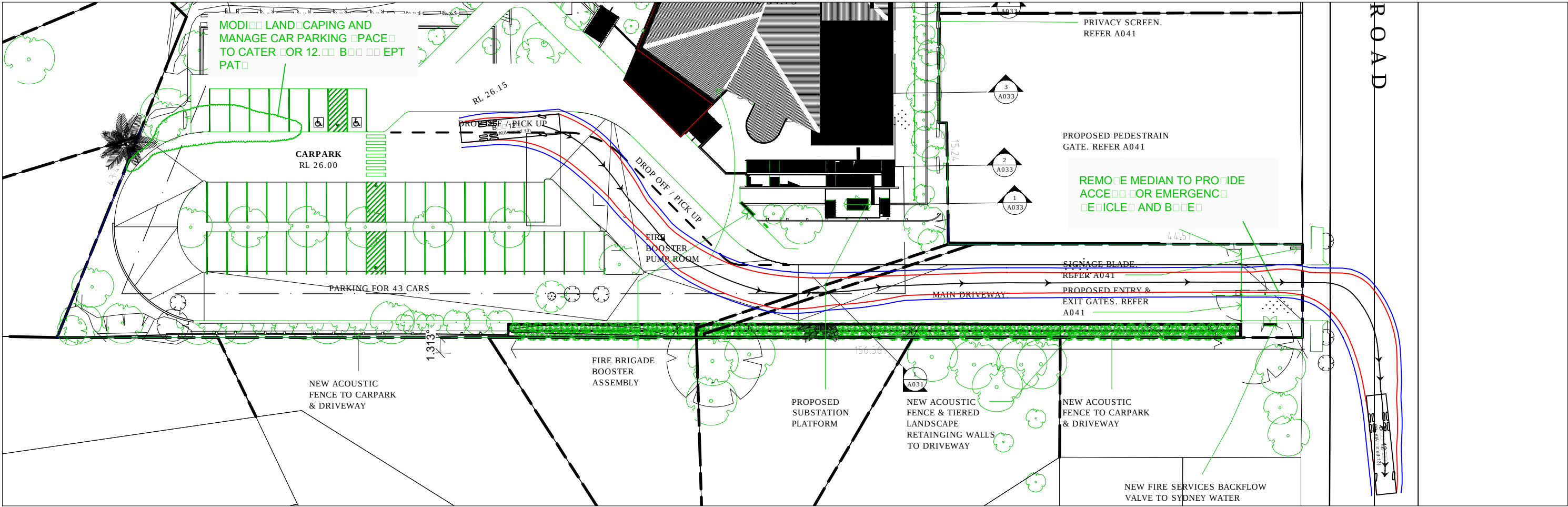
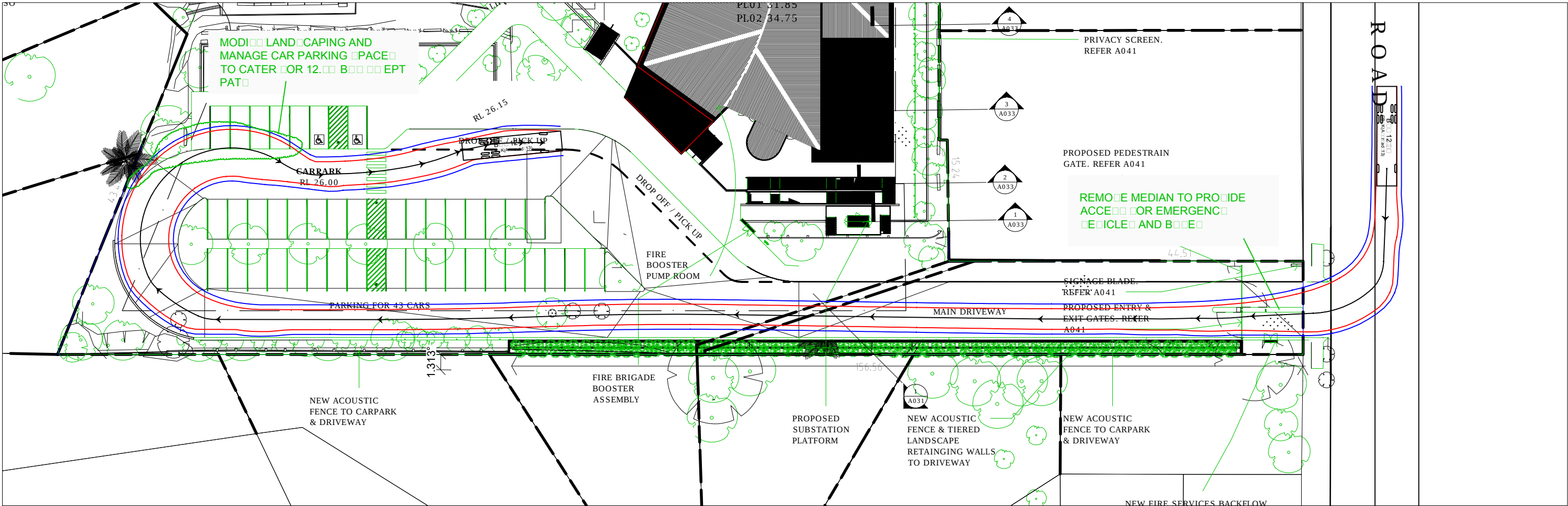


NOTE:
KETCHUP PLAN ONLY. PROPERTY BOUNDARIES
UTILITIES KERBLINE & DIMENSIONS ARE SUBJECT TO
SURVEY AND FINAL DESIGN. TRAFFIC MEASUREMENTS
PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND
ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEER.

—— Path through Block
—— Path through Block

B99 VEHICLE EPT PAT

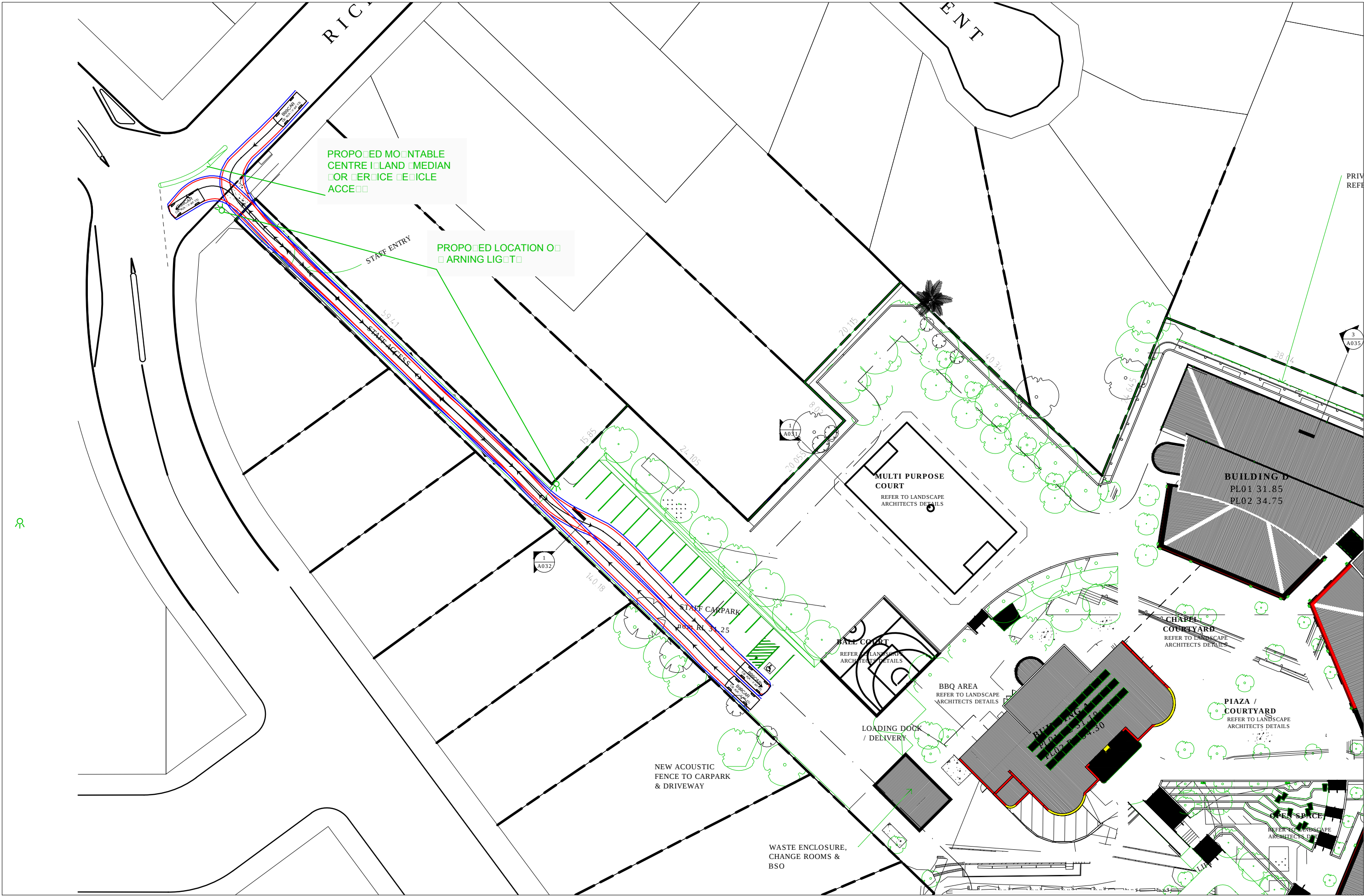




NOTE:
KETCHUP PLAN ONLY. PROPERTY BOUNDARIES
UTILITIES KERBLINE DIMENSIONS ARE SUBJECT TO
SURVEY AND FINAL DESIGN. TRAFFIC MEASUREMENTS
PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND
ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEER.

Red line: Path through Bed
Blue line: Path through Bed

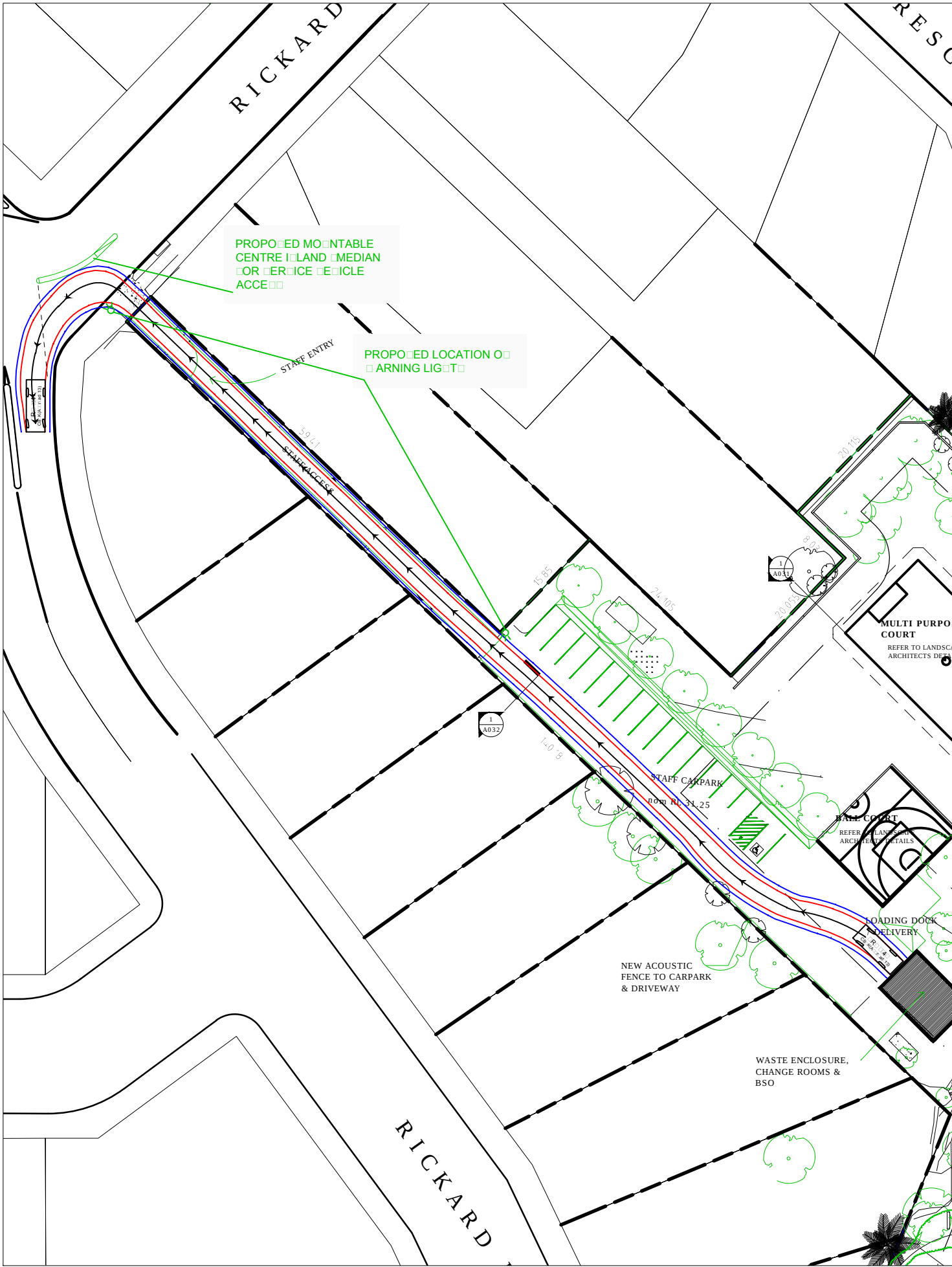
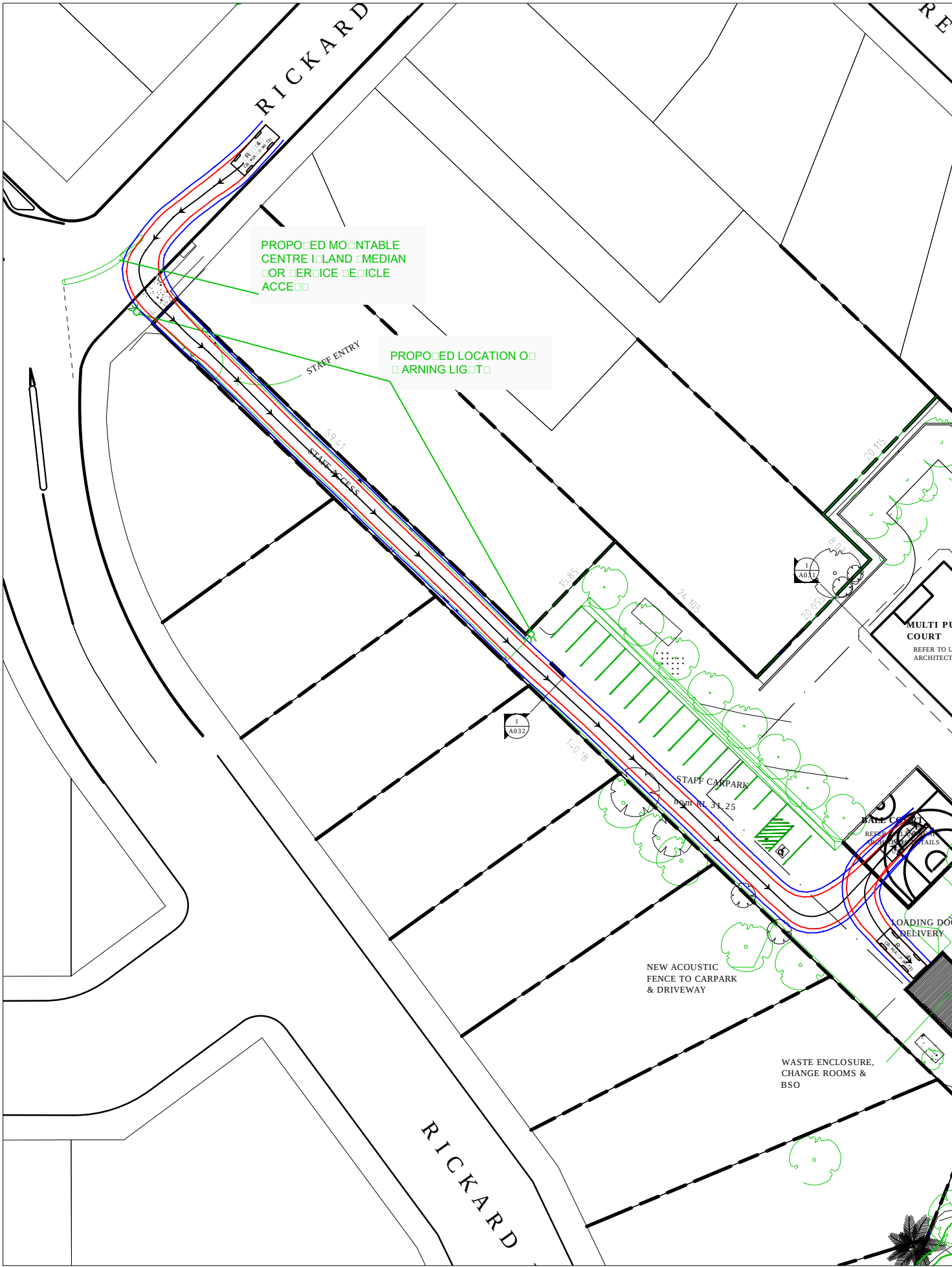
7.00 MINI BICYCLE
EPT PATH



NOTE:
KETC PLAN ONLY. PROPERTY BOUNDARIES
UTILITIES KERBLINE DIMENSIONS ARE SUBJECT TO
SURVEY AND FINAL DESIGN. TRAFFIC MEASURES
PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND
ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEER.

—— Path —— hatched B'd
—— Path —— Character —— hatched B'd

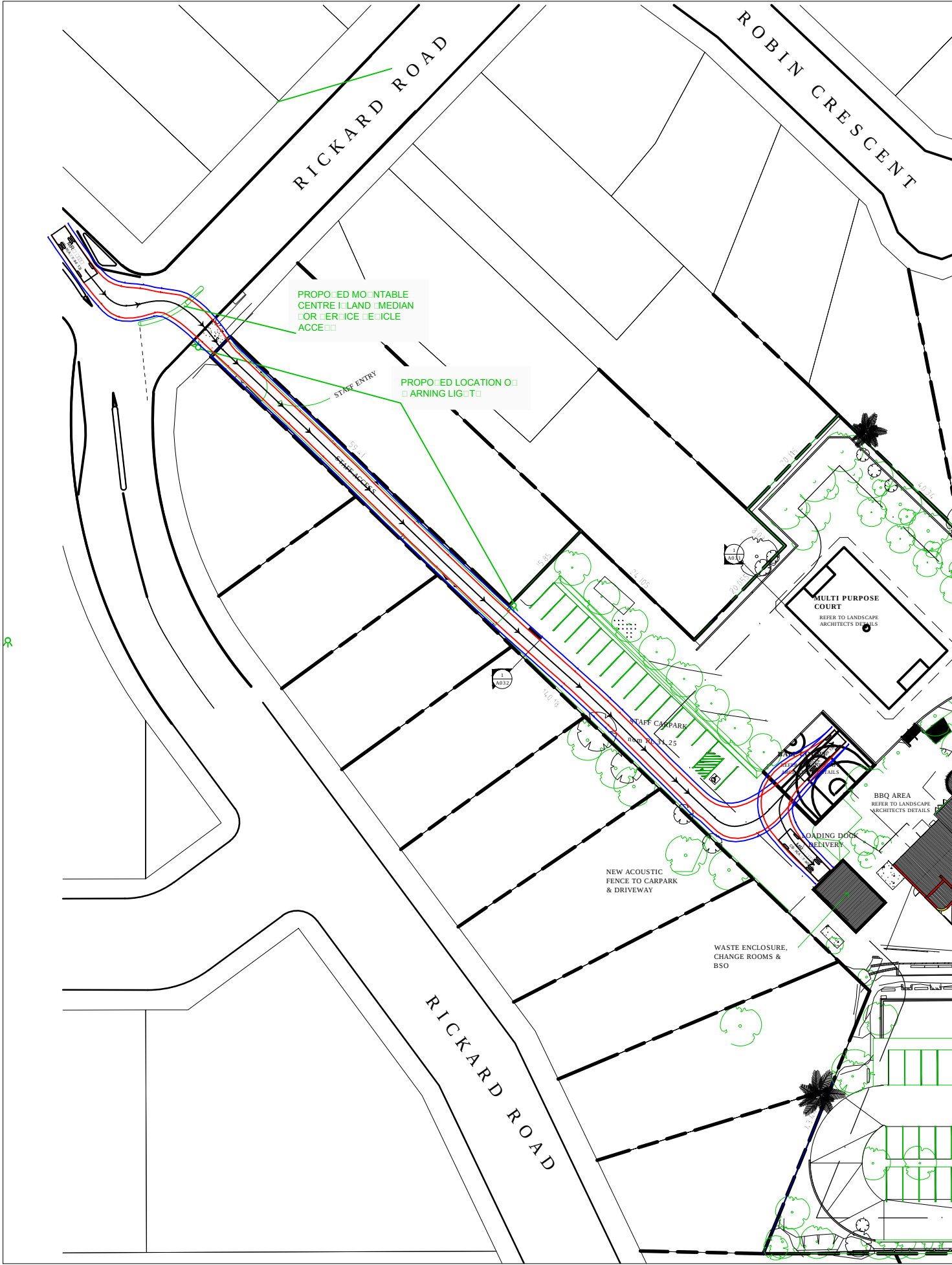
B99 VEHICLE EPT PAT



NOTE:
KETCHUP PLAN ONLY. PROPERTY BOUNDARIES
UTILITIES KERBLINE DIMENSIONS ARE SUBJECT TO
SURVEY AND FINAL DESIGN. TRAFFIC MEASUREMENTS
PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND
ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEER.

Proposed Path for Heavy Buses
Proposed Path for Caravan and Light Buses

4.4 MALL RIGID VEHICLE
EPT PAT



NOTE:
KETCH PLAN ONLY. PROPERTY BOUNDARIES
UTILITIES KERBLINE DIMENSIONS ARE SUBJECT TO
SURVEY AND FINAL DESIGN. TRAFFIC MEASURES
PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND
ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEER.

Path through Bed
Path through Bed

MEDIUM RIGID E
EPT PAT