



Our ref: PS208790-WSP-PER-PAM-LTR-001 Stage 1 RevD

Your ref: PS208790

18 March 2024

Andrea Veccia-Scavalli
30 Henry Street
Fremantle WA 6160

Dear Andrea,

**Landsdale Christian School
Traffic Impact Assessment Addendum**

WSP has been engaged by Seventh-day Adventist Schools to provide traffic engineering advice in relation to the proposed expansion to Landsdale Christian School located at 77 Queensway Road, Landsdale.

The purpose of this letter is to assess the suitability of the proposed changes in the scope of the development, and forms an addendum to the Traffic Impact Assessment (TIA) report prepared by Cardno dated 11 December 2020 (reference number CW1011700).

1. Statement of Changes

The TIA assessed the proposal on the basis of an increase in student numbers from 215 existing students to 670 students. This has since been revised, and the proposal now seeks to increase student numbers from 209 existing students to a Stage 1 enrolment of 344 students.

Upon completion of these Stage 1 works, the student body is expected to comprise approximately 172 primary school students and 172 secondary school students. This extends the anticipated Day One 2024 enrolment for the approved interim development comprising 250 students (125 primary school students and 125 high school students).

As part of the works, it is proposed that the school will provide a total of 112 on-site car parking spaces. Access to internal car parking and for private bus movements is proposed to be improved via two new crossovers located on Babylon Bend. The proposed arrangement retains future opportunities to increase parking as required to serve long-term needs.

The architectural site plan is attached in Appendix A.

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WSP acknowledges that every project we work on takes place on First Peoples lands. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

2. Existing Car Parking Conditions

A traffic engineering inspection of the site and its immediate environs was undertaken by WSP on Wednesday 25 October 2023 between 1:30pm and 4:00pm. This period was chosen as it reflects a typical school day and captures the critical after school pick-up period during which there is typically a higher concentration of vehicle movements than the morning drop-off period.

Whilst on-site, WSP observed vehicle arrival and departure to determine the accumulation of on-site car parking from 3:00pm to 3:30pm (presented in Figure 2.1). It is understood that the primary school day finishes at 3:10pm, and the secondary school day finishes at 3:20pm.

A peak demand for 24 car parking spaces was observed during this period. Based on the current enrolment numbers of 209 students, this is equivalent to a car parking demand rate of 0.11 bays per student. This low rate can be attributed to the high proportion of students using the bus (approximately 40%) and the staggered finish times for primary and secondary schools.

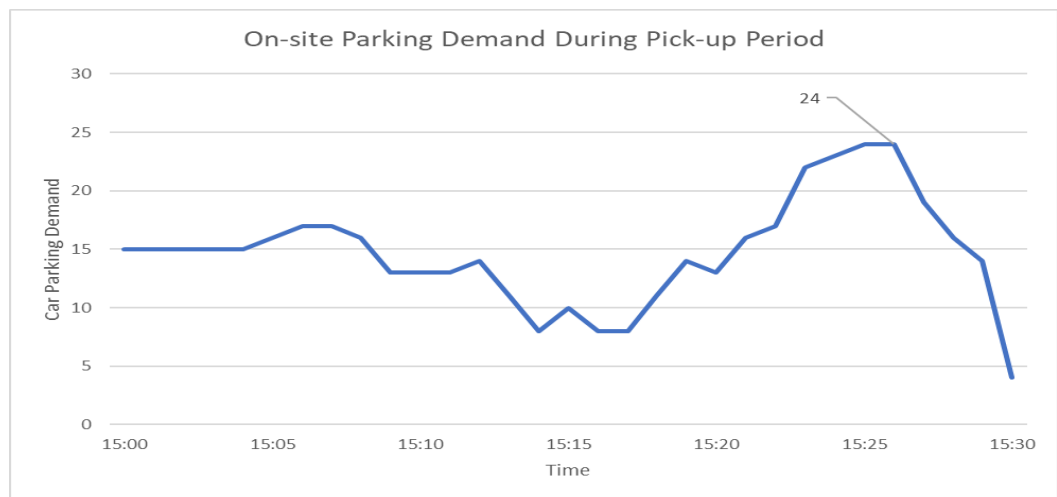


Figure 2.1 Variation in on-site car parking demand during school pick-up period

During the site inspection, no notable on-street parking activity was observed.

3. Car Parking Provision

3.1 Planning Scheme Requirements

The City of Wanneroo's District Planning Scheme 2 specifies the following car parking requirements for an educational establishment:

- For a Primary School:
 - A minimum of 46 car bays for staff and visitor parking for the first 475 students, and then
 - Ten (10) car bays for every 100 students or part thereof afterwards, plus
 - Fourteen (14) pickup/set down bays for every 100 students or part thereof which may be provided in the road reserve.
- For a Secondary School:
 - A minimum of 60 car bays for staff and visitor parking for the first 600 students, and then
 - Ten (10) car bays for every 100 students or part thereof afterwards, plus
 - Seven (7) pickup/set down bays for every 100 students or part thereof which may be provided in the road reserve.

Given the nature of the proposal as a P-12 school, it is expected that the simultaneous application of both requirements would result in an excessive provision of car parking. As such, the following conservative combination of the two rates above is considered to be more reflective of car parking demand patterns at the proposed school:

- A minimum of 60 car bays for staff and visitor parking for the first 600 students, and then
- 10 car bays for 100 students or part thereof afterwards, plus
- 7 pickup/set down bays per 50 primary school students (which may be provided in the road reserve), plus
- 3.5 pickup/set down bays per 50 secondary school students (which may be provided in the road reserve).

The above rates have been assessed based on the expected student body at both Day One 2024, and the Stage 1 enrolment scenario.

3.2 Day One 2024

Application of the proposed combined requirement to the expected student split of 125 primary school students and 125 secondary school students results in a requirement for 92 car parking spaces (of which 32 may be provided within the road reserve).

It is noted that this provision is expected to greatly exceed the parking demand for the school at Day One 2024, given the observed generation rate of 0.11 bays per student, and the relatively minor increase in enrolments (from 209 to 250 students). If this trend continues, peak parking occupancy can be expected to increase to only 27 bays.

Therefore, for the Day One scenario of 250 students, the proposed supply of 112 on-site parking bays is considered to be more than sufficient to accommodate demand.

3.3 Stage One Scenario

The Stage One scenario involves an increase in student enrolments to a total of 344 students. This would represent a requirement under the proposed combined rate calculation of 102 parking bays.

It is noted that there is provision within the DPS2 rates table for 42 of these bays to be within the adjacent road reserve. As discussed above, the peak parking occupancy is expected to be well below the available supply for this scenario.

3.4 Future Growth

Current observations indicate that application of the DPS2 parking rates is likely to significantly over-supply on-site parking. While a total of 156 parking bays have been identified to accommodate future growth, this would result in a reduction in on-site landscaping and loss of remnant bushland to achieve the requisite provision of all bays on-site.

It is therefore recommended that observations from Stage One operation be used to confirm the peak demand for staff and student parking, and that this data be used to inform long-term provision.

4. Design Considerations

4.1 Site Access and Circulation

Two new crossovers have been identified along Babylon Bend, providing access to staff parking at the rear of the school, in addition to direct access for private school buses and service/emergency vehicles. The location of these crossovers has been modified slightly since the completion of the TIA, placing them in a mid-block location between the two nearby intersections. While these crossovers are not anticipated to experience high traffic volumes, they serve a valuable access and connectivity function for the school, particularly for school buses and emergency services.

The two crossovers onto Babylon Bend are proposed to be 8m wide, to accommodate safe access and egress in all directions by the largest design vehicle (a 64-seat school bus) and would to be constructed in accordance with the City of Wanneroo standard drawing for industrial/commercial concrete crossover TS 07-11-4.

The internal accessways of the site carpark will predominantly provide fully circulating two-way aisles, with the exception of a one-way loop at the end of the existing dead-end aisle to facilitate turnaround which will be retained as part of the future works. It is noted that the school operates a private school bus service, in the form of minibuses (approximately equivalent to a 7.9m coaster), with provision for a larger 64-seat bus to support future growth). This will pick up and set down via the internal one-way loop and will be overseen by school staff.

Access for service and emergency vehicles has been designed with turnaround facilities in accordance with requirements, with specific geometries to be determined as the design progresses.

4.2 Sightline Assessment

Following discussions with the City's engineers, a preliminary sightline assessment has been completed for the proposed crossovers. The northern crossover has a minimum sightline dimension of 48.5m associated with right-turning outbound movements and visibility to through movements past the crossover approaching from around the bend.

The assessed sightline distance of 47.5m to the right (consistent with left-turning outbound movements), is related to vehicles turning right from Saverne Way. It is noted that this movement would be related to a prevailing speed in the order of 10-20km/hr, and is not considered to be the critical potential conflict.

The minimum Safe Stopping Distance (SSD) for a vehicle travelling at 40km/hr is 35m. However, the prevailing speed around this 90 degree bend was observed to be significantly lower than 40km/hr during the site visit. Trip volumes from this location are also expected to be low, even during peak usage.

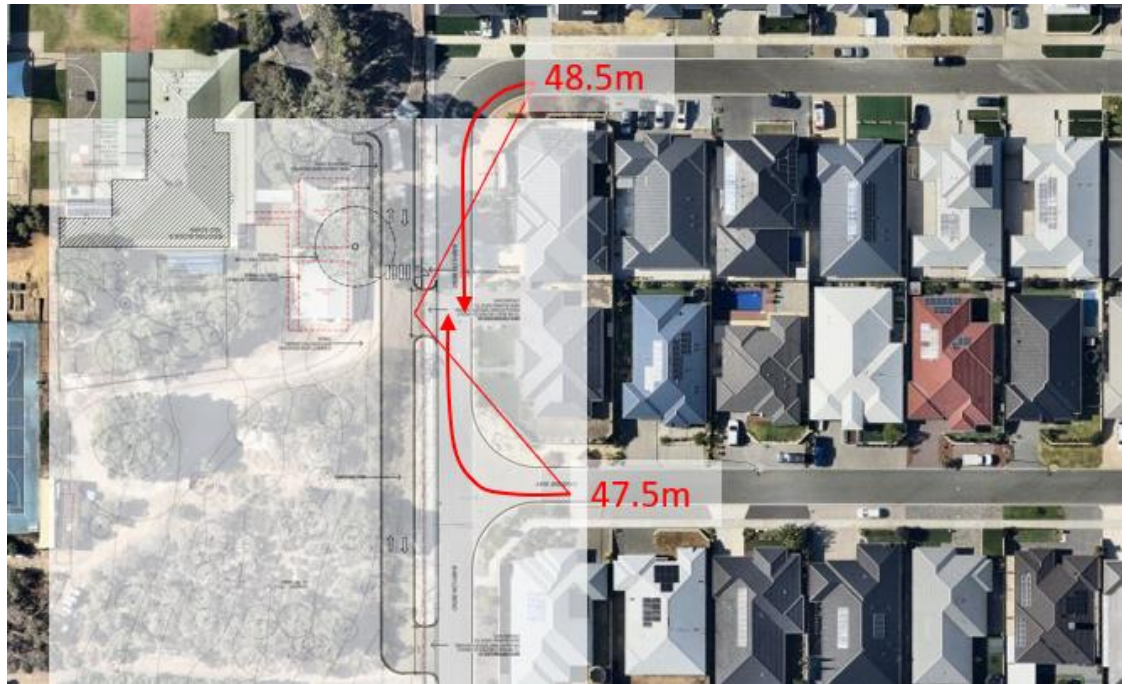


Figure 4.1 Critical sightline distance – northern crossover

A similar assessment for the southern crossover indicates a 38.5m and 57m sightline distance, associated with vehicles approaching from Saverne Way and turning south, and Monsanto Street turning north (respectively).

Movements along these streets are likely to be rare, given current network function, and prevailing speeds well below the nominal 40km/hr due to the give-way restrictions at the intersection.



Figure 4.2 Critical sightline distance – southern crossover

Based on the above analysis, the proposed access and circulation for the site is considered to be safe and appropriate.

4.3 Car Parking Design

All proposed general use car parking spaces will be provided at 5.4m x 2.5m, consistent with the existing design, with circulation and parking aisles designed in accordance with AS2890.1:2004. Proposed DDA car parking and adjacent shared areas will be provided with the same dimensions, in accordance with AS2890.6:2022.

5. Conclusion

The proposed Stage One development application for Landsdale Christian School would see future student enrolment increase to 344 students (172 primary and 172 secondary). As detailed above, the proposed parking and access arrangement is considered to be suitable on the basis of the following:

- The combined parking requirement (using the methodology proposed in Section 3.1) results in a Stage One provision of 102 car parking spaces, of which 42 are permitted to be on-street, is proposed to be met with a total supply of 112 bays on-site and only incidental use of on-street pick-up/drop-off parking.
- Based on observational surveys from current site use, parking demand is likely to be well below the supply rate for the foreseeable future.
- The design of the site access points, circulation aisles and parking bays are on accordance with the relevant Australia Standards.
- Adequate provisions have been made available for service vehicles, emergency vehicles and the school-operated minibus service.

It is therefore concluded that the proposal is appropriate from a traffic engineering perspective.

Yours sincerely



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Senior Principal - Transport Planning

Transport Impact Assessment

Landsdale Christian School

CW1011700



Prepared for
Seventh-day Adventist Schools

11 December 2020

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Our report is based on information made available by the client. The validity and comprehensiveness of supplied information has not been independently verified and, for the purposes of this report, it is assumed that the information provided to Cardno is both complete and accurate. Whilst, to the best of our knowledge, the information contained in this report is accurate at the date of issue, changes may occur to the site conditions, the site context or the applicable planning framework. This report should not be used after any such changes without consulting the provider of the report or a suitably qualified person.

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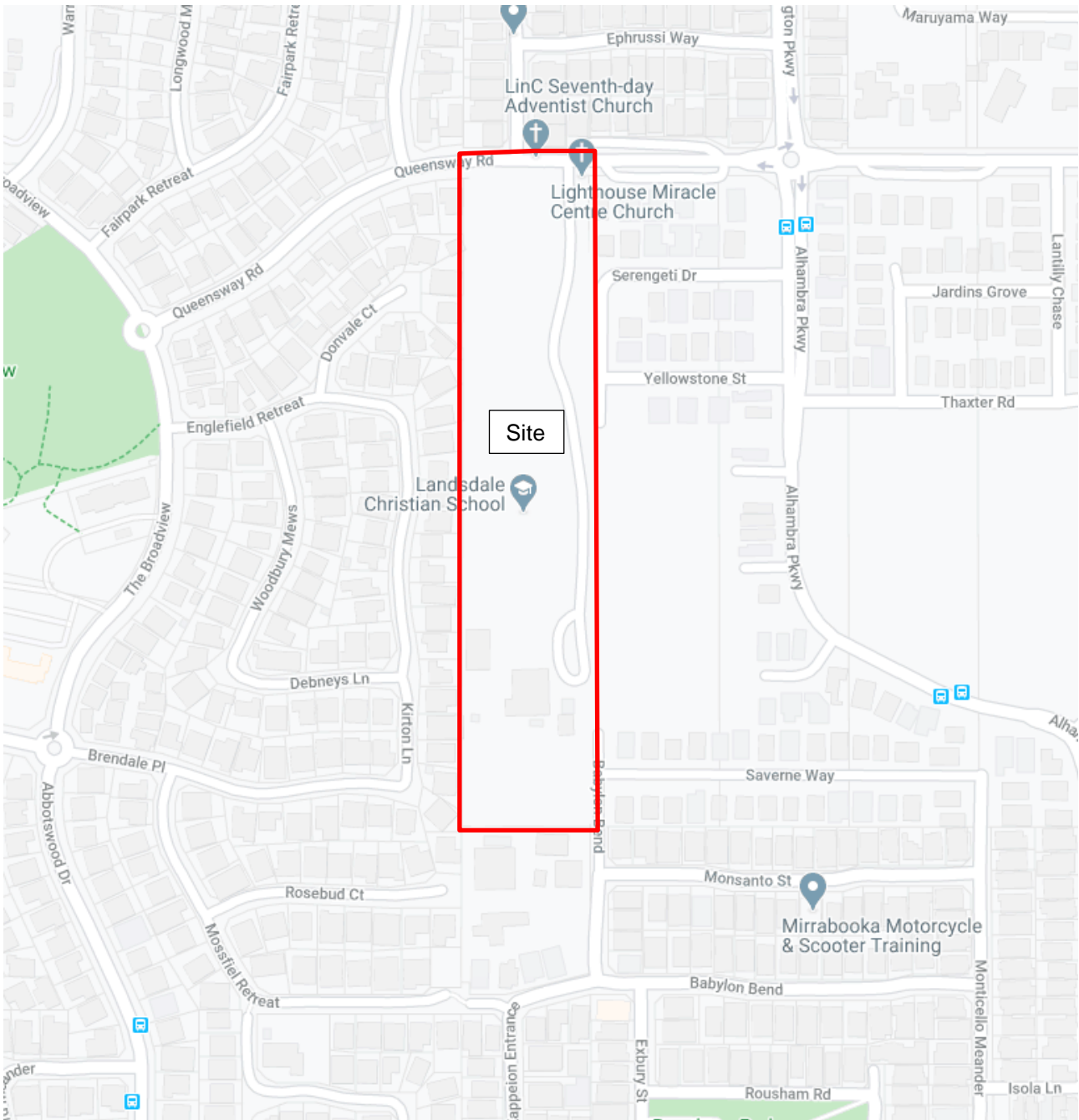
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1 Introduction

Cardno have been commissioned by Seventh-day Adventist Schools (Western Australia) Limited to prepare a Traffic Impact Assessment Report for the proposed expansion of Landsdale Christian College (“the Site”). The Site is located to the south of Queensway Road and east of Englefield Retreat in Landsdale, City of Wanneroo.

The Site location is shown on **Figure 1-1** below.

Figure 1-1 Site Location



Source: Nearthmap (2020)

1.2 Proposed Development

The proposal includes new infrastructure to accommodate an increase in overall student and staff numbers from the current 152 students to 670 students; an increase of 518 students and 22 staff to final staffing of approximately 45, including part-time and ancillary staff resulting in an increase of 23 staff.

The masterplan is enclosed in **Appendix A**.

1.3 Key Issues

Cardno have contacted, via email or phone, the City of Wanneroo (“the City”) and the Public Transport Authority (“PTA”) to identify the key issues to consider in this report.

1.3.1 City of Wanneroo

- > The City has some concerns regarding how traffic will distribute in and out of the property where it connects onto Queensway Road.
- > Queensway Road is an undivided single lane carriageway which could prove problematic given the increase in traffic which will be associated with the future school expansion.

1.3.2 PTA

- > At present the PTA does not specifically serve the school with the nearest Transperth services on Alhambra Parkway (Route 450) and Broadview Drive (Route 376). The PTA typically does not operate services for a school population like Landsdale Christian has currently, and requires the bulk of students to be of secondary student age.
- > No further changes to public transport services are proposed at this stage
- > Additional bus facilities may be required if the number of high school students increase substantially.

2 Review of the Site and Surrounding Road Network

2.1 Existing Road Network

2.1.1 Road Hierarchy

Figure 2-1 shows the Main Roads Functional Hierarchy for the roads surrounding the Site.

Road classifications are defined in the Main Roads Functional Hierarchy as follows:

Primary Distributors: These provide for major regional and inter-regional traffic movement and carry large Volumes of generally fast-moving traffic. Some are strategic freight routes and all are National or State roads. They are managed by Main Roads.

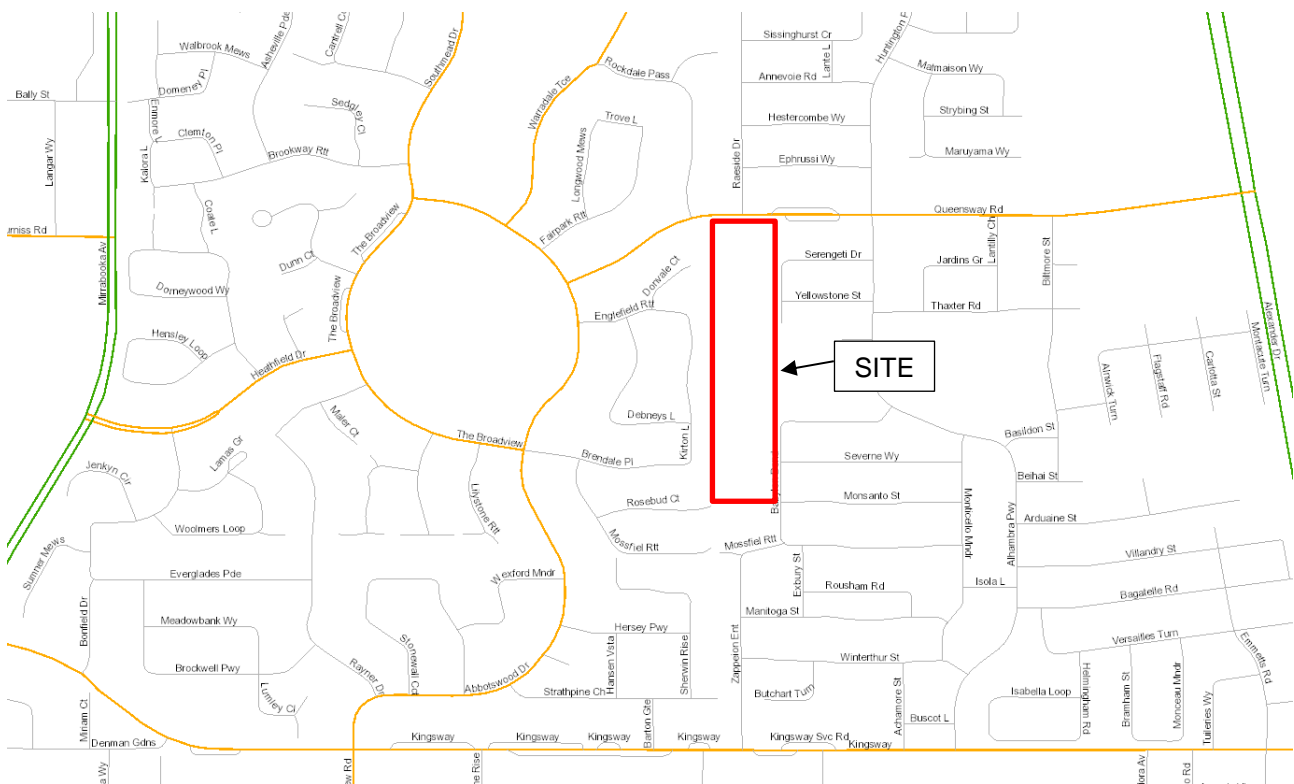
District Distributor A: These carry traffic between industrial, commercial and residential areas and generally connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.

District Distributor B: Perform a similar function to District Distributor A but with reduced capacity due to flow restrictions from access to and roadside parking alongside adjoining property. These are often older roads with a traffic demand in excess of that originally intended. District Distributor A and B roads run between Land-use cells and generally not through them, forming a grid which would ideally space them around 1.5 Kilometres apart. They are managed by Local Government.

Local Distributors: Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local Government.

Access Roads: Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local Government.

Figure 2-1 Road Hierarchy



Source: Main Roads (2020)

2.1.2 Queensway Road

Queensway Road, located along the northern boundary of the Site, consists of a two-lane, two-way road. The road is classified as a “Local Distributor” under the Main Roads Functional Hierarchy (MRFH) with a posted speed limit of 50 km/h.

2.1.3 Babylon Bend

Babylon Bend Road, located along the south-eastern boundary of the Site, consists of a two-lane, two-way road. The road is classified as a “Access Road” under the Main Roads Functional Hierarchy (MRFH) with a posted speed limit of 50 km/h. In its current form, there is no direct vehicle or pedestrian access from the Site onto Babylon Road.

2.2 Existing Traffic Volumes

Traffic data was obtained from the following sources;

- > Link count data supplied by the City for Queensway; and
- > Traffic surveys undertaken by Cardno staff at the existing School access on 18 October 2017 during the PM peak – this was advised by the School to be between 2:30pm to 3:30pm.

These volumes are enclosed in **Appendix B**.

2.3 Existing Site Access

The main vehicle access to the Site is located on the northern boundary which provides access onto Queensway Road as shown in **Figure 2-2**.

Figure 2-2 Site Access

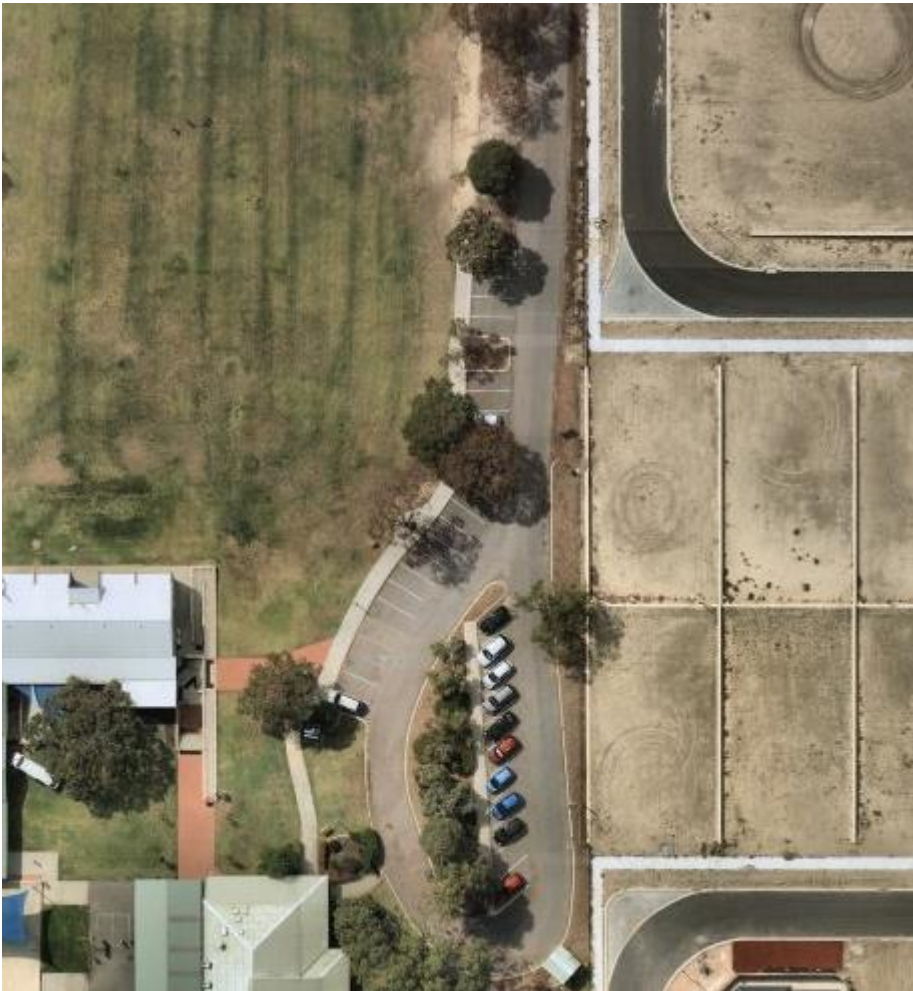


Source: Nearthmap (2020)

2.4 Existing Parking Provision

The school currently provides a total of 32 parking bays as shown in **Figure 2-3**.

Figure 2-3 Existing Parking Bays



Source: Nearmap (2020)

2.5 Surrounding Land Uses

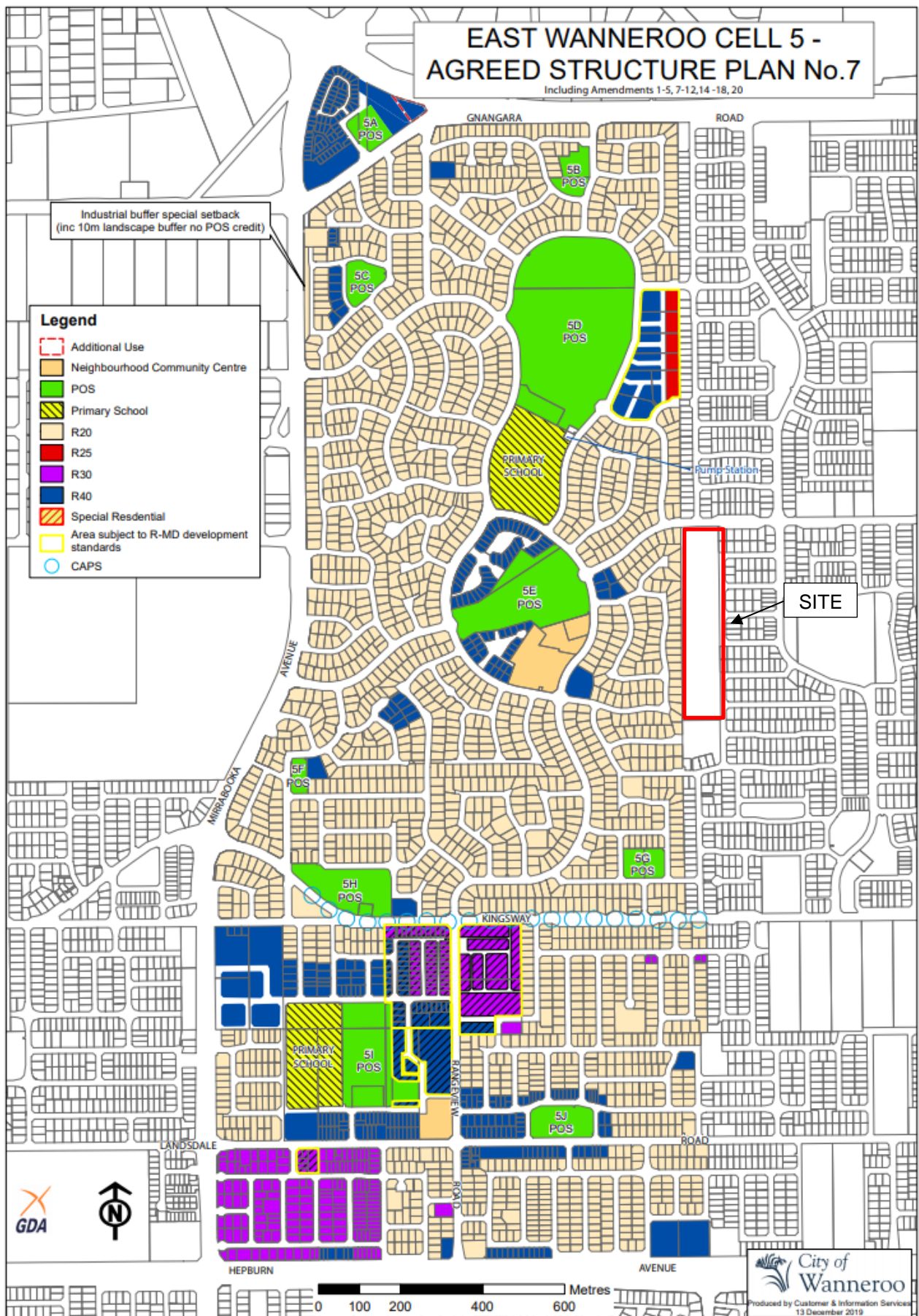
Figure 2-4 and **Figure 2-5** show the surrounding land uses within the vicinity of the Site according to the East Landsdale Cell 9 – Local Structure Plan (“LSP 9”) and the East Wanneroo Cell 5 – Local Structure Plan (“LSP 7”). The surrounding land uses comprise primarily of residential dwellings.

Figure 2-4 East Landsdale Structure Plan



Source: City of Wanneroo

Figure 2-5 East Wanneroo Structure Plan



Source: City of Wanneroo

3 Walking and Cycling Network Review

3.1 Footpaths

Approximately 2m-wide footpaths are located along Queensway Road for the following sections:

- > Footpath along the northern boundary of Queensway Road – between Raeside Drive and Alexander Drive.
- > Footpath along the southern boundary of Queensway Road – between The Broadview and Biltmore Street.

Within the School Site is also an approximately 2m-wide footpath along the eastern boundary of the school site. The footpath is approximately 320m long with a pedestrian crossing facility. The footpath and pedestrian crossing facility are as shown in **Figure 3-1** and **Figure 3-2**.

Figure 3-1 Pedestrian Footpath along Access Driveway



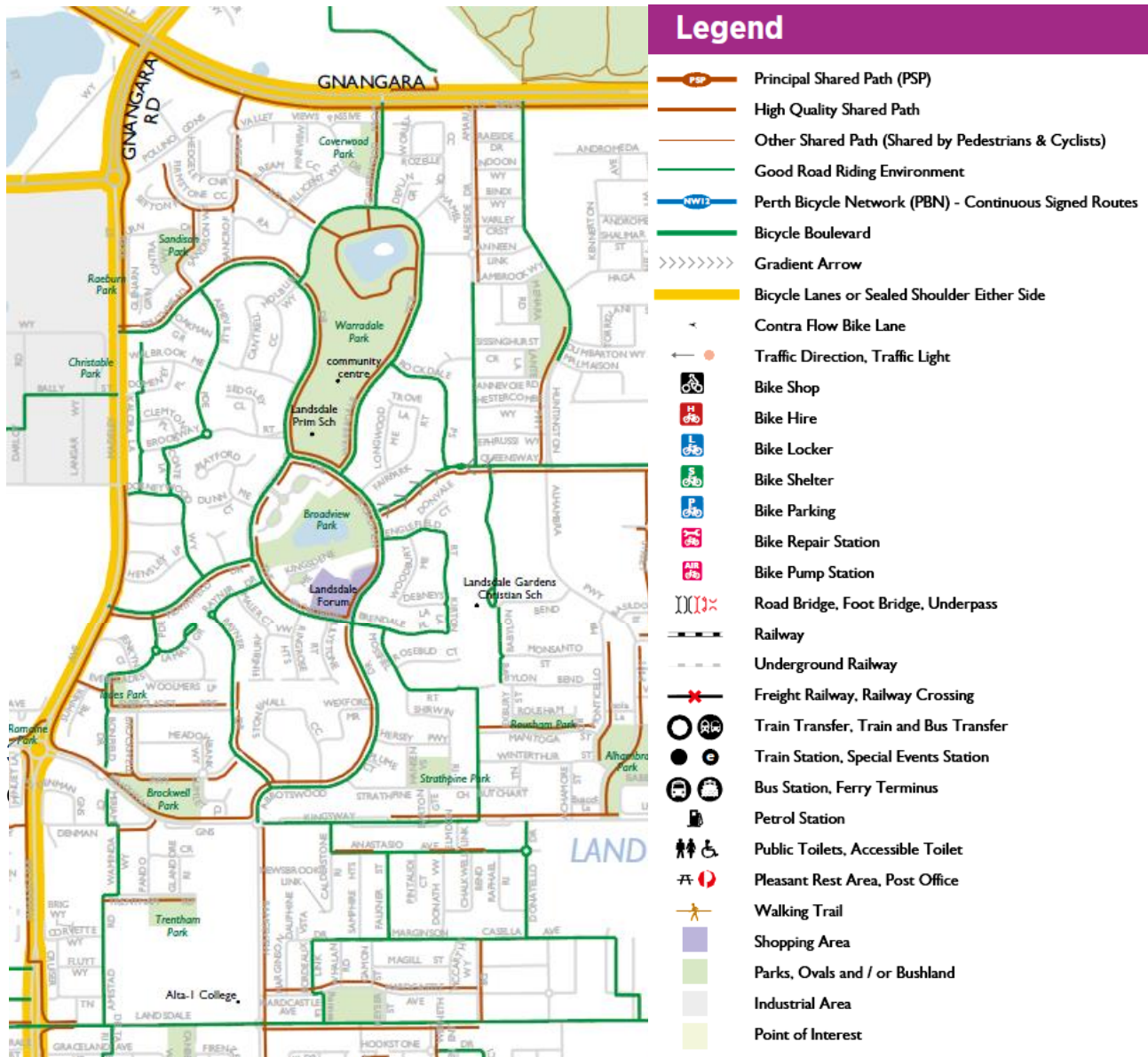
Figure 3-2 Pedestrian Crossing on Access Driveway



3.2 Cycling

The Department of Transport WA’s Bike Map shown in **Figure 3-3**, designates Queensway Road as a “good road riding environment” and the southern path as a high-quality shared path. These paths connect to a wider network of cycling routes, which include the paths on Hepburn Avenue, Mirrabooka Avenue, Gnangara Road and Alexander Drive.

Figure 3-3 Available Shared Paths in the Vicinity of the Site



Source: Department of Transport WA (2016)

3.4 Future/Proposed Walking Cycling Network

Changes to the pedestrian provision within the Site are detailed in **Section 5**.

4 Public Transport Services

4.1 Existing Public Transport Network

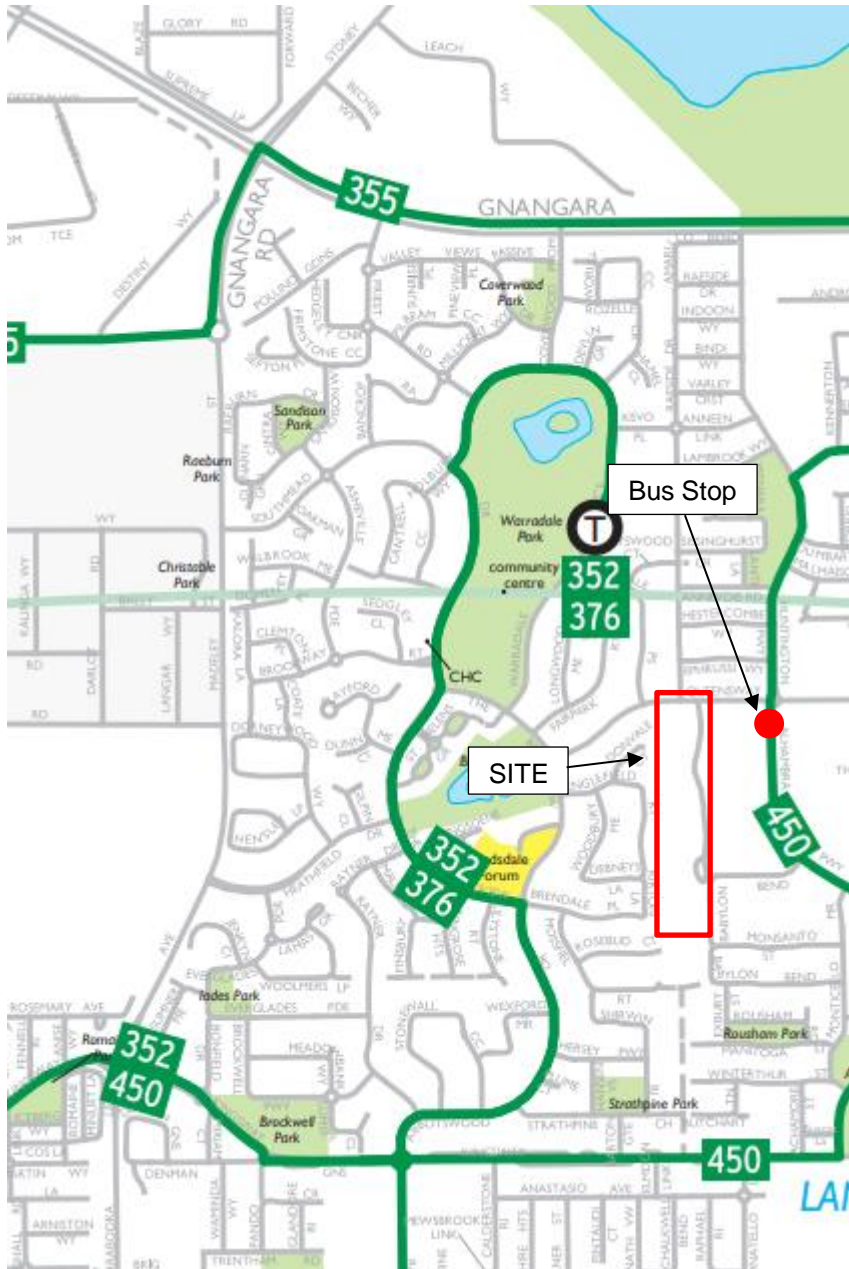
There are currently school buses that operate directly to and from Landsdale Christian School.

There is also a bus service (Route 450) that runs along Huntington Parkway/Alhambra Parkway with a stop located approximately 200m east of the Site. The location of these bus stops is shown in **Figure 4-1** and the frequency of public bus service is shown in **Table 4-1**.

Table 4-1 Bus Service Frequency

Bus Stop Number / Location	Route Number	Route	Weekdays Frequency (mins)			Saturday Frequency (mins)	Sunday and Public Holidays Frequency (mins)
			AM Peak	PM Peak	Off Peak		
27535 / Alhambra Parkway before Queensway Road	450	Warwick Station – Landsdale via Kingsway City Shopping Centre	10-15 mins	10-15 mins	30 mins	30 mins	60 mins

Figure 4-1 Bus Stops Location Near the Site



Source: Transperth

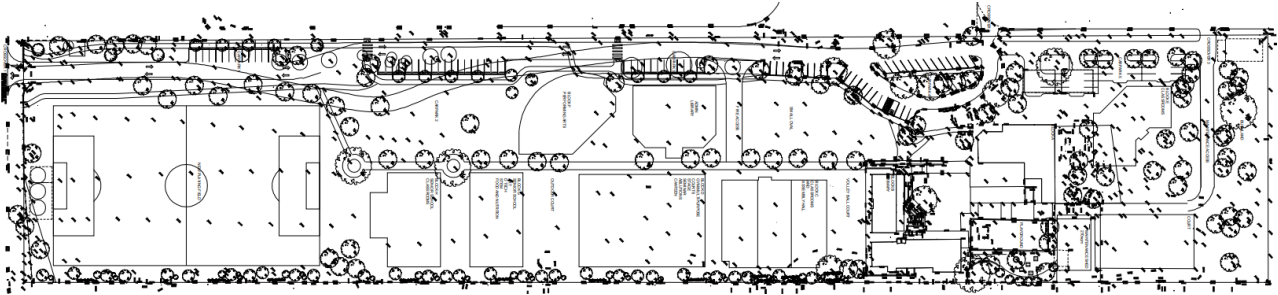
5 Development Proposal

5.1 The Development

The proposal includes new infrastructure to accommodate an increase in overall student and staff numbers from the current 152 students to 670 students (an increase of 518 students) and 22 staff to a final staffing of approximately 45 persons, including part-time and ancillary staff (an increase of 23 staff).

The masterplan shown in **Figure 5-1** with high quality plans provided in **Appendix A**.

Figure 5-1 Landsdale Christian College Site Plan



Source: Mathew & Scavalli Architects

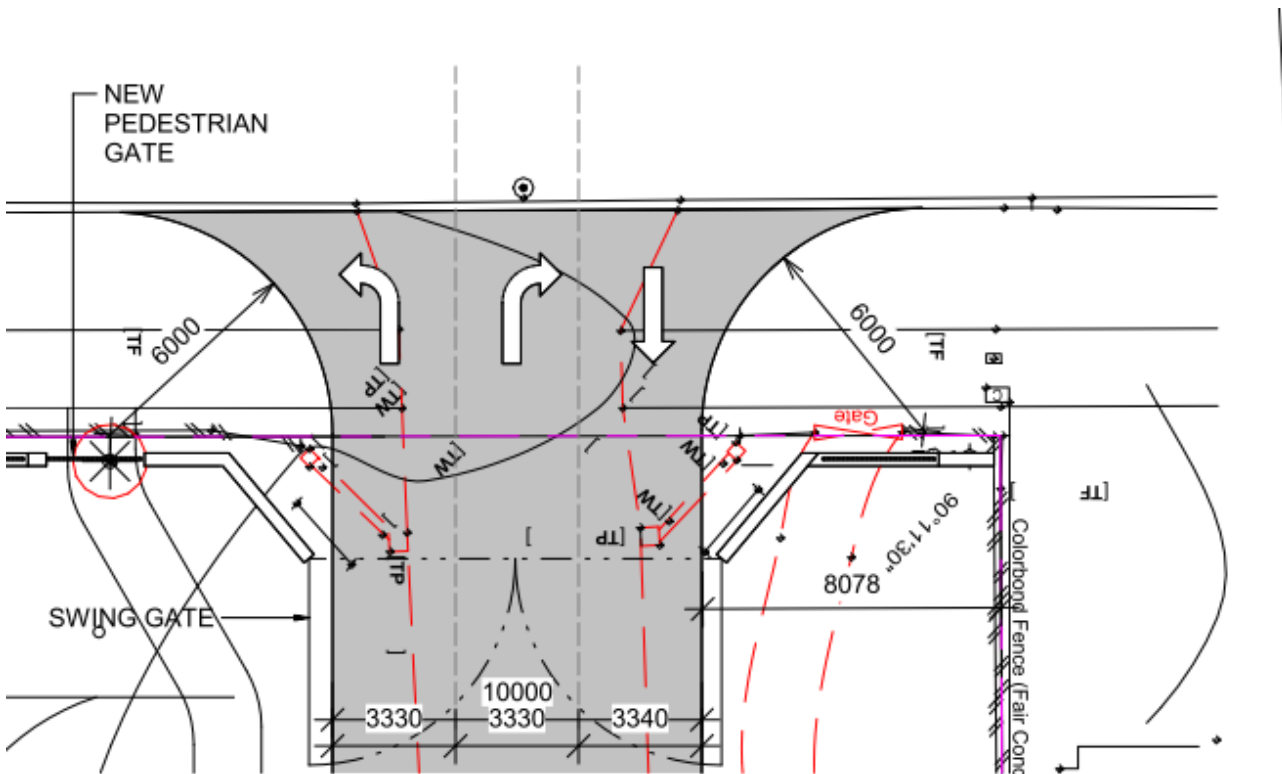
Note that the location of access points has been modified as described in **Section 5.2** below.

5.2 Access Arrangements

The existing access along Queensway Road will continue to be for school access. This access will be upgraded to include dedicated turning lanes for vehicles exiting the school as shown in **Figure 5-2**.

Two new access points are proposed along Babylon Bend as shown in **Figure 5-3**.

Figure 5-2 Proposed Upgrades to Existing Site Access



Source: Mathew & Scavalli Architects

Figure 5-3 Proposed Access Location Along Babylon Bend



Source: Nearmap

5.3 Car Parking

The existing car park area shown in **Figure 2-3** will be retained, and supplemented by an additional 67 bays proposed bringing the total provision to 99 bays. The existing drop-off facilities will retain their existing function.

The City of Wanneroo’s District Planning Scheme 2 details minimum car parking for an educational establishment as shown in **Table 5-1**.

Table 5-1 Parking Requirements

Land Use	Parking Provision Requirements
Kindergarten	Provision of a drive-in pickup/set down facility plus eight (8) bays.
Primary School	A minimum of 46 car bays for staff and visitor parking for the first 475 students and then ten (10) car bays for every 100 students or part thereof afterwards, plus fourteen (14) pickup/set down bays for every 100 students or part thereof which may be provided in the road reserve.
Secondary School	A minimum of 60 car bays for staff and visitor parking for the first 600 students and then ten (10) car bays for every 100 students or part thereof afterwards plus seven (7) pick up/set down bays for every 100 students or part thereof which may be provided in the road reserve.

For the purpose of the parking assessment, the “Secondary School” land use category has been selected. Therefore, for a proposed school enrolment of 670 students, 67 car bays will be required, plus 7 pick-up/set down bays, to meet the City’s requirements.

The proposed parking supply, as defined by the Site masterplan, will exceed this minimum requirement.

5.4 Design of Parking and Access

The car parks and access points (where modified from the current layout) will be designed in accordance with *AS2890.1 (2004) “Parking Facilities, Part 1: Off-Street Parking”*.

5.4.1 Parking Management

To reduce congestion and encourage parking turnover during the peak morning and afternoon periods, it is recommended that the use of pick-up/drop-off be monitored by school staff to help ensure that parents do not overstay. Visible will be used to designate pick-up/drop-off areas, and additional information can be provided through school communications such as newsletters and website updates, where required to address parking behaviour and function.

Staff and visitor parking areas will be clearly labelled to differentiate the user groups.

5.5 Pedestrian Facilities

A new footpath is proposed aligning the western edge of the internal access road as shown in **Figure 5-4**.

Figure 5-4 Footpath Realignment



Source: Mathew & Scavalli Architects

6 Analysis of Transport Network

6.1 Intersections

A SIDRA modelling exercise has been undertaken for the following intersections to determine the potential impacts of the Site on the surrounding road network:

- > Queensway Road/Access 1
- > Babylon Bend/Access 2
- > Babylon Bend/Access 3

The existing traffic volumes are likely to be very low as the road serves only as an access to a small number of residents. Therefore, the majority of traffic along Queensway Road would be development traffic in peak school periods.

6.2 Assessment Years and Time Period

As advised by the School, the peak traffic period is between 2.30PM – 3.30PM which has been adopted as the peak assessment period. It is noted the completion of the proposed expansion has yet to be decided and therefore, for the purpose this assessment, the completion of this initial stage is assumed to be in 2022.

6.3 Assessment Scenarios

The following analysis scenarios are described below for the Site accesses and intersections:

- > Scenario 1 – Background (2020)
- > Scenario 2 – Background (2022) + Proposed Expansion
- > Scenario 3 – Background (2024) + Full Development Buildout (including 2 new accesses on Babylon Bend)

6.4 Base (Existing) Traffic

Base traffic volumes on Queensway Drive were sourced from link count data supplied by the City, while turning counts at the Queensway Drive/ Site Access 1 were collected on-site by Cardno; these volumes are enclosed in **Appendix B**.

For the purpose of this assessment, the existing traffic volume along Babylon Bend was determined using a first principles approach. Details of this methodology area as follows:

- > It is likely that only local residents are currently using Babylon Bend with dwellings that are located closest to Babylon Bend more likely to use the road.
- > **Figure 6-1** shows the approximate number of dwellings that are like to use Babylon Bend (approximately 63 dwellings).

Figure 6-1 Dwellings which are likely to use Babylon Bend



- > A trip generation assessment was conducted to estimate how much traffic these dwellings will generate onto Babylon Bend.
- > Based on a PM peak trip generation rate of 1 trip per dwelling (ITE 210), approximately 63 vehicles can be expected along Babylon Bend, related to the adjacent residential development.

6.5 Traffic Growth

The base traffic volumes along Queensway Drive were obtained from the City of Wanneroo for the year 2015. A conservative annual growth rate of 5% has been applied predict the traffic volumes for the background traffic periods which accounts for the increase in development within the area.

6.6 Traffic Generation

The trip generation rates for the expanded Site are set out by the Western Australian Planning Commission (WAPC) *Transport Assessment Guidelines – Volumes 5 – Technical Guidance*. For the purpose of this assessment the trip generation will be calculated based on student numbers for the ultimate development buildout to provide a more robust assessment.

Table 6-1 shows the trip rates; **Table 6-2** presents the net increase compared to the traffic generation based on current student numbers; and **Table 6-3** presents the total potential trip generation of the expanded Site.

Table 6-1 Adopted Trip Generation Rates

Land Use	Source	AM Peak		PM Peak	
		Arrivals	Departures	Arrivals	Departures
School	WAPC	0.5 trips per student	0.5 trips per student	0.5 trips per student	0.5 trips per student

Table 6-2 Net Increase in Trip Generation, based on Trip Rates

Land Use	AM Peak		PM Peak	
	In	Out	In	Out
School – increase of 518 students	259	259	259	259
Total	259	259	259	259

Table 6-3 Total Trip Generation of Expanded Landsdale Christian School

Land Use	PM Peak	
	In	Out
School – total of 672 students, including expansion	314	320
Total	314	320

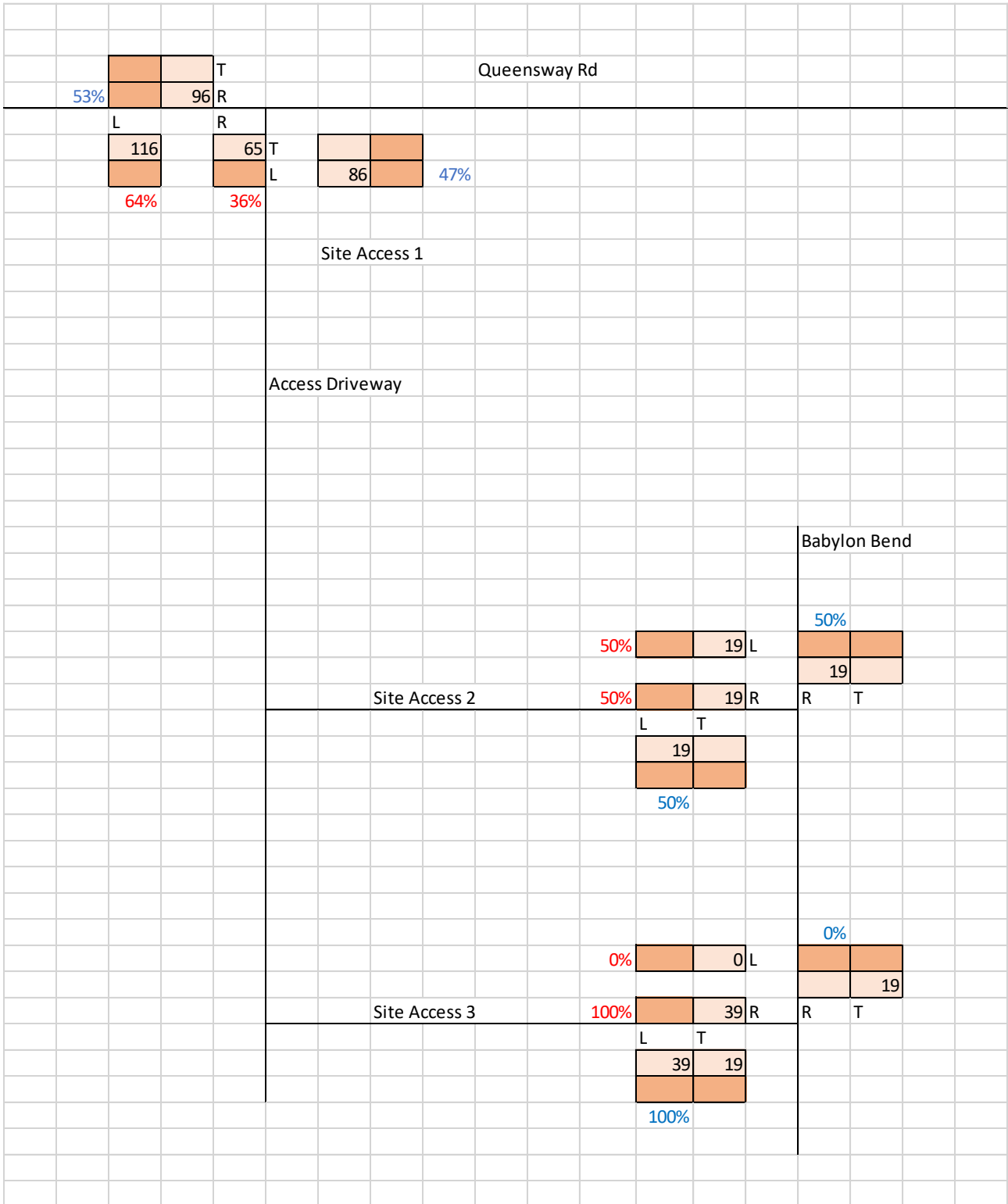
The proposed redevelopment represents an *additional* trip generation of approximately 518 vehicle trips in the PM peak hours (arrivals plus departures) for the full expansion.

6.7 Development Traffic Distribution and Assignment

The first stage of development will utilise the existing access as shown in **0**. The distribution of the traffic to the road network from the Site is as summarised in the assumptions below:

- > The school catchment area is unlikely to change. Trips to and from the School will be predominantly within Landsdale locality.
- > The majority of traffic departing/arriving from the School will travel through Queensway Road with a small percentage of traffic departing/arriving from Babylon Bend. The breakdown of development traffic at each of the accesses are as follows:
 - 70% of traffic departing/arriving at Access 1 along Queensway Road.
 - 15% of traffic departing/arriving at Access 2 along Babylon Bend.
 - 15% of traffic departing/arriving at Access 3 along Babylon Bend.
- > **Figure 6-2** shows the development traffic distribution

Figure 6-2 Development Traffic Distribution



6.8 Intersection Performance

SIDRA results for each approach are presented below in the form of Degree of Saturation (DOS), Average Delay, Level of Service (LOS) and 95th Percentile Queue. These characteristics are defined as follows:

- > Degree of Saturation (DOS): is the ratio of the arrival traffic flow to the capacity of the approach during the same period. The DOS for an un-signalized intersection is considered critical where $DOS > 0.80$;
- > 95th percentile Queue: is the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- > Average Delay: is the average per vehicle of all travel time delays for vehicles through the intersection; and
- > Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 6-4**.

Table 6-4 Level of Service (LOS) Performance Criteria

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	Free-flow operations (best condition)	≤10 sec	≤10 sec
B	Reasonable free-flow operations	10-20 sec	10-15 sec
C	At or near free-flow operations	20-35 sec	15-25 sec
D	Decreasing free-flow levels	35-55 sec	25-35 sec
E	Operations at capacity	55-80 sec	35-50 sec
F	A breakdown in vehicular flow (worst condition)	≥80 sec	≥50 sec

6.8.2 Queensway Road/Site Access 1

A simplified model of the Queensway Road/Site Access 1 intersection is shown in **Figure 6-3** and **Figure 6-4** for the existing and modified layouts, respectively. The peak period SIDRA assessment results for this intersection are summarised in **Table 6-5** below.

Figure 6-3 SIDRA layout for Queensway Road/Site Access 1 (existing) – Scenario 1

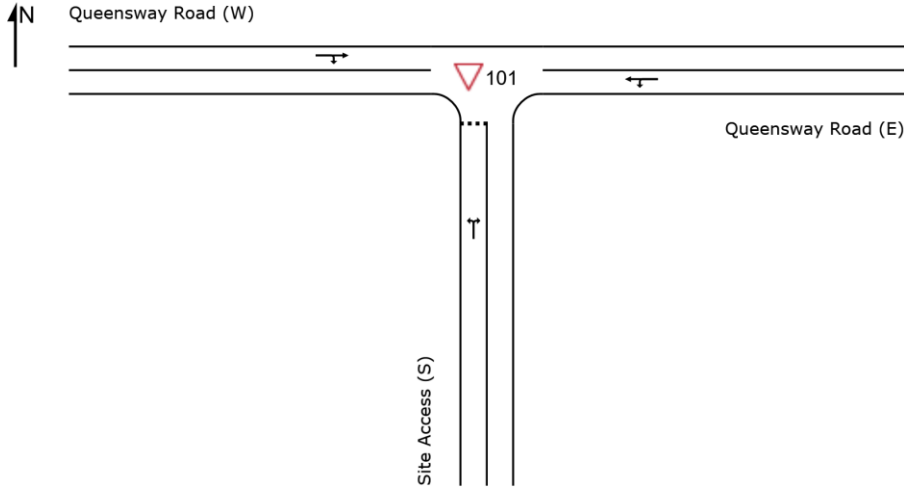


Figure 6-4 SIDRA layout for Queensway Road/Site Access 1 (modified) – Scenario 2

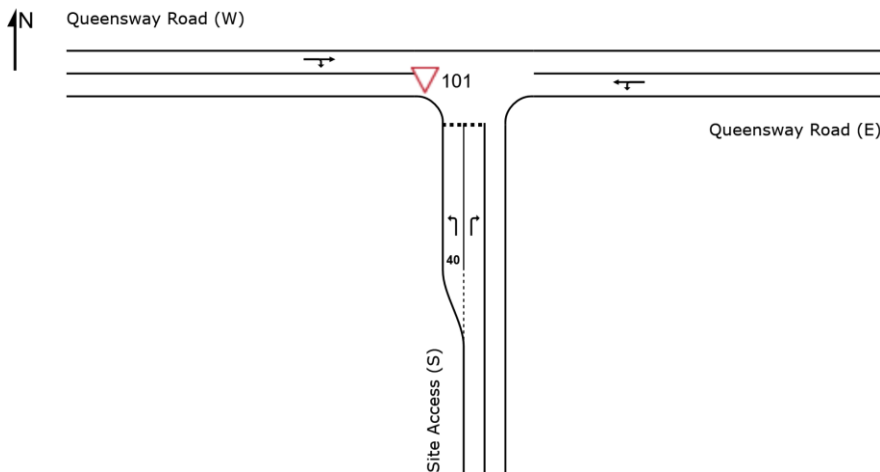


Table 6-5 SIDRA Results for Queensway Road/Site Access 1

Approach		Scenario 1 – Existing (Background 2020)				Scenario 2 – Background (2022) + Proposed Expansion				Scenario 3 – Background (2022) + Full Development Buildout			
		DOS	Average Delay (s)	LOS	95% Queue (m)	DOS	Average Delay (s)	LOS	95% Queue (m)	DOS	Average Delay (s)	LOS	95% Queue (m)
Site Access 1 (S)	L	0.047	4.8	A	1.2	0.137	4.9	A	4.2	0.104	4.9	A	3.1
	R	0.047	5.4	A	1.2	0.134	6.5	A	3.2	0.097	6.2	A	2.2
Queensway Road (E)	L	0.062	4.6	A	0	0.131	4.6	A	0	0.116	4.6	A	0
	T	0.062	0	A	0	0.131	0	A	0	0.116	0	A	0
Queensway Road (W)	L	0.062	0.1	A	1.2	0.165	0.8	A	5.9	0.138	0.7	A	4.7
	R	0.062	4.9	A	1.2	0.165	5.5	A	5.9	0.138	5.4	A	4.7

6.8.3 Babylon Bend/Site Access 2

A simplified model of the Babylon Bend/Site Access 2 intersection is shown in **Figure 6-5**. The peak period SIDRA assessment results for this intersection are summarised **Table 6-6** below.

Figure 6-5 SIDRA layout for Babylon Bend/Site Access 2 – Scenario 2

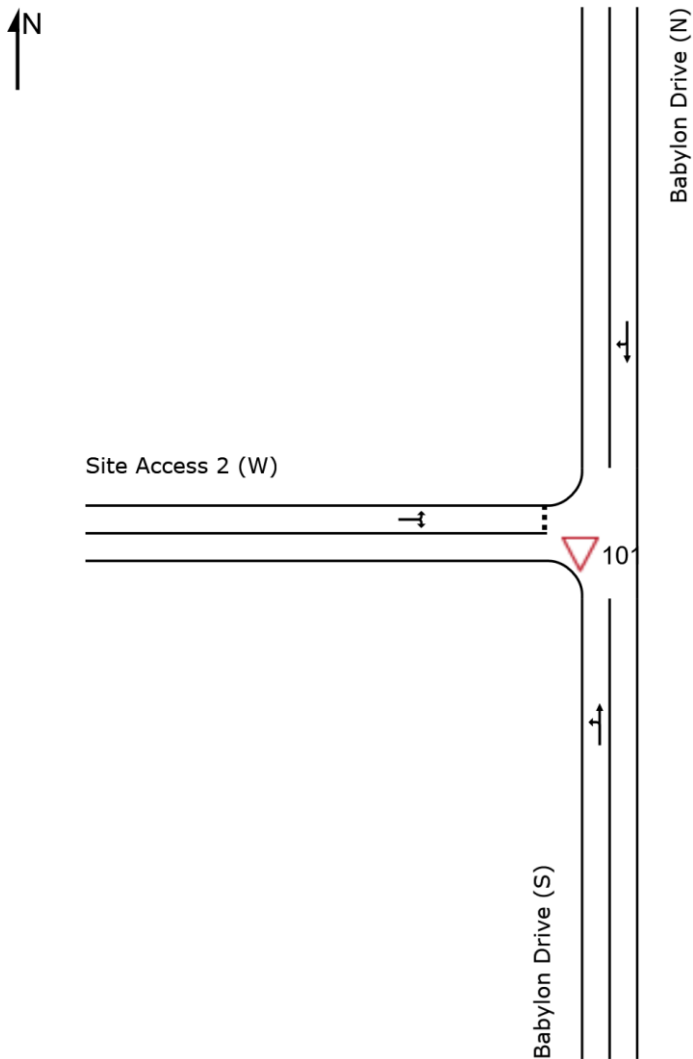


Table 6-6 SIDRA Results for Babylon Bend/Site Access 2

Approach		Scenario 3 – Background (2024) + Full Development Buildout			
		DOS	Average Delay (s)	LOS	95% Queue (m)
Babylon Drive (S)	L	0.027	5.5	A	0
	T	0.027	0	A	0
Babylon Drive (N)	T	0.028	0.1	A	0.7
	R	0.028	5.6	A	0.7
Site Access 2 (S)	L	0.028	5.6	A	0.7
	R	0.028	5.7	A	0.7

6.8.4 Babylon Bend/Site Access 3

A simplified model of the Babylon Bend/Site Access 3 intersection is shown in **Figure 6-6**. The peak period SIDRA assessment results for this intersection are summarised in **Table 6-7** below.

Figure 6-6 SIDRA layout for Babylon Bend/Site Access 3 – Scenario 2

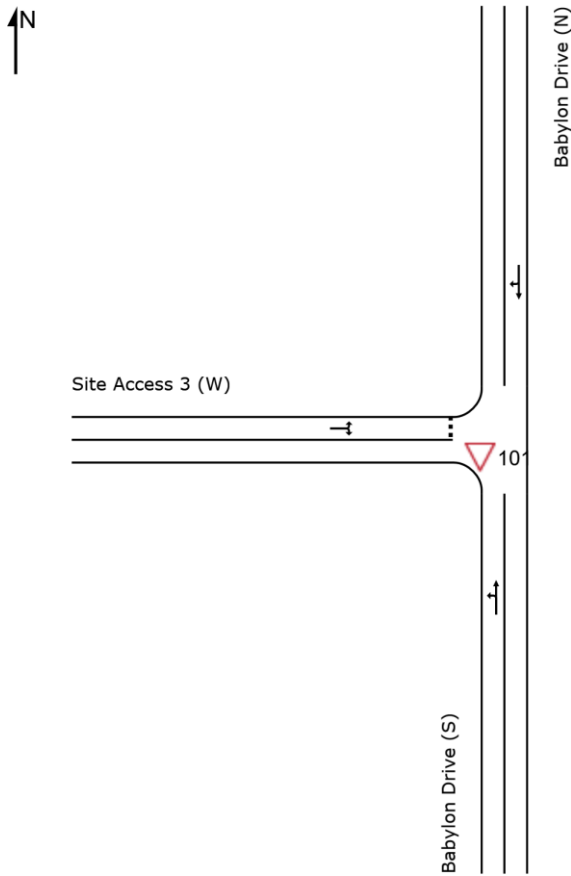


Table 6-7 SIDRA Results for Babylon Bend/Site Access 3

Approach		Scenario 3 – Background (2024) + Full Development Buildout			
		DOS	Average Delay (s)	LOS	95% Queue (m)
Babylon Drive (S)	L	0.047	5.5	A	0
	T	0.047	0	A	0
Babylon Drive (N)	T	0.027	0	A	0
	R	0.027	5.7	A	0
Site Access 3 (S)	L	0.034	5.7	A	0.8
	R	0.034	5.8	A	0.8

6.8.5 SIDRA Results Summary

The SIDRA results show that all accesses operate at an acceptable level of service for all scenarios. The inclusion of the 2 new accesses along Babylon Bend also improves the operation at the Queensway access as traffic is no longer restricted to only one Site access.

6.9 Impact on Neighbouring Areas

As the proposed development is an expansion of an existing school, the only expected impact on the neighbouring areas is the increase in traffic volumes during the morning and afternoon school peaks from an increase in students. Given the very low background traffic volumes and the short AM and PM peak period, traffic operations within the adjacent neighbourhood streets are unlikely to be significantly affected.

6.10 Traffic Noise and Vibration

Traffic will be primarily cars and buses, which will operate almost exclusively during school peak periods; therefore, it is considered that there will not be any issues regarding traffic noise and vibration.

7 Site Specific Issues

This section highlights identified safety issues within the surrounding road network with a focus on pedestrian and driver safety. Note that this section does not comprise a Road Safety Audit and is only intended to draw attention to potential safety issues.

7.1 Crash Statistics

Crash data for the five-year period between 1st January, 2015 and 31st December, 2019 have been obtained from Main Roads WA (MRWA) for Queensway Road. Babylon Bend has no recorded crashes within the last 5 years.

These are summarised and presented in **Table 7-1**.

Table 7-1 Crash Statistics along Queensway Road

Type of Crash (RUM Code)	Fatal	Hospital	Medical	Major Property Damage	Minor Property Damage	Not Stated	Total Crashes
Right Angle	-	-	1	1	2	-	4
Rear End	-	-	-	2	2	-	4
Head On	-	-	-	1	-	-	1
Total	0	0	1	4	4	0	9

The crash data shows that there is a relatively low frequency of recorded crashes along Queensway Road within the last five years. The majority were property damage crashes, with a single crash requiring medical attention.

7.2 Other Site-Specific Issues

Some site-specific issues have been identified by the City and the PTA, as detailed in **Section 1**, and addressed through the main body of this report.

8 Conclusions

Cardno have been commissioned by Seventh-day Adventist Schools (Western Australia) Limited to prepare a Traffic Report of the proposed expansion of Landsdale Christian College (“the Site”). The Site is located to the south of Queensway Road and east of Englefield Retreat in Landsdale, City of Wanneroo.

The following conclusions can be drawn from this Traffic Report:

- > The proposal includes new infrastructure to accommodate an increase in overall student and staff numbers from the current 152 students to 670 students and 22 staff to a final staffing of approximately 45 persons, including part-time and ancillary staff;
- > Consultation with the authorities (the City of Wanneroo and the PTA) showed the main concerns related to the future provision of bus services and traffic distribution at the accesses;
- > The Site is well provided for in terms of pedestrian and cyclist access, with footpaths on Queensway Road and pedestrian crossing facilities, in the form of dropped kerbs;
- > The Site is well provided for in terms of public bus transport;
- > The parking provision shown in the Site plan satisfies the City's requirements;
- > For the purpose of this assessment the trip generation will be calculated based on student numbers for the ultimate development buildout to provide a more robust assessment.
- > SIDRA results show that the Site Access intersections at Queensway Drive and Babylon Bend operate at an acceptable level of service in all of the assessment scenarios; and
- > Crash data shows that there is a relatively low frequency of crashes within the surrounding roads of the Site within the last five years.

Landsdale Christian School

APPENDIX

A

SITE PLANS

MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-182 -- English (ENA)

Datasets:

Site: [T00187--M12--] QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>
Attribute: [-31.804512 +115.872638]
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 10:42 Thursday, 15 October 2015 => 10:41 Friday, 23 October 2015,
Zone:
File: T00187--M12-- 0 2015-10-23 1041.EC0 (Plus)
Identifier: N032XR3E MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015 (7.91667)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 24741 / 24934 (99.23%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-182

Site: T00187--M12--.0.1WE

Description: QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>

Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015

Scheme: Vehicle classification (AustRoads94)

Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	8.0	10.0	11.0	8.0	15.0	27.0	41.0	11.2	16.9
0100-0200	5.0	4.0	4.0	6.0	7.5	17.0	33.0	5.7	10.5
0200-0300	8.0	5.0	4.0	4.0	7.0	10.0	20.0	5.8	8.1
0300-0400	6.0	10.0	5.0	4.0	7.0	11.0	16.0	6.5	8.3
0400-0500	15.0	16.0	29.0	20.0	18.0	10.0	2.0	19.3	16.0
0500-0600	89.0	86.0	83.0	83.0	80.5	22.0	25.0	83.7	68.6
0600-0700	184.0	192.0	207.0	179.0	186.0	61.0	38.0	189.0	154.1
0700-0800	316.0	286.0	307.0	299.0	295.5	118.0	57.0	299.8	246.8
0800-0900	293.0	262.0	269.0	282.0	293.0	166.0	95.0	282.0	244.1
0900-1000	165.0	159.0	162.0	161.0	188.0	189.0	140.0	167.0	166.3
1000-1100	144.0	164.0	148.0	130.0	140.0	179.0	166.0	145.2	153.0
1100-1200	162.0	130.0	150.0	151.5	154.0	195.0	195.0	149.8	161.1
1200-1300	138.0	156.0	142.0	155.0	149.0	216.0	209.0	149.2	165.0
1300-1400	149.0	137.0	138.0	147.5	167.0	200.0	182.0	147.7	158.5
1400-1500	195.0	196.0	200.0	192.5	195.0	207.0	184.0	195.2	195.3
1500-1600	293.0	291.0	247.0	280.0	318.0	199.0	147.0	284.8	256.9
1600-1700	296.0	265.0	265.0	266.5	287.0	222.0	209.0	274.3	259.6
1700-1800	291.0	290.0	281.0	302.5	307.0	228.0	179.0	295.7	272.6
1800-1900	187.0	231.0	204.0	221.0	266.0	177.0	117.0	221.7	203.0
1900-2000	113.0	145.0	144.0	131.5	147.0	141.0	78.0	135.3	128.9
2000-2100	75.0	90.0	77.0	99.5	97.0	76.0	65.0	89.7	84.9
2100-2200	54.0	85.0	85.0	84.5	91.0	65.0	64.0	80.7	76.6
2200-2300	28.0	46.0	48.0	39.5	63.0	81.0	38.0	44.0	47.9
2300-2400	28.0	16.0	16.0	27.5	46.0	61.0	15.0	26.8	29.6
Totals									
0700-1900	2629.0	2567.0	2513.0	2588.5	2759.5	2296.0	1880.0	2612.4	2482.2
0600-2200	3055.0	3079.0	3026.0	3083.0	3280.5	2639.0	2125.0	3107.0	2926.7
0600-0000	3111.0	3141.0	3090.0	3150.0	3389.5	2781.0	2178.0	3177.9	3004.2
0000-0000	3242.0	3272.0	3226.0	3275.0	3524.5	2878.0	2315.0	3310.0	3132.5
AM Peak	0700	0700	0700	0700	0700	1100	1100		
	316.0	286.0	307.0	299.0	295.5	195.0	195.0		
PM Peak	1600	1500	1700	1700	1500	1700	1600		
	296.0	291.0	281.0	302.5	318.0	228.0	209.0		

* - No data.

MetroCount Traffic Executive Class Speed Matrix

ClassMatrix-183 -- English (ENA)

Datasets:

Site: [T00187--M12--] QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>
Attribute: [-31.804512 +115.872638]
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 10:42 Thursday, 15 October 2015 => 10:41 Friday, 23 October 2015,
Zone:
File: T00187--M12-- 0 2015-10-23 1041.EC0 (Plus)
Identifier: N032XR3E MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015 (7.91667)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 24741 / 24934 (99.23%)

Class Speed Matrix

ClassMatrix-183

Site: T00187--M12--.0.1WE
Description: QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>
Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Speed (km/h)	Class												Speed Totals	
	SV 1	SVT 2	TB2 3	TB3 4	T4 5	ART3 6	ART4 7	ART5 8	ART6 9	BD 10	DRT 11	TRT 12		
10 - 20	12	.	.	2	.	.	.	.	.	.	.	.	14	0.1%
20 - 30	51	2	9	7	.	.	.	1	2	.	.	.	72	0.3%
30 - 40	519	32	62	23	6	3	3	4	2	2	.	.	656	2.7%
40 - 50	3773	99	212	37	12	7	11	5	5	2	.	.	4163	16.8%
50 - 60	11186	249	543	60	7	20	17	8	7	2	.	.	12099	48.9%
60 - 70	6345	92	245	4	3	28	10	.	.	.	.	.	6727	27.2%
70 - 80	838	3	28	.	1	.	4	.	.	.	.	.	874	3.5%
80 - 90	104	.	3	.	.	.	.	.	.	.	.	.	107	0.4%
90 - 100	21	.	1	.	.	.	.	.	.	.	.	.	22	0.1%
100 - 110	3	.	.	.	.	.	.	.	.	.	.	.	3	0.0%
110 - 120	2	.	.	.	.	.	.	.	.	.	.	.	2	0.0%
120 - 130	2	.	.	.	.	.	.	.	.	.	.	.	2	0.0%
130 - 140	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
140 - 150	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
150 - 160	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Class Totals	22856	477	1103	133	29	58	45	18	16	6	0	0	24741	
	92.4%	1.9%	4.5%	0.5%	0.1%	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive Speed Statistics

SpeedStat-184 -- English (ENA)

Datasets:

Site: [T00187--M12--] QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>
Attribute: [-31.804512 +115.872638]
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration: 10:42 Thursday, 15 October 2015 => 10:41 Friday, 23 October 2015,
Zone:
File: T00187--M12-- 0 2015-10-23 1041.EC0 (Plus)
Identifier: N032XR3E MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015 (7.91667)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 24741 / 24934 (99.23%)

Speed Statistics

SpeedStat-184

Site: T00187--M12--.0.1WE
Description: QUEENSWAY RD, WEST OF ALEXANDER DVE, LANSDALE <50>
Filter time: 11:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Vehicles = 24741

Posted speed limit = 50 km/h, Exceeding = 19836 (80.17%), Mean Exceeding = 59.20 km/h

Maximum = 127.8 km/h, Minimum = 12.3 km/h, Mean = 56.3 km/h

85% Speed = 63.7 km/h, 95% Speed = 68.8 km/h, Median = 56.5 km/h

20 km/h Pace = 46 - 66, Number in Pace = 19950 (80.64%)

Variance = 68.80, Standard Deviation = 8.29 km/h

Speed Bins (Partial days)

Speed	Bin	Below	Above	Energy	vMult	n * vMult			
0 - 10	0	0.0%	0	0.0%	24741	100.0%	0.00	0.00	0.00
10 - 20	14	0.1%	14	0.1%	24727	99.9%	0.00	0.00	0.00
20 - 30	72	0.3%	86	0.3%	24655	99.7%	0.00	0.00	0.00
30 - 40	656	2.7%	742	3.0%	23999	97.0%	0.00	0.00	0.00
40 - 50	4163	16.8%	4905	19.8%	19836	80.2%	0.00	0.00	0.00
50 - 60	12099	48.9%	17004	68.7%	7737	31.3%	0.00	0.00	0.00
60 - 70	6727	27.2%	23731	95.9%	1010	4.1%	0.00	0.00	0.00
70 - 80	874	3.5%	24605	99.5%	136	0.5%	0.00	0.00	0.00
80 - 90	107	0.4%	24712	99.9%	29	0.1%	0.00	0.00	0.00
90 - 100	22	0.1%	24734	100.0%	7	0.0%	0.00	0.00	0.00
100 - 110	3	0.0%	24737	100.0%	4	0.0%	0.00	0.00	0.00
110 - 120	2	0.0%	24739	100.0%	2	0.0%	0.00	0.00	0.00
120 - 130	2	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
130 - 140	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
140 - 150	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
150 - 160	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
160 - 170	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
170 - 180	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
180 - 190	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00
190 - 200	0	0.0%	24741	100.0%	0	0.0%	0.00	0.00	0.00

Total Speed Rating = 0.00

Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

Limit	Below	Above
0 | 50 (PSL)	4905 19.8%	19836 80.2%

MetroCount Traffic Executive Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-188 -- English (ENA)

Datasets:

Site: [T01431_M10] QUEENSWAY RD, WEST OF ROCKDALE PASS, LANDSDALE <50>
Attribute: [-31.804955 +115.865527]
Direction: 8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration: 11:00 Thursday, 15 October 2015 => 10:38 Friday, 23 October 2015,
Zone:
File: T01431_M10 0 2015-10-23 1038.EC0 (Plus)
Identifier: BV90QXAC MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015 (7.875)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 26083 / 26446 (98.63%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-188

Site: T01431_M10.0.1EW
 Description: QUEENSWAY RD, WEST OF ROCKDALE PASS, LANDSDALE <50>
 Filter time: 12:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015
 Scheme: Vehicle classification (AustRoads94)
 Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages	
								1 - 5	1 - 7
0000-0100	6.0	14.0	3.0	8.0	13.0	15.0	29.0	9.5	12.6
0100-0200	3.0	7.0	7.0	6.0	9.0	12.0	24.0	6.8	9.6
0200-0300	1.0	6.0	2.0	4.0	7.0	6.0	12.0	4.5	5.6
0300-0400	4.0	4.0	4.0	1.0	4.0	10.0	14.0	3.5	5.6
0400-0500	8.0	14.0	13.0	12.0	14.0	7.0	3.0	12.5	10.6
0500-0600	49.0	65.0	68.0	58.0	53.5	22.0	16.0	57.8	48.1
0600-0700	125.0	140.0	136.0	124.0	131.0	52.0	31.0	131.2	108.8
0700-0800	233.0	226.0	236.0	209.0	213.0	93.0	57.0	221.7	185.0
0800-0900	323.0	293.0	362.0	355.0	365.0	153.0	114.0	343.8	291.3
0900-1000	161.0	148.0	176.0	157.0	179.0	203.0	174.0	164.2	171.1
1000-1100	161.0	145.0	154.0	145.0	150.0	207.0	206.0	151.0	166.9
1100-1200	167.0	138.0	161.0	171.0	156.0	242.0	223.0	158.6	179.7
1200-1300	160.0	159.0	155.0	162.0	165.0	235.0	234.0	160.5	179.0
1300-1400	151.0	159.0	157.0	143.0	152.0	207.0	228.0	150.8	167.5
1400-1500	216.0	210.0	260.0	187.0	204.0	237.0	246.0	210.7	218.4
1500-1600	329.0	320.0	288.0	357.5	374.0	204.0	188.0	337.7	302.3
1600-1700	303.0	302.0	275.0	293.5	300.0	251.0	216.0	294.5	279.3
1700-1800	309.0	335.0	335.0	365.5	350.0	270.0	249.0	343.3	322.4
1800-1900	228.0	294.0	256.0	255.5	331.0	238.0	169.0	270.0	253.4
1900-2000	147.0	175.0	193.0	149.0	169.0	187.0	116.0	163.7	160.6
2000-2100	97.0	123.0	83.0	110.0	116.0	95.0	77.0	106.5	101.4
2100-2200	62.0	63.0	109.0	91.0	84.0	71.0	63.0	83.3	79.3
2200-2300	23.0	40.0	44.0	27.5	69.0	76.0	44.0	38.5	43.9
2300-2400	15.0	16.0	7.0	26.0	32.0	47.0	14.0	20.3	22.9
Totals									
0700-1900	2741.0	2729.0	2815.0	2801.0	2939.0	2540.0	2304.0	2806.8	2716.1
0600-2200	3172.0	3230.0	3336.0	3275.0	3439.0	2945.0	2591.0	3291.5	3166.1
0600-0000	3210.0	3286.0	3387.0	3328.5	3540.0	3068.0	2649.0	3350.3	3232.8
0000-0000	3281.0	3396.0	3484.0	3417.5	3640.5	3140.0	2747.0	3445.0	3325.1
AM Peak	0800	0800	0800	0800	0800	1100	1100		
	323.0	293.0	362.0	355.0	365.0	242.0	223.0		
PM Peak	1500	1700	1700	1700	1500	1700	1700		
	329.0	335.0	335.0	365.5	374.0	270.0	249.0		

* - No data.

MetroCount Traffic Executive Class Speed Matrix

ClassMatrix-189 -- English (ENA)

Datasets:

Site: [T01431_M10] QUEENSWAY RD, WEST OF ROCKDALE PASS, LANDSDALE <50>
Attribute: [-31.804955 +115.865527]
Direction: 8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration: 11:00 Thursday, 15 October 2015 => 10:38 Friday, 23 October 2015,
Zone:
File: T01431_M10 0 2015-10-23 1038.EC0 (Plus)
Identifier: BV90QXAC MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v4.06)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: 12:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015 (7.875)
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range: 10 - 160 km/h.
Direction: North, East, South, West (bound), P = East
Separation: Headway > 0 sec, Span 0 - 100 metre
Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 26083 / 26446 (98.63%)

MetroCount Traffic Executive Speed Statistics

SpeedStat-190 -- English (ENA)

Datasets:

Site: [T01431_M10] QUEENSWAY RD, WEST OF ROCKDALE PASS, LANDSDALE <50>
Attribute: [-31.804955 +115.865527]
Direction: 8 - East bound A>B, West bound B>A. **Lane:** 0
Survey Duration: 11:00 Thursday, 15 October 2015 => 10:38 Friday, 23 October 2015,
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Name: Default Profile
Scheme: Vehicle classification (AustRoads94)
Units: Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile: Vehicles = 26083 / 26446 (98.63%)

Speed Statistics

SpeedStat-190

Site: T01431_M10.0.1EW
Description: QUEENSWAY RD, WEST OF ROCKDALE PASS, LANDSDALE <50>
Filter time: 12:00 Thursday, 15 October 2015 => 9:00 Friday, 23 October 2015
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Vehicles = 26083

Posted speed limit = 50 km/h, Exceeding = 11258 (43.16%), Mean Exceeding = 54.60 km/h

Maximum = 95.5 km/h, Minimum = 11.1 km/h, Mean = 48.9 km/h

85% Speed = 55.1 km/h, 95% Speed = 59.0 km/h, Median = 49.0 km/h

20 km/h Pace = 39 - 59, Number in Pace = 23268 (89.21%)

Variance = 44.37, Standard Deviation = 6.66 km/h

Speed Bins (Partial days)

Speed	Bin	Below	Above	Energy	vMult	n * vMult
0 - 10	0 0.0%	0 0.0%	26083 100.0%	0.00	0.00	0.00
10 - 20	48 0.2%	48 0.2%	26035 99.8%	0.00	0.00	0.00
20 - 30	208 0.8%	256 1.0%	25827 99.0%	0.00	0.00	0.00
30 - 40	1706 6.5%	1962 7.5%	24121 92.5%	0.00	0.00	0.00
40 - 50	12863 49.3%	14825 56.8%	11258 43.2%	0.00	0.00	0.00
50 - 60	10215 39.2%	25040 96.0%	1043 4.0%	0.00	0.00	0.00
60 - 70	959 3.7%	25999 99.7%	84 0.3%	0.00	0.00	0.00
70 - 80	70 0.3%	26069 99.9%	14 0.1%	0.00	0.00	0.00
80 - 90	12 0.0%	26081 100.0%	2 0.0%	0.00	0.00	0.00
90 - 100	2 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
100 - 110	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
110 - 120	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
120 - 130	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
130 - 140	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
140 - 150	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
150 - 160	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
160 - 170	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
170 - 180	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
180 - 190	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00
190 - 200	0 0.0%	26083 100.0%	0 0.0%	0.00	0.00	0.00

Total Speed Rating = 0.00

Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

Limit	Below	Above
0 | 50 (PSL)	14825 56.8%	11258 43.2%

Landsdale Christian School

APPENDIX

B

TRAFFIC VOLUMES

