

EMMANUEL CHRISTIAN COMMUNITY SCHOOL

# TRANSPORT IMPACT ASSESSMENT

EMMANUEL CHRISTIAN COMMUNITY  
SCHOOL

SEPTEMBER 2019

CONFIDENTIAL



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## Traffic Impact Assessment Emmanuel Christian Community School

Emmanuel Christian Community School

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# EXECUTIVE SUMMARY

WSP was commissioned to assess the impact associated with a proposed High School development across two campuses on Salcott Road in the City of Wanneroo as part of the Emmanuel Christian Community School. A third campus provides for the primary school which has recently been constructed as part of a separate Development Application. This current proposed Development Application includes a maximum student enrolment of 338 High School students at Campus A and C. The Primary School will retain a maximum enrolment of 449 students at Campus B.

This Transport Impact Assessment has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Developments: Volume 4 – Individual Developments (2016). The following has been determined:

- The current parking provided by the school can accommodate the future growth
- The road network can accommodate the additional traffic generated by the school satisfactorily
- The existing vehicle crossovers achieve minimum sight distance
- A wombat crossing is recommended for installation to facilitate safer student movement between Campus A and C
- A footpath should be provided from the gate on Salcott Road, adjacent to the car park exit, along the school frontage. This path should be DDA compliant and guide students to the verge parking available to the west of the car park entry and adjacent to Hainsworth Park
- The existing kiss and drive needs to be modified to reduce conflict between vehicles
- Car parking within Campus C grounds should be allocated to staff

# 1 INTRODUCTION AND BACKGROUND

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## 1.1 CONTEXT

WSP has been commissioned by Emmanuel Christian Community School to prepare a Transport Impact Assessment (TIA) for the proposed upgrade of the High School campus (Campus B) at Emmanuel Christian Community School.

This TIA has been prepared in accordance with the WAPC Transport Impact Assessment Guidelines. The assessment considers the following key aspects:

- The site and surrounding road network
- Traffic generation characteristics
- Traffic distribution assessment and network assignment
- Parking assessment and management
- Road safety assessment
- Pedestrian and cyclist demand and facilities assessment
- Public transport accessibility.

## 2 EXISTING SITUATION

### 2.1 SITE LOCATION AND LAND USE

Emmanuel Christian Community School is located on the Lot 50, 3Salcott Road, Girrawheen, City of Wanneroo. The subject campus is bounded by Hainsworth Avenue to the east and Salcott Road to the south, Hainsworth Leisure Centre to the north and Hainsworth Park to the west.

The site location is shown in Figure 2.1.

Figure 2.1 Site location



### 2.2 EXISTING PARKING PROVISION

Existing parking bays being used by school staff and visitors are shown in Figure 2.2 and listed below:

- 68 existing bays at Campus A (58) and C (10) (including 2 disabled bays, one in each campus)
- Informal verge perpendicular parking space for 10 vehicles (on the northern side of Salcott Road) adjacent to the school frontage
- Approximately 30 informal indented perpendicular parking bays on Salcott Road within the road reserve adjacent to Hainsworth Park. The parking bays are to the west of Campus A

- There is also one official pick-up/drop-off bay in Campus A.

Figure 2.2 Existing parking spaces



## 2.3 EXISTING ACCESS ARRANGEMENT

Vehicle access to the school parking facility is through the two gates on Salcott Road. Vehicles can enter the campus through the western gate, and leave via the eastern gate. The access to the car park is also access to the Kiss and Drive facility. It was noted during the site visit that the Kiss and Drive operated satisfactorily however a number of issues were identified including:

- The car parking opposite the Kiss and Drive was being utilised by parents (dropping off and picking up students) resulting in conflict when they reversed out of the car parks
- Several students were observed entering cars that stopped on the main carriageway rather than enter the Kiss and Drive
- The Kiss and Drive is only delineated adjacent to the pick up location and better delineation would improve the utilisation of the car park as well as the Kiss and Drive.



Figure 2.3 Vehicle Access to campus



## 2.4 EXISTING SITE TRAFFIC GENERATION

The existing maximum enrolments at the high school is 182 students. The current enrolments based on WAPC and Building Management and Works (BMW) traffic generation rates would generate 474 trips daily and 182 trips during the peak drop off and pick up times as outlined in Table 2.1.

Table 2.1 Estimated traffic generated by existing high school enrolments

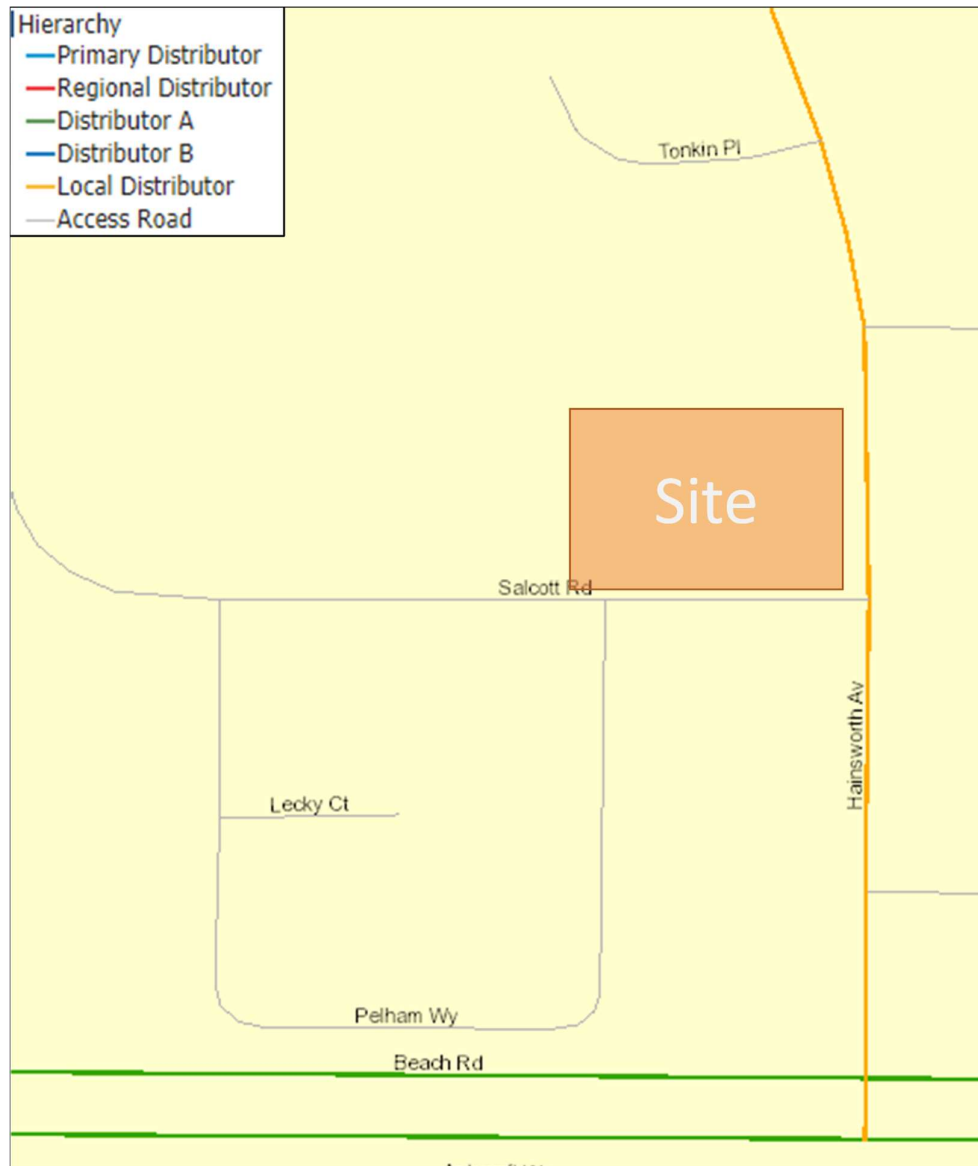
STUDENT NUMBERS	182	TRIPS GENERATED
DAILY TRAFFIC GENERATION RATE	2.6	474 (237 in / 237 out)
PEAK HOUR VEHICLE TRIP GENERATION RATE	1	182 (91 in / 91 out)

## 2.5 SURROUNDING ROAD NETWORK

### 2.5.1 ROAD HIERARCHY

The hierarchy of the local road network sourced from the Main Roads WA Road Information Mapping System is outlined in Figure 2.4. Salcott Road on the south of the Campus is classified as an Access road, and Hainsworth Avenue on the east is classified as a Local Distributor Road.

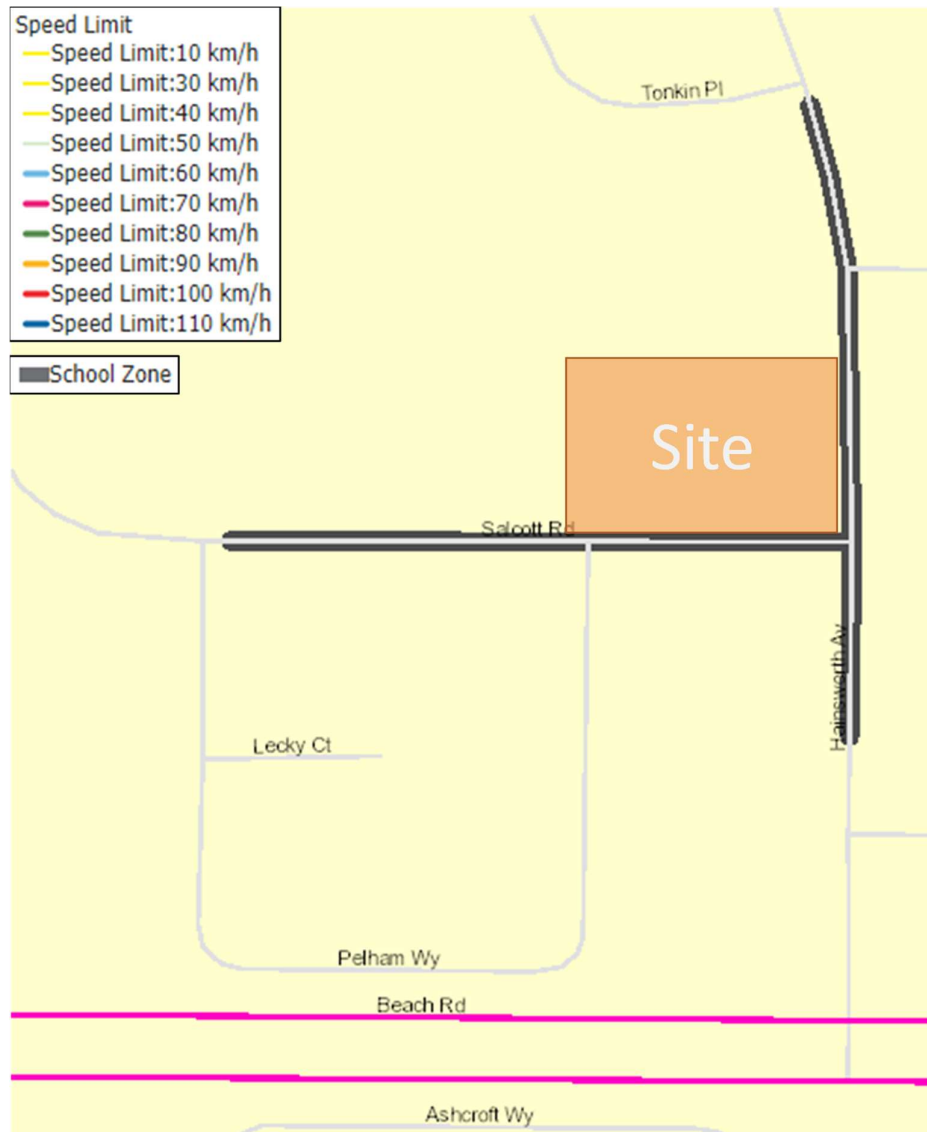
Figure 2.4 Road Hierarchy



### 2.5.2 SPEED LIMIT

The speed limits of the local road network sourced from the Main Roads WA Road Information Mapping System outlined in is Figure 2.5. The speed limit on both Salcott Road and Hainsworth Avenue are 50km/hr, road sections adjacent to the campus are identified as school zones with 40km/hr speed limit from 7:30 am to 9:00 am and 2:00 pm to 3:30 pm on school days.

Figure 2.5 Speed Limit



### 2.5.3 CARRIAGEWAY WIDTH AND CROSS SECTION

Salcott Road is a 6m wide single carriageway road with one lane in each direction. It provides access to a number of residential cul-de-sac roads, as well as Emmanuel Christian College High School campuses and Hainsworth Park. Hainsworth Avenue is a 9.4m wide single carriageway road with one lane in each direction and a 2.4m wide flush median. It is a local distributor road connecting the residential area to Beach Road and providing access to the Hainsworth Community Centre, Girrawheen Baptist Church and local shops.

Table 2.2 Road Information

ROAD AND LOCATION	ROAD HIERARCHY	CROSS SECTION	CARRIAGEWAY WIDTH
Salcott Road	Access Road	Single carriageway – 2 lanes	6m sealed width
Hainsworth Avenue	Local Distributor	Single carriageway – 2 lanes	2*3.5m lanes plus 2.4m median

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## 2.6 TRAFFIC MANAGEMENT ON FRONTAGE ROADS

As stated in section 2.5.2, the school frontage on Salcott Road is classified as school zone with 40km/hr speed limit from 7:30 am to 9:00 am and 2:00 pm to 3:30 pm on school days. The school also encourages vehicles to turn left from Salcott Road to Hainsworth Avenue during the school peaks, to reduced delay at the intersection.

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## 2.7 TRAFFIC VOLUMES

Some traffic volumes were obtained from the City of Wanneroo as part of the traffic impact statement prepared for the school scheme amendment and have been utilised for this transport impact assessment.

Table 2.3 Traffic volumes (Source: City of Wanneroo)

ROAD NAME	DATE	AVERAGE TWO-WAY DAILY TRAFFIC VOLUME	AVERAGE TWO-WAY AM PEAK TRAFFIC VOLUME	AVERAGE TWO-WAY PM PEAK TRAFFIC VOLUME
Salcott Road (West of Hainsworth Avenue)	2018	599	148 at 8:00AM	106 at 3:00 PM
Hainsworth Avenue (Amberton Avenue to Beach Road)	2016	4,863	463 at 8:00AM	508 at 3:00 PM

The Salcott Road / Hainsworth Avenue intersection is on the immediate southeast of the campus, and is used as a major intersection by the school traffic, in the existing situation, a queue of 5 to 8 vehicles was observed on the western approach during the school peak.

# 3 PROPOSED DEVELOPMENT

The proposal is to demolish the existing west wing building at the Emmanuel Christian Community School to construct 12 new high school classrooms, allowing enrolments to increase from the current 182 to a maximum of 338 students. The school is likely to take some time to reach 338 student enrolments. The proposed site plan is included in Appendix A

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## 3.1 STUDENT NUMBERS

The current Development Application is to provide additional classrooms on Lot 50 Salcott Road to enable the maximum student enrolment to be increased from 182 secondary (high) school students to 338 secondary school students. The number of enrolments will likely reach to 222 next year when the current Year 6 cohort moves to Year 7 and the school teach Year 12 for the first time. After 2021 the number of enrolments will be expected to increase steadily over time to reach 338 students. The new building will open in 2021.

# 4 TRAFFIC IMPACT ASSESSMENT

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## 4.1 OTHER DEVELOPMENTS

Girrawheen is an established residential suburb and there are no additional developments identified in the immediate vicinity. The Emmanuel Christian College Primary School has been relocated to Campus A between Casserley Avenue and Salcott Road with the main car park access from Casserley Avenue. The Primary school access to Salcott Road is set up as a left turn only and directs traffic towards the northern intersection of Salcott Road with Hainsworth Avenue away from the high school campuses.

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## 4.2 CHANGES TO THE ADJACENT ROAD NETWORK

There are no changes proposed to the road network.

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## 4.3 ASSESSMENT YEAR

The year of assessment is the year of opening 2021. Given that there is no development in the immediate vicinity and the suburb is considered established, no growth in background traffic is expected and therefore the 2021 is also considered to represent the assessment 10 years post opening.

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## 4.4 TIME PERIODS FOR ASSESSMENT

The time periods for the traffic assessment include the weekday morning peak period (7:30 to 9:00 am) and afternoon peak period (2:30 to 4:00 pm). Both the morning and afternoon peak periods coincide with the typical weekday peak periods.

In terms of parking impacts, the afternoon pick-up period puts greatest demand on available parking spaces as parents arrive prior to the end of the school day, park and wait to pick up their children.

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## 4.5 TRAFFIC GENERATION

The vehicular traffic generation rates for schools according to the WAPC Transport Assessment Guidelines is 0.5 vehicle trips per child to school and 0.5 trips per child from school during each of the morning and afternoon peak hours (i.e. 1 trip per student per peak period), based on the PARTS surveys.

The BMW guidelines also recommends that a daily rate of 2.6 trips per student is appropriate. These rates include staff vehicle trips. The existing 182 students will expand by 156 students over the next 10 years to a maximum enrolment number of 338 students. The additional traffic will be due to the additional 156 students, and is set out in Table 4.1.

Table 4.1 Estimated traffic generated by maximum high school enrolments

STUDENT NUMBERS	338	EXISTING TRIPS GENERATED	ADDITIONAL TRIPS GENERATED	TOTAL TRIPS GENERATED
DAILY TRAFFIC GENERATION RATE	2.6	474 (237 in / 237 out)	406 (203 in / 203 out)	880 (440 in / 440 out)
PEAK HOUR VEHICLE TRIP GENERATION RATE	1	182 (91 in / 91 out)	156 (78 in / 78 out)	338 (169 in / 169 out)

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## 4.6 DISTRIBUTION

Emmanuel Christian College is a private education establishment so its intake area is generally wider than a public school. The distribution is however dictated by the road network as all traffic on Salcott Road must utilise Hainsworth Avenue to access the wider road network. The operation of the existing school traffic at the intersection of Salcott Road and Hainsworth Avenue was observed before and after staff started directing all traffic to turn left, and based on this the following distribution has been assumed:

- 25% to and from Beach Road via Hainsworth Avenue
- 25% of traffic to and from Girrawheen Avenue via Amberton Avenue
- 25% of traffic to and from Mirrabooka Avenue via Montrose Avenue
- 25% of traffic to and from Marangaroo Drive via Amberton Avenue.

The traffic heading south to Beach Road is currently encouraged to turn left at Hainsworth Avenue and then use the roundabout at Montrose Avenue to complete a U-turn and then head south. This is currently encouraged to reduce the potential for the right turning vehicles to cause additional queuing as the road widening to allow both left and right turning vehicles is only 10m in length.

Based on this distribution, the following traffic turns at the intersection of Salcott Road and Hainsworth Avenue (which is the critical intersection) are estimated.

Table 4.2 Turning volumes at intersection of Salcott Road / Hainsworth Avenue

	EXISTING TRAFFIC	ADDITIONAL TRAFFIC	PROPOSED TRAFFIC
Left turn Hainsworth Avenue	19	43	62
Hainsworth Avenue northbound	250	0	250
Right turn Hainsworth Avenue	55	126	181
Hainsworth Avenue southbound	203	0	203
Left Turn Salcott Road	55	126	181
Right Turn Salcott Road	19	43	62

Whilst the traffic is currently encouraged to only turn left out of Salcott Road the intersection has been analysed with the right turn open to demonstrate that the intersection has sufficient capacity.

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## 4.7 IMPACT ON ROADS

### 4.7.1 AUSTRROADS GUIDELINES

Table 5.1 of Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis provides midblock capacities for urban roads with interrupted flow. An extract of this table is outlined in Table 4.3. Based on the information outlined in this table both Salcott Road and Hainsworth Avenue have sufficient capacity to double the traffic currently proposed without reaching capacity as Hainsworth Avenue traffic only increases to approximately 400 to 500 vehicles per lane in the peak hours.

Table 4.3 Typical Midblock Capacities for Urban Roads with Interrupted Flow

TYPE OF LANE	ONE WAY MID BLOCK CAPACITY(VPH)
Median or Inner Lane	
Divided Road	1,000
Undivided Road	900
Middle Lane (of a Three Lane Carriageway)	
Divided Road	900
Undivided Road	1,000
Kerb Lane	
Adjacent to Parking Lane	900
Occasional Parked Vehicles	600
Clearway Conditions	900

## 4.8 IMPACT ON INTERSECTIONS

SIDRA Intersection 8 has been used to assess the peak hour capacity and performance of the intersection between Salcott Road and Hainsworth Avenue.

SIDRA is a commonly used intersection modelling tool used by traffic engineers for all types of intersections. Outputs for four standard measures of operational performance can be obtained, being Degree of Saturation (DoS), Average Delay, Queue Length, and Level of Service (LoS).

- Degree of Saturation is a measure of how much physical capacity is being used with reference to the full capability of the particular movement, approach, or overall intersection. A DoS of 1.0 equates to full theoretical capacity although in some instances this level is exceeded in practice. SIDRA uses maximum acceptable DoS of 0.90 for signalised intersections for its Design Life analysis. Design engineers typically set a maximum DoS threshold of 0.8 for new intersection layouts or modifications.
- Average Delay reports the average delay per vehicle in seconds experienced by all vehicles in a particular lane, approach, or for the intersection as a whole. For severely congested intersections the average delay begins to climb exponentially.
- Queue Length measures the length of approach queues. In this document, we have reported queue length in terms of the length of queue at the 95th percentile (the maximum queue length that will not be exceeded for 95 percent of the time). Queue lengths provide a useful indication of the impact of signals on network performance. It also enables the traffic engineer to consider the likely impact of queues blocking back and impacting on upstream intersections and accesses.
- Level of Service is a combined appreciation of queuing incidence and delay time incurred, producing an alphanumeric ranking of A through F. A LoS of A indicates an excellent level of service whereby drivers delay is at a minimum and they clear the intersection at each change of signals or soon after arrival with little if any queuing. Values of B through D are acceptable in normal traffic conditions. Whilst values of E and F are typically considered undesirable, within central business district areas with significant vehicular and pedestrian numbers, corresponding delays/queues are unavoidable.



The intersection of Salcott Road and Hainsworth Avenue has been modelled based on the existing intersection layout with the proposed traffic. A sensitivity analysis has also been completed where the traffic at the intersection was increased by 25% (including straight through traffic on Hainsworth Avenue) to determine the capacity available within the intersection performance. As outlined in Table 4.4 the intersection performs satisfactorily in both scenarios.

Table 4.4 Sidra Outputs

<b>INTERSECTION</b>	<b>SCENARIO</b>	<b>WORST DOS</b>	<b>95%ILE QUEUE (M)</b>	<b>AVERAGE DELAY (S)</b>	<b>WORST DELAY(S)</b>	<b>WORST LOS</b>
Salcott Road / Hainsworth Avenue	2021 Opening	0.405	21.4	5.4	11.9	B
	Double 2021 Opening	0.555	40.8	6.9	18.1	C

The results indicate this intersection would perform with acceptable degree of saturation, queue distance and delay under the development scenario and the sensitivity testing. Note also that the peak hour factor (in the SIDRA software) has been set to 50% for the turning traffic to cover the school peak.

# 5 PARKING ASSESSMENT

## 5.1 PROPOSED CAR PARKING SUPPLY

The City of Wanneroo outline car parking requirements within the District Planning Scheme No.2 which are summarised in Table 5.1. The City of Wanneroo requirements outlined the need for a total of 84 car parking spaces with 24 for pick up / drop off and 60 for staff and visitors.

Table 5.1 City of Wanneroo Car Parking Requirements

LAND USE	BAY TYPE	CAR PARKING REQUIREMENT	STUDENTS	BAYS REQUIRED
Secondary School	Staff and Visitor	minimum of 60 car bays for staff and visitor parking for the first 600 students and then 10 car bays for every 100 students or part thereof afterwards	338	60
	Pick Up / set Down	7 pick up/set down bays for every 100 students or part thereof which may be provided in the road reserve		24

The school has 68 car parking spaces plus one Kiss and Drive space on site, therefore requiring the provision of 15 car parking bays on street. There is currently informal verge parking allowing for up to 11 perpendicular cars bays with two between the driveway crossovers and nine to the west of the entry only crossover. There is also approximately 30 sealed (unmarked) perpendicular bays to the west of the school adjacent to Hainsworth Park. Whilst these bays are unmarked they are within the road reserve and therefore considered to be appropriate for use by the school. During the site visit it was noted that the area was empty and therefore available to parents/guardians to utilise. As there are no organised sports utilising the park during school peak times the parking is considered available for school use.

Further, the school's proposed maximum enrolment numbers are 44% less than the minimum students number specified in the planning scheme and therefore further examination of the parking has been undertaken utilising the BMW requirements. With 68 car bays, onsite, 10 informal verge parking bays and the 30 informal parking bays adjacent to Hainsworth Park there is sufficient car parking compared to the City of Wanneroo's planning requirement for 84 parking bays.

### 5.1.1 BMW REQUIREMENTS

As the maximum student enrolment is less than 600, the City of Wanneroo parking requirement is considered to overestimate the car parking requirements. This is supported by the fact that during the site visit it was observed the car park in Campus C was empty and Campus B was only 50% occupied.

Therefore, the parking requirements for public schools in accordance with the BMW Primary School Brief and Secondary School Planning Guide have been used for comparison. The car parking requirements for public schools based on these guidelines is summarised in Table 5.2 and shows a requirement of 63 parking bays. The site has 68 parking bays therefore satisfying the BMW requirements.

Table 5.2 City of Wanneroo Car Parking Requirements

LAND USE	BAY TYPE	CAR PARKING REQUIREMENT	STUDENTS	BAYS REQUIRED
Secondary School	Staff and Visitor	10 bays for every 100 Y7-12 students (plus 5 visitor bays)	338	39
	Pick Up / set Down	7 bays for every 100 Y7-12 students		24

### 5.1.2 ADJACENT PARKING

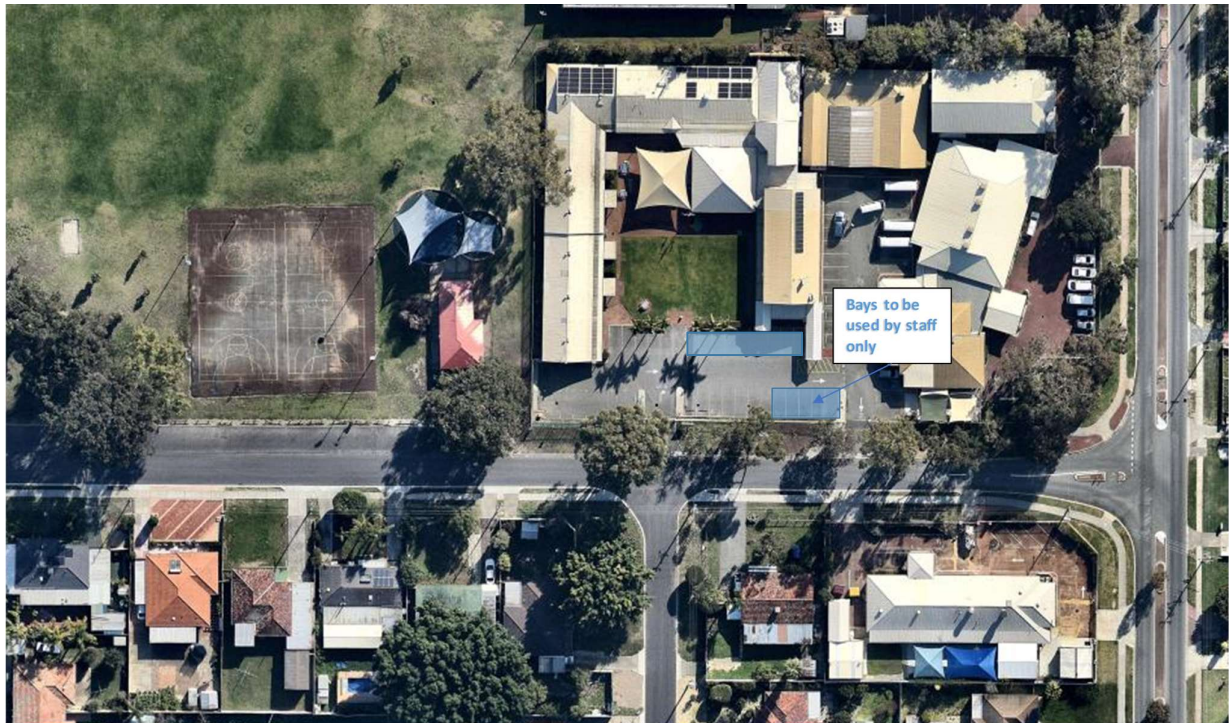
The school is co-located with a church on the same Lot, the church has 13 car parks which the school could also arrange to be utilised by the school if required, since the church does not operate at the same time as the school.

### 5.1.3 KISS AND DRIVE

The current Kiss and Drive consists of one marked standing zone within the main car park. Several issues were identified with the Kiss and Drive which can be addressed by implementing the additional measure as outlined:

- The car parking adjacent to the Kiss and Drive was available for visitor and pick up / drop off parking. This resulted in several instances of drivers accessing the Kiss and Drive almost being hit by drivers reversing out of the adjacent car parking bays. To reduce the interruption at the drop off bay, it is recommended that the parking bays immediately south of the drop off bay should be used by staff only as well as parking adjacent to where the Kiss and Drive queue would form, as shown in Figure 5.1
- It is also recommended that the school allocate the 10 car parking bays within Campus C to staff car parking and the northern half of the eastern car park as staff. Staff generally arrive to and depart from the school outside of the school peak and therefore by allocating these cars parking bay to staff the conflict within the car park is reduced and the Kiss and Drive operates with minimal conflict
- Yellow dashed linemarking and a yellow arrow should also be provided to delineate the access to the Kiss and Drive with a white arrow adjacent to delineate the bypass lane for the Kiss and Drive
- The operation of the Kiss and Drive is outlined in the school newsletter on a regular basis and a staff member continues to monitor operation of the Kiss and Drive
- During the site visit it was noted that several students were picked up from the verge of Salcott Road behind cars parked on the verge. Given the extra conflict this introduces to the school peak time operation this should be actively discouraged via student education and information in the school newsletter.

Figure 5.1 Proposed change to existing parking strategy



#### **5.1.4 VERGE PARKING**

The existing verge parking allows for approximately 12 to 14 car parking bays along the southern verge of the school and there are also approximately 30 indented unmarked perpendicular car parks within the road reserve adjacent to Hainsworth Park, starting approximately 80m to the west of the pedestrian exit from the school. These bays are adjacent to the school and do not require students to cross the road. They are considered to be suitable for use by the school activity and support the development of the school.

#### **5.1.5 BICYCLE PARKING**

The existing site includes bicycle parking for 5 bikes. Space should be allocated to allow for the provision of an additional 5 bike racks to cater for additional demand if required in the future.

#### **5.1.6 PARKING SUPPLY**

Based on the BMW requirements the on site bays are considered to meet the requirements. The car parking requirement of the City of Wanneroo of 84 is also considered to be satisfied through the provision of 68 onsite car bays, the utilisation of 10 informal verge bays along the southern boundary of the school and 30 informal bay within the road reserve adjacent to Hainsworth Park.

The existing provision of car parking is sufficient and no additional car parking is required.

# 6 ROAD SAFETY ASSESSMENT

## 6.1 CRASH HISTORY

The crash history for Salcott Road and Hainsworth Avenue at midblock and intersections within the vicinity of the proposed high school expansion for the five year period ending December 2018 was obtained from the MRWA Reporting Centre.

The crashes identified in the report are summarised in Table 6.1

Table 6.1 Crash History

LOCATION	NUMBER OF CRASHES	MR NATURE	SEVERITY
Salcott Rd / Hainsworth Ave	1	Right Angle	PDO Minor
Hainsworth Ave	1	Hit Object	Medical
Hainsworth Ave/ Montrose Ave	1	Hit Object	Medical

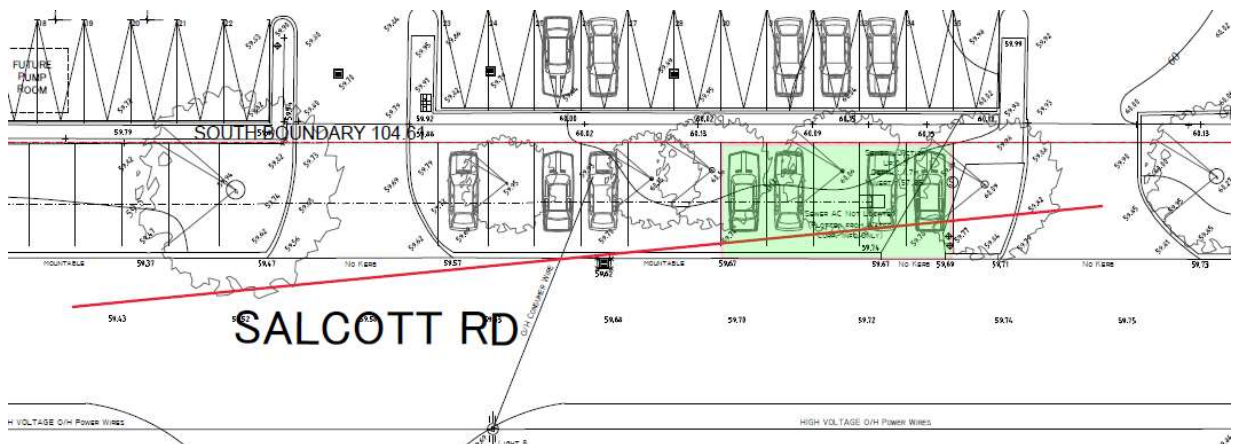
The crash pattern is not considered atypical and the proposed development should not increase the crash potential to an unacceptable level of risk. It should also be noted that the majority of the traffic increase will be subject of the school peak speed limits of 40kph reducing the potential crash severity and likelihood.

## 6.2 VEHICLE ACCESS

It is proposed to retain the existing access arrangement. The school crossovers have been assessed for sight distance in accordance with Australian Standard AS 2890.1-2004 *Parking Facilities - Off-street car parking*. Based on the frontage road speed of 40 km/h (school zone speed limit) the minimum required sight distance is 35 metres (55 metres desirable). During the site visit it was observed that Salcott Road is on a straight and flat alignment, and a measurement of the sight distance indicates that the minimum required 35 metres would be available at all crossovers on Salcott Road.

The sight distance from the exit crossover at Campus A can be temporarily blocked by cars parking on the verge adjacent to the exit. There is a proposed wombat crossing being installed and to complement the crossing a number of informal bays are to be removed through the provision of no standing signage as highlighted in Figure 6.1. This will resolve a potential sight line issue.

Figure 6.1 Proposed Verge Parking Removal to Ensure Sight Distance is Achieved



# 7 PEDESTRIANS AND CYCLISTS

## 7.1 EXISTING CYCLE AND PEDESTRIAN INFRASTRUCTURE

The school currently has four pedestrian gates providing access to the school including two to Hainsworth Park and two to Salcott Road. There is a footpath along the southern side of Salcott Road but not on the northern side. There are footpaths along both sides of Hainsworth Avenue. The school provides a DDA compliant crossing immediately south of the western Salcott Road gate to allow students to cross to Campus C and to the footpath on the southern side of Salcott Road.

Figure 7.1 Existing Pedestrian Facilities



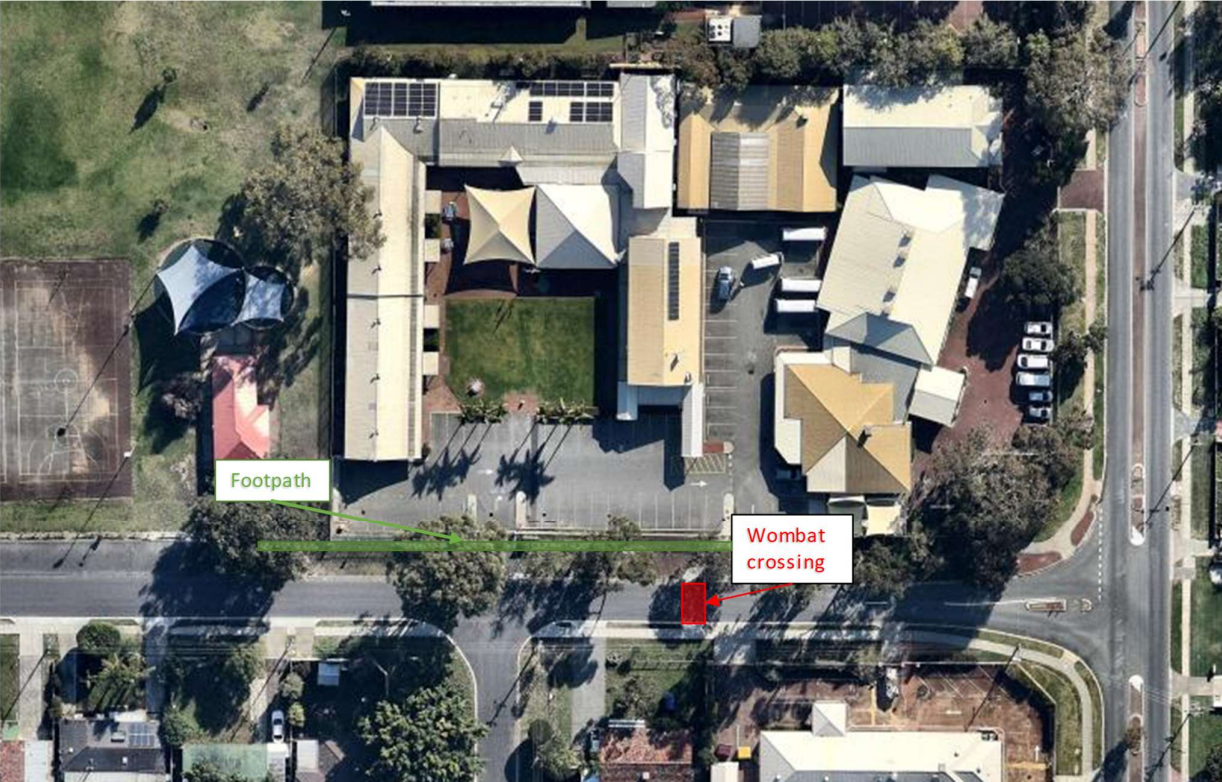
It is recommended that the school provide a wombat crossing adjacent to the school to improve safety for students crossing between Campus A and C together with a footpath along the southern boundary of the school to provide DDA compliant access to the adjacent verge parking. This also delineates the path for students walking up to vehicles parked in the indented parking adjacent to Hainsworth Park in front of the verge parking, minimising the potential for conflict.

Improvements as shown in Figure 7.2 are suggested to Emmanuel Christian Community to improve the access for pedestrians and cyclists. They include providing a footpath along the southern boundary of the school western of the exit crossover to improve pedestrian access to the park and informal verge parking. The other benefit of the footpath would be to delineate the path from the informal parking and encourage pedestrians to walk in front of the parked vehicles rather than behind.

The second improvement is the provision of a wombat crossing. As students are required to cross the road to access Campus C classrooms the provision of a wombat crossing is recommended to minimise the pedestrian conflict. The benefit of a wombat crossing is that drivers are required to slow down to negotiate the plateau hump which will help reinforce the school zone speed limit and reduce the severity and potential for crashes.

Currently students are walked to the classrooms under staff supervision and it is recommended that this practice be written into the student and staff information.

Figure 7.2 Proposed Pedestrian Facilities



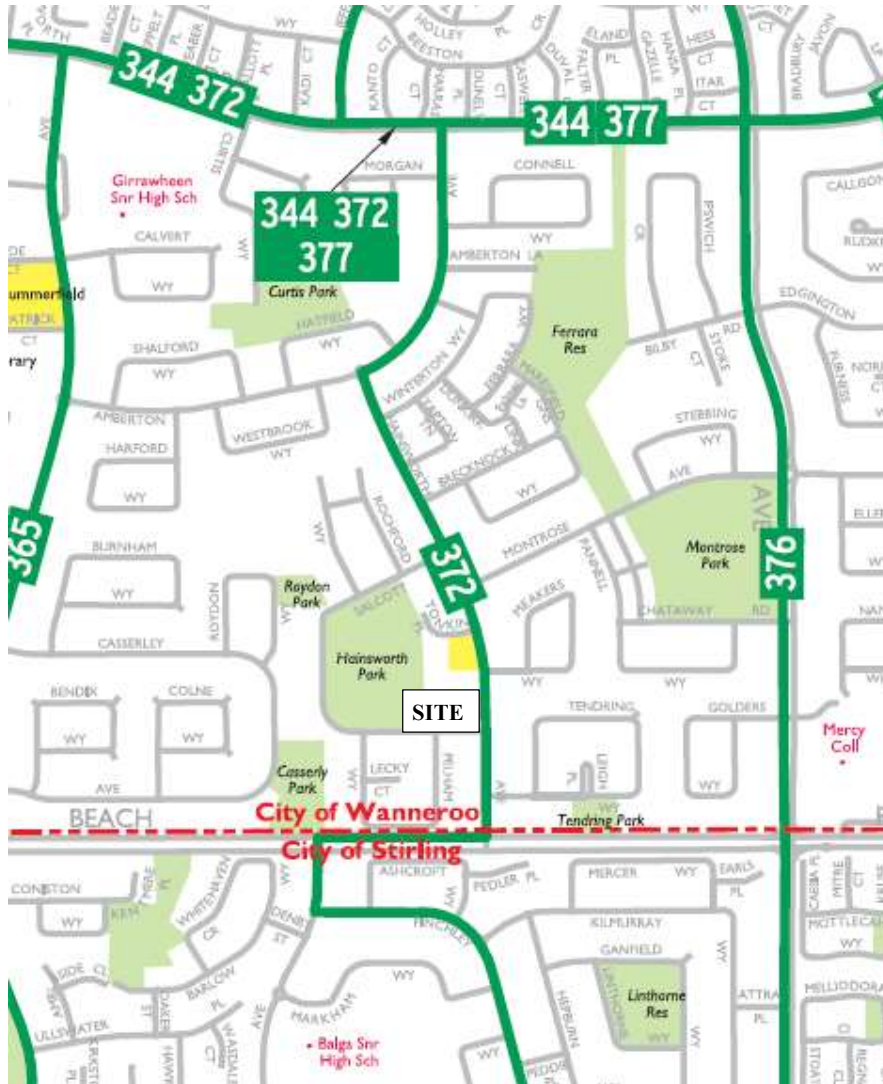
## 7.2 SAFE WALK/CYCLE TO SCHOOL

The potential walk / cycle catchment to schools is considered to include residential areas within 800 metres of the school. A review of the likely routes to the school within the catchment concluded that the existing and proposed pedestrian and cyclist infrastructure is adequate to allow the safe and efficient movement of students to and from the school and no deficiencies were identified.

# 8 PUBLIC TRANSPORT ACCESSIBILITY

PTA bus route 372 runs along Hainsworth Avenue with bus stops located approximately 120m and 140m south of Salcott Road. The bus runs at half hour intervals during off peak improving to 15 minute intervals during peak times. There are additional buses during the school pick up / drop off times and therefore the existing public transport is considered acceptable and no improvements are required.

Figure 8.1 Existing public transport adjacent to site





# 9 CONCLUSIONS

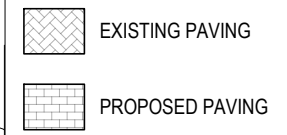
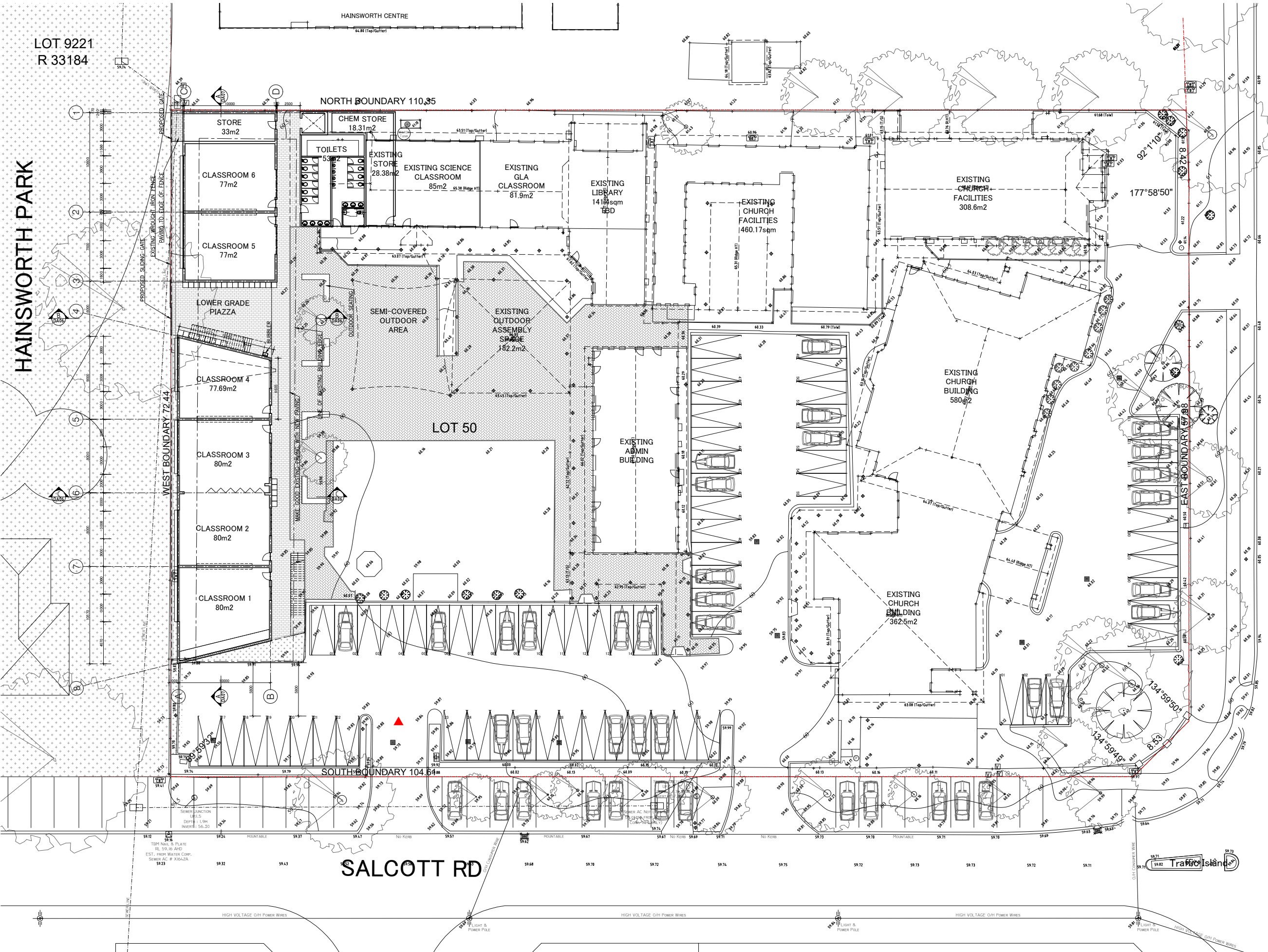
The following has been determined:

- The current parking provided by the school can accommodate the future growth
- The road network can accommodate the additional traffic generated by the school satisfactorily
- The vehicle crossovers achieve minimum sight distance
- A wombat crossing is recommended for installation to facilitate safer student movement between Campus A and C
- A footpath should be provided from the gate on Salcott Road, adjacent to the car park exit, along the school frontage. This path should be DDA compliant and guide students to the verge parking available to the west of the car park entry and adjacent to Hainsworth Park.
- The existing Kiss and Drive needs to be modified to reduce conflict
- Car parking within Campus C grounds and adjacent to the Kiss and Drive should be allocated to staff to minimise conflict.

# APPENDIX A

PROPOSED SITE PLAN





HAINSWORTH AVE

LOT 9221  
R 33184

HAINSWORTH PARK

SALCOTT RD

LOT 50

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**REVISIONS**

Rev	Date	Notes

**STATUS**  
DA

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 19 JEWELL PARADE NORTH FREMANTLE 6159  
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**PROJECT NAME**  
ECCS - WEST WING BUILDING  
**SITE ADDRESS**  
3 SALCOTT ROAD, GIRRAWHEEN

**PROJECT NUMBER**  
19A08  
**CAD FILE REF**

**DRAWING TITLE**  
SITE PLAN  
**SCALE @ A1**  
1:200 @ A1

**DATE**  
SEPT 2019

**DRAWING NUMBER**  
DA02  
**REVISION**  
-

# APPENDIX B

SIDRA OUTPUTS



# MOVEMENT SUMMARY

Site: 101 [Salcot Rd / Hainsworth Ave Peak Proposed Development]

New Site  
 Site Category: (None)  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hainsworth Ave S												
1	L2	122	0.0	0.201	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.7
2	T1	263	0.0	0.201	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.3
Approach		385	0.0	0.201	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.8
North: Hainsworth Ave N												
8	T1	214	0.0	0.405	2.2	LOS A	3.1	21.4	0.55	0.48	0.64	54.7
9	R2	362	0.0	0.405	7.9	LOS A	3.1	21.4	0.55	0.48	0.64	53.1
Approach		576	0.0	0.405	5.7	NA	3.1	21.4	0.55	0.48	0.64	53.7
West: Salcott Rd												
10	L2	362	0.0	0.280	6.6	LOS A	1.3	9.2	0.40	0.63	0.40	52.4
12	R2	122	0.0	0.251	11.9	LOS B	0.9	6.2	0.69	0.90	0.77	48.6
Approach		484	0.0	0.280	8.0	LOS A	1.3	9.2	0.47	0.70	0.49	51.4
All Vehicles		1445	0.0	0.405	5.4	NA	3.1	21.4	0.38	0.47	0.42	53.9

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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Project: U:\Projects\PS116939\_Emanuel\_Traffic4\_WIP\Docs\salcot\_hainsworth.sip8

# MOVEMENT SUMMARY

Site: 101 [Salcot Rd / Hainsworth Ave Peak Proposed Development 25% growth]

New Site  
 Site Category: (None)  
 Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hainsworth Ave S												
1	L2	156	0.0	0.254	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.7
2	T1	332	0.0	0.254	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		488	0.0	0.254	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.8
North: Hainsworth Ave N												
8	T1	267	0.0	0.555	4.1	LOS A	5.8	40.8	0.69	0.62	1.05	53.2
9	R2	454	0.0	0.555	9.9	LOS A	5.8	40.8	0.69	0.62	1.05	51.7
Approach		721	0.0	0.555	7.8	NA	5.8	40.8	0.69	0.62	1.05	52.2
West: Salcott Rd												
10	L2	454	0.0	0.376	7.3	LOS A	2.1	14.5	0.48	0.70	0.52	52.1
12	R2	156	0.0	0.459	18.1	LOS C	1.8	12.6	0.84	1.02	1.17	44.8
Approach		610	0.0	0.459	10.1	LOS B	2.1	14.5	0.57	0.78	0.68	50.1
All Vehicles		1819	0.0	0.555	6.9	NA	5.8	40.8	0.47	0.56	0.65	52.8

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

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

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.