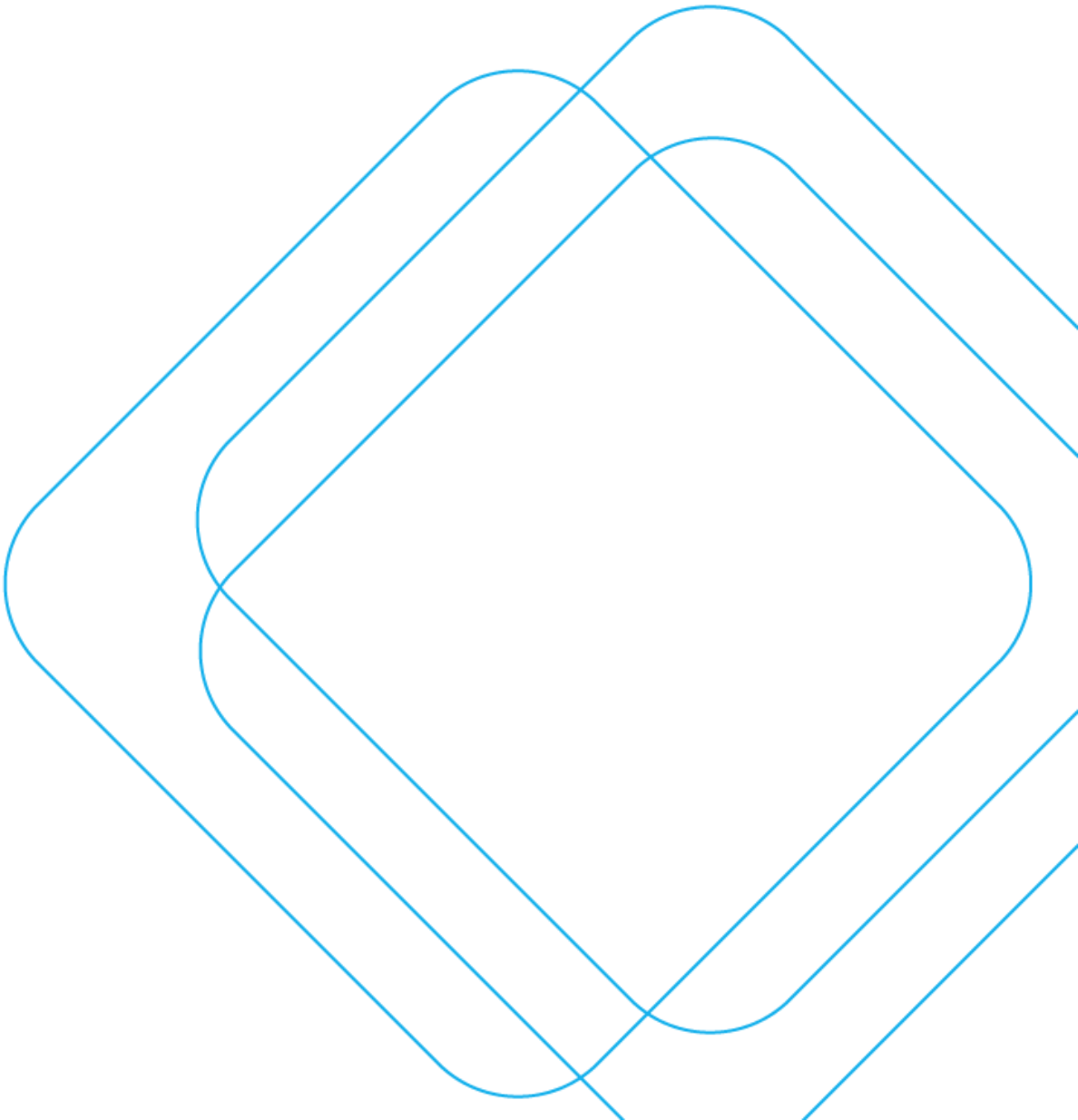
SCT Consulting

AUSTRALIAN CHRISTIAN COLLEGE SINGLETON MASTERPLAN

TRAFFIC IMPACT ASSESSMENT

27 MAY 2024

SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.



Quality Assurance

Project:	Australian Christian College Singleton Masterplan		
Project Number:	SCT_00368		
Client:	Christian Education Ministries	**ABN:**	65 124 826 722
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	**ABN:**	53 612 624 058

Information	Name	Position	Signature
Author:	Shawn Cen	Principal Consultant	
	Qian Lee	Senior Consultant	
	Joshua Hort	Consultant	
Reviewer:	Jonathan Busch	Associate Director	
Authoriser:	Jonathan Busch	Associate Director	

Version	Date	Details
1.0	18 April 2023	Draft report
2.0	23 May 2023	Final report
3.0	27 June 2023	Final report based on updated staging
4.0	13 October 2023	Final report based on updated staging
5.0	29 April 2024	Updated to address comments from TfNSW and Planning Panel
6.0	23 May 2024	Final report to address comments from TfNSW and Planning Panel
7.0	27 May 2024	Final report to address comments from TfNSW and Planning Panel

Contents

Appendices

Executive Summary

The proposal

SCT Consulting has been engaged by Christian Education Ministries to undertake a Traffic Impact Assessment (TIA) to support a development application (DA) for the proposed expansion of Australian Christian College, Singleton. The site is bounded by Kelso Street to the north, New England Highway to the east and Waddles Lane to the south, adjoining existing low-rise residential dwellings to the west.

SCT Consulting is advised that the school could expand to a size of 400 students without any additional accommodation. As the previous development application did not identify a capacity limit for the site, 400 students has been used in lieu of a condition of consent capacity limit. Hence, any increase up to 400 students would not be regarded as impacts of the subject development, which is considered as a base case in future year assessment.

The development proposal will deliver new buildings and two car parking areas on-site by stages to accommodate the student capacity increase from the existing 378 students (in 2024):

– Stage 1+2: 491 students. Using the School Transport Plan (STP in **Appendix A**), a student size of 491 students could be accommodated without any increase in vehicle trip generation from 400 students. It is proposed that the school be limited to 491 students prior to the opening of Singleton Bypass based on the implementation of the School Transport Plan. The School Transport Plan has been prepared as a standalone document, allowing for it to be conditioned individually.

– Stage 3: 700 students.

At full development, the northern car park (110 spaces) will provide the primary parking supply for students and staff whilst the southwestern car park (25 spaces) will serve trade staff and students, totalling 135 spaces.

The drop-off and pick-up area is located on the southern edge of the northern parking area which is connected to school buildings and facilities via a new paved area. This will include two bus parking spaces and six kiss-and-drop spaces.

Existing transport conditions

Australian Christian College currently comprises pre-kindergarten and a K-12 school, which have an enrolment of 378 students (22 students for pre-k and 356 students for k-12) and 37 full-time equivalent (FTE) staff. Rainbow Preschool is operating a childcare service next to Australian Christian College which currently has 55 students and 15 staff. A TAFE/ trade school runs on Tuesdays and Thursdays, which accommodates 15-20 students. There is no change to childcare or TAFE as part of the DA.

New England Highway/Maitland Road, Kelso Street and Waddells Lane are the three major roads around the site. The signposted speed limits are generally 40km/h to 60km/h. Kelso Street has a load limit of five tonnes which would impact the potential construction activities during the school expansion.

A footpath is available on Kelso Street west of Edward Street (the southern side only between Edward Street and Church Street and the northern side only west of Church Street). There are no pedestrian crossings or signalised intersections within the vicinity of the site. Cycling facilities in the vicinity of the site are limited to New England Highway/Maitland Road, which is road shoulder cycle lanes. The cycle lanes are also shared with on-road car parking (where allowed).

There are 13 school bus services in the morning, most of which arrive at school between 8:30am and 8:50am. There are 12 school bus services in the afternoon which are scheduled to leave school between 15:15pm and 15:50pm. A private bus service is available between the school and Branxton/ Greta/ Huntlee/ North Rothbury.

SIDRA modelling was prepared for the existing intersection of New England Highway/Kelso Street/Maitland Road located northeast of the school. The results show a poor Level of Service (LoS) of E for both the AM and PM peak hours, respectively. This is due to the delays experienced by the right turn movements from Kelso Street onto New England Highway where the heavy traffic volumes on New England Highway in both directions limit the opportunities for the right turners who therefore experience a long delay.

Singleton Bypass is expected to alleviate the congestion at the intersection of New England Highway/Kelso Street in the vicinity of the site. At the time of drafting this report, the design and construction contract has been awarded to

Acciona Construction Australia Pty Ltd, with major work expected to begin in mid-2024. The Singleton Bypass is scheduled to open in late 2026 according to TfNSW.

Transport appraisal

The existing school could support up to 400 students without the need for approvals whereas the school could expand to 491 students without any increase in traffic generation based on the implementation of the School Transport Plan. The full expansion of the school seeks to accommodate a total of 700 students. Hence, the future year scenarios are assumed as below:

Scenario	Background traffic assumption	Student enrolment	Additional trips
Interim scenario in 2027	– Without bypass (assuming delay happens) – +22 students (based on being able to be accommodated by existing accommodation)	491 students given STP (+91 students)	+0 veh per direction per hour x2
Ultimate scenario in 2036	– With the bypass – +22 students (based on being able to be accommodated by existing accommodation)	700 vehicles (+300 students)	+128 veh per direction per hour x2

Interim scenario in 2027

For an intersection operating at capacity in the existing condition, any further small increase in the demand would result in exponential deterioration of the intersection performance. In 2027, based on the traffic volumes from the Bypass REF (AECOM 2019), the intersection operates at LoS E in the AM peak and LoS F in the PM peak, which is in an unsatisfactory condition (This scenario has included the additional 22 students from 378 to 400 students). In the PM the maximum delay is 340 seconds, which demonstrates that the intersection would cease to operate effectively. The heavy delay occurs for the right turn out of Kelso Street whereas the New England Highway is still operating satisfactorily, meaning that the priority would not satisfy the traffic growth if the bypass were not in place.

Ultimate scenario in 2036

The future year base scenario with the completion of the bypass will improve the traffic conditions of the intersection significantly from LoS E to B for the AM and PM peaks, respectively. When development traffic is introduced, there are small changes in LoS in PM peak only from B to C and only minor increases in delay (It should be noted that the delay in the future base case is already on the boundary of B and C). Overall, the introduction of the bypass leads to the acceptable performance of the intersection in the future year without any additional upgrades necessary.

A total of 87 spaces and 135 spaces are provided in the master plan for Stage 1+2 and Stage 3, respectively, which satisfies the DCP requirement. This assumes the different drop off/pick up periods between childcare and the school, which results in a shared parking area.

The provision of 70 spaces (as part of the 135 spaces) for temporary parking is sufficient. The parking demand could be halved if proper management is introduced for the drop off/pick up activity.

It is forecast that there could be an additional 90 students who would be travelling to/from school by bus based on the 700 students' enrolment, resulting in demand for two additional buses in both the AM and PM. Further opportunities for improvements may assist in reducing the impacts of expansion and increasing sustainable travel for the school.

Conclusion

The Traffic Impact Assessment concluded that the impacts of the proposed development are at a level able to be accommodated by the existing and planned infrastructure as well as the proposed school travel plan.

1.0 Introduction

1.1 Purpose of the report

SCT Consulting has been engaged by the Christian Education Ministries to prepare a Transport Impact Assessment (TIA) report to support the Development Application (DA) for the proposed expansion of Australian Christian College, Singleton. The report includes the following:

– Review of strategic context

– Review against Singleton Development Control Plan (DCP) transport planning requirements

– Undertake traffic data collection during the two morning and two afternoon peak hours for the Kelso Street/New England Highway intersection

– Review existing traffic conditions

– Generate future vehicle trips from the proposed development and distribute the trips to the surrounding road network based on preferred access strategies and travel patterns

– Undertake SIDRA intersection modelling for the Kelso Street/New England Highway intersection for the following scenarios:

  - Base case 2024
  - Future year (2027) background growth without Singleton Bypass
  - Future year (2036) background growth with Singleton Bypass
  - Future year (2036) with school expansion with Singleton Bypass

– Considerate construction traffic management

– Assess impacts on the road, active transport, public transport (including school bus) network, and school traffic operations (kiss and drop and parking).

1.2 Development context

The school is a pre-K-12, co-educational, Christian school. It has currently a student population of 378 students and 37 full-time equivalent (FTE) staff for the school. The bell times are 8:50am to 15:00pm. The proposal would expand the enrolment of the primary school and high school components by three stages:

– Stage 1+2: 400 students and 45 staff. A school travel plan (STP in **Appendix A**) has been developed to demonstrate that the actual student number can increase to 491 students without any further impact on the road network given the proposed staggered bell time and before and after school care facility. The STP is expected to be in place until the opening of Singleton Bypass to mitigate any traffic impact.

– Stage 3: 700 students and 88 staff.

There are around 55 students and 16 staff for the childcare centre. There are 15 students (Tuesday 1.30-4:30pm) to 20 students (Thursday 1.30-4:30pm) attending the TAFE/trade school with an estimation of one staff at the school campus. No change will take place for the childcare centre and TAFE as part of this DA.

The school is located within Singleton Local Government Area (LGA) as shown in **Figure 1-1**. It is bound by Kelso Street to the north, Waddells Lane to the south and New England Highway to the east. It has a single vehicular access on Kelso Street which leads to the existing school car park and kiss and drop areas.

Figure 1-1 Location of the school

Source: Nearmap, 2022

1.3 Planning panels briefing

Hunter and Central Coast Regional Planning Panel issued the planning panel briefing minutes (**Appendix B**) on 1 February 2024 based on the TfNSW's comments. The key transport-related matters raised by the panel for consideration in the traffic and transport assessment and where this report addresses these matters are outlined in **Table 1-1**.

Table 1-1 Issued panel briefing minutes and location addressed in this report

Requirement	Section Addressed
The Panel expect a wholistic assessment and consideration of all operations on the site to understand the integration of the various uses and how staff numbers have been calculated (actual numbers on the site at various times) so that the extent of impacts can be properly assessed including for any interim or staged mitigation measure proposed.	Section 5.6
Clarification of the childcare/preschool component is required due to inconsistencies in documentation which will have a bearing on staffing, hours of operation etc.	Section 1.2
The Panel want to clarify on the status of the Singleton bypass including, timing, funding commitments and approval status.	Section 2.2
There needs to be a factual assessment of the traffic impacts with and without the bypass including drop off and pick up, any reliance on on-street parking (if any) and how any proposed interim measures may impact the local street network.	Section 5.2, 5.3, Appendix A
The Panel want clear plans and cross-sections showing existing and proposed RLs, and details of any retaining walls and earthworks, particularly in relation to the proposed car park.	To be provided by other consultants

Requirement	Section Addressed
Details of waste management arrangements on-site and off-site collection need to be documented and assessed.	No change to the existing waste collection strategy
The Panel notes the need for possible re-notification of the DA depending on any interim traffic management arrangements that may be proposed.	Appendix A

1.4 Report structure

The report comprises the following sections:

– **Section 2.0** summarises the strategic context of the region and describes how the development could support the future intents of the region.

– **Section 3.0** describes the existing transport conditions for all modes of transport.

– **Section 4.0** describes the proposed development, including its access strategy and parking intents.

– **Section 5.0** assesses the estimated trips generated, their distribution based on the preferred access strategy, and the likely traffic impacts associated with the additional trips.

– **Section 6.0** discusses the construction impact assessment.

– **Section 7.0** summarises the report and presents the conclusion.

2.0 Strategic context

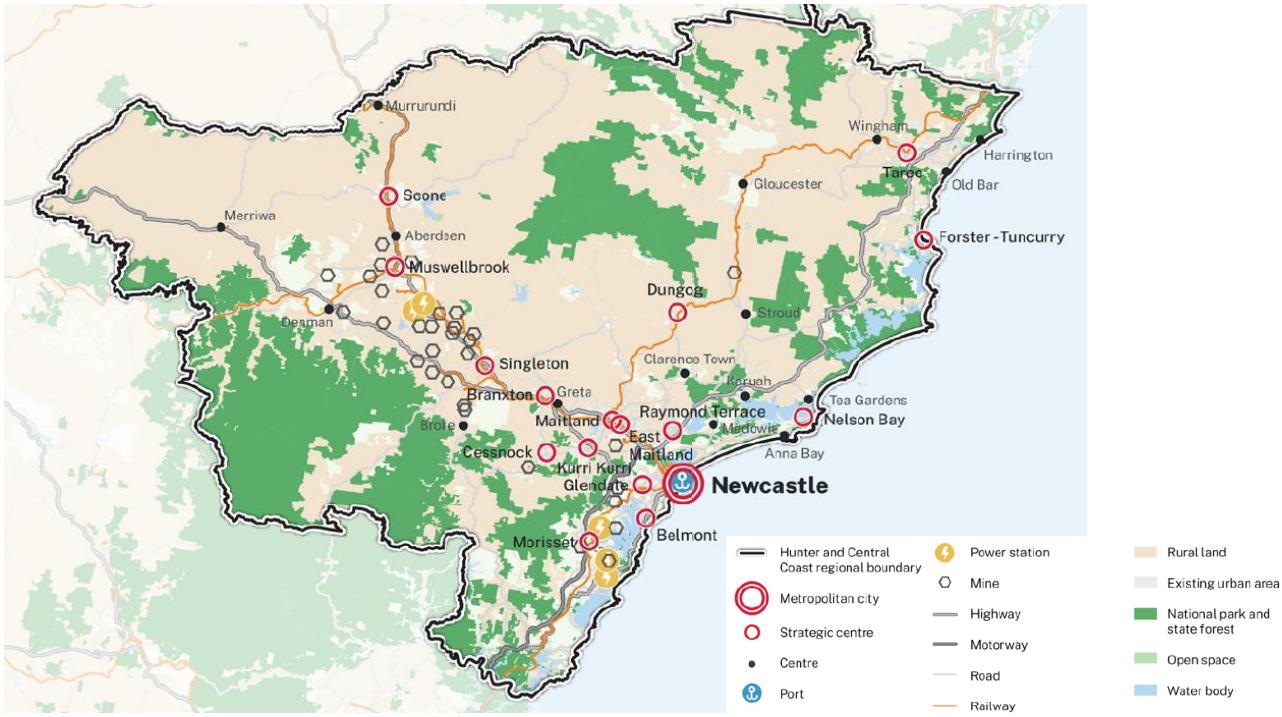
2.1 Hunter Regional Plan 2041

Hunter Regional Plan 2041 is a 20-year plan consolidating an understanding of each local council's local strategic planning statements, which reflects the community aspirations for the region. It provides an overarching framework to guide subsequent and more detailed land use plans, development proposals and infrastructure funding decisions. The Hunter has a projected population of more than 900,000 people, with more than 100,000 additional dwellings needed by 2041.

Local strategic planning will consider transport initiatives to complement the increased diversity of land uses and housing typologies in neighbourhoods by:

- rolling out low-speed zones supported by physical changes to the road environment
- upgrading existing paths and streets, with more crossing opportunities, and better landscaping, shading and lighting
- planting trees along streets and paths
- re-allocating vehicle lanes to other public spaces within and around key destinations
- prioritising pedestrian movements in and around key destinations, including at traffic signals
- using low-cost and/or temporary infrastructure to trial or test local initiatives
- streamlining processes for community or council-led local walking, cycling and place-making initiatives
- using technology to improve places and movements.

Figure 2-1 Location of the Singleton Strategic Centre



Source: Hunter Regional Plan 2041, Department of Planning and Environment (DPE) 2022

Implications for the site: The plan would support population growth and diversity within Singleton. The transport networks, including cycling and walking paths, will be extended for both recreation and commuting, and enhanced inter-regional transport connections will bolster education, business and industry growth in the local area.

2.2 Singleton Bypass

The New England Highway passes through Singleton and forms the main road access through the town and to the town centre. A previous traffic assessment report estimated that more than 25,000 vehicles use the highway through Singleton and across the Hunter River (AECOM 2018). Traffic volumes are also expected to further increase due to growth in population, regional freight movement, and future land development.

In response to this, a future New England Highway bypass is being planned at Singleton with the key objectives of:

– Improve journey time and reliability on the New England Highway through Singleton, particularly for road freight supporting the Upper Hunter and the North West New England region

– Improve the town centre by removing freight traffic

– Improve road safety for through and local traffic in Singleton

– Provide the best value for money

– Provide clarity for Singleton Council by including the corridor in the LEP

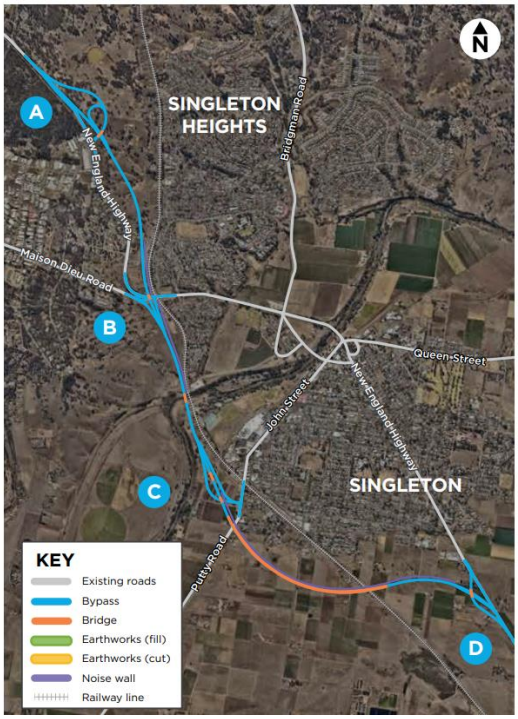
– Potentially provide improved flood amenity and/or evacuation routes for Singleton.

With the completion of the bypass, a reduction in traffic through Singleton's town centre is anticipated.

The alignment of the proposed Singleton bypass is shown in **Figure 2-2**. The singleton bypass project has been committed by both the State and Australian governments to be open to traffic in late 2026 with 760 million dollars of funding.

In late 2022, early work began on the project, including fencing being erected along the corridor and existing buildings being demolished. Additionally, the design and construction contract has been awarded to *Acciona Construction Australia Pty Ltd*, with major work expected to begin in mid-2024.

Figure 2-2 Singleton bypass alignment



Source: New England Highway – Singleton Bypass Project Update – Concept Design and Review of Environmental Factors, 2019

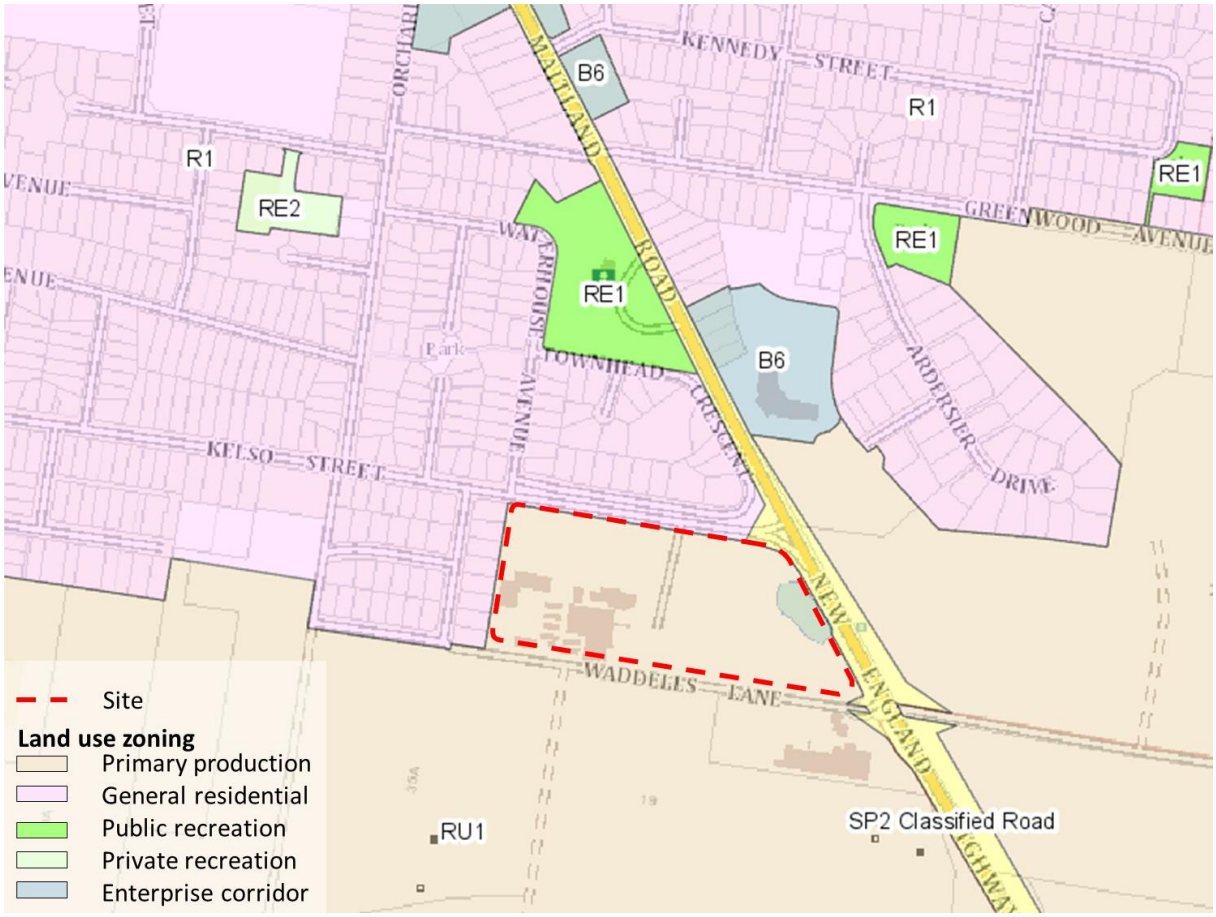
Implications for the site: The bypass would support a reduction in traffic on New England Highway through Singleton's town centre, which significantly alleviates the traffic pressure at the intersection of New England Highway/Kelso Street in the vicinity of the site. This provides more capacity to accommodate future traffic growth in the area. TfNSW advised the project team that it would translate to an estimated 35 per cent reduction in traffic through Singleton, which has been adopted in the modelling for the development application.

3.0 Existing conditions

3.1 Australian Christian College Singleton

Australian Christian College is located within Singleton as shown in **Figure 3-1**. It is surrounded by predominantly residential use north and west of the site. The school and its eastern and southern surrounds are zoned RU1 (primary production).

Figure 3-1 Land use zoning



Source: NSW Department of Planning and Environment 2022

3.2 Travel behaviour

An in-person survey of student travel choices was conducted on the 27th of February 2024, the survey received 318 responses resulting in a completion rate of 84 per cent. **Table 3-1** contains the results of this survey.

Table 3-1 Mode share from the survey

Transport mode	Proportion	
	AM	PM
Car	68%	67%
Bus	29%	30%
Active	3%	3%
Total	100%	100%

Source: Australian Christian College Singleton

3.3 Road network

Figure 3-2 shows the road network surrounding the site.

Figure 3-2 Road network

– **New England Highway / Maitland Road** – is classified as an arterial road. New England Highway transitions to Maitland Road north of the New England Highway / Maitland Road / Kelso Street intersection and is predominantly one lane in each direction between Whittingham in the south and Darlington in the north. It has a posted speed limit of 50km/hr for traffic passing through Singleton, with speed limits increased to 60km/hr outside the town centre boundary (south of Kelso Street and north of the overpass across Hunter River). There are no footpaths on either side of the road between Witthingham to Maitland Road / Orchard Avenue / Howe Street intersection. There are on-road cycle paths along New England Highway in the vicinity of the site and on-parking is generally allowed on both sides of the road.

– **Kelso Street** – is classified by TfNSW as a local street. It has one lane in each direction with no road line marking. The road has a posted speed limit of 50km/hr except for the school zone. There are no adjacent footpaths on either side of the road and there is no parking restriction on Kelso Street. The street forms a give-way intersection with New England Highway, providing strategic access for Australian Christian College Singleton. Kelso Street has a load limit of five tonnes which would impact the potential construction activities during the school expansion.

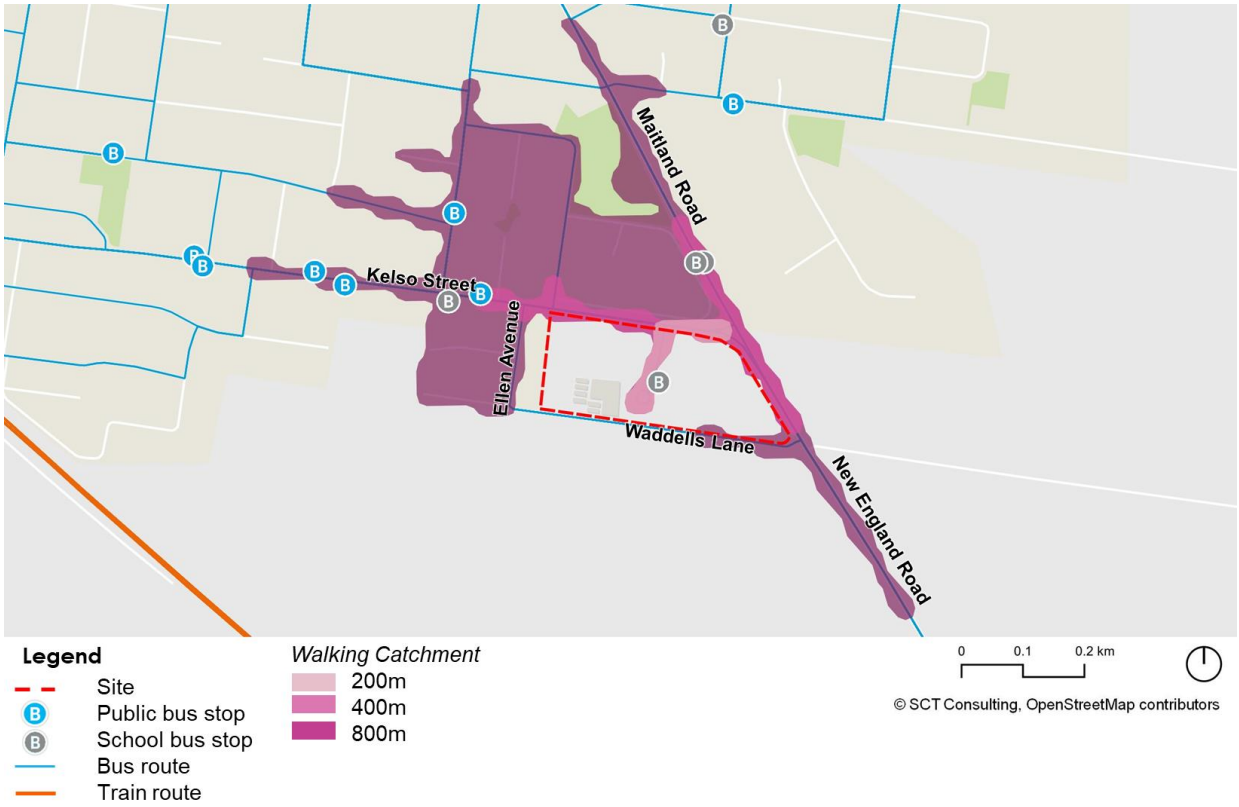
– **Waddells Lane** – is classified as a local street and has no line marking. It is an unsealed road with a carriageway width of about three metres. The speed limit in the vicinity of the site is 40km/hr. There are no restrictions on parking and there are no footpaths on either side of the road. It forms a give-way intersection to the west with Ellen Avenue and New England Highway to the east.

3.4 Walking

The footpath network surrounding the site is limited. There are no footpaths on Waddells Lane and Kelso Street (east of Edward Street). Footpath is available on Kelso Street west of Edward Street (the southern side only between Edward Street and Church Street and the northern side only west of Church Street). There are no pedestrian crossings or formalized intersections within the vicinity of the site.

Figure 3-3 shows the 200m to 800m walking catchment from Australian Christian College Singleton. An 800m coverage would reach many residential dwellings to the north and west of the school site.

Figure 3-3 Walking catchment



3.5 Cycling

Cycling facilities in the vicinity of the site are limited to New England Highway/Maitland Road, which is road shoulder cycle lanes. The road shoulder cycle lanes start from Whittingham (south of New England Highway/Race Course Lane) and extend through Singleton (George Street/Cambridge Street/Campbell Street). The cycle lanes are discontinued between George Street/York Street/Boundary Street and George Street/Orchard Avenue/Howe Street intersections which forces cyclists to cycle within mixed traffic between those sections. The cycle lanes are also shared with on-road car parking (where allowed). However, under the NSW Road Rules people aged 16 and above are allowed to cycle in mixed traffic conditions.

Figure 3-4 Cycle network

3.6 Public transport

The school is within 800m of two bus stops on Kelso Street (**Figure 3-3**). The services provide connections from Singleton to:

– Route 180: Singleton Heights to Green Hills Shopping Centre via Maitland

– Route 401: Singleton Square to Hospital via Civic Park & Station (Loop Service)

Route 180 is infrequent with a maximum of four services per day. As a local service, route 401 runs once every hour from 9:00am to 3:00pm.

Singleton Station is approximately 1.8km to the west of the site which is serviced by the Hunter Line. Train frequencies are relatively low with two trains servicing the stop per day.

3.7 School bus network

There are 13 school bus services in the morning, most of which arrive at school between 8:30am and 8:50am. There are 12 school bus services in the afternoon which are scheduled to leave school between 15:15pm and 15:50pm.

A private school bus (57 seaters) operates between the school and Branxton/ Greta/ Huntlee/ North Rothbury which has a timetable shown in **Table 3-2**.

Table 3-2 Private bus timetable

Inbound	Time	Outbound	Time
Branxton - Cnr Maitland St & John Rose Ave Traffic Lights (Singleton Side)	7:52 am	Leave school	3:05 pm
East Branxton - Opposite Miller Park	7:54 am	Cnr Standen Dr & New England Hwy	3:20 pm
East Branxton- 1st Driveway approaching N/N Highway & A43 Link Road		Branxton - Cnr Maitland St & John Rose Ave Traffic Lights (Singleton Side)	3:23 pm
Greta - Cnr Whitburn & Oxford St	7:56 am	East Branxton - Opposite Miller Park	3:25 pm
Greta - Cnr Kent St and Leaconfield Rd	7:58 am	East Branxton - 1st Driveway Approaching N/E Highway & A43 Link Road	3:27 pm
Greta Town Centre	8:00 am	Greta - Corner Whitburn & Oxford Street	3:31 pm
Huntlee - Cnr Tooze & McGann Dr (stopping on Tooze approaching McGann Drive)	8:10 am	Greta - Corner Kent Street & Leconfield Road	3:33 pm
Huntlee - Cnr Nord Grove & Jamieson Dr	8:12 am	Greta Town Centre	3:35 pm
North Rothbury - Cnr Thomas & Morgan St	8:16 am	Huntlee - Corner Tooze Circuit & McGann Drive	3:45 pm
North Rothbury - Cnr Mitchell & Scott St	8:18 am	Huntlee - Corner Nord Grove & Jamieson Drive	3:47 pm
Arrive school	8:40-8:45 am	North Rothbury - Corner Thomas & Morgan Street	3:49 pm
-	-	North Rothbury - Corner Mitchell & Scott Street	3:51 pm

For safety reasons, southbound buses are forced to use the intersection of Orchard Avenue/New England Highway to make a right turn. Right turn from Kelso Street to New England Highway is prohibited for buses.

Detailed school bus information has been included in **Appendix C**.

3.8 Kiss and drop

It is assumed that the current drop-off and pick-up activities take place at the designated area within the school boundary.

3.9 Existing traffic conditions

A SIDRA Intersection 9.1 model was prepared for the intersection of New England Highway/Kelso Street/Maitland Road located northeast of the school.

3.9.1 Key assumptions for base year model

Traffic survey counts were conducted on 13 February 2024 at New England Highway/Kelso Street/Maitland Road and the entrance to the school on Kelso Street. The data was collected in 15-minute intervals. Based on these surveys, the following peak periods have been defined:

– Weekday AM peak hour: 8:00am to 9:00am

– Weekday PM peak hour: 2:30pm to 3:30pm.

Queue lengths were also collected in a five-minute intervals for calibration.

Intersection layouts were derived from a combination of Nearmap imagery and Google Streetview.

3.9.2 Model calibration

Queue lengths were used to calibrate the model. Typical queues on all approaches were observed to be from zero to four vehicles during both peak periods.

3.9.3 Intersection level of service definition

Intersection Level of Service (LoS) is a typical measure used by traffic engineers to identify when roads are congested. The Level of Service, as defined in TfNSW Traffic Modelling Guidelines, is provided in **Table 3-3**.

Table 3-3 Level of Service definitions

Level of Service	Average delay per vehicle	Performance explanation
A	Less than 14.5s	Good operation
B	14.5s to 28.4s	Good with acceptable delays and spare capacity
C	28.5s to 42.4s	Satisfactory
D	42.5s to 56.4s	Operating near capacity
E	56.5s to 70.4s	At capacity. At signals, incidents will cause excessive delays. Roundabouts require another control method.
F	70.5s or greater	At capacity. At signals, incidents will cause excessive delays. Roundabouts require another control method.

Source: Roads and Maritime Services (2002), Traffic Modelling Guidelines

In addition, **Degree of Saturation (DoS)** has been extracted from models. DoS is a measure of the volume/capacity for the worst turning movement at the intersection. A DoS of 1.0 implies the turning movement is at capacity.

3.9.4 2024 intersection performance

Table 3-4 presents a summary of the modelled intersection performance for 2024 base year traffic conditions, detailed model results are presented in **Appendix D**. The results show a Level of Service (LoS) of E for both the AM and PM peaks, respectively. This is due to the delays experienced by the right turn movements from Kelso Street onto New England Highway. The heavy traffic volumes on New England Highway in both directions limit the opportunities for right turners who therefore experience a long delay. All other movements in both peak periods operate at LoS B or above with minimal delays.

Table 3-4 2024 Existing Intersection Performance

2024 base case							
DoS	LoS	Queue (cars)	Delay (sec)	DoS	LoS	Queue (cars)	Delay (sec)
Weekday AM Peak				Weekday PM Peak			
0.40	E	1.7 (NW)	61.0	0.65	E	1.6 (W)	64.1

Note: The queue location are shown in brackets

4.0 Proposed development

Australia Christian College Singleton is seeking to redevelop their campus to upgrade its facilities for the expected increase in students over the coming years. These upgrades are outlined in the subsequent chapters.

4.1 School upgrades

The proposed development is illustrated in **Figure 4-1** below, featuring new classroom buildings and two new car parking lots for staff and students. The proposed upgrades will be split across the three stages:

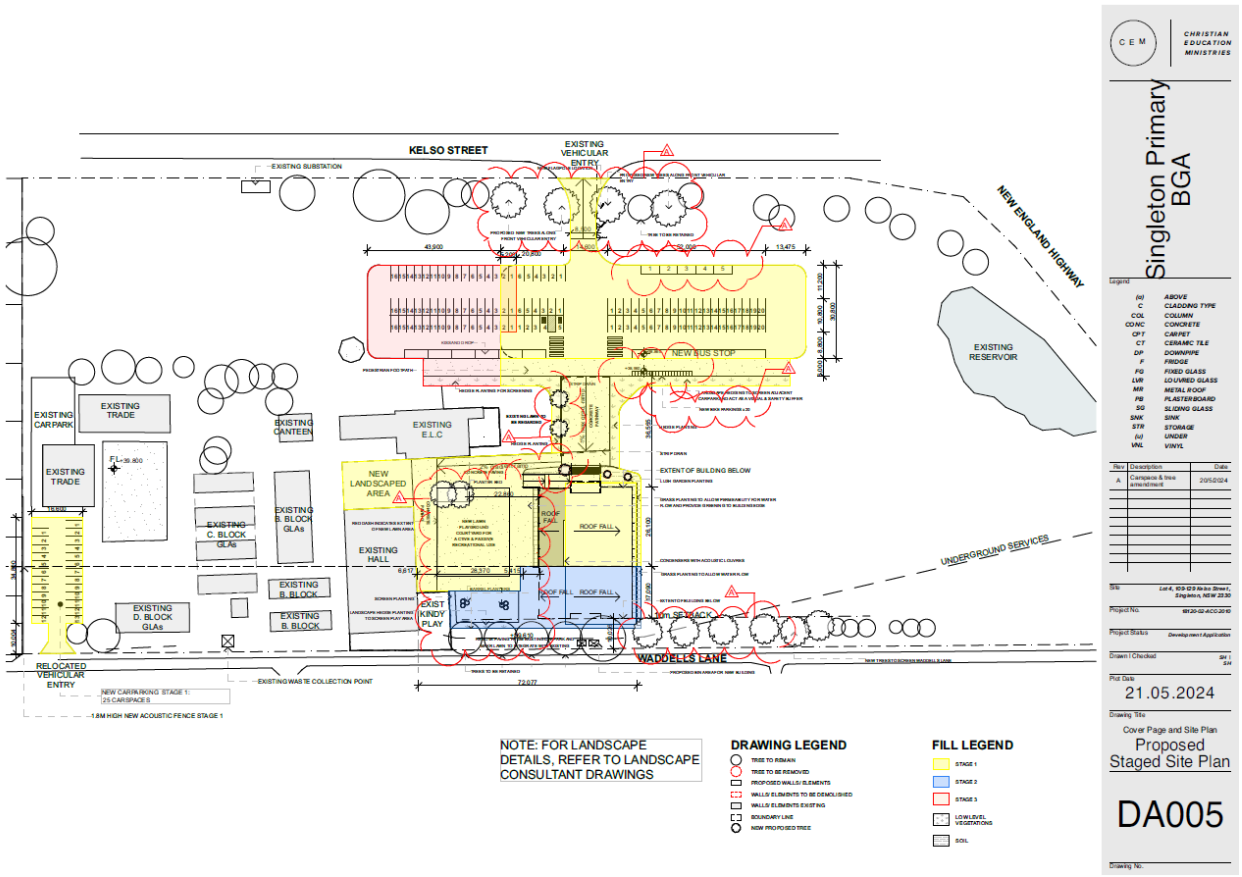
– Stage 1: New car parking including 62 spaces in the north portion and 25 spaces in the southwest portion (totalling 87 spaces), new concrete pathway and new classroom building

– Stage 2: New classroom building

– Stage 3: New car parking including further 48 spaces (totalling 135 spaces).

The northern car park will provide the primary parking supply for students and staff whilst the southwestern car park will serve trade staff and students and is relatively small in size. The proposed parking strategy is elaborated further in **Section 4.3**.

Figure 4-1 Proposed Staged Site Plan



Source: Australian Christian College, 2024

4.2 Proposed access

The proposed access to the school remains unchanged, as shown in **Figure 4-1** above, with primary access being provided from Kelso Street. The additional vehicle entry on Waddells Lane will be relocated and formalised.

The existing service entry is on Waddells Avenue. There is no change to the servicing operation as part of the proposal.

4.3 Proposed parking

4.3.1 Compliance with DCP

According to Singleton DCP, the parking rates for the childcare centre and school are listed below:

– Car parking
  - Childcare centre: 1 per staff member + 1 per 4 enrolled children
  - School: 0.5 per staff member + 1 per 10 students

– For bicycle parking, the requirement is 0.75 spaces per student.

– Two coach parking spaces should be accessible by children and a queuing area for six coaches should be provided. One delivery truck space is needed.

Therefore, the required parking spaces for the school upgrade are calculated in **Table 4-1**.

Table 4-1 Parking requirement

Land use type	Parking requirements	Scale		Required spaces	
		Existing	Expansion	Existing	Expansion
Childcare centre	1 / staff + 1 / 4 enrolled children	– 15 staff – 55 children		– 15 (s) – 14 (v)	
School	0.5 / staff + 1 / 10 students.	– 37 staff – 378 students	**Stage 1+2** – 45 staff – 491 (400)^ students **Stage 3** – 88 staff – 700 students	– 19 (s) – 38 (v)	**Stage 1+2** – 23 (s) – 49 (v) **Stage 3** – 44 (s) – 70 (v)
Total*	**-**	**-**	**-**	**62 spaces**	**87/ 129 spaces**

Note: (s) = staff parking, (v) = visitor parking;

*Visitor parking for childcare is excluded due to staggered timing and shared parking strategy.

^The parking requirement is calculated based on the actual students that the school will accommodate and the related parking demand, which is different from the student number increase and related traffic increase during peak hours.

A total of 87 spaces and 135 spaces are provided in the master plan for Stage 1+2 and Stage 3, respectively, which satisfies the DCP requirements.

A total of 525 bicycle parking spaces is required according to Council's DCP. Based on the expected bicycle mode share, this level of provision is excessive. This translates to an expected mode share of 75 per cent bicycle mode share, which is unrealistic for a school.

Based on the low mode share of active transport (3%) including bicycles, the provision of a bicycle parking zone (allowance of 20 bicycle racks) in the current master plan is reasonable. Additional bicycle parking can be further supplemented if needed in the future given the nature of the development.

Two bus parking spaces have been provided in the parking area, which provides drop-off and pick-up opportunities for school buses. The queuing area within the parking is up to 100 m which allows a total of six school buses to queue up on the internal road without overspilling to Kelso Street.

4.3.2 Proposed drop off pick up

The drop-off and pick-up area is located on the southern edge of the parking area which is connected to school buildings and facilities via a new paved area. This will include two bus parking spaces and six kiss-and-drop spaces (One space for Stage 1+2 and an additional five spaces for Stage 3).

4.4 AS2890 review

Being a staff parking area for teachers and temporary parking for students, the site is identified as a User Class 1A and User Class 3 structure according to AS2890.1. The aisle width could be a minimum of 5.8m as long as 90-degree parking is provided, which the current design satisfies.

The access width is 8.5m wide, which satisfies two buses passing each other (14.5m long) in two different directions. A swept path assessment was conducted separately by the civil engineers.

4.5 Sustainable transport principles

Sustainable transport and Travel Demand Management (TDM) strategies involve the application of policies, objectives, measures, and targets to influence travel behaviour, to encourage the uptake of sustainable forms of transport, i.e., non-car modes, wherever possible. TDM measures have proven to reduce congestion created by growth within urban areas and unlock urban renewal opportunities. They result in travel behaviour that uses less road space than a single-occupant vehicle commute and takes advantage of spare transport capacity outside the morning and afternoon peaks.

TDM strategies generally guide all relevant customers (residents, employees, and visitors) in changing travel behaviour in the following ways:

- Re-mode (consideration of travel via alternative modes)
- Re-time (consideration of travel at alternative times)
- Re-route.

A School Transport Plan including a Green Travel Plan and Transport Access Guide has been developed for the Australian Christian College to deliver best-practice travel programs and initiatives to manage travel demand for students and staff before the completion of the Singleton Bypass. Suggested initiatives and programs to be included as part of the ongoing School Transport are as follows:

- Use of carpooling and carsharing
    - An online carpooling forum for staff travelling on the same route to be set up
    - Priority designated parking within the staff car park could be considered
    - Provide information to staff regarding the availability of car-share opportunities
    - Parents living in clusters can be contacted by the school and invited to exchange phone numbers with others living nearby, to arrange car-sharing
    - A web-based car-sharing scheme for the school could be set up by parents or the P&C
    - Prompt families to make their informal sharing arrangements, even if not participating in a ‘formal scheme’.
- Increase of bicycle mode share
    - Coordinated through Bicycle Network as a day where students and staff are encouraged to ride, walk, scoot or skate to work (March every year)
    - Can involve educational class presentations and awards or bicycle maintenance workshops
    - Register: https://www.bicyclenetwork.com.au/rides-and-events/ride2school
    - There is a big gender difference in cycling in the 0-14 age range, with boys cycling twice as often as girls (AMR, 2013). E.g. MIND.BODY.PEDAL program for high school girls by the Bicycle Network, to address issues of self-esteem and confidence regarding bike riding. Ideas could be tailored to younger girls:
        - A team of youth workers chat with the girls about issues such as peer pressure and challenging social norms
        - Group sessions on mindfulness and the importance of moving
        - Educational bike ride around the local community.
    - Bicycle Network provides resources for teachers to create their bike education lesson plans. Lessons could include safety in riding, bike control, hazards, bike games, route planning and riding set route together, end-of-course riding celebrations

– Provision of a Travel Access Guide
    - Prepare a Travel Access Guide (map with descriptive text) that provides information for students and parents with the most sustainable and safe modes to accessing school
    - Include a description for each mode such as public transport routes and stops, key walking access routes, possible park and walk locations, bike routes, pedestrian crossing points and school entry points
    - The map may also encourage meeting points for students to walk, ride or scoot to school together.
– Enhancement of school bus network
    - The expansion of the school would result in an increased number of students using school buses. Additional school bus routes and more services on the same route can be provided to further reduce car mode share.
    - School bus pick-up timings are staggered by routes to reduce the pressure at the pick-up hours.

The School Transport Plan is a tool designed to address the school's travel needs and impacts and to provide measures and initiatives that encourage and support sustainable travel alternatives for staff, students and their parents or guardians. It also covers the efficient and safe access and operation of the school transport environment for students and staff accessing by any applicable mode of transport (e.g. kiss and drop, bus, car, etc.). The planning and implementation of a targeted School Transport Plan could support mode shift and provide significant opportunities for alternative travel options and reduce the need for car travel.

While it is important to develop a School Transport Plan that is aimed at managing travel demand and reducing reliance on car travel, it is more important to monitor and evaluate the effectiveness of individual measures and the need to adjust the measures. It is a living document, meaning it will change over time. This plan will require ownership by stakeholders to be effectively implemented.

4.6 School transport plan

As part of the development, Singleton Council required the development of a school transport plan (STP in **Appendix A**) to mitigate the impacts of the growth of the school before the opening of the Singleton Bypass. The STP contains targeted policies aimed at making the most significant impact on school traffic. There are two policies within the STP aimed at reducing traffic, staggered bell times and out-of-school hours care (OOSH). The STP should be read in conjunction with this report.

School bell times will be staggered by 20 minutes, resulting in high school students starting 20 minutes later, and ending 20 minutes later than primary school students. Staggered bell times result in a lengthened peak period of vehicle arrivals and departures, leading to a reduced traffic impact. Based on the staggered bell times it was estimated that 46 extra students could be supported

In addition to staggered bell times, the school will implement an OOSH for 45 students, with a maximum of three staff members, this will run from 7:00am to 8:30am and 3pm till 6.30pm. OOSH can be operated in existing classrooms, allowing students to be dropped off and picked up by parents at times more suitable to them, rather than at school bell times, reducing vehicle trips. It is expected that students who use OOSH would be expected to have a 100 per cent car mode share, based on this, 45 extra students could be supported without additional impact on the road network.

The STP and associated policies have been endorsed by Singleton Council.

5.0 Traffic and transport impact appraisal

5.1 Traffic modelling approach and assumptions

5.1.1 Background traffic growth

Future year traffic modelling was undertaken for the below two scenarios:

– **2027 without the Singleton bypass (interim scenario assuming the delay of opening)**

  Intersection volumes were calculated for 2027 by applying a one per cent growth to the 2026 midblock volumes of New England Highway in AECOM's Traffic Impact Assessment published in November 2019 as part of the Review of Environmental Factors (REF) for the bypass. No growth was assumed for the movements associated with Kelso Street.

– **2036 with the Singleton bypass (Ultimate scenario)**

  The 2036 scenario assumed the full operation of the Singleton bypass option without the Putty Road ramps (do minimum without ramps option) and used the volumes for this scenario from the AECOM's REF. The purpose of the bypass is to reduce passing trips through the Singleton township, therefore reducing the expected northbound and southbound trips travelling along New England Highway and the New England Highway/Kelso Street/Maitland Road intersection. It was also assumed that the STP was no longer in place after the completion of the bypass.

The derived northbound and southbound traffic volumes during the AM peak and PM peak hours are indicated in **Table 5-1**, reflecting an about 50 per cent reduction of the traffic on New England Highway due to Singleton Bypass in 2036. Based on communication from TfNSW, this reduction was set to 35 per cent to reflect updated modelling. It was assumed there would be no background growth in traffic volumes along Kelso Street.

Table 5-1 Traffic volumes on New England Highway

Direction	AM peak hour	PM peak hour
2026 without bypass		
Northbound	856 vehicles	786 vehicles
Southbound	757 vehicles	1,291 vehicles
2036 without bypass		
Northbound	995 vehicles	886 vehicles
Southbound	914 vehicles	1,403 vehicles
2036 with bypass (values in brackets are adjusted 35% reduction based on TfNSW requests)		
Northbound	531 (647) vehicles	430 (576) vehicles
Southbound	456 (594) vehicles	735 (911) vehicles

5.1.2 Trip generation

SCT Consulting is advised that the school could expand to a size of 400 students without any additional accommodation. As the previous development application did not identify a capacity limit for the site, 400 students has been used in lieu of a condition of consent capacity limit. Hence, any increase up to 400 students would not be regarded as impacts of the subject development.

Using the School Transport Plan, a student size of 491 students could be accommodated without any increase in vehicle trip generation. It is proposed that the school be limited to 491 students prior to the opening of Singleton Bypass based on the implementation of the School Transport Plan. The School Transport Plan has been prepared as a standalone document, allowing for it to be conditioned individually.

The number of generated trips in the future scenarios was calculated based on the expected growth to:

– The approved 400 students (with an increase of up to 491 students due to the STP) in 2027

– The enrolment of 700 students in 2036.

Mode shares were extracted from the travel choice survey conducted in school and it was assumed that the additional students would be evenly split between the primary and high school age groups. Based on a light vehicle occupancy rate of 1.6 students per vehicle, the additional students' trip generation for both the 2027 and 2036 scenarios is identified in **Table 5-2**.

Furthermore, it is estimated the proposal will generate an additional two bus movements in the AM and PM peak which are included in traffic modelling.

Staff traffic generation is excluded from the modelling given it would not take place during school park hours.

Table 5-2 Development trip generation

Scenario	AM Peak hour	PM Peak hour
2027 (a total of 491 students)*	+0 veh per direction x2	+0 veh per direction x2
2036 (a total of 700 students)	+128 veh per direction x2	+128 veh per direction x2

*Given the STP, the actual student enrolment can be 491 students.

5.1.3 Trip distribution

The trip distribution of additional development trips in 2036 is shown in **Figure 5-1** and **Figure 5-2** below.

Figure 5-1 2036 AM development trip distribution

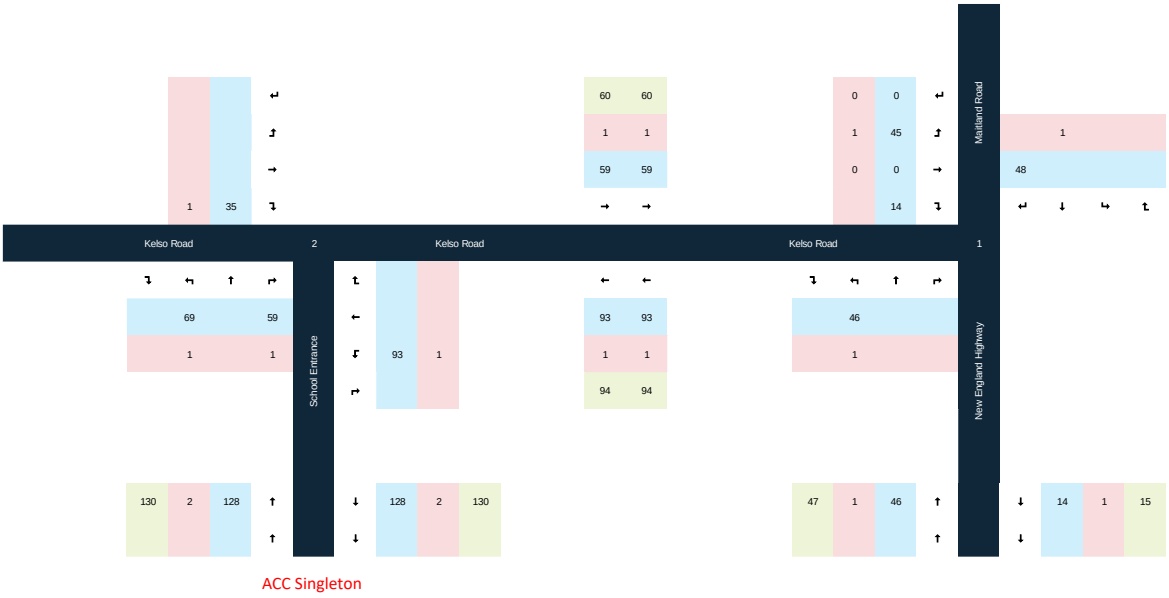
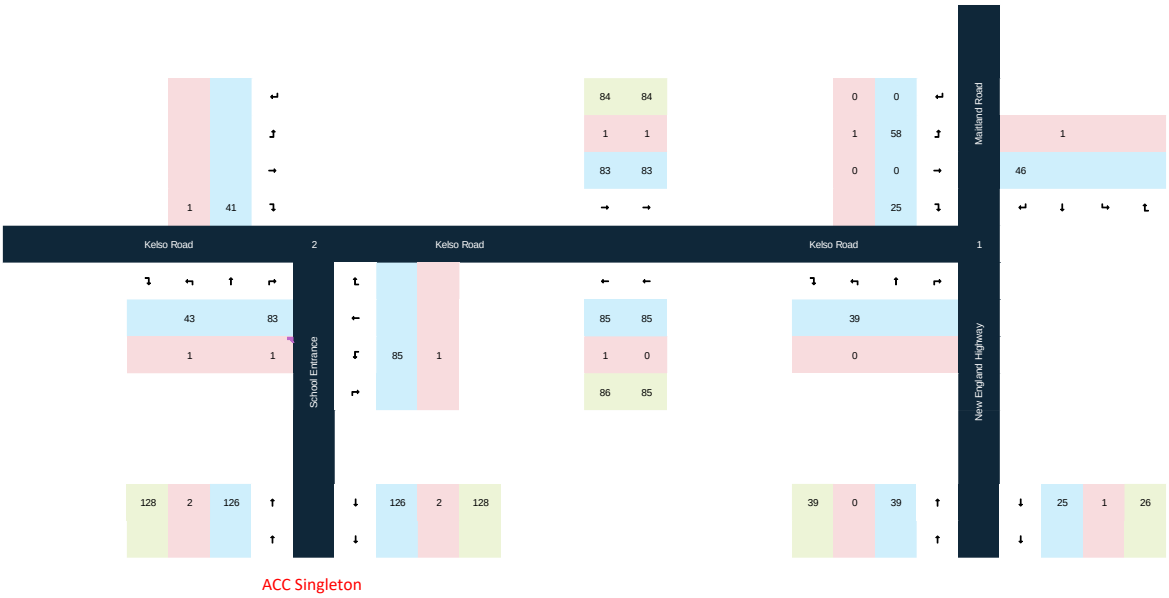


Figure 5-2 2036 PM development trip distribution



5.2 Road network impact

The performance of the New England Highway / Kelso Street / Maitland Road for 2027 and 2036 future year base and future year with development is shown in **Table 5-3**. A summary of the detailed SIDRA modelling outputs is included in **Appendix D**.

Table 5-3 Future year intersection performance

Scenarios	Intersection performance							
	DoS	LoS	Queue (cars)	Delay (sec)	DoS	LoS	Queue (cars)	Delay (sec)
	Weekday AM Peak				Weekday PM Peak			
2027 base case with 491 students	0.43	E	1.5 (NW)	63.2	1.23	F	8.0 (W)	>70.5
2036 base case	0.31	B	0.9 (NW)	21.5	0.43	B	0.9 (W)	27.1
2036 base case with 700 students	0.32	B	1.4 (NW)	25.5	0.52	C	1.5 (W)	31.9

Note: The queue location are shown in brackets

Interim scenario in 2027

For an intersection operating at capacity in the existing condition, any further small increase in the demand would result in exponential deterioration of the intersection performance. In 2027, based on the traffic volumes from the Bypass REF (AECOM 2019), the intersection operates at LoS E in the AM peak and LoS F in the PM peak, which is in an unsatisfactory condition (This scenario has included the additional 22 students from 378 to 400 students). In the PM the maximum delay is 340 seconds, which demonstrates that the intersection would cease to operate effectively. The heavy delay occurs for the right turn out of Kelso Street whereas the New England Highway is still operating satisfactorily, meaning that the priority would not satisfy the traffic growth if the bypass were not in place.

Ultimate scenario in 2036

The future year base scenario with the completion of the bypass will improve the traffic conditions of the intersection significantly from LoS E to B for the AM and PM peaks, respectively. When development traffic is introduced, there are small changes in LoS in PM peak only from B to C and only minor increases in delay (It should be noted that the delay in the future base case is already on the boundary of B and C). Overall, the introduction of the bypass leads to the acceptable performance of the intersection in the future year without any additional upgrades necessary.

5.3 Kiss and drop performance

The provision of 70 visitor parking spaces (as part of the 135 spaces) for 700 students may be excessive. The actual temporary parking demand may reduce based on the below assumptions:

– 67 to 68 per cent of the school students (700) use private cars.

– 5-minute dwelling time for one pick up activity (without management) and 2-minute dwelling time for one pick up activity (with management). Pick up usually takes longer time than drop off, hence, the pickup scenario is selected for the analysis.

– An average of 1.6 students per car

– A 30-minute window in the morning and afternoon which assumes 100 per cent of the students will be dropped off or picked up.

As a result, a total of 28 and 60 spaces are required for the drop off/pick up area assuming with management and without management, respectively. Hence, the provision of 70 spaces (as part of the 135 spaces) for temporary parking is sufficient. The parking demand could be halved if proper management is introduced during the drop off/pick up activity.

5.4 Public transport impact

Assuming there could be an additional 300 students to be enrolled by 2036, it is forecast that there could be an additional 90 students who would be travelling to/from school by bus, resulting in two additional school bus demands in each peak.

CDC NSW is a leading provider of school bus services for development. The existing school bus network is strong with over 10 routes provided. Further opportunities for improvements may assist in reducing the impacts of expansion and increasing sustainable travel for the school. They should continue to monitor the capacity of services as the school expands.

It is recommended that a Green Travel Plan and Transport Access Guide be prepared as part of the School Transport Plan to improve awareness about sustainable travel options and to better equip the school community to walk, cycle and take public transport.

5.5 Active transport impact

Though the student population increase is significant, the increase in the number of students who walk/cycle/scoot to/from school is relatively minor due to the nature of the private school and relatively wider school catchment area. No footpath/shared path works are required to mitigate the impacts of the proposed school upgrade and it is assumed that there is no capacity issue concerning the walking/cycle infrastructure. However, the provision of the missing links, combined with their proximity to the school, could improve safety and walkability for students/staff commuting to school. On-site bicycle parking facilities would also help to promote active transport mode.

5.6 Impact of other operations

The impact of other operations of the facilities on the campus is shown in **Table 5-4**.

Table 5-4 Impact of other operations

Facilities	Operating hours	Impact
ACC Singleton (the subject DA)	Monday to Friday 8:50am to 15:00pm (staggered bell time subject to STP)	Impact is addressed in this document and STP
Childcare	Monday to Friday 7:30am-18:00pm	Traffic generation spreads out in the morning and afternoon and will not result in cumulative impact with the school.
Out of School Hours (OOSH)	Monday to Friday 7:00am-8:30pm & Monday to Friday 15:00am-18:30pm	Traffic generation occurs before and after the school peak hours and will not result in cumulative impact with the school.
TAFE / trade school	Tuesday class 13:30pm till 16:30pm Thursday class 13:30pm till 16:30pm	Traffic generation will be minimal and will not result in cumulative impact with the school.

It is acknowledged that the all staff days are usually the week prior to the school terms, e.g. 20-24 January 2025 and 7-11 July 2025 as scheduled. Hence, there would be no overlapping with the normal school traffic and would not result in any cumulative impact.

6.0 Construction impact assessment

6.1 Overview and objectives

A Construction Traffic Management Plan (CTMP) will be developed by the Principal Contractor to outline measures taken to ensure the safety of road users and workers during construction. The primary objectives of the CTMP should include the following:

– Minimise impact on pedestrians and cyclists, especially while school is still in operation

– Maintain public transport access

– Maintain access to and from adjacent buildings

– Restrict construction vehicle movements to designated routes to and from the site

– Manage and control construction vehicle activity within the vicinity of the site.

6.2 Works programme

A detailed works program highlighting the expected periods of peak construction activity will be provided by the preferred contractor during the preparation of a CTMP. At this stage, the timeline for works associated with the proposal (demolition, build, and fitout) is expected to be in the order of two years.

6.3 Work hours

It is expected that construction hours will be those of typical construction hours, being:

– Weekdays: 7:00am-6:00pm (excluding drop off/pick up hours)

– Saturdays: 8:00am-1:00pm

– Sundays and public holidays: No work permitted.

Workers would be informed of site operating hours during site induction. There may be a need for isolated examples of construction activities to occur outside of the nominated periods. For example, the delivery of large plants or equipment requires oversize vehicles to enable delivery. In these cases, approval will be sought from the relevant authorities.

6.4 Work zones

No work zones are expected to be needed for this project. Work is expected to be conducted from within the confines of the site during construction.

6.5 Construction site access

The site will likely be accessed via Kelso Street from New England Highway. Traffic controllers will be on-site during times of access and egress to ensure safe interaction between heavy vehicles and pedestrians. Construction access routes will be confirmed by the Principal Contractor in a detailed CTMP, alongside traffic control requirements and the timing of construction vehicle access to minimise impacts.

Figure 6-1 Load limit on Kelso Street

Source: Google Streetview, 2023

New England Highway is a 25/26m B-double route that is expected to accommodate the construction vehicle. Kelso has a load limit of up to five tonnes, which needs to be lifted during the construction.

6.6 Construction traffic volumes

It is assumed that there would be around 20 truck movements a day and 50 workers on site. Construction traffic volumes will be confirmed by the Principal Contractor in a detailed CTMP. As part of the future detailed CTMP, a review of the cumulative impact of concurrent construction activities in the local area will need to be completed.

6.7 Construction worker parking and traffic

Light vehicle traffic will likely be generated by construction workers travelling to and from the site. The number of construction workers is currently unknown. Workers will be encouraged to use car-pooling. Construction worker traffic movements will be generated outside of peak periods due to previously mentioned work hours and therefore should have minimal impacts.

The impacts of construction traffic vehicle generation will be determined by the Principal Contractor and any required mitigations will be outlined in the detailed CTMP. It is expected that construction hoarding will be required to segregate the school operation from the construction site.

6.8 Traffic control plans

The Principal Contractor will be required to provide Traffic Control Plans (TCP) for the proposed work, meeting WorkCover requirements and in accordance with the Transport for NSW *Traffic Control at Work Sites Technical Manual* Issue 6.1 released in February 2022. These TCPs should consider:

– Construction vehicle movements and logistics of construction material delivery

– Minimisation of construction vehicle activity during peak periods

– Priority of pedestrians and passing vehicles.

6.9 Pedestrian and cyclist management

All work will take into consideration pedestrians and cyclists, in particular school children. Advanced warning signage will be installed and pedestrian detours will be installed where appropriate. Appropriate fencing will be outlined in a detailed CTMP by the Principal Contractor.

6.10 Public transport impacts

Bus routes 180, 180X and 401 currently operate along Kelso Street. Combined, these routes operate nine services each weekday in each direction. Therefore, the impact on public transport is expected to be minimal.

Several school bus routes operate before and after school hours.

6.11 Existing and future developments

The Principal Contractor will be responsible to liaise with Health Infrastructure and surrounding landowners to coordinate traffic management and wayfinding in the instance of concurrent construction.

6.12 Detailed CTMP requirements

This TIA provides an overview of the CTMP requirements for the development. A detailed CTMP will be developed by the Principal Contractor and cover/formalise the following information:

– Description of construction activities and duration

– Work hours

– Detailed assessment of construction traffic impacts including any cumulative impacts from surrounding developments

– Swept path analysis of heavy vehicle access to the site

– Detailed strategy for pedestrian diversion

– Traffic Guidance Schemes

– Contact details of key project personnel.

7.0 Conclusion

The school expansion proposal will deliver a new building and two new car parking on-site to accommodate the increased students from the existing 378 to 491 students (Stage 1+2) and 700 students (Stage 3). The northern car park (110 spaces) will provide the primary parking supply for students and staff whilst the southwestern car park (25 spaces) will serve trade staff and TAFE students. In summary:

– The proposed development would generate an additional of 136 vehicle trips per direction during AM and PM peak hours, respectively compared to the existing school.

– Without Singleton bypass in 2027, the intersection of New England Highway/Kelso Street will fail with the expected traffic growth. The School Travel Plan proposes staggered bell time and OOSH to mitigate the traffic impact during the interim scenario.

– The ultimate scenario with the completion of the Singleton bypass will improve the traffic conditions of the intersection from LoS E to B in the AM and PM peaks respectively. When development traffic is introduced, the LoS will remain acceptable in both peak periods and there is only minor increases in delay. The introduction of the bypass leads to the acceptable performance of the intersection in the future year without any additional upgrades necessary.

– The proposed access to the school remains unchanged with primary access being provided from Kelso Street. The additional vehicle entry on Waddells Lane will be relocated and formalised.

– A total of 87 spaces and 135 spaces are provided in the master plan for Stage 1+2 and Stage 3, respectively, which satisfies the DCP requirement. This assumes the different drop off/pick up periods between childcare and the school, which results in a shared parking area.

– When the development is fully delivered, a total of 28 and 60 spaces are required for the drop off/pick up area assuming with management and without management, respectively. Hence, the provision of 70 spaces (as part of the 135 spaces) for temporary parking is sufficient. The parking demand could be halved if proper management is introduced during the drop off/pick up activity.

– It is forecast that there could be an additional 90 students who would be travelling to/from school by bus, resulting in two additional school bus demands each peak hour. Further opportunities for improvements may assist in reducing the impacts of expansion and increasing sustainable travel for the school.

– Two bus parking spaces have been provided in the parking area, which provides drop-off and pick-up opportunities for school buses. The queuing area within the parking is up to 100 m which satisfies a total of six school buses to queue up on the internal road without overspilling to Kelso Street.

– Based on the expected bicycle mode share, the DCP rate for bicycle parking is excessive and unnecessary. Hence, the provision of a bicycle parking zone (allowance of 20 bicycle racks) in the current master plan is reasonable. Additional bicycle parking can be further supplemented if needed in the future given the nature of the development.

– The existing service entry is on Waddells Avenue. There is no change to the servicing operation as part of the proposal.

The Traffic Impact Assessment concluded that the impacts of the proposed development are at a level able to be accommodated by the existing and planned infrastructure as well as the proposed school travel plan.

APPENDIX A

School Travel Plan

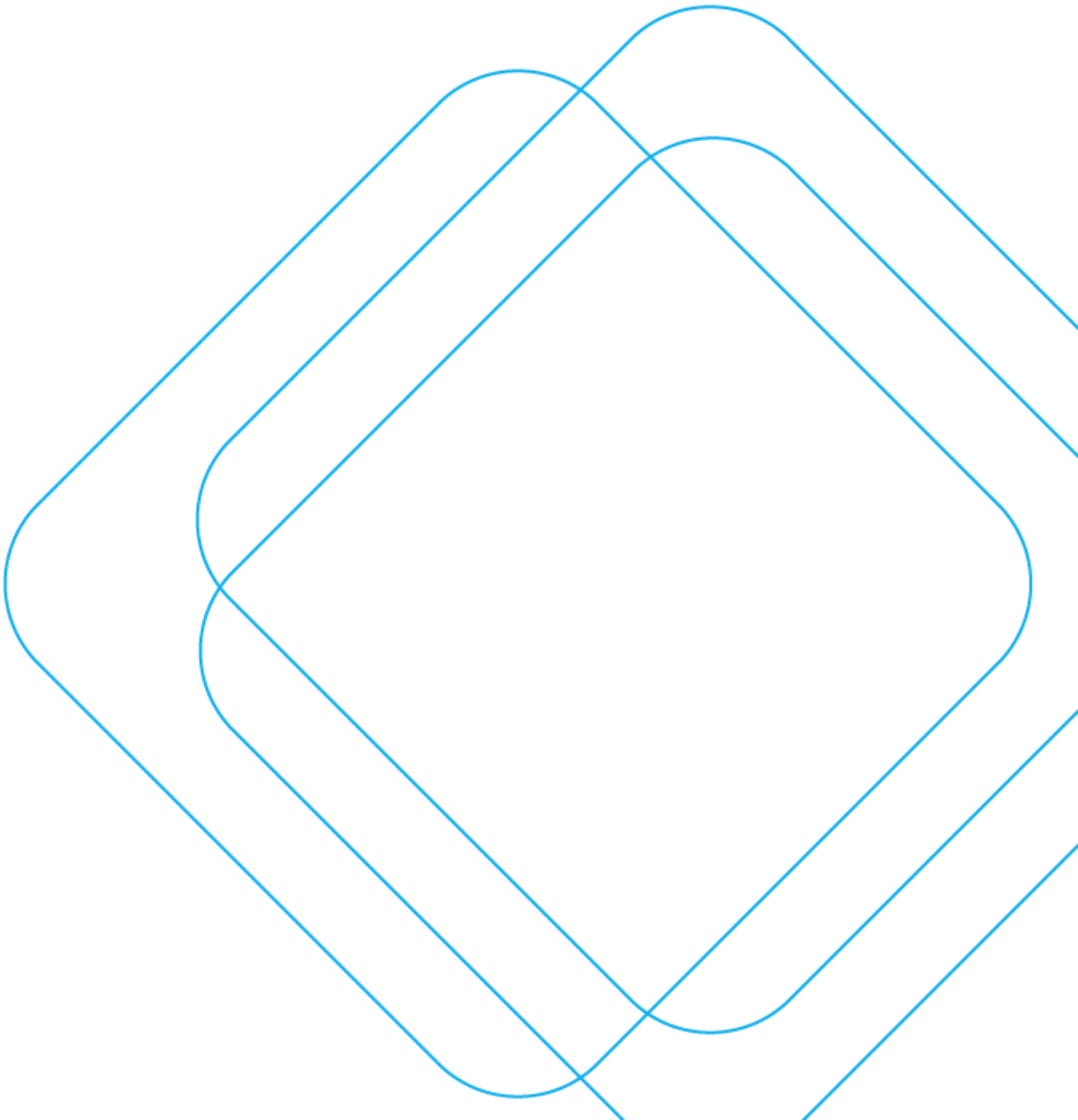
SCT Consulting

AUSTRALIAN CHRISTIAN COLLEGE SINGLETON MASTERPLAN

School Transport Plan

26 APRIL 2024

SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.



Quality Assurance

Project:	Australian Christian College Singleton Masterplan		
Project Number:	SCT_00368		
Client:	Christian Education Ministries	**ABN:**	65 124 826 722
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	**ABN:**	53 612 624 058

Information	Name	Position	Signature
Author:	Shawn Cen	Principal Consultant	
Reviewer:	Jonathan Busch	Associate Director	
Authoriser:	Jonathan Busch	Associate Director	

Version	Date	Details
1.0	8 March 2024	Draft report
2.0	4 April 2024	Updates based on CEM feedback
3.0	26 April 2024	Final report

Contents

1.0 Introduction

SCT Consulting has been engaged by Christian Education Ministries to develop a School Transport Plan (STP) for the upgrade of Australian Christian College Singleton (ACCS). ACCS is located within the Singleton Shire Local Government Area, adjacent to the New England Highway (Maitland Street) as seen in **Figure 1-1**.

Figure 1-1 Location of the school

Source: Nearmap, 2022

A Transport and Traffic Impact Assessment (TIA) is simultaneously being undertaken to support the development application for this upgrade. The STP should be read in conjunction with the TIA for further understanding of traffic and transport impacts across all modes of transport.

The purpose of the STP is to introduce initiatives to be implemented by ACCS which will help to alleviate external impacts of the future expansion of the school.

1.1 Mode share for students

A travel survey was conducted by the school, which was completed by existing school students. 84 per cent of students completed the survey (318 of 378 students) on 17 Feb 2024. The results of the mode share survey are below in **Table 1-1**.

Table 1-1 Existing mode share

Mode	Student mode share
Walking	1%
Cycle / Scoot	2%
Bus	29%
Car	68%
Total	**100%**

1.2 Student growth

At the time of writing, the school has 378 enrolled students.

The existing buildings could accept some additional student demand – indicatively a population of 400 could be accommodated without any new facilities.

2.0 Adopted policies and procedures

The policies and procedures will be adopted by the school to lessen the external traffic and parking impacts of the school. The effects of these will be discussed in **Table 2-1**.

Table 2-1 Adopted policies and procedures

Stagger bell times by 20 minutes
Bell times will be staggered by 20 minutes, resulting in high school students starting 20 minutes later, and ending 20 minutes later than primary school students. The new bell times will be: – 8:50am – Primary students start. – 9:10am – High school students start. – 3:00pm – Primary students finish. – 3:20pm – High school students finish.
Out of school hours care (OOSH)
The school will implement an OOSH for 45 students, with a maximum of three staff members, this will run from 7:00 to 8:30 (TBC) and 3pm till 6.30pm. OOSH can be operated in existing classrooms, allowing students to be dropped off and picked up by parents at times more suitable to them, rather than at school bell times, reducing vehicle trips. Staff could include teachers, or specific OOSH staff members and students charged an additional fee if they choose to take advantage of this service.

These initiatives will be in place prior to the occupancy of the new facilities and until the opening of Singleton Bypass to general traffic. If Singleton Bypass opens prior to occupancy of the new facilities, these initiatives do not need to be implemented.

3.0 Expected impact of transport initiatives

3.1 Staggered bell times

Staggered bell times result in a lengthened peak period of vehicle arrivals and departures, leading to a reduced traffic impact. Turning count data was extracted to understand the demand for the school within each 15 minutes during peak periods. This was then used to forecast the impacts of peak spreading.

The estimated impact of the staggered bell times can be seen in **Figure 3-1** and **Figure 3-2**, with percentage of arrivals and departures being spread more evenly over the time period.

Figure 3-1 AM vehicle arrivals (staggered vs current)

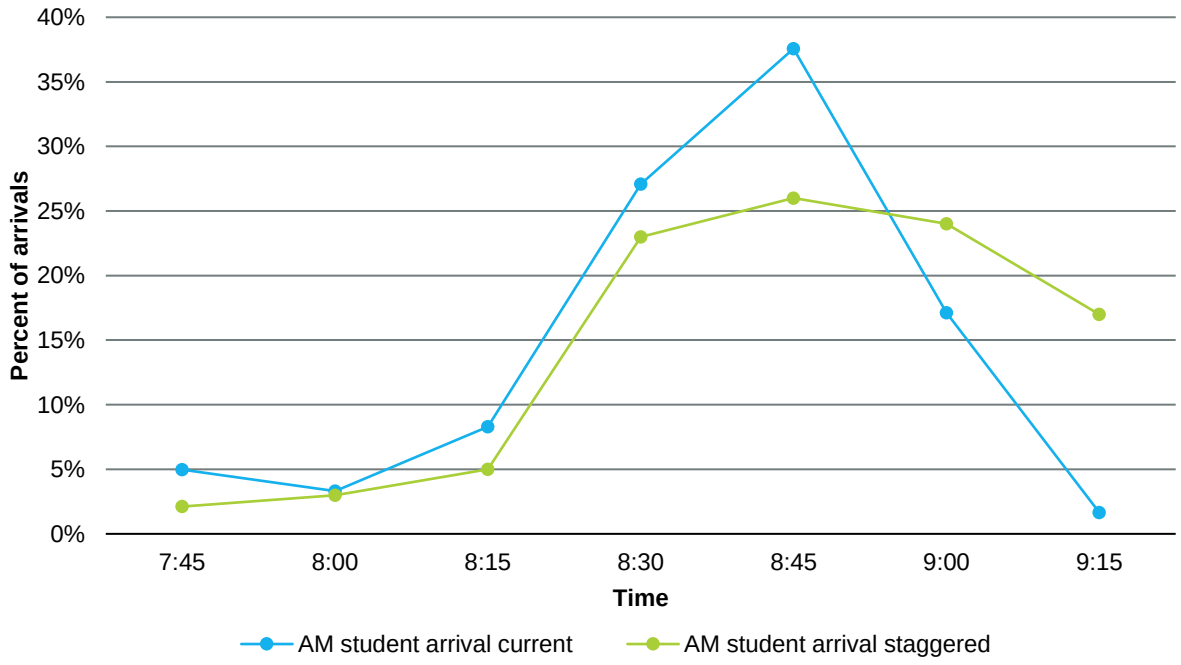
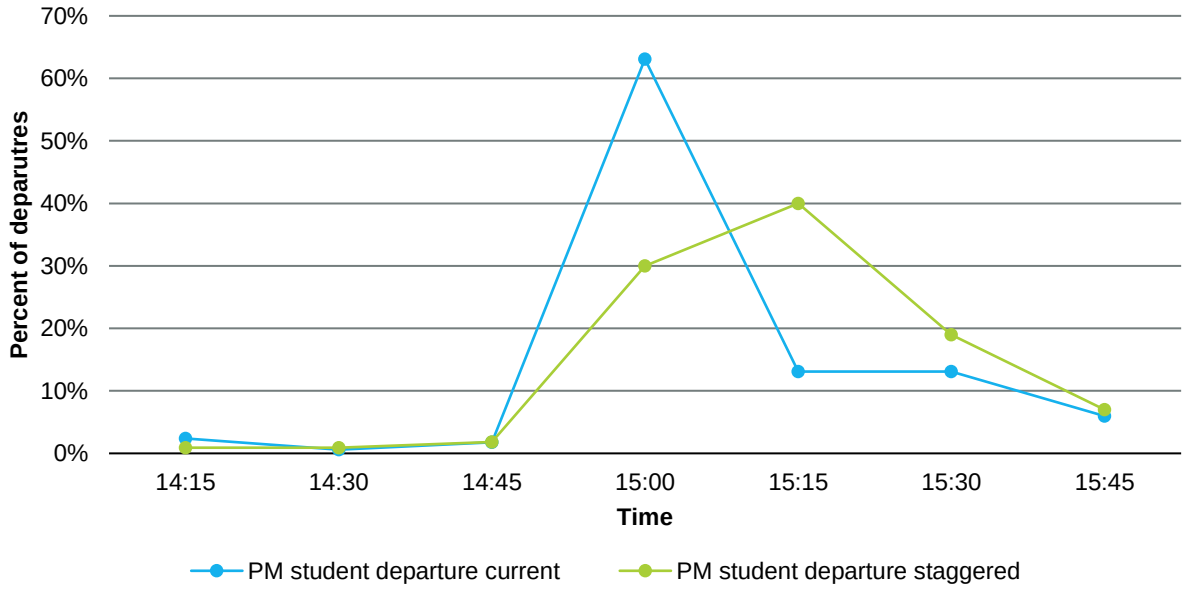


Figure 3-2 PM vehicle departures (staggered vs current)



In the AM, the maximum arrival percentage has fallen from 38 per cent to 26 per cent, additionally, the peak vehicle volume in the network was observed to be between 8.30am and 8.45am, staggered bell times will result in less school traffic during this time period. Overall, this will improve traffic impact of the school for the AM peak period.

The PM peak period has a much more concentrated peak currently with 63 per cent of vehicles departing at 3.00pm to 3.15pm. The impact of the staggered bell times reduces the maximum percent of departures to around 40 per cent, which could significantly reduce the traffic impact of the school, helping to mitigate the effects of any increases in student capacity.

Table 3-1 summarises the effect of the staggered bell time in relation to the reduced number of students. This indicates that up to 46 students can be added onto the current road network without any additional impact, which is equivalent to about 30 cars (based on occupancy of 1.5 people per car).

Table 3-1 Effect of bell times on vehicle volumes

Scenario	AM peak arrival volumes		PM Peak departure volumes	
	8.30am-8.45am	8.45am-9.00am	3.00pm-3.15pm	3.15pm-3.30pm
Current bell times, 400 students	108 students	150 students	252 students	52 students
Staggered bell times, 400 students	92 students	104 students	120 students	160 students
Reduction of the students*	**150-104=46 students**		**252-160=92 students**	

*The reduction is calculated based on the difference of either of the peak 15 minutes. The smaller number between AM and PM peak prevails given the less impact at the other peak hour.

3.2 OOSH

Usually, OOSH students are unlikely to use bus or other modes but is expected to be car dominant. It is assumed that the provision of OOSH will take away 100 per cent car mode share students. Hence, an OOSH with the capacity of 45 students running at 100 per cent capacity, could reduce the vehicle trips by 29 cars (based on occupancy of 1.5 people per car), during both the AM and PM peak periods, helping to reduce the impact of any increased student capacity, this represents a 22 per cent reduction of trips in the AM and a 25 per cent reduction of trips in the PM.

Table 3-2 Effect of OOSH

Scenario	AM peak arrival volumes (veh)	PM Peak departure volumes (veh)
Reduction of the cars with OOSH	**29 cars**	**29 cars**

4.0 Conclusion

The combined impact of the above initiatives is expected to help mitigate the external impacts of future expansion of school. The staggered bell times will spread out the pickup and drop off of students combined with the reduction in vehicle trips produced by an OOSH. Therefore, based on 400 students (without the need for any new facilities):

– By staggered bell time, an addition of 46 students could be accommodated which would not cause any upgrade of the transport network.

– By operation of OOSH, an addition of 45 students could be accommodated which would not cause any upgrade of the transport network.

A total of 91 students could be accommodated with the combined impact of the above initiatives.

Compared with the current 378 enrolled students (2024), there would be a potential allowance of up to **113 additional students** for the school expansion before any additional car trips would be generated in the network. This is based on 22 students from the remaining capacity of the existing facility and 91 students as a result of School Transport Plan initiatives (**Table 4-1**).

Table 4-1 School enrolment summary

Scenarios	Existing 2024	Remaining capacity of the facilities	With initiatives
Student number	378 students	+22 students	+46 students by staggered bell time
			+45 students by OOSH
Total enrolment forecast	**-**	**400 students**	**491 students**

In summary, the school could expand to 491 students subject to the initiatives identified in this school transport plan. With a growth of up to 491 students, the impact on the transport network would be no more than the school accommodates under the existing facility (400 students).

Thoughtful Transport Solutions

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060
sctconsulting.com.au

APPENDIX B

Planning Panel Briefing Minutes

RECORD OF PRELIMINARY BRIEFING
HUNTER AND CENTRAL COAST REGIONAL PLANNING PANEL

BRIEFING DETAILS

BRIEFING DATE / TIME	Wednesday, 31 January 2024
LOCATION	MS Teams Teleconference

BRIEFING MATTERS

PPSHCC-253 – Singleton – DA 8/2023/502/1 – 109-129 Kelso Street, Singleton 2330 – Educational Establishment - School

PANEL MEMBERS

IN ATTENDANCE	Alison McCabe (Chair), Roberta Ryan, Tony McNamara, Sue Moore, Sue George
APOLOGIES	Nil
DECLARATIONS OF INTEREST	Nil

OTHER ATTENDEES

APPLICANT REPRESENTATIVES	Stephen Earp, Louise Popowitz, Simon Vant, Sophie Hoppe, Tim Shields, Esreban Olmos, Johnathan Busch, Shawn Cen
COUNCIL ASSESSMENT STAFF:	Benjamin Pogson, Ashleigh McTackett, Sarah Boyton
DEPARTMENT STAFF	Leanne Harris and Holly McCann

COUNCIL BRIEFING:

- DA is for alterations and additions to an existing school.
- Overview of the existing school, childcare and TAFE Centre on the site.
- Propose to increase capacity over 2 stages from 300 to 700 students.
- Overview of the site which is on the south side of Singleton and surrounding context.
- The site is constrained by flooding – proposed building will be outside the high hazard floodway but the new car parking is within it.
- The site is also constrained by the existing intersection of Kelso Street and the New England Highway which is already at capacity.
- There is an adjacent heritage item however no impacts identified.
- Internal referrals to building, environmental compliance (acoustic, contamination), engineering, trade waste, sewer and water and ecology.
- Car parking is being provided in excess of the DCP requirements.
- Site is zoned RU1 – using SEPP for permissibility.
- Main assessment issue relates to traffic and Council has issued an RFI regarding the adequacy of the traffic report and assumptions regarding the relationship of the development to the new Singleton

bypass. Modelling provided to date has assumed the bypass is built. Council is considering options for interim arrangements assuming the bypass will be operational by 2026/2027.
- Council has identified the need for an Operational Management Plan particularly in relation to managing any interim traffic management impacts.

APPLICANT PRESENTATION:
- Overview of site and history of the school to date.
- Three stage construction, two storey primary school building and new car parking, waste removal area, signage etc.
- 14 classrooms + library.
- Design features and elevations presented.
- Car park raised to address flooding
- Overview of the specialist reports submitted supporting the DA.
- Consultation undertaken to date.
- Issues:
    - Traffic (consulting with TfNSW and Council issued RFI).
    - Written confirmation has been received from TfNSW to assume bypass is going ahead with an understanding that 2026 date is committed.
    - Working on interim arrangement scenarios and Plan of Management.
    - Confirmation that traffic modelling and car parking assumptions have been made using FTE staff numbers.

PANEL COMMENTS:

- The Panel expect a wholistic assessment and consideration of all operations on the site to understand the integration of the various uses and how staff numbers have been calculated (actual numbers on the site at various times) so that the extent of impacts can be properly assessed including for any interim or staged mitigation measures proposed.
- Clarification of the childcare/pre-school component is required due to inconsistencies in documentation which will have a bearing on staffing, hours of operation etc.
- Flooding is a key assessment issue and the Panel want clarity on warning times, evacuation plans etc. This documentation needs to be lodged and assessed with the DA and updated to reflect the proposed increase in student numbers.
- The Panel want clarity on the status of the Singleton bypass including, timing, funding commitments and approval status.
- There needs to be a factual assessment of the traffic impacts with and without the bypass including drop off and pick up, any reliance on on-street parking (if any) and how any proposed interim measures may impact the local street network.
- A detailed landscape plan is required. The Panel notes that removal of trees is proposed and will want to understand the extent of this and in particular why trees on the boundaries of the site are proposed for removal. The landscaping plans needs to include details of any proposed fencing.
- The Panel want clear plans and cross sections showing existing and proposed RLs, details of any retaining walls and earthworks particularly in relation to the proposed car park.
- Details of waste management arrangements on-site and off-site collection need to be documented and assessed.
- The Panel note the need for possible renotification of the DA depending on any interim traffic management arrangements that may be proposed.

A further briefing will be scheduled with Council to discuss the applicant's response to the RFI.

APPENDIX C

School Bus Information

School Travel Advice

For trip planning visit www.transportnsw.info or call 131 500.
For current school and route services visit www.cdcbus.com.au

Conditions of Carriage: Students must have a valid Opal card and must tap on and off every trip. Further details about the SSTS are available at: www.transportnsw.info

Key: L: Bus turns left; R: Bus turns right

Australian Christian College Singleton

Bell Times — Effective 28/01/2022

Morning: 08:50
Afternoon: 15:00

MORNING BUSES

Route	Time	Bus Route
6314	**06:52**	**Bulga :** via Magpie, R New England Highway, L Bridge off ramp - John, L Ryan, L Glendenning - Putty **7.27 Milbrodale Public School** via Putty **7.34 turn around RTA Gravel dump** 3km past Milbrodale School depart via Putty **7.41** R Milbrodale **7.46 turn around Tullochs Gate MBR 312 Milbrodale** via Milbrodale, R Putty **7.57 Putty & Inlet** L Inlet **turn around MBR 303 Inlet Rd** via Inlet, L Putty, L Wambo **8.08** turn around big tree on gravel, via Wambo, L Putty, over Bridge, Putty, John, R York, R King - **8:**43 Singleton High School via King, L Edinburgh, R Orchard, L Kelso, R School Driveway to school
6302	**07:35**	**Rutherford: via Rutherford Shops,** P/Up students in Hillview in Rutherford and at Lochinvar **7:49 Bus shelter near Nelson St Greta transfer to 6346 see details below**
6330	**07:35**	**Reedy Creek: Mirannie Hall** via Mirannie, R Westbrook **8.12 Cattle turnaround**, via Westbrook **8.20** R Mirannie **- Mitchells Flat -** Gresford - Queen, L Patrick, R Boundary, York, L King - **8.40 Singleton High School collect pax from 6352& 6350 -** L Edinburgh, R Orchard, L Kelso, R School driveway to school
6346	**07:40**	**Greta:** via Highway, R Hunter, L Anvil, L Nelson, L Highway **7:52 Greta Bus shelter near Nelson St Collect pax from 6302** via New England Highway, R Wyndham **8.00 East Branxton Miller Park** Wyndham, turns at intersection with Dalwood, Wyndham, R Highway, L Cessnock, R Drinan, R Clift **8:05 Branxton** L Highway, R Wentworth, turns at end of street, L Highway, R Clift, L Drinan, R Bridge, Wine Country, L Expressway, Hwy, L Kelso, L School driveway to school
6334	**07:42**	**Glennies Creek:** via Glennies Creek, R Middle Falbrook **7.53 Glennies Creek & Middle Falbrook** L Stoney Creek, R Bridgman **8.07 Bridgman & Stoney Creek** R Blaxland, L White, L New England Highway, L Off Ramp, R Queen, L Civic, R Combo, L Queen, R Boundary, L Hwy, R Kelso, L School driveway to School
6352	**07:45**	**Jerrys Plains:** Burren Rd & Doyles Creek Via Burren Rd **7.55 Jones Reserve & Denman** via Burren, L Queen, R Pagan, **7.59 Tavern Jerrys Plains,** L Putty - John, R York, L King, **8.37 Singleton High School transfer to 6330 see details below**
6322	**07:48**	**Elderslie** Stanhope Rural Fire Station driveway: via Stanhope, R Cranky Cnr, **7.58 U/Turn at Glenalister** via Cranky Cnr, R Stanhope, R Elderslie **8.05 Stanhope & Elderslie** L Glendon **8.10 Elderslie & Glendon**, R Glendon **8.**20 Glendon & Glendon L Scott's Flat **8.30 turn around end Scott's Flat** returns via Scott's Flat **8.34** L Glendon, **8.40 Glendon & Gresford** L Gresford, Queen, L Patrick, R Boundary, York, L King, L Edinburgh, R Orchard, L Kelso, R School driveway to School

School Travel Advice

Route	Time	Bus Route
6316	**07:50**	**Glendonbrook:** (turnaround 1669) via Glendonbrook **8.00 Cranky & Glendonbrook** via Glendonbrook - Blind Creek, via Glendonbrook - Elderslie, turnaround MBR 1463 Elderslie Rd, via Elderslie, **8.22 Gresford and Elderslie** L Gresford – Queen, L Patrick, R Boundary, York, L King - **8.39 Singleton High School** **transfer to 6330 see detail above**
6350	**07:50**	**Wattle Ponds:** Cnr Wattle Ponds & Pioneer **7:57 Wattle Ponds at Christies** Continues along Wattle Ponds, R Retreat **8:00** R Dyrring, R Pioneer, L Graham, R Casey **8:08 Casey and Dominion** Casey, L Woodside, R Dominion, L Casey, R Acacia, L Bridgman, L Highway, L Off Ramp, R Queen, R Boundary, York **transfer to 6330 see detail above**
6332	**07:53**	**Mitchell Flat:** (Gresford Road approx 100m past Sedgefield Creek) via Gresford, L Robertson (clockwise) L Roberston, L Gresford, R Mitchell's Flat **8.12 turn around MBR 259** via Mitchell's Flat, L Gresford, L Roughit, R Glendon **8.20 Roughit & Glendon** L Gresford - Queen, L Patrick, R Boundary, York, L King, L Edinburgh, R Orchard, L Kelso, R School driveway to School
6310	**07:55**	**Bowmans Creek :** (3rd Cattle Grid in Scrumlo) via Scrumlo, Upper Hebden, R Hebden, L New England Highway **8.15 New England Highway & Alpha**, L Alpha, L McInerney, L Dulwich, R Lethbridge, L Dawson, L Glennie, L Dulwich, R McInerney, L New England Highway **8.25 Motel approaching McDougall's Hill** R Parkview **8.30 turn around McDougall & Parkview** R New England Highway, L White, Blaxland - **8.35 Singleton Heights Public School** via Blaxland, R Bridgman, L New England Highway, R York, L King - **8.40 Singleton High School** via King, L Edinburgh, R Orchard, L Kelso, R School driveway to school
6344	**08:00**	**Belford:** via New England Highway from Bell Rd, L Standen - 8.05 New England Hwy & Standen, **(8.17)** Kirkton School, L Bell, L New England Highway, R Old Hwy, R Pothana - **(8.31)** turn around Pothana & old Highway via Pothana, L New England Highway, L Hermitage, **(8.33)** turn around Information sign returns via Hermitage, L New England Highway - **(8.36)** New England Hwy Nth of Bell, Highway to Singleton, L Kelso, L School driveway to School.
6312	**08:05**	**Whittingham: (Racecourse Lane & Kanoona Lane)** via Racecourse, L Neotsfield across Hwy - Range L Minimbah **8.15 turn around at the end of Minimbah** returns via Minimbah, L Range, L Mitchell Line (Golden Hwy) L New England Highway **8.23 Mudies Creek Bridge** L Kelso L School driveway to School
6338	**08:10**	**Wynyard Street & Rawcliffe Street :** via Wynyard, L Church, R Barton, R Sussex, L Buchan, R Loder, L Kelso, L Waterhouse, R Orchard, L Edinburgh, R King, L York, R Bathurst, R Pitt, L New England Highway, L Bridgman, L Dunolly, R Darlington **8.22** R Simpson, R Grainger, R Simpson, R New England Highway, L White, R James Cook, R Lawson, L Wentworth, R White, R Blaxland, L Willcox, R O'Halloran, R Marshall, L Blaxland, L Bridgman, Express's to Casey & Dominion via R Acacia, L Wilkinson, L Casey **8.46 Casey & Dominion** L Woodside, R Dominion, L Casey, R Acacia, L Bridgman, L New England Highway, L off ramp, R Queen, R Boundary, L New England Highway, R Kelso, L School driveway to School
6340	**08:18**	**Hunterview :** from Wilkinson & Acacia, Operates via Wilkinson, R Casey, R Wilkinson, L Acacia, L Polo, L Benjamin, L Banksia, R Burbank, L Acacia, L Bridgman, L Highway, L Cambridge, R Bishopgate, R Boundary, L Dangar **8:35 Dangar & Brisbane** R Brisbane, L Howe, L Boonal, R Dangar, R Carroll **8:40 Carrol and Springdale** via Carroll, R Greenwood, R Boonal **8:43 Boonal & Kennedy** L Kennedy, L Highway, R Kelso, L School driveway to school.

School Travel Advice

Route	Time	Bus Route
6346	08:26	**Bourke & William,** via Bourke, L Elizabeth, L John, L William, R Bathurst, L Wynyard, L Rawcliffe, R Shaw, L Church, R Castlereagh, R Sussex, R Barton, L Church, L Andrew, Ada, L Bond, R Kelso, R School Driveway to school
6326	08:35	**White Ave Bus Shelter:** via White, Blaxland, L Wakehurst, L Lachlan, L Gardner, R Robinson, L Gardner, R Bridgeman, L Hwy, R Pitt, L King, Singleton High, via King, L Edinburgh, R Orchard, L Kelso, R school driveway to school

AFTERNOON BUSES

Route	Time	Bus Route
6307	15:15	**To Hunterview:** via School Driveway, L Kelso, R Orchard, L Edinburgh, R King - **King Street Primary School** King, Bourke, L Elizabeth **- Singleton Primary School -** R John, R Campbell, L Hwy, R Bridgman, R Acacia, L Casey, R Dominion, L Woodside, R Casey (2nd) R Wilkinson, L Acacia, L Polo, L Benjamin, L Banksia, R Burbank to Acacia.
6303	15:17	**To Singleton Heights:** via L Kelso, R Orchard, L Edinburgh, R King - **King Street Primary School**, R York, R Hwy, L Howe, R Carrol, R Greenwood, R Boonal, L Kennedy, R Hwy, L Elizabeth - **Singleton Primary School** via Elizabeth, R John, R Campbell, L Highway, L Bridgman, L Dunolly, R Darlington, R Simpson, R Grainger, R Simpson, R Highway, L White, R James Cook, R Lawson, L Wentworth, R White, R Blaxland, L Wakehurst, L Cunningham, R D'Arbon, L Henry, R Lachlan, L Gardner, R Nicholas Conoly, turns at turning area, via Nicholas Conoley, L Gardner, L Robinson, L Gardner, R Wilcox, L O'Halloran, R Marshall, L Blaxland.
6333	15:18	**To Reedy Creek:** via School driveway, R Kelso, L New England Highway, L Elizabeth, L John, L York, R King, U/Turn, via King, R York, Boundary, L Patrick, R Queen, Gresford, L Mirannie, L Westbrook - Cattle turnaround, via Westbrook, L Mirannie to Mirannie Hall
6301	15:20	**To Mitchells Flat:** via School driveway, R Kelso, L Highway, L York, L King - **Singleton High School**, U-turn via King, Bourke, L Elizabeth, R John, R Queen, Gresford, , L Robertson (clockwise) L Roberston, L Gresford, R Mitchell Flat, turnaround MBR 259, returns via Mitchell's Flat, L Gresford, L Roughit, R Glendon.
6335	15:20	L Kelso, L Bond, R Andrews, L Rose, R View, R Church, L Wynard, R Bathurst, Pitt, R Sussex, L York, R King, u-turn in turning area return via King**,** L Bourke, L Elizabeth, R John, Queen, L Civic, L into carpark (Colleen Gale Centre), return via R Civic, L Queen, R Cambridge, L Broughton, R Boundary, L Hwy, L Kennedy, R Boonal, L Greenwood, L Carroll, L Dangar, L Boonal, R Howe, R Brisbane, L Dangar, L Boundary, York, R King- **Singleton High School** U-turn King, R Pitt, L Highway, R Bridgman, L Blaxland, R Deans, L Cunningham, L Wakehurst, L Mitchell, R Blaxland, White
6339	15:28	**To Bowmans Creek:** via School driveway, R Kelso, L New England Hwy, L Elizabeth, R John, Queen, R Boundary, York, L King - **Singleton High School**, via turnaround, returns via King, R Pitt, L New England Highway, L Bridgeman, L Dunolly, R Darlington, R Simpson, R Graigner, R Simpson, L Hwy, L Parkview, turn around at the end of Parkview, L New England Highway, R McInerney, L Dulwich, R Lethbridge, L Dawson, L Glennie, L Dulwich, R McInerney, R New England Highway - **Ravensworth -** R Hebden, L Upper Hebden, R Scrumlo to 3rd cattle grid

School Travel Advice

Route	Time	Bus Route
6341	**15:30**	**To Bulga:** via School Driveway : R Kelso, L New England Highway, L Elizabeth, R John, Queen, R Boundary, York, L King - **Singleton High School** via turn around, returns via King, L York, L Bathurst, R Argyle, R John, L Ryan, L John, Putty, R Wambo, turn around at big tree on gravel, returns via Wambo, R Putty, R Inlet turn around MBR 303, via Inlet, R Putty, L Milbrodale, turn around Tulloch's gate MBR 312, via Milbrodale, L Putty, turnaround RTA Gravel Dump 3km past Milbrodale School
6351	**15:33**	**To Elderslie :** via School driveway, R Kelso, L New England Highway, L York, L King - **Singleton High School** turn around, via King, R York, L Boundary, L Patrick, R Queen, Gresford, R Glendon, R Scott's Flat Lane, turn around end of Scott's Flat, via Scott's Flat, R Glendon, L Glendon, R Elderslie, L Stanhope, L. Cranky Cnr, U/Turn at Glenalister, Cranky Cnr, L Stanhope to Stanhope Rural Fire Service driveway.
6327	**15:38**	**To Belford:** via School driveway, R Kelso, R New England Highway, L Bridge, L Bridge, R Lindsay, L,Hovell, R Bell, R Standen - **Kirkton Primary School**, via Standen, L New England Highway, R Clift, L Drinan, R Bridge, Wine Country, L Expressway, Hwy, L Hermitage, Hermitage turnaround Information sign.
6323	**15:40**	**To Glennies Creek:** via School driveway, R Kelso, L New England Highway, L York, L King, **Singleton High School,** via turn around, via King, R Pitt, L New England Highway, R Bridgman, L Stoney Creek, R Middle Falbrook, L Glennies Creek, to New England Highway
6355	**15:41**	**To Whittingham:** via School driveway, R Kelso, L New England Highway, L York, L King - **Singleton High School,** via King, via turn around, via King, R York, R New England Highway, L Neotsfield, R Racecourse, turn around Kanoona lane, returns via Racecourse, L Neotsfield across Hwy - Range, L Minimbah, turn around at the end of Minimbah, L Range, L Mitchell Line (Golden Hwy) L New England Highway.
6343	**15:50**	**To Greta:** via School driveway, R Kelso, L Highway, L York, L King, U/Turn via King, R York, R Hwy, L John Rose **transfers students to 2442 & 2233** U-turn via John Rose, L Hwy, **at Miller Park transfer to Thornton 245** L West, R High, R Hunter, L Highway, R Nelson, R Anvil, R Wyndham, L Highway, L Cessnock, R Drinan, L Clift – **Branxton**

APPENDIX D

SIDRA Modelling Results

MOVEMENT SUMMARY

Site: 1AM [NEW_KEL_AM_24_X (Site Folder: Base Year)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway/Kelso Road/Maitland Road. AM Peak 8:00 - 9:00AM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	124	5.9	124	5.9	0.067	5.4	LOS A	0.3	2.3	0.23	0.54	0.23	44.0
2	T1	All MCs	838	9.9	838	9.9	0.462	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach			962	9.4	962	9.4	0.462	0.9	LOS A	0.3	2.3	0.03	0.07	0.03	57.0
NorthWest: Maitland Road															
8	T1	All MCs	571	13.8	571	13.8	0.329	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29b	R3	All MCs	126	3.3	126	3.3	0.431	21.0	LOS B	1.7	12.0	0.84	1.02	1.13	37.2
Approach			697	11.9	697	11.9	0.431	3.9	NA	1.7	12.0	0.15	0.18	0.21	53.8
West: Kelso Road															
10b	L3	All MCs	86	8.5	86	8.5	0.119	8.6	LOS A	0.4	3.3	0.66	0.83	0.66	39.3
12a	R1	All MCs	25	4.2	25	4.2	0.392	61.0	LOS E	0.9	6.8	0.95	1.02	1.11	26.1
Approach			112	7.5	112	7.5	0.392	20.4	LOS B	0.9	6.8	0.72	0.87	0.76	35.3
All Vehicles			1771	10.3	1771	10.3	0.462	3.3	NA	1.7	12.0	0.12	0.17	0.14	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1PM [NEW_KEL_PM_24_X (Site Folder: Base Year)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway/Kelso Road/Maitland Road. PM Peak 2:30 - 3:30PM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	78	2.7	78	2.7	0.040	5.2	LOS A	0.2	1.4	0.19	0.53	0.19	44.1
2	T1	All MCs	539	10.4	539	10.4	0.298	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			617	9.4	617	9.4	0.298	0.7	LOS A	0.2	1.4	0.02	0.07	0.02	57.2
NorthWest: Maitland Road															
8	T1	All MCs	951	7.9	951	7.9	0.529	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
29b	R3	All MCs	95	5.6	95	5.6	0.173	11.1	LOS A	0.6	4.4	0.57	0.84	0.57	41.3
Approach			1045	7.7	1045	7.7	0.529	1.2	NA	0.6	4.4	0.05	0.08	0.05	57.2
West: Kelso Road															
10b	L3	All MCs	102	4.1	102	4.1	0.084	6.0	LOS A	0.4	2.6	0.52	0.65	0.52	40.4
12a	R1	All MCs	49	12.8	49	12.8	0.645	64.1	LOS E	1.6	12.6	0.97	1.12	1.39	25.4
Approach			152	6.9	152	6.9	0.645	25.0	LOS B	1.6	12.6	0.67	0.80	0.81	33.9
All Vehicles			1814	8.2	1814	8.2	0.645	3.0	NA	1.6	12.6	0.09	0.13	0.11	54.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM27F [NEW_KEL_AM_27_F (Site Folder: Future Year - 2027)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New England Highway/Kelso Road/Maitland Road. AM Peak 8:00 - 9:00AM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	128	5.8	128	5.8	0.069	5.4	LOS A	0.3	2.4	0.23	0.54	0.23	44.0
2	T1	All MCs	785	9.4	785	9.4	0.431	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach			912	8.9	912	8.9	0.431	0.9	LOS A	0.3	2.4	0.03	0.08	0.03	56.8
NorthWest: Maitland Road															
8	T1	All MCs	677	7.8	677	7.8	0.377	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
29b	R3	All MCs	129	3.3	129	3.3	0.382	18.2	LOS B	1.5	10.7	0.80	0.99	1.04	38.2
Approach			806	7.1	806	7.1	0.382	3.0	NA	1.5	10.7	0.13	0.16	0.17	54.8
West: Kelso Road															
10b	L3	All MCs	90	8.2	90	8.2	0.111	8.0	LOS A	0.4	3.2	0.63	0.79	0.63	39.6
12a	R1	All MCs	26	4.1	26	4.1	0.411	63.2	LOS E	1.0	7.2	0.95	1.02	1.12	25.6
Approach			115	7.3	115	7.3	0.411	20.4	LOS B	1.0	7.2	0.70	0.85	0.74	35.3
All Vehicles			1834	8.0	1834	8.0	0.431	3.1	NA	1.5	10.7	0.12	0.16	0.14	53.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1PM27F [NEW_KEL_PM_27_F (Site Folder: Future Year - 2027)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway/Kelso Road/Maitland Road. PM Peak 2:30 - 3:30PM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	79	3.6	79	3.6	0.041	5.2	LOS A	0.2	1.4	0.19	0.53	0.19	44.1
2	T1	All MCs	631	9.3	631	9.3	0.347	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			709	8.7	709	8.7	0.347	0.7	LOS A	0.2	1.4	0.02	0.06	0.02	57.5
NorthWest: Maitland Road															
8	T1	All MCs	1072	7.7	1072	7.7	0.595	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
29b	R3	All MCs	95	6.3	95	6.3	0.209	12.9	LOS A	0.7	5.3	0.65	0.88	0.68	40.5
Approach			1167	7.5	1167	7.5	0.595	1.4	NA	0.7	5.3	0.05	0.07	0.06	57.2
West: Kelso Road															
10b	L3	All MCs	102	4.1	102	4.1	0.095	6.5	LOS A	0.4	2.8	0.56	0.70	0.56	40.2
12a	R1	All MCs	49	12.8	49	12.8	1.227	340.5	LOS F	8.0	61.8	1.00	2.09	4.54	8.7
Approach			152	6.9	152	6.9	1.227	115.5	LOS F	8.0	61.8	0.71	1.16	1.86	18.5
All Vehicles			2028	7.9	2028	7.9	1.227	9.7	NA	8.0	61.8	0.09	0.15	0.18	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM36F [NEW_KEL_AM_36_B (Site Folder: Future Year - 2036 base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway/Kelso Road/Maitland Road. AM Peak 8:00 - 9:00AM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	124	5.9	124	5.9	0.067	5.4	LOS A	0.3	2.3	0.23	0.54	0.23	44.0
2	T1	All MCs	559	10.0	559	10.0	0.308	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			683	9.2	683	9.2	0.308	1.1	LOS A	0.3	2.3	0.04	0.10	0.04	56.1
NorthWest: Maitland Road															
8	T1	All MCs	480	13.8	480	13.8	0.277	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29b	R3	All MCs	126	3.3	126	3.3	0.233	11.5	LOS A	0.9	6.2	0.60	0.86	0.63	41.1
Approach			606	11.6	606	11.6	0.277	2.5	NA	0.9	6.2	0.12	0.18	0.13	54.6
West: Kelso Road															
10b	L3	All MCs	86	8.5	86	8.5	0.076	6.2	LOS A	0.3	2.4	0.53	0.66	0.53	40.3
12a	R1	All MCs	25	4.2	25	4.2	0.153	21.5	LOS B	0.4	2.9	0.84	0.91	0.85	36.4
Approach			112	7.5	112	7.5	0.153	9.7	LOS A	0.4	2.9	0.60	0.72	0.60	39.3
All Vehicles			1401	10.1	1401	10.1	0.308	2.4	NA	0.9	6.2	0.12	0.18	0.13	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1PM36F [NEW_KEL_PM_36_B (Site Folder: Future Year - 2036 base)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway/Kelso Road/Maitland Road. PM Peak 2:30 - 3:30PM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	78	2.7	78	2.7	0.040	5.2	LOS A	0.2	1.4	0.19	0.53	0.19	44.1
2	T1	All MCs	453	10.5	453	10.5	0.251	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			531	9.3	531	9.3	0.251	0.8	LOS A	0.2	1.4	0.03	0.08	0.03	56.9
NorthWest: Maitland Road															
8	T1	All MCs	774	7.9	774	7.9	0.431	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
29b	R3	All MCs	95	5.6	95	5.6	0.149	9.9	LOS A	0.5	3.9	0.52	0.79	0.52	41.9
Approach			868	7.6	868	7.6	0.431	1.2	NA	0.5	3.9	0.06	0.09	0.06	57.0
West: Kelso Road															
10b	L3	All MCs	102	4.1	102	4.1	0.076	5.6	LOS A	0.3	2.4	0.48	0.61	0.48	40.4
12a	R1	All MCs	49	12.8	49	12.8	0.326	27.1	LOS B	0.9	6.7	0.89	0.99	1.05	34.3
Approach			152	6.9	152	6.9	0.326	12.6	LOS A	0.9	6.7	0.61	0.73	0.66	38.2
All Vehicles			1551	8.1	1551	8.1	0.431	2.2	NA	0.9	6.7	0.10	0.15	0.11	54.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1AM36D [NEW_KEL_AM_36_O1 (Site Folder: Development 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway/Kelso Road/Maitland Road. AM Peak 8:00 - 9:00AM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	174	4.8	174	4.8	0.097	5.5	LOS A	0.5	3.4	0.28	0.55	0.28	43.9
2	T1	All MCs	559	10.0	559	10.0	0.308	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach			733	8.8	733	8.8	0.308	1.4	LOS A	0.5	3.4	0.07	0.13	0.07	55.1
NorthWest: Maitland Road															
8	T1	All MCs	481	14.0	481	14.0	0.278	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
29b	R3	All MCs	177	2.4	177	2.4	0.322	12.2	LOS A	1.4	9.8	0.63	0.91	0.76	40.8
Approach			658	10.9	658	10.9	0.322	3.3	NA	1.4	9.8	0.17	0.24	0.21	53.2
West: Kelso Road															
10b	L3	All MCs	135	6.3	135	6.3	0.117	6.2	LOS A	0.5	3.7	0.54	0.68	0.54	40.3
12a	R1	All MCs	40	2.6	40	2.6	0.264	25.5	LOS B	0.7	5.2	0.87	0.96	0.98	35.0
Approach			175	5.4	175	5.4	0.264	10.6	LOS A	0.7	5.2	0.62	0.74	0.64	39.0
All Vehicles			1565	9.3	1565	9.3	0.322	3.2	NA	1.4	9.8	0.17	0.25	0.19	51.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1PM36D [NEW_KEL_PM_36_O1 (Site Folder: Development 2036)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New England Highway/Kelso Road/Maitland Road. PM Peak 2:30 - 3:30PM
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: New England Highway															
21a	L1	All MCs	120	2.6	120	2.6	0.064	5.4	LOS A	0.3	2.2	0.24	0.54	0.24	44.0
2	T1	All MCs	453	10.5	453	10.5	0.251	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			573	8.8	573	8.8	0.251	1.2	LOS A	0.3	2.2	0.05	0.11	0.05	55.6
NorthWest: Maitland Road															
8	T1	All MCs	775	8.0	775	8.0	0.431	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
29b	R3	All MCs	143	3.7	143	3.7	0.220	9.9	LOS A	0.8	5.9	0.54	0.80	0.54	41.9
Approach			918	7.3	918	7.3	0.431	1.7	NA	0.8	5.9	0.08	0.12	0.08	55.9
West: Kelso Road															
10b	L3	All MCs	164	3.2	164	3.2	0.121	5.6	LOS A	0.5	3.9	0.49	0.63	0.49	40.4
12a	R1	All MCs	77	8.2	77	8.2	0.516	31.9	LOS C	1.5	11.5	0.92	1.07	1.26	32.9
Approach			241	4.8	241	4.8	0.516	14.0	LOS A	1.5	11.5	0.63	0.77	0.73	37.7
All Vehicles			1732	7.5	1732	7.5	0.516	3.2	NA	1.5	11.5	0.15	0.21	0.16	52.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX E

TfNSW Meeting Minutes

Pre-DA meeting with TfNSW

Date: 12 December 2022

Attendance:

TfNSW:

– Holly Taylor (Development Services)

– Christine Bower (Team Leader Development Services)

ACC Team:

– Shawn Cen and Jonathan Busch (SCT Consulting)

– Sophie Hoppe and Darryl Sweetman (CEM)

– Stephen Earp and Louise Popowitz (EPM)

Item	Topics	Actioned by
Discussion	– Introduction – Showed parking requirements to indicate the proposal – Discussed scale of impacts, and mentioned child care centre – The school will be a combined primary and high school – The Timescale of development is 5-10 years away (double emphasised by EPM and SCT) – Description of the site, adjoining roads etc - coach parking within the site – Seeking feedback and info on network impacts	Jonathan Busch
	– External traffic investigations – West approach to Kelso and New England Highway is the main problem - primarily restricted by traffic volumes of the main road – Future year base case - the important assumption is the creation of the bypass which significantly benefits traffic flows through the town - bringing vehicle movements down by 60 per cent which would improve the level of service up to C/B. – Assumes completion of the bypass	Shawn Cen

TfNSW comments and queries	– All bus movements on Kelso Street? Any on New England Highway • No bus right turn occurs from Kelso Street to New England Highway. The right turn will occur only from Dalton Avenue. – Bypass is a committed project that is fully funded - it is imminent/certain. TfNSW accepts the assumption of traffic report that bypass alleviates the traffic issues – Dates of the project to be provided by TfNSW • The singleton bypass project has been committed by both the State and Australian governments to be open to traffic in 2026. An assumption that the bypass will be operated in early 2027 is therefore considered acceptable (According to TfNSW's email on 16 Dec 2022). – Are any mitigation measures proposed in the interim? Or only reliant on the bypass? • Behavioural mitigation measures to be considered in the TIA report – TfNSW would want to see the management plan, Green Travel Plan (GTP) • It is strongly encouraged that sufficient information is provided to justify the interim scenario. It is therefore recommended that a GTP accompany the future DA, however, it this is not a mandated requirement (According to TfNSW's email on 16 Dec 2022). • Kiss and ride area and how this is managed? Loop this into the GTP discussion. – Noted this is not an SSD, so SEARs and TfNSW standard requirements do not apply – TfNSW would require a Construction Management Plan, particularly noting the ongoing operation of a child care centre • SCT to provide this high-level discussion in a chapter of the TIA – TfNSW is to have an internal discussion to clarify what the lodgement requirements/expectations are to deal with the issues as discussed above. – No curb and gutter on New England Highway - linking to a reservoir on the school site. Any discharging into this system may have an impact on TfNSW assets, so will need sufficient information to address this.	All attendees

Source: Prepared by Stephen Earp (EPM), 2022

Thoughtful Transport Solutions

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060
sctconsulting.com.au