

Transport Impact Assessment

Austral Public School

Document control

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1. Introduction

Introduction

Transport Impact Assessment for Austral Public School

This Transport Impact Assessment has been prepared to support a Review of Environmental Factors (REF) for the Department of Education (DoE) for the upgrade of Austral Public School (APS) (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as “development permitted without consent” on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37 of the T&I SEPP.

The proposed activity is for the upgrades to the existing APS at 205 Edmondson Avenue, Austral, NSW, 2179 (the site).

The purpose of this report is to review of the design and assessment of the traffic, parking and transport impacts of the upgrade of Austral Public School, with the increased students and staff.

Introduction

Background and scope

- The transport strategy for the site prioritises active transport and public transport over private vehicle travel for both staff and students. This is consistent with NSW state government policy and SINSW ongoing commitment to promote sustainable travel for its schools.
- The purpose of this assessment is to assess and identify potential gaps within the existing transport network and provide tangible recommendations to improve the overall traffic and transport operations of the school.

Scope of works

This report summarises the following:

- Strategic contextual review of strategic and statutory documents relevant to Austral Public School;
- Assessment of existing transport networks around the school;
- Assessment of existing and future catchment analysis;
- Recommendations for multi-modal travel to/ from Austral Public School; and
- Future transport impacts if recommendations are applied to the school.

Data inputs

- NSW Centre of Road Safety crash and casualty statistics (TfNSW, 2024)
- Depersonalised residential data of existing students (SINSW, 2024)
- Existing and proposed catchment boundaries (SINSW, 2024)
- Site observations (Arup, December 2023)
- Google Traffic (Google 2024)
- Staff and students existing travel modes (Austral Public School, February 2024)
- Various government documents (see sources throughout)

Site description

Background and scope

APS is located at 205 Edmondson Avenue, Austral on the south-eastern corner of the intersection between Edmondson Avenue and Tenth Avenue. The site has an area of 2.986 ha and comprises of 6 allotments, legally described as:

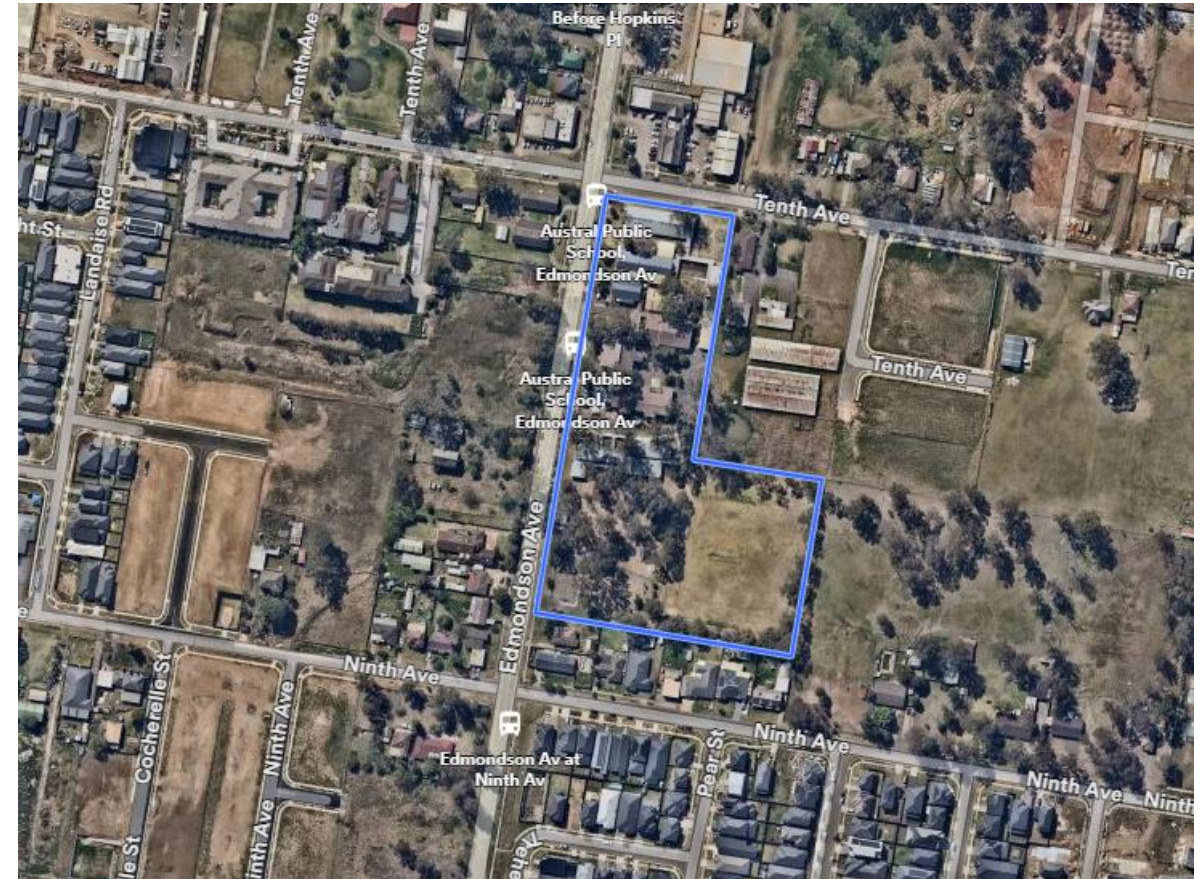
- Lot 1 DP 398105
- Lot 1 DP 398106
- Lot 1 DP 509613
- Lot 1 DP 512119
- Lot 2 DP 509613
- Lot 865 DP2475

The site currently comprises an existing co-educational primary (K-6) public school with:

- 8 permanent buildings;
- 14 demountable structures;
- interconnected paths;
- covered walkways;
- play areas: and
- at-grade parking.

The Austral Community Pre-school is also located within the site.

The existing buildings are clustered in the northern part of the site, ranging between 1 to 2 storeys in height. There is a sports oval in the south-eastern portion of the site, and a densely vegetated informal play area located in the south-western portion of the site.



Aerial image of site (source: NearMap, taken 7 Sept 2023)

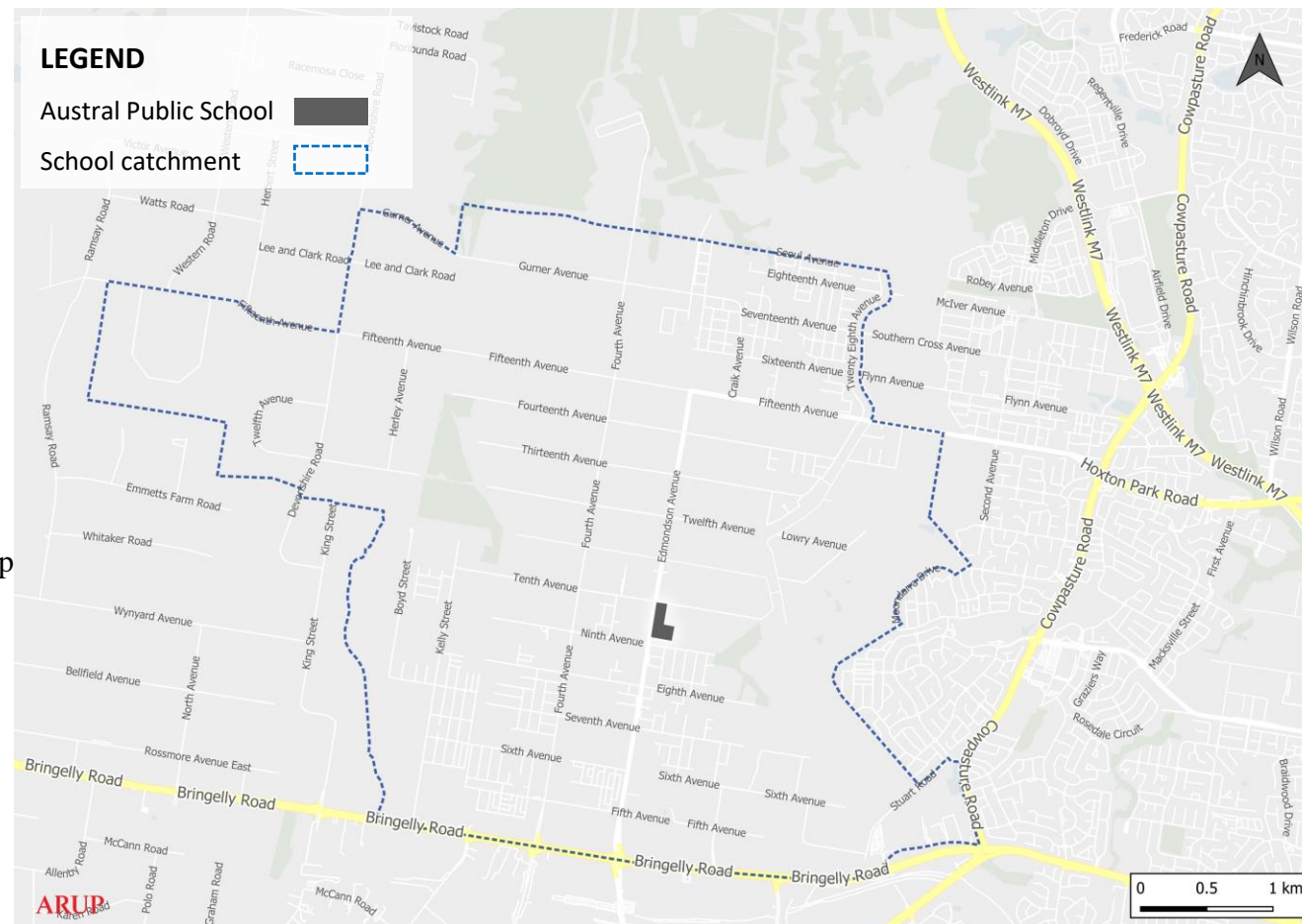
Site description

Background and scope

The school is accessible via multiple modes of transport, including:

- **Walking/ cycling/ scooting:** There are two main pedestrian access points to the school, one to the north on Tenth Avenue and the other to the west on Edmondson Avenue.
- **Bus:** Approximately 2 local routes and 9 school bus routes serve the school in the peak hours. There are existing bus stops on Edmondson Avenue and Tenth Avenue.
- **Car:** The school recognises an approximately 30m long kiss and drop zone on the eastern side of Edmondson Avenue, between the existing wombat crossing and the bus zone to the south. Parents and carers currently use on-street parking zones along Edmondson Avenue and Tenth Avenue for pick-up and drop-off.

A Preliminary Construction Traffic Management Plan (PCTMP) has been prepared alongside this Transport Impact Assessment.

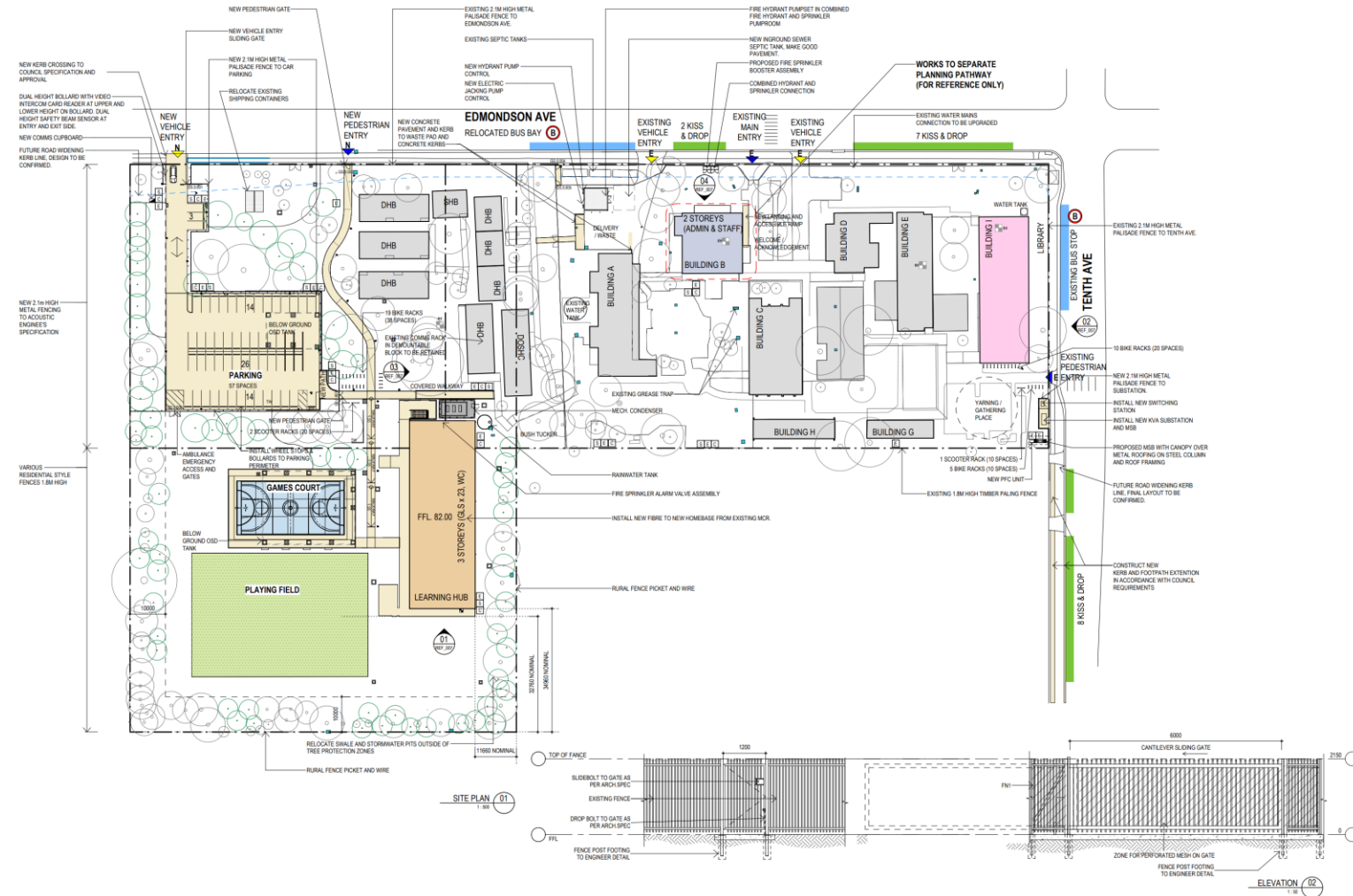


Proposed activity description

The proposed activity involves alterations and additions to the existing APS, including the following:

- Demolition of existing structures and removal of trees, as well as other site preparation works;
- The erection of a new 3-storey building comprising teaching spaces that includes 20 permanent teaching spaces and 3 support teaching spaces;
- Refurbishment and change of school function of Building I from classrooms to a Library;
- At-grade parking (57 new spaces, including 1 accessible space);
- New driveway and access gate from Edmondson Road;
- Erection of a substation within the site on the northern boundary;
- Upgrade of the sports field;
- Internal pathways, fencing, utility upgrades and associated works; and
- Off-site public domain improvements including retention and upgrading of the Kiss & Drop area and a temporary pedestrian road crossing on Tenth Avenue.

The intent of the activity is to allow for upgrades to APS that will provide a CORE 35 primary school compliant with the Educational Facilities Standards and Guidelines (EFSG). The works will increase the capacity of the school from 681 students and 40 FTE teachers to 734 students and 64 FTE teachers, respectively. Furthermore, provision within the expanded 734 student capacity will be made for the creation of 30 support class students places.



Proposed Site Plan (Source: Pedavoli Architects, Overall Site Plan Revision D)

Findings from Rapid Transport Assessment

Key Findings from Ason Group's Rapid Transport Assessment (RTA) (May 2023).

Pedestrian & Vehicle Access

- Unsafe pedestrian crossings, especially on Tenth Ave (adjacent to IGA loading dock).
- Missing or poorly maintained footpaths forcing pedestrians onto the road.
- Parents frequently conduct unsafe U-turns and park in bus zones.

Traffic & Parking

- No formal Kiss and Ride facility, leading to congestion and safety concerns.
- Limited staff and visitor parking, causing overflow into local streets.
- School buses not aligned with student needs despite repeated requests.

Public Transport

- Students within the SSTs exclusion zone rely on public transport due to poor walking conditions.
- Some students live outside 400m of a bus stop, limiting access.

Key Recommendations from the RTA:

- Upgrade pedestrian crossings (e.g., Tenth Ave, Eleventh Ave, Landaise Rd).
- Formalise a Kiss and Drop zone to improve student drop-off/pick-up.
- Expand public bus routes west of Boyd St to cover travel demand.
- Construct new footpaths along key school routes to support active transport.
- Improve staff and visitor parking with additional on-site spaces.
- Encourage walking and cycling through school-led initiatives and incentives.
- Provide sheltered bicycle racks (60 spaces) and end-of-trip facilities.
- Monitor traffic post-upgrades with traffic controllers for initial two weeks.



2. School project context

School project context

Education rationale

- Austral and Leppington North have been rezoned by the NSW Government as part of the South West Growth Area, which requires development of new educational facilities to accommodate the growing population and their families. This includes the upgrade of Austral Public School.
- The scope of this project includes the upgrade of Austral Public School with a student body of up to 734 primary school students. The site also include a Universal Pre-School (UPS) and Support Learning Unit (SLU), with 30 students each.
- The proposed activity provides an opportunity to explore place making opportunities to strengthen the identity of Austral and surrounding areas. Schools are an important public asset whose facilities are used by the wider community, providing residents with a sense of social place and belonging through delivery of quality social infrastructure.

Planning pathway

- The planning pathway is Part 5 of the Transport and Infrastructure State Environmental Planning Policy (T&I SEPP) Review of Environmental Factors (REF).

School project context

Strategic context summary

Document	Document Purpose	Guidance relevant to project	
Liverpool Bike Plan 2018-2023	<ul style="list-style-type: none"> • Outlines the provision of bicycle-related infrastructure • Promotes and increases the rates of cycling in Liverpool 	<ul style="list-style-type: none"> • Bike paths to Leppington Station from Austral and surrounds will be critical to encouraging active transport and alternative modes of commuting, mainly for staff at Austral Public School • Future developments incorporating cycling facilities into plans • Low density, semi-rural area in Austral provides opportunity for recreational cycle paths 	
Liverpool Growth Centre Precincts Development Control Plan (DCP) Schedule 1	<ul style="list-style-type: none"> • Provides guidance and regulations for planning and design • Establishes an overall vision and Indicative Layout Plan for the Austral and Leppington North Precincts 	<ul style="list-style-type: none"> • Residential structure in Austral • Precinct road hierarchy • Pedestrian and cycle network • Centre development control • Edmondson Avenue and Tenth Avenue design 	
Liverpool DCP 2008 Part 1 (updated on September 2024)	<ul style="list-style-type: none"> • Provides general controls for proposed activity* 	<u>School car parking:</u> <ul style="list-style-type: none"> • 1 space per staff member • Loading facilities for a coach 	<u>Disabled car parking:</u> <ul style="list-style-type: none"> • 2 per 100 spaces <u>Bicycle parking:</u> <ul style="list-style-type: none"> • 1 per 10 staff • 1 per 10 students
Liverpool Growth Centre Precincts DCP (18 June 2021)	<ul style="list-style-type: none"> • Provides general controls for proposed activity* 	<u>School car parking:</u> <ul style="list-style-type: none"> • 1 space per staff member • 1 space per 100 students 	

*Note the DCP is used as a planning control, any deviation is provided through justification of mode share analysis. Car and cycle parking has been determined based on future modal split

School project context

Strategic context summary

Document	Document Purpose	Relevant to project
Austral and Leppington North Precinct Indicative Layout Plan	<ul style="list-style-type: none"> Illustrate the road layout and hierarchy and indicates that there will be medium density residential development surrounding the school 	<ul style="list-style-type: none"> The future road layout and developments have been considered in the catchment analysis within this Transport Impact Assessment
Austral and Leppington North (ALN) Precincts Transport Assessment Post-Exhibition Traffic Report (Addendum)	<ul style="list-style-type: none"> Illustrate proposed cycleway, shared path and crossing facilities surrounding the school Demonstrate the proposed regional/ district peak bus routes and the public transport coverage surrounding the school Provide information regarding residential growth and traffic growth rate in Austral 	<ul style="list-style-type: none"> Crossings are missing to the west of Austral Public School where proposed residential super lots are proposed. This will help to encourage active travel to and from school. Bus routes are proposed along Fifteenth Avenue, Sixteenth Avenue and Seventeenth Avenue to the north and Eighth Avenue to the south Austral Public School to accommodate the future residential development. Bus corridor coverage is proposed to the north and west of Austral Public School which aligns with the new residential developments within Austral, which will help to encourage an uptake on public transport use.
Edmondson Avenue upgrade plan	<ul style="list-style-type: none"> Provide details of the design of Edmondson Avenue upgrade 	<ul style="list-style-type: none"> Edmondson Avenue is due to be upgraded by 2028, with construction starting between Bringelly Road and Sixth/ Seventh Avenue. The activity proposal does not contemplate the road widening to take place prior to the completion of this project, which is expected in 2026.
Tenth Avenue upgrade plan	<ul style="list-style-type: none"> Road Reserve Works – Section 138, RR-104/2024 	<ul style="list-style-type: none"> Upgrade of existing Tenth Avenue road reserve including – road pavement, kerbs, footpath, street trees, stormwater drainage and services. Stormwater drainage upgrade, servicing and verge works within Buljabasich Street.
Travel Zone Projections 2022	<ul style="list-style-type: none"> Illustrate ERP and EMP Projection in Austral (2016-2031) 	<ul style="list-style-type: none"> 10% increase in residents 2021-2026, likely to be within the catchment area for Austral Public School

*Detail of document is extracted in Appendix A

3. Existing transport network

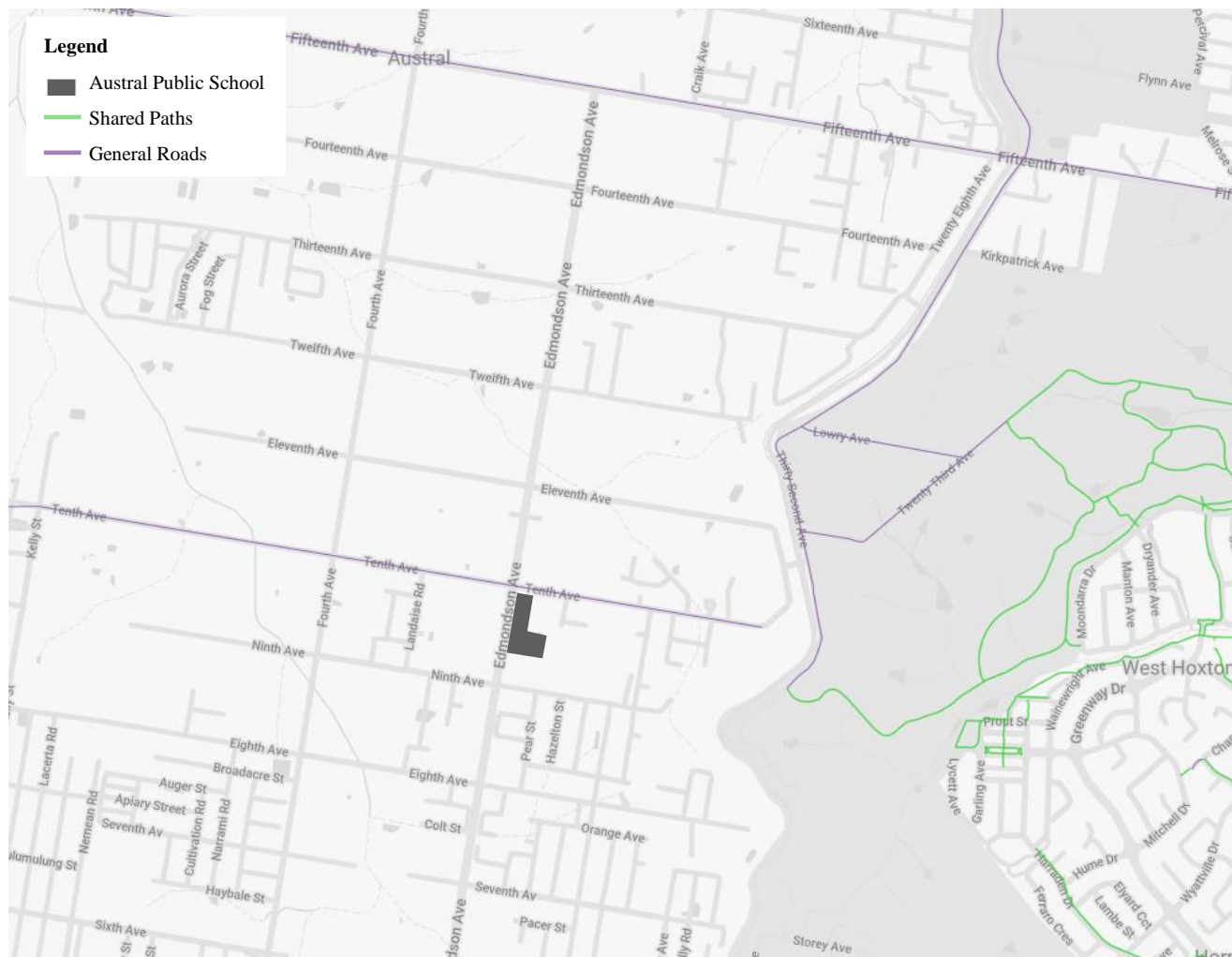
Existing transport network

Pedestrian infrastructure and operations networks



Existing transport network

Active transport



Source: Cycleway Finder (TfNSW, 2023)

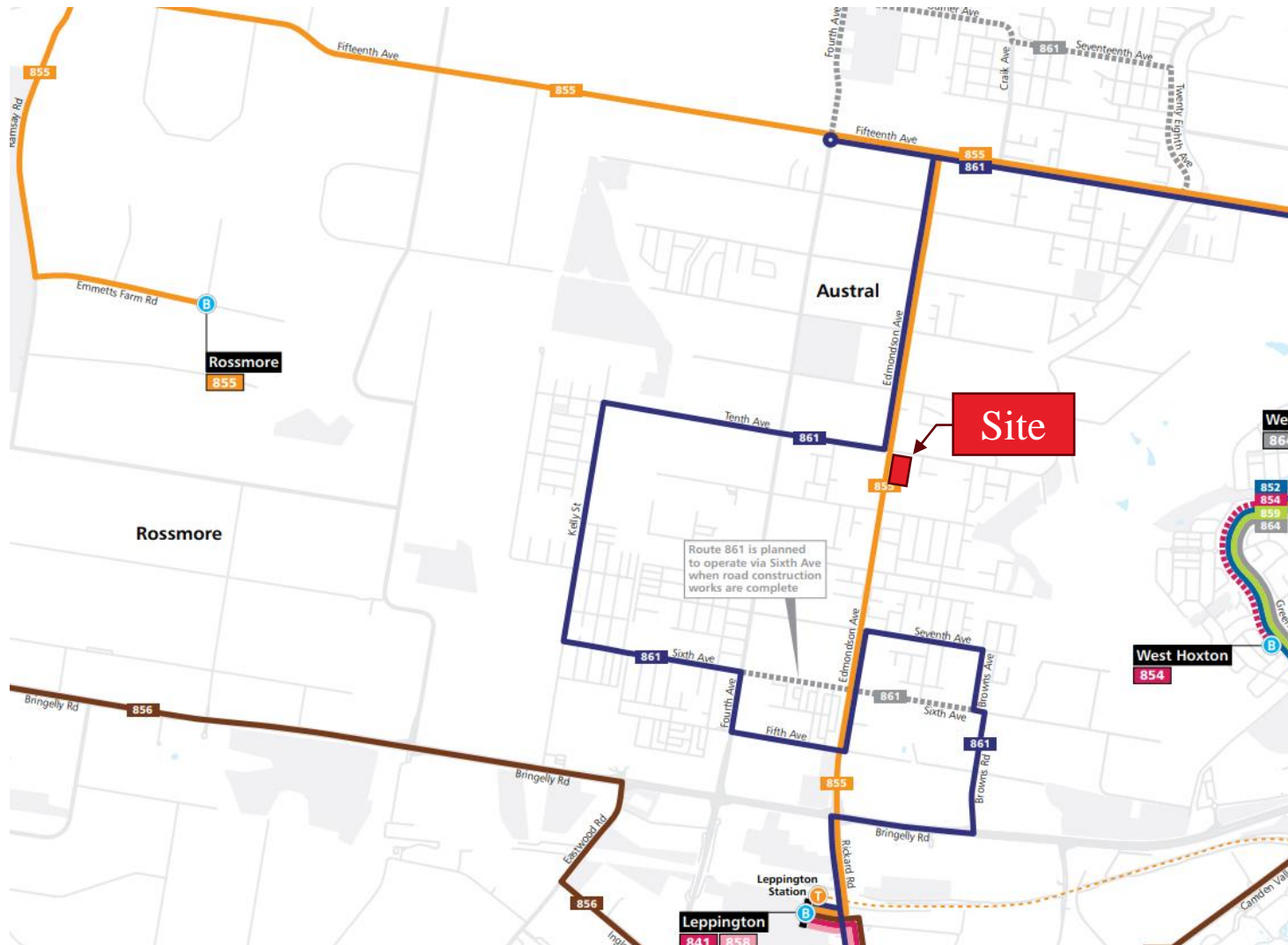
There is currently no cycling infrastructure providing connecting to the school. Dedicated off road cycle paths are expected to be completed on Tenth Avenue according to DCP to encourage staff to cycle to the school. The improved footpaths in the area will encourage students to cycle/ scoot.



Source: Liverpool Growth Centre Precincts DCP Schedule 1 (Liverpool City Council, 2021)

Existing transport network

Public transport network – bus services



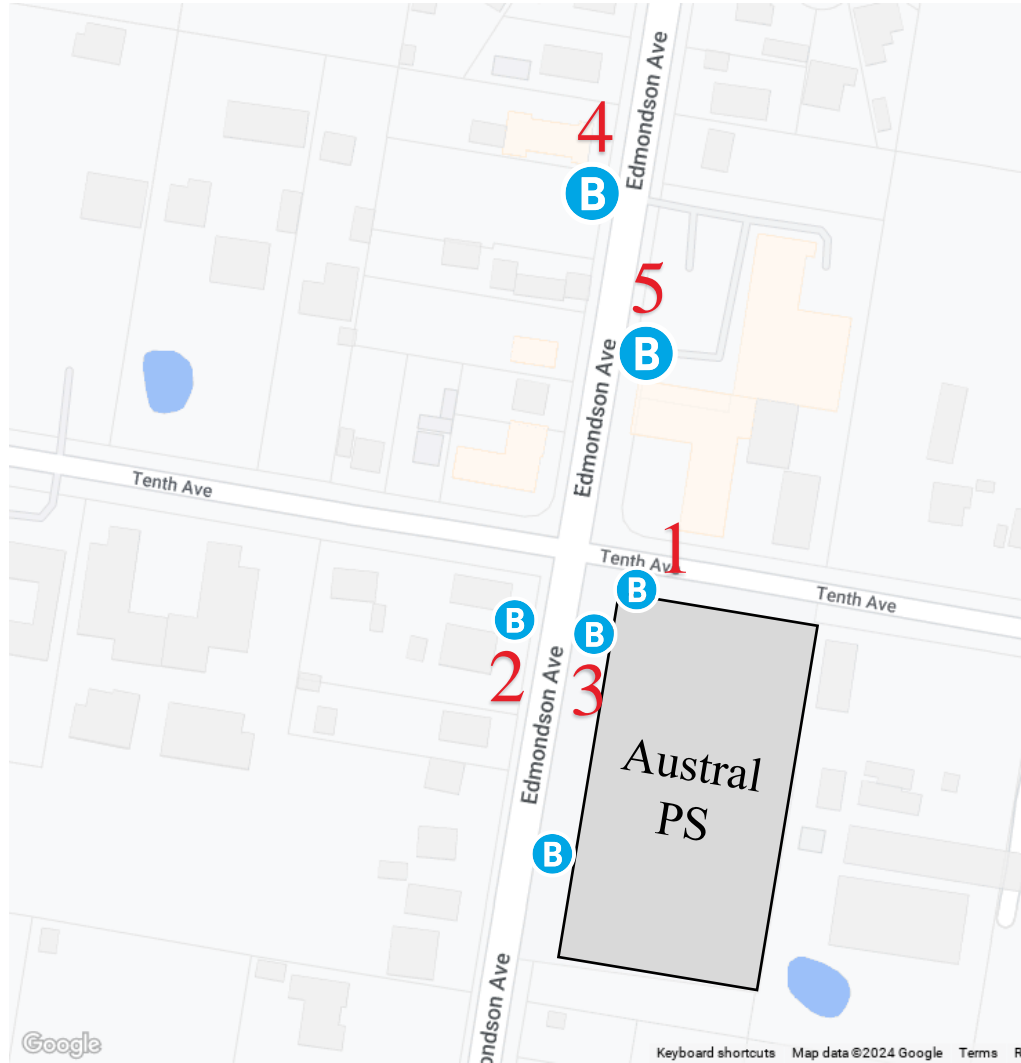
Bus services at nearby bus stops

- 855 – Rutleigh Park to Liverpool via Austral & Leppington Station
- 861 – Denham Court to Carnes Hill via Austral
- 9 school bus services

Note the bus stop for Route 861 is located up to 200m north from Austral PS

Existing transport network

Public transport network – nearby bus stops



Stop	Key bus services	Number of services	
		AM school period (8am – 9:30am)	PM school period (2:30pm – 4pm)
1 – Tenth Avenue	855 2032, 2033, 2042, 2056	1	5
2 – Edmondson Avenue opposite Austral PS	855, 2025	0	2
3 – Austral Public School, Edmondson Avenue	855, 2014, 2028	1	2
4 – Edmondson Avenue before Hopkins Place	855, 861 1033, 2009, 2025, 2033, 2042, 2060	5	9
5 – Edmondson Avenue before Tenth Ave	855, 861 1052, 2014, 2028	4	5
Total		11	23

Existing transport network

Road network

Austral Public School is bordered by Edmondson Avenue to the west and Tenth Avenue to the north. Ninth Avenue is the nearest road to the south.

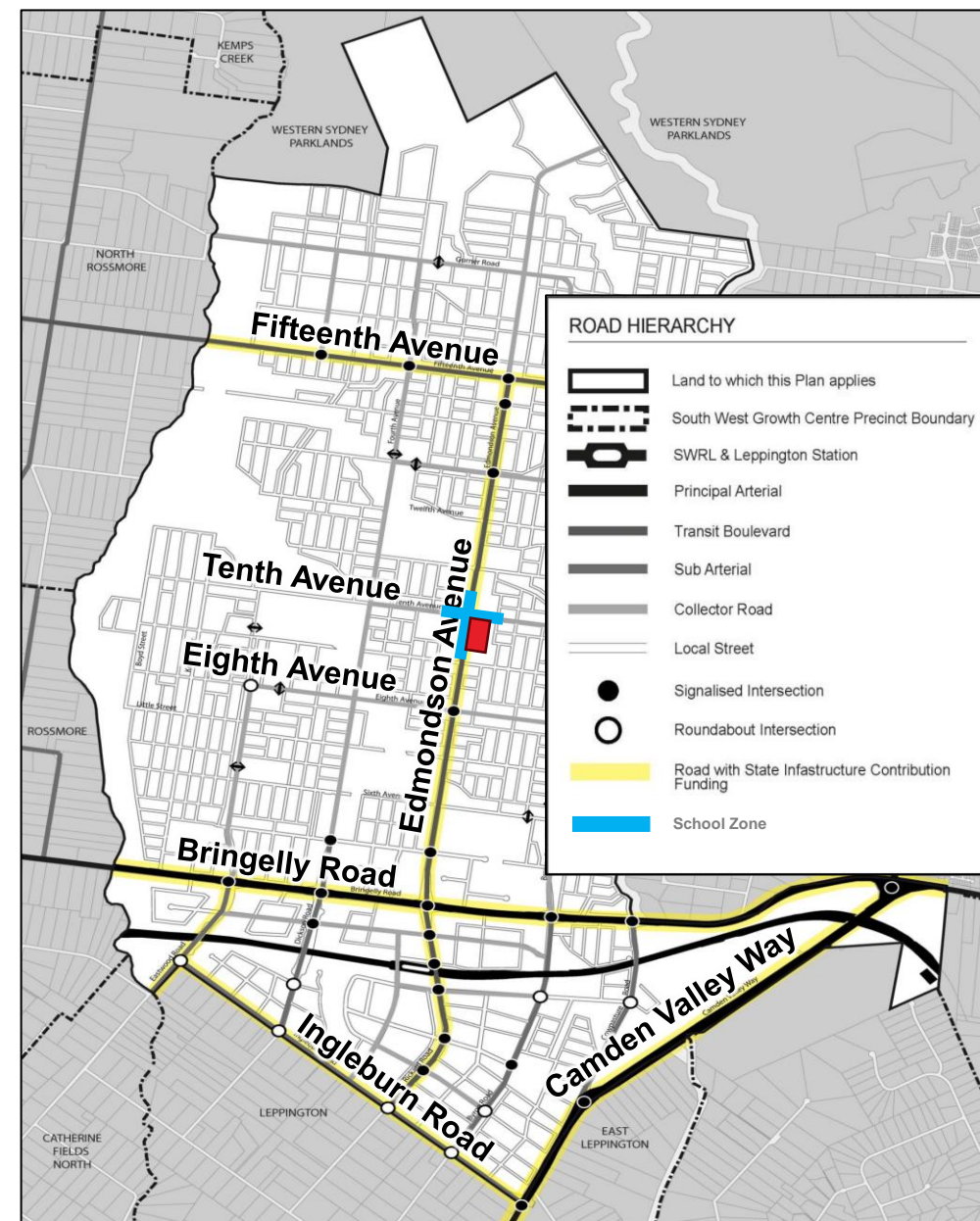
School Zones (40km/h) apply during morning and afternoon bell times. These are signposted on Edmondson Avenue and Tenth Avenue outside the school.

Currently, the intersections of Edmondson Avenue – Tenth Avenue and Edmondson Avenue – Ninth Avenue operate as priority intersections with priority given to Edmondson Avenue. There are currently no signalised intersections on the surrounding roads.

Road name	Road hierarchy (see Note)	Posted speed limit	Layout and parking
Edmondson Avenue	Transit boulevard	60 km/hr (with School Zone)	2 lanes with unrestricted on-street parking outside of school times. Adjacent to the school is signposted No Parking (during school peak periods) and a bus zone.
Tenth Avenue	Collector road	60 km/hr (with School Zone)	2 lanes with unrestricted on-street parking on unpaved road verges
Ninth Avenue	Local street	50 km/hr	2 lanes with unrestricted on-street parking on unpaved road verges

Note:

Image and Road Hierarchy designation sourced from *Austral and Leppington North Precincts Infrastructure Delivery Plan* (GLN Planning, 2012)



Existing transport network

Pedestrian and vehicle access



Pedestrian access on Edmondson Ave



Pedestrian access on Tenth Avenue



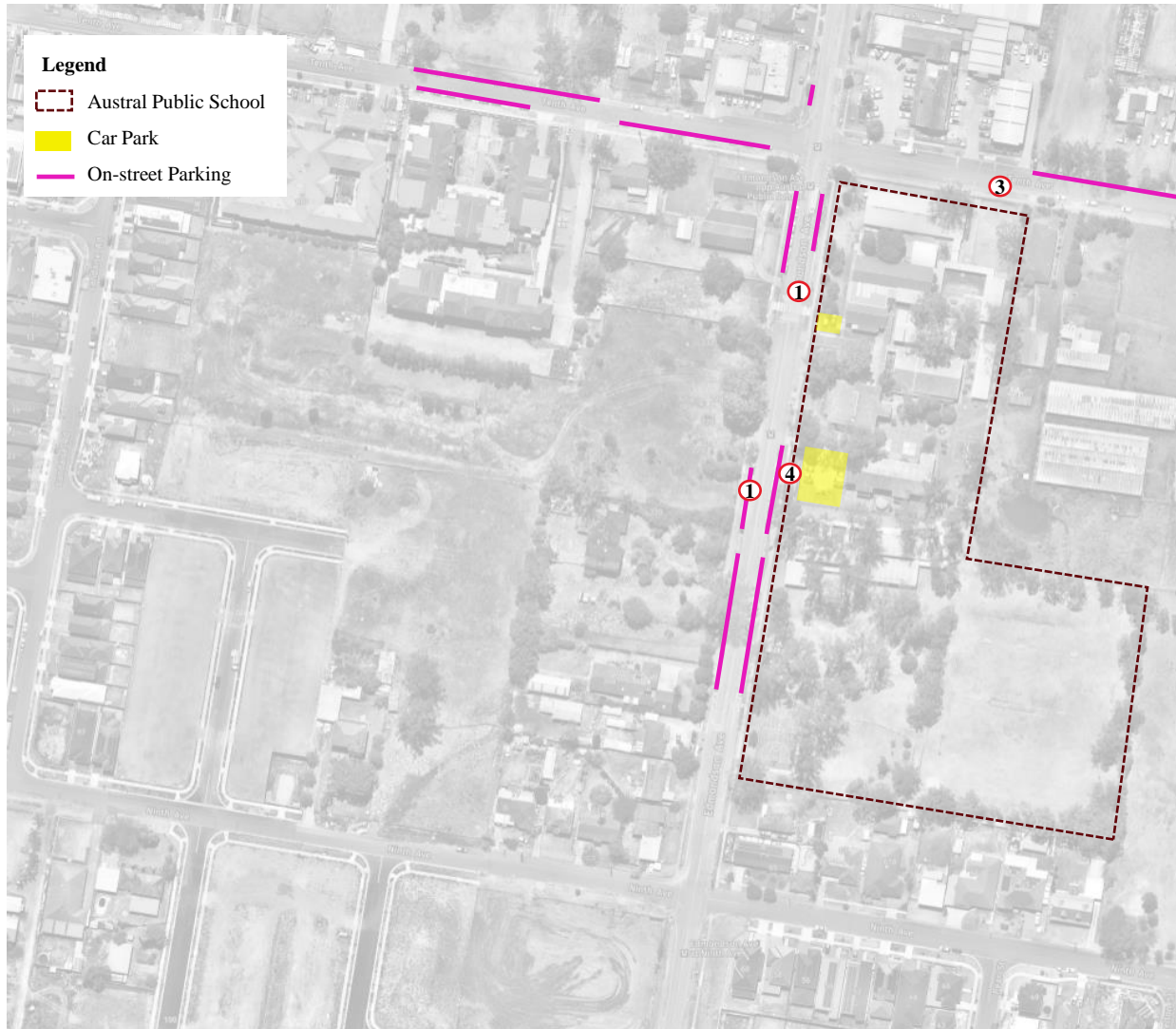
Vehicular access on Edmondson Ave



Vehicular access on Edmondson Avenue

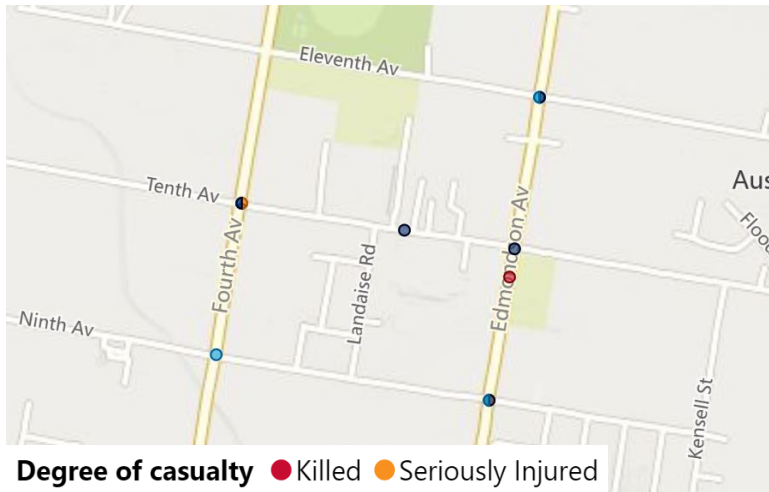
Existing transport network

Parking and road layout surrounding the site



Existing transport network

Crash statistics



Source: RMS Crash Statistics Website (TfNSW, 2023)

Existing safety issues on Edmondson Avenue illustrate a need to improve footpaths and crossing facilities to encourage safe active and sustainable travel to and from the school. It is recommended to liaise with Liverpool City Council on new and upgraded footpaths and crossings advised to link existing and new residential areas to the school. These recommended footpath and crossing upgrades are not immediately adjacent to Austral Public School.

Year	Location	Degree of crash	RUM description	Natural Lighting	Number injured/ killed
2018	Fourth Ave/ Tenth Avenue	Serious Injury	Cross traffic	Daylight	1
2018	Edmondson Ave/ Eleventh Ave	Minor/ Other Injury	Cross traffic	Daylight	1
2018	Edmondson Ave/ Eleventh Ave	Non-casualty (towaway)	Cross traffic	Dusk	0
2019	Edmondson Ave/ Ninth Ave	Non-casualty (towaway)	Cross traffic	Daylight	0
2019	Edmondson Ave/ Ninth Ave	Serious Injury	Left near	Daylight	2
2019	Edmondson Ave/ Fourth Ave	Minor/ Other Injury	Cross traffic	Darkness	1
2019	Fourth Ave/ Tenth Avenue	Moderate Injury	Cross traffic	Daylight	1
2019	Fourth Ave/ Tenth Avenue	Minor/ Other Injury	Cross traffic	Daylight	1
2019	Tenth Ave	Moderate Injury	Emerging from drive	Daylight	1
2019	Edmondson Ave/ Eleventh Ave	Non-casualty (towaway)	Cross traffic	Daylight	0
2020	Edmondson Ave/ Tenth Ave	Moderate Injury	Cross traffic	Daylight	1
2020	Edmondson Ave/ Ninth Ave	Moderate Injury	Cross traffic	Darkness	2
2020	Edmondson Ave/ Fourth Ave	Non-casualty (towaway)	Right near	Daylight	0
2020	Fourth Avenue near Eleventh Avenue	Non-casualty (towaway)	Off rd left => obj	Dusk	0
2021	Edmondson Ave	Fatal*	Off rd right=> obj	Darkness	1
2021	Fourth Ave/ Tenth Avenue	Moderate Injury	Right far	Dusk	2
2021	Fourth Ave/ Tenth Avenue	Serious Injury	Cross traffic	Darkness	2
2021	Fourth Ave/ Tenth Avenue	Moderate Injury	Cross traffic	Daylight	2
2021	Edmondson Ave/ Eleventh Ave	Moderate Injury	Cross traffic	Daylight	2
2022	Edmondson Ave/ Ninth Ave	Moderate Injury	Cross traffic	Daylight	1
2022	Edmondson Ave/ Ninth Ave	Minor/ Other Injury	Cross traffic	Daylight	1
2022	Edmondson Ave/ Ninth Ave	Minor/ Other Injury	Cross traffic	Daylight	1

* Single-vehicle crash into fence and power pole during nighttime on 12 June 2021

Existing transport network

Intersection performance at Edmondson Avenue / Tenth Avenue



Date

6 February 2024



Time

7:30 am – 9:30 am
2:30 pm – 4:30 pm



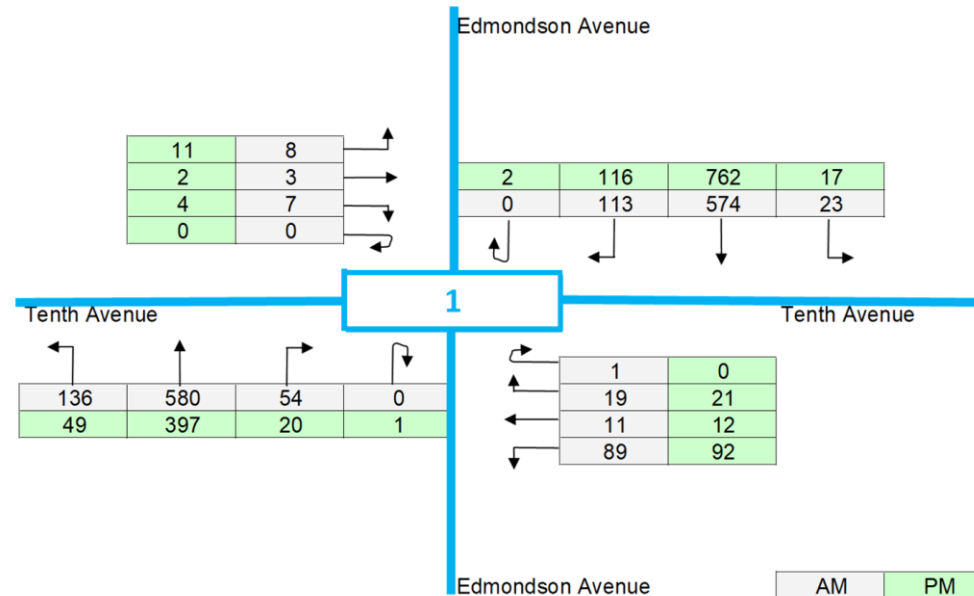
Location

Edmondson Avenue/ Tenth Avenue intersection



Peak hour

8:00 am – 9:00 am
3:15 pm – 4:15 pm



2024 Existing Performance	AM	PM
Degree of saturation (DoS)	0.99	0.83
Average delay (seconds per vehicle)	69	94
Level of service (LoS)	E	F
95th percentile queue length (m)	141.2	37.5

The modelling results show that the existing priority intersection operates beyond capacity at level of service E and F during AM and PM peak respectively. However, with the signalisation of the intersection during the Edmondson Avenue upgrade, the performance is expected to be improved.

Key observations

Existing performance

The poor level of service at the intersection is due to the high volume of movements on Edmondson Avenue, providing insufficient gaps for vehicles exiting the minor road approach.

Edmondson Avenue

23-vehicle queues on Edmondson Avenue north in AM peak
3-vehicle queues on Edmondson Avenue south in AM peak

Tenth Avenue

From 3:15-3:30pm, more than 15-vehicle queues along Tenth Avenue (predominantly from the east) after picking up school students. By 3:35pm, all queues were gone.

Existing transport network

School entry count survey



Date

6 February 2024



Time

8:15 am – 9:15 am
3:00 pm – 4:00 pm



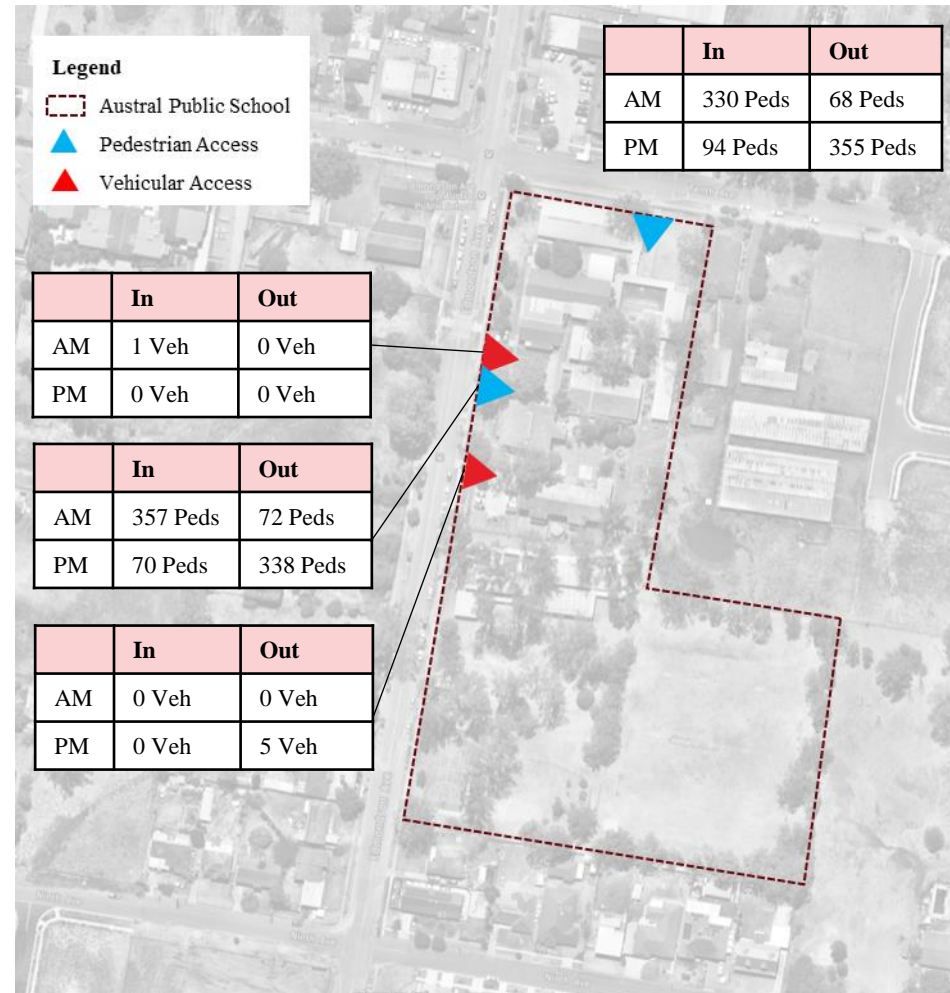
Location

Current pedestrian and
vehicular access on
Edmondson Avenue and
Tenth Avenue



Type of count

Vehicle, pedestrian,
scooter, bicycle



Key observations

Vehicular Access

The recorded vehicle counts at the school are minimal as staff may enter / leave school outside of the school peak hours.

Pedestrian Access

The survey shows parents access the school to pick up and drop off their children during both peak hours. No students were observed to access the school by scooter/ bicycle.

Issue to note

It is noted that 11 ped and 140 ped accessed the site via the northern vehicular access during AM and PM peaks respectively. Although the number of vehicles accessing the site is minimal, it is still recommended to prevent students/ parents entering the site via vehicular access.

Mode share analysis

Hands-up survey result



Survey period
9 – 13 February 2024



Class involved
20 classes from K -Year 6

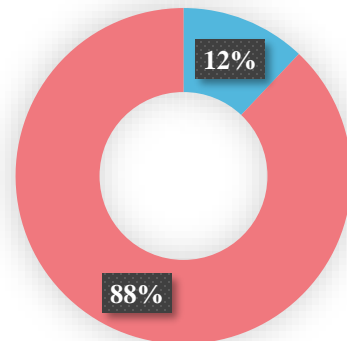


students participated
430

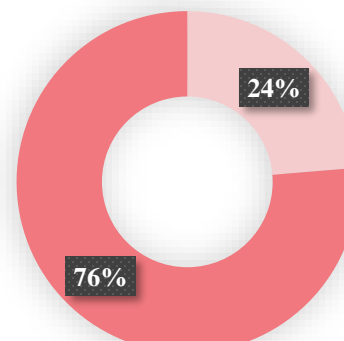


Staff participated
20 Class teachers &
18 Admin staff

Pre-school student mode share

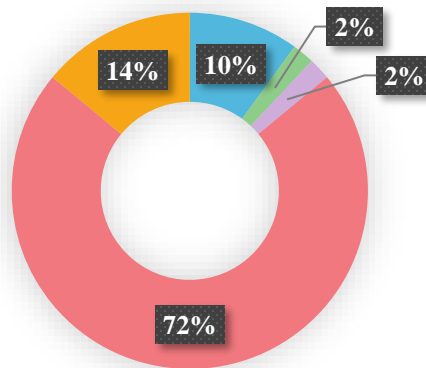


Staff mode share

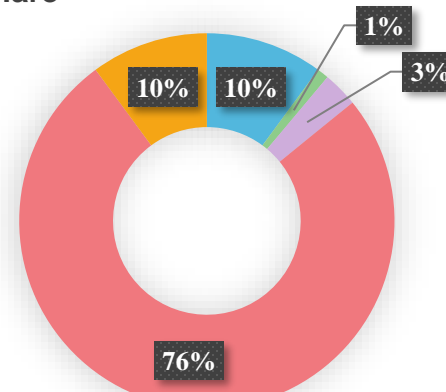


**Travel mode share of pre-school students and staff are consistent in AM and PM*

Primary school student mode share



AM



PM

■ Walk ■ Cycle or other rideable ■ Bus ■ Car (parked on-site) ■ Car (parked nearby) ■ Carpool

Key observations

Pre-school

The travel demand for the pre-school is **88% driver mode share**. 6% of pre-school students attend OOSH during AM and PM.

Staff

The travel demand for the staff is **100% car mode share**. With insufficient parking on-site (14 spaces), 76% of them parked their cars nearby.

Primary School

Approx. 15% of primary students travel by active travel and public transport. 6% and 9% of primary school students attend OOSH during AM and PM respectively

Mode share analysis

Comments from parents



Insufficient active travel facilities

- Unconnected and unsafe footpath with poor condition
- No shared path for cycling/ scootering
- Dangerous intersections and crossing on Tenth Avenue



Limited public transport options

- Unreliable service
- Limited bus stops
- Insufficient information online



Poor pick-up/ drop-off arrangement

- Parents park their cars on-street, obstructing sight line and causing traffic congestion
- K&D bay too close to bus stop
- Without safe pick-up/ drop-off arrangement, parents park their cars and walk to school with their kids



Traffic issue

- Speeding vehicles at school zone
- Poor road condition
- Road works causing congestion

Measures

Better active travel facilities

- Provide proper footpaths/shared paths along Edmondson Avenue and traffic signals at Edmondson Ave/ Tenth Avenue via Edmondson Avenue Upgrade
- Provide missing footpath to extend the active travel catchment
- Walking school bus
- Crossing supervisors at Tenth Avenue

Enhance public transport services

- Improve public transport coverage by providing more stops and diversion of routes
- Adjust timetable to align with Austral PS bell time
- Provide new services operating in south-west and north-east in the AM
- Staff supervision at bus stop

Better pick-up/ drop-off arrangement

- No Parking control along Edmondson Avenue and Tenth Avenue.
- Provide designated kiss-and-drop waiting zone within school for students
- Staggered pick-up/ drop-off time for students in different grades
- Separate bus stop with K&D

Better pick-up/ drop-off arrangement

- Install school zone speed cameras
- Prevent road works during school peak hour

4. Transport analysis

Future residential growth (2024-2028)



Several subdivided lots and new homes have already been completed in the past few years and enrolment data indicates that primary students are already residing in these homes.

Post 2028 is not explicitly accounted for yet within the planning portal.

Method:

- Arup reviewed recently subdivided plots and future subdivided plots to serve as a proxy where these new homes will be built.
- Data sources for subdivided lots include DA's listed in the 2023 Rapid Transport Assessment¹ and cadastral survey².

¹ Austral Public School Rapid Transport Assessment, Asongroup, May 2023

² Clip and Ship, State Government of NSW and Spatial Services

Catchment analysis

Active travel

Existing Catchment	Existing road network				Suggested footpath on missing link			
	As the crow flies		Actual on path		As the crow flies		Actual on path	
	No. of students	% of students	No. of students	% of students	No. of students	% of students	No. of students	% of students
0 - 400m (5 mins)	28	4%	4	1%	36	5%	4	0%
400 - 800m (10mins)	71	10%	37	5%	83	10%	40	5%
800 - 1200m (15mins)	107	15%	15	2%	125	16%	40	5%
Total	199	28%	56	8%	244	31%	83	10%

Future catchment with suggested footpath	As the crow flies		Actual on path	
	No. of students	% of students	No. of students	% of students
0 - 400m (5 mins)	36	5%	9	1%
400 - 800m (10mins)	83	10%	71	9%
800 - 1200m (15mins)	125	16%	46	6%
Total	244	31%	126	16%

**Refer to Appendix B for details*

Walking and cycling improvements

Shortest path analysis



What does this mean for Austral Public School?

- High demand streets include: Edmondson Avenue, Ninth Avenue, Tenth Avenue, Twelfth Avenue.
- Students within the 1200m (recommended walking network) catchment were considered for the shortest path assessment.

Walking and cycling improvements

Top 5 routes by demand



What does this mean for Austral Public School?

- Using shortest path analysis, the five routes with highest walking demand from Austral Public School has been prioritised in terms of providing new or widened paths.
- Missing pedestrian crossings on these routes to and from the school on these paths have also been identified and labeled.

5 shortest paths to school

Potential footpath improvement

Name	Infrastructure	Number of students benefited	DCP alignment	Rationale
Paths				
(1) Tenth Avenue	Shared Path (both sides)	24	Collector road	Shared path as per DCP collector cross section. Ensures adequate width for this relatively higher demand path.
(2) Ninth Avenue	Footpath (both sides)	14	Local Street	Connects developments on the west of Edmondson Avenue to Edmondson Avenue footpath and school via new crossing.
(3) Twelfth Avenue	Footpath (both sides)	11	Local Street	Connects developments on the east of Edmondson Avenue to Edmondson Avenue footpath and school.
(4) Eighth Avenue	Shared path (both sides)	10	Collector road	Completion of missing paths connecting to Edmondson Avenue N-S footpath.
(5) Ninth Avenue	Footpath (both sides)	8	Local Street	Completion of missing paths and connecting new developments on Ninth Avenue to Edmondson Avenue.

- Footpaths on Eighth Avenue, Ninth Avenue and Twelfth Avenue have not been committed to. These paths are listed as potential footpath improvements required to complete continuous footpaths for the 5 shortest paths to school.
- All five routes listed converge onto Edmondson Avenue. Completing footpath gaps on east-west roads will ensure continuous connection from new homes to/from school.
- Completing recommended footpaths is expected to increase the walking catchment to 16% of total students, an increase of 5%.

5 shortest paths to school

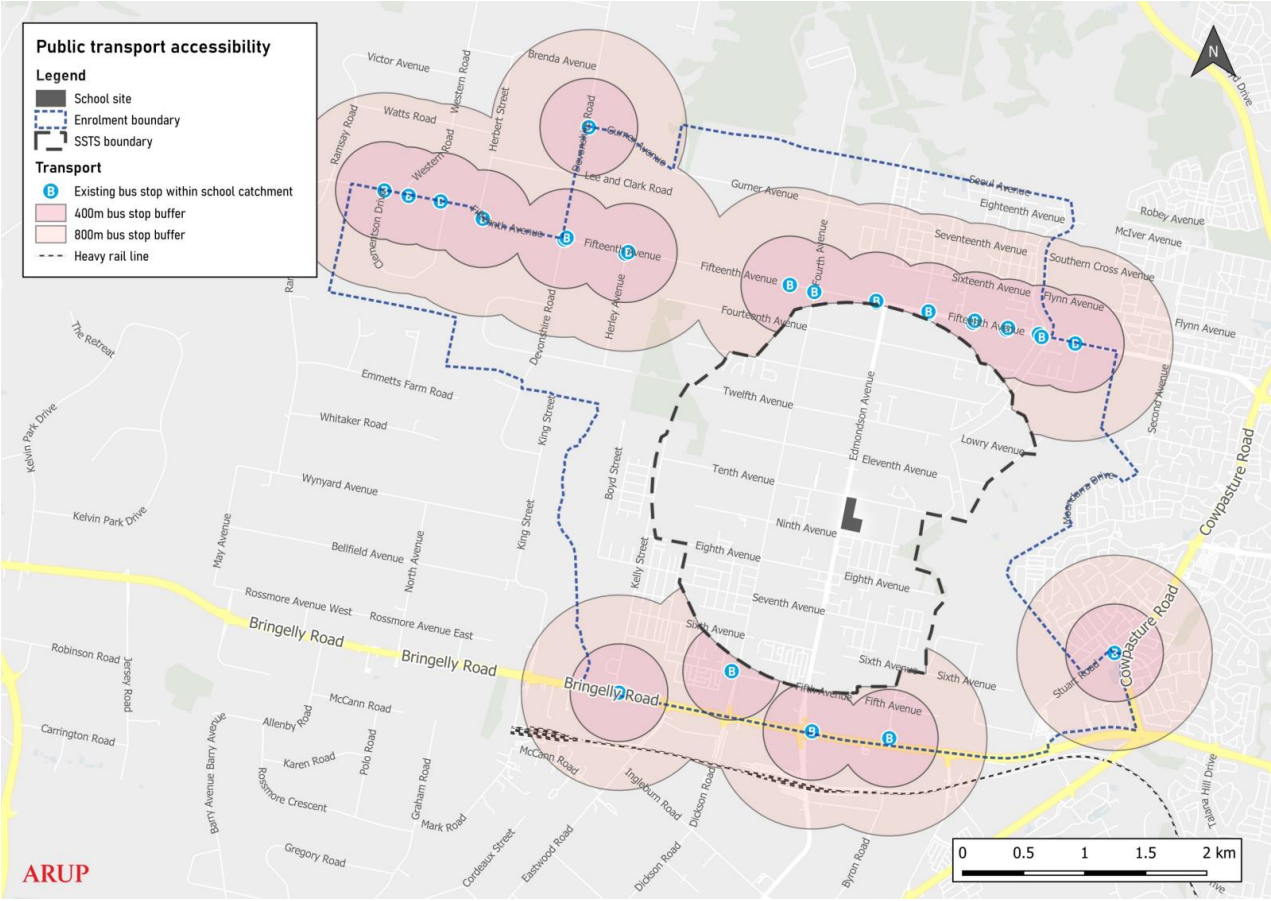
Potential crossing improvement

Name	Infrastructure	Number of students benefited	Rationale
Crossings			
(1) Ninth Avenue / Edmondson Avenue	Pedestrian refuge	11	This leg has not been proposed in Edmondson Avenue upgrade. The proposed pedestrian refuge crosses a collector street under DCP road network
(2) Eighth Avenue / Lethbridge Road	Pedestrian refuge	6	Crosses a collector street under DCP road network. Located on an important N-S road, allowing southern developments connect to the north
Tenth Avenue/ Edmondson Avenue	Zebra crossing	TBC	Prior to the construction of signalised pedestrian crossings at Edmondson Avenue a temporary zebra crossing is required to facilitate students using the bus stop to the north of the school which caters for 861

- The Edmondson Avenue upgrade proposes a number of crossing upgrades which will be utilised by most of the students who walk/cycle to school. However, there are some crossing directions which have not been proposed to be built. It is recommended to liaise with Liverpool City Council to establish the timeline for these upgrades.

Catchment analysis

Public Transport



Catchment	Existing		Future	
	No. of students	% of students	No. of students	% of students
Not eligible (within SSTS distance)	284	40%	375	47%
Eligible for free travel (outside SSTS distance)	427	60%	419	53%
Total	711	100%	794	100%
Current bus services				
Eligible for free travel and within 400m of a bus stop	114	16%	127	16%
Eligible for free travel and within 800m of a bus stop	292	41%	254	32%
Recommended bus services				
Eligible for free travel and within 400m of a bus stop	363	51%	365	46%
Eligible for free travel and within 800m of a bus stop	419	59%	405	51%

**Refer to Appendix B for details*

Bus analysis

Bus service improvements

The following investigation into bus timetables and routes consider changes to better meet the increased demand. These recommendations are included in this TIA as a preliminary analysis on future bus service capacity only. These improvements were reviewed by TfNSW (see TWG 2 in Appendix C) and discussed during TWG 3. However, no changes to the bus services and timetables are currently planned as part of this REF activity.

Austral Public School is serviced by both public and school bus routes which include the following.

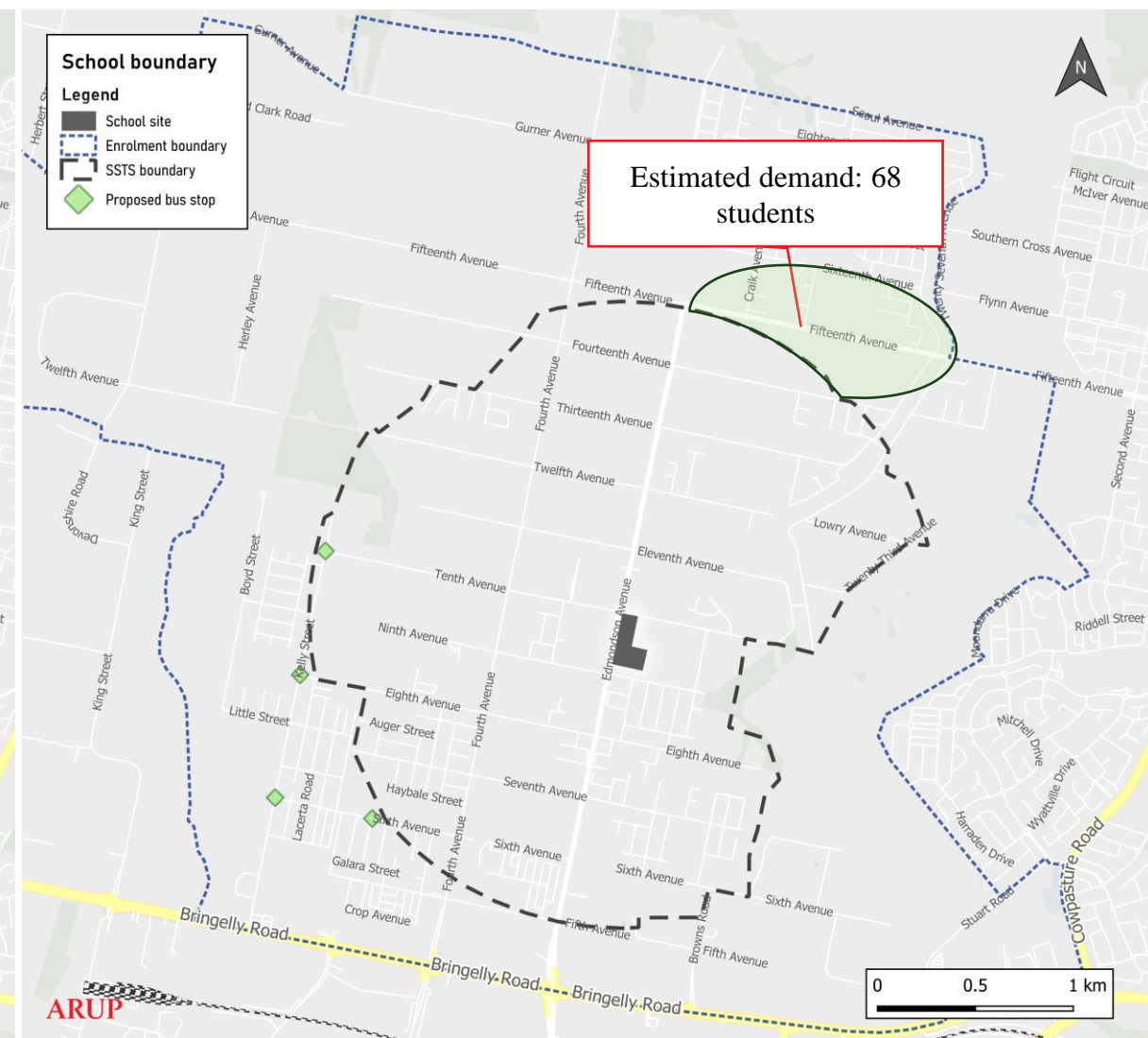
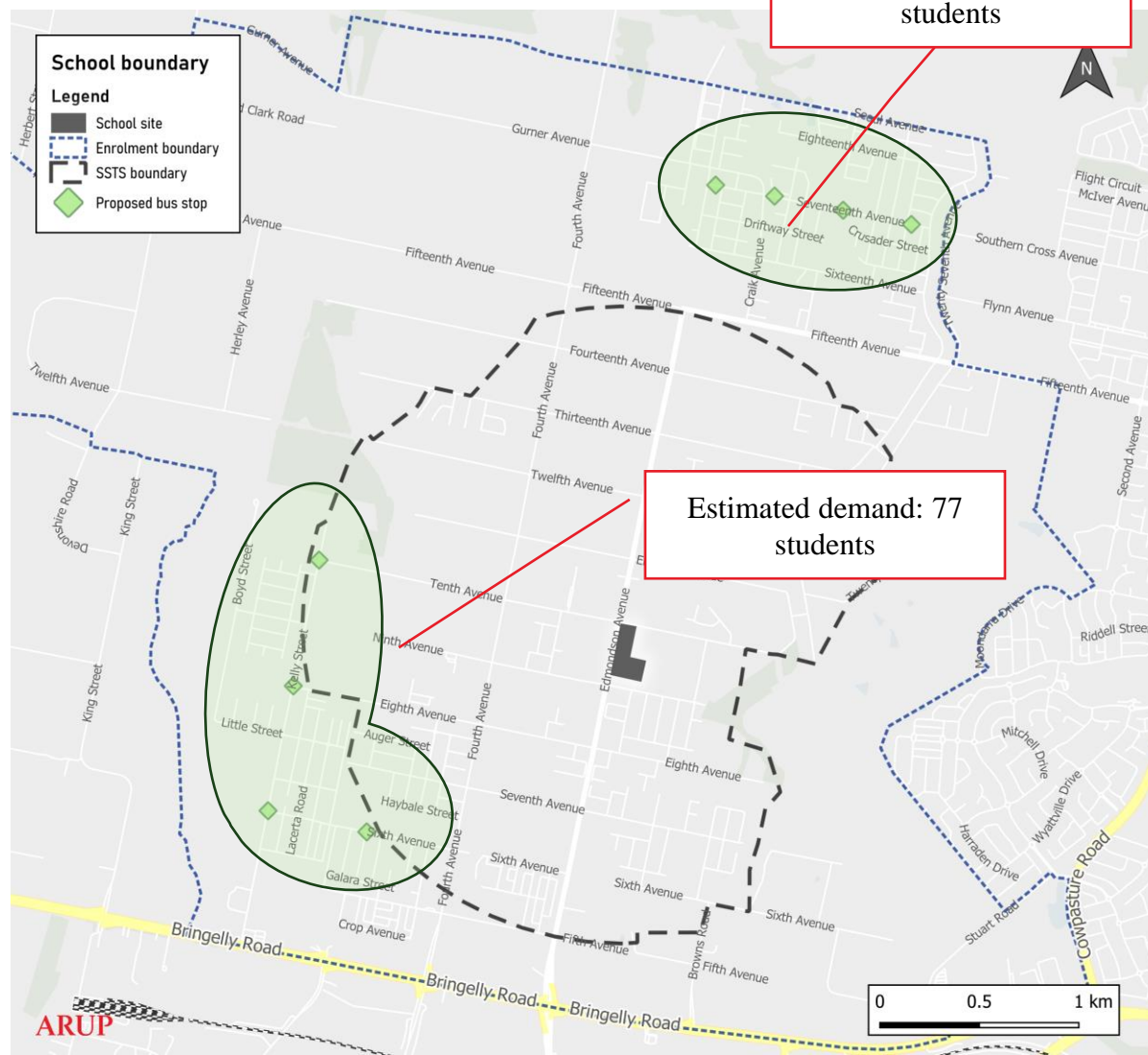
- Public routes: 861, 855
- School routes (S): 1033, 1038, 1052, 2033, 2042

A detailed analysis of each bus route and their recommended improvements are contained within Appendix B. A combined summary of the findings from this analysis is included in the following pages.

Bus analysis

Bus service improvements

**Refer to Appendix B for details*



Bus service improvements

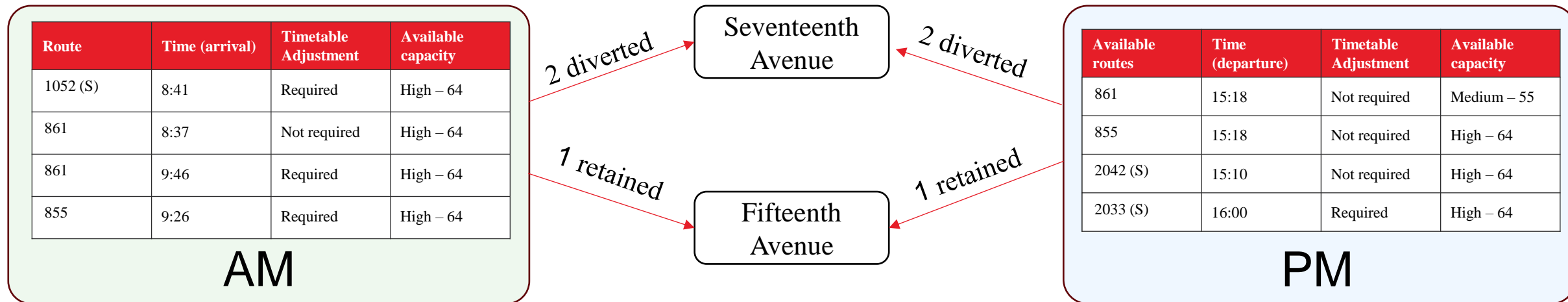
Future capacity analysis – Proposed bus stops

AM	Service Area	Route	Time	Available capacity (pax)
	North-east	1052 (S)	AM	High – 64
		861	8:20/ 8:37	High – 64
		855	9:15 / 9:26	High – 64
	Service Area	Routes	Time	Available capacity (pax)
	South-west	1033 (S)	AM	High – 64
		1038 (S)	AM	High – 64
		855	8:35 / 9:08	High – 64
PM	Service area	Available routes	Time	Available capacity (pax)
	North-east	861	14:50 / 15:18	Medium – 55
		855	15:18	High – 64
		2042 (S)	PM	High – 64
		2033 (S)	PM	High – 64
	Service area	Route	Time	Available capacity (pax)
	South-west	861	14:58 / 15:23	Medium – 60
		855	13:35 / 14:21	High – 64

- Bus services have been separated by the time of day they operate and which area in Austral they service.
- **Two bus services from each table** would need to be selected and re-routed (excluding 861) into their respective area in order to meet the anticipated student demand for the proposal.
- Selected services should take into account detailed information provided in previous slides (scheduling time adjustments, other schools impacted etc.)

Bus service improvements

Future capacity analysis – Fifteenth Avenue



- As part of recommended bus service improvements, two services could be diverted onto Seventeenth Avenue to meet new demand – and one service would be needed to run on Fifteenth Avenue to better meet demand.
- The three selected services need to arrive before morning bell times and depart afternoon bell times.
 - Among the AM services, two services would need rescheduling to more closely meet the Austral PS 9am bell time.
 - Among the PM services, only the 2033 would need adjustment if selected to meet the Austral PS 3pm bell time.
- If 861 frequency increases to every 15 minutes, and existing school bus services are adjusted there is no requirement for a new bus service. However, if the frequency is not increased and/or the timetables cannot be adjusted, a dedicated school bus service may be required to accommodate existing and future students.
- Adjustment to Routes 2033 or 861 schedules would impact other schools on the route (such as St Anthony of Padua). Feasibility to be confirmed with TfNSW.
- The recommended changes are detailed further in Appendix B – Catchment Analysis.

Trip generation

All modes



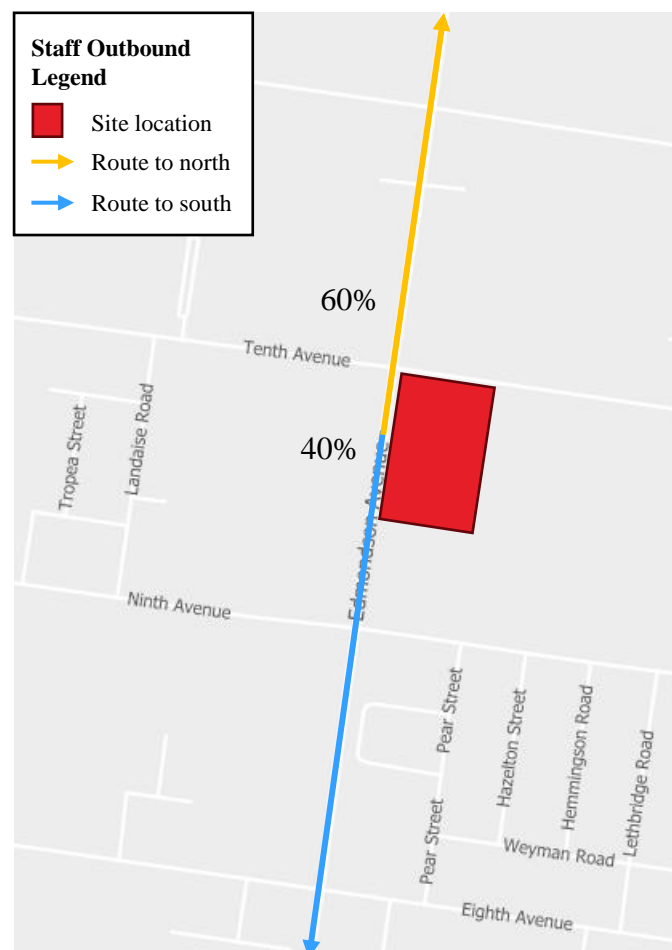
All modes	AM peak (08:00 – 09:00)		PM peak (14:30 – 15:30)		Daily trips		Additional trips (compared to existing)
	In	Out	In	Out	In	Out	
Staff	64	0	0	64	64	64	24
Student	704	0	0	704	704	704	23
Pre-school and SLU	60	0	0	60	60	60	30
Total	828	0	0	828	828	828	77

All modes trip generation was calculated based on the increased student and staff totals present at the completion of the REF activity. This includes 734 students and 64 FTE teachers.

- The distribution of inbound and outbound movements are estimated based on the location of Austral Public School within the Austral precinct and the precinct's location within Greater Sydney. The distribution take into account the bus services that run along Edmondson Avenue.

Trip generation

All modes



All modes	AM peak (08:00 – 09:00)		PM peak (14:30 – 15:30)		Daily trips		Additional trips (compared to existing)
	In	Out	In	Out	In	Out	
Staff	64	0	0	64	64	64	24
Student	704	0	0	704	704	704	23
Pre-school and SLU	60	0	0	60	60	60	30
Total	828	0	0	828	828	828	77

5. Operational impact

Methodology scenario testing

Mode share scenarios

	Student	Staff	Total
Pre-school	30	7	37
Support Learning Unit	30	6	36
Primary School	704	51	755
Total	764	64	828

Transport facilities will be provided according to the worst-case scenario (base case). The moderate and reach scenarios are based on improvements from new developments and the Edmondson Avenue upgrade, as well as improvements to bus services as detailed within the catchment analysis.

Student enrolment target and staffing requirement are provided by SINSW.

Scenario 0 Baseline (do nothing)

- Using catchment analysis mode share,



Scenario 1/3/5

“Moderate” active/ public transport mode share

- Inclusion of active transport programs to achieve lower kiss-and-drop utilization as per catchment analysis
- Improvement of walking environment, including improved footpaths and crossings to provide a safe environment for active travel



Scenario 2/4/6

“Reach” active/ public transport mode share

- Encourage parenting community that support children walk and scoot to school
- Provision of enhanced bus services to further reduce the kiss-and-drop demand as per the catchment analysis
- Behavioral change measures to encourage active transport



Methodology scenario testing

Baseline

Mode	Pre-school and support learning unit students		Primary school students		Staff	
	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %
Active Transport	5	8% ⁽²⁾	59	8% ⁽²⁾	0	0%
Public Transport	0	0%	22	3%	0	0%
Car ⁽¹⁾	55	92%	653	89%	64	100%

Notes:

- 1) Car passengers, not cars
- 2) According to the catchment analysis, currently only 8% of existing students can safely walk to school within 15 minutes on existing footpaths, despite existing hands up survey data showing 12%. Remaining 4% from active travel has been redistributed onto car.
- 3) Existing travel demand for pre-school and support learning group (60 students) is assumed to remain unchanged across the three scenarios with 92% car mode share and 8% active transport mode share.

Methodology scenario testing

“Moderate” and “Reach” active/ public transport mode share targets

Primary student mode share	Scenario 1: Moderate AT		Scenario 2: Reach AT		Scenario 3: Moderate PT		Scenario 4: Reach PT		Scenario 5: Moderate AT and PT		Scenario 6: Reach AT and PT	
	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %
Active Transport	70	10%	113	16%	56	8%	56	8%	70	10%	113	16%
Public Transport	21	3%	21	3%	113	16%	225	32%	113	16%	225	32%
Car^	612	87%	570	81%	535	76%	422	60%	521	74%	366	52%

^car passengers, not cars

Staff mode share	Moderate (Scenario 1/3/5)		Reach target (Scenario 2/4/6)	
	Usage #	Mode share %	Usage #	Mode share %
Active Transport	1	2%	2	3%
Public Transport	3	4%	5	8%
Car^	60	94%	57	89%

^car passengers, not cars

Methodology scenario testing

Private vehicles

Kiss and drop	Scenario 0: Base case	Scenario 1: Moderate Active Travel	Scenario 2: Reach Active Travel	Scenario 3: Moderate PT	Scenario 4: Reach PT	Scenario 5: Moderate PT and AT	Scenario 6: Reach PT and AT
Primary school	17	17	16	15	12	14	10
Pre-school and Support learning unit	2	2	2	2	2	2	2

Notes

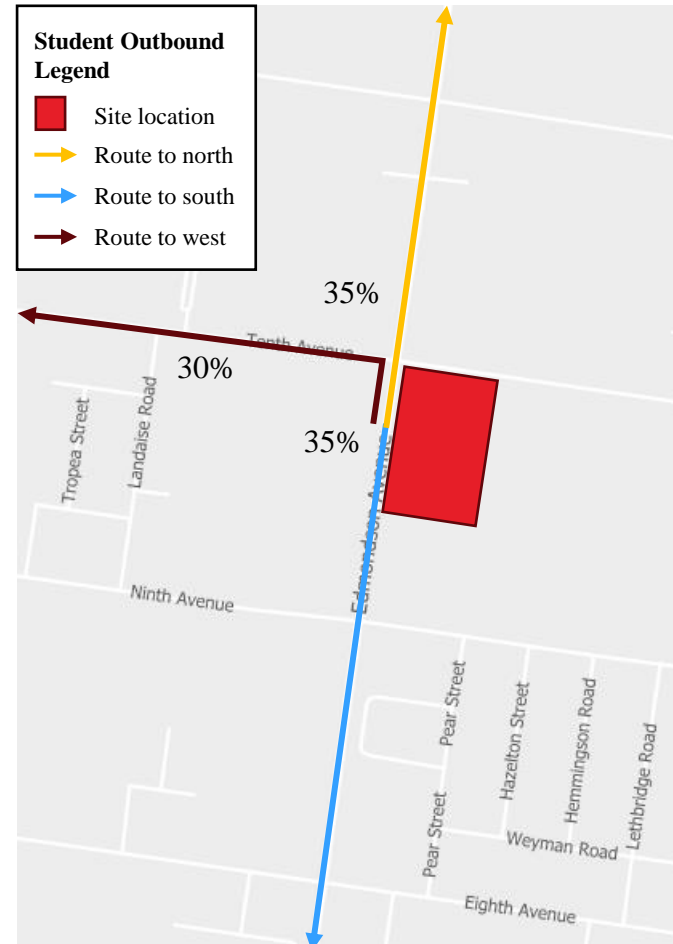
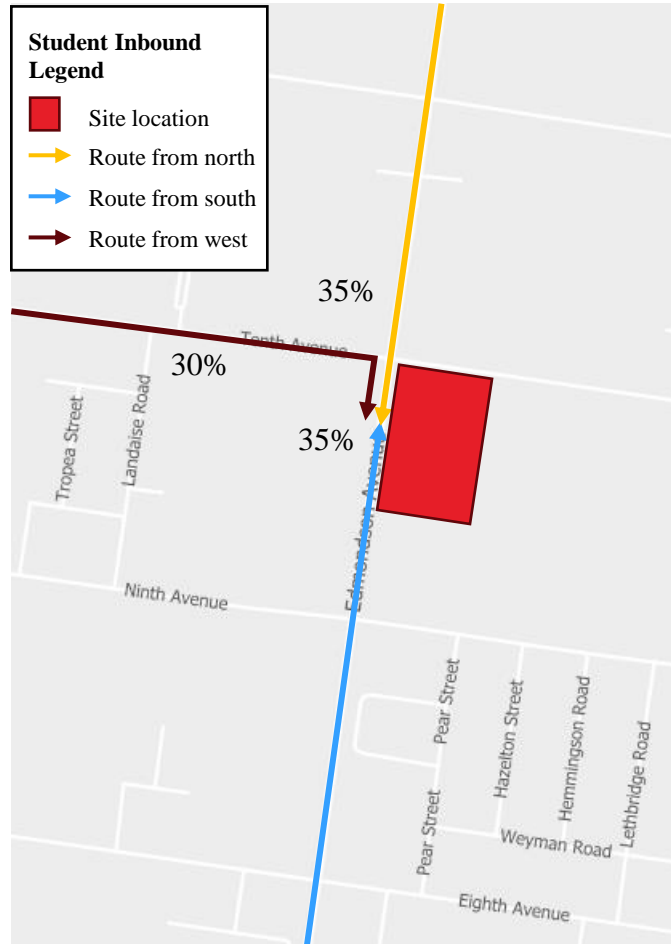
- No. of kiss-and-drop bay is calculated based on student target mode share with the assumption of vehicle occupancy (1.5 students/car), peak arrival rate (80%), dwelling time (AM: 1 min, PM: 1.5 mins) and 30 mins drop-off window.
- The pre-school and support learning units' spaces are contained within the school grounds as per existing.
- Minimum 17 spaces required for kiss and drop for primary school students according to base case scenario**

Stage	Staff car parking
APS (2026)	57

Austral precinct is undergoing rapid development and demographic change. Modelling of the existing intersection performance showed that the Edmondson Avenue / Tenth Avenue intersection is operating at LoS E during the AM peak and LoS F during the PM peak, largely due to high volumes along Edmondson Avenue. Further modelling of the future road operations have not been undertaken as part of this assessment, as Liverpool City Council has previously identified that Edmondson Avenue required upgrading to support ongoing residential development in Austral. As part of this upgrade, Edmondson Avenue will be widened to two lanes in each direction and Edmondson Avenue / Tenth Avenue will be upgraded to signals. In the *Connected Liverpool 2040 Local Strategic Planning Statement (March 2020)* Liverpool City Council estimated that this would be completed in 2023 and a detailed design was completed in 2021.

Trip generation

Vehicle trips



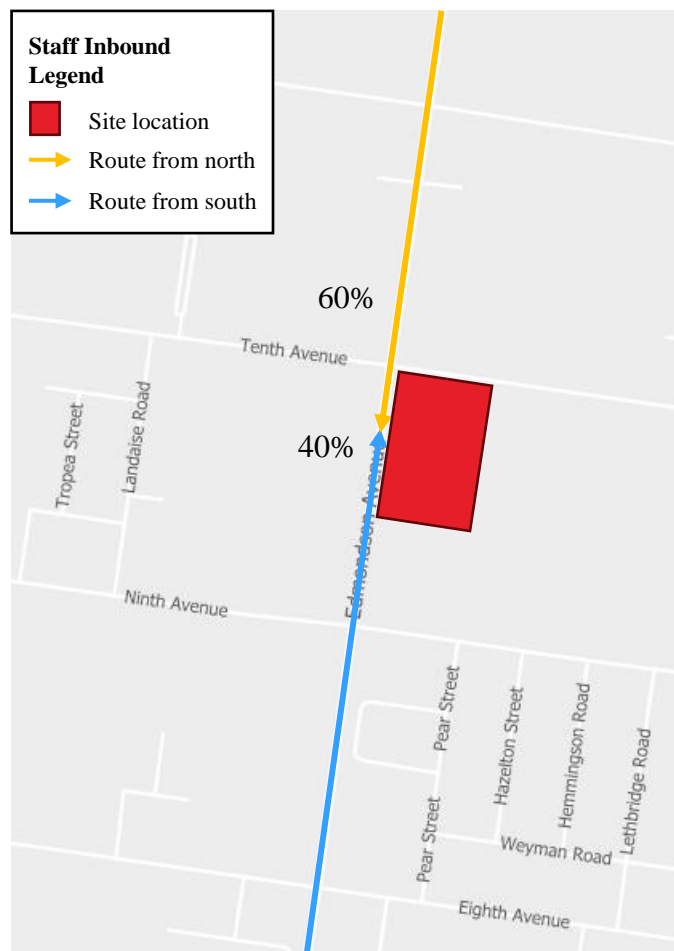
Vehicles	AM peak (08:00 – 09:00)		PM peak (14:30 – 15:30)		Daily trips		Additional trips (compared to existing)	
	In	Out	In	Out	In	Out	AM	PM
Staff	64	0	0	64	64	64	24	24
Student	507	0	0	535	507	535	24	23
Pre-school and SLU	60	0	0	60	60	60	30	30
Total	631	0	0	659	631	659	78	77

Vehicle trip generation was calculated based on the increased student and staff totals present at the completion of the REF activity. This includes 734 students and 64 FTE teachers. Vehicle mode share is determined from the baseline scenario.

- The distribution of inbound and outbound vehicle traffic is estimated based on the location of Austral Public School within the Austral precinct and the precinct's location within Greater Sydney and key connections such as Fifteenth Avenue to the north and Bringelly Road to the south.

Trip generation

Vehicle trips



Vehicles	AM peak (08:00 – 09:00)		PM peak (14:30 – 15:30)		Daily trips		Additional trips (compared to existing)	
	In	Out	In	Out	In	Out	AM	PM
Staff	64	0	0	64	64	64	24	24
Student	507	0	0	535	507	535	24	23
Pre-school and SLU	60	0	0	60	60	60	0	0
Total	631	0	0	659	631	659	48	47

The additional vehicle traffic generated by the REF activity includes 62 additional vehicles during the AM peak and 64 additional vehicles during the PM peak.













Edmondson Avenue is receiving road widening after the completion of this REF activity. This upgrade also includes a signalised intersection at Edmondson Avenue – Tenth Avenue and will significantly increase the capacity of the intersection. Liverpool City Council has identified that this upgrade is necessitated by background residential growth in Austral.

6. Proposed activity

[illegible]

64 staff

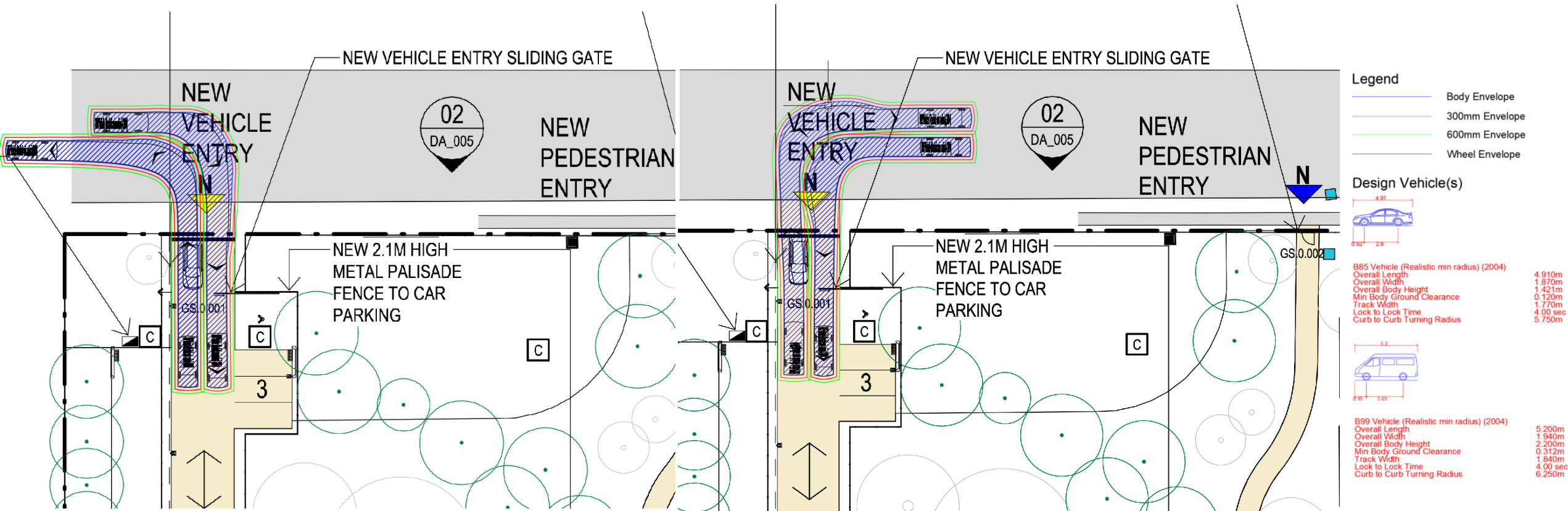
LEGEND - PUBLIC DOMAIN WORKS

	SCHOOL PEDESTRIAN ENTRY
	BUS ZONE
	KISS AND DROP, 6.5m LONG APPROX.
	NO STOPPING
	REFUGE ISLAND
	EXISTING CROSSING
	TEMPORARY CROSSING
	WOMBAT TYPE - TCA MODULAR
	RELOCATED CROSSING WITH NEW PLANTERS & PEDESTRIAN FENCE
	PROPOSED WALKING ROUTE
	PROPOSED FOOTPATH
	EXISTING FOOTPATH TO REMAIN

NOTES:
[SIGNAGE TO COUNCIL REQUIREMENTS
FOOTPATH TO COUNCIL REQUIREMENTS]

Proposed activity

Swept path analysis – proposed staff car park

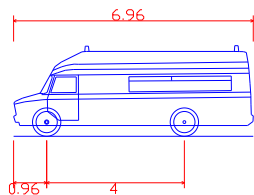


- Access to the new staff car park and maneuvering details comply with AS2890 Parts 1, 2 & 6 and Council's Development Control Plan, with maneuvering on-site and forward entry and exit to and from the public road.
- All other vehicle access points remain as the existing accesses.

Proposed activity

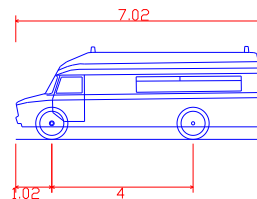
Staff vehicle and emergency vehicle movements

- The staff carpark entry and exit is designed as a 6m wide access driveway. Its location on the Edmondson Avenue frontage, a sub-arterial road, requires the entry and exit combined width to be a minimum of 6m wide according to AS2890 Part 1.
- The driveway is able to accommodate the simultaneous entry and exit of vehicles up to B99 dimension and turning radius.
- A 3m wide ambulance access gate is provided at the south-eastern corner of the staff car park. The design of this gate is sufficiently wide to accommodate a single entry or exit movement of NSW ambulance. NSW NETS ambulance have overall width less than 2.4m and NSW Bariatric ambulance have an overall width of 2.6m as shown in the figures below.



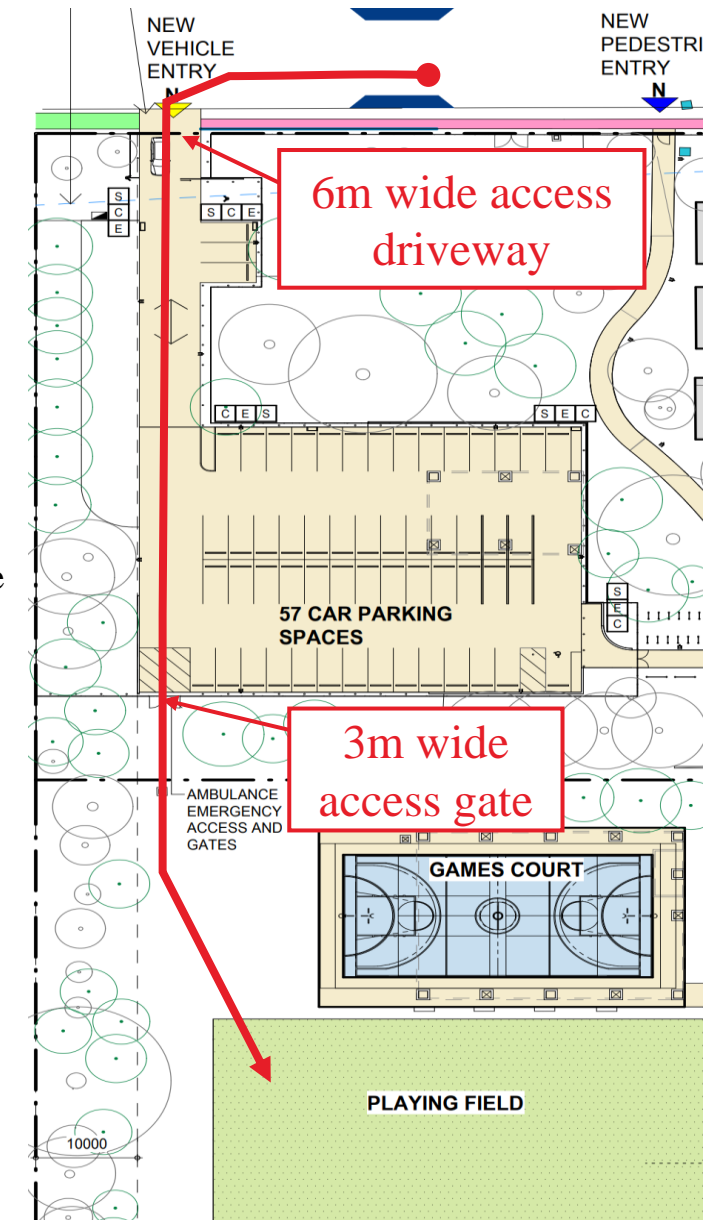
NSW NETS Ambulance
 Overall Length 6.960m
 Overall Width 2.350m
 Overall Body Height 2.630m
 Min Body Ground Clearance 0.311m
 Track Width 2.350m
 Lock-to-lock time 4.00s
 Wall to Wall Turning Radius 7.500m

NSW NETS ambulance dimensions (AS2890.1)



NSW Bariatric Ambulance
 Overall Length 7.020m
 Overall Width 2.600m
 Overall Body Height 2.630m
 Min Body Ground Clearance 0.355m
 Track Width 2.600m
 Lock to Lock Time 4.00s
 Wall to Wall Turning Radius 7.500m

NSW Bariatric ambulance dimensions (AS2890.1)

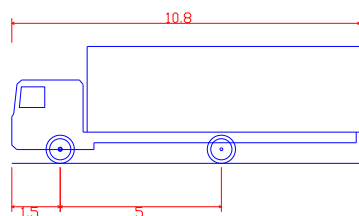


Proposed activity

Waste vehicle movements

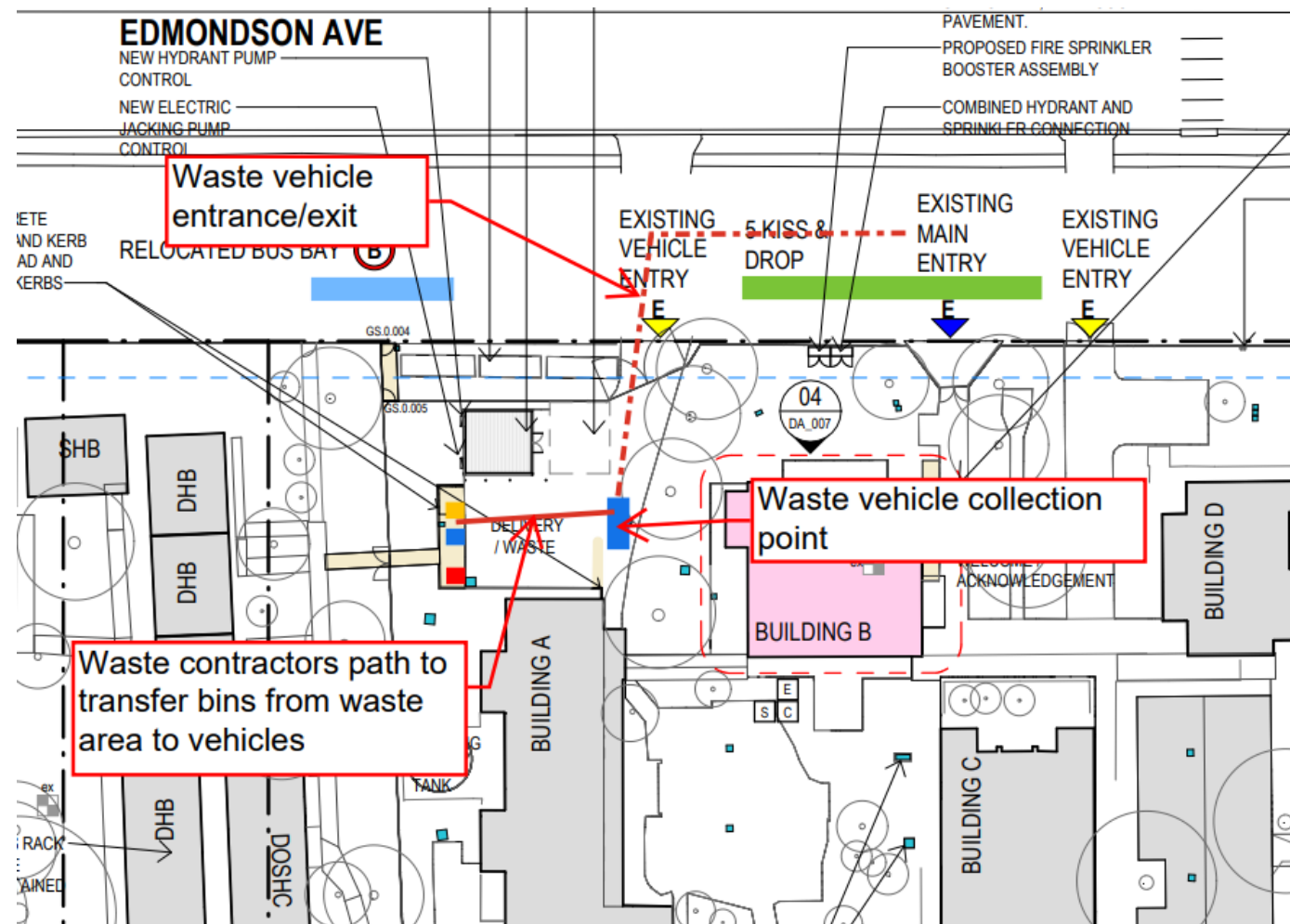
Waste vehicle access to the proposed site will remain unchanged from current operations. Access will be via the existing vehicle driveway on Edmondson Avenue. Waste consolidation is positioned in an area within 10m from the waste vehicle collection point.

The waste vehicle is a Veolia/Suez medium rigid rear-lift truck.



GARBAGE TRUCK	
Overall Length	10.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m

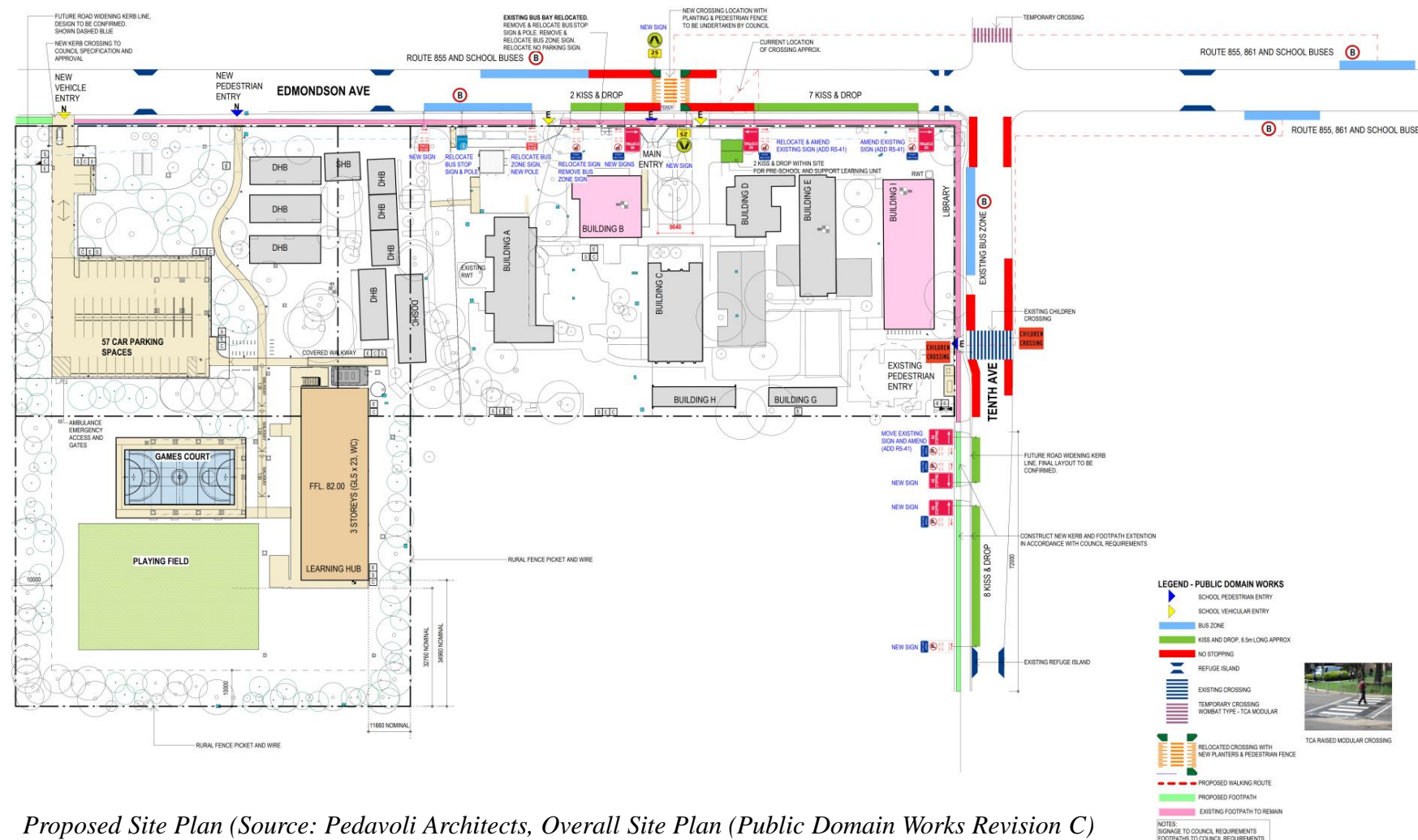
Indicative dimensions of the Veolia/Suez medium rigid rear-lift garbage truck dimensions (AS2890.1)



Waste vehicle access and collection point (source: Operational and Construction Waste Management Plans, Foresight Environmental)

Proposed activity

Proposed site transport




- 9 Kiss and Drop bays on Edmondson Avenue + 8 bays on Tenth Avenue.
- Students will be expected to wait within the confines of the school until the proposed bus times outside the school on Edmondson Avenue.
- There are existing shelters on Tenth Avenue for students to wait at, and at the 861 bus stops further north on Edmondson Avenue.
- The raised crossing on Edmondson Avenue is being relocated approximately 10m south of its current location. This work will be carried out by Liverpool City Council. This crossing is indicated in orange on the Public Domain Works site plan.
- A temporary crossing on Tenth Avenue is proposed. This will be undertaken as part of the REF activity and in consultation with Liverpool City Council. Indicated in purple on the Public Domain Works site plan.

Proposed Site Plan (Source: Pedavoli Architects, Overall Site Plan (Public Domain Works Revision C))

Proposed activity

Active travel

Component	Pre-school	SLU	Primary School	Staff	Total
 Bicycle/ scooter parking	0	0	98	2	100

Students

- Bicycle parking for students to be provided based on **Green Star requirements**, as this exceeds the number of spaces to service the expected future mode split of cycling/scooting.
- Green Star requirements call for bike parking serving 40% of students over Grade 4 (98 spaces).
- A 16% future mode split for active travel has been assumed, and as 10% of students currently walk to school it is reasonable to assume a cycling/scooting mode share of 6%.

Staff

- The provision of bicycle parking facilities at destinations provides the fundamental requirements to support bicycle trips. This includes the provision of appropriate change room facilities, showers and personal storage space (lockers) to store clothing and towels.
- Bicycle parking for staff is based on the reach mode share (2 spaces).
- *Liverpool Development Control Plan 2008 Part 1: General Controls for all Development* ('the DCP') specifies in Section 20.3 that end-of-trip facilities are to be provided at the rate of 1 shower and change room per 10 employee bicycle spaces. The DCP requirement is for 1 end-of-trip facility for staff (unisex). The EFSG does not contain requirements for staff end of trip facilities.
- The masterplan for the school looks to further developing the school in the next 1-2 years and this will see replacement of some of the existing facilities that includes a new staff and administration building which will include new end-of-trip facilities for staff. This facility will include a disabled access toilet, shower and locker.

Proposed activity

Green star accreditation

Green star requirement relevant to this report	Where it is addressed
The project team are required to demonstrate outcomes of this transport impact assessment in line with the SINSW transport assessment process, including:	
• A review of the school's travel demand;	Section 3
• The establishment of transport modes to promote during construction and post-occupancy;	Section 5
• Identification of transport improvements required to meet school travel demand;	Section 4
• Actions to inform the site design, master plan, Construction Traffic and Pedestrian Management Plan and Travel Plan;	All measures has been considered in the site design, master plan and Preliminary Construction Traffic Management Plan
• Actions to address road safety concerns; and	Section 7
• Compliance with the Transport Planning Advisory Note.	Our reports are compliant with the SINSW TA

7. Cumulative Impact Assessment

Cumulative Impact Assessment

Cumulative Impact Assessment

Located in the South-West Growth Area (SWGA), the site and surrounding areas are poised for substantial growth and densification. Austral is undergoing significant change and transition following recent rezoning by the NSW Government. Numerous residential subdivisions in both the immediate and broader vicinity are set to reshape the area, further contributing to the evolving landscape. The impact of this population uplift on the surrounding transport and traffic network is considered in combination to the operation of the school.

This section sets out the cumulative impact of the proposed activity. Impacts listed in this assessment are addressed in Section 8 - Mitigation Measures.

Impact	Description
Queuing from high peak hour traffic volume.	High car mode share for the school and generated by new residential subdivisions create increased strain on Kiss and Drop bays during peak hours.
Road network performance at critical intersections reaching capacity.	<p>In the baseline scenario (based on current mode shares), an additional 78 vehicle trips are generated for the AM peak and 77 for the PM peak. This includes 24 staff vehicles, 30 vehicles accessing the supported learning unit and 23 vehicles for primary school student pick-up and drop-off. This would have minor impact on performance of Edmondson Avenue which has intersection priority, while the eastern approach of Tenth Avenue is expected to experience some increased delays. This approach would continue to operate at Level of Service F.</p> <p>However, population growth expected in Austral will increase traffic growth at a rate of 1.45% compounded annually until the forecasted year 2036. This growth has necessitated planned road widening of Edmondson Avenue and installation of signals at Edmondson Avenue / Tenth Avenue (planned delivery by 2028). This intersection upgrade is expected to address the additional demand created by the REF activity.</p> <p>Under the baseline (worst-case) scenario, temporary additional delays at Tenth Avenue would be experienced in the interval prior to completion of the Edmondson Avenue / Tenth Avenue. This could be offset by mode shift among primary school students. In the short-term, this is most achievable through incentives for carpooling. Staff can be supported to shift their trips (arrival or departure) outside of the peak hour, carpool or use public transport.</p> <ul style="list-style-type: none"> • A mode shift of 10% among primary school students would offset all additional vehicle trips (staff and students) • A mode shift of 7.5% among primary school students would offset all additional student vehicle trips only (primary school and support class students) • A mode shift of 3% among primary school students would offset additional primary school student vehicle trips only.

Cumulative Impact Assessment

Impact	Description
High accident frequency on Edmondson Avenue.	A high rate of vehicle-based crashes on Edmondson Avenue was recorded between 2018 and 2022. These safety issues demonstrate the need to improve crossing facilities and make efforts to reduce vehicle use and provide improved pedestrian safety and promote the visibility of pedestrians to vehicles.
Staff parking overflow onto surrounding streets	Approximately 76% of existing staff park their vehicles on the surrounding streets. With the proposed activity, the increase of school student and staff numbers will increase the demand for parking. The new parking facility constructed as part of the REF activity has been designed to accommodate increased staff numbers.
Kiss and Drop bay congestion causing visibility issues	Kiss and Drop bay is positioned close to the bus stop and too many vehicles parking at one time can obstruct driver sight lines, causing traffic congestion and presenting as a hazard to students and other road users.
Walkability is poor within the SSTS boundary.	SSTS boundary encompasses a significant area that is beyond a 1200m or 15-minute walking accessibility range. A large number of students are expected to live beyond a 15-minute walking range from the school but also do not qualify for subsidised travel. Estimated only 8% of existing students and 10% of total future students live within a 15-minute walk of school which is likely to increase demand for travel by private vehicle.
Limited public transport access within the school enrolment boundary	Enrolment boundary reaches over 2km from the school in most directions and relatively limited public transport options exist for students who are eligible for subsidised travel. It is expected that number of students living in the catchment will increase by 70% with future developed subdivisions. Only 32% of future students eligible for subsidised travel are within 800m walk of existing bus stops and services.

8. Mitigation Measures

Mitigation Measures

As part of this project, SINSW is proposing to commit to the mitigation measure outlined in the table below. This Transport Impact Assessment determines that the proposed activity will not have a *significant effect on the environment*. All impacts assessed can be adequately mitigated through recommended measures. The impact of the additional trips is temporary and short term, expected to be improved with the Edmondson Avenue upgrade (Stage 2). Implementation of the mitigation measures outlined in this report and a mode shift towards 10% carpooling among primary school students, facilitated through the School Transport Plan, will offset the additional vehicle trips generated by the REF activity.

Mitigation	Aspect	Mitigation measure	Reason for mitigation measure
Footpath improvements	Precinct works	The project is proposing new footpath, road kerb and kiss and drop signage along the southern side of Tenth Avenue to the end of the indicated Kiss and Drop zone shown in the Public Domain Works site plan. Paths have been designed in alignment with DCP Collector and Local Street specifications.	These paths will offer safer routes for students living in new residential developments to travel to school and expand the walking catchment to include more of the student population.
Temporary pedestrian crossing	Precinct works	A temporary raised pedestrian crossing at Edmondson Avenue / Tenth Avenue. A modular rubber product would be installed with appropriate tactile ground surface indicators on the approaches.	Facilitate student access from APS to the Route 861 bus stop prior to delivery of the Edmondson Avenue upgrade being delivered by LCC, in which the intersection will be upgraded to a signalised crossing.
School Transport Plan	Prior to completion of project	Prior to commencement of operations, a School Transport Plan (STP) must be prepared to the satisfaction of the NSW Department of Education (DoE) Transport Planning team. Any existing STP is to be reviewed and updated if necessary to reflect the impacts of the REF works, to the satisfaction of the DoE Transport Planning team. The Travel Access Guide and School Transport Plan will be finalised and promoted to students and parents to encourage use of carpooling, public transport, walking and cycling.	The School Transport Plan set out objectives and strategies to assist in the development of transport goals, policies and procedures for Austral Public School. These measures promote the use of sustainable travel modes. In particular, a 10% mode shift towards carpooling should be encouraged to minimise increase in vehicle trip generation for student drop-off and pick-up.

Mitigation Measures

Mitigation	Aspect	Mitigation measure	Reason for mitigation measure
Staff vehicle parking	Precinct works	<ul style="list-style-type: none"> 57 parking spaces provided on site <p>Number of staff parking spaces was determined according to the forecast reach car mode share (89%) for staff.</p>	This will increase capacity for on-site parking from 24% (baseline survey) to 89%. This will reduce impact on on-street parking capacity of surrounding streets, reduce vehicle circulation and mitigate loss of on-street parking following the Edmondson Avenue upgrade.
Bike parking	Precinct works	<ul style="list-style-type: none"> 2 parking spaces for staff 98 parking spaces for students <p>Bicycle and scooter parking will be provided according to the forecast reach active travel mode share for staff (3%) and Green Star requirements for students. Bicycle and scooter parking will be provided according to the forecast mode share for staff and pupils.</p>	Reduce demand for vehicle access by providing adequate cycling facilities.
Kiss and Drop	Precinct works	<ul style="list-style-type: none"> 2 K&D bays within the school for pre-school and support learning unit 17 K&D bays on Edmondson Avenue and Tenth Avenue (with footpath extension) 	Continue to enable parents to drop off and pick up students in a safe designated location. Reducing risk of queuing at access points.

9. Consultation with agencies

Consultation with agencies

Consultation meeting	Agencies involved
Traffic Working Group (TWG) 1, held on 19/03/2024	Arup, TfNSW, Liverpool City Council, SINSW, CTPG
Traffic Working Group (TWG) 2, held on 20/02/2024	Arup, TfNSW, Liverpool City Council, SINSW, CTPG

Consultation group	Topic	Issue raised	Decision / action
TWG 1	Contingency to include for Opal data	Should Arup include a contingency to capacity in order to more accurately account for students not tapping on or off buses.	TfNSW advised a 10% contingency to capacity should be included in the analysis to accommodate students who do not tap on or off buses when reviewing current bus capacity.
	Bus route updates	Indicative changes to bus services for routes 861, 1052, and 2033. With increased frequency and deviation to routes to include Seventeenth Ave.	TfNSW recommended additional services of bus route 855 (Rutleigh Park to Liverpool via Austral & Leppington Station) in the AM peak.
	Kiss and drop zone allocation	A minimum of 17 vehicle spaces is required for Stage 1 kiss and drop bays. Discussion on where to locate these bay.	TfNSW recommended providing kiss and drop bays on Tenth Avenue instead of Edmondson Avenue as all the on-street activities along the Edmondson Avenue will be ultimately removed due to the upgrade. It is also worth to provide a plan to show kiss and drop bay on Tenth Avenue. TfNSW and Liverpool City Council (LCC) agree that kiss and drop should be provided on Tenth Avenue to minimize conflict to the traffic on the main road. LCC advised that kiss and drop should be continuous where possible.
	Road and intersection upgrades for Edmondson Ave	Understanding that there are planned upgrades to Edmondson Ave. Confirm estimated dates for upgrade commencement and completion and how the improvements impact intersection analysis.	LCC advised that analysis for Austral Primary School Stage 1 should be based on the existing road layout as the Edmondson Avenue upgrade is targeted to complete in 2028.
	Wombat crossing relocation	General consideration for wombat crossing location.	LCC advised the existing wombat crossing on Edmondson Avenue will be relocated further south. The works is expected to be carried out during Christmas holiday 2024. LCC recommended to group the kiss and drop bays in one area, separated to the bus zone. LCC will provide the crossing relocation plan to Arup to consider.

Consultation with agencies

Consultation group	Topic	Issue raised	Decision / action
TWG 2	Actions from TWG 1	<ul style="list-style-type: none"> Review kiss and drop arrangement on Edmondson Avenue and Tenth Ave. Review Edmondson Avenue wombat crossing. 	<ul style="list-style-type: none"> LCC will send through the latest plans to reflect in Arup drawings. LCC agreed the kiss and drop bays should be within one location to make management of the bays easier on Edmondson Avenue. Stage 1 Kiss and Drop areas have been updated with Revision K site plans. LCC agrees that the wombat crossing will be moving south, closer to the school pedestrian access on Edmondson Ave.
	Bus route 855	Arup presented modifications to bus route 855 required for new residential areas.	Arup concluded that bus route 855 is an infrequent and long service which is currently underutilised, and changes to the timetable would be required to fit with the start and end times of Austral Public School if it were to be used. TfNSW agreed it was an infrequent service but should still be considered in the analysis.
	Bus route 861	Impacts of changes to bus route 861 on other schools in the area.	TfNSW requested to look at the impact of bus route 861 on St Anthony of Padua Catholic College. Arup to provide bell times as an appendix to Traffic Impact Assessment. TfNSW noted that the frequency of 861 would increase to every 15 minutes if funding was secured. If this is implemented prior to the completion of the proposed activity (2026), this would provide more services for the school to use. TfNSW noted if funding was not secured prior to 2026 then alternative arrangements would need to be made, such as a dedicated school bus service for Austral Public School. TfNSW to review funding and bus options prior to 2026.
	Edmondson Avenue intersection	Arup queried whether a temporary crossing could be installed as a result during the Edmondson Avenue – Tenth Avenue intersection upgrade.	LCC mentioned this would need to be discussed at a future traffic committee. SINSW could provide a pedestrian count survey result to Arup to justify a temporary crossing.

ARUP

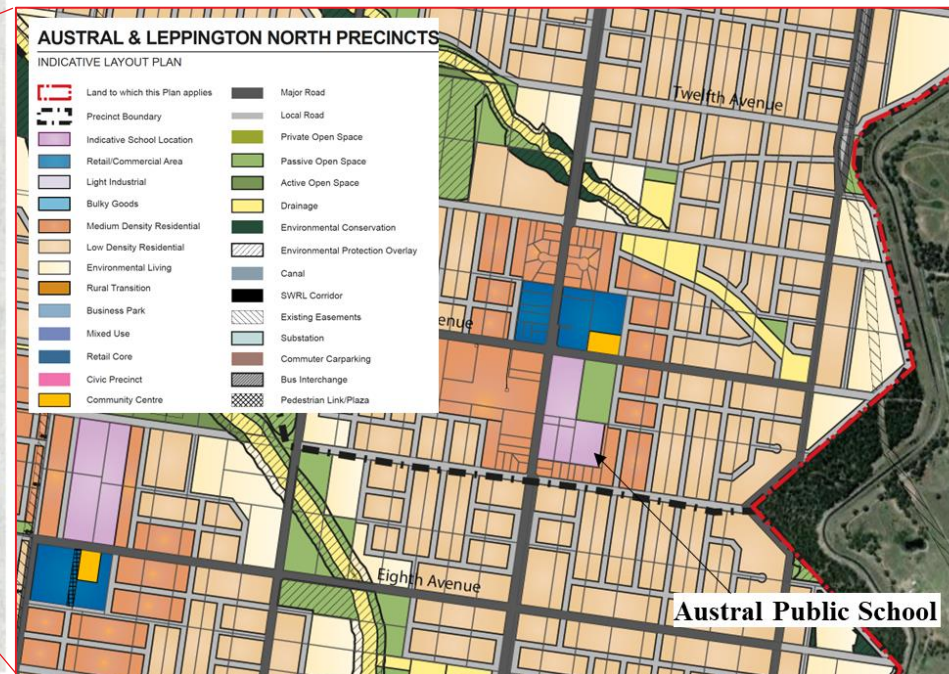
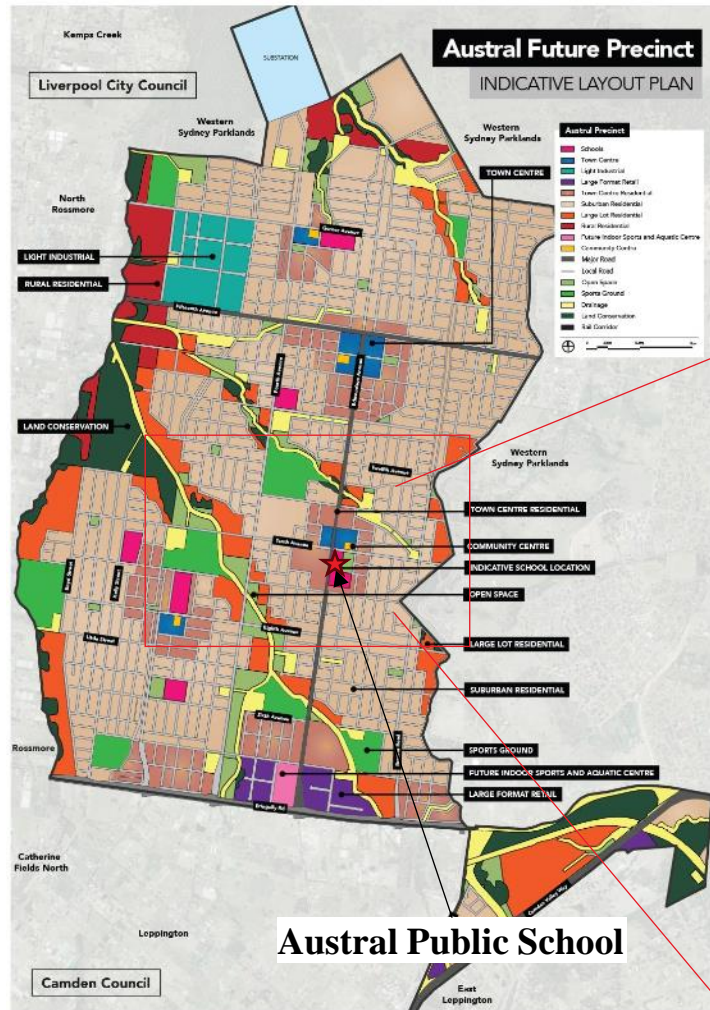
Supplementary details

Appendix A – School Project Context

School project context

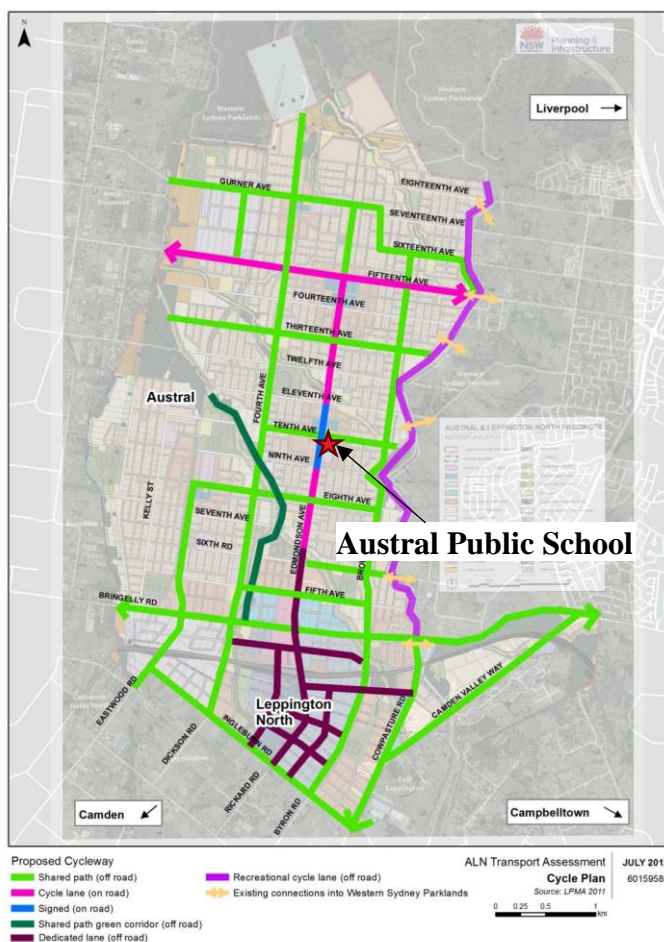
Austral and Leppington North (ALN) Precincts – Indicative Layout Plans

- The Austral and Leppington North Precinct illustrate the road layout and hierarchy and indicates that there will be medium density residential development surrounding the school, which has been illustrated within the catchment analysis within this Transport Impact Assessment.

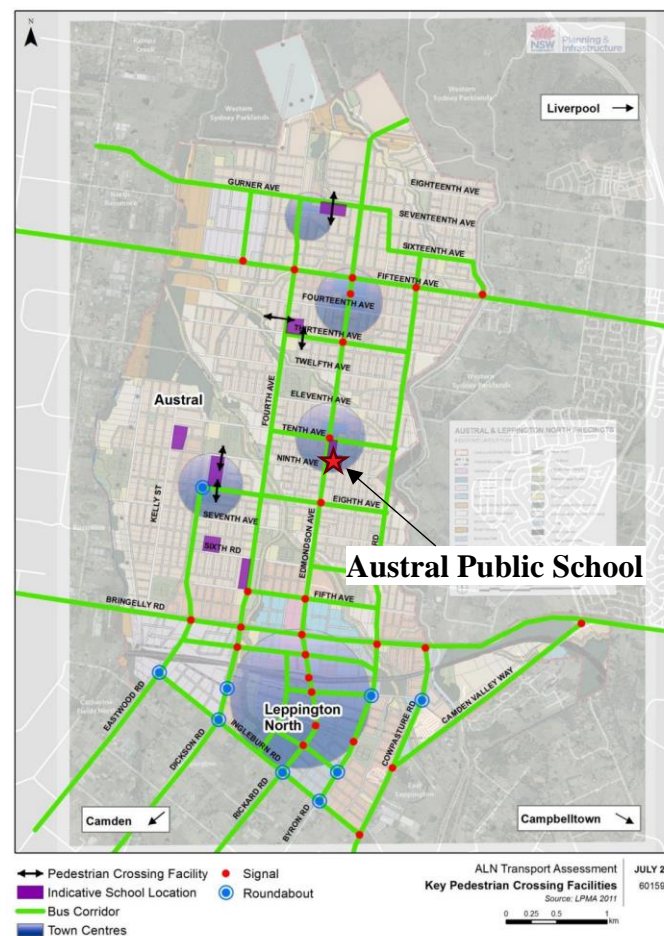


School project context

Austral and Leppington North (ALN) Precincts – Proposed Active Transport Network



Proposed cycleways

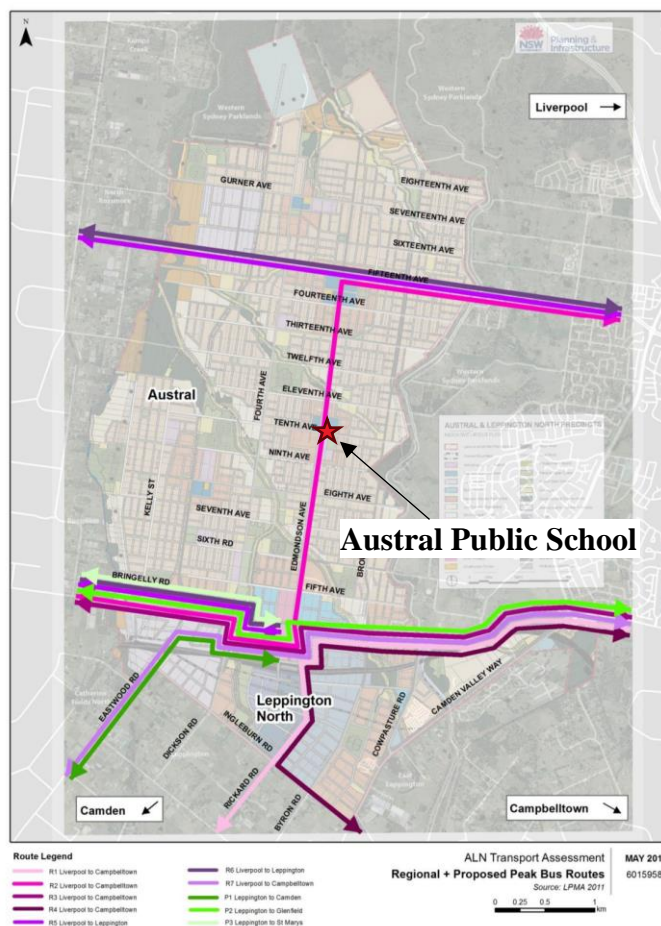


Proposed pedestrian crossing facilities

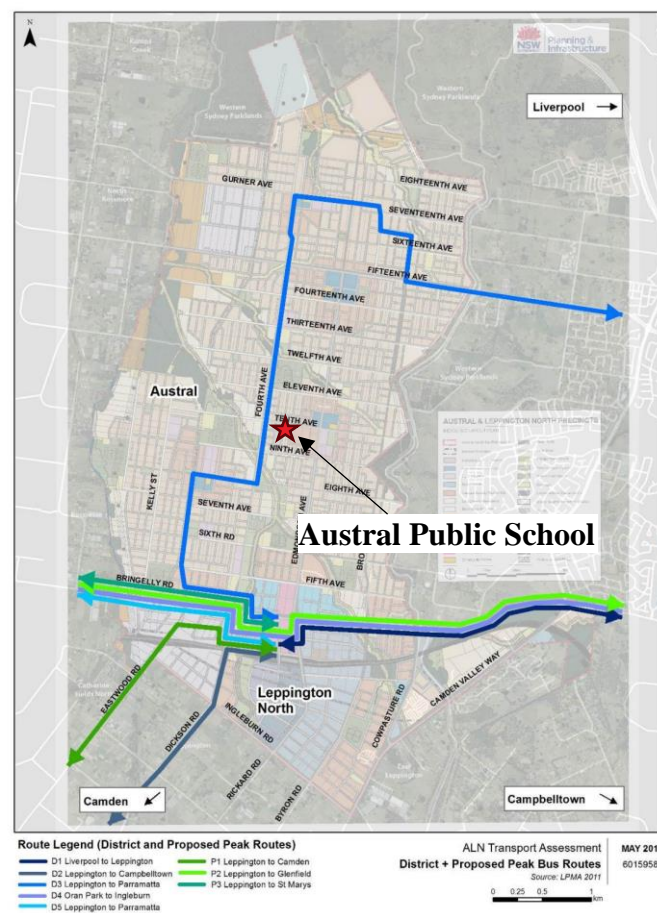
- On road cycle routes are proposed on Edmondson Avenue, with shared routes proposed to the east and west of Austral Public School which could be used by staff.
- Students are likely to cycle and scoot on footpaths given the shared paths proposed in the surrounding proposed residential super lots.
- Key crossing facilities proposed on Edmondson Avenue upgrade, as well as on Fifteenth Avenue to the north and Fifth Avenue and Bringley Road to the south.
- Crossings are missing to the west of Austral Public School where proposed residential super lots are proposed. This will help to encourage active travel to and from school.
- Infrastructure is being provided by developers in different stages, and therefore could be delayed or halted in the future.
- Developers are permitted to provide footpaths on both sides of the road for their developments to align with crossings.

School project context

Austral and Leppington North (ALN) Precincts – Proposed Bus Network



Regional and proposed peak bus routes

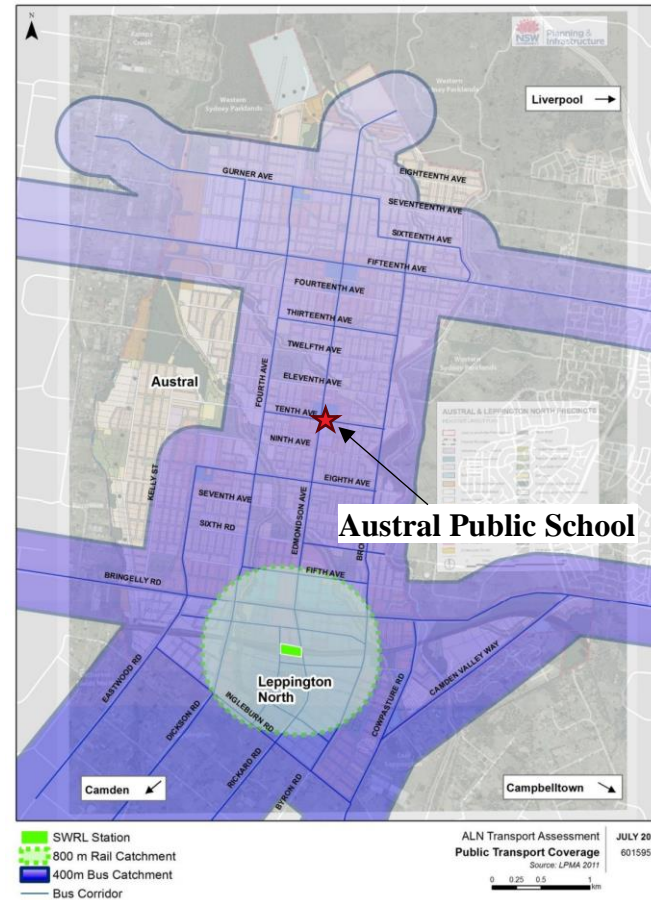


District and proposed peak bus routes

- Bus routes are proposed along Fifteenth Avenue, Sixteenth Avenue and Seventeenth Avenue to the north and Eighth Avenue to the south Austral Public School to accommodate the future residential development.
- These routes align with the school bus routes identified for Austral Public School to encourage an uptake on public transport use.

School project context

Austral and Leppington North (ALN) Precincts – Proposed Bus Network

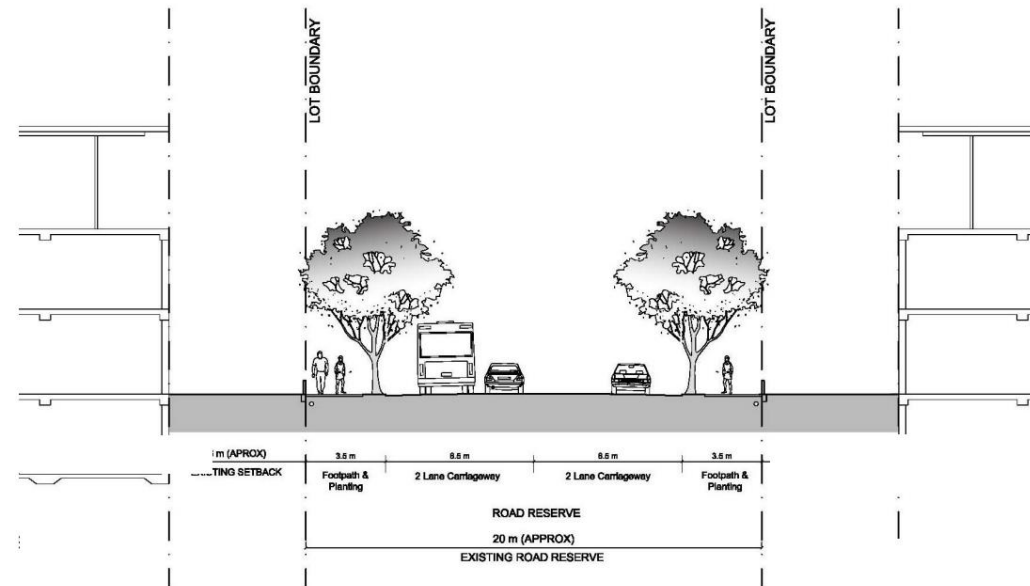
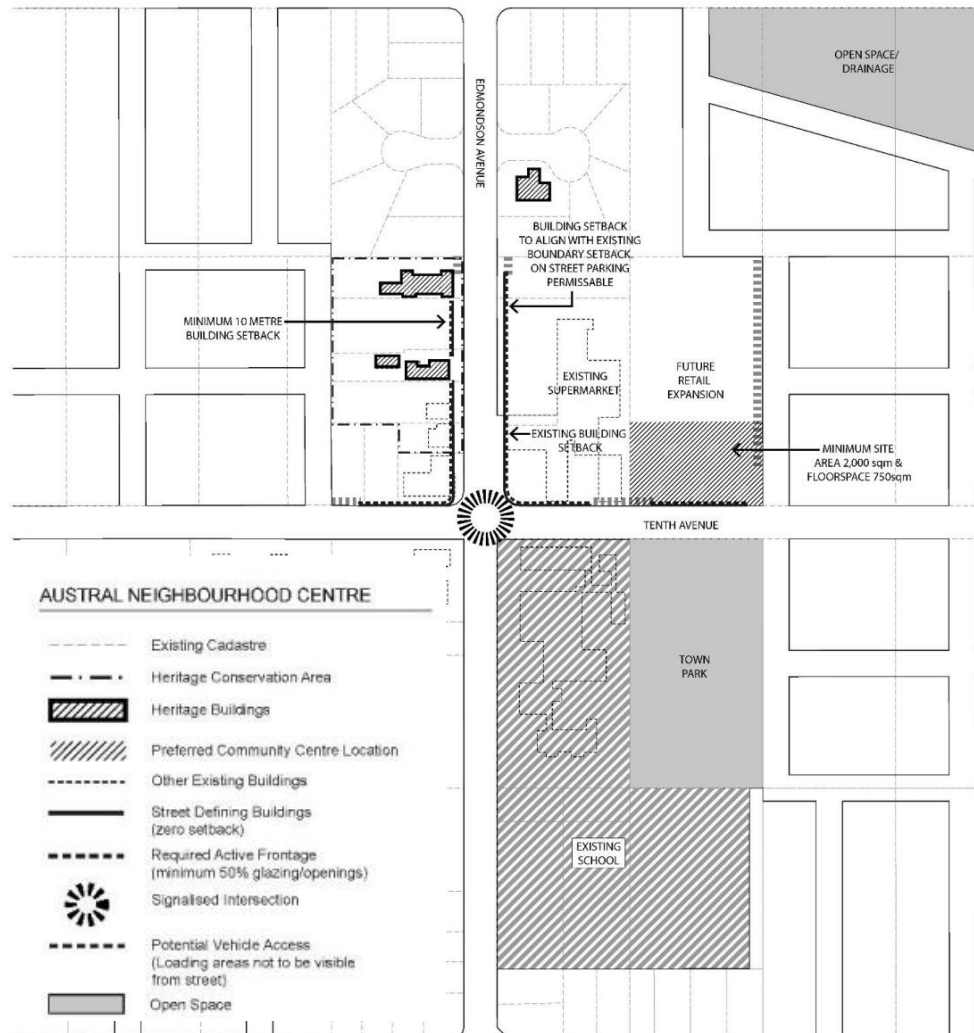


- Bus corridor coverage is proposed to the north and west of Austral Public School which aligns with the new residential developments within Austral, which will help to encourage an uptake on public transport use.

Public transport coverage

School project context

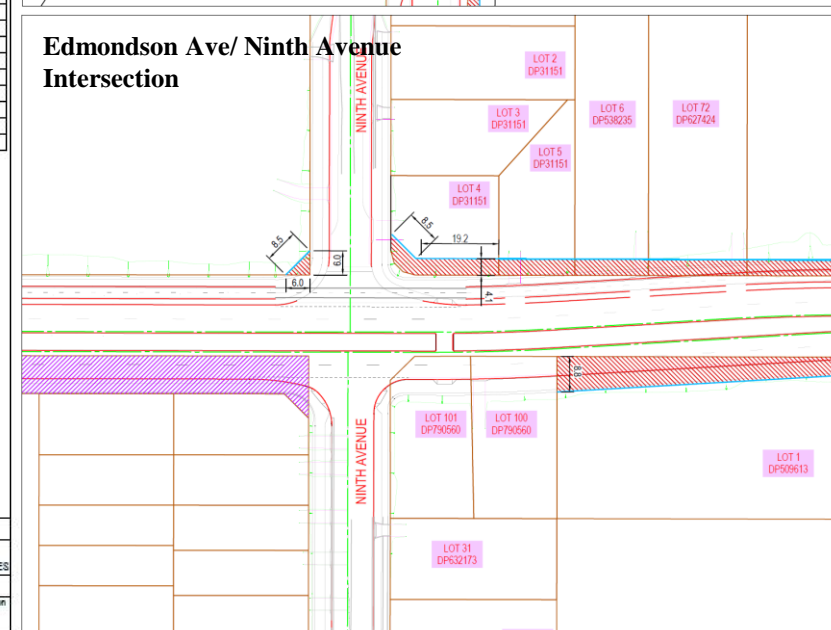
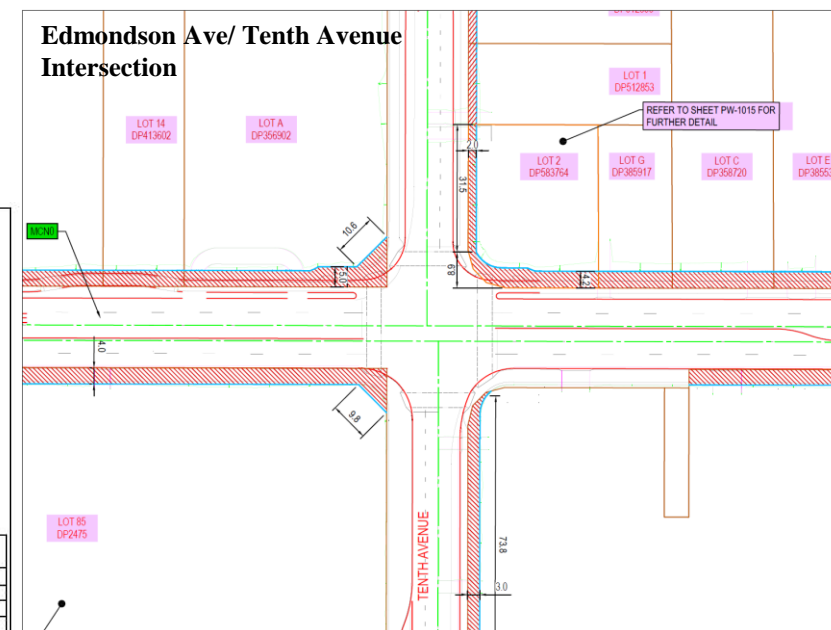
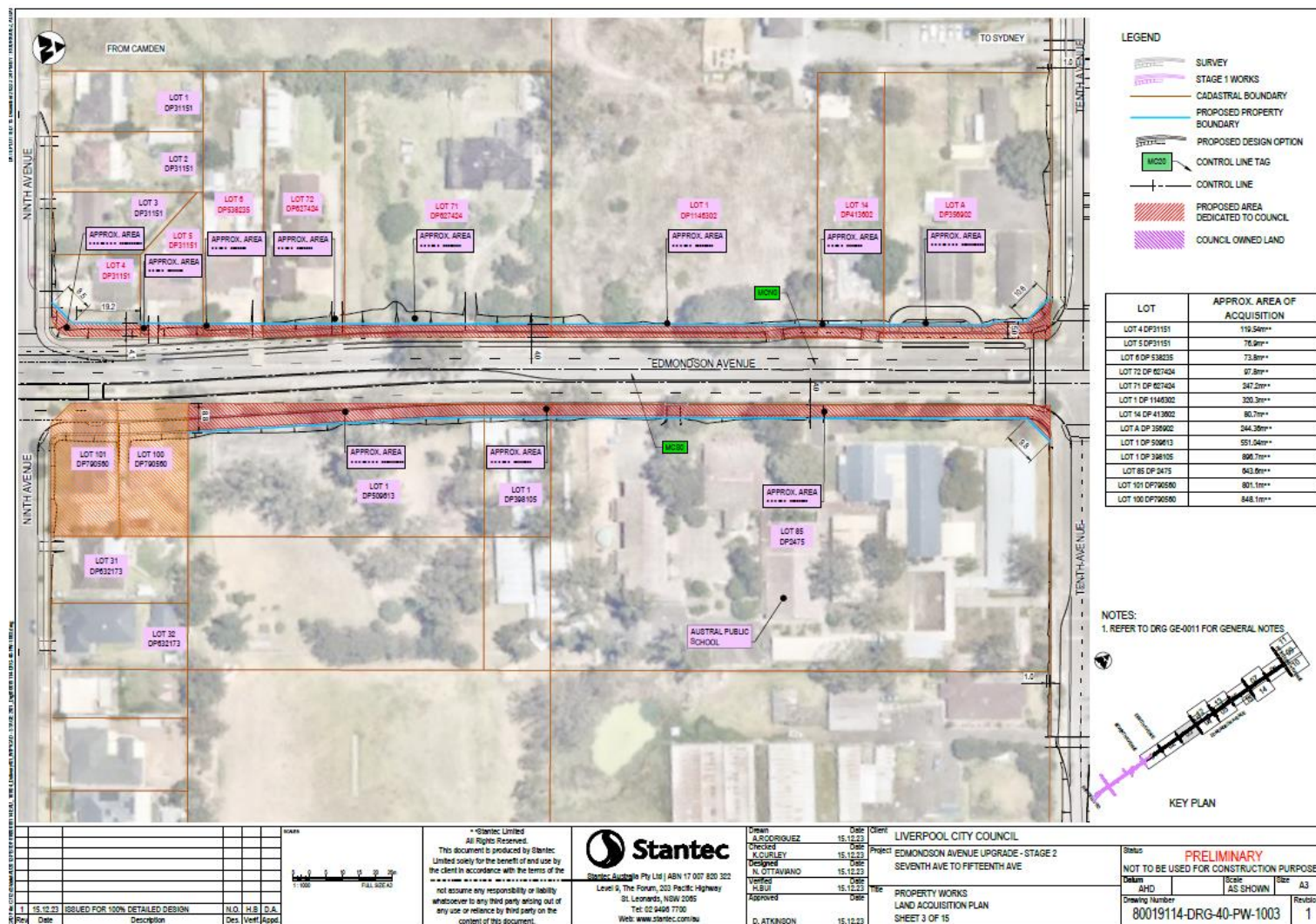
Austral and Leppington North (ALN) Precincts – Town Centre DCP



Edmondson Avenue design – Austral Neighbourhood Centre

- New signalised intersection at Edmondson Avenue/ Tenth Avenue with controlled pedestrian crossings.
- Potential for future retail expansion to the north of Austral Public School, which may impact future kiss and drop activity on Tenth Avenue.
- New footpaths are proposed on Edmondson Avenue to encourage safe and active travel in Austral, which connect directly to the school.

Edmondson Avenue upgrade



School project context

Residential growth and traffic growth rate

The Post-Exhibition Traffic report (Addendum) 2012 of Austral and Leppington North (ALN) Precincts Transport Assessment provides data showing the expected volumes along the road network in the Austral and Leppington North Area in the year 2036. These traffic volumes were then compared to survey data obtained at the key intersections for 2023 for context.

A compounded 1.45% annual traffic growth rate has been adopted for the purpose of this to project future year background traffic volumes. A similar compounded growth rate of 1% was adopted in the Transport Impact Assessment for St Anthony of Padua Catholic College, Austral prepared by Bitzios in August 2023.

Location	Direction	2023 Survey		2036 Forecast		Compounded Annual Growth Rate	
		AM	PM	AM	PM	AM	PM
Edmondson Avenue (N of Tenth Avenue)	NB	516	409	1,020	480	5.38%	1.24%
	SB	748	819	480	1,000	-3.35%	1.55%
	Total	1,264	1,228	1,500	1,480	1.33%	1.45%

Table 8: Forecast 2036 peak hour flows for proposed road network

Location	Direction	AM Peak	PM Peak	AADT	Classification
Edmondson Avenue (N of Tenth Avenue)	Northbound	1,020	480	15,000	Transit Boulevard
	Southbound	480	1,000		

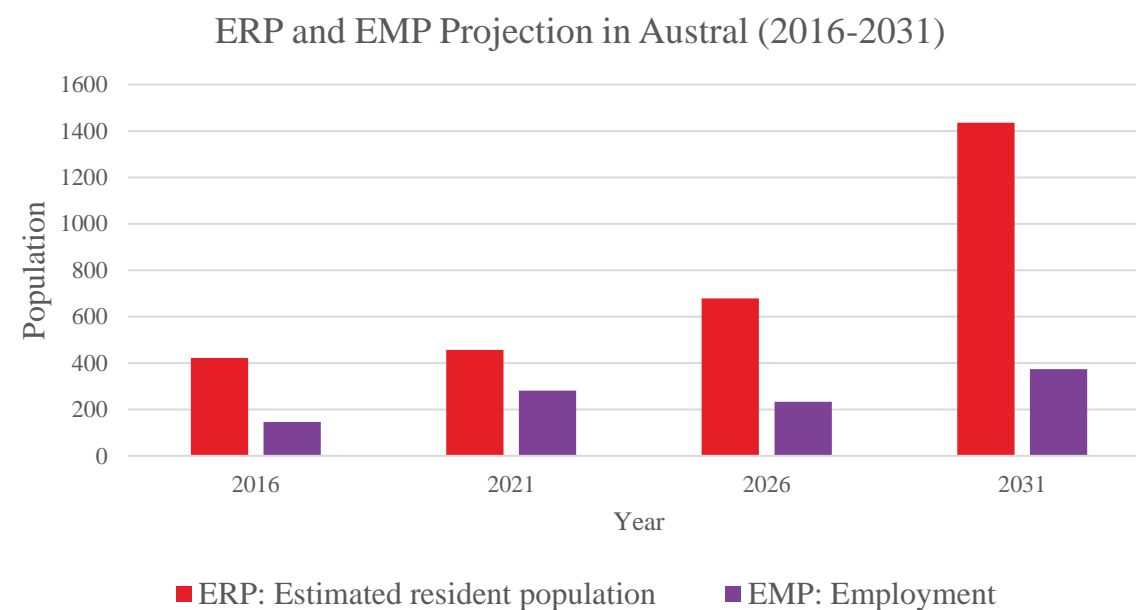
Table 1: Cumulative Dwelling Occupation by Precinct in the Growth Centres from 2011

Precincts	2011	2016	2021	2026	2031	2036	Post 2036
South West Rezoned Precincts							
Edmondson Park	415	2,615	6,315	7,600	7,600	7,600	7,600
Oran Park	565	3,115	6,015	8,515	8,786	8,786	8,786
Turner Road	500	2,250	4,150	4,991	4,991	4,991	4,991
South West Released Precincts							
Austral	-	900	2,800	4,800	6,500	6,751	6,751
Leppington North	-	1,050	4,050	6,550	7,314	7,314	7,314
South West Future Release Precincts							
The Northern Road Corridor	-	750	4,400	10,100	14,473	14,663	14,663
Camden Valley Way Corridor	-	-	2,550	11,750	21,468	27,519	28,019 (+1,036)
Bringelly Road / Elizabeth Drive Corridor	-	-	-	100	3,800	15,917	35,910 (+19,993)

Source: Department of Planning and Infrastructure, August 2010

School project context

Population and employment projection in Austral (2016 – 2031)



Item	AAGR 2016-21	AAGR 2021-26	AAGR 2026-31
ERP	2%	10%	22%
EMP	19%	-3%	12%

Item	2016	2021	2026	2031
ERP	422	457	679	1,435
EMP	146	281	232	374

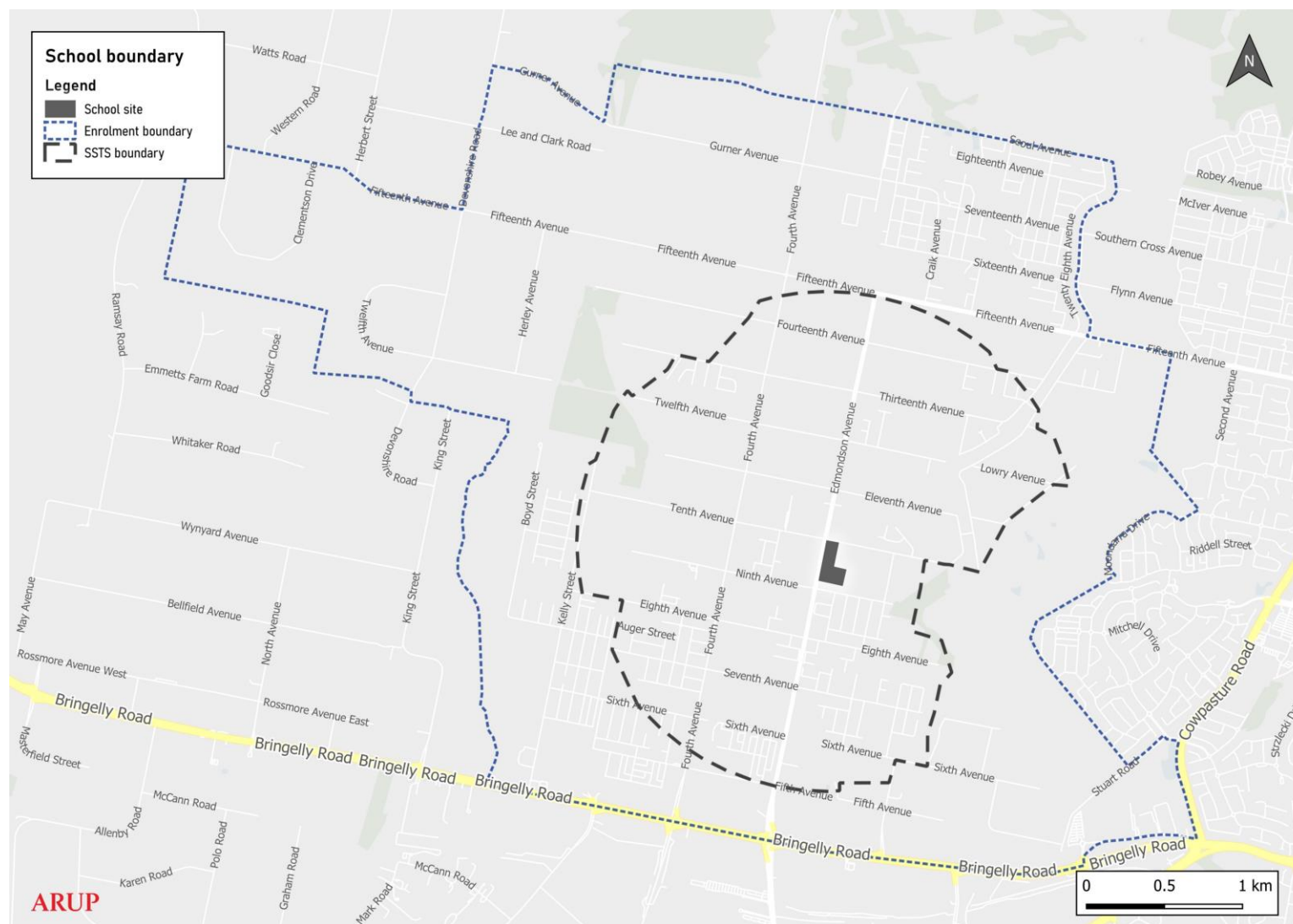
- 10% increase in residents 2021-2026, likely to be within the catchment area for Austral Public School
- Funding forecast from developers of residential super lots (more than 30 lots coming forward 2024-2028, \$30k per lot from developers, c\$1m)

Supplementary details

Appendix B – Catchment Analysis

Catchment analysis

Current enrolment boundary



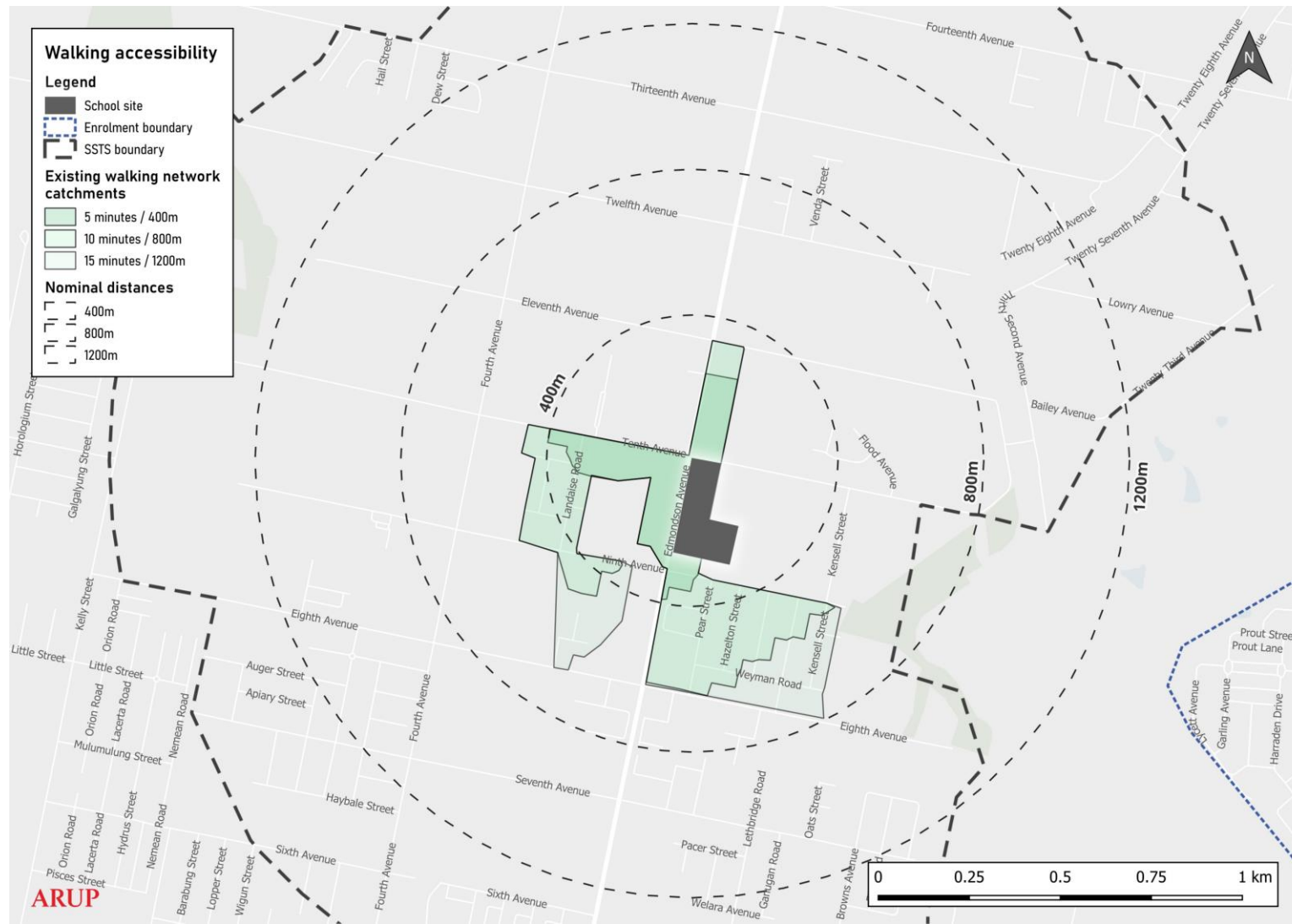
What does this mean for Austral Public School?

- Current primary school students cluster to the south-west and north, extending past Fifteenth Avenue.
- Future subdivisions and students are expected to live east, west, and north of Austral Public School. It's approximated this could increase the number of students living in the school catchment by 70% *.
- Overall, in the near-term future students are expected to be located closely around the school rather than dispersed.

**based on observed patterns from the number of students living in recently completed subdivisions*

Catchment analysis

Existing walking/ scooting network catchment



Catchment analysis

Existing walking/ scooting catchment

Current students	As the crow flies		Actual on path	
	No. of students	% of students	No. of students	% of students
0 - 400m (5 mins)	28	4%	4	1%
400 - 800m (10mins)	71	10%	37	5%
800 - 1200m (15mins)	107	15%	15	2%
Total	199	28%	56	8%

- Current primary school students cluster to the south-west and north, extending past Fifteenth Avenue.
- Future subdivisions and students are expected to live east, west, and north of Austral Public School. It's approximated this could increase the number of people living in the school catchment by 70%*.
- Overall, in the near-term future students are expected to be located closely around the school rather than dispersed.

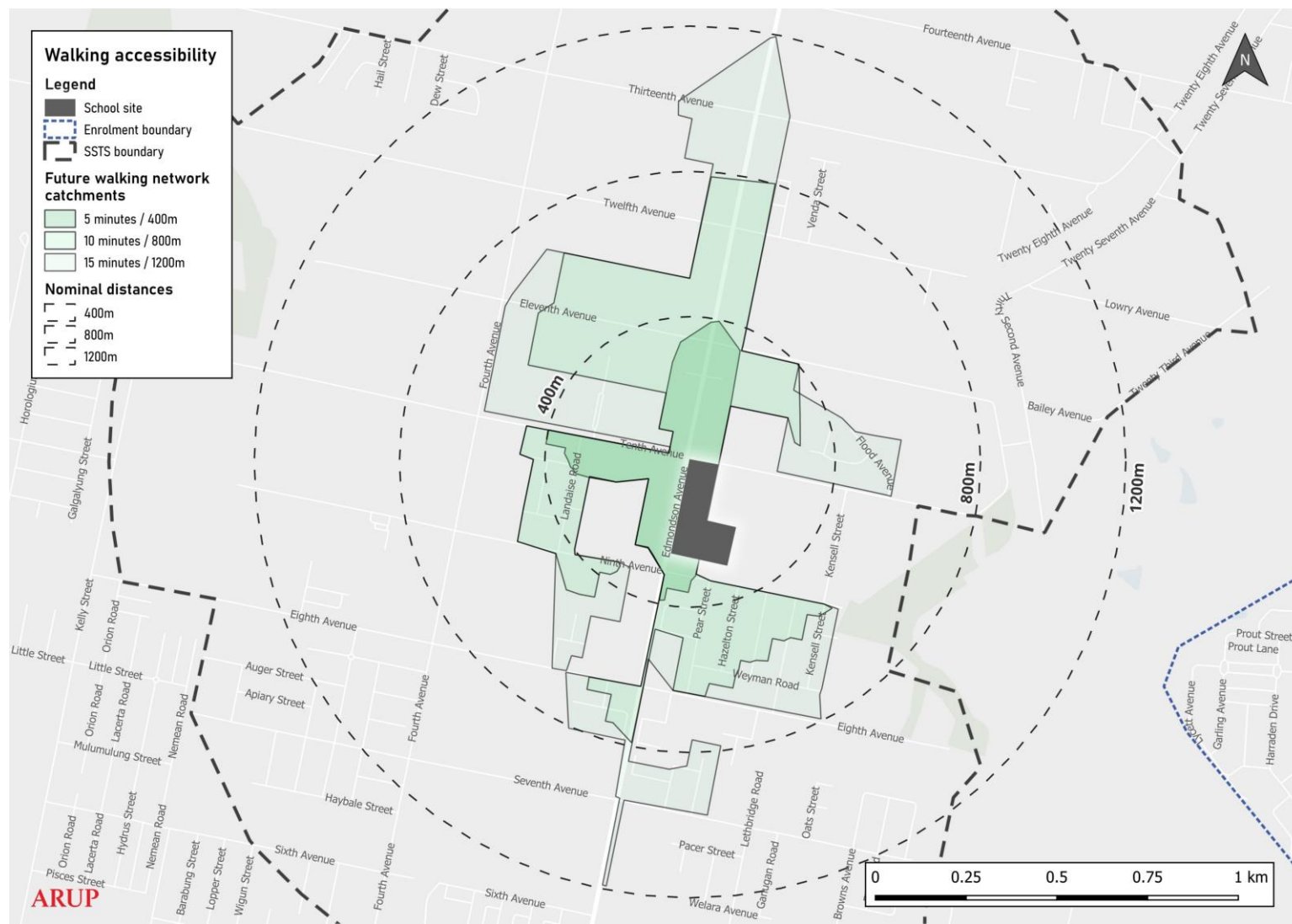
**based on observed patterns from the number of students living in recently completed subdivisions*

What does this mean for Austral Public School?

- 8% of existing students can safely walk to school within 15 minutes.
- Lack of crossings across Eleventh Avenue restrict much of the accessibility north of the school.
- Discontinuous footpaths means existing students don't have a direct connection to Edmondson Avenue.
- students have been observed to walk on grass verges during the site visit.

Catchment analysis

Future walking/scooting network catchment

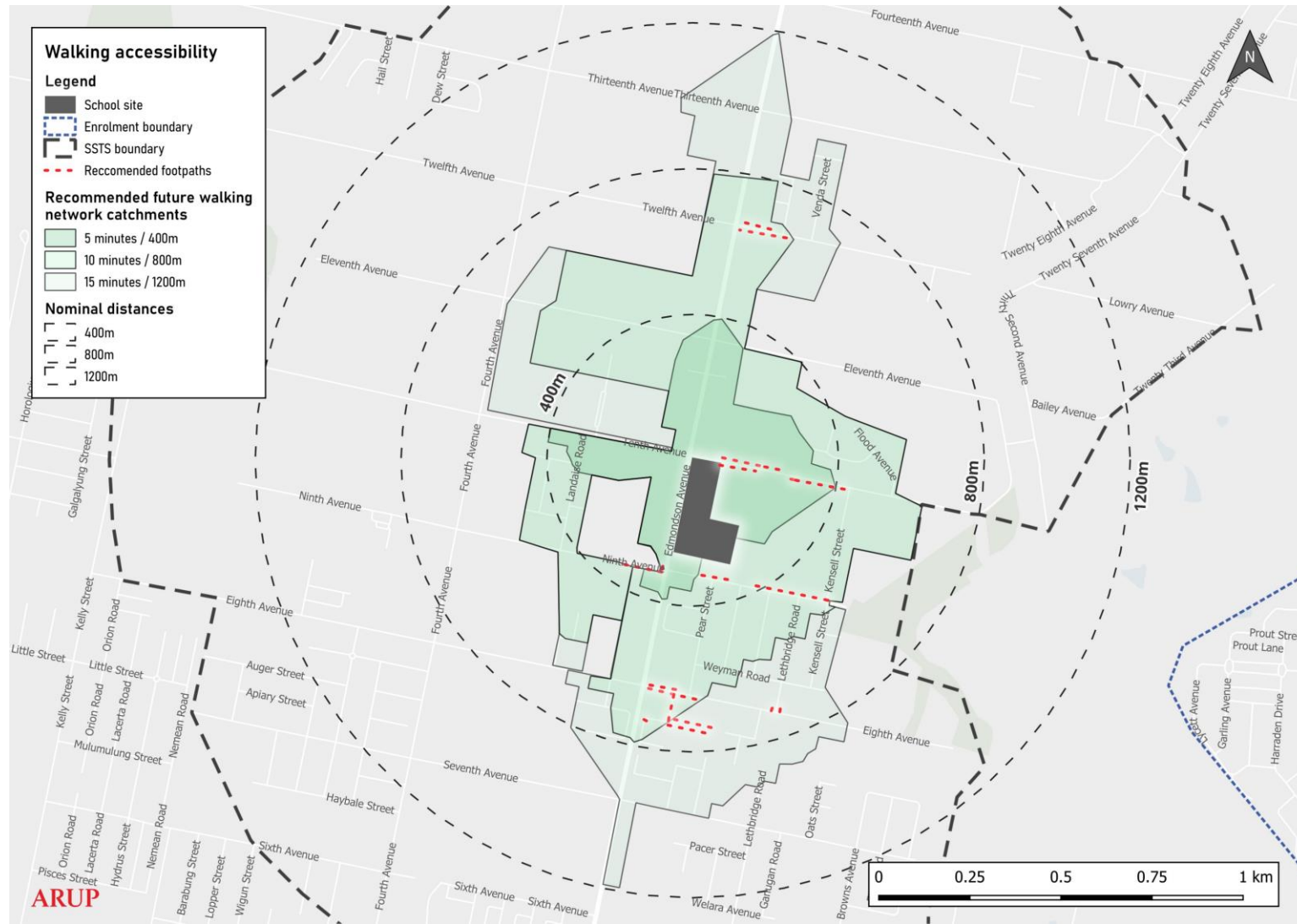


What does this mean for Austral Public School?

- Accounts for footpath and crossing upgrades to Edmondson Road (2026-2028).
- Accounts for footpaths built adjacent to future developments (2024-2028) in order comply with the DCP.
- Footpaths on the E-W roads are expected to remain fragmented.

Catchment analysis

Recommended future walking/ scooting network catchment



What does this mean for Austral Public School?

- Added 'missing links' dotted in red in image opposite
- The walking network identifies the recommended footpaths that connect new developments to the school.

Catchment analysis

Future walking/ scooting catchment

Current students	As the crow flies		Actual on path	
	No. of students	% of students	No. of students	% of students
0 - 400m (5 mins)	36	5%	4	0%
400 - 800m (10mins)	83	10%	40	5%
800 - 1200m (15mins)	125	16%	40	5%
Total	244	31%	83	10%

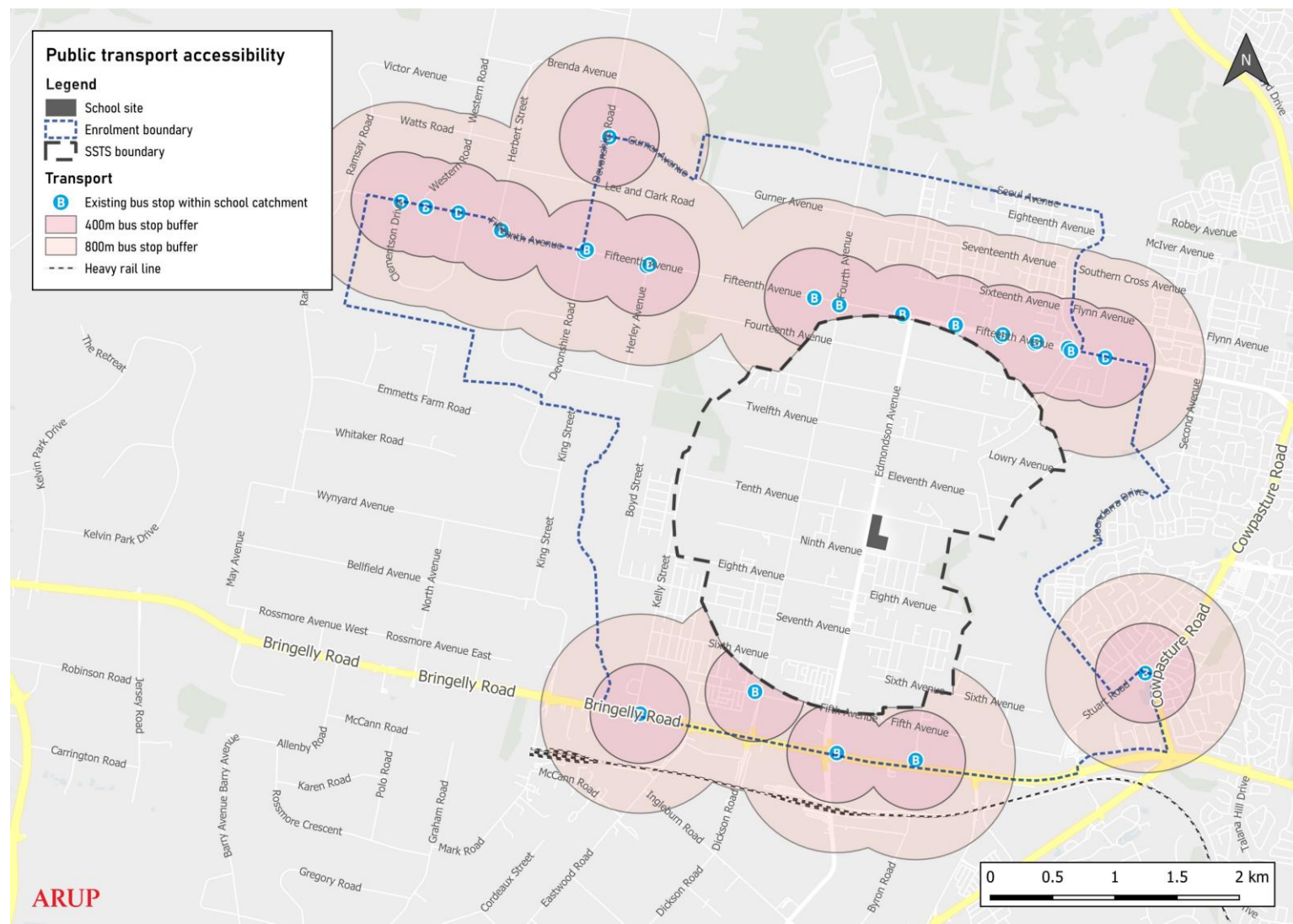
Future students	As the crow flies		Actual on path	
	No. of students	% of students	No. of students	% of students
0 - 400m (5 mins)	36	5%	9	1%
400 - 800m (10mins)	83	10%	71	9%
800 - 1200m (15mins)	125	16%	46	6%
Total	244	31%	126	16%

What does this mean for Austral Public School?

- Around 16-17% of all students live within 400-800m distance from school.
- Although not currently dedicated footpaths on all routes within 15 min catchment, students have been observed to walk on grass verges
- This percentage is anticipated to remain consistent in the future, as new homes are expected be built both close by the school and further out.
- The concentration of homes to the south-west of the school are beyond walking distance but are within cycle/scooting distance.

Catchment analysis

Public transport catchment



Catchment analysis

Public transport catchment

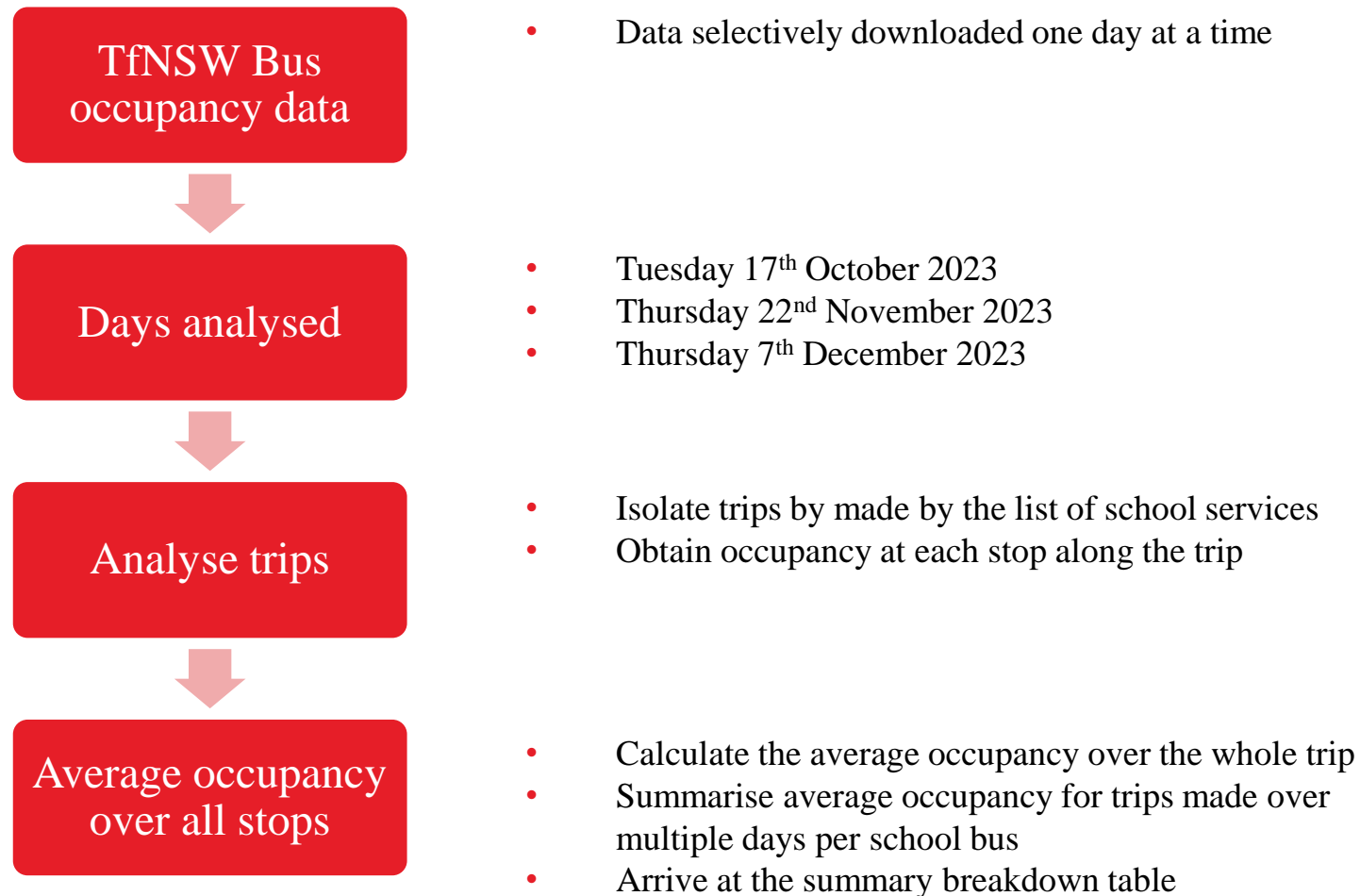
Catchment	Existing		Future	
	No. of students	% of students	No. of students	% of students
Not eligible (within SSTS distance)	284	40%	375	47%
Eligible for free travel (outside SSTS distance)	427	60%	419	53%
Total	711	100%	794	100%
Current bus services				
Eligible for free travel and within 400m of a bus stop	114	16%	127	16%
Eligible for free travel and within 800m of a bus stop	292	41%	254	32%
Recommended bus services				
Eligible for free travel and within 400m of a bus stop	363	51%	365	46%
Eligible for free travel and within 800m of a bus stop	419	59%	405	51%

What does this mean for Austral Public School?

- More than half of the students live far enough to qualify for free travel to school via public transport.
- Currently, around 16% of students in the future will have convenient access (5 minutes-walk) to a public transport service that takes them to/from school.
- Introducing additional bus stops near new subdivisions would substantially boost the number of students with public transport access to school (particularly those in north and southwest).
- It is advised to improve bus routes to provide these bus stops and encourage more students to use bus services subject to discussion with TfNSW.

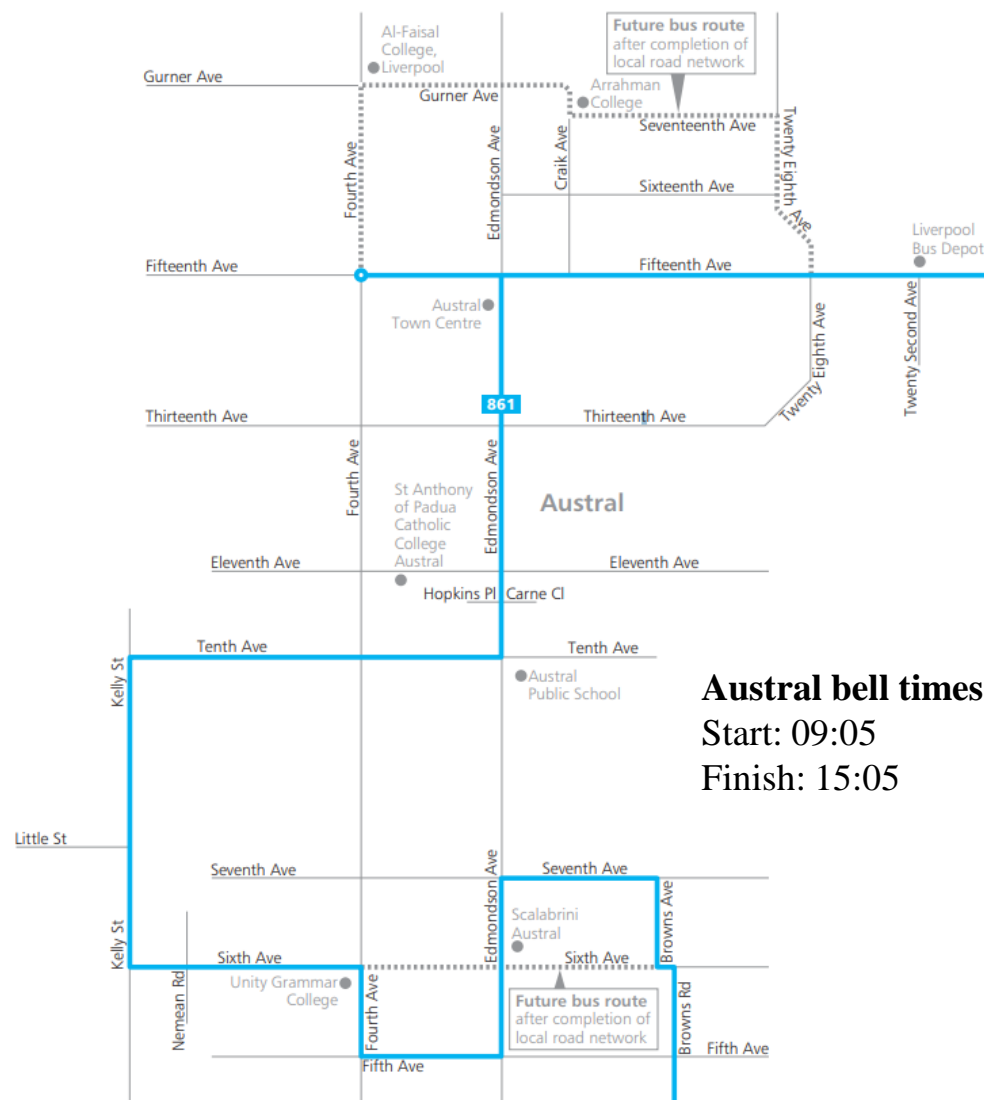
Catchment analysis

School bus services capacity analysis



Indicative changes to bus services

Route 861



Amend the 861-bus service as per the TfNSW future bus plan. This would include services along Seventeenth Avenue and Sixth Avenue.

Proposed changes:

- Deviation of the route as per future bus plan.
- Timetable adjustments to accommodate for the deviation.
- Timetable to better align with school commencement and departure (2 southbound and 2 northbound).
- Provide additional stops on all new streets (approx. 400m spacing)

Rationale:

- Existing service and future plan is already considered.
- Opal data shows low occupancy (0-20) for most of the route, with capacity available to accommodate addition student usage.
- Would service new student population for both north and south of the school site.

TfNSW have advised route 861 may increase to 15-minute frequency, but timetable adjustments may be difficult with St Anthony of Padua Catholic College.

Bus analysis

Route 861

Route	Service area	Service start/ Austral arrival time	Additional km / time	Suggested scheduling change	Other schools impacted?
861 (SB) AM	North-east	7:20/ 7:41 7:54/ 8:11 8:20/ 8:37* 9:25/ 9:46**	3.3km / 7min	Adjust one of the two services to either to be earlier or later in order to align with 9:05am.	Yes. Leppington Public School (8:30am) St Anthony of Padua Catholic College (9am) Unity Grammar College (bell time not known)
861 (NB) AM	South-west	7:45/ 8:13 8:15/ 8:43* 8:48/ 9:16**	3.3km / 7min	Adjust one of the two services to either to be earlier or later in order to align with 9:05am.	Yes. Leppington Public School (8:30am) St Anthony of Padua Catholic College (9am) Unity Grammar College (bell time not known)
861 (SB) PM	South-west	14:30/ 14:51** 14:58/ 15:23* 15:28/ 15:49**	3.3km / 7min	Adjust one of the two services to either to be earlier or later in order to align with 3:05pm.	Leppington Public School (3:30pm) St Anthony of Padua Catholic College (3pm) Unity Grammar College (3pm)
861 (NB) PM	North-east	14:20/ 14:48** 14:50/ 15:18* 15:25/ 15:53**	3.3km / 7min	Make 14:48 depart closer to 15:05 and bring forward 15:53 service.	-

*Best existing time for Austral start/ end bell time

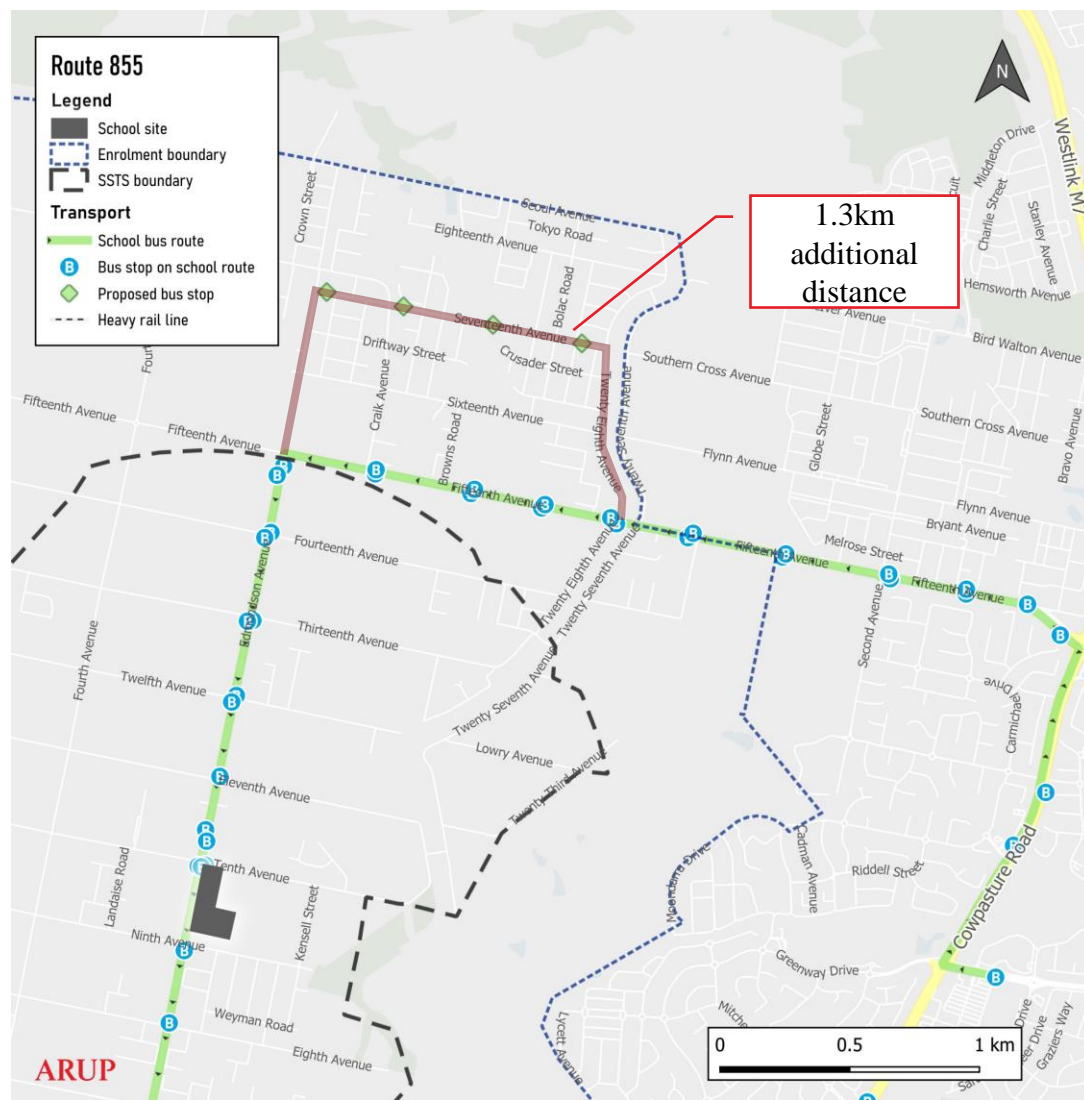
**Bus service time to amend closer to start/ end bell time of Austral

Route	Departure / arrival time	Direction	Occupancy 0-20	Occupancy 21-40	Occupancy 41-60	Occupancy 61-80
861	8:20 / 8:37	Southbound	100%	0%	0%	0%
861	8:15 / 8:43	Northbound	100%	0%	0%	0%
861	9:25/ 9:46	Southbound	100%	0%	0%	0%
861	14:30 / 14:51	Southbound	100%	0%	0%	0%
861	14:58 / 15:23	Southbound	78%	22%	0%	0%
861	14:50 / 15:18	Northbound	71%	14%	14%	0%

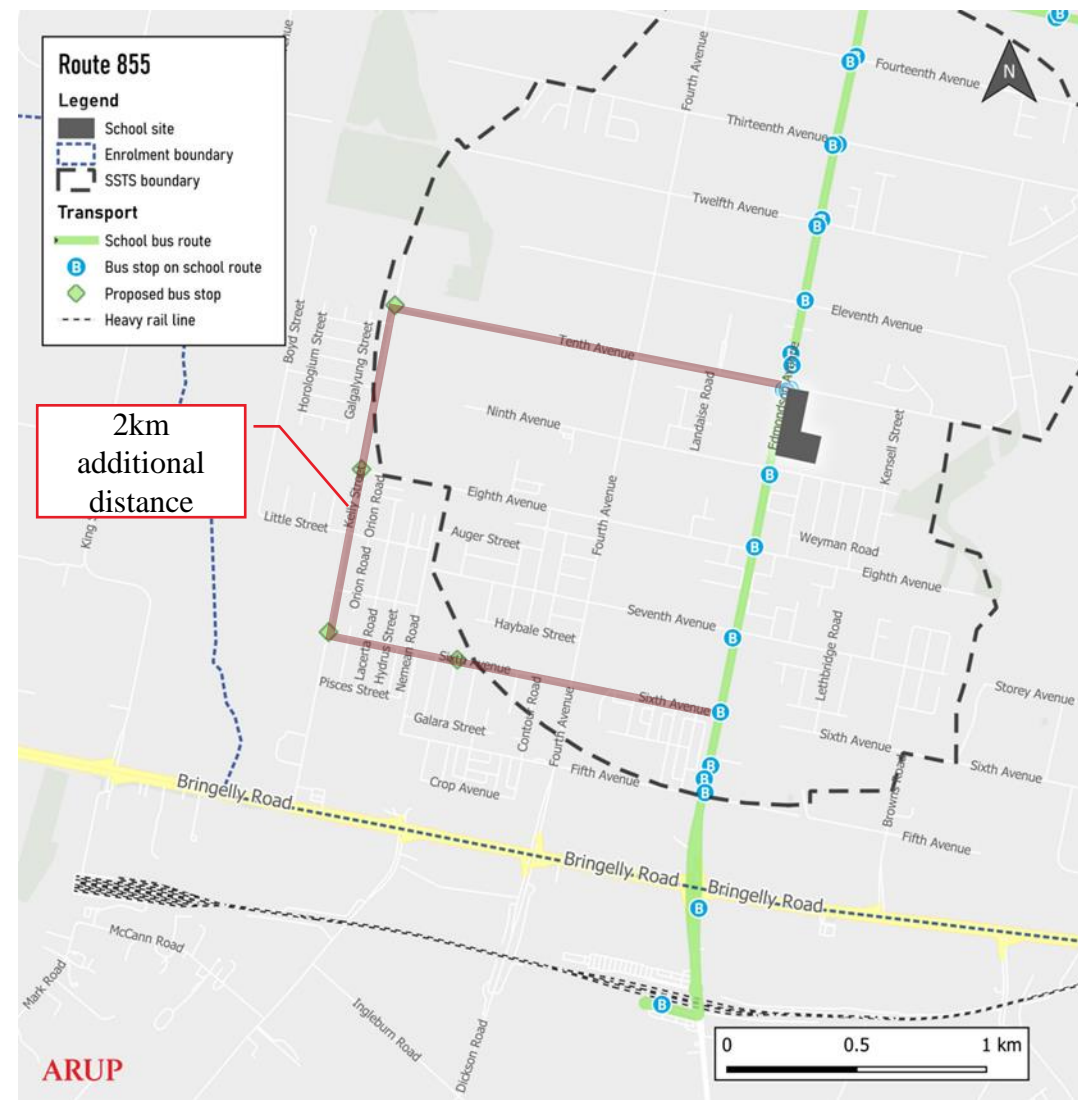
- The special 14:58 service that stops at St Anthony's College is noticeably more utilised than other services.
- The 14:50 service coming from Leppington Station was the most utilised service.

Bus service improvements

Route 855 AM southbound

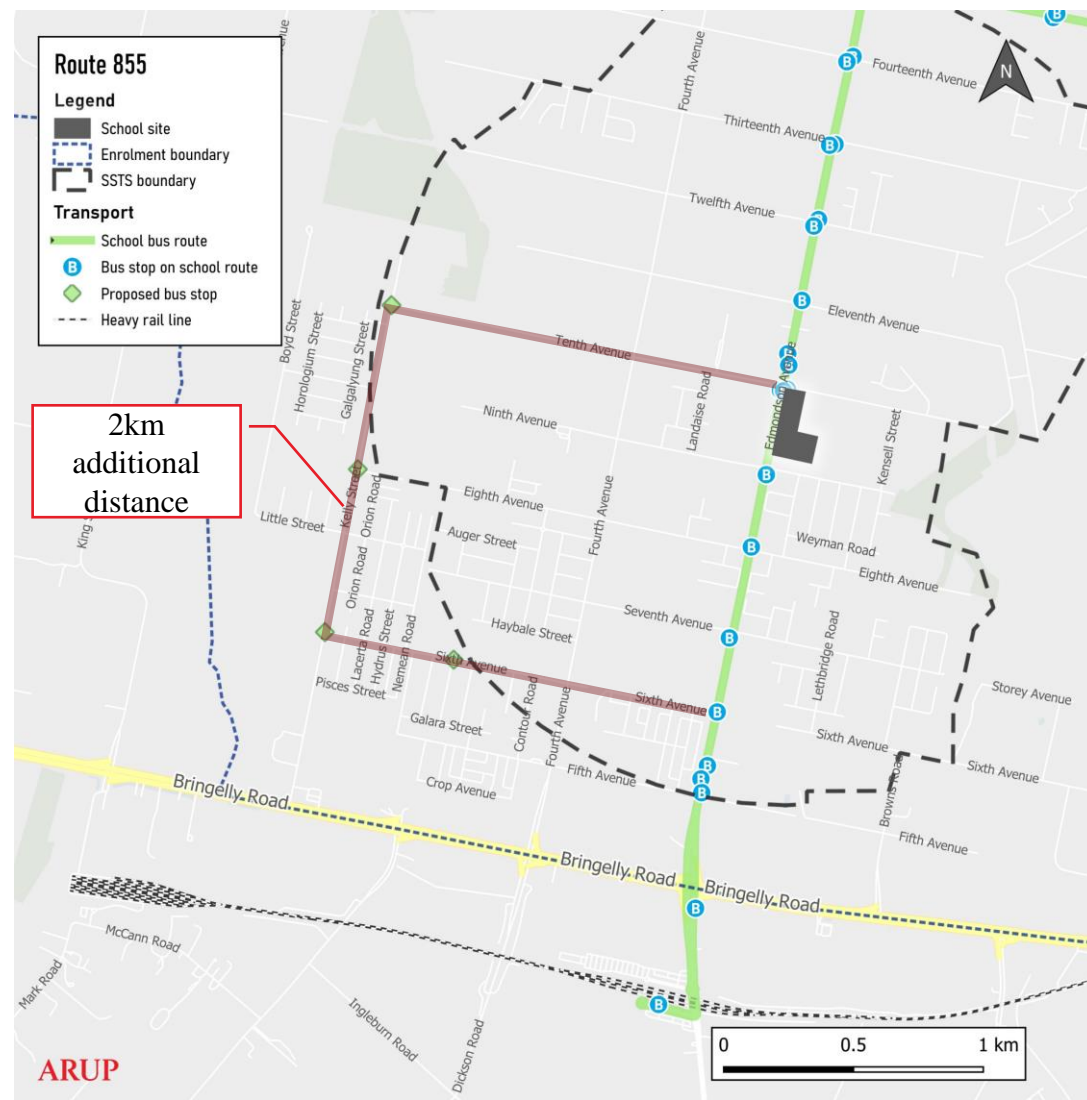


Route 855 AM northbound



Bus service improvements

Route 855 PM southbound



Route 855 PM northbound



Bus service improvements

Route 855

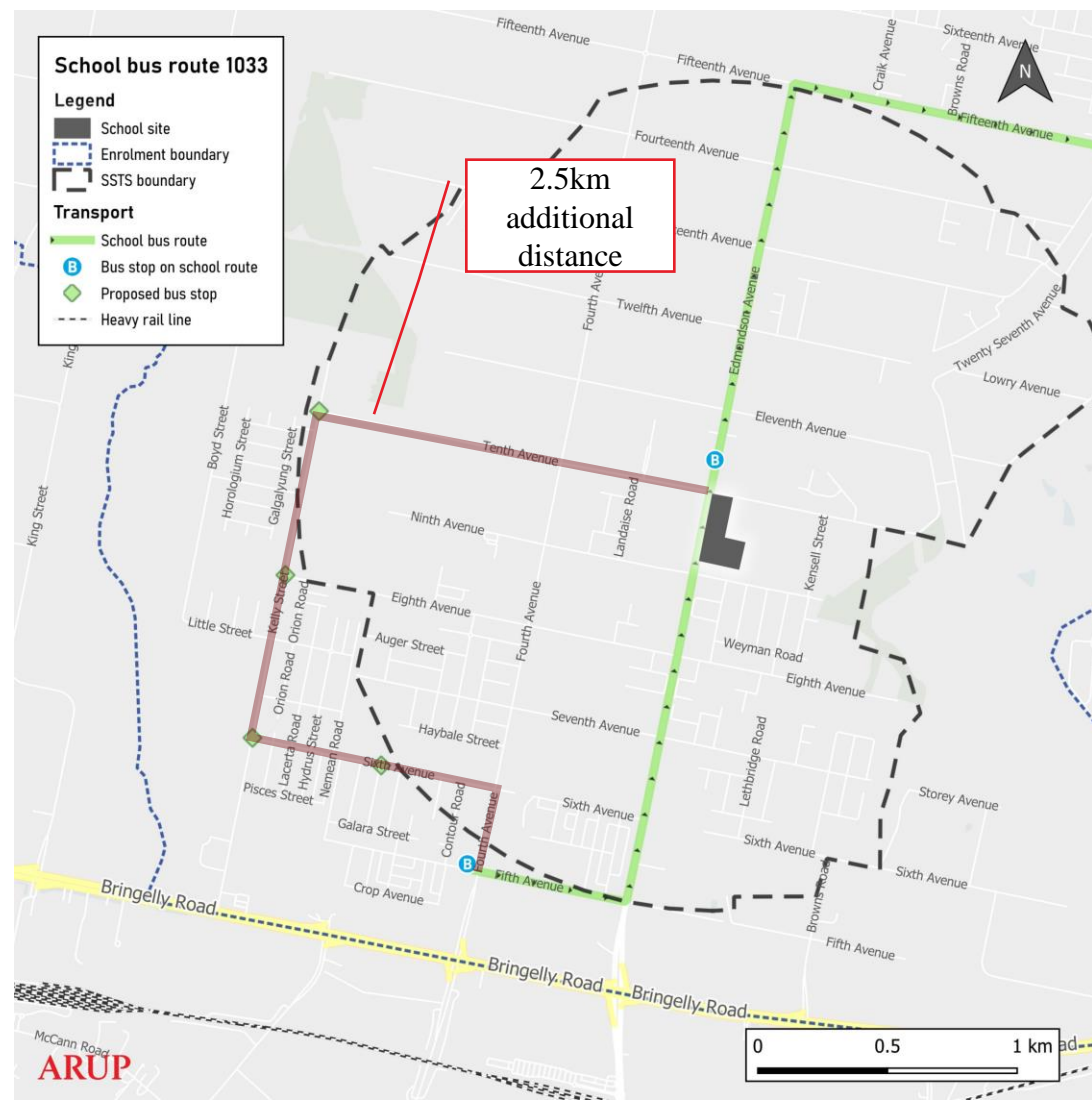
Route	Service area	Service start/ Austral arrival time	Additional km	Suggested scheduling change	Other schools impacted?
855 (SB) AM	North-east	9:15 / 9:26	1.3km	Yes. Shift service to start ~30 minutes earlier.	No. Carnes Hill Marketplace short service.
855 (NB) AM	South-west	8:35 / 9:08	2km	Yes: Shift service to start ~ 15 minutes earlier.	No. But may be used for commuting to Leppington Station.
855 (SB) PM	South-west	13:35 / 14:21 16:00 / 16:50	2km	Either shift one service or create a new service.	No.
855 (NB) PM	North-east	15:18	1.3km	No. This is a special service departing from Austral PS.	No

Route	Departure / arrival time	Direction	Service area	Occupancy			
				0-20	21-40	41-60	61-80
855	9:15 / 9:26	Southbound	North-east	100%	0%	0%	0%
855	8:35 / 9:08	Northbound	South-west	100%	0%	0%	0%
855	13:35 / 14:21	Southbound	South-west	100%	0%	0%	0%
855	16:00 / 16:50	Southbound	South-west	100%	0%	0%	0%
855	15:18	Northbound	North-east	100%	0%	0%	0%

- The 855 is an infrequent service and therefore other times have not been listed as they are more than an hour before/after school start/end.
- 855 has been provided as per recommendation by TfNSW. This is subject to discussion in future TWGs.
- Occupancy data suggests the service is underutilised throughout the day.

Bus analysis

Route 1033 - AM



Provide a re-route of the 1033 School service to capture the expanded student catchment for morning travel.

Proposed changes:

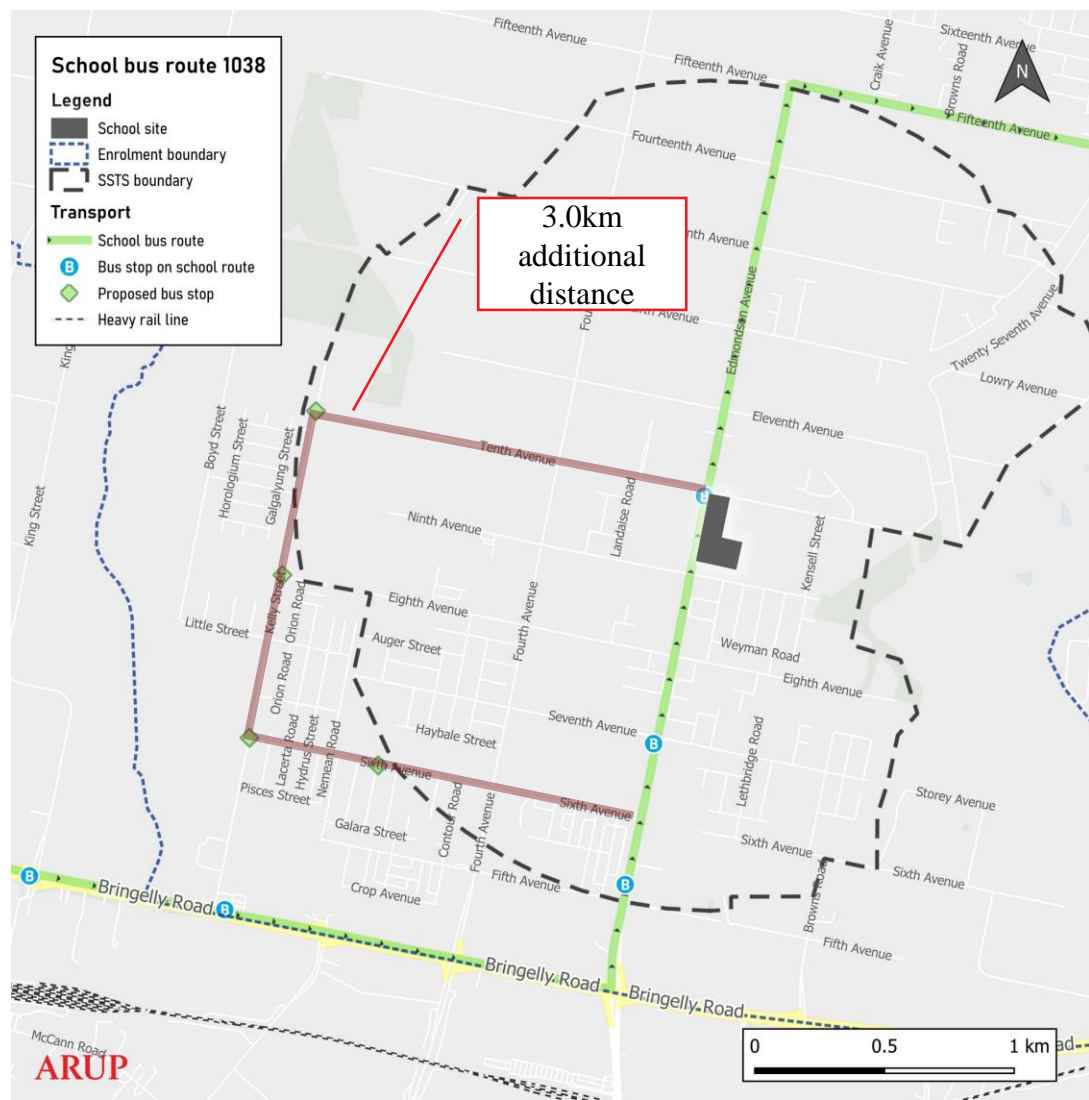
- Deviation to include Seventeenth Avenue approximately 2.5km from existing service on Edmondson Avenue.
- The service arrives at Austral PS at 8:15 and therefore the start time would need to be shifted to start later to align with Austral PS bell times. Hoxton Park High School will be impacted.
- Provide 4 new bus stops on Kelly Street and Sixth Avenue.

Rationale:

- All existing stops of this school route can be maintained.
- Opal data shows low occupancy (0-20) throughout route, with capacity available to accommodate addition student usage.

Bus analysis

Route 1038 - AM



Provide a re-route of the 1038 School service to capture the expanded student catchment for morning travel.

Proposed changes:

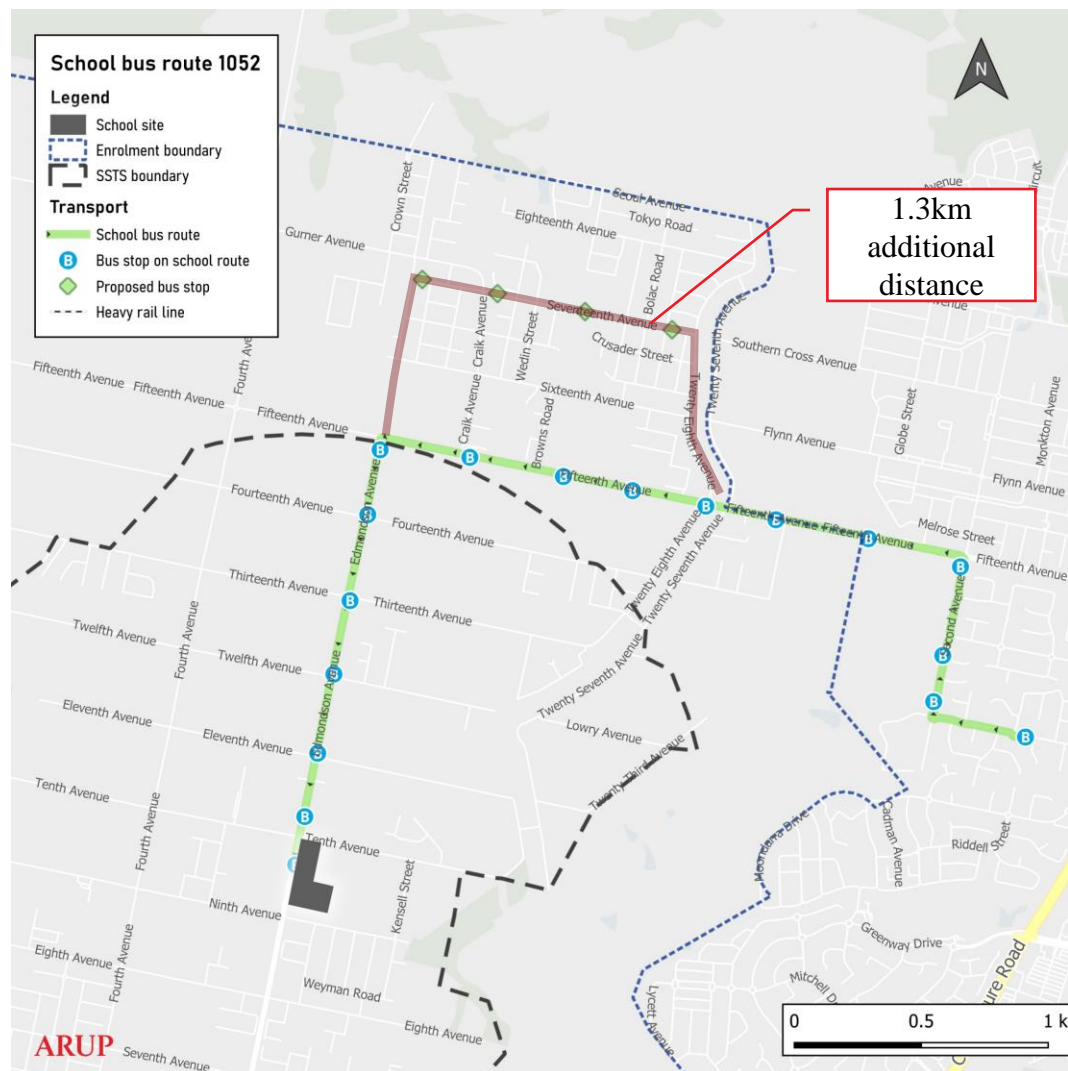
- Deviation to include Seventeenth Avenue approximately 3.0km from existing service on Edmondson Avenue.
- The service arrives at Austral PS at 7:38 and therefore the start time would need to be shifted to start later to align with Austral PS bell times. Rossmore Public School may potentially be impacted.
- Provide 4 new bus stops on Kelly Street and Sixth Avenue

Rationale:

- Existing school service already services the school on Edmondson Avenue.
- Opal data shows low occupancy (0-20) throughout route, with capacity available to accommodate addition student usage.

Bus analysis

Route 1052 - AM



Provide a minor re-route of the 1052 School services to capture the expanded student catchment for morning travel.

Proposed changes:

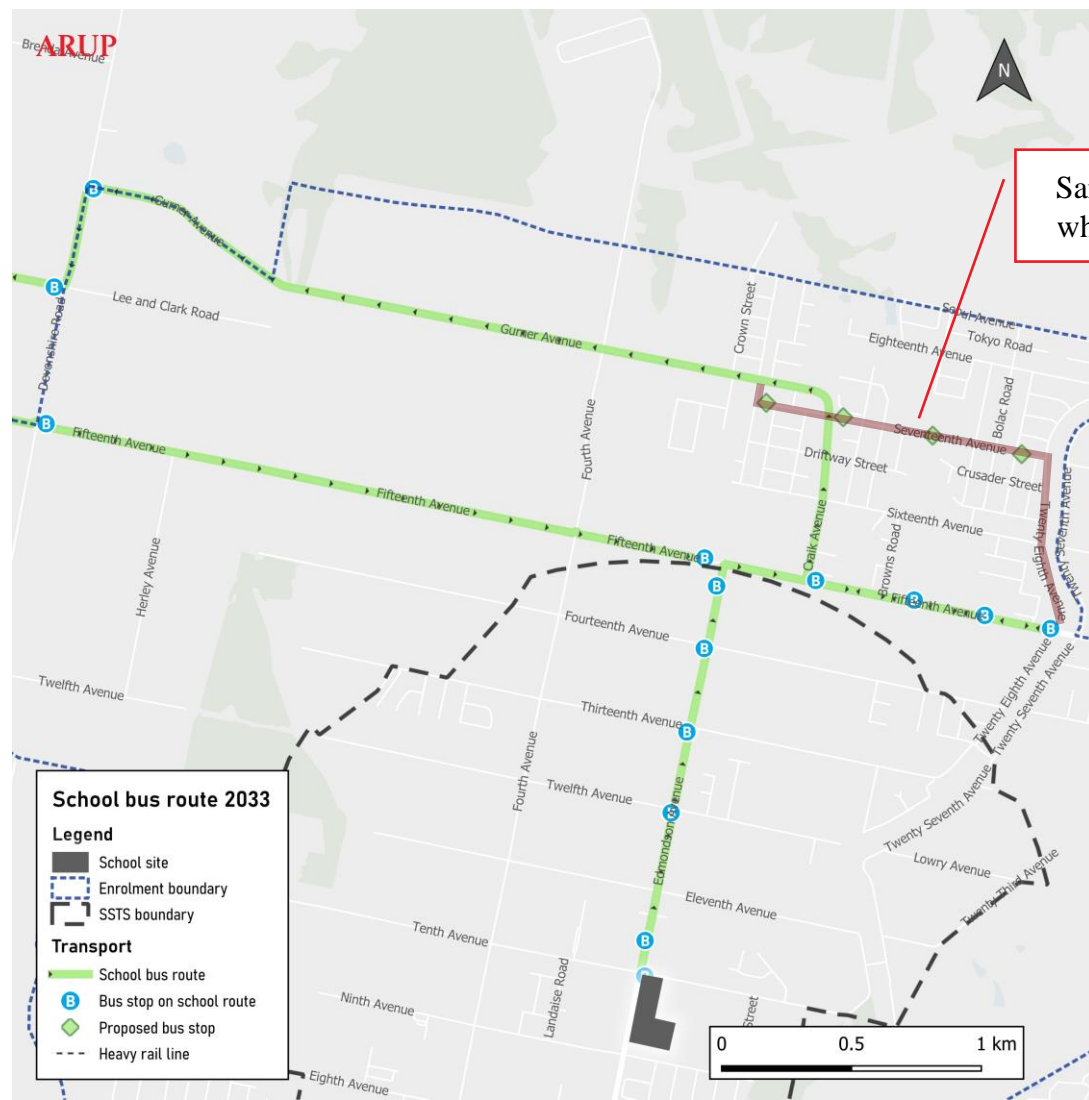
- Deviation to include Seventeenth Avenue approximately 1.3km from existing service on Fifteenth Avenue.
- Minor timetable adjustments to accommodate for the deviation.
- Provide 4 new bus stops on Seventeenth Avenue.

Rationale:

- Service arrival time suits Austral PS bell time.
- No other schools on route, primarily services Austral PS.
- Opal data shows low occupancy (0-20) throughout route, with capacity available to accommodate addition student usage

Bus analysis

Route 2033 - PM



Provide a minor re-route of the 2033 School service to capture the expanded the student catchment for afternoon travel.

Proposed changes:

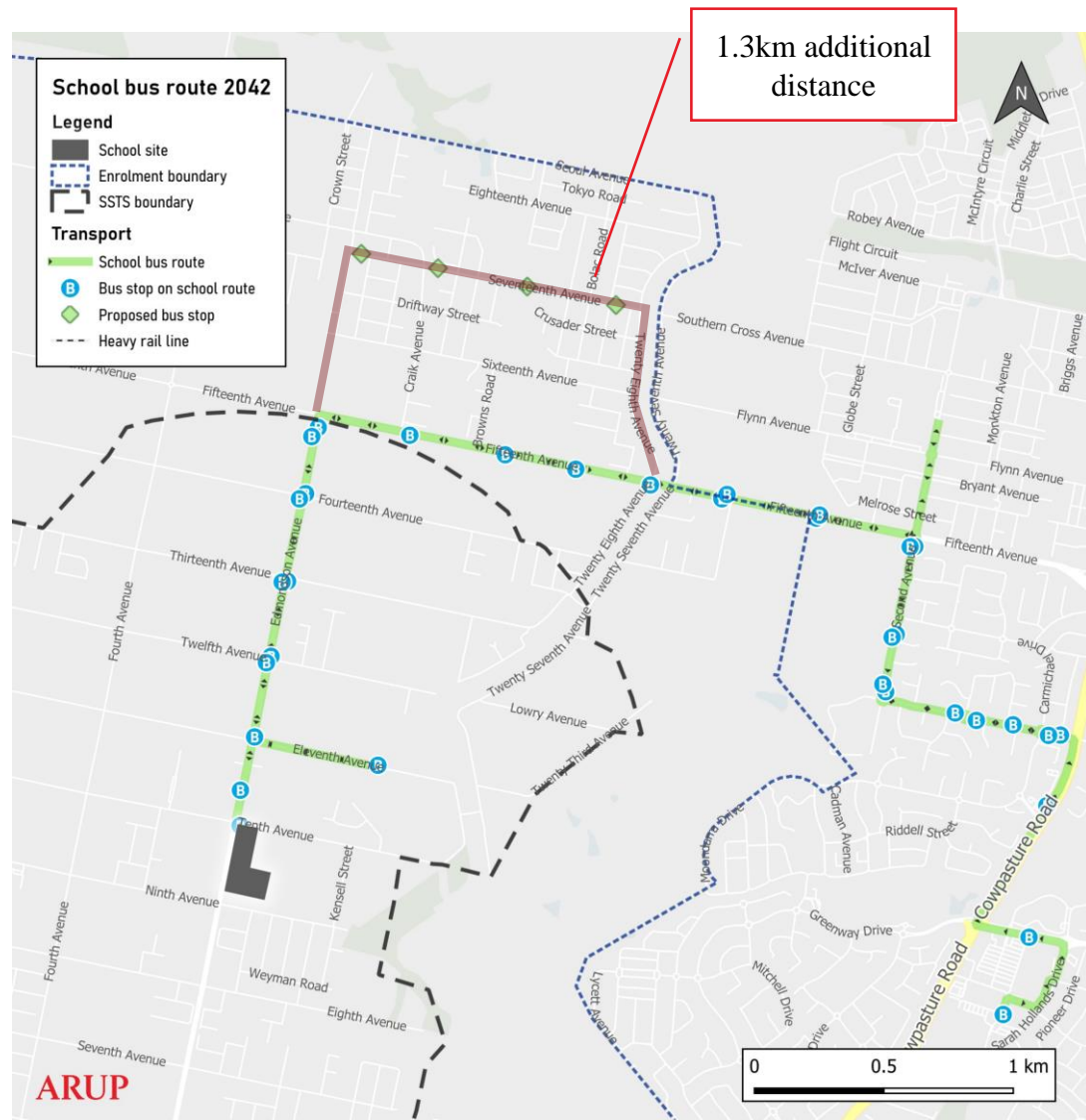
- No additional distance when route is diverted to include Seventeenth Avenue .
- Change time to depart earlier (departs Austral PS at 16:00).
- Provide 4 new bus stops on Seventeenth Avenue.

Rationale:

- No net change in km's when diverted.
- No other schools on route, primarily services Austral PS.
- Opal data shows low occupancy (0-20) throughout route, with capacity available to accommodate addition student usage.

Bus analysis

Route 2042 - PM



Provide a minor re-route of the 2042 School service to capture the expanding student catchment for afternoon travel.

Proposed changes:

- Service stops at Austral Public mid-way, looping back up Edmonson Avenue and Fifteenth Avenue.
- Propose to continue service up Edmondson Avenue then Seventeenth Avenue, diverting the route approximately 1.3km.
- Minor timetable adjustments to accommodate for the deviation.
- Provide 4 new bus stops on Seventeenth Avenue.

Rationale:

- Service departure time aligns with Austral PS bell time.
- Opal data shows low occupancy (0-20) throughout route, with capacity available to accommodate addition student usage.

Bus analysis

School bus routes 1052 and 2033

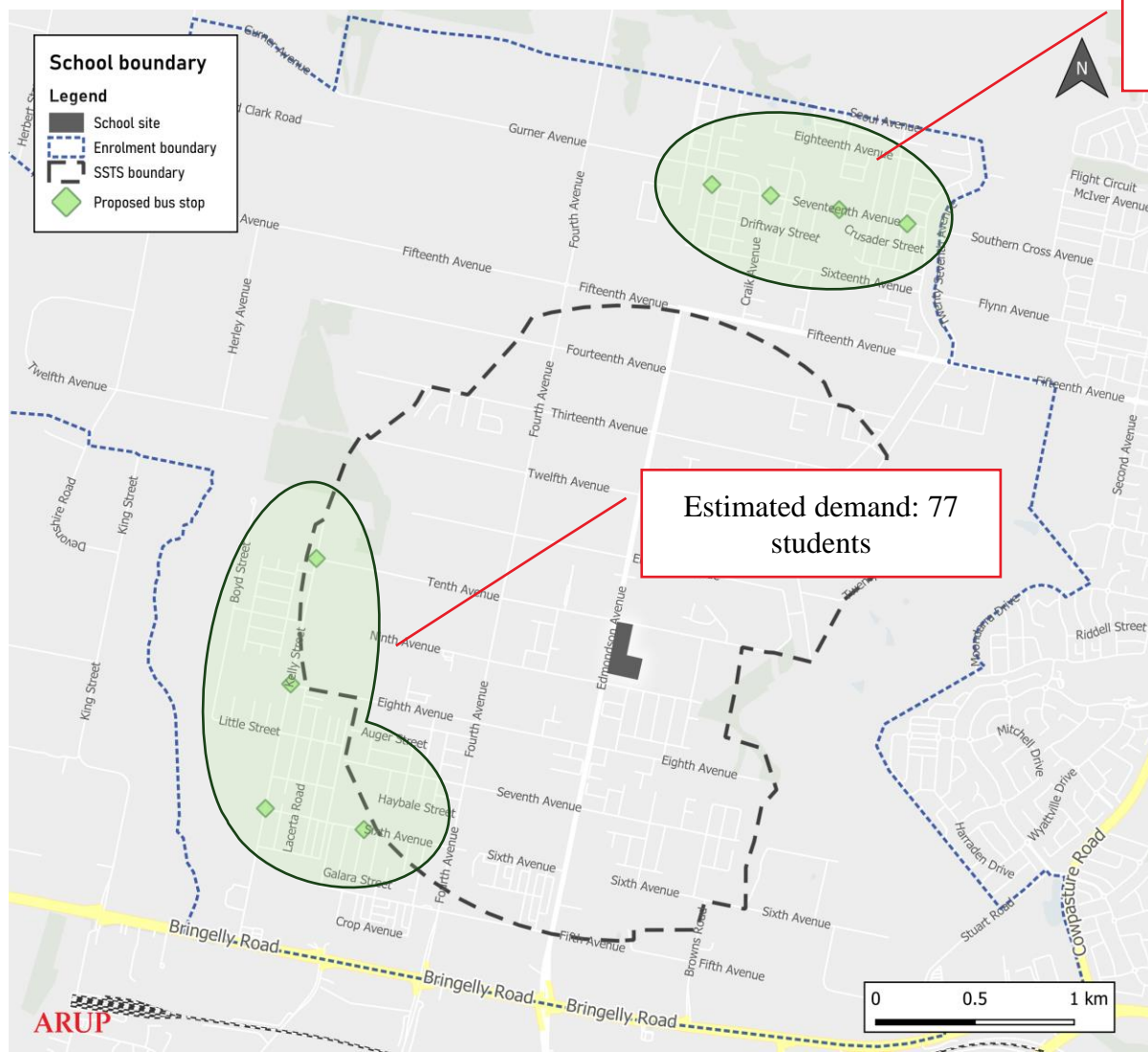
Route	Direction	Service area	Service start/ School arrival time	Additional km	Suggested scheduling change	Other schools impacted?
1033	Northbound	South-east	8:08 / 8:15	2.5km	Yes	Yes. Hoxton Park High School (8:50)
1038	Northbound	South-east	7:13 / 7:38	3.0km	Yes	Potentially. Rossmore Public School (unknown)
1052	Southbound	North-east	8:31 / 8:41	1.3km	No	-
2033	Northbound	North-east	16:00	0km	Yes	No other schools on route
2042	Northbound	North-east	14:50 / 15:10	1.3km	No	No. Holy Spirit PS, Thomas Hassall Anglican College

Route	Occupancy			
	0-20	21-40	41-60	61-80
1033	100%	0%	0%	0%
1038	100%	0%	0%	0%
1052	100%	0%	0%	0%
2033	100%	0%	0%	0%
2042	100%	0%	0%	0%

- School services 1033, 1038, 2033 would need to be adjusted in order to better align with Austral PS bell times.
- Occupancy data suggests that all services are underutilised.

Bus service improvements

Future capacity analysis – Proposed bus stops (Stage 1)



Estimated demand: 77
students

Demand and services required

- The proposed new bus stops on Seventeenth Avenue (north-east area) and Kelly Street (south-west area) are expected to generate demand for around 77 students in each area.*
- Majority of the bus services that have considered for re-routing have 64 spaces (sitting + standing) available based on occupancy analysis.**
- Therefore, two buses on average would be required to meet the demand in each area, totalling to four buses in the morning and four buses in the afternoon to cater for both north and south of the school.

*Based on the PT reach mode share target for Stage 1 (32%)

**Includes existing Opal capacity, including 10% additional for school students who do not touch in and out

Bus service improvements

Future capacity analysis – Proposed bus stops (Stage 1)

Public routes: 861, 855

School routes (S): 1033, 1038, 1052, 2033, 2042

AM

Service Area	Route	Time	Available capacity
North-east	1052 (S)	AM	High – 64
	861	8:20/ 8:37	High – 64
	855	9:15 / 9:26	High – 64

Service Area	Routes	Time	Available capacity
South-west	1033 (S)	AM	High – 64
	1038 (S)	AM	High – 64
	855	8:35 / 9:08	High – 64

PM

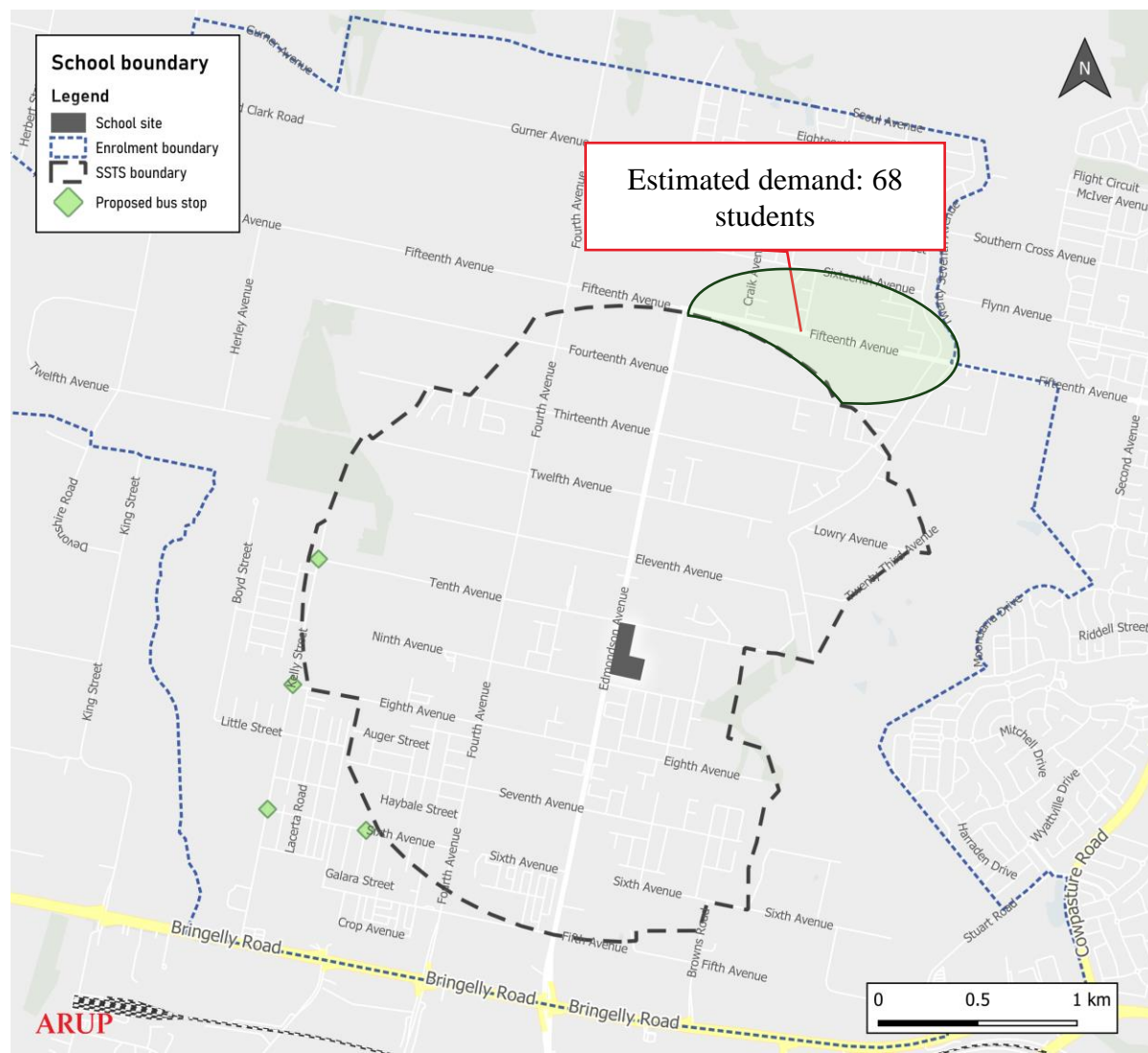
Service area	Available routes	Time	Available capacity
North-east	861	14:50 / 15:18	Medium – 55
	855	15:18	High – 64
	2042 (S)	PM	High – 64
	2033 (S)	PM	High – 64

Service area	Route	Time	Available capacity
South-west	861	14:58 / 15:23	Medium – 60
	855	13:35 / 14:21	High – 64

- Bus services have been separated by the time of day they operate and which area in Austral they service.
- **Two bus services from each table** would need to be selected and re-routed (excluding 861) into their respective area in order to meet the anticipated student demand for Austral PS at Stage 1.
- Selected services should take into account detailed information provided in previous slides (scheduling time adjustments, other schools impacted etc.)

Bus service improvements

Future capacity analysis – Fifteenth Avenue (Stage 1)



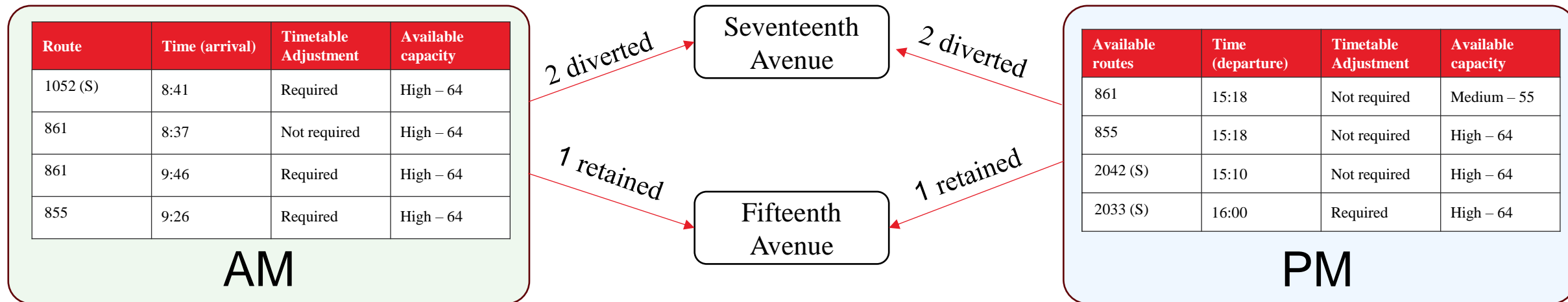
Demand and services required

- Anticipated demand from existing students residing near Fifteenth Avenue bus stops.
- Existing bus on Fifteenth Avenue services have capacity for 64 spaces (sitting + standing) based on occupancy analysis.
- Anticipated demand slightly exceeds capacity for a single bus.
- Recommended in Stage 1, **one bus runs on Fifteenth Avenue in AM and PM**. Monitor occupancy and introduce 2nd bus if demand exceeded.

*Based on the PT mode share target for Stage 1

Bus service improvements

Future capacity analysis – Fifteenth Avenue (Stage 1)



- **Two services should be diverted onto Seventeenth Avenue to meet new demand – and one service would be needed to run on Fifteenth Avenue to meet demand.**
- The three selected services need to arrive before morning bell times and depart afternoon bell times.
 - Among the AM services, two services would need rescheduling to more closely meet the Austral PS 9am bell time.
 - Among the PM services, only the 2033 would need adjustment if selected to meet the Austral PS 3pm bell time.
- If 861 frequency increases to every 15 minutes, and existing school bus services are adjusted there is no requirement for a new bus service. However, if the frequency is not increased and/or the timetables cannot be adjusted prior to Stage 1 of Austral Public School, a dedicated school bus service may be required to accommodate existing and future students.
- Adjustment to Routes 2033 or 861 schedules would impact other schools on the route (such as St Anthony of Padua). Feasibility to be confirmed with TfNSW.

Supplementary details

Appendix C –TWG meeting minutes

MINUTES

Austral Public School (Stage 1) Transport Working Group Meeting 1

Date	20 February 2024		
Time	09:30 to 10:30		
Venue	Microsoft Teams		
Chairperson	Rocco Bombardiere (CTPG)		
Invitees	John Broady	JB	TfSNW
	Michelle Carter	MC	TfSNW
	Siva Balasubramaniam	SB	TfSNW
	Dina Hanna	DH	TfSNW
	David Spare	DS	TfSNW
	Patrick Bastawrous	PB	Liverpool City Council (LCC)
	Rachel Palermo	RP	Liverpool City Council (LCC)
	Stella Qu	SQ	Liverpool City Council (LCC)
	Raymond Tran	RT	Liverpool City Council (LCC)
	Rebecca Lehman	RL	SINSW
	Kamoru Adetunmbi	KA	SINSW
	Zeeshan Ijaz	AI	SINSW
	Rocco Bombardiere	RB	CTPG
	Tessa Knox-Grant	TKG	Arup
	Bryony Vaughan	BV	Arup
	Joyce Wong	JW	Arup

		Responsible/ Due Date
1.	Introduction	
1.1	RB introduced the project to the team including project background, site overview and the school proposal.	Note
2.	Local context	
2.1	BV presented the local context including the Edmondson Avenue Upgrade and raised questions to LCC regarding delivery programme of the Edmondson Avenue Upgrade.	Note
2.2	<p>SQ confirmed that the assumption and proposed dates of Edmondson Avenue Upgrade presented in the meeting is in line with the latest project information. She advised that funding has not been allocated for stages 2 & 3 of the Edmondson Avenue Upgrade therefore the transport provision of Austral Public School (Stage 1) should be based on the existing road condition.</p> <p>SQ also advised that there will be no change on bus route for the Edmondson Avenue Upgrade. Schools will be consulted before the construction to minimise construction impacts to the schools. Construction work is expected to occur outside of school peak hours and all the current bus services will be available to school during construction stage.</p>	Note

		Responsible/ Due Date
3.	Catchment analysis and improvements	
3.1	BV presented the active travel and public transport catchment data findings according to the school enrolment boundary and SSTS boundary. BV advised currently there are lack of crossings and discontinuous footpaths surrounding the site. BV also presented the recommended footpaths within the walking catchment.	Note
4.	Bus services improvements	
4.1	BV presented the bus service improvements including diverting and re-scheduling existing public bus route 861 and school bus routes 1052 and 2033 to accommodate future student demand and expand the school catchment. BV queried if there was a contingency to apply to pupils using school bus services.	Note
4.2	JB advised a 10% contingency to capacity should be included in the analysis to accommodate students who do not tap on or off buses when reviewing current bus capacity.	Arup to update in Opal analysis.
4.3	JB mentioned waterboards are located on Gurner Avenue and Twenty Eighth Avenue, affecting the implementation of future bus service of route 861. SQ advised that the new bus stop and services can be implemented once the construction works have been completed which will hopefully be before 2026 (stage 1 of Austral Public School). JB confirmed the re-route options of the 861 will be available following the completion of road infrastructure.	Note
4.4	SQ mentioned all bus stops on Edmondson Avenue will be relocated to Tenth Avenue during the upgrade works. No on-street parking and kiss and drop activities will be permitted along Edmondson Avenue after the upgrade. Also, with the implementation of the signals at Edmondson Avenue/ Tenth Avenue intersection, the current crossing on Tenth Avenue may need to be relocated.	Note
4.5	JB advised bus-rail connection should be considered in the bus service improvements as most of the bus routes provide services connecting to the Leppington Station. Complaints have been received regarding the overcrowded services of bus route 861 from Carnes Hill to Leppington. JB also advised the current bus services in Austral are operating in an efficient and tight schedule. There may be possibility to make slight changes to the schedule of the service, however, JB recommended staggered bell time among Austral Public School and St Anthony of Padua Catholic School so as to provide school special services to meet the student demand for both schools. JB noted that there are school bus routes which are probably not well utilised and should be investigated by TfNSW to remove/ amend in the future.	Note
4.6	RP advised St Anthony of Padua Catholic School has submitted request for additional bus services. JB advised that TfNSW is not keen to offer the services.	Note
4.7	RL enquired about the bus strategy for the growing precincts in Liverpool like Austral. JB advised that currently no funding has been approved yet.	Note

		Responsible/ Due Date
4.8	JB recommended additional services of bus route 855 (Rutleigh Park to Liverpool via Austral & Leppington Station) in the AM peak.	Arup to consider route in analysis.
5.	Mode share potential	
5.1	BV presented the hands-up survey result according to the mode share of students and staff. Seven scenarios have been presented for the baseline, moderate and reach active/ public transport mode share.	Note
6.	Initial site access proposal	
6.1	BV presented the on-site transport provision and kiss and drop arrangement during stage 1 of Austral Public School.	Note
6.2	JB asked SQ about the provision of a bus lane on Edmondson Avenue for the upgrade work. SQ advised that the kerbside lane will be designed as transit lane instead of bus lane due to the current low bus usage. Bus bay and bus lane can be considered along Edmondson Avenue if there is more services in the future.	Note
6.3	JB recommended providing kiss and drop bays on Tenth Avenue instead of Edmondson Avenue as all the on-street activities along the Edmondson Avenue will be ultimately removed due to the upgrade. It is also worth to provide a plan to show kiss and drop bay on Tenth Avenue.	Arup and project team to consider.
6.4	SQ advised that Austral Primary School Stage 1 should based on the existing road layout as the Edmondson Avenue upgrade is targeted to complete in 2028.	Arup and project team to consider.
6.5	RT agreed with JB that kiss and drop should be provided on Tenth Avenue to minimize conflict to the traffic on the main road.	Arup and project team to consider.
6.6	<p>RP advised the school frontage on Tenth Avenue is short and there is no proper kerb and footpath along Tenth Avenue, creating constraints for establishing kiss-and-drop bays.</p> <p>She also advised the existing wombat crossing on Edmondson Avenue will be relocated further south. The works is expected to be carried out during Christmas holiday this year. She recommended to group the kiss and drop bays in one area, separated to the bus zone. RP will provide the crossing relocation plan to Arup to consider.</p> <p>RP advised that kiss and drop should be continuous where possible.</p> <p>The proposed crossing at the Tenth Avenue should be presented to the traffic committee.</p>	<p>Arup and project team to consider.</p> <p>RP to provide information on updated wombat crossing.</p>
6.7	RB confirmed the presented student enrollment target is the latest and most current.	Note

MINUTES

Austral Public School (Stage 1) Transport Working Group Meeting 2

Date	19 March 2024		
Time	10:00 to 10:30		
Venue	Microsoft Teams		
Chairperson	Rocco Bombardiere (CTPG)		
Invitees	John Broady	JB	TfSNW
	Siva Balasubramaniam	SB	TfSNW
	Patrick Andrade	PA	DPHI
	Patrick Bastawrous	PB	Liverpool City Council (LCC)
	Mahavir Arya	MA	Liverpool City Council (LCC)
	Rachel Palermo	RP	Liverpool City Council (LCC)
	Stella Qu	SQ	Liverpool City Council (LCC)
	Rebecca Lehman	RL	SINSW
	Kamoru Adetunmbi	KA	SINSW
	Zeeshan Ijaz	ZI	SINSW
	David Spare	DS	SINSW
	Rocco Bombardiere	RB	CTPG
	Ian Brocklehurst	IB	Arup
	Bryony Vaughan	BV	Arup
	Joyce Wong	JW	Arup

		Responsible/ Due Date
1.	Introduction	
1.1	ZI summarised where the project is currently at with plans to submit the final Transport Assessment in Mid-late April following the TWGs. ZI summarised the issues identified previously such as the kiss and drop on Edmondson Avenue and Tenth Avenue.	Note
2.	Actions from TWG 1	
2.1	BV summarised the four actions from the first TWG, relating to the bus analysis, kiss and drop arrangement and review of the revised wombat crossing location.	Note
3.	Bus service improvements	
3.1	BV queried if 75 was an appropriate average number of people sitting and standing on buses with JB, who agreed this was appropriate.	Note
3.2	BV presented bus route 855 and the improvements that would be required to accommodate the new residential areas for AM and PM northbound and southbound movements. BV concluded that the 855 is an infrequent and long service which is currently underutilised, and changes to the timetable would be required to fit with the start and end times of Austral Public School if it were to be used. JB agreed it was an infrequent service but should still be considered in the analysis.	Note

		Responsible/ Due Date
3.3	JB requested to look at the impact of 861 on St Anthony of Padua Catholic College impact.	Arup provided bell times in Appendix A of slides.
3.4	JB noted that the frequency of 861 would increase to every 15 minutes if funding was secured. If this is implemented prior to stage 1 opening of Austral (2026) this would provide more services for the school to use. JB noted if funding was not secured prior to 2026 then alternative arrangements would need to be made, such as a dedicated school bus service for Austral Public School.	TfNSW to review funding and bus options prior to 2026.
3.5	RP and RB noted that there were currently issues with Gurner Avenue which is very busy and confirmed LCC were looking into this.	LCC
3.6	BV summarised the future capacity analysis for buses and concluded two bus services would be required in the AM and PM for north-east and south-west locations.	Note
4.	Initial site access proposal (on-site and adjacent to site infrastructure)	
4.1	BV presented the updated kiss and drop bays required as a result of the updated pupil numbers, which included 17 spaces at base case.	Note
4.2	BV presented the updated site access proposal and the split of kiss and drop bays on Edmondson Avenue and Tenth Avenue. BV queried the updated wombat crossing with RP who confirmed it would be moving south closer to the school pedestrian access on Edmondson Avenue.	RP/ LCC
4.3	RP confirmed she would send through the latest plans to reflect in Arup drawings. RP confirmed the kiss and drop bays should be within one location to make management of the bays easier on Edmondson Avenue.	Arup to amend and send to LCC prior to next TWG
4.4	BV queried when the development to the east of the school on Tenth Avenue was likely to be built and if the footpaths would be built prior to stage 1 of Austral Public School (2026). RB said he had been informed that the commencement of design work was due to begin shortly with funding allocation to be considered in 24/25 budget.	RP/ LCC to confirm
4.5	BV presented the temporary crossing on Edmondson Avenue/ Tenth Avenue which would be required until the signalised intersection was installed as part of the Edmondson Avenue updates, to safely transfer pupils from the school to the 861 bus stop. BV asked if a temporary crossing could be installed as a result. LCC confirmed this would need to be discussed at a future traffic committee. RL said she could provide a pedestrian count survey result to Arup to justify the temporary crossing	LCC to confirm RL to provide.
4.6	SQ queried what would happen in future stages of the school in regard to the bus stops but IB, RL and BV confirmed this TWG was for stage 1 only. JB and LCC agreed to keep the existing bus stop provision on Edmondson Avenue and Tenth Avenue.	Note

Supplementary details

Appendix D –School Transport Plan

School Transport Plan

Austral Public School (APS) – Stage 1
Draft

Document control

Consultant	Arup
Project title	Austral Public School
Document title	School Transport Plan
Date	14/02/2025
Revision	3 Draft update to support REF submission.
Distribution	CTPG: Rocco Bombardiere, Sophia Palmer SINSW: Zeeshan Ijaz Arup: Tessa Knox-Grant, James Turner, Annabel Kerr, Henry Zheng

Contents

- 1) Introduction
- 2) Transport goals
- 3) Policies and procedures
- 4) School transport operations
- 5) Communication plan
- 6) Data collection and monitoring
- 7) Governance framework
- 8) Implementation checklist
- 9) Cumulative Impact Assessment
- 10) Mitigation Measures
- 11) Consultation with agencies

1. Introduction

Introduction

School Transport Plan for Austral Public School

This School Transport Plan has been prepared to support a Review of Environmental Factors (REF) for the Department of Education (DoE) for the upgrade of Austral Public School (APS) (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as “development permitted without consent” on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37 of the T&I SEPP.

The proposed activity is for the upgrades to the existing APS at 205 Edmondson Avenue, Austral, NSW, 2179 (the site).

The purpose of this report is to review the existing transport modal choice and targets. This School Transport Plan also set out objectives and strategies to assist site-specific measures to promote and maximise the use of sustainable travel modes.

Site description

APS is located at 205 Edmondson Avenue, Austral on the south-eastern corner of the intersection between Edmondson Avenue and Tenth Avenue. The site has an area of 2.986 ha and comprises of 6 allotments, legally described as:

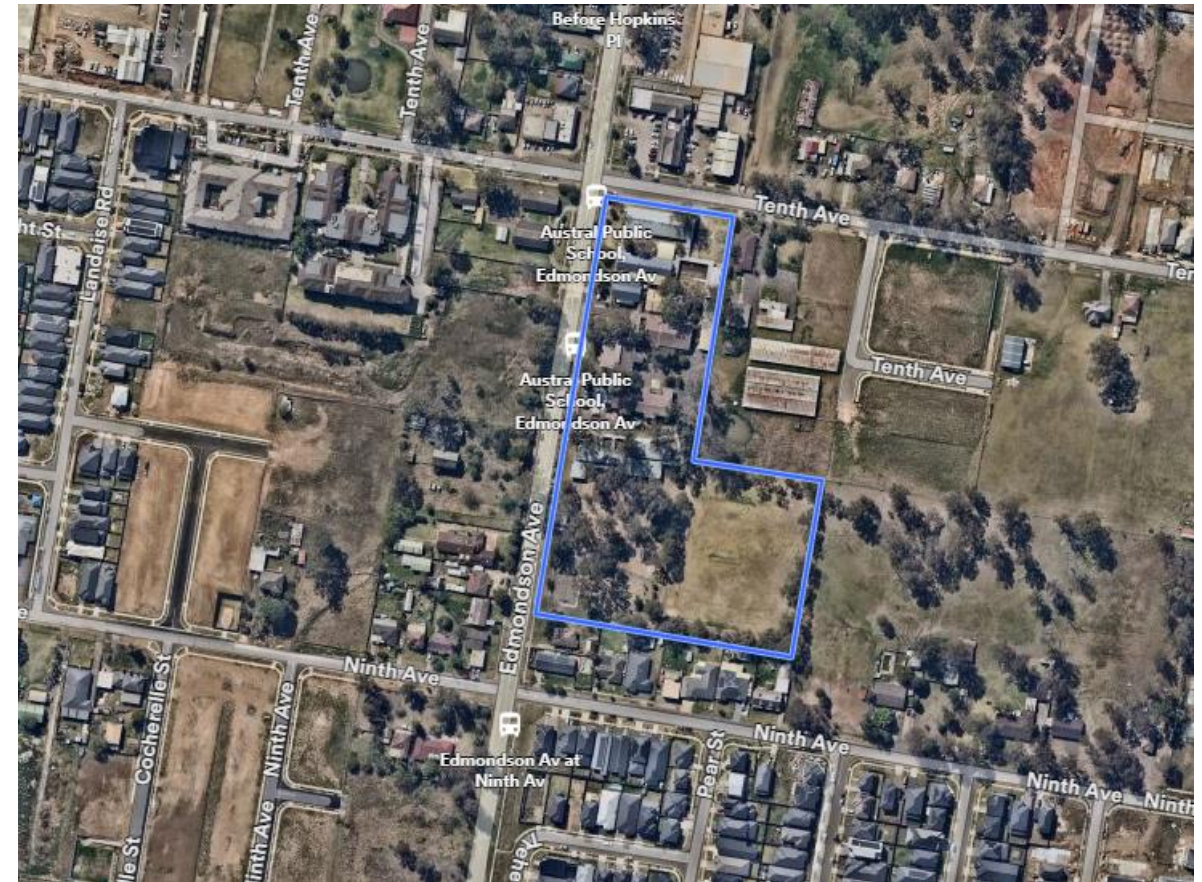
- Lot 1 DP 398105
- Lot 1 DP 398106
- Lot 1 DP 509613
- Lot 1 DP 512119
- Lot 2 DP 509613
- Lot 865 DP2475

The site currently comprises an existing co-educational primary (K-6) public school with:

- 8 permanent buildings;
- 14 demountable structures;
- interconnected paths;
- covered walkways;
- play areas: and
- at-grade parking.

The Austral Community Pre-school is also located within the site.

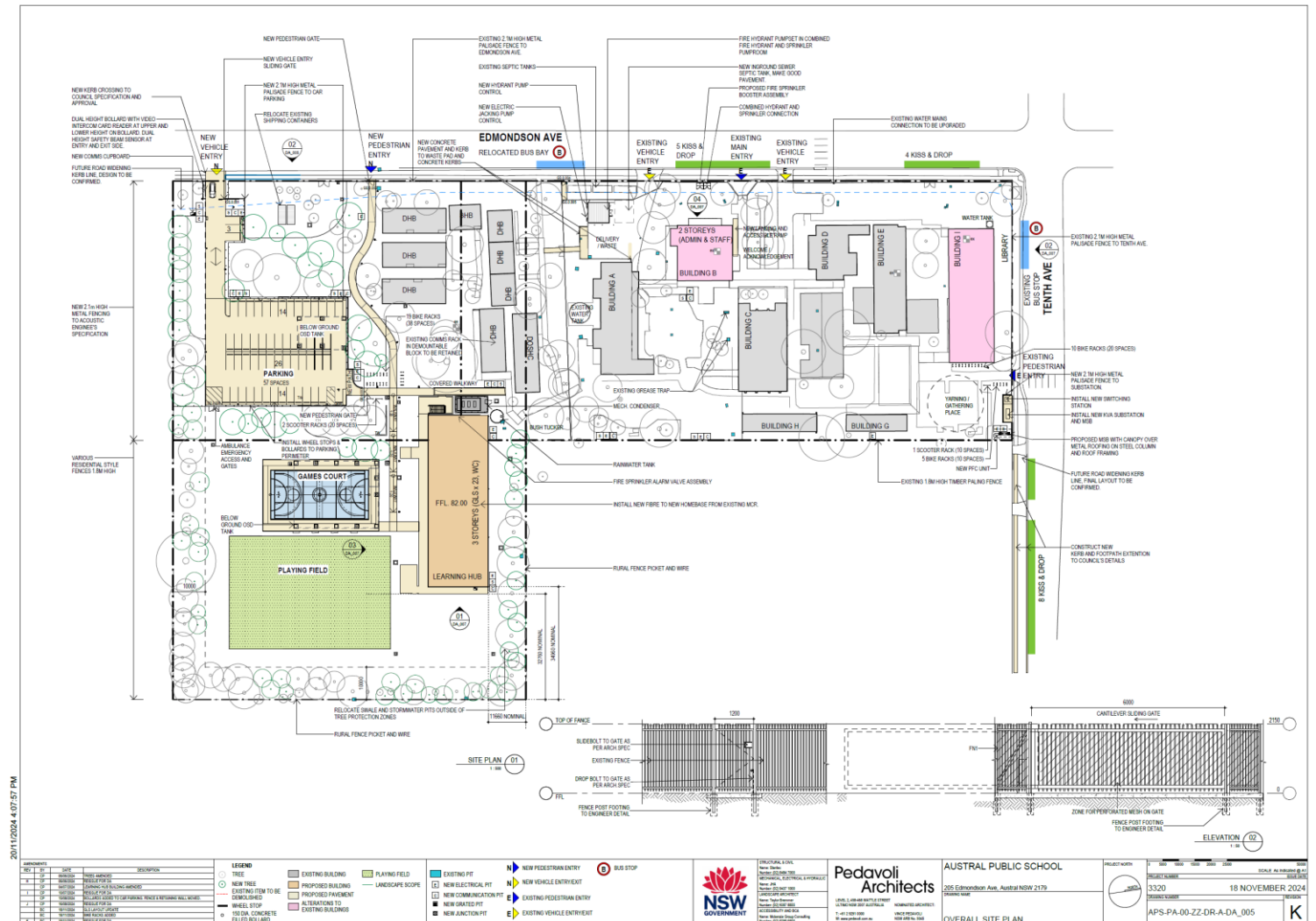
The existing buildings are clustered in the northern part of the site, ranging between 1 to 2 storeys in height. There is a sports oval in the south-eastern portion of the site, and a densely vegetated informal play area located in the south-western portion of the site.



Aerial image of site (source: NearMap, taken 7 Sept 2023)

- Demolition of existing structures and removal of trees, as well as other site preparation works;
- The erection of a new 3-storey building comprising teaching spaces that includes 20 permanent teaching spaces and 3 support teaching spaces;
- Conversion of the first floor of Building B from a Library to staff annex (staff room) and minor modifications on the ground floor;
- Refurbishment and change of school function of Building I from classrooms to a Library;
- At-grade parking (57 new spaces, including 1 accessible space);
- New driveway and access gate from Edmondson Road;
- Erection of a substation within the site on the northern boundary;
- Upgrade of the sports field;
- Internal pathways, fencing, utility upgrades and associated works; and
- Off-site public domain improvements including retention and upgrading of the Kiss & Drop area and a temporary pedestrian road crossing on Tenth Avenue.

The intent of the activity is to allow for upgrades to APS that will provide a CORE 35 primary school compliant with the EFGS. The works will increase the capacity of the school from 681 students and 40 FTE teachers to 734 students and 64 FTE teachers, respectively. Furthermore, provision within the expanded 734 student capacity will be made for the creation of 30 support class students places.



Proposed Site Plan (Source: Pedavoli Architects, Overall Site Plan (Rev K)

2. Transport goals

Transport goals

School Transport Plan vision and objectives

A School Transport Plan aims to manage travel demand during construction and to govern travel to school throughout post-occupancy. The following objectives have been developed in order to support this overarching aim:



Meet school travel demand

To proactively identify and meet school travel demand safely, efficiently and sustainably deliver transport infrastructure to meet school travel demand.



Maximise active and public transport modes

To maximise the use of active and public transport modes in a safe transport environment to reduce car traffic before and after school start and end times.



Safe travel

To enhance connectedness to neighbourhood and community through safe travel to and from school to reduce risk of injury or harm to students as they travel to and from school.



Education

To empower children and young people to be safe road users now and into the future.



Road networks

To decongest the road networks around schools and reduce local traffic congestion and parking impacts, outline required infrastructure and operations to be delivered prior to occupancy, and resolve issues early in the school master planning, schematic design and business case stages.



Collaborative

Identify opportunities to work with state or local government authorities, share travel demand and transport initiatives, and engage transport agencies to seek or improve existing transport networks.

Mode share targets

Mode share scenarios

	student	Staff	Total
Pre-school	30	7	37
Support Learning Unit	30	6	36
Primary School	704	51	785
Total	764	64	858

Transport facilities will be provided according to the worst-case scenario (base case). The moderate and reach scenarios are based on improvements from new developments and the Edmondson Avenue upgrade, as well as improvements to bus services as detailed within the catchment analysis.

Student enrollment target and staffing requirement are provided by SINSW.

Scenario 0

Baseline (do nothing)

- Using catchment analysis mode share,



Scenario 1/3/5

“Moderate” active/ public transport mode share

- Inclusion of active transport programmes to achieve lower kiss-and-ride utilisation
- Improvement of walking environment, including improved footpaths and crossing to provide a safe environment for active travel



Scenario 2/4/6

“Reach” active/ public transport mode share

- Encourage parenting community that support children walk and scoot to school
- Provision of enhanced bus services to further reduce the kiss-and-drop demand
- Behavioral change measures to encourage active transport



Baseline travel survey

Hands-up survey result



Survey period
9 – 13 February 2024



Class involved
20 classes from K -Year 6

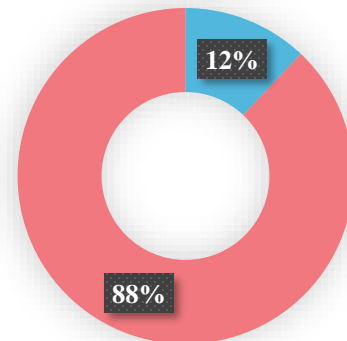


students participated
430

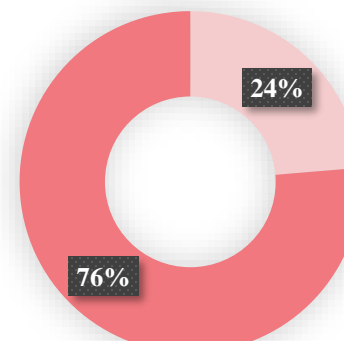


Staff participated
20 Class teachers &
18 Admin staff

Pre-school student mode share

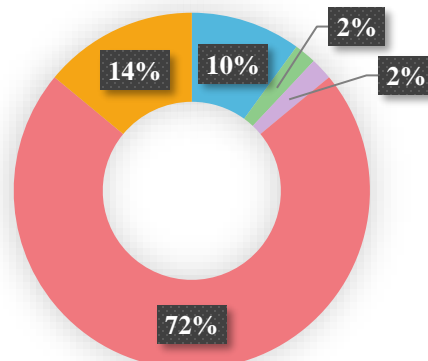


Staff mode share

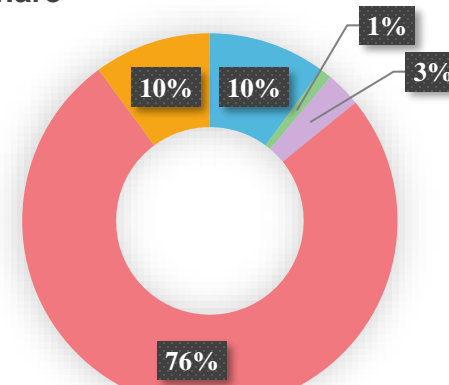


**Travel mode share of pre-school students and staff are consistent in AM and PM*

Primary school student mode share



AM



PM

■ Walk ■ Cycle or other rideable ■ Bus ■ Car (parked on-site) ■ Car (parked nearby) ■ Carpool

Key observations

Pre-school

The travel demand for the pre-school is **88% driver mode share**. 6% of pre-school students attend OOSH during AM and PM.

Staff

The travel demand for the staff is **100% car mode share**. With insufficient ing on-site (14 spaces), 76% (29) of them parked their cars nearby.

Primary School

Approx. 15% of primary students travel by active travel and public transport. 6% and 9% of primary school students attend OOSH during AM and PM respectively.

Mode share targets

Baseline transport mode share target

Mode	Pre-school and support learning unit students		Primary school students		Staff	
	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %
Active Transport	5	8% ⁽²⁾	59	8% ⁽²⁾	0	0%
Public Transport	0	0%	22	3%	0	0%
Car ⁽¹⁾	55	92%	653	89%	64	100%

Notes:

- 1) Car passengers, not cars
- 2) According to the catchment analysis, currently only 8% of existing students can safely walk to school within 15 minutes on existing footpaths, despite existing hands-up survey data showing 12%. Remaining 4% from active travel has been redistributed onto car.
- 3) Existing Travel demand for pre-school and support learning group (60 students) is assumed to remain unchanged across the three scenarios with 92% car mode share and 8% active transport mode share.

Mode share targets

“Moderate” and “Reach” active/ public transport mode share target

Primary student mode share	Scenario 1: Moderate AT		Scenario 2: Reach AT		Scenario 3: Moderate PT		Scenario 4: Reach PT		Scenario 5: Moderate AT and PT		Scenario 6: Reach AT and PT	
	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %	Usage #	Mode share %
Active Transport	73	10%	117	16%	59	8%	59	8%	73	10%	117	16%
Public Transport	22	3%	22	3%	117	16%	235	32%	117	16%	235	32%
Car^	639	87%	595	81%	558	76%	440	60%	543	74%	382	52%

^car passengers, not cars

Staff mode share	Moderate (Scenario 1/3/5)		Reach target (Scenario 2/4/6)	
	Usage #	Mode share %	Usage #	Mode share %
Active Transport	1	2%	2	3%
Public Transport	3	4%	5	8%
Car^	60	94%	57	89%

^car passengers, not cars

Transport goals

Links to other application documentation

Item	Links to other application document
Green Star achievement	Section 6 of Transport Assessment
Consultation Plan	This School Travel Plan has been prepared and includes consultation with Transport Working Group. Refer to Appendix A for minutes of TWG meeting.

3. Policies and procedures

Policies

Strategic context summary

Document	Document Purpose	Relevance to project	
Liverpool Bike Plan 2018-2023	<ul style="list-style-type: none"> • Outlines the provision of bicycle-related infrastructure • Promote and increase the rates of cycling in Liverpool 	<ul style="list-style-type: none"> • Bike paths to Leppington Station from Austral and surrounds will be critical to encouraging active transport and alternative modes of commuting • Future developments incorporating cycling facilities into plans • Low density, semi-rural area in Austral provides opportunity for recreational cycle paths 	
Liverpool Growth Centre Precincts Development Control Plan (DCP) Schedule 1	<ul style="list-style-type: none"> • Provides guidance and regulations for planning and design • Establishes an overall vision and Indicative Layout Plan for the Austral and Leppington North Precincts. 	<ul style="list-style-type: none"> • Residential structure in Austral • Precinct road hierarchy • Pedestrian and cycle network • Centre development control • Edmonson Avenue and Tenth Avenue design 	
Liverpool DCP 2008 Part 1 (updated on 1 Feb 2021)	<ul style="list-style-type: none"> • Provides general controls for development 	<u>School car parking:</u> <ul style="list-style-type: none"> • 1 space per staff member • Loading facilities for a coach 	<u>Disabled car parking:</u> <ul style="list-style-type: none"> • 2 per 100 spaces <u>Bicycle parking:</u> <ul style="list-style-type: none"> • 1 per 10 staff • 1 per 10 students
Liverpool Growth Centre Precincts DCP (18 June 2021)	<ul style="list-style-type: none"> • Provides general controls for development 	<u>School car parking:</u> <ul style="list-style-type: none"> • 1 space per staff member • 1 space per 100 students 	

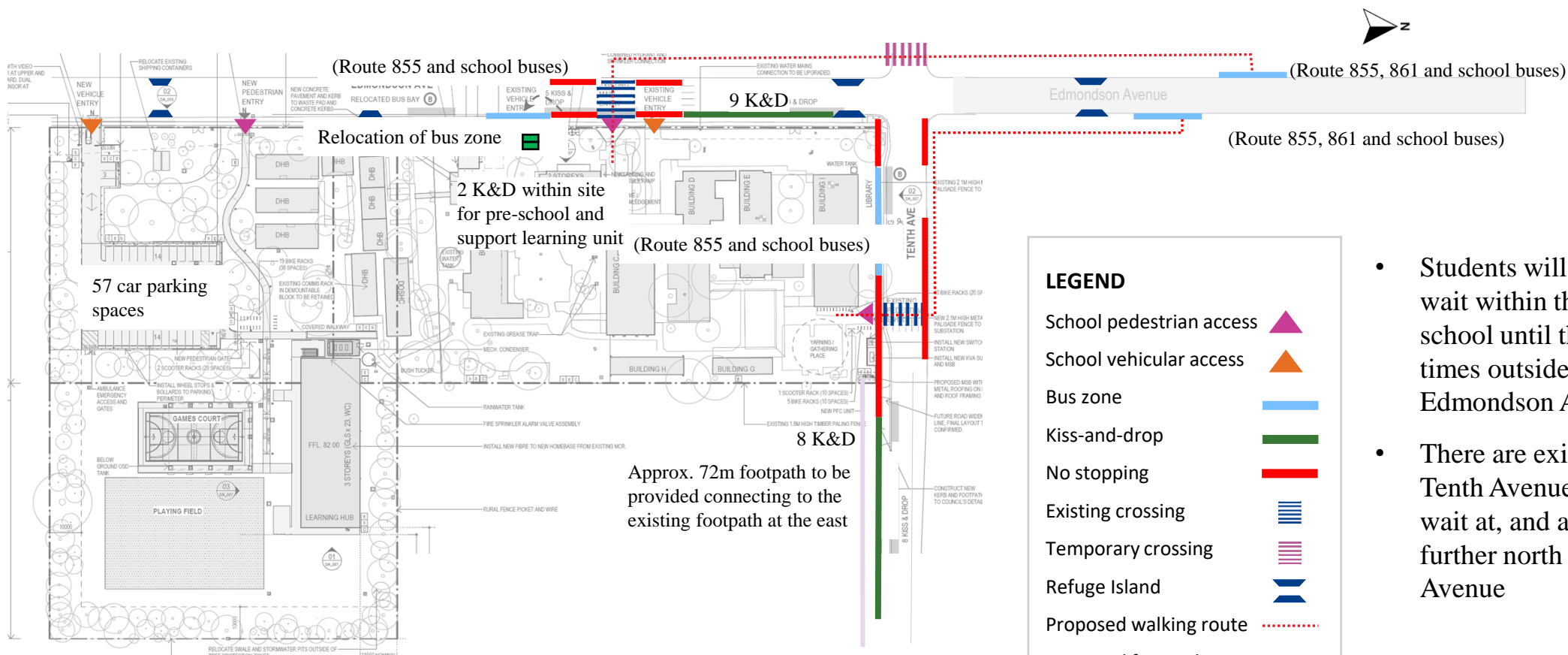
*Note the DCP is used as a planning control, any deviation is provided through justification of mode share analysis. Car and cycle parking has been determined based on future modal split

4. School transport operations

School transport operations

Proposed site transport

- 2 bays within site + 9 bays on Edmondson Avenue + 8 bays on Tenth Avenue (construction date dependent)



*Kiss and drop demand is calculated based on the car mode share under baseline scenario

- Students will be expected to wait within the confines of the school until the proposed bus times outside the school on Edmondson Avenue
- There are existing shelters on Tenth Avenue for students to wait at, and at the 861 bus stops further north on Edmondson Avenue

School transport operations

Day-to-day operations (stage 1)

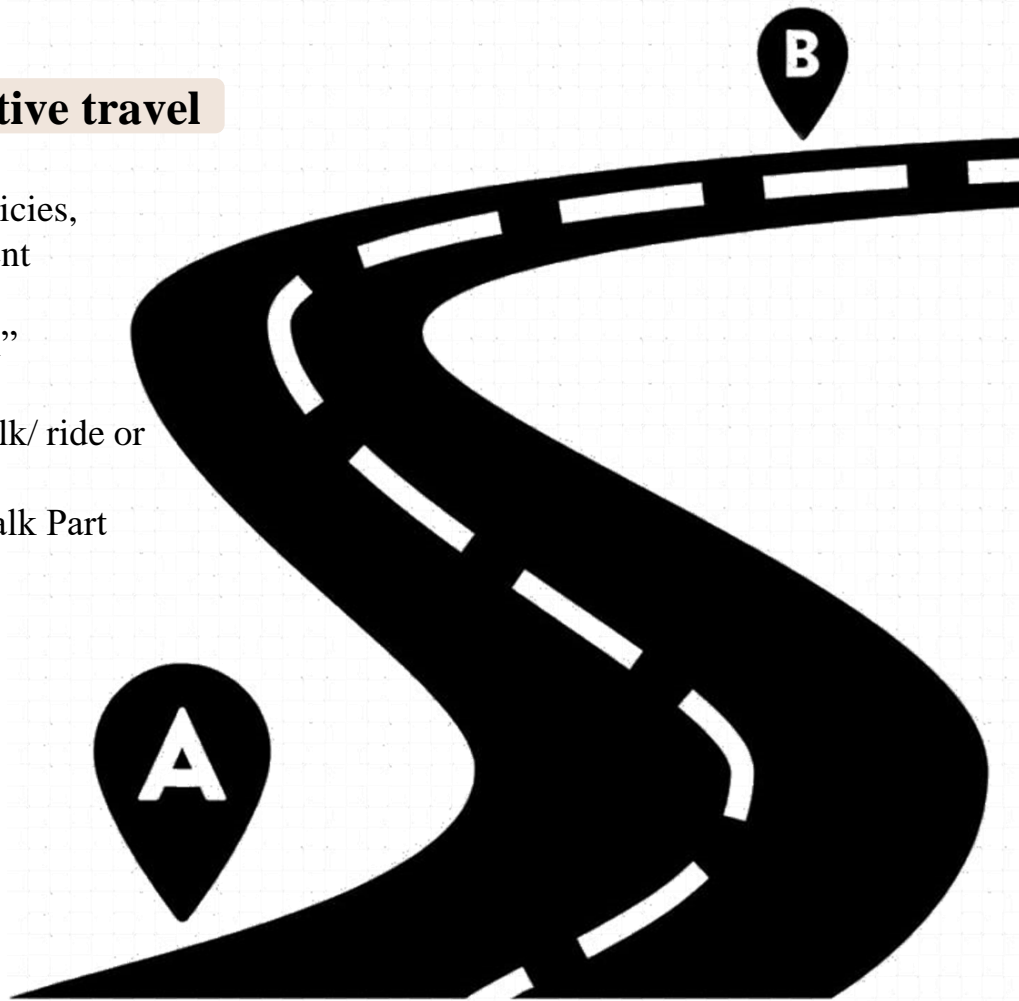
Transport Infrastructure	On-site	Adjacent to site	Management measures
Site entries, pedestrian and vehicle	<u>Edmondson Avenue:</u> <ul style="list-style-type: none"> 2 pedestrian accesses 2 vehicular accesses (separated for staff parking and service vehicles) <u>Tenth Avenue:</u> <ul style="list-style-type: none"> 1 pedestrian access 	N	<p>Staff monitoring during bell time, including staggering for the bus stops.</p> <p>Cycle parking within the confines of the site, in line with 'reach' scenario mode share</p>
Kiss-and-drop including Assisted School Transport Program	N	9 kiss-and-drop bays will be provided on Edmondson Avenue and 8 kiss-and-drop bays will be provided on Tenth Avenue along the school frontage. 2 childcare spaces will also be accessed from Edmondson Avenue	Parents will be informed to remain within their vehicles in the kiss and ride area at all times and they may stop for up to a maximum of 2 mins
Buses	N	Regular bus (routes 855 and 861) and school bus stops on Edmondson Avenue and Tenth Avenue within 2-minute walk of APS	Staff monitoring during bell time
Parking including carpool, carshare pod	57 car parking for staff	N	N
Delivers and service vehicles	Loading bay and service vehicle access serving high school is accessed from Edmondson Avenue	N	N

School transport operations

Transport encouragement programs

Strategies to promote active travel

- New starter kit with transport policies, transport access options for student induction
- In-class “Active Travel to School” education
- Independent travel training to walk/ ride or travel with a buddy
- Walk/Ride to school day and “Walk Part Way to School” programme
- Walking school bus/ bike bus
- STEPtember
- Walk Safety to School Day
- Gamification
- Cycle parking



Strategies to promote public transport

- SSTS “tap on”
- School bus enhancement by providing additional stops and potential tweaking timings of existing bus services
- New starter kit with bus schedule

Strategies to reduce driving

- Carpool matching / incentives
- Remote car parking
- Remote kiss-and-drop

5. Communication plan

Communication plan

Channels

Communications will be developed, and information sessions will be made available on top of information packs being issued to the families and covering access. There will be information packs going out addressing how students can travel to school through the various modes.



Onboarding letters to parents



Reporting mechanism
(non-emergency policy hotline
131444)



School newsletter



Brochures for Kiss and Ride safety tips



School website's travel page



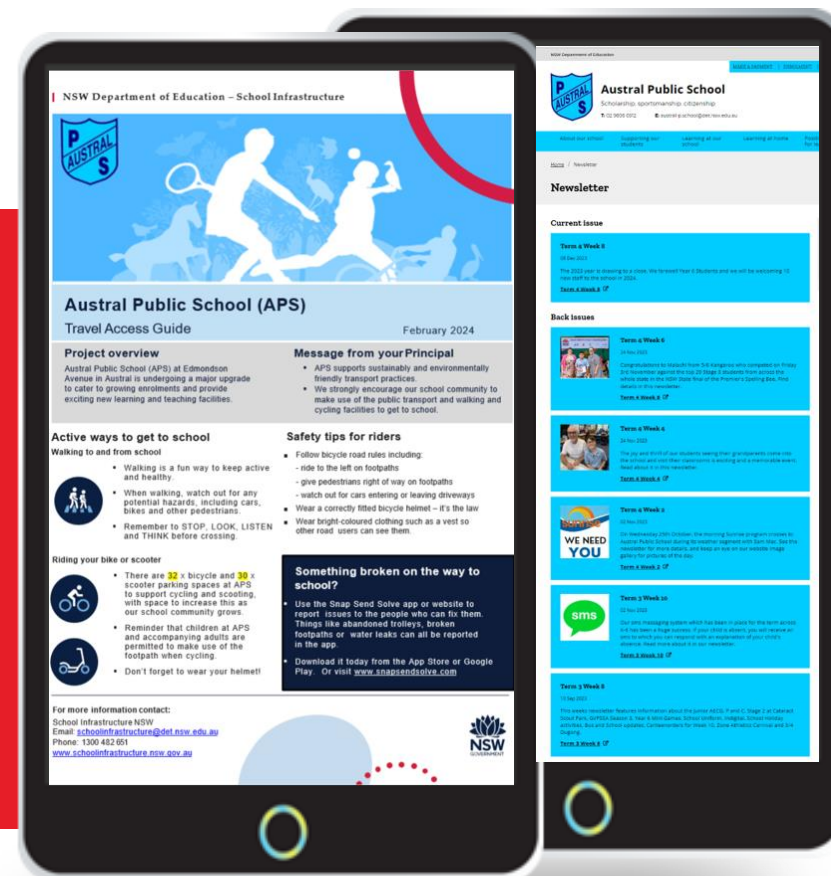
Kiss and Traffic Safety door sticker

Communication plan

Messages

Short content about:

- Principal's message about transport goals and expectations
- List of transport access modes with maps
- Method to report transport issue with links
- Kiss-and-drop arrangement as well as guidance and rules to abide by
- Safety tips for students and parents
- Encourage the use of sustainable transport modes by promoting walking, cycling and utilising public transport and car sharing rather than single occupant car travel
- Useful links including trip planner, SSTS and safe school travel



3 key elements:



Promotion of active travel and public transport



School operation, arrangement and safety tips



List of transport access modes with maps

6. Data collection and monitoring

Data collection and monitoring

Data collection

Data

Method

Transport catchment access

To understand the travel demand of different modes

GIS

With the use of depersonalised residential data

Staff and student travel demand and transport use

To understand preferred mode of transportation

Annual journey to school questionnaires

Monitoring active travel uptake and obtain feedback

Pedestrian and vehicle count at school entries

To obtain data on pedestrian, scooter, cycling and car arrivals to school

Traffic survey (Video camera surveys)

Provide insight on how school facilities are being used during peak times and the performance of transport access

Data collection and monitoring

Program evaluation

Strategy	Target mode	Phase 1	Phase 2	Responsibility
Encourage new students to use active/public transport when travelling to/from school during orientation periods.	Active transport, Bus	Organising material outlining active transport routes to school and provide relevant resources from TfNSW	Review material and uptake of active transport for new students after one term	APS
Promote Walk Safely to School day and Ride2School day	Active transport	Raise awareness of the events and potential health and wellbeing benefits leading up to the day	Review student participation in the events annually	APS
Carpooling where the school raises awareness of reputable services for parents to organise	Car	Carpooling occurs organically over time between parents	Carpooling occurs organically over time between parents	Parents
Bus pooling to pair students for bus travel, where the parents are able to facilitate these connections	Bus	To occur organically over time between parents	To occur organically over time between parents	Parents
Students buddy up to travel sustainably	Active transport, Bus	To occur organically over time between parents	To occur organically over time between parents	Parents
Walking school bus that runs along planned walking routes at set times	Walk	To occur organically over time between parents	To occur organically over time between parents	Parents
Articles on school Enews app to include travel tips for students	Active transport, Bus	Organise transport information to be included on the app	Review relevance of information and determine additional information students and parents may want to be informed on	APS
Staff organised carpooling system	Car	To occur organically over time between staff	To occur organically over time between staff	Staff
Staff recognition programs	Active transport, Bus	Keep staff members informed about transportation-related initiatives, updates on public transportation routes or schedules, and success stories of colleagues who have adopted alternative modes of travel.	Implement recognition programs to acknowledge and celebrate staff members who consistently use active or public transportation. This can help foster a sense of community and camaraderie among staff members who share similar transportation choices.	Staff

Data collection and monitoring

Reporting findings

Reporting	Responsibility
<ul style="list-style-type: none"> Conduct questionnaires and surveys annually and compare results to determine the proportion of persons travelling to/from the Site by each transport mode twice yearly in the first year as far as practicable. Analysis and assessment of monitoring data collected to identify challenges preventing the school from achieving their targets and prepare strategies to address these challenges. Review information regarding participation in active travel programs to increase sustainable transport use. Undertake community consultation to gauge feedback regarding implemented strategies and areas for improvement to further encourage the use of alternative modes of transport. Document progress or deficiencies during Action Plan delivery Review updated depersonalised data from the Department of Education with GIS analysis to decide any additional improvement measures needed to accommodate the change to catchment analysis Periodic on-site review of facilities such as the short stay parking area, and bicycle racks. 	Travel Plan coordinator (TPC)
<ul style="list-style-type: none"> Report transport issues / missing links via web tools or apps 	Students / parents
<ul style="list-style-type: none"> Install (additional) infrastructure (i.e. bus shelters) to accommodate sustainable transport demand 	TfNSW

7. Governance framework

Governance framework

Travel plan coordinator (TPC)

A dedicated TPC will coordinate and monitor all travel plan activities to ensure the targets and objectives specified within the STP are met. The school will assign an administrative staff member to this role. External support will be sought as required to assist this role.

Monitoring strategy	Monitoring activity	Timeframe
Travel survey	TPC to coordinate and review all required steps to undertake surveys for staff and students (parents) to fill out on their travel patterns. Surveys, at discretion of TPC, can be 'hands up' printing copies or suitable online base; e-correspondence (Email), Survey Monkey®, Microsoft Forms®, etc.	Twice yearly for the first year of operation
Walking, cycling and scooting arrival data	TPC to undertake an observational survey to obtain data on pedestrian, cycling and scooting use to support the travel survey.	Annually
Observations and notes	TPC to conduct site visits of the school's transport systems and report on operations of buses and other issues	Once mid-term after opening and annually thereafter
Consultation with TfNSW and Council	Using the travel coordination meetings, the TPC should discuss any issues that have been raised to these bodies such as bus demand, parking issues or pedestrian path concerns.	Two occasions after the start of the Stage 1, then as required
Consultation with the Parents and Citizens (P&C) group	TPC to organise question and answer (Q&A) events with the P&C to broadcast travel issues and obtain feedback.	Twice yearly
Identify any school parking demand that spills out beyond the Kiss and Ride area	Car parking demand surveys (undertaken during and after school hours).	Twice yearly
Records, data collation, evaluation	Performance report including outcomes and analysis of conducted surveys, on-site observations and monitoring mode of transportation (mode share targets).	Annually

Governance framework

Internal school working group

The internal stakeholder group is formed with the school community prior to construction commencement and initially formed during the Consultation Stream 3 during the transport options development.



Governance framework

External transport working group

For the external stakeholder group, the Transport Working Group is initially formed during the Consultation Stream 2, during the transport options development to govern transport issues and opportunities during the implementation of the Travel Plan.

Task	Responsibility
<ul style="list-style-type: none"> Reviewing bus operation efficiency including service catchment, route planning, occupancy, scheduling to provide sufficient and reliable service to people attending to school Collaborate with the working group and provide feedback on operational challenges, suggest improvements and strategies to maximise the efficiency of services 	Bus operators/ TfNSW
<ul style="list-style-type: none"> Collaborate with the working group to establish budgets, allocate funding to upgrade transport services and infrastructure 	TfNSW
<ul style="list-style-type: none"> Collaborate with the working group to enhance safety of travel Plan and develop infrastructure related to school transportation, such as bus stops, dedicated school bus lanes, and safe pedestrian pathways around schools. Potentially introduce and enforce parking restrictions around the school, although noting the proposed parking restrictions on Edmondson Avenue following the upgrades. 	Council
<ul style="list-style-type: none"> Share project information with TWG in order to increase awareness of upcoming projects in the planning phase to minimise surprises when planning applications are made. Work through solutions to risks and problems raised in the TWG forum to enable improved planning applications that respond to the needs of all parties in a transparent and positive way. 	SINSW

8. Implementation checklist

Implementation checklist

Item no.	Action/ description	Responsibility
1. General		
1.1	Establish a centralised TPC who is to take responsibility for the ongoing review and monitoring of this Plan. This person(s) shall also provide direction to staff/parents in relation to specific requirements arising from the Plan.	Department of Education
1.2	Provide ‘Travel Welcome Pack’ for newly employed staff, highlighting alternate modes of transport other than the use of a private vehicle.	TPC
1.3	Review of School Travel Plan as a regular item on the agenda of staff/management meetings.	Staff
1.4	Preparation of a Transport Access Guide (TAG) and review following changes stipulated by the TPC.	TPC
2. Active travel		
2.1	Promote Walk to Work Day and coincide with participation in “Walk Safely to School” Day. It would encourage alternative modes of transport. Older students can be paired with younger students who live close together to walk to school as a pair or group	TPC
2.3	Develop further school-specific activities designed to get people moving with reward participation. For example, a competition to see which staff and/or students in each year can get the most ‘steps’ in a given time period; similar to Steptember activities.	TPC
2.4	Encourage volunteers to organise a ‘walking school bus’. This allows for students to travel to school in an organised group guided by two (2) adults. This would require liaising with the TPC.	TPC/ parents
3. Education initiatives		
3.1	For Year K-2 students include education programs teaching road awareness using play-based learning.	TPC
3.2	For Year 3-4 students include education programs teaching road safety with a focus on walking independently to school.	TPC
3.3	For Year 5-6 students include education programs to teach how to travel independently on the public bus system in preparation for travelling to high school and other destinations.	TPC

Implementation checklist

Item no.	Action/ description	Responsibility
4. Public transport		
4.1	Display route maps and timetables (for services within 5 minutes walking distance) in high trafficable areas within the school.	TPC/ DoE
4.2	Advocate for TfNSW to improve public transport services in response to increased development within the surrounding area.	TPC/ DoE
4.3	Update this Plan and TAG to reflect changes to any bus routes and service times.	TPC
4.4	Undertake a review to promote initiatives for staff using public transport. This may include a review of potential tax incentives for Government employees that use public transport.	TPC
4.5	Promote the use of public transport for students with a rewards scheme. i.e., students are provided incentives to travel to and from the school.	TPC
4.6	Liaise and discuss with TfNSW the feasibility of providing bus services for students outside of the 2.3km driving distance from the School.	TfNSW
5. Reducing car travel		
5.1	Review initiatives for staff and parents to promote carpooling. This may include (but not limited to) the provision of online services or forums to facilitate ease of finding carpooling scheme participants.	TPC
5.2	Potentially introduce and enforce parking restrictions around the school. This is to be discussed and implemented in collaboration with Council's Road Safety Officer.	TPC
5.3	Liaise with staff to discuss the feasibility of a parking management scheme which would discourage the use of single occupant car travel to the site while incentivising employees to travel by alternative modes of transport.	TPC

9. Cumulative Impact Assessment

Cumulative Impact Assessment

Cumulative Impact Assessment

Located in the South-West Growth Area (SWGA), the site and surrounding areas are poised for substantial growth and densification. Austral is undergoing significant change and transition following recent rezoning by the NSW Government. Numerous residential subdivisions in both the immediate and broader vicinity are set to reshape the area, further contributing to the evolving landscape. The impact of this population uplift on the surrounding transport and traffic network is considered in combination to the operation of the school.

Impact	Description
Queuing from high peak hour traffic volume.	Very high car use creating strain on completed Kiss and Drop bays during peak hours.
Road network performance at critical intersections reaching capacity.	Population growth expected in Austral will increase traffic growth at a rate of 1.45% compounded annually until the forecasted year 2036. This will strain the performance of the Edmondson Avenue and Tenth Avenue intersection which currently is operating at a PM peak Level of Service F. Edmondson Avenue is planned for road widening and installation of signalisation in 2026.
High accident frequency on Edmondson Avenue.	High vehicle based crash occurrence rate on Edmondson Avenue was recorded between 2018 and 2022. These safety issues demonstrate the need to improve crossing facilities and make efforts to reduce vehicle use and provide improved pedestrian safety and promote the visibility of pedestrians to vehicles.

Cumulative Impact Assessment

Impact	Description
Kiss and Drop bay congestion causing visibility issues.	Kiss and Drop bay is positioned close to the bus stop and too many vehicles parking can obstruct driver sight lines, causing traffic congestion and presenting as a hazard.
Walking catchment coverage is small relative to SSTS boundary.	SSTS boundary encompasses a significant area that is beyond a 1200m or 15-minute walking accessibility range. A large number of students are located beyond a 15-minute walking range from the school but also do not qualify for subsidised travel. Estimated only 8% of existing students and 10% of total future students live within a 15-minute walk of school.
Enrolment boundary covers significant reaches with limited public transport access.	Enrolment boundary reaches over 2km from the school in most directions and relatively limited public transport options exist for students who are eligible for subsidised travel. It is expected that number of students living in the catchment will increase by 70% with future developed subdivisions. Only 32% of future students eligible for subsidised travel are within 800m walk of existing bus stops and services.

10. Mitigation Measures

Mitigation Measures

Mitigation measures

We recommend that these mitigation measures be evaluated and carried out by Austral Public School.

Mitigation	Aspect	Mitigation measure	Reason for mitigation measure
Dedicated Transport Plan Coordinator (TPC)	Post completion	TPC to undertake observational surveys to obtain data on pedestrian, cycling and scooting use to support the travel survey. They are to conduct site visits to evaluate the school's transport system and flag issues. Surveys should be conducted at least once every year and utilise the hands-up survey method. TPC will be able to engage with TfNSW and Council.	Travel plan activities can be monitored by TPCs to ensure that targets and objectives specified within the STP are met
Travel welcome pack for staff	Post completion	Provide new staff with information on alternate modes of transport to reduce use of private vehicle.	Reduce traffic on road network and parking demand.
Creation and update of a Transport Access Guide (TAG)	Post completion	TAG to track changes to bus routes and service times. Information used to maintain awareness of public transport options and operations. Awareness of availability could influence mode share changes towards using public transport where available.	Promoting the use of public transport options and as alternative to active transport.
Programs to promote active travel	Post completion	Hosting programs such as 'Walk to Work Day', 'Walk Safely to School', 'Walking School Bus', and 'September'.	Advocate active transport by educating younger students on how to safely navigate walk to school routes.

Mitigation Measures

Mitigation	Aspect	Mitigation measure	Reason for mitigation measure
Display bus route maps and timetables within school ground	Post completion	Reminders of public transport options and making information available for students to evaluate suitable bus routes and engage with bus timetables in convenient spaces.	Increase public transport use to reduce private vehicle demand on car parking and road network.
Introduce carpooling system and school carpark use restrictions	Review need 6 months post completion	Create carpooling initiatives such as provision of online services or forums to facilitate ease of finding carpooling scheme participants. Introduce carpark restrictions and liaise with staff to discuss the feasibility of a parking management scheme which would discourage the use of single occupant car travel to the site while incentivising employees to travel by alternative modes of transport.	Reduce vehicle traffic on road network and prevent queuing at access point during morning and afternoon peak hours.

11. Consultation with agencies

Consultation with agencies

Consultation meeting	Agencies involved
Traffic Working Group (TWG) 1	Arup, TfNSW, Liverpool City Council, SINSW, CTPG
Traffic Working Group (TWG) 2	Arup, TfNSW, Liverpool City Council, SINSW, CTPG

Consultation group	Topic	Issue raised	Decision / action
TWG 1	Contingency to include for Opal data	Should Arup include a contingency to capacity in order to more accurately account for students not tapping on or off buses.	TfNSW advised a 10% contingency to capacity should be included in the analysis to accommodate students who do not tap on or off buses when reviewing current bus capacity.
	Bus route updates	Indicative changes to bus services for routes 861, 1052, and 2033. With increased frequency and deviation to routes to include Seventeenth Ave.	TfNSW recommended additional services of bus route 855 (Rutleigh Park to Liverpool via Austral & Leppington Station) in the AM peak.
	Kiss and drop zone allocation	A minimum of 17 vehicle spaces is required for Stage 1 kiss and drop bays. Discussion on where to locate these bay.	TfNSW recommended providing kiss and drop bays on Tenth Avenue instead of Edmondson Avenue as all the on-street activities along the Edmondson Avenue will be ultimately removed due to the upgrade. It is also worth to provide a plan to show kiss and drop bay on Tenth Avenue. TfNSW and Liverpool City Council (LCC) agree that kiss and drop should be provided on Tenth Avenue to minimize conflict to the traffic on the main road. LCC advised that kiss and drop should be continuous where possible.
	Road and intersection upgrades for Edmondson Ave	Understanding that there are planned upgrades to Edmondson Ave. Confirm estimated dates for upgrade commencement and completion and how the improvements impact intersection analysis.	LCC advised that analysis for Austral Primary School Stage 1 should be based on the existing road layout as the Edmondson Avenue upgrade is targeted to complete in 2028.
	Wombat crossing relocation	General consideration for wombat crossing location.	LCC advised the existing wombat crossing on Edmondson Avenue will be relocated further south. The works is expected to be carried out during Christmas holiday 2024. LCC recommended to group the kiss and drop bays in one area, separated to the bus zone. LCC will provide the crossing relocation plan to Arup to consider.

Consultation with agencies

Consultation group	Topic	Issue raised	Decision / action
TWG 2	Actions from TWG 1	<ul style="list-style-type: none"> Review kiss and drop arrangement on Edmondson Ave and Tenth Ave. Review Edmondson Ave wombat crossing. 	<ul style="list-style-type: none"> LCC confirmed they would send through the latest plans to reflect in Arup drawings. LCC confirmed the kiss and drop bays should be within one location to make management of the bays easier on Edmondson Avenue. LCC confirms the combat crossing will be moving south, closer to the school pedestrian access on Edmondson Ave.
	Bus route 855	Arup presented modifications to bus route 855 required for new residential areas.	Arup concluded that bus route 855 is an infrequent and long service which is currently underutilised, and changes to the timetable would be required to fit with the start and end times of Austral Public School if it were to be used. TfNSW agreed it was an infrequent service but should still be considered in the analysis.
	Bus route 861	Impacts of changes to bus route 861 on other schools in the area.	TfNSW requested to look at the impact of bus route 861 on St Anthony of Padua Catholic College. Arup to provide bell times as an appendix to Traffic Impact Assessment. TfNSW noted that the frequency of 861 would increase to every 15 minutes if funding was secured. If this is implemented prior to Stage 1 opening of Austral (2026) this would provide more services for the school to use. TfNSW noted if funding was not secured prior to 2026 then alternative arrangements would need to be made, such as a dedicated school bus service for Austral Public School. TfNSW to review funding and bus options prior to 2026.
	Edmondson Ave intersection	Arup queried whether a temporary crossing could be installed as a result during the Edmondson Ave – Tenth Ave intersection upgrade.	LCC confirmed this would need to be discussed at a future traffic committee. SINSW could provide a pedestrian count survey result to Arup to justify a temporary crossing.

ARUP

Supplementary details

References

References

- Liverpool City Council Delivery Program 2022-32 Operational Plan 2023-24 (Liverpool City Council, 2023)
- Austral and Leppington North Contributions Plan 2021 (Liverpool City Council, 2023)
- Liverpool Growth Centre Precincts Development Control Plan Schedule 1 (Liverpool City Council, 2021)
- Liverpool Development Control Plan 2008 (Liverpool City Council, 2021)
- Liverpool Local Environmental Plan 2008 (Liverpool City Council, 2023)
- Austral and Leppington North Precinct Post Exhibition Traffic Report Addendum (AECOM, 2012)
- Guide to South West Growth Area Structure Plan (DPE, 2022)
- Austral and Leppington North Precinct Indicative Layout Plan (Planning & Infrastructure, 2023)
- Green Star Design & As Built Submission Guideline (Greenstar, 2017)
- Population projects Open Data Hub and Development Portal (TfNSW, 2023)
- Liverpool City Council Agenda Ordinary Council Meeting (Liverpool City Council, 2023)