Transport and Accessibility Impact Assessment

Jerrabomberra High School - Stage 2

Prepared for School Infrastructure

28 July 2023

231314 TAAA

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Executive Summary

This Transport and Accessibility Impact Assessment (TAIA) addresses the traffic and transport design parameters, investigations, and outcomes of the proposed development of Jerrabomberra High School - Stage 2. The project comprises the construction of a new school building containing general learning spaces, labs, workshops and ancillary facilities; additional outdoor sports courts; and associated civil and landscape works.

The overall transport strategy for the proposed school is as follows:

- **Pedestrians**
  - Retain Pedestrian accesses from Environa Drive, Lexcen Avenue, and the eastern entry connecting to Jerrabomberra Public School.
  - Rely on additional external active transport infrastructure constructed as part of the Stage 1 works.

- **Cyclists**
  - Provide 114 new bicycle/scooter storage spaces for students and staff.
  - Provide additional end of trip facilities.

- **Public transport**
  - No change; existing provisions to be retained.
  - Usage of public transport to be encouraged through the School Transport Plan and improved through ongoing consultation and governance measures.

- **Service and loading**
  - No change: existing provision to be retained, access to the site will be retained for service vehicles through the existing entrance from Environa Drive.

- **Pick up and drop off**
  - No change: existing provisions to be retained.
  - Usage of alternative travel modes to be encouraged through the School Transport Plan

- **Car parking**
  - An additional 34 on-site parking spaces to be provided to cater for the increase staff.

Contents

Section 1 Introduction

1.1 Project Description

This Transport and Accessibility Impact Assessment (TAIA) has been prepared by TTW on behalf of the NSW Department of Education (DoE) to support a development application (DA) to Queanbeyan-Palerang Regional Council (Council) for an addition to the approved Jerrabomberra High School located at 101 Environa Drive, Jerrabomberra (the site).

The proposal is for additions to the approved Jerrabomberra High School including:

- Construction of a new school building containing general learning spaces, kitchen, workshops and ancillary facilities;
- Extension to the existing carpark with provision for an additional 34 parking spaces;
- Provision of 114 bicycle parking spaces;
- Construction of a large outdoor play space for student use;
- Associated civil and landscape works; and
- Internal alterations to the ground floor of Block B (already approved and constructed under SSD- to replace the existing kitchen, food and textiles facilities with a new science lab, general learning spaces, and ancillary facilities.

The objective of the proposal is to accommodate project demand for high school spaces in the area.

The development is Crown development with a capital investment value of more than $5 million, and therefore it is “regionally significant” under section 2.19 and Schedule 6 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). The Southern Regional Planning Panel is the relevant consent authority for the application.

1.2 Scope of Works

This Transport and Accessibility Impact Assessment (TAIA) has been developed to assess and address the traffic and transport impacts of the proposed development and define the key traffic-related design elements of the proposal. This report has been prepared in support of a development application (DA) for the project.

This report covers the following areas:

- Site access
- Active transport (pedestrians and cyclists)
- Public transport
- Service and loading
- Pick up and drop off
- Car parking
- Travel mode investigation
- Road network performance

A preliminary Construction Traffic Management Plan has also been developed as part of this report to assess any traffic impacts expected to occur during construction works.

1.3 Guidelines and References

The traffic and transport strategy for the project has been prepared in the context of a variety of relevant codes, standards, and references listed below.

- Australian Standards, including:
  - AS2890 – Parking facilities

- Austroads Guidelines, including:
  - Guide to Traffic Management
  - Guide to Road Design
  - Guide to Road Safety
- TfNSW (formerly RTA) Guide to Traffic Generating Developments
- NSW Planning Guidelines for Walking and Cycling
- Queanbeyan-Palerang Regional Council Development Control Plan DCP 2015.
- Queanbeyan-Palerang Regional Local Environmental Plan 2022 (QPRLEP2022).
- New High School in Jerrabomberra Transport Assessment (2021)

1.4 Consultation

Ongoing consultation has been occurring as part of the Stage 1 proposal and as part of finalising the School Transport Plan required for operation of the School. Key points of consultation with Council and TfNSW include:

- Initial consultation with TfNSW (Rural and Regional Contracts) regarding new and modified bus services associated with the school's location on Environa Drive.
- Consultation with Council and TfNSW through participation in multiple Transport Working Group meetings. These meetings focused on discussing active transport infrastructure upgrades pertaining to Condition B24(c - e) of the SSDA associated with Stage 1.

Section 2 Existing Conditions

2.1 Site Overview

The site is located at 101 Environa Drive, Jerrabomberra (Lot 2 DP1277158). The site is irregularly shaped and has an area of approximately 4.5ha. The site has two road frontages—one to the west (Environa Drive) and one to the north (Lexcen Avenue). Lexcen Avenue provides direct access to the school site.

The site is located in the Southern Tablelands region of NSW, approximately 10km southeast of Canberra.

An aerial view of the site and the surrounding road network is shown in Figure 1.

Figure 1: Site location
Source: MetroMap

The primary pedestrian and bicycle access points to the site are via Environa Drive and Lexcen Avenue. Additionally, there is an access point from the eastern entry, which connects to the existing oval footpath network.

As for vehicular access, the main entry point is through the Lexcen Avenue, while an additional access point is available from Environa Drive for deliveries.

2.2 Pedestrian Network

Footpaths are currently provided along the northern side of Coachwood Avenue and on the eastern side of Jerrabomberra Parkway. Signalised pedestrian crossings are available at the intersection of Tompsitt Drive and Henry Place. School crossings are designated at the frontage of Jerrabomberra Public School on Coachwood Avenue and Firethorn Place. At the end of Coachwood Avenue, there is a pedestrian path along the southern boundary of the school site, running alongside David Madew Oval, with an approximate width of 1.2 metres.

An aerial view of the surrounding active infrastructure is shown in Figure 2.

Figure 2: Active transport infrastructure

Source: New High School in Jerrabomberra Transport Assessment (GHD) 2021

As part of Stage 1, SINSW has committed to constructing several active transport infrastructure elements before the school's opening[1]. These improvements will be in place prior to the operation of Stage 2 and include:

- A pedestrian crossing across Lexcen Avenue, located at the intersection of Environa Drive and Lexcen Avenue.
- A staggered, raised wombat combat crossing along Jerrabomberra Parkway, between Coachwood Avenue and Bicentennial Drive.
- A 2.5-metre-wide footpath along the western side of Jerrabomberra Parkway, connecting the new crossing on Jerrabomberra Parkway to Coachwood Avenue, along with an east-west connection to the existing school crossing on Coachwood Avenue.
- Widening of the existing footpath on the northern side of Coachwood Avenue, at its western end, to a width of 2.5 metres.

Additionally, refuge islands on Bicentennial Drive near Bayside Court and Brudenell Drive near Stringybark Drive, along with a new path between Coral Drive and David Madew Oval, are part of the Stage 1 delivery.

[1] School Transport Plan Jerrabomberra High School (PDC,2023)

Figure 3: Public Domain Works

2.3 Cyclist Network

A dedicated on-road bicycle path is available on the northern side of Tompsitt Drive. Figure 4 illustrates the existing and planned infrastructure around the site, including relevant extracts from the Queanbeyan Bicycle and Pedestrian Facilities Plan 2020.

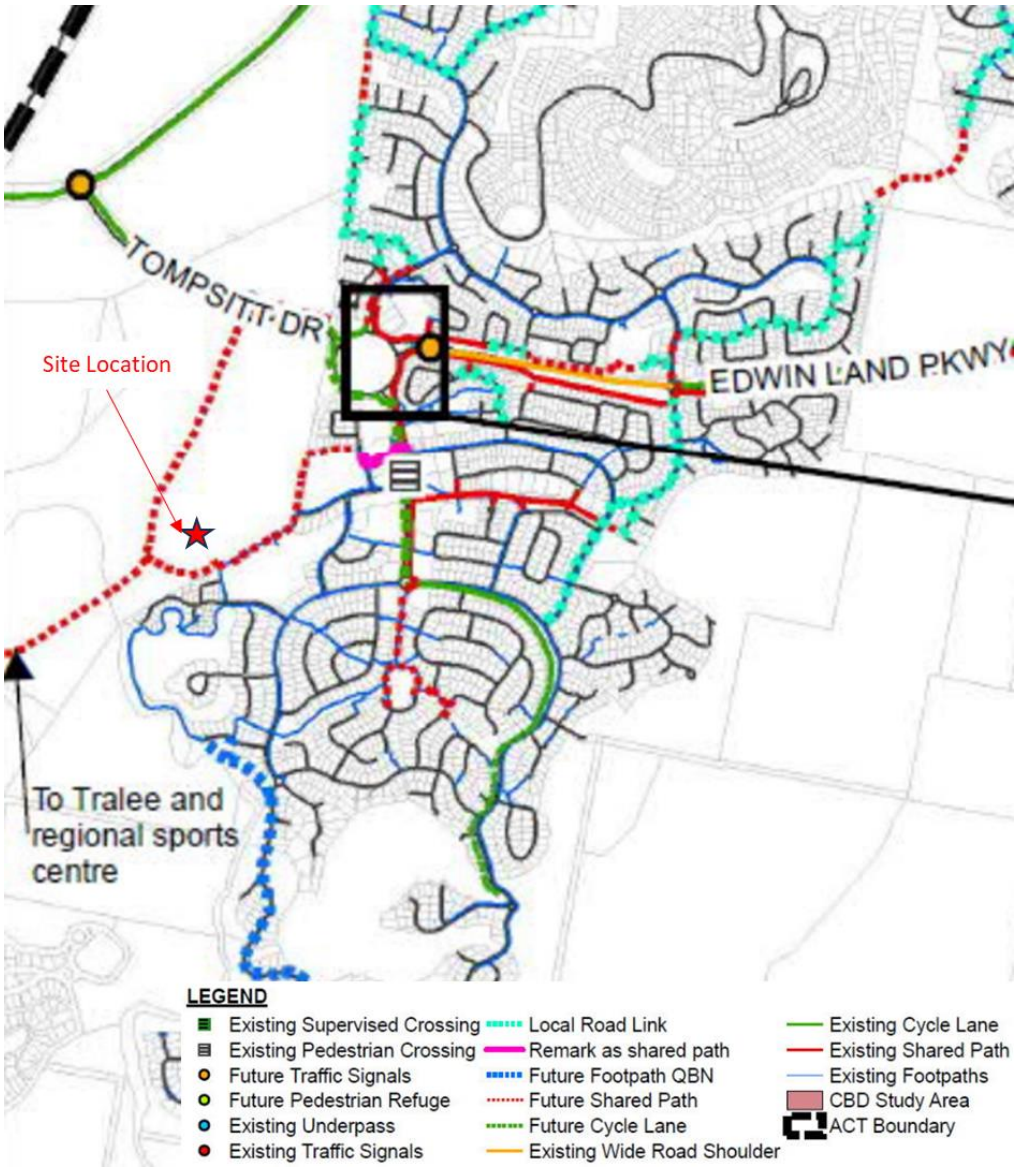

Figure 4: Local cycling infrastructure

Source: Queanbeyan Bicycle and Pedestrian Facilities Plan 2020

2.4 Public Transport

2.4.1 Bus Zone

The nearest bus stops are located at Environa Drive, at the front of Jerrabomberra High School, and Coachwood Avenue, at the front of Jerrabomberra Public School

Figure 5 illustrates the location of the nearest bus stops and relevant bus routes in the vicinity of the site.

Figure 5: Local bus services

2.4.2 Bus Services

There are several public and school bus services that operate from the bus zone area outside the school on Coachwood Avenue (these are outlined in Table 1).

Table 1: Bus Routes Servicing at Jerrabomberra Public School

Bus Number	Bus Route	Weekday Frequency
836	Jerrabomberra to Queanbeyan (Loop Service)	AM: 20 – 60 minutes PM: 30 – 50 minutes
S103	Jerrabomberra PS to Queanbeyan West	1 service after school
S109	Jerrabomberra to Queanbeyan High via Letchworth	1 service before school
S128	Jerrabomberra Public to Jerrabomberra Waterfall Dr	1 service after school
S130	Jerrabomberra to Daramalan College via Carolyn Jackson Dr	1 service before school
S138	Jerrabomberra Public to Jerrabomberra Edwin Land Pkwy	1 service after school

Bus Number	Bus Route	Weekday Frequency
S141	Daramalan College to Jerrabomberra via Letchworth	1 service after school
S145	St Edmunds and St Clares Colleges to Letchworth via Jerrabomberra	1 service after school
S155	Queanbeyan High to Jerrabomberra via North Tce & Letchworth	1 service after school
S160	Jerrabomberra to Calwell High	1 service before school
S161	Jerrabomberra Nth Tce to Red Hill Public via Jerrabomberra & Letchworth	1 service before school
S163	Queanbeyan Tharwa Rd to St Peter & Paul Primary via Jerrabomberra	1 service before school
S171	St Francis of Assisi Primary to Jerrabomberra via Waterfall Dr	1 service after school
S172	Jerrabomberra to St Gregorys Primary via Letchworth	1 service before school
S173	St Benedicts Primary to Jerrabomberra and Letchworth	1 service after school
S175	St Peter & Paul Primary to Queanbeyan Tharwa Rd via Jerrabomberra	1 service after school
S179	Campbell High to Jerrabomberra Limestone Dr via Letchworth	1 service after school
S180	Jerrabomberra to Telopea Park School via Waterfall Dr	1 service before school
S189	Jerrabomberra to Jerrabomberra Public via Waterfall Dr	1 service before school
S191	Jerrabomberra Public to Queanbeyan West Public via Letchworth	1 service before school
S198	Jerrabomberra Limestone Ave to Holy Family Primary	1 service before school
216	Jerrabomberra Public to Googong	1 service after school

A Bus Zone is currently being constructed as part of Stage 1. This is located west of the high school, as a separated layover from Environa Drive. The bus bay length is approximately 105 metres and can accommodate up to seven buses, facilitating additional bus route services for the high school. Suitable bus routes will be developed in collaboration with TfNSW during the detailed design phase, to address the transportation needs of both the high school and the adjacent primary school.

The bus bay is designated and restricted as a 'Bus Zone' during specific school peak periods, which are as follows:

- 8 am – 9:30 am on school weekday mornings.
- 2:30 pm – 4 pm on school weekday afternoons.

A survey was conducted by PDC Consultants in 2023 of Year 6 students currently attending Jerrabomberra Public School (JPS) and Year 7 and 8 students of the current Temporary Jerrabomberra High School (TJHS).

The survey was for students who currently use buses for their travel to and from school including which specific bus route was taken by the students. The summary of the current bus routes used by students is presented in Table 2.

Table 2: Bus Service Survey

Route	Route Name Mode split Volume	Number of Students		
		AM	PM	Average
835	Tralee to Queanbeyan via South Jerrabomberra & Queanbeyan West (Loop Service)	10	14	12
S187	Jerrabomberra to Telopea Park School via Waterfall Drive	14	0	7
S217	Queanbeyan Interchange to Googong Anglican School and Jerrabomberra Public School via Karabar	6	0	3
S189	Jerrabomberra to Jerrabomberra Public via Waterfall Drive	1	0	1
S128	Jerrabomberra Public to Jerrabomberra Waterfall Drive	0	7	4
S138	Jerrabomberra Public to Jerrabomberra Edwin Land Parkway	0	5	3
S103	Jerrabomberra Public School to Queanbeyan West	0	14	7
S216	Jerrabomberra Public to Googong	0	3	2

The survey results indicated that out of the 22 available school buses, seven buses are utilised by the surveyed students. Additionally, a moderate number of students are currently utilising the public bus route, specifically Route 835. It is important to note that Route 835 does not have a stop directly at Jerrabomberra Public School, and currently, students have to catch the bus at Limestone Drive, opposite Jerrabomberra Village Shopping Centre.

2.4.3 Train

The nearest train station is Queanbeyan Station which is located a 12-minute drive from the school. Queanbeyan is served by three daily NSW TrainLink Xplorer services in each direction operating between Sydney and Canberra. NSW TrainLink also operate a road coach service from Queanbeyan to Cootamundra.

2.5 Road Network

The key roads in the local network are described in Table 3.

Table 3: Local Road Network

Road name	Classification	Speed limit	Road geometry	Parking restrictions
Tompsitt Drive	Sub-arterial	80km/hr	Two lane each direction Parking on both side, on-road bike lane provided on the northern side	NA
Coachwood Avenue	Local	50km/hr 40 km/h School Zone (8:00 am 9:30 am and 2:30 pm – 4:00 pm school days)	One lane in each direction Footpath is provided on the northern side crossing at the front of the School	No Parking signage (8:30 am – 9:30 am and 2:30 pm – 4:00 pm school days)
Jerrabomberra Parkway	Collector	50km/hr 40 km/h School Zone (8:00 am 9:30 am and 2:30 pm – 4:00 pm school days)	One lane in each direction Footpaths are provided on the eastern side Crossing at the frontage to the Jerrabomberra Shopping Centre.	Parking not permitted
Environa Drive	Local	60km/hr 40 km/h School Zone (8:00 am 9:30 am and 2:30 pm – 4:00 pm school days)	One lane in each direction Shared path are provided on both sides	Parking not permitted

The extent of State and Regional roads in the vicinity of the site is illustrated in Figure 6.

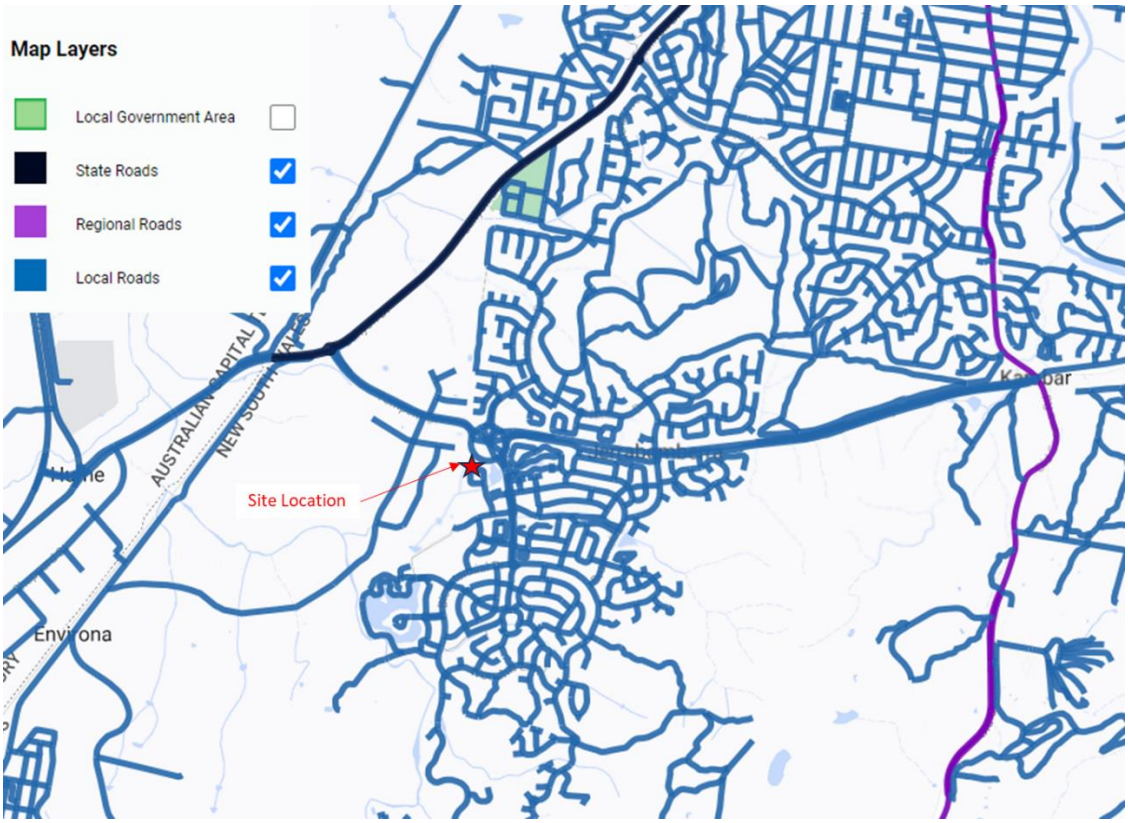

Figure 6: Classified roads map
Source: Transport for NSW

2.6 Parking Facilities

2.6.1 On-Site Parking

Access to on-site parking currently under construction as part of Stage 1 is facilitated through Lexcen Avenue. The existing car park has a capacity of 44 car parking spaces including 2 accessible spaces.

The location of the existing car park is illustrated in Figure 7.

Figure 7: Existing car park

Source: Approved Plans (New High School in Jerrabomberra)

2.6.2 On-Street Parking

On-street car parking is generally available in the Lexcen Avenue and on Coral Drive near Jerrabomberra Public School (JPS).

As part of an agreement with QPRC, there are 71 car spaces available for students in two separate parking areas situated southwest of David Madew Oval, with access from Bayside Crescent. Additionally, a proposed pedestrian footpath from the oval to the school will be constructed as part of Stage 1, noting that the North-South portion of the footpath already exists.

Additionally, 15 spaces are available along Laxcen Avenue, and around 16 spaces are available outside school peak periods along Environa Drive within the bus bay.

Figure 8 shows the current on-street parking restrictions in the surrounding streets.

Figure 8: On-Street Parking Restrictions
Source: New High School in Jerrabomberra Transport Assessment (GHD) 2021

2.6.3 Bicycle Parking

A total of 114 bicycle parking spaces was proposed in Stage 1 to cater for both students and staff, these spaces are located at the northern and eastern pedestrian entries of the school. One unisex shower/change room is provided that is accessed from Lexcen Avenue.

2.6.4 Pick up and Drop off Arrangement

Eight on-street parking spaces are designated on the southern side of Lexcen Avenue to facilitate pick-up and drop-off operations during school peak periods. Parents and guardians accessing these spaces will be required to perform a U-turn at the eastern end of Lexcen Avenue, utilising the turning head. They can exit the bay and proceed westward to leave Lexcen Avenue and access Environa Drive.

To ensure smooth traffic flow and efficient use of the bay, 'No Parking' signage will be displayed between 8 am – 9:30 am and 2:30 pm – 4:30 pm during school days. These restrictions will encourage quick vehicle turnover, while outside these hours, the bays will be available for public (and visitor) parking.

Additionally, designated pick-up and drop-off points for students with special needs is located within the staff car park and at the specified pick-up/drop-off bay, offering convenient access and assistance for these students.

2.7 Traffic Conditions

2.7.1 Traffic Data Collection

GHD's report gathered Sydney Coordinated Adaptive Traffic System (SCATS) data from TfNSW for the signalised intersections of Tompsitt Drive/Lanyon Drive and Tompsitt Drive/Henry Lane on the 13th of May 2021 for stage 1 of the project. SCATS provides information on traffic volumes and signal phasing.

Upon reviewing the SCATS data, it was found that during the afternoon periods:

- At the intersection of Tompsitt Drive and Lanyon Drive, the school peak traffic volume is approximately 85% of the overall road network's peak traffic volume.
- At the intersection of Tompsitt Drive and Henry Place, the school peak traffic volume is around 78% of the road network's peak traffic volume.

Based on this analysis, it is assumed that the traffic volumes during the afternoon school peak hour amount to approximately 82% of the road network's peak hour.

GHD has provided the existing traffic conditions in the vicinity of the new high school in Jerrabomberra as documented in the previous Traffic Assessment (TA) report. The traffic surveys were conducted by Trans Traffic Survey at the following intersections on the 13th of May 2021:

- Lanyon Drive and Tompsitt Drive.
- Tompsitt Drive, Henry Place, and Environa Drive.
- Tompsitt Drive, Limestone Drive, Edwin Land Parkway, and Jerrabomberra Parkway (referred to as Jerrabomberra Circle).

Based on the observations, the peak hours for the road network were determined as follows:

- AM Peak: 7:45 am - 8:45 am.
- PM Peak: 5:00 pm - 6:00 pm.

2.7.2 Network Configuration and performance

Considering the existing (2021) traffic volumes and road geometry, the findings of the SIDRA intersection modelling analysis, as extracted from the GHD transport assessment in Stage 1, are presented in Table 4.

Figure 9 illustrates the geometry and layout of the intersections as they have been modelled for the existing conditions.

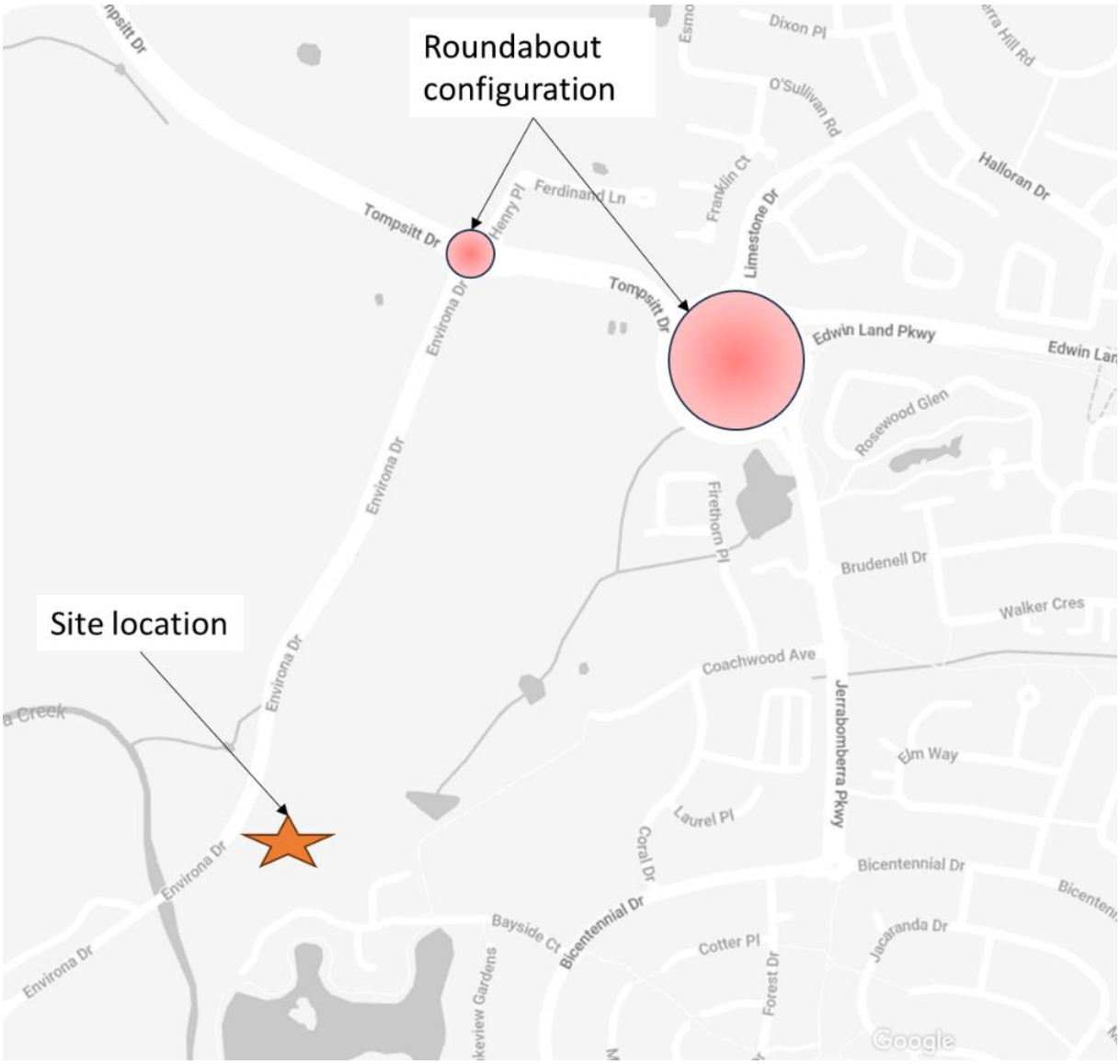

Figure 9: Network Layout

Table 4: Intersection Modelling Results (2021)

Source: New High School in Jerrabomberra Transport Assessment (GHD) 2021

Lanyon Drive and Tompsitt Drive						
	AM School Peak			PM School Peak		
	Average delay (sec)	LoS	95th% Queue (m)	Average delay (sec)	LoS	95th% Queue (m)
Lanyon Drive - South	17	LoS B	126	20	LoS B	159
Tompsitt Drive	24	LoS B	134	24	LoS B	35
Lanyon Drive - North	31	LoS C	113	34	LoS C	100
Total	24	LoS B	134	24	LoS B	159
Tompsitt Drive and Henry Pl						
Tompsitt Drive - east	13	LoS A	223	7	LoS A	23
Henry Pl	60	LoS E	33	49	LoS D	27
Tompsitt Drive - west	10	LoS A	23	22	LoS B	175
Total	15	LoS B	233	21	LoS B	175
Jerrabomberra Circle						
Jerrabomberra Pkwy	1	LoS A	0	1	LoS A	0
Edwin Land Pkwy	24	LoS B	164	4	LoS A	15
Limestone Drive	3	LoS B	17	5	LoS A	18
Tompsitt Drive	2	LoS A	8	3	LoS A	39
Total	8	LoS A	164	3	LoS A	39

The data provided in Table 4 indicates that all the intersections under consideration exhibit satisfactory Levels of Service (LoS) during peak periods of school activity in the existing (2021) scenarios. It is assumed that these results remain valid at present.

Furthermore, Stage 1 compared the results for the two scenarios of build and no-build option, and the results indicated that JHS with build option will have minor impact on the operation of the intersections of interest. SIDRA intersection modelling analysis, as extracted from the GHD transport assessment in Stage 1, are presented in Table 5.

Table 5: Intersection Modelling Results - Build Scenario (2023)

Source: New High School in Jerrabomberra Transport Assessment (GHD) 2021

Lanyon Drive and Tompsitt Drive						
	AM School Peak			PM School Peak		
	Average delay (sec)	LoS	95th% Queue (m)	Average delay (sec)	LoS	95th% Queue (m)
Lanyon Drive - South	19	LoS B	160	121	LoS F	660
Tompsitt Drive	22	LoS B	168	39	LoS C	113
Lanyon Drive - North	39	LoS C	144	35	LoS C	123
Total	25	LoS B	168	86	LoS F	660
Tompsitt Drive and Henry Pl						
Environa Drive	30	LoS C	143	140	LoS F	549
Tompsitt Drive - east	77	LoS F	490	66	LoS E	123
Henry Pl	46	LoS D	54	51	LoS D	101
Tompsitt Drive - west	43	LoS D	64	135	LoS F	506
Total	57	LoS E	490	111	LoS F	549
Jerrabomberra Circle						
Jerrabomberra Pkwy	2	LoS A	15	1	LoS A	0
Edwin Land Pkwy	1790	LoS F	3868	17	LoS B	61
Limestone Drive	204	LoS F	589	29	LoS B	80
Tompsitt Drive	23	LoS A	12	11	LoS B	156
Total	557	LoS F	3868	11	LoS B	156

According to the SIDRA results, the operation of the "build" scenario is consistent when compared to the "no-build" scenario. GHD's report noted that the planned increase in high school traffic will have a minor impact on the intersections, which are already failing due to large background traffic increases in the south Jerrabomberra region by 2033. As a result, any improvements to the intersections in Jerrabomberra to allow an acceptable LoS should not be funded or implemented by the high school.

2.8 Travel Mode

Sourced from the TfNSW Trip Generation Surveys School Analysis Report, which aims to provide up-to-date trip generation data for schools in Greater Sydney and Regional NSW, the following table presents the average mode split for regional high schools. The mode share surveys were conducted in Kiama, Cessnock, Springwood, and Wyong.

Table 6: Regional Secondary School Mode Split

Mode	Portion
Car	38%
Bus	35%
Walk	28%

In the previous approved Traffic Assessment (TA)[2], a comparison was made between the Base case scenario and the Reach scenario, which was determined based on catchment analysis. The purpose was to establish a Target mode share that falls between the base and reach scenarios. The target mode share with the existing student and staff numbers is outlined in Table 7, the below assumptions were made:

- In terms of walking or scootering, the base scenario accounts for 25 percent, while the reach scenario represents 33 percent. A target scenario of 30 percent has been established to ensure adequate support for students residing within a 1,200-metre radius to walk to and from school.
- Regarding cycling, it is expected that a majority of students will be within a 15-minute cycling distance from the school. Therefore, a target scenario of 20 percent, equivalent to approximately 100 students, has been set for cycling.
- For buses, the baseline scenario indicates a 10 percent mode share, while the reach scenario, determined through first-principles analysis, stands at 20 percent. As a target scenario, an average of the two, 15 percent, has been assumed for the bus mode share.
- Among the remaining 35 percent of students, it is estimated that 25 percent will be picked up or dropped off, while 10 percent will either drive themselves or be passengers.

Table 7: Existing Target Mode share (GHD)

	Staff	Students
Travel mode	**Mode split**	**Mode split**
Walk	10%	30%
Bicycle	10%	20%
School Bus	0%	15%
Kiss and Drop	0%	25%
Car, as driver	70%	10%
Car, as a passenger	10%	0%
Total	100%	100%

A survey of existing Year 6 students of JPS and Year 7 and 8 students of the Temporary Jerrabomberra High School (TJHS) was conducted to determine the existing travel modes of students specific to Jerrabomberra. These students are expected to attend the school once construction is completed and operational by Day 1, Term 1 of 2024. The survey results are summarised in Table 8. These survey results were reported in the School Transport Plan prepared by PDC Consultants.

[2] New High School in Jerrabomberra Transport Assessment (GHD,2021)

Table 8: Existing Students Mode Share Target (PDC School Transport Plan)

Travel mode	Morning Mode split	Evening Mode split	Average
Car, dropped off	46%	24%	35%
Bus	11%	27%	19%
Walked	23%	29%	26%
Rode a bicycle or other rideable (incl. scooter, skateboard, etc.)	20%	20%	20%

The data obtained from GHD and PDC is similar in nature; however, there is a noticeable difference in the percentage of students being dropped off. The School Transport Plan provides a more realistic representation of students' behavior and transportation patterns and the PDC's recent data is considered as the most accurate representation for the travel mode share behaviour of the existing students.

2.8.1 Census Travel Data

Method of Travel to Work (MTWP) data from the 2021 Census provides an estimate of travel modes to and from the local area as defined by Statistical Area Level 2 (SA2) zones. The site is located within SA2 zone Queanbeyan West – Jerrabomberra as illustrated in Figure 10.

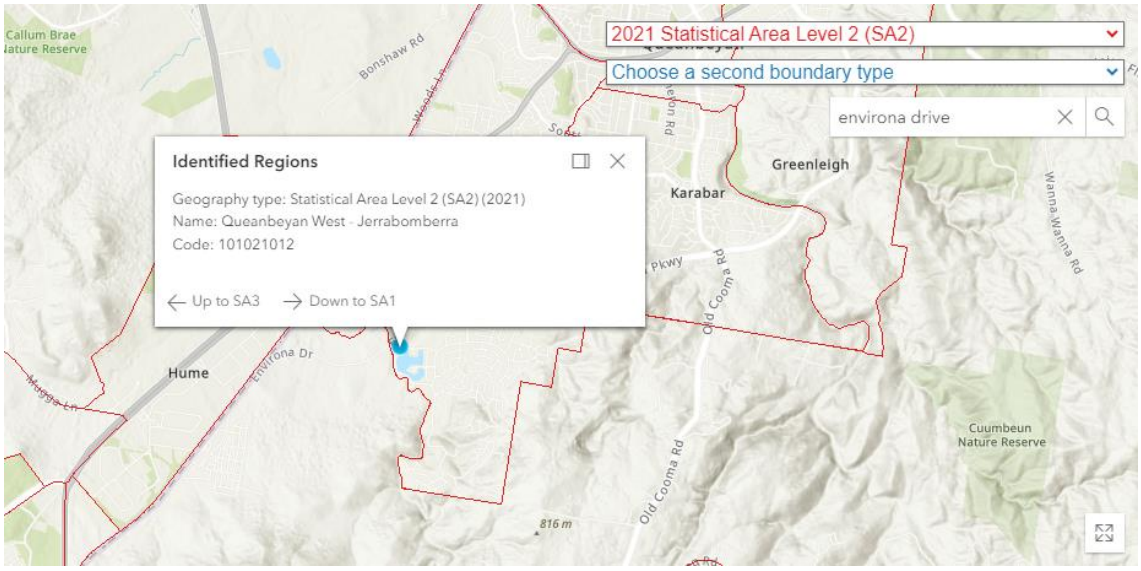

Figure 10: Statistical Area Level 2 (SA2)

The census travel data is summarised in Table 9, for this SA2 zone as a place of work (i.e. travelling from somewhere else) and as a place of residence (i.e. travelling to somewhere else)

Responses for “worked at home”, “did not go to work”, and “mode not stated” have been excluded from this analysis.

Journey to Work data indicates that private vehicle transport is the predominant travel mode.

Table 9: Census travel data
Source: Australian Bureau of Statistics 2021 Census

Travel mode	Place of work	Place of residence
Train	0%	0%
Bus	0%	1%
Ferry	0%	0%
Tram	0%	0%
Taxi	0%	0%
Car, as driver	90%	90%
Car, as passenger	3%	6%
Truck	3%	1%
Motorbike/Scooter	1%	1%
Bicycle	0%	0%
Walked only	1%	0%
Other modes	1%	0%

The JTW data can be summarised into three main categories as shown in Table 10.

Table 10: Summarised JTW Data
Note: Values may not add to totals due to rounding

Mode Summary	Existing
Active transport (bicycle, walk)	1%
Public transport (train, bus, ferry, tram)	0%
Private vehicle (taxi, car, truck, motorcycle)	99%
Total	100%

Section 3 Proposed Works

Stage 2 of the New High School project in Jerrabomberra proposes alterations and additions to the previously approved plans in Stage 1. The proposed development aims to expand the current capacity of 530 students by an additional 470 students to increase total capacity up to 1,000 students. The proposal includes:

- Construction of a new school building containing general learning spaces, labs, workshops and ancillary facilities;
- Additional outdoor sports courts; and
- Associated civil and landscape works.

The objective of the proposal is to accommodate project demand for high school spaces in the area. The overall proposed site plan is illustrated in Figure 11.

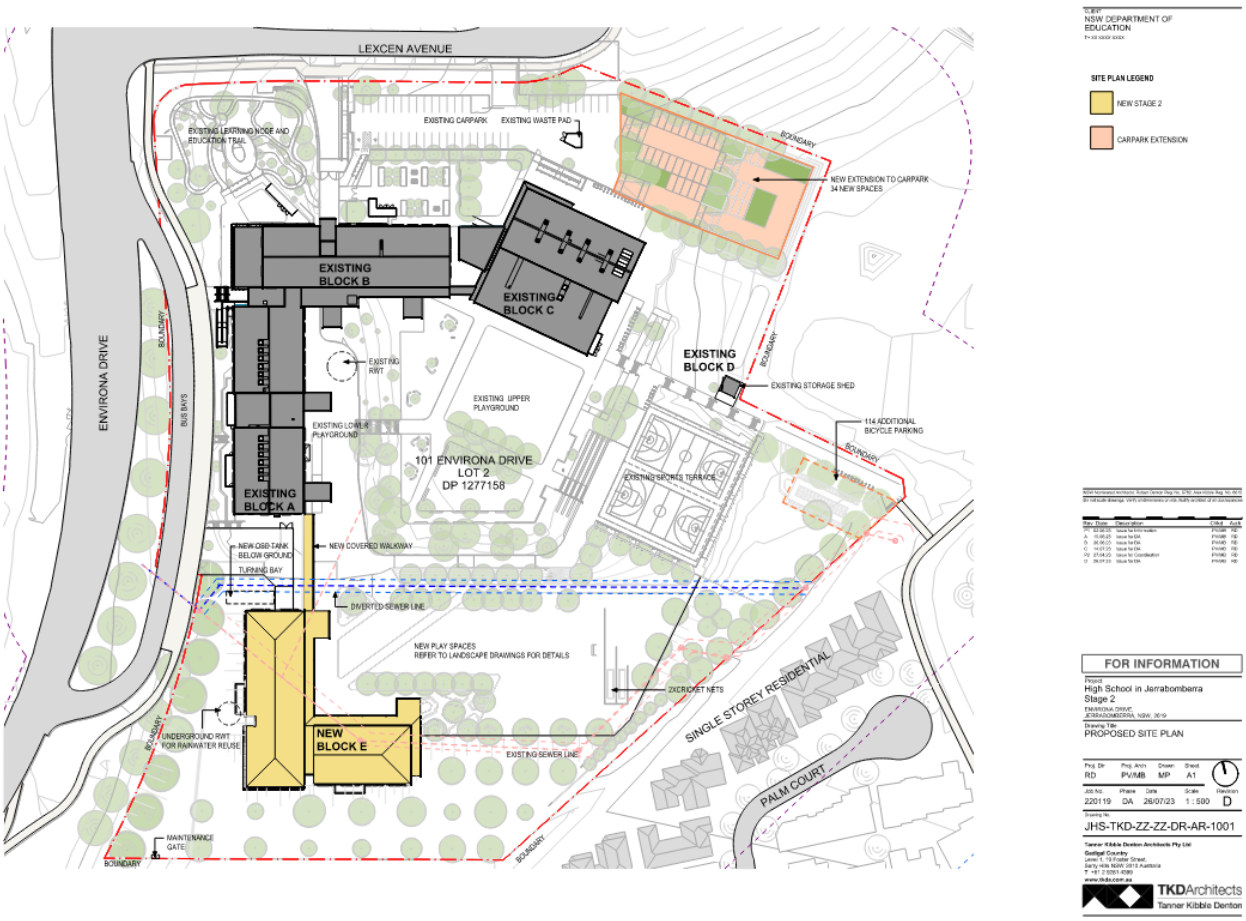

Figure 11: Proposed site plan
Source: TKD Architects

The proposed works will represent an increase in students and staff population of approximately 470 students and 32 staff, as detailed in Table 11.

Table 11: Proposed development capacity

Travel mode	Existing	Proposed
Students	530	1,000
Staff	46	78

3.1 Site Access

The existing car park driveway access at Lexcen Avenue and Environa Drive will be retained. Additionally, pedestrian access to the site will be maintained through Environa Drive, Lexcen Avenue, and the eastern entry connecting to Jerrabomberra Public School.

The site access and circulation strategy on completion of the proposed works is shown in Figure 12.

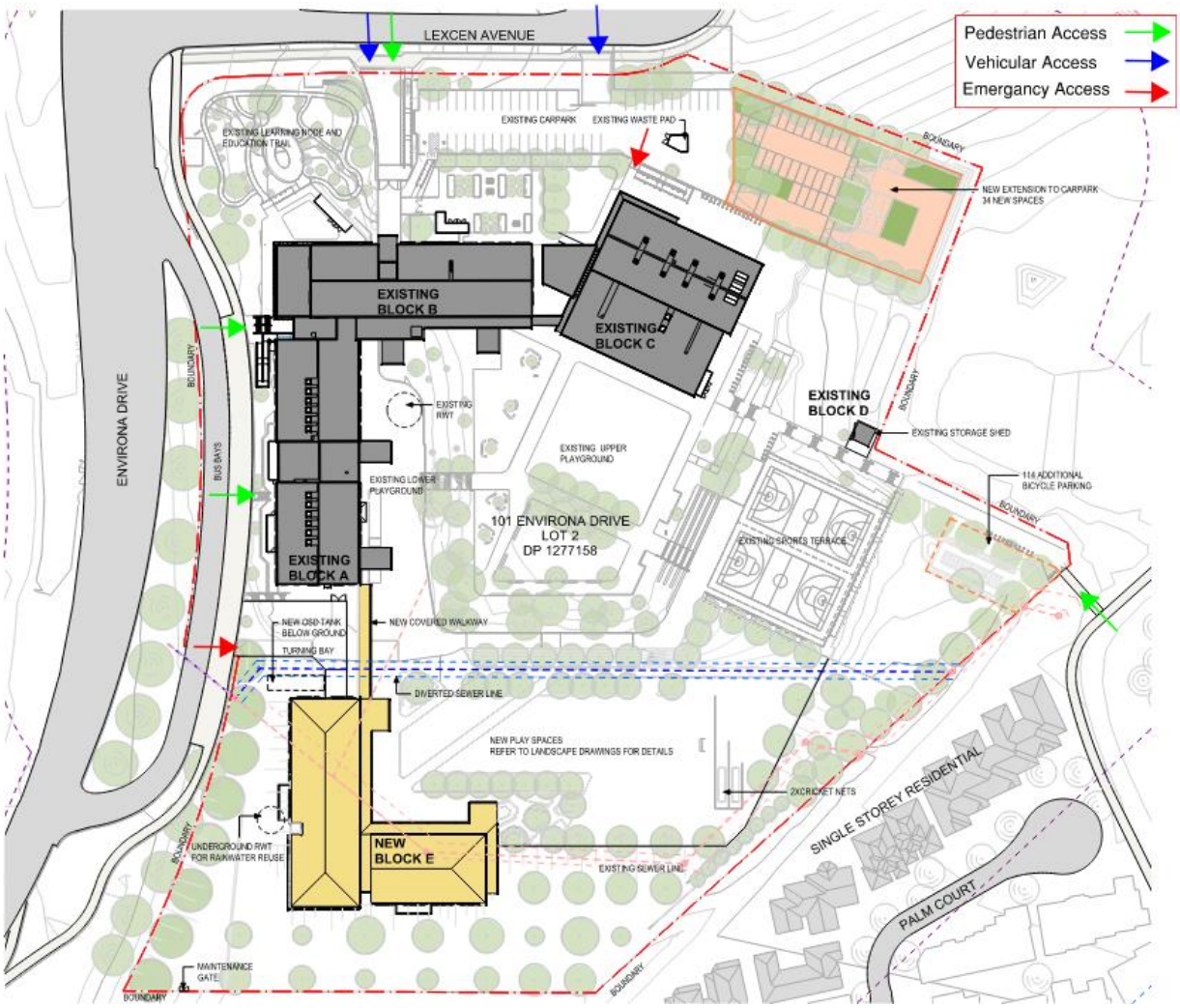

Figure 12: Proposed Site Access
Source: TKD Architects

3.2 Cyclist Facilities

The proposal includes additional bicycle storage with capacity for 114 bicycles, the existing access for scooter and bicycles will be retained.

End-of-trip facilities for staff will be provided with an additional 3 showers and one change room located near the existing shower/change room facility aligning with NSW Planning Guidelines for walking and cycling.

All bike parking will be provided within the secured, fenced, boundary of the school. The proposed bicycle storage area will be located near the eastern pedestrian access as illustrated in Figure 13.

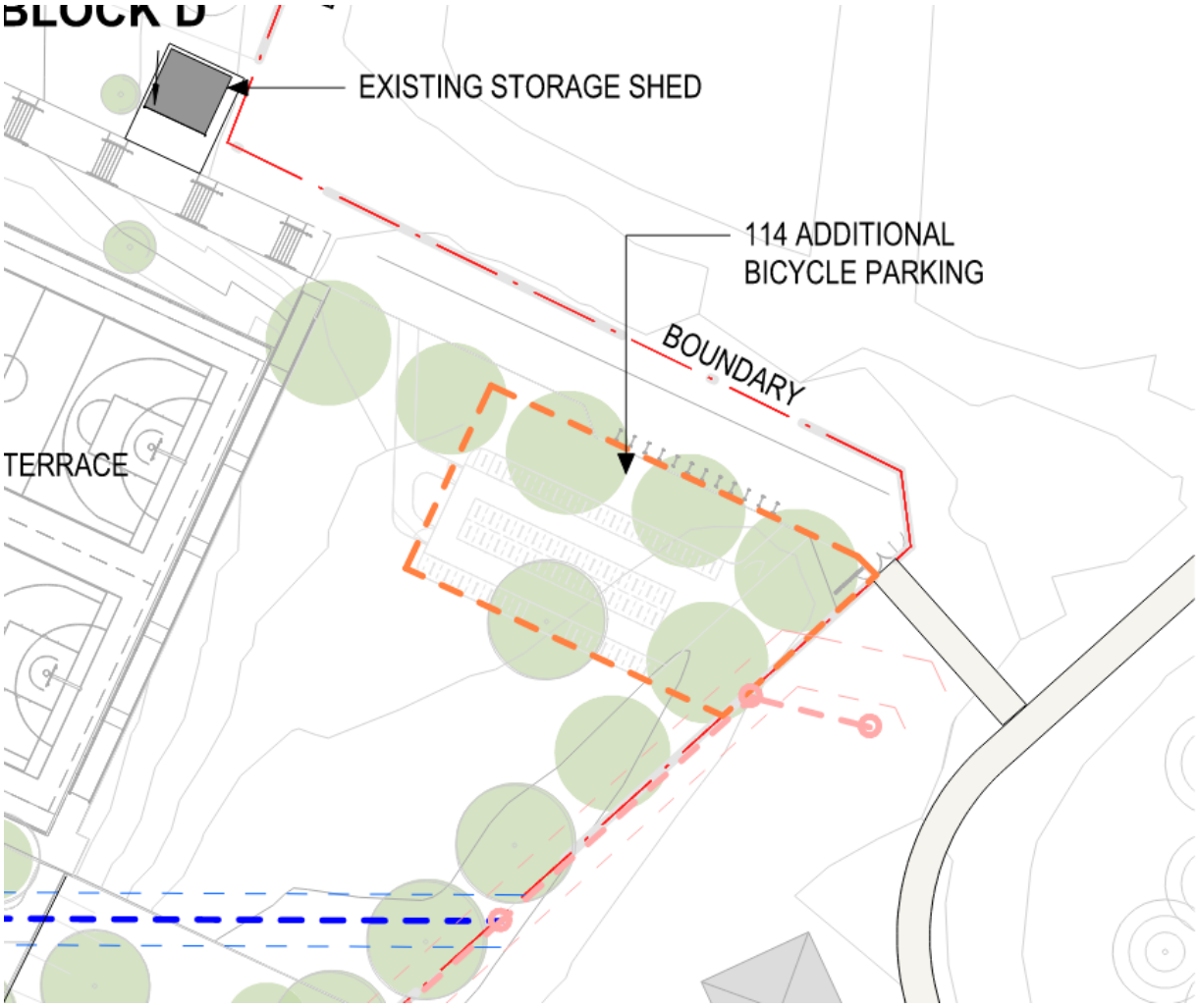

Figure 13: Proposed Bicycle Parking Location

3.3 Public Transport

The proposed works will result in no change to existing public transport facilities and services.

3.4 Service Vehicles

The proposed works will result in no change to the existing access to service vehicle facilities. Access to the site will be retained for service vehicles through the existing entrance from Environa Drive.

3.5 Parking Facilities

The proposal includes a new car park with capacity for an additional 34 spaces. The car park is proposed to be controlled with a gate and a reader/intercom system, accessed from Lexcen Avenue.

The proposed car park layout is illustrated in Figure 14.

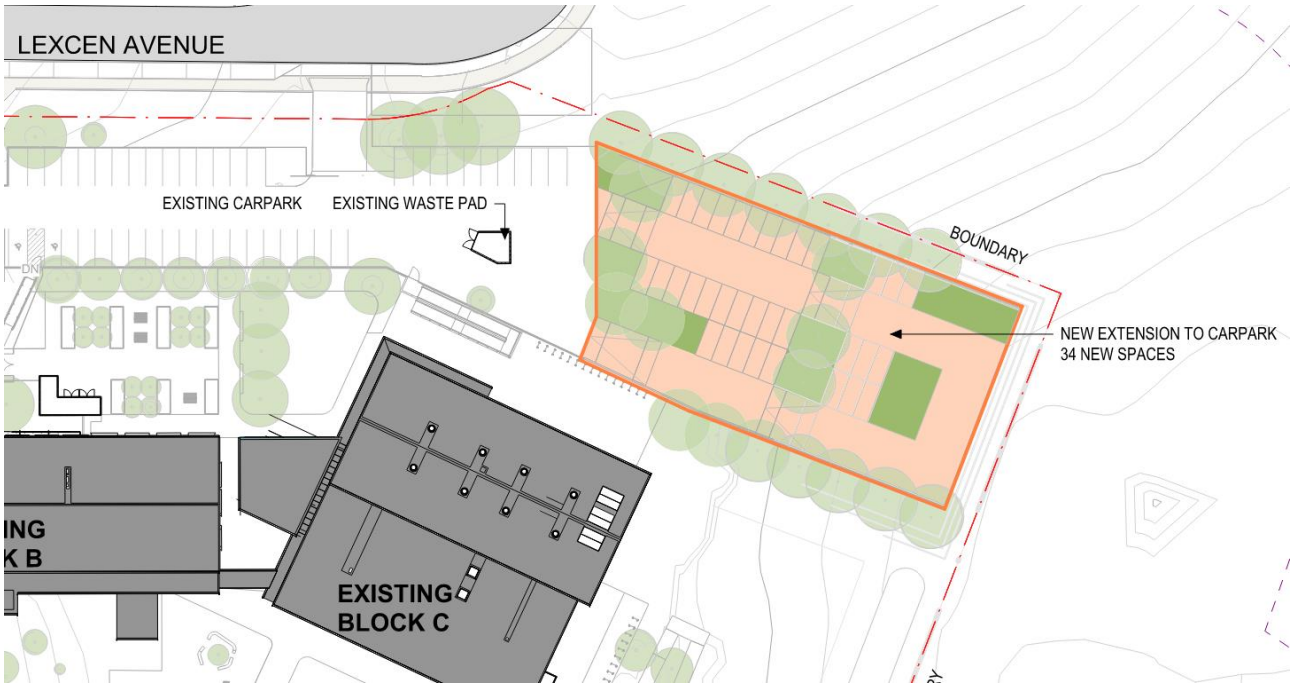

Figure 14: Proposed car parking

3.6 Pick up and Drop off Arrangement

There are no modifications to the pick-up and drop-off arrangement installed as part of the Stage 1 works. The existing arrangement, which involves eight on-street parking spaces on the southern kerbside of Lexcen Avenue, will continue to facilitate pick-up and drop-off operations during school peak periods.

3.7 Off-Site Works

There are no off-site public domain works proposed as part of this proposal as the works constructed during Stage 1 will allow for the active transport network.

Section 4 Analysis of Impacts

4.1 Catchment Analysis

De-personalised student address data received on the 5th of June 2023 (Jerrabomberra High School Proposed Catchment Students Location), from School Infrastructure was analysed to assess the likely travel habits of future students attending Jerrabomberra High School.

Figure 15 presents the school catchment analysis and walking distance catchments for various distances, including 400m, 800m, 1,200m, 2,000m, and 2,900m. These distances are roughly equivalent to walking times of 5 minutes, 10 minutes, 15 minutes, and 30 minutes respectively.

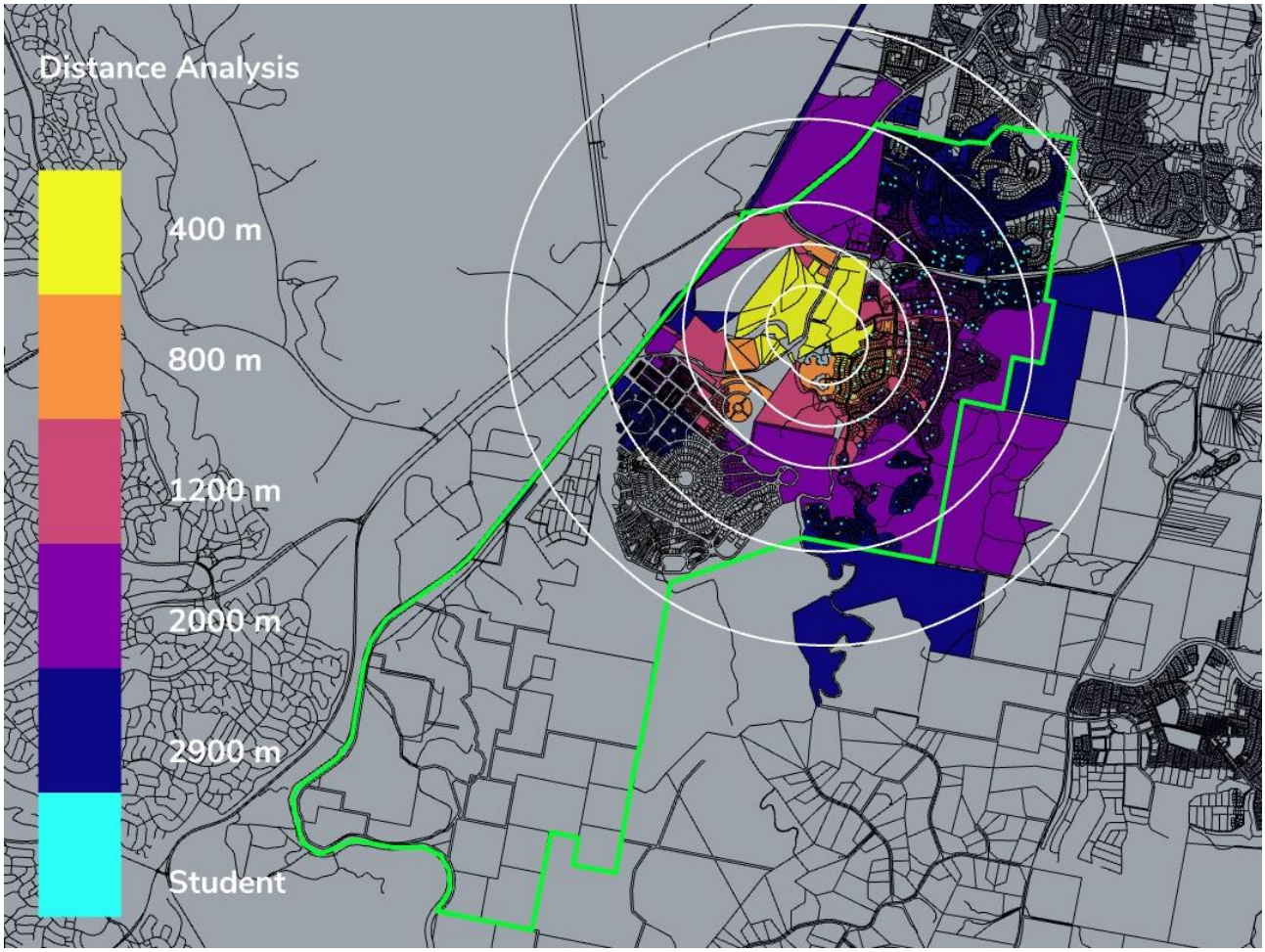

Figure 15: Catchment Boundary

The catchment analysis encompassed the locations of 208 high school student residences, offering a good sample size to assess potential transport demands, categorised by mode, for future students at the high school in Jerrabomberra. The results from the catchment analysis are presented in Table 12.

Table 12: Catchment Analysis

Distance (m)	Number of Students Lots in catchment	% Actual	Proposed Students
1-400	2	1%	10
401-800	17	8.2%	82
801-1200	19	9.1%	91
Total Walking Catchment	**38**	**18.3%**	**183**
1201-2000	74	35.6%	356
2001-2900	84	40.4%	404
Total Cycling Catchment	**158**	**75%**	**760**
2901+	12	5.8%	58
Total Students	208	100%	1,000

This approach aligns with SINSW specifications, which entail the following catchment assumptions:

- Pedestrians: 400 metres, 800 metres, and 1.2 kilometres
- Cyclists: 1,200 metres, 2,400 metres, and 3.6 kilometres

4.2 Travel Demands

The target travel mode share has been developed to align with the target modes described as part of the Stage 1 School Transport Plan. The subsequent travel demands for the different modes have been assessed within Table 13, taking into account the proposed total number of students and staff, as well as the public and active transport coverage, existing and future residential occupancy within the school catchment area, and catchment analysis. The findings are presented in Table 13.

The target mode share reflects the anticipated travel habits and behaviours of the students and staff post development. Note that Table 13 shows the total volume of staff and students generated from both Stage 1 and Stage 2 of the Jerrabomberra High School project.

Table 13: Forecast Travel Demands

	Staff		Students	
Travel mode	**Mode split**	**Volume**	**Mode split**	**Volume**
Walk	10%	8	30%	300
Rode a bicycle or other rideable (incl. scooter, skateboard, etc.)	10%	8	23%	230
Bus	0%	0	22%	220
Car, as driver	70%	54	10%	100
Car, dropped off	10%	8	15%	150
Total	100%	78	100%	1,000

4.3 Pedestrians

According to the catchment analysis, approximately 18% of the students, equivalent to 183 students, live within walking distance of the school. The analysis also indicates that a significant portion of students reside in the south area near the site. Based on the survey conducted as part of the Stage 1 School Transport Plan, it is likely that students are walking to school from further distances than 1.2km (an average of 26% of students were shown to be walking).

Applying sustainable travel initiatives, a target travel mode split for the site of 30% walking is considered acceptable (equivalent to 300 students). The majority of these students will reside to the east of the school, which includes a significant number of residential houses and constitutes a substantial portion of the school's likely student population. The existing access on the eastern boundary, connecting with a shared path provided along the perimeter of David Madew Oval, offers a good and safe access route.

The proposed pedestrian infrastructure to be implemented in Stage 1 prior to operation of the site will resolve current deficiencies within the pedestrian network and will enhance active transport and pedestrian safety in the area. This includes the installation of a new refuge island on Brudenell Drive near Stringybark Drive and the pedestrian crossing at the Bicentennial Drive and Coral Drive intersection. Refer to Section 2.2 for further details.

Figure 16: Pedestrian Crossing

4.4 Cyclists

With the anticipated increase in student and staff numbers, it is expected that there will be a corresponding rise in demand for cycling facilities. According to the catchment analysis, approximately 75% of students reside within a distance of 1,200m to 2,900m from the school. Based on the travel mode survey conducted as part of Stage 1, it is anticipated that some students within the cycling catchment are currently travelling to and from the site by walking, as a result the target mode share for cycling has been adjusted to suit.

The development will provide an additional 114 bicycle parking spaces supporting approximately 23% of the student population and is deemed sufficient to cater to the expected increase in cyclists. The site has sufficient space to allow for future expansion of bicycle facilities as demand grows.

4.5 Public Transport

A dedicated bus zone is situated adjacent to the school, along Environa Drive. This bus zone is designed as a separate lane from the southbound travel lane on Environa Drive, providing a designated area for buses to stop and pick up/drop off students safely and efficiently.

The travel mode survey results, although representing a small percentage of the students, provide valuable insights into the potential future bus usage. Among the seven bus routes connecting to JPS, route 385 appears to be the most frequently used by students. Route S187 and S103 are the second most common service. Table 14 summarises the number of additional buses likely required by the projected student increase.

Table 14: Bus Routes Distribution

Route Number	# of Bus Users using Particular Route	% of Bus Users using Particular Route	Additional Number of Students	Number of extra Buses Required
835	12	32%	71	1
S187	7	19%	42	1
S217	3	8%	18	0
S189	1	1%	3	0
S128	4	9%	21	1
S138	3	7%	15	0
S103	7	19%	42	1
S216	2	4%	9	0
Total	37	100%	220	4-5

The anticipated increase in demand for 4-5 buses will be discussed with TfNSW as part of the ongoing development of the School Transport Plan that is anticipated to form a condition of consent for the project. The bus bay from Environa Drive, with its length of approximately 105 metres, has the potential to accommodate up to seven buses. This capacity allows for effectively meeting the increasing demand as the high school reaches its full capacity.

It is important to note that progressive increases in school population will gradually require additional bus services, as the number of students travelling by bus increases, the frequency of bus bay cycles can be adjusted to accommodate the growing demand, ensuring a smooth and efficient transportation system for the school community. The capacity of the bus bay can be effectively managed by running multiple cycles, allowing it to adapt to the evolving transportation needs as the school population expands. Additionally, TfNSW planning data will play a crucial role in identifying and implementing the necessary adjustments to meet the school's future transportation requirements.

4.6 Service Vehicles

No alteration is proposed to the loading area to be completed as part of the Stage 1 construction. Waste collection at the school is proposed to be carried out by a private contractor. A separate vehicle access will be provided from the Bus Zone.

Vehicles are likely to service the site outside of peak school hours from 8:00 am to 9:30 am and from 2.30 pm to 4:00 pm to reduce safety concerns of service vehicle manoeuvres in the presence of students.

Waste vehicles will enter the site from Lexcen Avenue through the staff car park for waste collection at the designated waste pad. The staff car park is designed to accommodate waste trucks up to 11 metres in length with front-loading capabilities. The waste contractor will determine collection hours based on the school's location and logistical access requirements. Swept path analysis of this waste collection area was verified as part of the Stage 1 proposal.

4.7 Car Parking

4.7.1 Capacity

The Queanbeyan-Palerang Regional Council DCP does not provide a parking rate for high schools.

As part of the Stage 1 development approval, a total of 44 on-site car parking spaces were provided to accommodate a parking rate of 1 space per 1 staff member.

The total number of staff is anticipated to increase to 78 staff members in total servicing both Stage 1 and 2 of the school. Applying the approved parking rate, this will result in an increase in parking demand on site by 34 spaces.

The proposed plan includes the provision of 34 on-site car parking spaces, which aligns with the established parking rate conditioned on the Stage 1 development. This allocation is considered acceptable and capable of adequately accommodating the expected parking demand associated with the day-to-day operations of the high school.

As stated in section 2.6.2, the availability of 71 car spaces for students at David Madew Oval, along with the additional 15 spaces along Laxcen Avenue and 16 spaces along Environa Drive indicates that the proposed capacity is deemed sufficient and suitable to meet the demand for parking.

4.7.2 Design

Car parking shall be designed in accordance with AS2890.1 Key design parameters for 90-degree angled parking include:

- Classification: Class 1 (all-day employee parking) or higher

Note: Higher classes are typically only required for higher turnover usage and would not be required for this use class, however, does have a narrower aisle width (with wider space) which can be a useful design option to consider.

- Parking space width: 2.4m or higher
- Aisle width: 6.2m (or as required by class)
- Parking space length: 5.4m
- Gradient: 1:20 (5%) maximum

Accessible parking spaces will be provided in accordance with Table D3.5 of the BCA, at a rate of 1 space for every 100 car parking spaces or part thereof (1%). The development is required to provide a minimum of 2 accessible parking spaces, which the proposal meets and therefore complies with the BCA.

4.7.3 Operation

The proposed car park would be controlled by a gate and reader/intercom at the entry point from Environa Drive. Access to the car park will be strictly controlled through the use of gates, which will remain closed at all times except when used by the school.

4.8 Intersection Performance

4.8.1 Trip Generation

Based on the forecasted vehicle volumes as calculated in Table 13 (including drivers and passengers), it is estimated that the development will result in an increase in 34 vehicles associated with staff driving to the site and an increase in 31 vehicles associated with student pick up and drop off. A total of 65 vehicle trips will therefore be generated by the Stage 2 development.

The trip generation of the proposed development is calculated as shown in Table 15.

Table 15: Vehicular trip generation

Element	Quantity
Additional students	470
% travel by car	10%
Additional students travelling by car	47
Vehicle occupancy	1.2
Additional vehicles	39
% travel during peak hour	80%
Additional student vehicles during peak hour	31

4.8.2 Intersection Performance

As noted in the Stage 1 Traffic Impact Assessment, the majority of adjacent intersections are projected to fail as a result of large background traffic increases in the south Jerrabomberra region by 2023. The additional vehicle trips are expected to be accommodated within the surrounding road network. As a result, any improvements to the intersections in Jerrabomberra to allow an acceptable LoS should not be funded or implemented by the high school.

Section 5 Preliminary Construction Traffic Management Plan

This preliminary Construction Traffic Management Plan (CTMP) addresses the proposed construction of the Jerrabomberra High school (JHS) development. It discusses the management of construction vehicles and activities, and an investigation of the local traffic and safety conditions throughout the construction process.

A detailed CTMP will be prepared by the Main Works Contractor with consideration of all final design selections. This preliminary CTMP is intended to provide a framework within which a future CTMP can be developed and implemented, and to demonstrate the potential operation of the construction site.

5.1 Construction Operations

5.1.1 Access Arrangements

The majority of built works are located adjacent to Lexcen Avenue, providing good construction access to the site. Refurbishment works are located adjacent to Environa Drive, also providing good construction access. Construction access arrangements will be confirmed in the final CTMP.

5.1.2 Worker Parking

Heavy vehicle activities, including deliveries and waste collection, will be conducted exclusively on site. To ensure smooth operations and avoid any disruption to traffic or pedestrian flow, careful coordination of heavy vehicle arrivals will be implemented. There will be no queuing, double parking, or obstruction of traffic, pedestrian thoroughfare, or property access by vehicles.

For light vehicles and short-term parking for workers and deliveries on Lexcen Avenue can be arranged by the building contractor through the application of a Works Zone with the Council before construction begins. For longer-term parking, options within the construction site boundary or the David Madew Park car parking area can be explored in consultation with the Council. However, on-street parking is likely to be the utilised by the majority of workers and the following mitigation measures are recommended:

- Workers to be provided with a Travel Access Guide containing information on available public transport options and transport planning
- Workers recommended and reminded to carpool where possible
- Preferred parking locations should be advised to workers, to reduce impacts to residents for those workers that do choose to drive
- No workers to park within 100 metres of the school boundary (to ensure parking availability and to reduce impact to drop off and pick up periods)
- Workers recommended to park away from the pick up and drop off areas to avoid additional congestion
- Workers must follow all on-street regulatory signage including drop off and pick up zones around the school

5.1.3 Construction Program

The hours of operation for construction activities are to be determined by the planning authority and will likely contain similar work hours to the following:

- Monday to Friday 7am to 6pm
- Saturday 8am to 5pm
- Sunday and public holidays None

5.2 Construction Traffic Management

5.2.1 Vehicle Management

Vehicle volumes for a school of this scale are likely to be on the order of no more than 10-20 vehicles per day (equivalent to 2-4 vehicles per hour), subject to confirmation by an appointed contractor. At these volumes, the local road network could easily accommodate the proposed standard construction vehicle movements subject to appropriate management.

Construction vehicle management will be subject to local traffic control by qualified traffic controllers. A detailed CTMP will be developed prior to commencement of construction.

5.2.2 Construction Vehicle Routes

The primary construction access point is expected to be located on Lexcen Avenue and Environa Drive, subject to the final CTMP. The recommended haulage routes for both these access points are shown in Figure 17.

Construction vehicles are expected to approach and depart from the site via the signalised intersection at Tompsitt Drive and Environa Drive. The anticipated ingress and egress haulage routes are as follows:

- **Ingress route:** Canberra Avenue > Lanyon Drive > Tompsitt Drive > Envorina Drive > Lexcen Avenue
- **Egress route:** Lexcen Avenue > Envorina Drive > Tompsitt Drive > Lanyon Drive > Canberra Avenue

Figure 17: Construction Vehicle Routes

5.2.3 Public Transport Impacts

No impacts to the current public transport services is expected to occur during construction.

The bus stop located on Coachwood Avenue will continue to operate without any interruption. Pedestrian access to this bus stop will also be preserved.

5.2.4 Cumulative Impacts

It is noted that the proposal is being as an upgrade works as part of the second stage of the JHS stage 1, which is currently under construction.

Subject to the finalisation of the construction program, Council and Transport for NSW would be contacted for information relating to other developments in the area which may be impacted by the construction traffic.

5.3 Road Safety

5.3.1 Construction Vehicle Access Points

It is recommended that construction vehicle access points to the site are secured by manned traffic control to ensure no unauthorised or unsafe access is permitted for vehicles or pedestrians. Traffic control will also enable safe pedestrian movements across the construction access driveway, particularly students walking to and from school or students accessing the pick up and drop off zone.

5.3.2 Construction Vehicle Routes and Intersections

The state and regional road network is constructed to a high standard and would comfortably accommodate all construction vehicles. The state and regional roads used to access the site include Warringah Freeway, Military Road and Falcon Street (refer to Figure 17).

The intersections encountered by construction vehicles within vicinity of the site are summarised in Table 16.

Table 16: Routes Intersection Summary

Type of Intersection	Location
Signalised	Tompsitt Drive / Envorina Drive
	Lanyon Drive / Tompsitt Drive
Unsignalised T-intersection	Envorina Drive / Lexcen Avenue
	Lanyon Drive / Canberra Avenue

Signalised intersections have minimal safety concerns as all road users are managed in a safe and controlled manner.

The unsignalised T-intersection at Envorina Drive / Lexcen Avenue contains suitable sight distances for truck drivers turning left onto Environa Drive.

All materials (including bin storage) will be stored within the work area. No materials will be stored outside the work area without the approval from Council.

5.3.3 Pedestrians and Cyclists

During school peak hours, significant pedestrian activity is expected as students and staff arrive and depart from the site. There are several management measures that may be implemented to ensure the safety of these active transport users including:

- Scheduling construction vehicle movements outside of school peak hours where possible to ensure pedestrian and cyclist safety.
- Prohibit pedestrians from entering or passing through specific areas of the site during construction, enforced by fencing around the perimeter.
- Signage should be fitted to communicate to students and staff any detours or prohibited areas within the site. Any changes to external pedestrian or cyclist routes should also be communicated with signage and have detours clearly marked.

Section 6 Conclusion

6.1 Transport Strategy

The overall transport strategy for the proposed development is as follows:

- **Pedestrians**
  - Retain Pedestrian accesses from Environa Drive, Lexcen Avenue, and the eastern entry connecting to Jerrabomberra Public School.
  - Rely on additional external active transport infrastructure constructed as part of the Stage 1 works.

- **Cyclists**
  - Provide 114 new bicycle/scooter storage spaces for students and staff.
  - Provide additional end of trip facilities.

- **Public transport**
  - No change; existing provisions to be retained.
  - Usage of public transport to be encouraged through the School Transport Plan and improved through ongoing consultation and governance measures.

- **Service and loading**
  - No change: existing provision to be retained, access to the site will be retained for service vehicles through the existing entrance from Environa Drive.

- **Pick up and drop off**
  - No change: existing provisions to be retained.
  - Usage of alternative travel modes to be encouraged through the School Transport Plan

- **Car parking**
  - An additional 34 on-site parking spaces to be provided to cater for the increase staff.
  - Usage of alternative travel modes to be encouraged through the School Transport Plan

6.2 Key Findings

This report has assessed the transport strategy of the proposed development and has found that:

- Analysis of the school catchment indicates that 75% of students are anticipated to live within a 2.9km radius of the school, indicating that active and sustainable transport modes are likely to form the majority of student travel to the site.
- The proposed school is projected to result in an expansion of student enrolment from 530 students to approximately 1000 students and an increase in staff from 46 to 78. A total of 44 parking spaces are provided as part of Stage 1 development, to accommodate this growth, an additional allocation of 34 on-site parking spaces will be implemented. Therefore, traffic and transport demands are considered acceptable.
- There are no proposed modifications to the operation, service, or arrangements related to public transportation, including loading, pick-up, and drop-off procedures.

Based on these findings, the proposed development is considered suitable for approval and is not expected to create adverse or unreasonable impacts in the local area.

Prepared by

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AMMAR AHMED

Traffic Engineer

Approved by

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GRACE CARPP

Associate

Appendix A Swept Path Analysis

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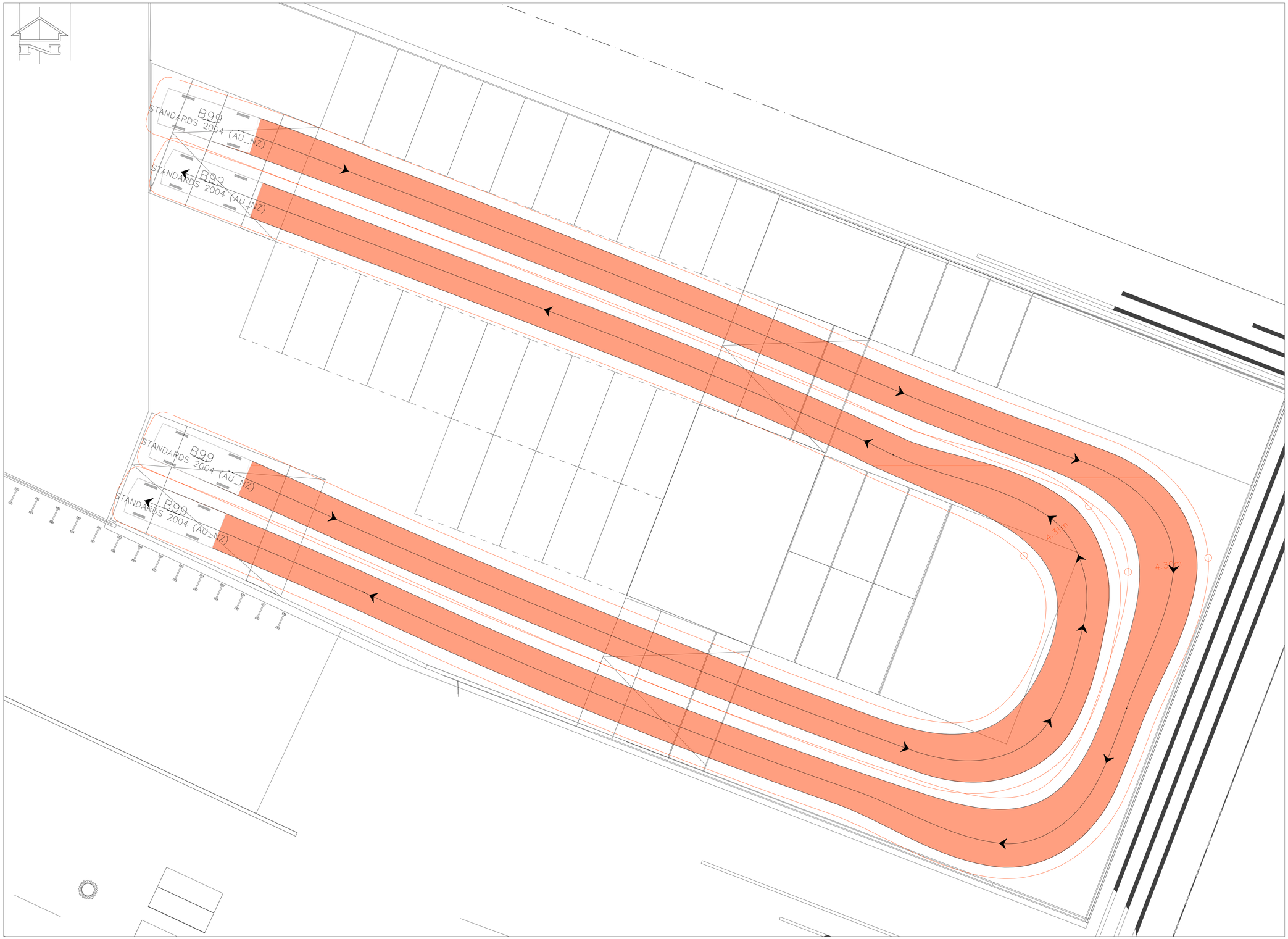

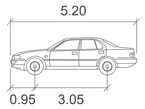

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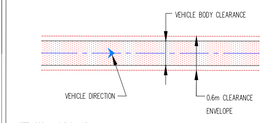
Track	:	1.84
Lock to Lock Time	:	6.0
Steering Angle	:	33.9

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890.2

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Rev	Description	Eng	Draft	Date
P1	ISSUE FOR SSDA	AA	GC	27.07.22

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Project
HIGH SCHOOL IN JERRABOMBERRA STAGE 2
ENVIRONA DRIVE

Sheet Subject
B99 SWEPT PATH ANALYSIS

Scale : A1	Drawn	Authorised
1:100	GC	PY

Job No	Drawing No	Revision
231314	SKT01	P1

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