Traffic Impact Assessment

UNE Tamworth Central Campus

Prepared for Architectus / 23 October 2024

221823

Contents

Revision Register

Rev	Date	Prepared By	Reviewed By	Authorised By	Remarks
1	02/08/2023	AA	GC	PY	Draft for comment
2	01/09/2023	AA	GC	PY	Draft for comment
3	22/11/2023	AA	GC	PY	For issue
4	06/05/2024	AA	GC	PY	Following submissions
5	16/10/2024	AA	GC	PY	Following submissions
6	22/10/2024	AA	GC	PY	Following submissions
7	23/10/2024	AA	GC	PY	Final

1.0 Response to Submission

This report has been prepared to provide further context to the University of New England Tamworth Central Campus project to a Request for Information (RFI) received from the Tamworth Regional Council on 17 April 2024 and 20 September 2024.

The Traffic Impact Assessment (TIA) has been updated to reflect the necessary changes.

1.1 Response to Request for Further Information Dated 20 September 2024

This report section summarises the responses to each item raised in the Request for Further Information. The items and corresponding responses are outlined below:

Revised Traffic and parking analysis and strategy that includes:

- *Comparative data with more relevant tertiary institutions, including the UNE Armidale campus.*

Parking benchmarking against relevant universities for student and staff parking has been conducted over the past six years (2018 to 2023). This review includes data from 7 Regional Universities Network (RUN) institutions, 45 Australian universities (AUS), and specifically the UNE Armidale campus (UNEA). A summary of the parking spaces provided per Full-Time Employee (FTE) and Equivalent Full-Time Student Load (EFTSL) is presented below.

Further information on the equivalent student load has been provided from UNE since the original issue of this report. It is understood that the development is anticipated to operate at 56% occupancy from the maximum student occupancy (refer to Section 5.2).

	Parking/EFTSL	Parking/FTE	Parking/(EFTSL+FTE)
Tamworth DCP	0.20	0.50	0.23
RUN	0.26	2.05	2.31
AUS	0.17	1.34	1.51
UNEA	0.24	2.15	2.39
UNE Tamworth	0.27	0.16	0.16

- *Analysis by building user group including consideration of public use of the building such as the clinical spaces*

Building users will primarily consist of students, staff, and a maximum of 10 clinic visitors. With the low number of expected clinic visitors, the overall impact will be negligible. However, parking access is not restricted by a physical barrier, as there is no boom gate, leaving it open to visitors.

There are no formal partnerships in place with TAFE or Tamworth schools that would result in regular use of the building. Instead, the space will primarily host community events and offer bookable spaces for community groups, with these activities scheduled outside regular teaching hours to prevent parking demands compounding.

Specialised events, such as Science Week or High school engagement ‘booster’ days, will also occur outside of standard teaching periods, typically during semester breaks.

- *Indicative operational arrangements such as allocated parking, paid parking and timed parking to support quantum of proposed parking*

On-site parking will follow a similar paid permit system to the UNE Armidale Campus. There are several permit categories with varying costs associated dependent on the visitor. In the case of special events parking will be made available for free on campus.

Permits will not be restricted, and individuals arriving on-site can collect a permit for a shorter duration if needed. Events utilising the car park will require the preparation of an event management plan which we suggest forms a condition of consent.

- *Justification for reliance on on-street parking availability*

As outlined in the comparative data response, the development proposes utilising on-street parking adjacent to the site, considering the ample parking available in the Tamworth CBD. A review of Tamworth Regional Council's parking strategy has been completed for the adjacent parking areas.

The figures below illustrate the current utilisation levels of both on-street parking and nearby parking facilities, demonstrating sufficient capacity to accommodate the proposed on-street spaces. Parking availability on Peel Street adjacent to the site is noted at a low utilisation of 0-49% (refer Figure 1.1).

Off street parking areas at Peel Street adjacent to the Country Music Hall of Fame, on Kable Avenue and adjacent to Bicentennial Park is also noted as 0-49% utilisation (refer to Figure 1.2) all within 500m walk of the site. Additional parking is available at Byrnes Avenue (noted as 50-84% utilisation).

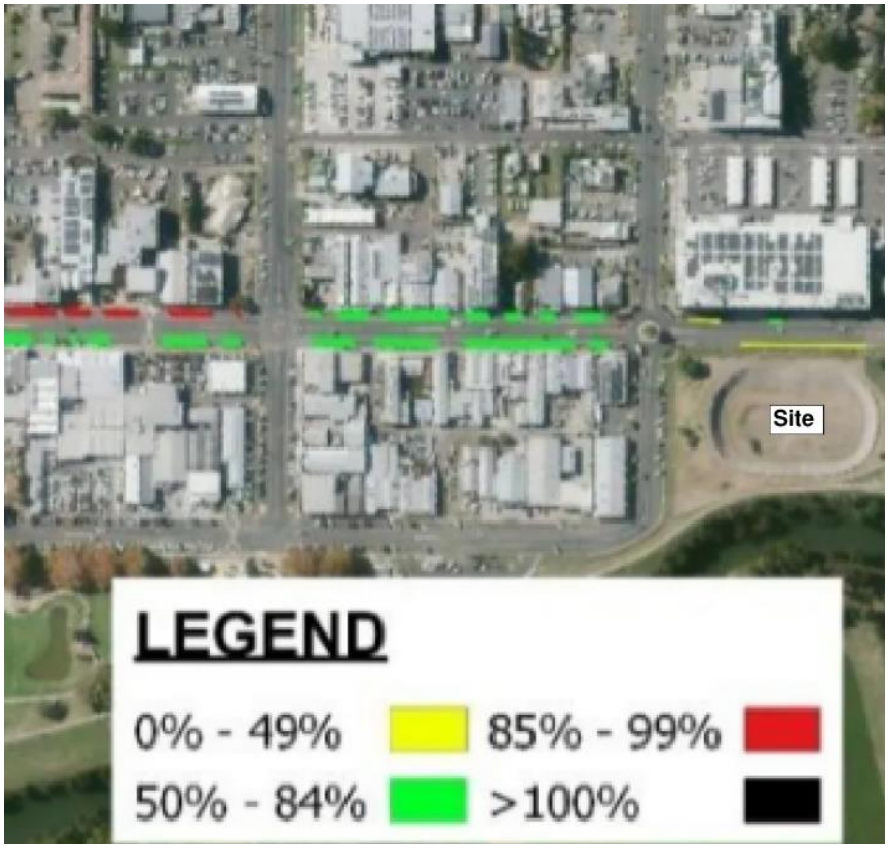

Figure 1.1: Average Weekday Car Space Utilisation (Mon-Fri)

Source: Parking Strategy, Tamworth Regional Council

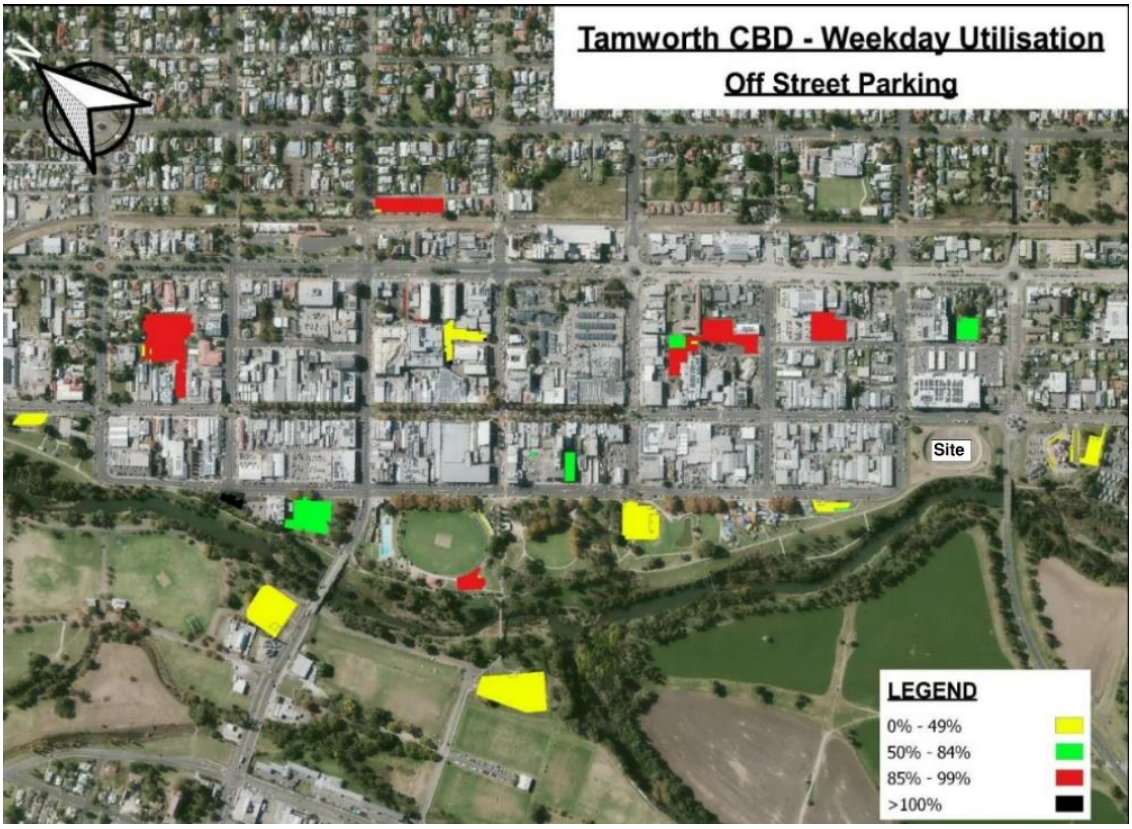

Figure 1.2: Off Street Car Space Utilisation (Weekday)

Source: Parking Strategy, Tamworth Regional Council

- *Linkages to other public parking areas*

A map showing linkages between the site to other parking areas has been included - Refer to Section 3.5.1.

Available parking at Kables Avenue, Peel Street and Roderick Street adjacent to the site is shown to be well connected via footpath. Additional upgrades works to CCTV and lighting is proposed to the underpass of Scott Road to improve safety and connectivity to the carpark at the country Music Hall of Fame.

- *Opportunities to relocate parking for people with disabilities closer to the building*

Two accessible parking spaces have been provided in the on-site car park, near the walkway connecting to the UNE building. Additionally, two more spaces have been relocated closer to the main entrance along Roderick Street – Refer to Section 4.2.1 and Section 4.2.2.

- *Location and number of proposed bicycle parking spaces*

A total of 31 bicycle parking spaces are proposed. Of these, 28 spaces will be accessible from Roderick Street, with an additional 3 undercover spaces provided on the ground level near the entry door - Refer to Section 4.6

- *Green Travel Plan to support proposed parking provision*

A Green Travel Plan has been prepared for the site - Refer to Appendix C.

- *Provision of shared paths on Roderick and Peel streets adjacent the site and adequate connection to other potential off-site parking areas*

Shared paths are now proposed to Roderick and Peel Streets – Refer to Section 4.3.

The proposed development incorporates external lighting and CCTV along Peel and Roderick Streets, as well as in the on-site parking area, to ensure safe access for pedestrians and cyclists.

1.2 Response to Request for Further Information Dated 17 April 2024

This section of the report summarises the responses to each item raised within the Request for Further Information, in particular sections **1. Agency Requested Information** and **2. Parking and Access**.

Agency Requested Information

Proposed traffic generation rates to be based on a survey of similar existing developments.

It is important to note that the proposed development is unique to the city of Tamworth, with no current University campus of similar scale within Tamworth to compare trip generation rates with. To provide a comprehensive understanding of traffic and transport behaviour, census data showing Journey-to-work patterns (Place of work & Place of Residence), along with data from similar regional universities within other city centres has been included in Section 3.6.

Given the unique nature of the project within Tamworth, benchmarking against similar regional university projects was undertaken with available information from the NSW Planning Portal. This benchmarking indicates that the adopted traffic generation rate is in line with what has been applied for other regional university campuses.

It's important to note that the methodology used in developing the Traffic Impact Assessment (TIA) was conservative, as the campus in Tamworth is a new development. The approach was based on Tamworth's Development Control Plan (DCP) rate for parking at an educational establishment, basing trip generation on the imposed car parking rate by Tamworth Regional Council to adapt localised trip generation rates.

While surveys from other University of New England (UNE) sites were considered, they may not accurately represent transport behaviours within Tamworth. Factors such as local commuting habits, public transportation infrastructure, and regional road conditions can vary significantly across different locations. Therefore, using the DCP rate for parking as the baseline provides a more reliable estimate for the Tamworth campus, acknowledging its unique context.

The total impact of existing and proposed development on the road network with consideration for a 10-year horizon.

Traffic modelling has been completed with consideration to a 10-year horizon. Analysis indicates that the level of service (LoS) remains within acceptable ranges, with levels primarily at LoS A and B for both post development and in the 10-year horizon.

This finding suggests that the proposed Tamworth Central Campus development has no significant impact on the performance of the three nearby roundabouts. Refer to Section 5.3.2 for further information regarding the traffic generation.

The distribution of the trips generated by the proposed development, shown diagrammatically.

Updated - Refer to Section 5.3.1.

Background growth rate to be applied to future horizon.

Updated - Refer to Section 5.3.1.

Traffic analysis of the proposed development using SIDRA and including submission of updated electronic files.

Attached to the submission.

Relevant swept path analysis for the largest design vehicle accessing the site (refuse, deliveries, etc).

Updated – Appendix A

Table 4.1 shows the incorrect total figures for staff and students and should be updated.

Updated – Section 5.2.1

Amend the speed zone the comment on page 8, Section 2.2.3 indicating a speed zone of 80km/h, whereas the limit has reduced to 60km/h well in advance of the development location.

Updated – Section 3.2.3

There are multiple mistakes (i.e. Road name labels, access arrow direction), these should be rectified.

A review of all road name labels and access arrow directions within this report has been completed.

There are multiple reductions around parking requirements from unknown program shifts throughout the document.

Only a reduction to the Development Control Plan (DCP) rate has been requested, based on the following key factors (refer to Section 5.2.1):

- The site benefits from 33 on-street parking spaces on Peel Street and Roderick Street, reducing the need for excessive on-site parking.
- Proposed sustainable travel initiatives encourage staff and students to use alternative transportation modes, aligning with TfNSW's Road User Space Allocation Policy and fostering a safer, lower-traffic environment around the campus.
- The central location of the site within Tamworth provides strong connectivity to pedestrian and cyclist networks, including a shared path along Peel River, promoting active transportation.
- Reducing on-site parking also supports environmental sustainability by discouraging car dependency and enhancing the urban streetscape, maintaining a vibrant city center atmosphere.

These factors form the basis for the requested reduction to the DCP rate, supporting a more sustainable and efficient approach to campus development.

We note that the current Tamworth CBD Parking Strategy prepared by Tamworth Regional Council notes an average of at least 1,500 vacant car parking spaces at any one time within the city centre, indicating there is ample parking within the city centre available for overflow demands of the university should that overflow be required.

Additionally, UNE is open to exploring potential leasing car parking opportunities through commercial agreements to address potential overflow parking needs while the transport mode shift occurs.

Consideration of alternative modes of transport should address maximising pedestrian and bicycle facilities around the site.

Bicycle parking has been provided in accordance with the rates for tertiary education establishments, as specified by the NSW Planning Guidelines for Walking and Cycling. This ensures that the Tamworth Central Campus meets the recommended standards for accommodating cyclists. To further support sustainable transportation, end-of-trip facilities have been incorporated into the design, providing amenities for those who choose to cycle to campus. These facilities include secure bike storage, showers, and changing rooms. For additional information on the specifics of the bicycle parking and end-of-trip facilities, refer to Section 4.6.

Further consideration should be given to the continuation of the shared path along the front of Peel Street to allow for flow of bicycles and pedestrians.

The proposal includes the provision of shared paths adjacent to the site along Peel and Roderick streets to allow for bicycle and pedestrian flow and to ensure adequate connections to other off-site parking areas.

The Applicant should examine opportunities for relocating the driveway further than 65 meters from the roundabout and State Road to provide safe access to the site.

The driveway is located in accordance with the requirements outlined in AS2890. The traffic impact assessment confirms that the development will generate a limited number of trips, with no need for access controls such as boom gates. This, along with the site's left-turn-only access when exiting the state road network, will ensure smooth traffic flow into and out of the site. Consequently, there will be no queuing impacts on the roundabout at Peel St/Murray St/Scott Rd, mitigating potential congestion concerns.

Parking and Access

The proposed car parking arrangement and number of spaces is not considered appropriate for the use sought. The Tamworth Regional Development Control Plan 2010 (TRDCP) requires 1 space per 2 staff plus 1 space per 5 students for higher education establishments.

Refer to the above responses and Section 5.2.1.

Based on the presumed staff and student numbers as detailed within the Traffic Impact Assessment (31 staff and 266 students), the development would require 70 car parking spaces to be provided on site. The proposed 53 is not supported, and an updated plan with a minimum 70 spaces is to be provided. Council will not support the consideration of 33 available on street spaces to form an offset from the requirement to provide parking to cater for the use proposed.

UNE is open to exploring potential leasing car parking opportunities through commercial agreements to address potential overflow parking needs while the transport mode shift occurs.

Further, the carparking layout proposed does not meet the objectives outlined in AS2890.1, particularly with reference to the use of long blind aisles. The blind aisles will result in cars reversing in the event that they enter, only to find all bays are occupied, and no facility for turning. The carpark should be re-designed to accommodate the additional required bays, and provide proper circulation.

The carpark design can be brought into compliance with minor adjustments, as indicated in Appendix A. The proposed adjustments involve incorporating a one-way circulation system from the south of the carpark. This will enable recirculation of vehicles. These changes will not require significant adjustment to the current layout and can be accommodated.

The design does not facilitate any separation of passenger vehicles and commercial vehicles. The current vehicular access would be disrupted by waste collection and other service vehicle activity, and should be redesigned to allow for concurrent access and servicing to occur. It is also noted that no marked delivery/set down/drop off areas are shown on plans where all three elements would be expected to occur with an educational establishment.

Waste collection will be managed to occur outside of peak hours, reducing the risk of service vehicle manoeuvres and passenger vehicle conflict. An MRV swept path was provided to confirm entry and exit in a forward direction. Furthermore, when an MRV is parked to collect waste, passenger vehicles can still navigate the site smoothly, with adequate space to manouevre around the service vehicle, refer to Appendix A.

Circulation should be explored further within the revised design and vehicle manoeuvring/swept paths on site and within the parking and waste areas are to be provided. It is noted that the current TIA shows swept paths for passenger vehicles running through dedicated car bays and landscape elements.

Updated - see the item above related to the carparking layout

In terms of traffic impact and interaction with the surrounding road network, it has previously been flagged that Roderick Street and Kable Avenue may be closed to all but emergency vehicles, taxis and buses. While this concept is still preliminary, a sensitivity analysis and commentary should be incorporated into the TIA – specifically to demonstrate that the presence and format of the development will not negatively impact on this objective.

The primary access and loading point is through Peel Street. Given this configuration, the potential closure of Roderick Street and Kable Avenue would not impact the site's accessibility or functionality. Trip generation to and from the site has assumed no use of Roderick Street or Kable Avenue.

2.0 Introduction

TTW has been engaged by Architectus to provide a Transport Impact Assessment (TIA) 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 to accompany a development application (DA) made to Tamworth Regional Council for the University of New England Tamworth Central Campus project, located at 545 Peel Street, Tamworth.

2.1 Scope

University of New England (UNE) is collaborating with Tamworth Regional Council to establish a university presence that encourages growth in the city and surrounding area, improves educational performance across the region, and supports Tamworth's aims for the region.

The scope of this project is to provide a tertiary educational campus which includes a four-storey building with associated landscaping, cultural grounds and carparking. This development will cater to a total of 295 students and 30 staff members.

This report covers the following areas:

- Site access
- Active transport (pedestrians and cyclists)
- Public transport
- Service and loading
- Car parking
- Road network performance
- Access and Circulation
- Traffic Impacts

2.2 References and Guidelines

This report has been prepared in the context of and with knowledge of relevant documents as follows:

- Tamworth Regional Council Development Control Plan 2010
- Tamworth Regional Local Environmental Plan 2014
- RMS Guide to Traffic Generating Developments 2002
- Clinical Services Framework 2020-2025
- UNE Tamworth Site Investigation and Campus Development Strategy (2021)
- Tamworth CBD Parking Strategy 2020-2030
- University of New England Tamworth plan (2020)

3.0 Existing Conditions

3.1 The Site

The proposed campus location is at 545 Peel Street, Tamworth at the corner of Roderick and Peel Streets. The site is situated within the local government area of Tamworth Regional Council, in the northeast region of New South Wales.

Within the vicinity of the proposed site, Peel Street is aligned north-west to south-east, connecting with Roderick Street to the north-west and Scott Road to the south-east. Peel River is adjacent to the site from the south-west direction.

The site is surrounded predominantly by a mix of low-density residential properties and industrial premises to the north-east, agricultural land and Calala Creek to the south of the site. The Campus is approximately 20-minutes' walk from Tamworth train station and a 7 minutes' drive to Tamworth Hospital.

The site location and surrounding environs are shown in Figure ***3.1***.

Figure 3.1: Site Location within Local Context

3.2 Road Network

3.2.1 State and Regional Roads

The state and Local Road network within the vicinity of the Campus site can be seen in Figure ***3.2***.

Figure 3.2: State and Regional Road Network

Source: NSW Road Network Classifications (TfNSW)

3.2.2 Local Roads

Peel Street

UNE Campus is bordered by Peel Street. It is a two-way road with one lane in each direction and a 50 km/h speed limit. The road contains parallel on-street parking on both sides of the road and a footpath on the eastern side of the road. There are no public transport facilities or services along this road. According to traffic count data[1] collected on Friday the 28th of September 2018, a total of 748 vehicles were counted at the morning peak hour and 924 at the evening peak on Peel Street.

Roderick Street

Roderick Street connects Kabel Avenue with Peel Street and provides direct access to the site. It contains two travel lanes, one in each direction. The road is signposted with a 50 km/h speed limit. A roundabout is located

[1] UNE Tamworth Site Investigation and Campus Development Strategy

at the intersection between Peel Street and Kable Street at the northern corner of the site. Adjacent to the site to the south of the street, 45° angle on-street parking is generally permitted along one side of the road and parallel parking on the other side. However, a footpath is located on north-western side of the road while no bicycle facilities nor public transport facilities are provided along the road. According to the UNE Tamworth Site Investigation and Campus Development Strategy, 438 vehicles were counted on Roderick Street during the morning peak hour and 654 during the evening peak.

3.2.3 State Roads

Scott Road

Scott Road is a state road connecting Tamworth to Newcastle. It aligns north to south and serves as the southern approach to the roundabout intersection with Peel Street. It is a two-way road with one travel lane in each direction, with a shared path located on the western side of the road. The road forms part of the state route A15, with an 60km/hr speed limit and no parking.

3.3 Public Transport

There are 9 public bus routes operating in Tamworth as shown in the network map in Figure ***3.3***. These buses are operated by Tamworth Buslines Service. At the Marius Street bus stop, which is close to the Campus's main entrance, the bus route 430 stops every 2 hours throughout the week, Saturdays from 9am to 4pm only, and no scheduled trips on Sundays and public holidays. The bus routes and their frequencies are detailed in Table ***3.1***.

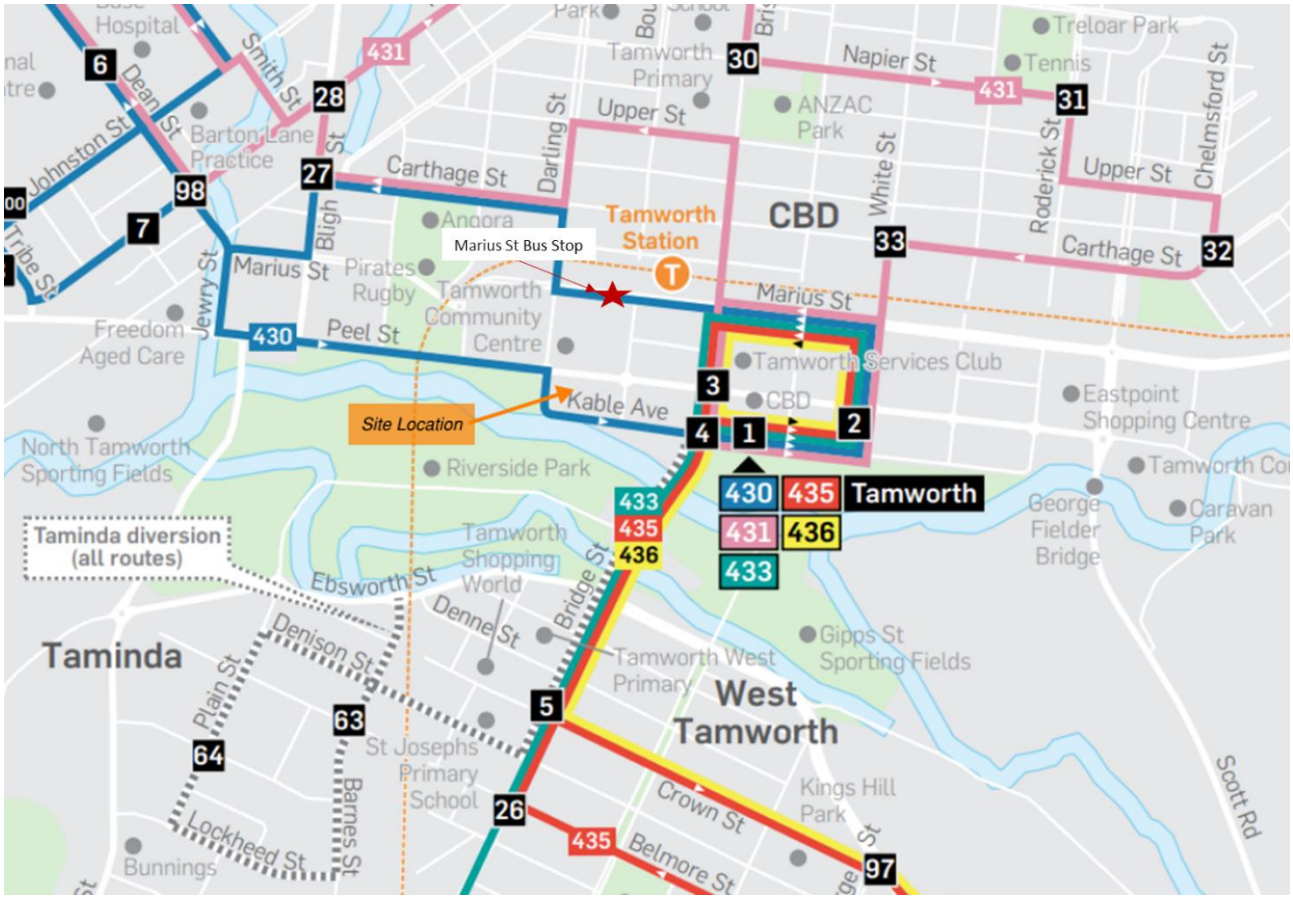

Figure 3.3: Tamworth Bus Service Network Map

Source: Tamworth Bus lines

Table 3.1: Bus Routes Services

Bus Number	Bus Route	Weekday Frequency
430	Tamworth to Oxley Vale via Tamworth Hospital (Loop Service)	1 service per hour
431	Tamworth to North Tamworth via Tamworth Hospital (Loop Service)	1 service per 2 hours
433	Tamworth to South Tamworth (Loop Service)	1 service per hour
435	Tamworth to Tamworth Sports Dome via South Tamworth (Loop Service)	1 service per hour
436	Tamworth to Calala via Goonoo Goonoo Rd & Tamworth Shopping world (Loop Service)	1 service per 1.5 hour

3.4 Active Transport

3.4.1 Pedestrian and Cycling Facilities

Active transportation options near the site are limited to pathways on Roderick and Peel streets, as well as a shared route on Scott Road. Off-road cycling via a shared path is available along Scott Road.

Figure ***3.4*** identifies cycling routes map in the Tamworth within the vicinity of site.

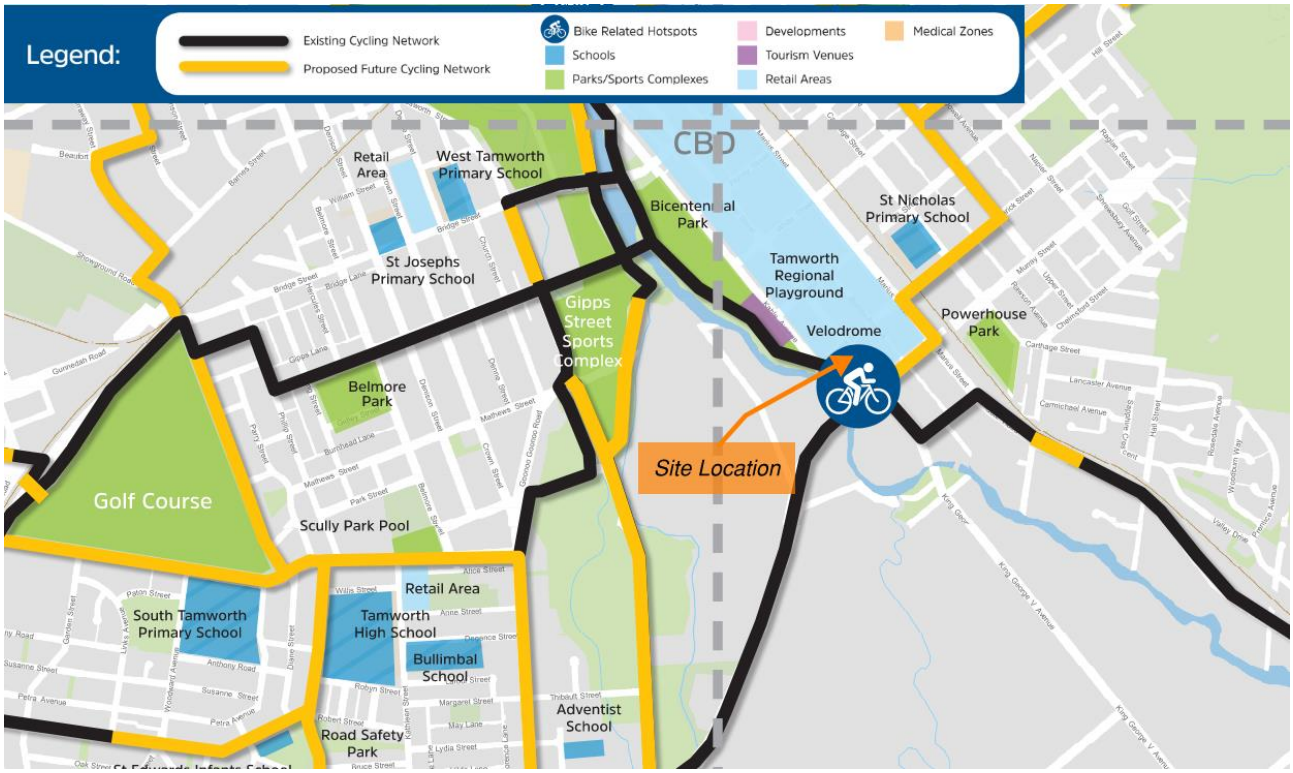

Figure 3.4: Existing and Proposed cycling Infrastructure within the Vicinity of the Site

Source: Tamworth Regional Council

3.5 Car Park

3.5.1 On-Street Parking

The surrounding area of the site offers mostly unrestricted on-street parking, particularly in the adjacent streets (Peel Street and Roderick Street). The Tamworth Parking Strategy provides a detailed map displaying the network, including the locations of carparks, parking meters, time-restricted zones, and free on-street parking zones.

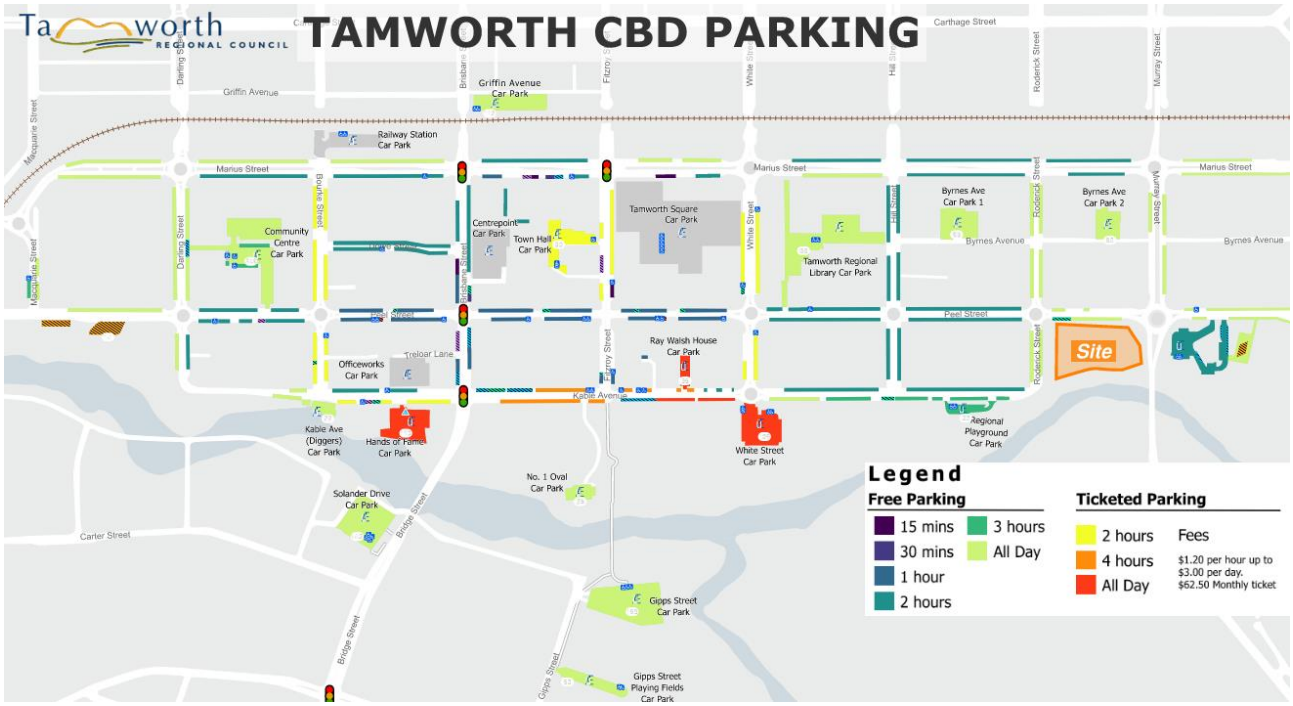

Figure 3.5: Tamworth Parking Strategy

Source: Tamworth Regional Council

Figure 3.6 shows the site's connections to public parking areas, including the footpath network links.

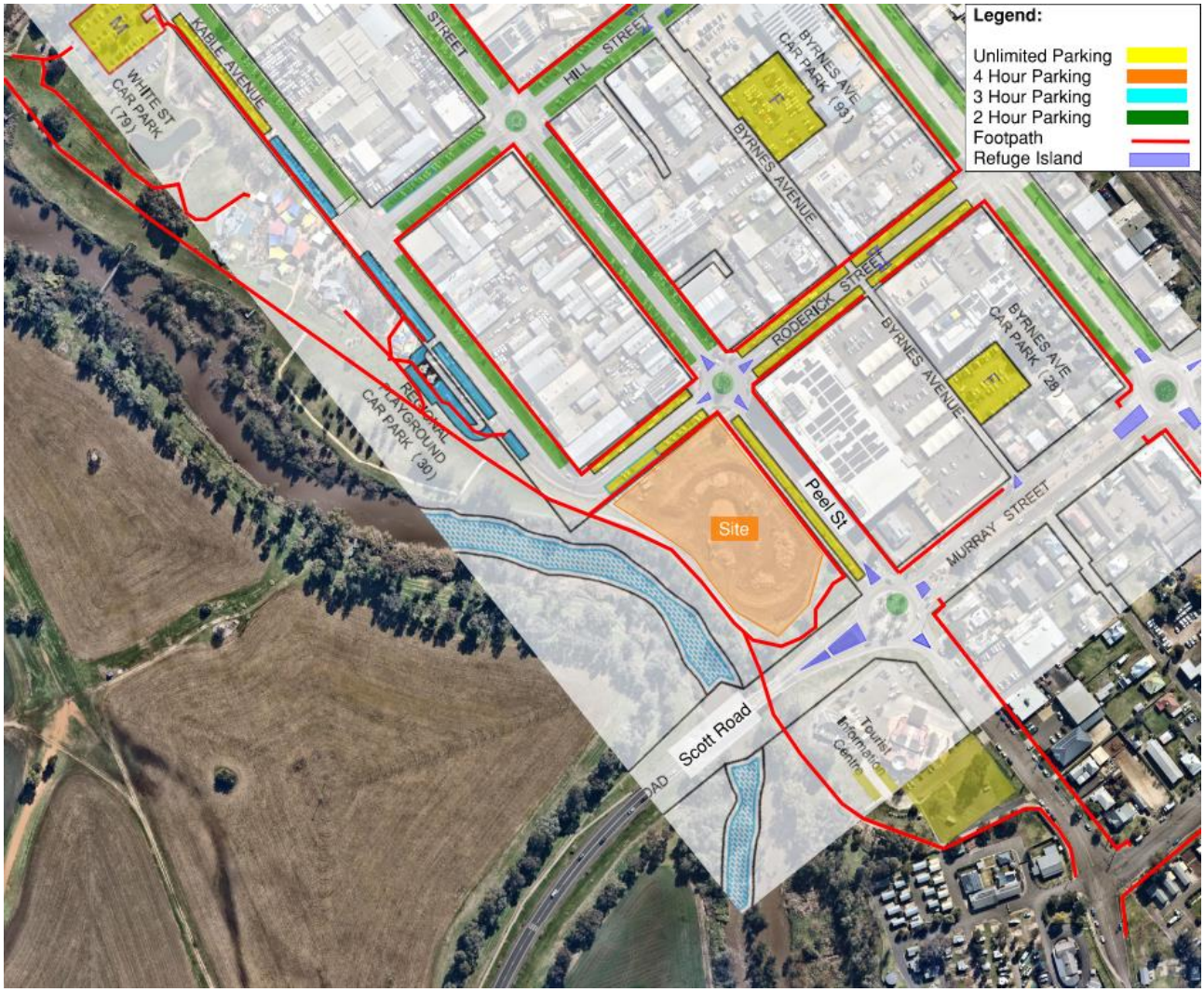

Figure 3.6: Linkages to Public Parking

3.6 Travel Characteristics

3.6.1 Journey to Work (JTW)

Journey to Work (JTW) data supplied by the 2016 Australian Census approximates the current mode share split for those who work in Tamworth and can be used to represent the travel modes of the staff working at the Campus. The JTW data is defined by Statistical Area Level 2 zones, and the site is located within the Tamworth - North region.

Table 3.2 demonstrates the breakdown of mode shares for each mode of travel. It is clear that private vehicle use is the favoured travel mode (as driver or passenger). In addition, while all other means of transportation show low usage, less than 1% take the train and bus combined and 3.3% of people walk to work.

Method of Travel (MTW15P) categorisation of travel modes (as listed in the left column of Table ***3.2***) is used for a clearer and simpler assessment of key travel modes through the allocation of a primary mode when multiple modes have been used in one trip.

Table 3.2: Journey to Work Data for Tamworth (Place of Work)

Source: Australian Bureau of Statistics 2016 Census

Travel Mode	Mode Share (%)
Train	0.13%
Bus	0.58%
Taxi	0.26%
Car, as driver	86.97%
Car, as passenger	6.63%
Truck	0.87%
Motorbike/scooter	0.66%
Bicycle	0.46%
Walked only	3.33%
Other Mode	0.09%
Total	**100.0%**

Table ***3.3*** shows a summary of the above information into three main travel mode categories. Private vehicle usage is the most popular mode choice, with 95% share, followed by active transport and lastly public transport.

Table 3.3: Summarised Journey to Work Data

Mode Summary	Mode Share (%)
Private vehicle (car, truck, taxi, motorbike)	95.39%
Public transport (train, bus)	0.71%
Active transport (walk, bicycle)	3.79%
Total	**100.0%**

Journey to Work data for the Place of Work can be seen in Table ***3.4*** below. This data can be used to further examine where people live, their demographic characteristics, and how they connect to employment centres. The data shows a similar pattern to Place of Work data, with the predominant mode of travel being private vehicles (91.56%), followed by active transport (4.75%).

Table 3.4: Journey to Work Data for Tamworth (Place of Residence)

Source: Australian Bureau of Statistics 2016 Census

Travel Mode	Mode Share (%)
Train	0.17%
Bus	0.54%
Taxi	0.35%
Car, as driver	84.64%
Car, as passenger	6.92%
Truck	1.30%
Motorbike/scooter	0.73%
Bicycle	0.35%
Walked only	4.40%
Other Mode	0.61%
Total	**100.0%**

3.6.2 Comparable Sites

Table 3.5 below extracted from the 2016 data collection survey illustrates the mode splits observed over this period for travel to and from the UNE Armidale Campus. With car-based travel being the dominant mode, similar to travel patterns across the region.

Table 3.5: UNE Armidale Campus Travel Mode Share

Mode Summary	Mode Share (%) to UNE	Mode Share (%) from UNE
Car travel	81%	83%
Public transport	3%	3%
Active transport (walk)	2%	2%
Active transport (Cycling)	14%	12%

A review of similar existing developments has been included in Table 3.6 below. These developments can serve as a good benchmark for travel characteristics for this unique regional university project type.

Table 3.6: Similar Existing Developments

Source: NSW Planning Portal

Project	Proposed works	Student number	Staff number	Traffic generated (peak hour trips)	Vehicle Trips /Total Occupation
UNE Tamworth Central Campus	**Four-storey school building with carpark.**	**295**	**30**	**75**	**23%**
Educational Establishment (Charles Sturt University) and Associated Infrastructure	Whole university	700	74	336	43%
Nihon University Newcastle Campus (accommodation)	Education establishment with student accommodation. Construction of two 4-storey buildings	100	8	20	18%
New Space Project at the University of Newcastle CBD Campus	10 storey education buildings	2000	100	19	1%
University of Newcastle, Gosford Campus	New tertiary institution in Gosford.	660	50	35	5%

As shown above, the ratio of trip generation to total site occupation varies significantly across regional university projects. The location of the proposed UNE Tamworth campus is such that it is located within the town centre with access to key transport networks such as key cycle routes and public transport routes.

3.7 Road Safety

Transport for NSW provides a history of recorded crash data for a 5-year period between 2017 and 2021. This data is reviewed to better understand the existing levels of safe road operation at and around the site, and the potential implications of any increases to traffic volumes.

Figure 3.7 presents the crash history locations available from TfNSW.

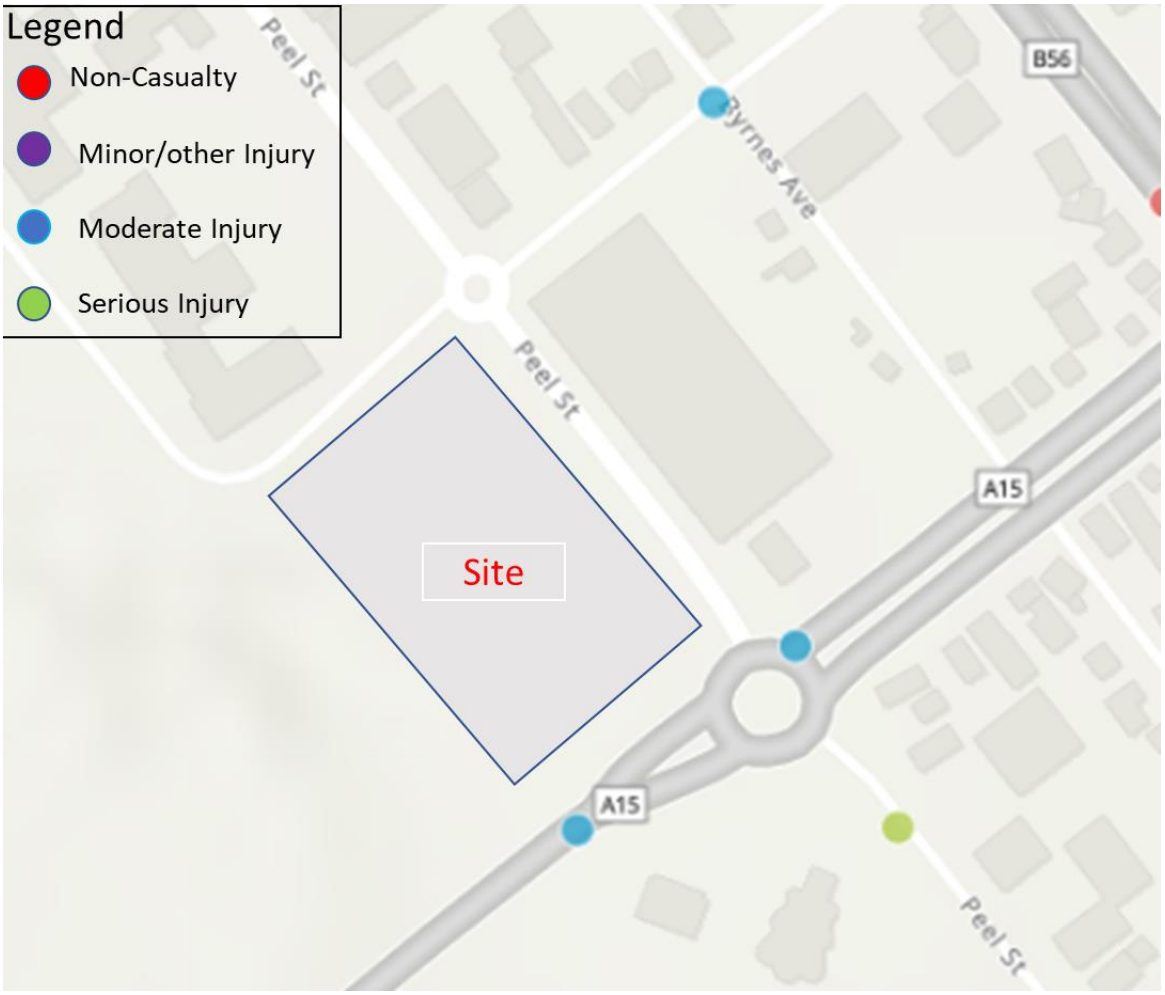

Figure 3.7: Recorded Crash History (2017 - 2021)

Source: Transport for NSW

The data indicates two moderate injuries along Scott Road whereas no incidents are shown along Peel Street nor Kabel Street.

Traffic impacts in this area should be carefully considered and treated for future developments and road user safety should be considered on an ongoing basis during future design stages.

3.8 Traffic Condition

3.8.1 Traffic Data Collection

To develop a baseline for this transport assessment, traffic data collection has been undertaken for several intersection around the site, as illustrated in Figure 3.8. Traffic volume data was collected on Thursday the 27th of August 2023 from 7am to 10am and 3pm to 7 pm at the three-roundabout listed below.

- Peel Street, Murray Street and Scott Road
- Peel Street and Roderick Street
- Marius Street and Murray Street

Figure 3.8: Modelled intersections

These locations have been chosen due to their potential for the most significant impact or relevance in relation to this development assessment. Analysing the traffic data collected, the identified peak hours for the roundabouts are 8:00 am - 9:00 am and 4:45 pm - 5:45pm.

3.8.2 Traffic Modelling

The analysis of the existing traffic conditions has been conducted for these three intersections using SIDRA Intersection 9.0 software. The intersections were modelled in a network configuration, refer to Figure 3.9 for the modelling schematic within SIDRA.

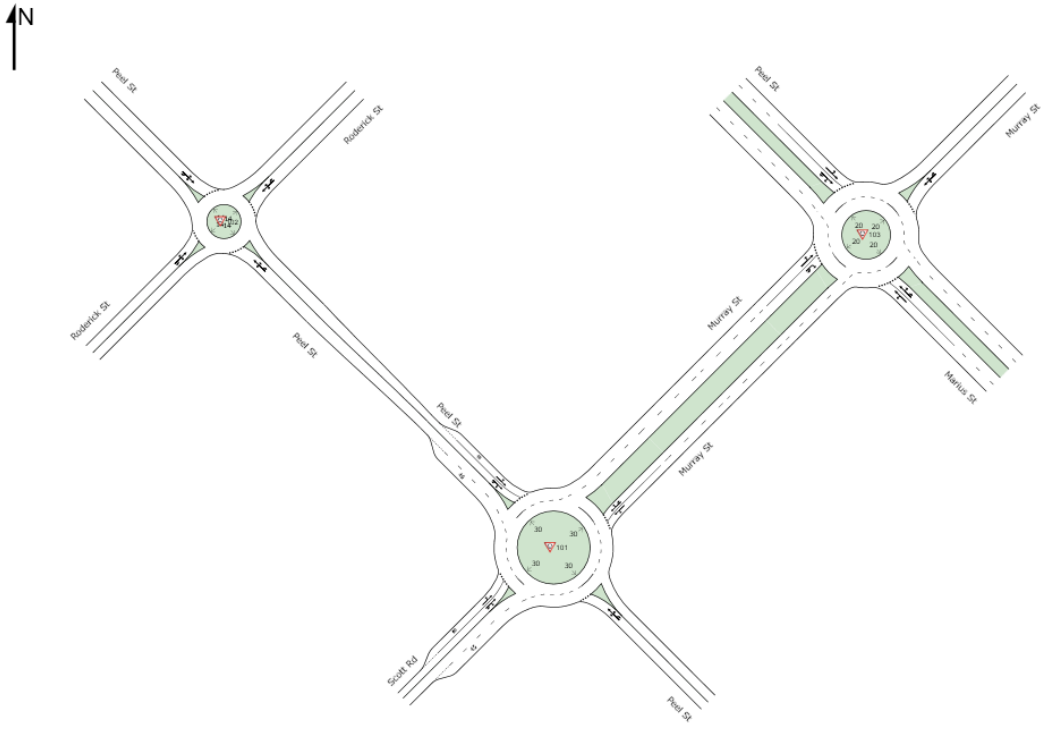

Figure 3.9: SIDRA Intersection Layout

Layout pictures are schematic functional drawings; not to scale.

3.8.3 Network Performance

Table ***3.7*** presents a summary of the existing operation of the key intersections, with full results presented in Appendix B It should be noted that the level of service for the key roundabouts is based on the approach with the highest delay.

Table 3.7: SIDRA modelling results for existing Conditions

Data for unsignalised intersections is the manoeuvre with worst delay

Intersection	Peak Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
Peel St x Murray St / Scott Rd	AM	0.301	12.4	5.4	LOS A
	PM	0.446	14.1	8.7	LOS A
Peel St x Roderick St	AM	0.140	10.2	1.9	LOS A
	PM	0.334	12.2	5.8	LOS A
Marius St x Murray S	AM	0.346	16.1	5.3	LOS B
	PM	0.266	14.3	3.3	LOS A

As indicated in Table ***3.7***, all roundabouts demonstrate satisfactory performance, achieving a level of service A and B within during both the AM and PM peak hours which indicates limited queues on any approach at the assessed roundabouts.

Table ***3.8*** summarise the analysis for the three intersections in a 10-year horizon, looking ahead to 2034, with the full results available in Appendix B. All the assessed roundabouts exhibit a slight decrease in average delay and degree of saturation while maintaining satisfactory performance, achieving Level of Service A and B during both AM and PM peak hours. This indicates minimal queuing on any approach to the roundabouts.

Table 3.8: SIDRA modelling results for 2034 Conditions (Without Development Volumns)

Data for unsignalised intersections is the manoeuvre with worst delay

Intersection	Peak Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
Peel St x Murray St / Scott Rd	AM	0.348	12.6	6.5	LOS A
	PM	0.535	15.4	12.5	LOS B
Peel St x Roderick St	AM	0.161	10.5	2.3	LOS A
	PM	0.409	13.3	7.7	LOS A
Marius St x Murray S	AM	0.429	18.1	7.3	LOS B
	PM	0.333	15.3	4.5	LOS B

According to the level of service criteria provided in Table ***3.8*** and Table ***3.9*** all of the three roundabouts have a good operation at Level of Service A and an average delay below 14 seconds per vehicle.

Table 3.9: Level of service criteria for intersections

Level of Service	Average Delay (sec/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	**<14**	Good operation	Good operation
B	**15 to 28**	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	**29 to 42**	Satisfactory	Satisfactory, but accident study required
D	**43 to 56**	Operating near capacity	Near capacity & accident study required
E	**57 to 70**	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, required other control mode

4.0 Proposed Works

4.1 Overall works

The project involves the construction of a contemporary four-storey school building located adjacent to Roderick Street. Additionally, a car park with access from Peel Street, cultural grounds, and complementary landscaping will be established. This site is situated at the corner of Peel Street and Roderick Street as shown in Figure 4.1.

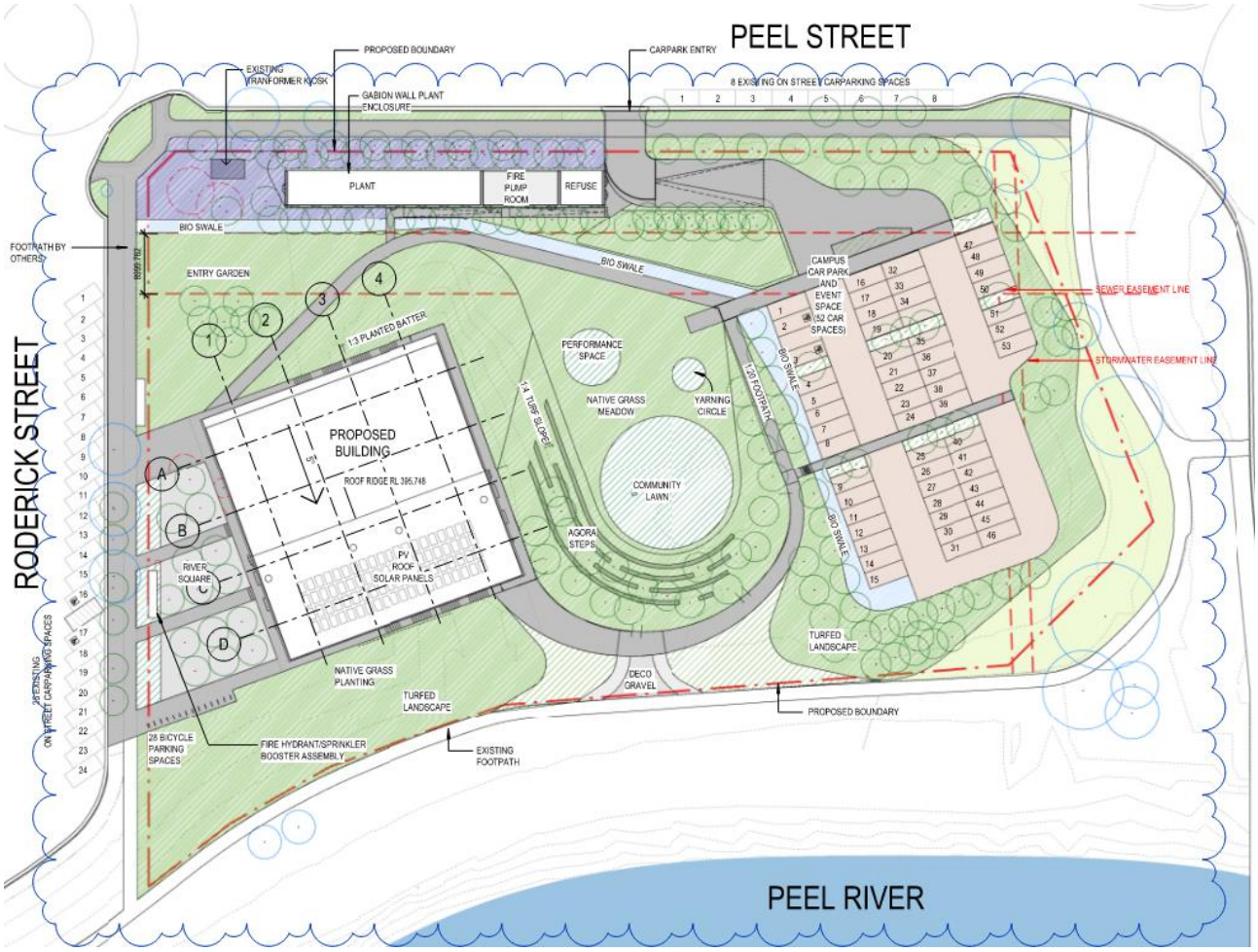

Figure 4.1: Concept Design

4.2 Car Parking

4.2.1 Off-Street Parking

The campus contains on-grade car parking providing 53 parking spaces on-site. All on-site parking is proposed to be paid parking. Visitor, student, and staff parking will operate under a permit system, similar to UNE Armidale Campus. These permits will not be restricted and can be obtained for shorter term parking if required.

Figure 4.2 outlines the details of this car park.

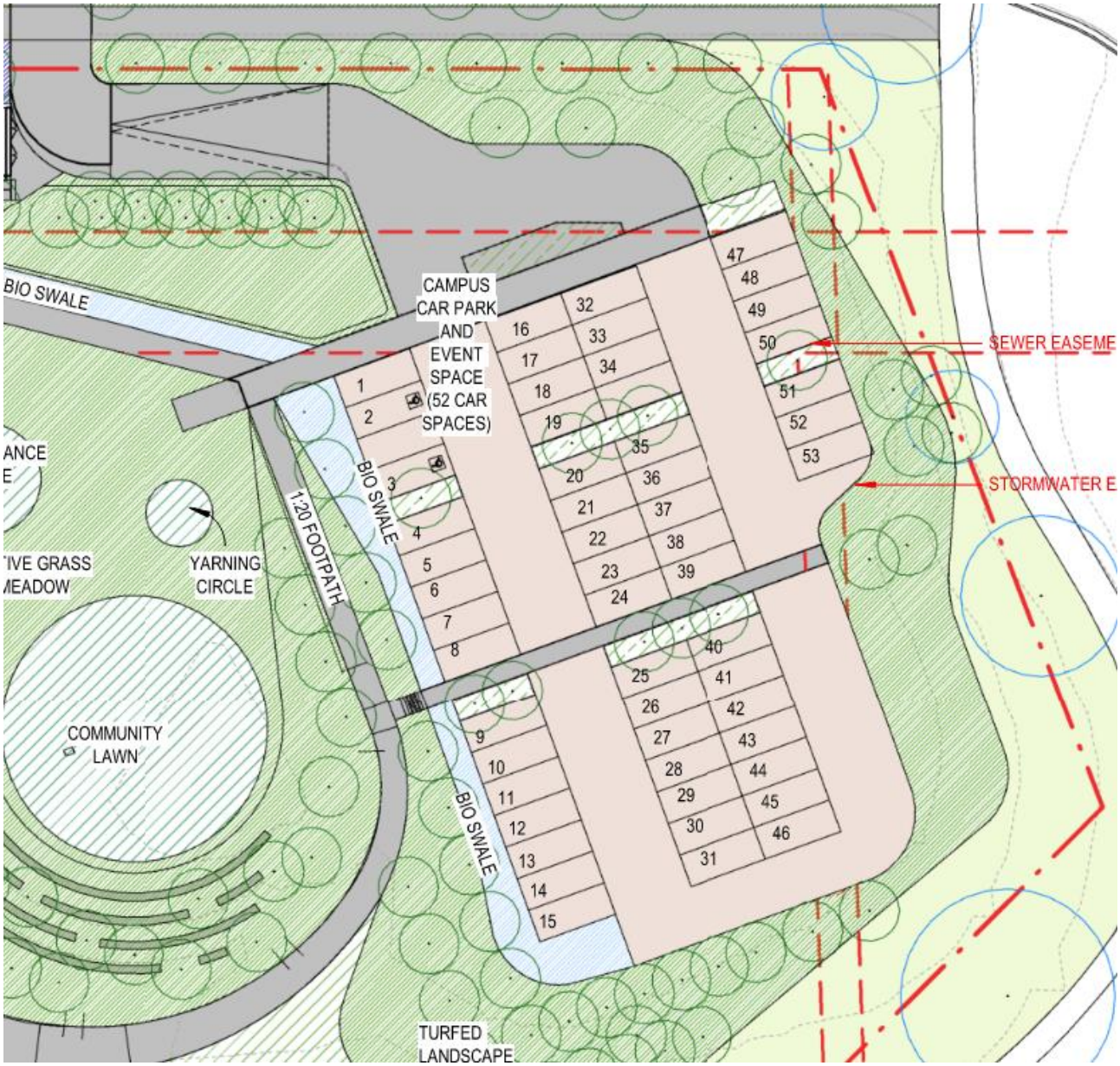

Figure 4.2: Off-Street Car Parking

4.2.2 On-Street Parking

Outside the main campus entry, on-street parking is widely available on Roderick Street, with 45-degree angled parking available on one side of the road for the majority of the road length and parallel parking on the other side of the road. A total of 24 existing angled parking spaces are to be retained on Roderick Street to the eastern kerbside and a further 8 existing parallel parking spaces will be retained on Peel Street to the southern kerbside.

The on-street parking design option for the concept design phase is shown in Figure 4.1.

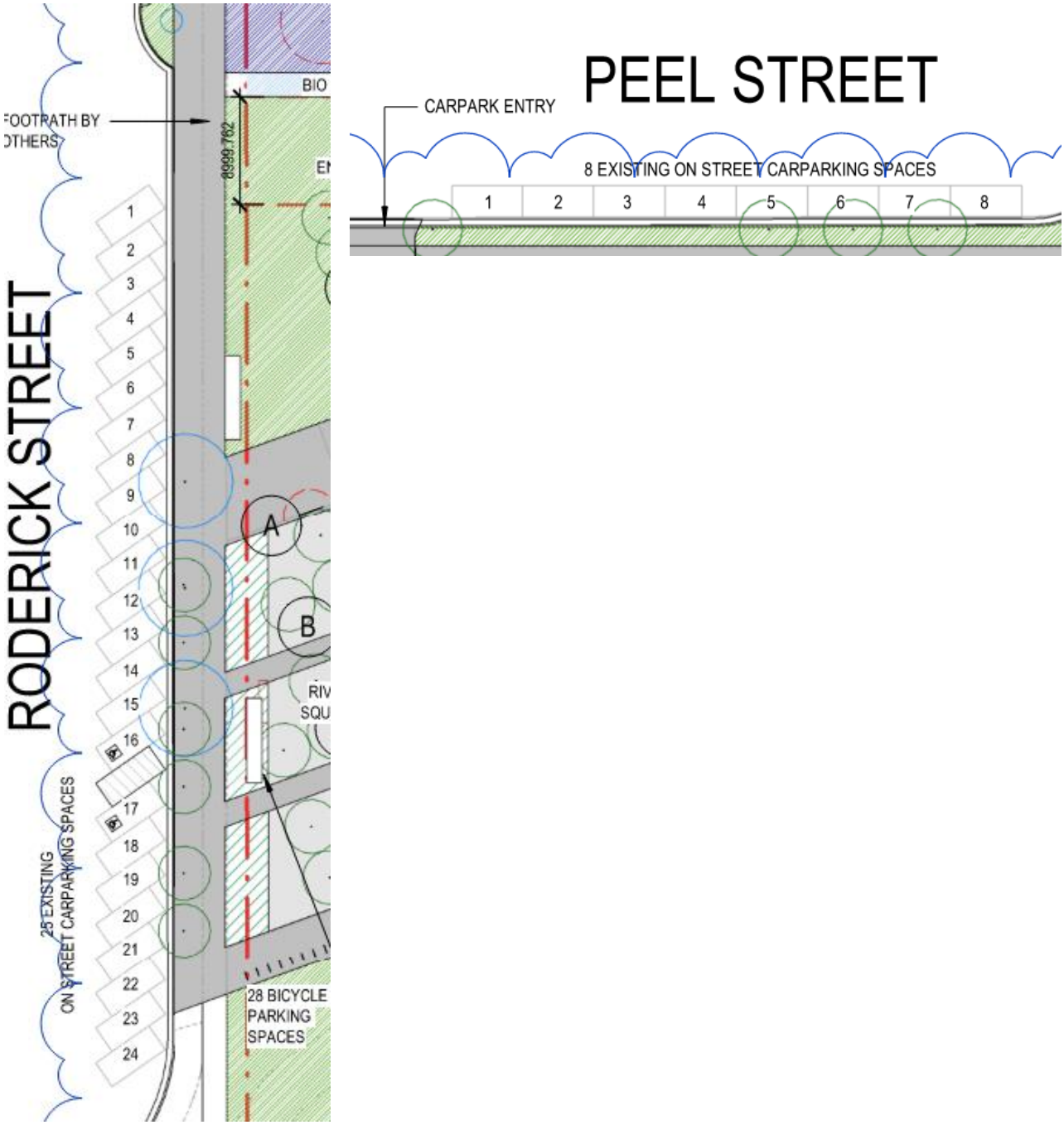

Figure 4.3: On-Street Parking

4.3 Pedestrian and Cyclist Linkages

The area is well-connected by footpaths; however, there are missing linkages along Peel and Roderick Streets in front of the site. The proposal includes the provision of shared paths adjacent to the site along these streets to ensure adequate connections to other off-site parking areas.

A new access point is proposed from the existing shared path on the levee that connects to the internal walkway running along the southwestern end of the site. Additionally, the connecting underpass below Scott Road leading to the car park area will be retained and improved with CCTV and lighting proposed as part of the project.

Figure 4.4 below illustrates the proposed works along these streets.

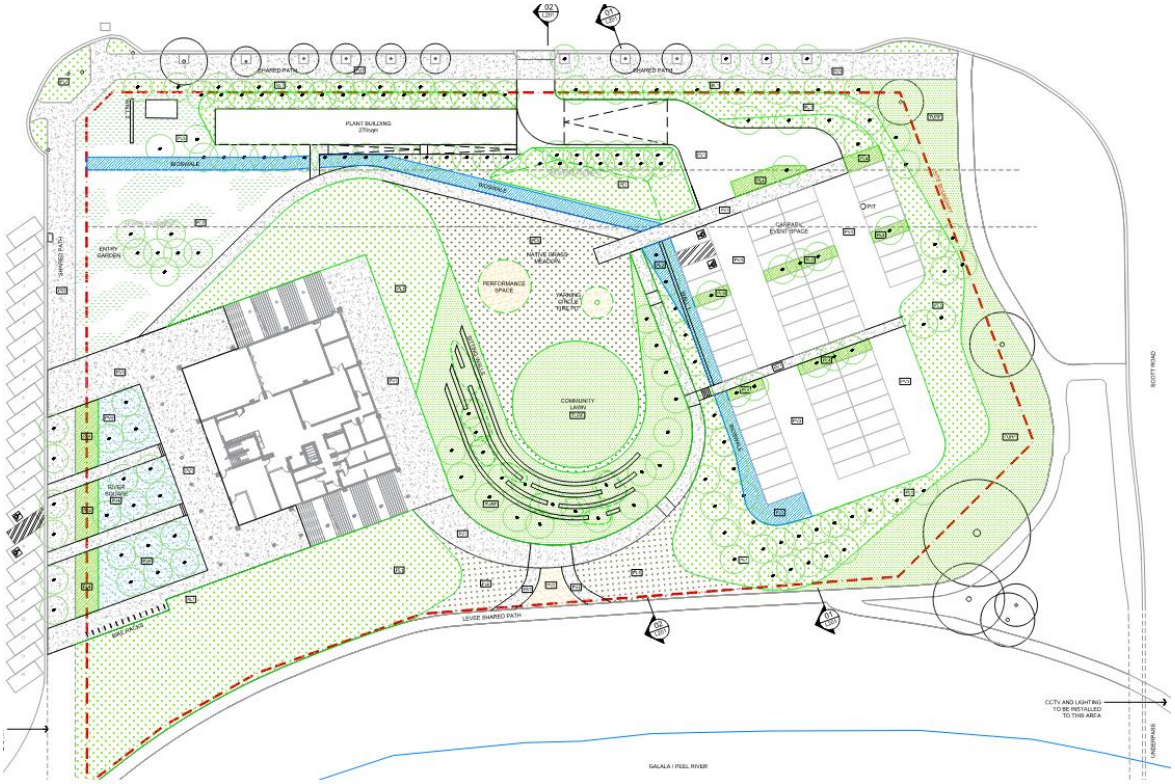

Figure 4.4: Pedestrian and Cyclist Linkages

4.4 Service and Loading

Service and loading vehicles will access the site through the vehicle access point connected to Peel Street. To efficiently manage waste disposal, dedicated waste facilities will be positioned to the north-west of the premises. The largest anticipated vehicle will be a medium rigid vehicle, primarily employed for on-site operations and waste collection purposes.

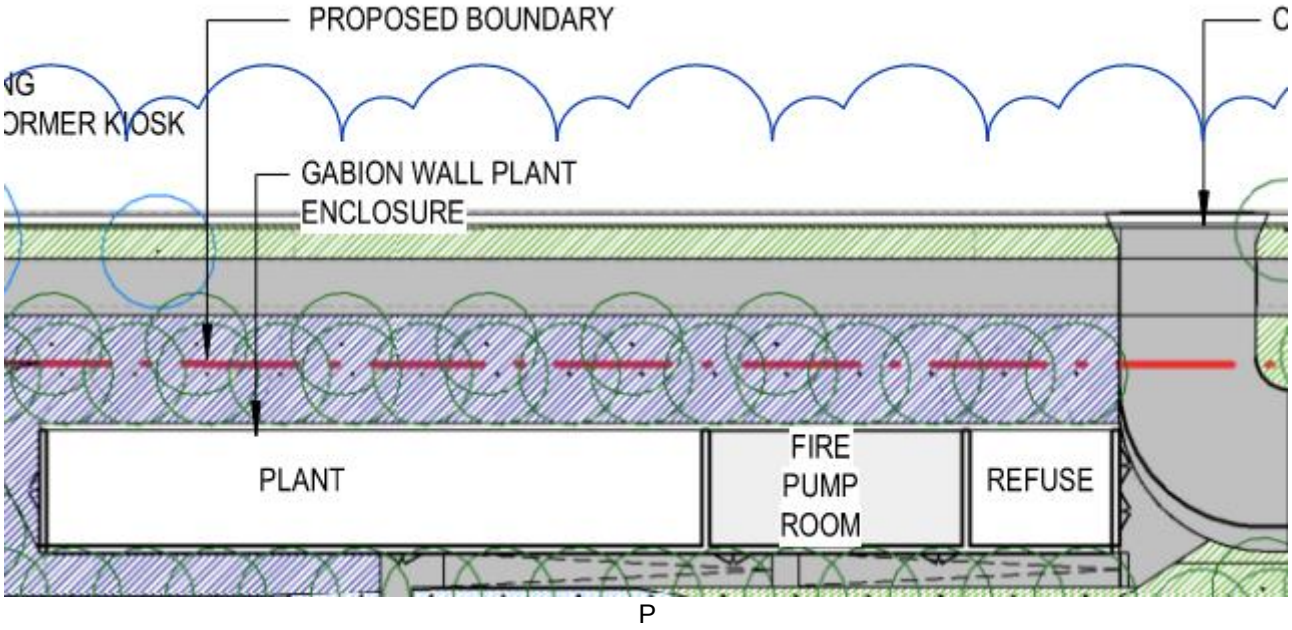

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Figure 4.5: Service and Loading

4.5 Site Access

The site has multiple pedestrian access points from Roderick Street and one access point from the existing levee-shared path as shown in Figure 4.6. The site has an internal walkway spanning the south-western end of the site. The main vehicle access is through Peel Street directly to the car park area. A shared service vehicle area, encompassing waste and delivery services, is located to the west of the site, with an entry/exit access point from Peel Street.

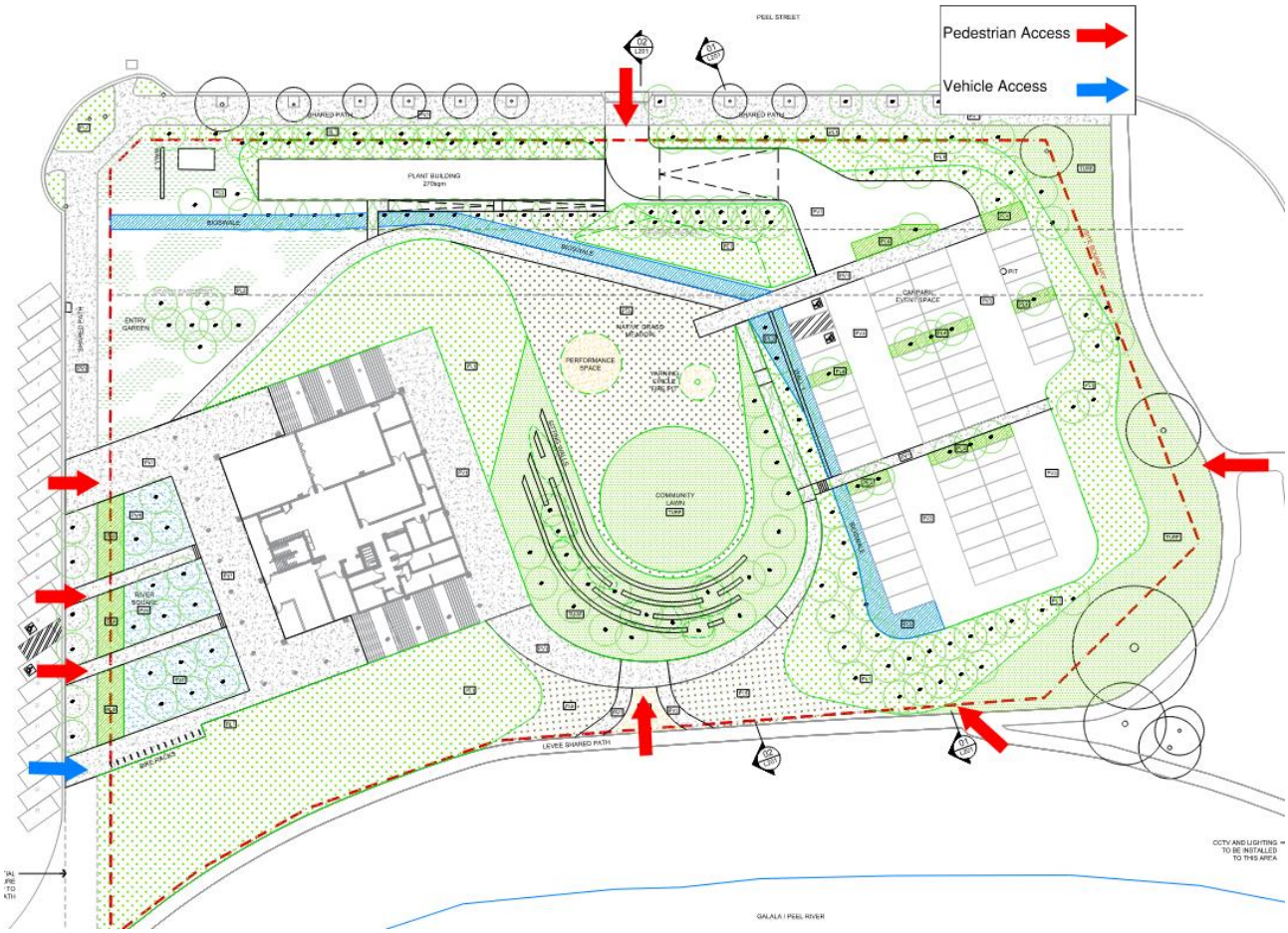


Figure 4.6: Site Access Points

4.6 Bicycle Parking

On-site cyclist facilities are available to ensure secure storage of bicycles and equipment. A total of 28 bicycle parking spaces is proposed that can be accessed from Roderick Street, along with an additional 3 undercover spaces located on the ground level near the entry door, as shown in Figure 4.7. and Figure 4.8.

Figure 4.7: Bicycle Parking

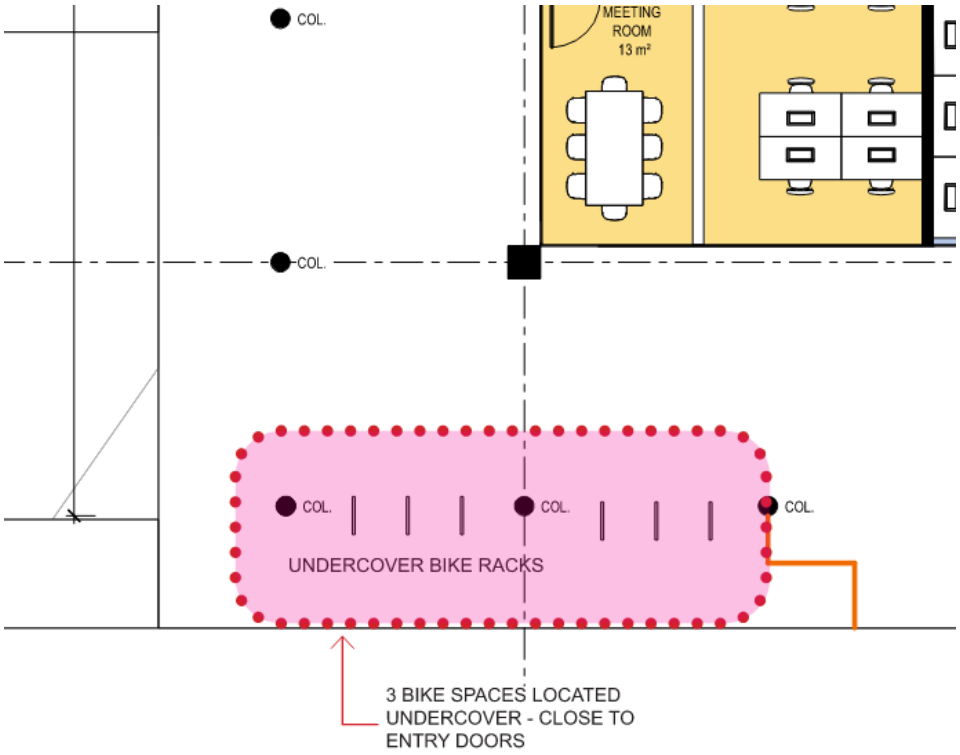


Figure 4.8: Undercover Bicycle Parking

4.7 End-of-Trip Facilities

End-of-trip facilities, including two showers and 15 lockers, are proposed on the ground level, as shown in Figure 4.9

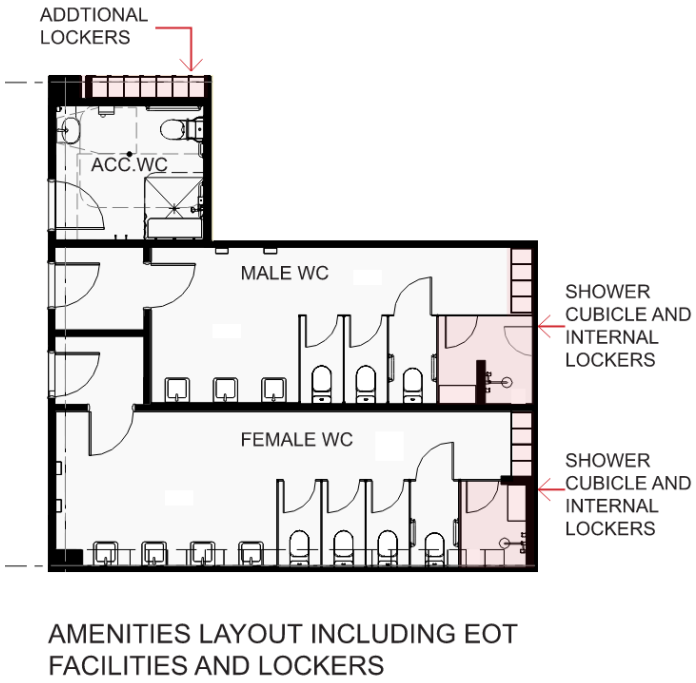


Figure 4.9: End-of-Trip Facilities

5.0 Impact analysis

5.1 Transport Hierarchy

The transport strategy for the project is designed as a sustainable transport strategy, prioritising non-vehicle modes such as active transport (i.e., walking, cycling) and public transport and discouraging private vehicle travel (including car parking). This hierarchy is indicatively illustrated in Figure 5.1.

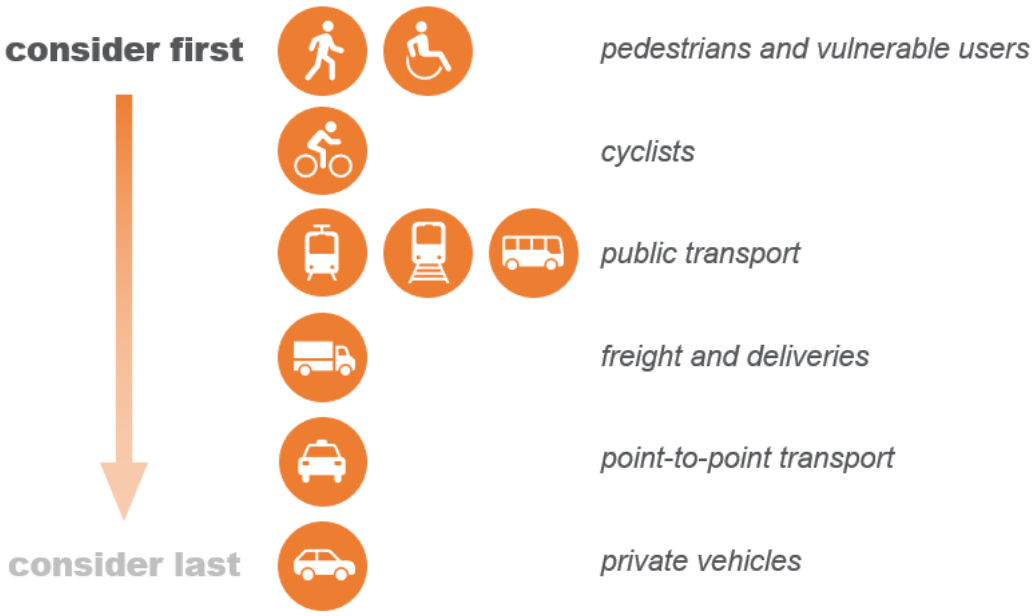


Figure 5.1: Sustainable Transport Hierarchy

This strategy is consistent with NSW state government policy, specifically the Road User Space Allocation Policy.

5.2 Parking Provision

5.2.1 Car parking

The Tamworth Regional Development Control Plan 2010 (DCP) requires a car parking rate for educational establishment to be:

- 1 space per 2 staff, plus
- 1 space per 30 students over 17 years for high school and 1 space per 5 students for higher education establishments.

Table 5.1: DCP parking Requirements for Maximum Occupancy

	Total	DCP Parking Requirements
Staff	30	15
Students	295	59
Total	**325**	**74**

While the maximum capacity of the site is noted as 30 staff and 295 students, average utilisation data from the Tertiary Education Management Association (TEFMA) notes that average occupancy of university sites sits at

56%. This benchmark is based on both metropolitan and regional universities across Australia and New Zealand. Applying this conservative 56% utilisation rate to UNE Tamworth reduces the on-site student occupancy to 165 students at any given time. An assessment of this requirement has been completed against the DCP requirements in Table ***5.2***.

Table 5.2: DCP Parking Requirements for Typical Occupancy

	Total	DCP Parking Requirements
Staff	30	15
Students	165	33
Total	**195**	**48**

The development proposes 53 car parking spaces which is a reduced supply when compared to the DCP rate for the maximum occupancy, however, this is deemed sufficient for the following reasons:

- The site is providing sufficient parking for typical use in accordance with the DCP.
- The proposed sustainable travel initiatives that will be in place to encourage staff to use alternative transportation modes, reducing reliance on vehicles.
- A reduction in on-site car parking will promote staff use of alternative modes, leading to lower vehicular traffic volumes around the site and enhanced safety for students.
- Prioritising pedestrian access and reducing private vehicle infrastructure aligns with the TfNSW Road User Space Allocation Policy.
- The site is located within the town centre of Tamworth and is well connected to the wider pedestrian and cyclist networks including being adjacent to the shared path along Peel River that connects to all major areas of Tamworth, including west across the river, north and east.

The approach aligns with the Tamworth Parking Strategy[2], considering various factors for effective parking management, particularly the below:

- Environmental sustainability is compromised through a dependency on cars. The convenient and abundant availability discourages the opportunities for the development of public transport and active transport infrastructure, and the lack of options feeds our car dependency.
- Excessive or poorly located car parking spaces detract from the quality of the urban streetscape, by fragmenting the street-facing businesses in the commercial area. This disrupts the atmosphere of a bustling and vibrant city centre.

In summary, the proposed lower provision of parking spaces is in line with the project's sustainable transport objectives, promoting alternative transportation options and adhering to relevant state planning policies and strategies.

The following assessment evaluates the worst-case scenario based on Journey to Work (JTW) data, which indicates that 86.97% of occupants will travel by car as drivers. With a total of 205 occupants (including staff, students, and clinic visitors), 53 parking spaces are available on-site. This leaves an estimated 125 vehicles expected to utilise other parking areas within the site’s vicinity, as outlined in Table 5.3 below.

[2] Tamworth Parking Strategy 2020-2030

Table 5.3: Parking Assessment

	Total
Staff	30
Students	165
Clinic Visitors	10
Total Occupants	**205**
Mode Share (%)	86.97%
Driving	**178**
Parking On-site	53
Parking Accommodated for On-Street	**125**

According to the current Parking Strategy, 1,500 spaces remain vacant at any given time. The nearest parking areas and their weekday utilisation are shown in Figure 5.2 below. Table 5.4 provides an assessment of available parking in each area based on current occupancy levels. A total of 125 spaces can be accommodated within these parking areas. Note that this calculation does not account for the proposed on-street parking spaces on Roderick and Peel Streets following consultation with council.

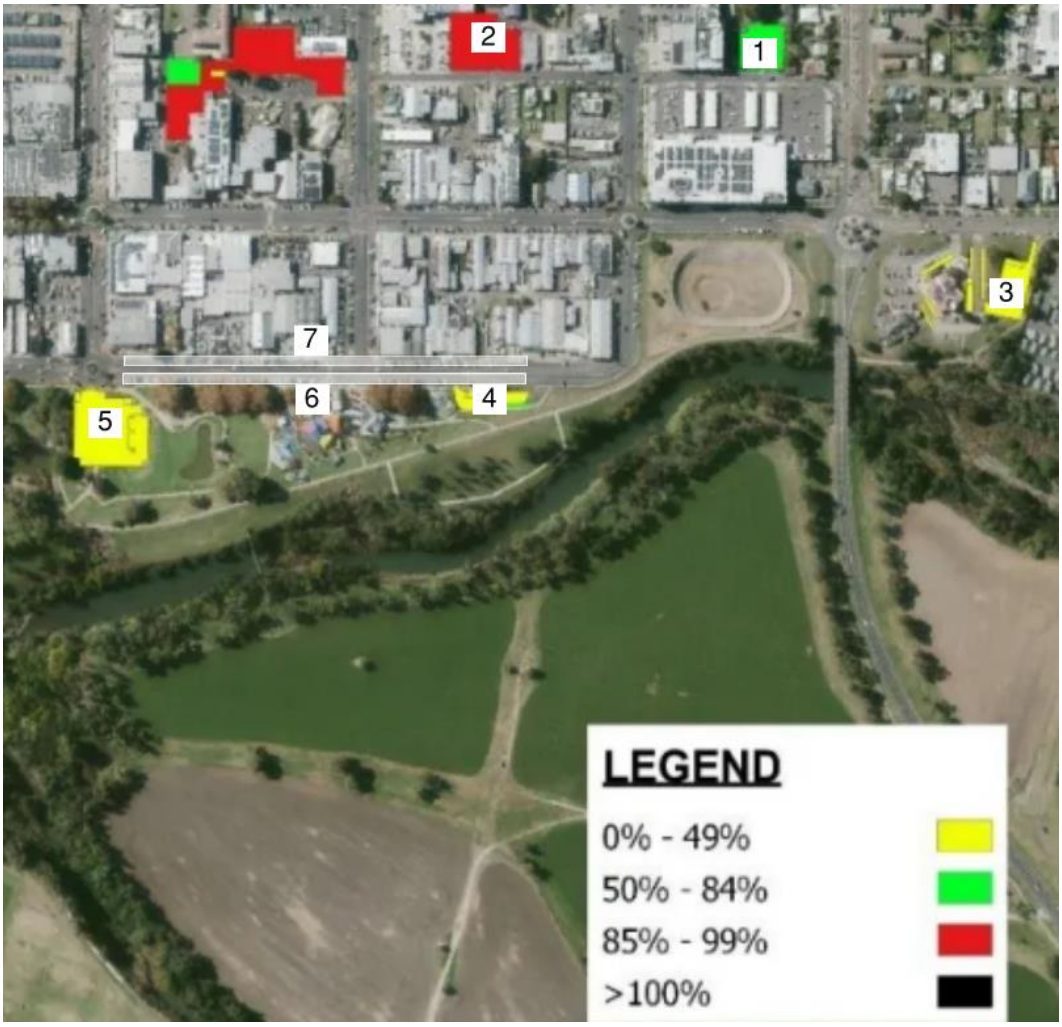


Figure 5.2: Parking Utilisation

Table 5.4: Parking Assessment (2)

#	Approximate Available Parking	Approximate Parking Utilisation	Parking Used	Assumed Vacant spaces
1	42	67%	28	14
2	94	92%	86	8
3	40	25%	10	30
4	31	25%	8	23
5	105	25%	26	79
6	100	25%	25	75
7	80	50%	40	40
Total	**492**	**-**	**-**	**268**

Given the low utilisation of parking facilities and the well-connected pedestrian network linking on-street and off-street parking areas to the site, the proposed parking strategy is expected to be sufficient. Even in the unlikely event of higher-than-expected parking demand, which would be mitigated by sustainable transport initiatives, the available parking capacity will meet the needs of the development.

5.2.2 Motorcycle Parking

There are no requirements for motorcycle parking specified in the Tamworth Regional Council DCP. Motorcycle parking should be provided in car parks where possible, in locations such as corners where it would not be possible to provide car parking spaces.

5.2.3 Bicycle Parking

There are no requirements for bicycle parking specified in the Tamworth Regional Council DCP, however the NSW Planning Guidelines for Walking and Cycling provide the following rates for tertiary education establishments:

- 3-5% of staff
- 5-10% of full time students

Applying these rates to the development bicycle parking provisions are recommended in the range of 14 to 28 spaces. The site proposes 28 bicycle parking spaces, which aligns with the recommendations of the NSW Planning Guidelines for Walking and Cycling.

5.2.4 Compliance Review

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)
- Parking space width: 2.4m or higher
- Aisle width: 6.2m
- 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 one accessible parking spaces, which the proposal meets and therefore complies with the BCA.

The proposed car parking has been reviewed for compliance with the above standards and has been found that it can readily comply with minor changes to its arrangement.

5.3 Intersection Analysis

5.3.1 Proposed Trip Generation

As a conservative estimate, the generated trips from the development have been assumed to be equal to the number of parking spaces required under the DCP rate (75 peak hour trips). Based on the distribution of residential areas within Tamworth, the distribution of these trips has assumed to be even from North Tamworth, Central Tamworth and Western Tamworth. It has been assumed that these trips are towards the site during the AM peak and away from the site in the PM peak.

As discussed in Section 3.6, benchmarking has been completed to review this trip generation rate against other similar regional university campus trip generation rates and against the Australian Bureau of Statistics Journey to Work data.

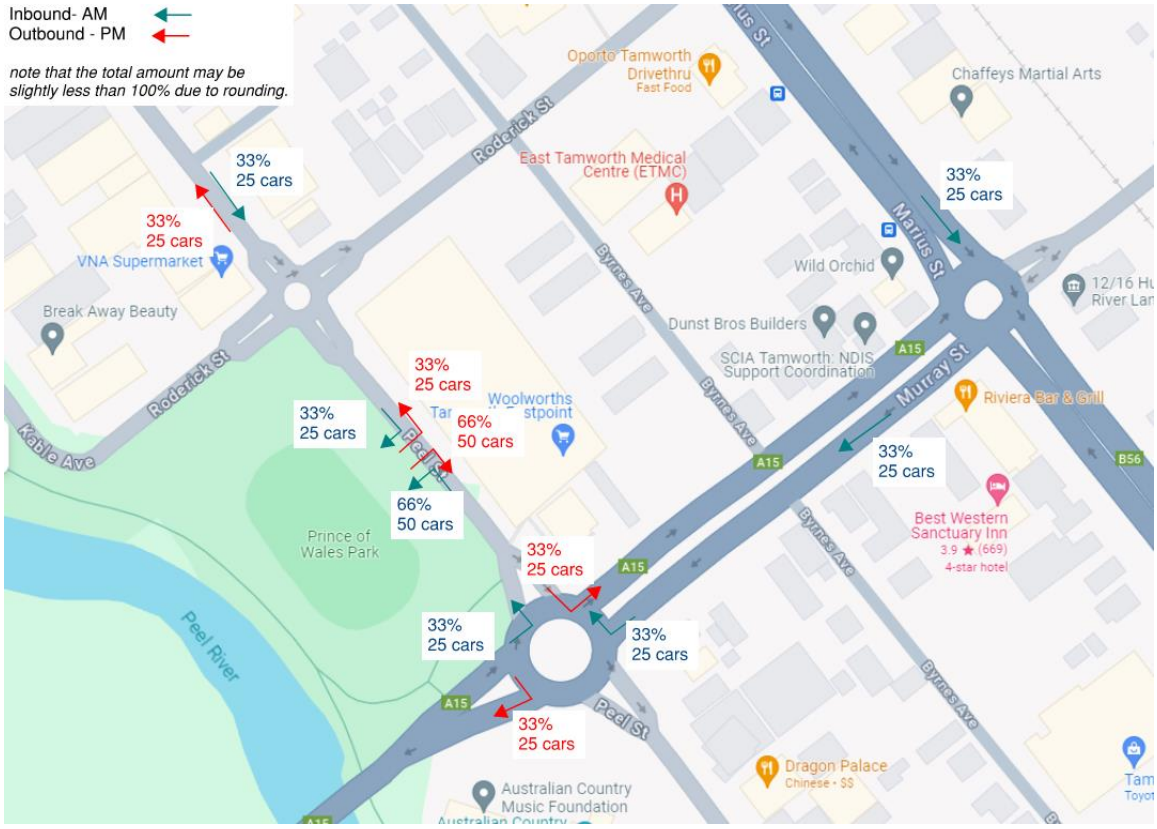


Figure 5.3: Trip Distribution

5.3.2 Intersection Performance

Table ***5.5*** provides an overview of the anticipated operation of the relevant intersections post-development without the account for the population growth in Tamworth, and Table ***5.6*** shows the projected results in 10 years ahead with development volumes. A comprehensive breakdown of results is available in Appendix B.

Table 5.5: SIDRA modelling results for proposed conditions

Data for unsignalised intersections is the manoeuvre with worst delay

Intersection	Peak Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
Peel St x Murray St / Scott Rd	AM	0.390	12.5	7.5	LOS A
	PM	0.456	14.4	9.2	LOS A
Peel St x Roderick St	AM	0.142	10.4	2	LOS A
	PM	0.336	12.2	5.8	LOS A
Marius St x Murray St	AM	0.347	16.3	5.3	LOS B
	PM	0.266	14.3	3.3	LOS A

As detailed in Table ***5.5***, the intersections demonstrate a satisfactory operational performance, operating at a level of service A during both the AM and PM peak hours (the exception being the Marius St/Murray St roundabout is operating at a LoS of B). These findings highlight the minimal presence of significant delays or

queues on any approach at the roundabouts post-development.

Table ***5.6*** presents the expected performance results for 2034, incorporating a background growth rate of 1.2% taken from the Tamworth Regional Council's average annual population growth estimate, with the addition of the development volumes.

Table 5.6: SIDRA modelling results for 2034 proposed Conditions (With Development Volumes)

Data for unsignalised intersections is the manoeuvre with worst delay

Intersection	Peak Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
Peel St x Murray St / Scott Rd	AM	0.457	12.6	9.5	LOS A
	PM	0.574	15.9	14.8	LOS B
Peel St x Roderick St	AM	0.166	10.7	2.4	LOS A
	PM	0.429	14.0	8.5	LOS A
Marius St x Murray S	AM	0.432	18.1	7.4	LOS B
	PM	0.343	15.5	4.7	LOS B

The results indicate a slight increase in the average delay and degree of saturation, with a similar level of service compared to the 2034 projections without development volumes. This suggests that the proposed development does not have a significant impact on any of the three nearby roundabouts.

6.0 Access and Circulation

One vehicular access point from Peel Street is proposed to provide access to the carpark, while one pedestrian access point is proposed from Roderick Street.

The proposed driveway access will be located at a sufficient distance from the roundabout to ensure adequate queuing space. The distance between the driveway access and the tangent point of the kerb at the roundabout of Peel and Short Street is approximately 65m.

6.1 Service and Loading

Service and loading vehicles will access the site from Peel Street. The waste contractor will determine collection hours based on the university location and logistical access requirements, 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.

7.0 Conclusion

7.1 Summary

The proposed development includes a new tertiary educational campus which includes a four-storey building with associated landscaping, cultural grounds and carparking. The development will cater to a total of 295 students and 30 staff members, with typical occupancy at approximately 56%.

The design has been reviewed with regards to traffic, parking and access. The main vehicular access will be through Peel Street, that will provide access both to car parking and a waste collection area.

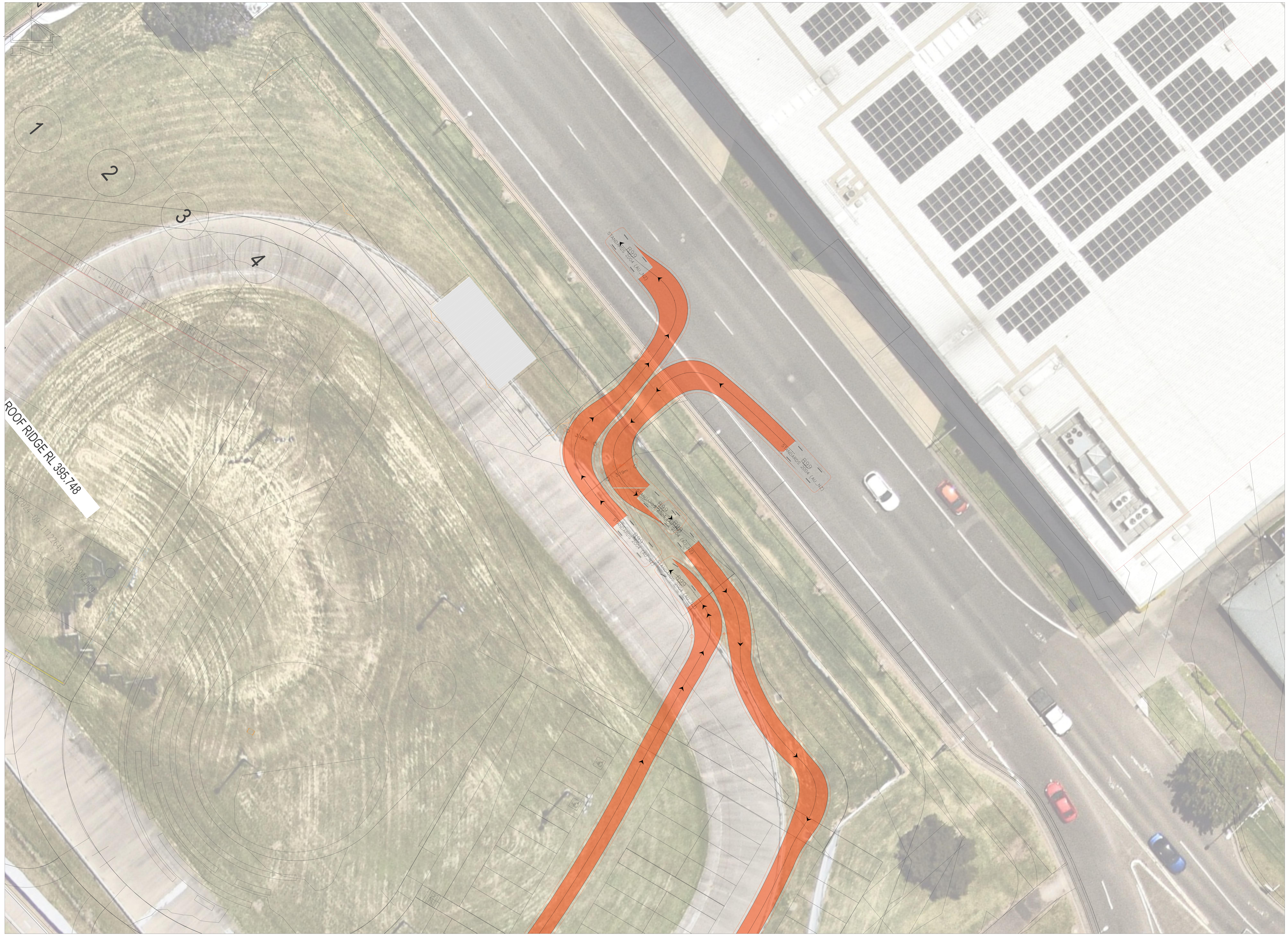
The proposed 53 parking spaces are considered sufficient for the development, considering the availability of parking in the adjacent areas and the likely occupancy of the site. The encouragement of alternative transportation use will reduce car reliance and promote pedestrian access, in line with sustainable transport goals and state policies.

All intersections operate at a satisfactory Level of Service both pre and post development, achieving a level of service A during AM and PM peak hours, except for the Marius Street and Murray Street roundabout, which achieves Level of Service B. This indicates minimal significant delays or queues at relevant intersections near to the site after the proposed development.

Prepared by	Reviewed By	Authorised By
TAYLOR THOMSON WHITTING (NSW) PTY LTD	**TAYLOR THOMSON WHITTING (NSW) PTY LTD**	**TAYLOR THOMSON WHITTING (NSW) PTY LTD**
		
AMMAR AHMED Traffic Engineer	**GRACE CARPP** Associate	**PAUL YANNOULATOS** Technical Director

Appendix A

Swept Path Analysis



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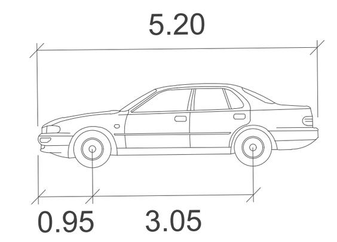

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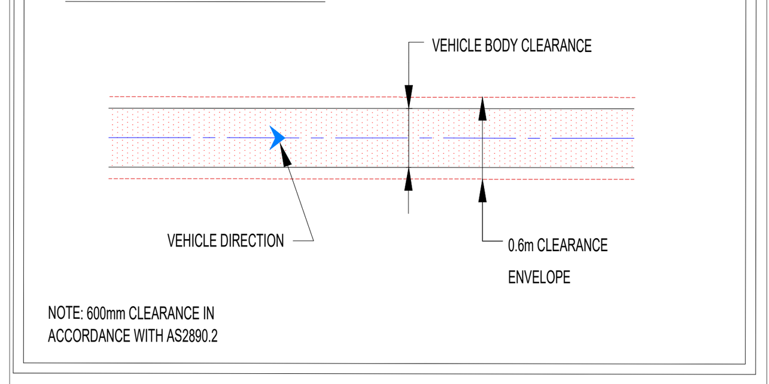

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Rev	Description	Eng	Draft	Date
P1	ISSUE FOR INFORMATION	AA	GC	23.10.24

Architect
ARCHITECTUS
Level 18
25 Martin Place
Sydney NSW 2000

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
UNE - TAMWORTH CENTRAL CAMPUS

Sheet Subject
B99 VEHICLE SWEPT PATH ANALYSIS

Scale : A1	Drawn	Authorised
1:200	AA	GC

Job No	Drawing No	Revision
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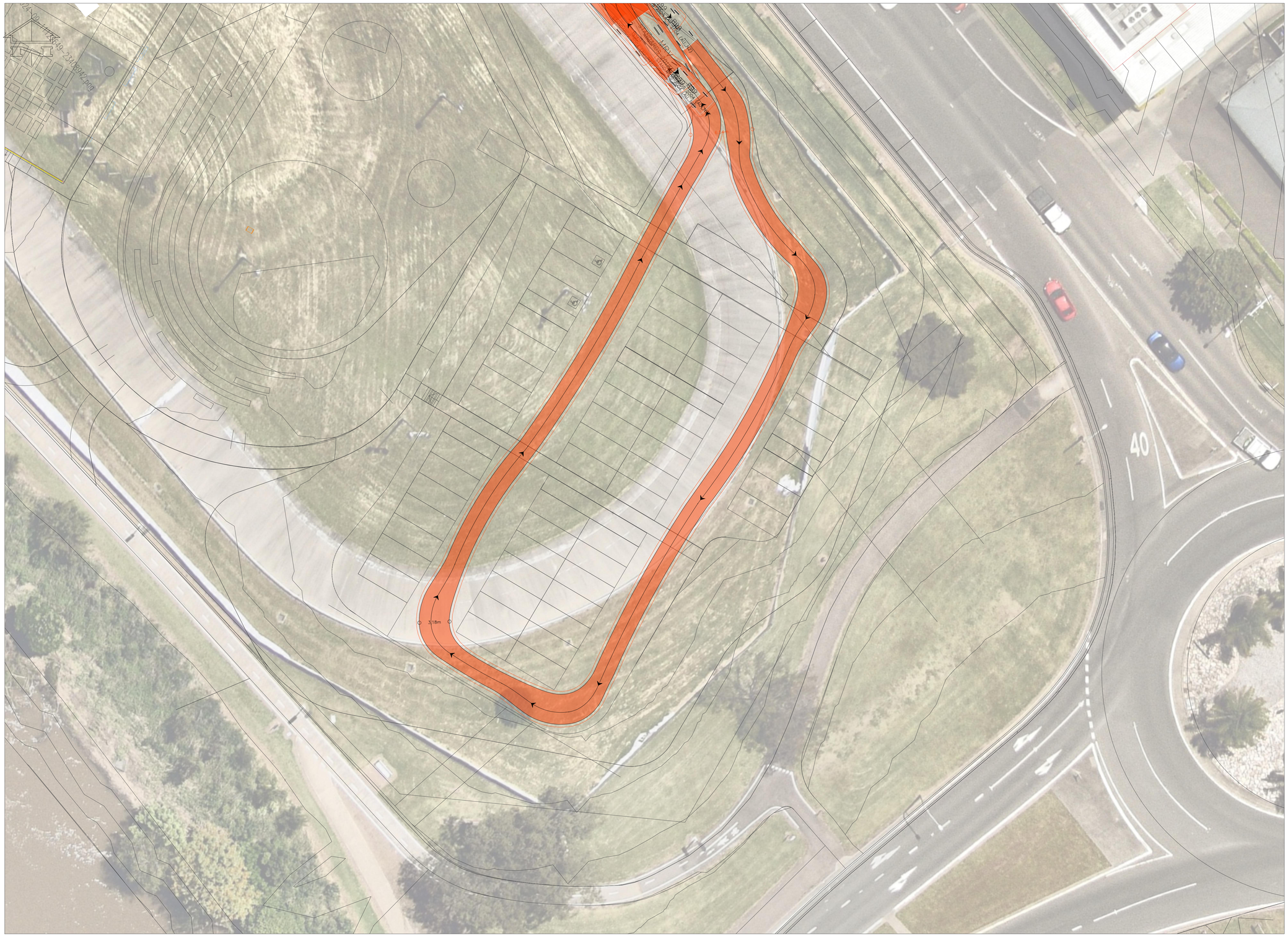

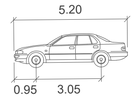

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Lock to Lock Time	:	6.0
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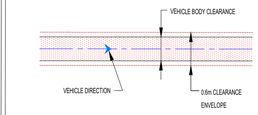

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P1	ISSUE FOR INFORMATION	AA	GC	23.10.24

Architect
ARCHITECTUS
Level 18
25 Martin Place
Sydney NSW 2000

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
UNE - TAMWORTH CENTRAL CAMPUS

Sheet Subject
B99 VEHICLE SWEPT PATH ANALYSIS

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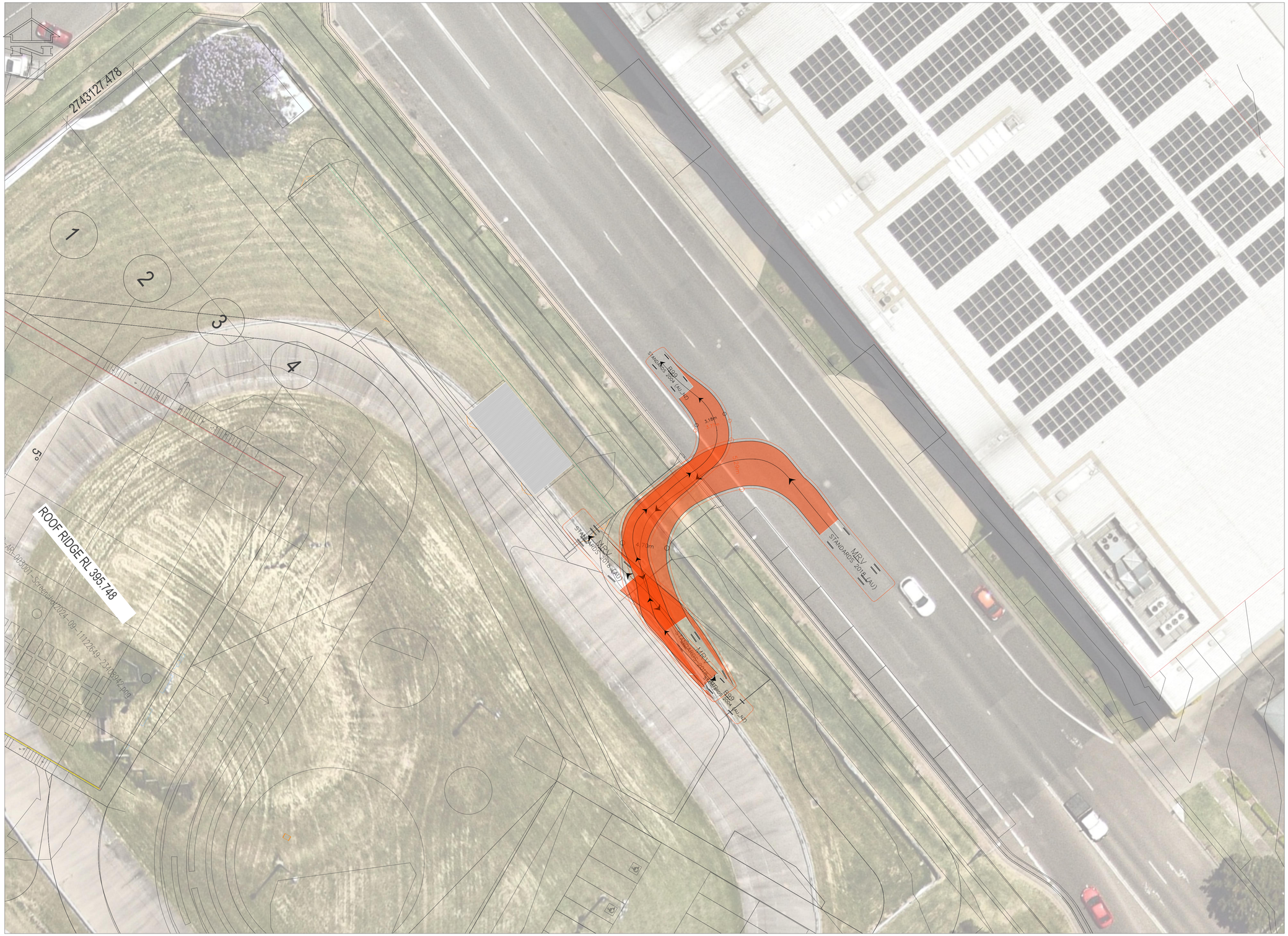

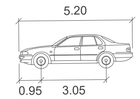

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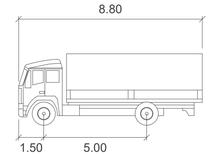
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9



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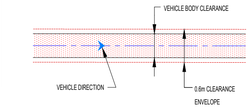

NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890.2

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0 2 4 6 8 10 12 14 16m

1:200 A1 1:400 A3

FileName: C004.dwg - USER: ammara - Plot File Created: Oct 23, 2024 - 1:34pm

Rev	Description	Eng	Draft	Date
P1	ISSUE FOR INFORMATION	AA	GC	23.10.24

Architect
ARCHITECTUS
Level 18
25 Martin Place
Sydney NSW 2000

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
UNE - TAMWORTH CENTRAL CAMPUS

Sheet Subject
B99 & MRV VEHICLES SWEPT PATH ANALYSIS

Scale : A1	Drawn	Authorised
1:200	AA	GC

Job No	Drawing No	Revision
221823	C004	P3

Plot File Created: Oct 23, 2024 - 1:34pm

Appendix B

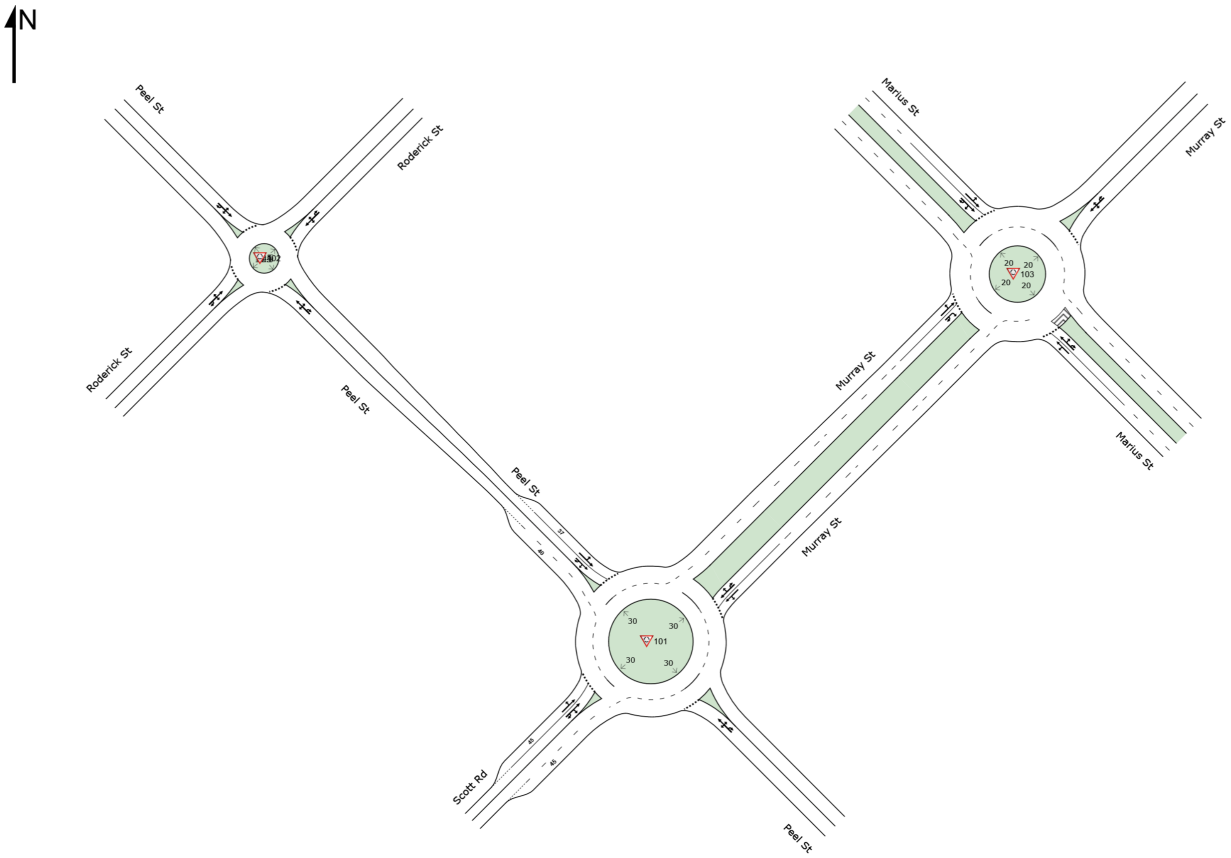
SIDRA Results

NETWORK LAYOUT

Network: N101 [Existing AM 8:00-9:00 (Network Folder: UNE Tamworth - Existing - AM)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Peel St & Murray St & Scott Rd - AM 8:00-9:00
102	NA	Peel St & Roderick St - AM 8:00-9:00
103	NA	Marius St & Murray St - AM 8:00-9:00

MOVEMENT SUMMARY

Site: 102 [Peel St & Roderick St - AM 8:00-9:00 (Site Folder: Existing-AM)]

Network: N101 [Existing AM 8:00-9:00 (Network Folder: UNE Tamworth - Existing - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	157	2.0	157	2.0	0.371	4.3	LOS A	0.8	5.8	0.33	0.51	0.33	37.9
22	T1	245	0.9	245	0.9	0.371	4.2	LOS A	0.8	5.8	0.33	0.51	0.33	42.4
23	R2	63	0.0	63	0.0	0.371	7.5	LOS A	0.8	5.8	0.33	0.51	0.33	42.0
23u	U	1	0.0	1	0.0	0.371	9.1	LOS A	0.8	5.8	0.33	0.51	0.33	35.1
Approach		466	1.1	466	1.1	0.371	4.7	LOS A	0.8	5.8	0.33	0.51	0.33	41.0
NorthEast: Roderick St														
24	L2	39	0.0	39	0.0	0.140	4.7	LOS A	0.3	1.9	0.38	0.55	0.38	36.7
25	T1	81	2.6	81	2.6	0.140	4.7	LOS A	0.3	1.9	0.38	0.55	0.38	40.6
26	R2	26	4.0	26	4.0	0.140	8.1	LOS A	0.3	1.9	0.38	0.55	0.38	42.3
26u	U	3	33.3	3	33.3	0.140	10.2	LOS A	0.3	1.9	0.38	0.55	0.38	42.3
Approach		149	2.8	149	2.8	0.140	5.4	LOS A	0.3	1.9	0.38	0.55	0.38	40.3
NorthWest: Peel St														
27	L2	28	0.0	28	0.0	0.149	4.6	LOS A	0.3	2.1	0.37	0.53	0.37	41.3
28	T1	112	6.6	112	6.6	0.149	4.6	LOS A	0.3	2.1	0.37	0.53	0.37	37.2
29	R2	15	7.1	15	7.1	0.149	7.9	LOS A	0.3	2.1	0.37	0.53	0.37	40.2
29u	U	6	0.0	6	0.0	0.149	9.4	LOS A	0.3	2.1	0.37	0.53	0.37	43.7
Approach		161	5.2	161	5.2	0.149	5.1	LOS A	0.3	2.1	0.37	0.53	0.37	38.9
SouthWest: Roderick St														
30	L2	14	7.7	14	7.7	0.156	5.5	LOS A	0.3	2.3	0.48	0.66	0.48	36.9
31	T1	41	7.7	41	7.7	0.156	5.4	LOS A	0.3	2.3	0.48	0.66	0.48	38.4
32	R2	88	8.3	88	8.3	0.156	8.8	LOS A	0.3	2.3	0.48	0.66	0.48	27.7
32u	U	5	0.0	5	0.0	0.156	10.1	LOS A	0.3	2.3	0.48	0.66	0.48	27.7
Approach		148	7.8	148	7.8	0.156	7.6	LOS A	0.3	2.3	0.48	0.66	0.48	33.0
All Vehicles		925	3.2	925	3.2	0.371	5.3	LOS A	0.8	5.8	0.37	0.54	0.37	39.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [Marius St & Murray St - AM 8:00-9:00 (Site Folder: Existing-AM)]

Network: N101 [Existing AM 8:00-9:00 (Network Folder: UNE Tamworth - Existing - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marius St														
21	L2	186	5.1	186	5.1	0.415	6.6	LOS A	1.3	9.4	0.68	0.66	0.68	38.9
22	T1	648	6.3	648	6.3	0.415	7.1	LOS A	1.3	9.4	0.69	0.68	0.69	44.7
23	R2	51	4.2	51	4.2	0.415	12.0	LOS A	1.2	9.0	0.70	0.71	0.70	45.8
23u	U	11	10.0	11	10.0	0.415	14.3	LOS A	1.2	9.0	0.70	0.71	0.70	46.6
Approach		896	6.0	896	6.0	0.415	7.3	LOS A	1.3	9.4	0.69	0.68	0.69	43.9
NorthEast: Murray St														
24	L2	33	3.2	33	3.2	0.290	5.6	LOS A	0.4	3.0	0.47	0.66	0.47	45.1
25	T1	156	1.4	156	1.4	0.290	5.8	LOS A	0.4	3.0	0.47	0.66	0.47	39.2
26	R2	82	1.3	82	1.3	0.290	10.4	LOS A	0.4	3.0	0.47	0.66	0.47	45.9
26u	U	1	0.0	1	0.0	0.290	12.5	LOS A	0.4	3.0	0.47	0.66	0.47	49.8
Approach		272	1.6	272	1.6	0.290	7.2	LOS A	0.4	3.0	0.47	0.66	0.47	42.6
NorthWest: Marius St														
27	L2	23	9.1	23	9.1	0.240	4.9	LOS A	0.5	3.9	0.56	0.54	0.56	42.1
28	T1	272	12.8	272	12.8	0.240	4.8	LOS A	0.5	3.9	0.56	0.58	0.56	43.2
29	R2	148	2.1	148	2.1	0.240	9.2	LOS A	0.5	3.6	0.56	0.70	0.56	31.9
29u	U	6	0.0	6	0.0	0.240	11.0	LOS A	0.5	3.6	0.56	0.70	0.56	42.6
Approach		449	8.9	449	8.9	0.240	6.3	LOS A	0.5	3.9	0.56	0.61	0.56	40.3
SouthWest: Murray St														
30	L2	302	2.4	302	2.4	0.608	9.7	LOS A	1.9	13.7	0.83	0.99	1.06	40.2
31	T1	197	0.0	197	0.0	0.608	9.7	LOS A	1.9	13.7	0.83	0.99	1.06	45.2
32	R2	171	9.9	171	9.9	0.346	14.6	LOS B	0.7	5.3	0.74	0.92	0.78	39.4
32u	U	6	0.0	6	0.0	0.346	16.1	LOS B	0.7	5.3	0.74	0.92	0.78	31.1
Approach		676	3.6	676	3.6	0.608	11.0	LOS A	1.9	13.7	0.81	0.97	0.98	41.2
All Vehicles		2293	5.3	2293	5.3	0.608	8.2	LOS A	1.9	13.7	0.67	0.75	0.72	42.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Peel St & Murray St & Scott Rd - AM 8:00-9:00 (Site Folder: Existing-AM)]

Network: N101 [Existing AM 8:00-9:00 (Network Folder: UNE Tamworth - Existing - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	32	3.3	32	3.3	0.086	4.7	LOS A	0.1	0.9	0.43	0.52	0.43	50.4
22	T1	37	2.9	37	2.9	0.086	3.6	LOS A	0.1	0.9	0.43	0.52	0.43	38.4
23	R2	14	7.7	14	7.7	0.086	9.0	LOS A	0.1	0.9	0.43	0.52	0.43	38.4
23u	U	1	0.0	1	0.0	0.086	10.9	LOS A	0.1	0.9	0.43	0.52	0.43	51.3
Approach		83	3.8	83	3.8	0.086	5.0	LOS A	0.1	0.9	0.43	0.52	0.43	45.5
NorthEast: Murray St														
24	L2	29	0.0	29	0.0	0.131	4.9	LOS A	0.3	1.9	0.42	0.49	0.42	46.5
25	T1	398	3.7	398	3.7	0.301	4.7	LOS A	0.7	5.4	0.42	0.49	0.42	54.0
26	R2	73	0.0	73	0.0	0.301	10.0	LOS A	0.7	5.4	0.42	0.49	0.42	41.0
26u	U	5	0.0	5	0.0	0.301	12.4	LOS A	0.7	5.4	0.42	0.49	0.42	41.0
Approach		505	2.9	505	2.9	0.301	5.6	LOS A	0.7	5.4	0.42	0.49	0.42	52.6
NorthWest: Peel St														
27	L2	46	9.1	46	9.1	0.082	6.8	LOS A	0.1	1.1	0.62	0.68	0.62	32.8
28	T1	45	4.7	45	4.7	0.181	4.4	LOS A	0.4	2.7	0.60	0.71	0.60	42.1
29	R2	131	3.2	131	3.2	0.181	9.9	LOS A	0.4	2.7	0.60	0.71	0.60	49.4
29u	U	1	0.0	1	0.0	0.181	11.8	LOS A	0.4	2.7	0.60	0.71	0.60	32.4
Approach		223	4.7	223	4.7	0.181	8.1	LOS A	0.4	2.7	0.61	0.70	0.61	46.5
SouthWest: Scott Rd														
30	L2	360	0.6	360	0.6	0.371	4.4	LOS A	1.0	6.9	0.35	0.45	0.35	51.3
31	T1	620	3.2	620	3.2	0.371	4.3	LOS A	1.0	6.9	0.36	0.44	0.36	50.8
32	R2	18	0.0	18	0.0	0.371	9.9	LOS A	1.0	6.9	0.37	0.44	0.37	54.5
32u	U	1	0.0	1	0.0	0.371	12.3	LOS A	1.0	6.9	0.37	0.44	0.37	58.2
Approach		999	2.2	999	2.2	0.371	4.4	LOS A	1.0	6.9	0.36	0.44	0.36	51.1
All Vehicles		1811	2.8	1811	2.8	0.371	5.2	LOS A	1.0	6.9	0.41	0.49	0.41	50.7

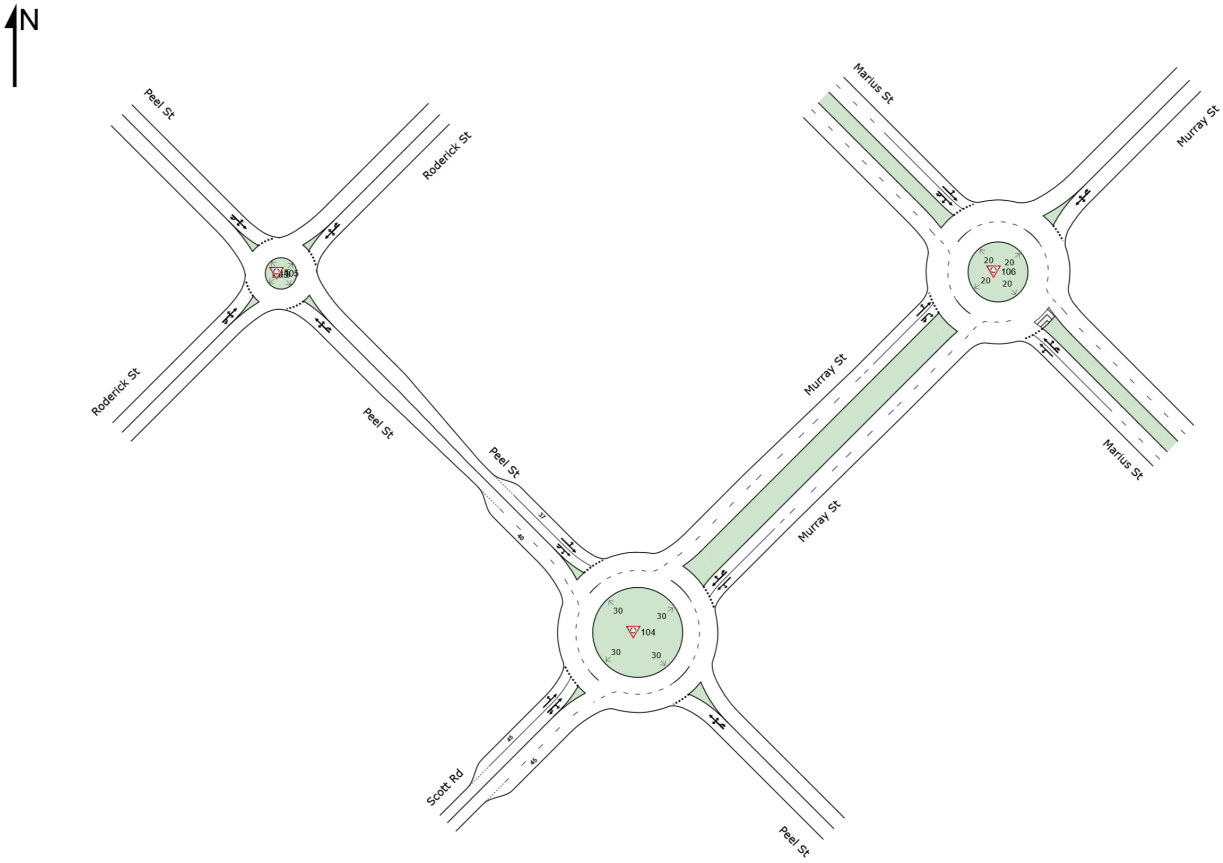
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK LAYOUT

Network: N101 [Existing PM 4:45-5:45 (Network Folder: UNE Tamworth - Existing - PM)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
104	NA	Peel St & Murray St & Scott Rd - PM 4:45-5:45
105	NA	Peel St & Roderick St - PM 4:45-5:45
106	NA	Marius St & Murray St - PM 4:45-5:45

MOVEMENT SUMMARY

Site: 105 [Peel St & Roderick St - PM 4:45-5:45 (Site Folder: Existing-PM)]

Network: N101 [Existing PM 4:45-5:45 (Network Folder: UNE Tamworth - Existing - PM)]

UNE Tamworth
27 July 2023 - PM Peak Period: 4:45-5:45
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	93	1.1	93	1.1	0.244	4.3	LOS A	0.5	3.6	0.32	0.50	0.32	38.1
22	T1	166	0.0	166	0.0	0.244	4.1	LOS A	0.5	3.6	0.32	0.50	0.32	42.6
23	R2	33	0.0	33	0.0	0.244	7.5	LOS A	0.5	3.6	0.32	0.50	0.32	42.1
23u	U	3	0.0	3	0.0	0.244	9.0	LOS A	0.5	3.6	0.32	0.50	0.32	35.3
Approach		295	0.4	295	0.4	0.244	4.6	LOS A	0.5	3.6	0.32	0.50	0.32	41.2
NorthEast: Roderick St														
24	L2	149	1.4	149	1.4	0.334	7.4	LOS A	0.8	5.8	0.70	0.79	0.70	33.4
25	T1	76	1.4	76	1.4	0.334	7.4	LOS A	0.8	5.8	0.70	0.79	0.70	37.9
26	R2	39	0.0	39	0.0	0.334	10.7	LOS A	0.8	5.8	0.70	0.79	0.70	40.1
26u	U	2	0.0	2	0.0	0.334	12.2	LOS A	0.8	5.8	0.70	0.79	0.70	41.0
Approach		266	1.2	266	1.2	0.334	7.9	LOS A	0.8	5.8	0.70	0.79	0.70	36.3
NorthWest: Peel St														
27	L2	88	1.2	88	1.2	0.464	6.1	LOS A	1.2	8.6	0.63	0.69	0.63	40.1
28	T1	340	0.0	340	0.0	0.464	6.0	LOS A	1.2	8.6	0.63	0.69	0.63	35.4
29	R2	9	0.0	9	0.0	0.464	9.3	LOS A	1.2	8.6	0.63	0.69	0.63	39.3
29u	U	13	0.0	13	0.0	0.464	10.9	LOS A	1.2	8.6	0.63	0.69	0.63	42.4
Approach		451	0.2	451	0.2	0.464	6.2	LOS A	1.2	8.6	0.63	0.69	0.63	37.1
SouthWest: Roderick St														
30	L2	25	0.0	25	0.0	0.338	5.1	LOS A	0.8	5.5	0.47	0.65	0.47	37.2
31	T1	96	0.0	96	0.0	0.338	5.0	LOS A	0.8	5.5	0.47	0.65	0.47	38.7
32	R2	240	0.9	240	0.9	0.338	8.4	LOS A	0.8	5.5	0.47	0.65	0.47	27.9
32u	U	3	0.0	3	0.0	0.338	9.9	LOS A	0.8	5.5	0.47	0.65	0.47	23.4
Approach		364	0.6	364	0.6	0.338	7.3	LOS A	0.8	5.5	0.47	0.65	0.47	32.8
All Vehicles		1376	0.5	1376	0.5	0.464	6.5	LOS A	1.2	8.6	0.54	0.66	0.54	37.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [Peel St & Murray St & Scott Rd - PM 4:45-5:45 (Site Folder: Existing-PM)]

Network: N101 [Existing PM 4:45-5:45 (Network Folder: UNE Tamworth - Existing - PM)]

UNE Tamworth
27 July 2023 - PM Peak Period: 4:45-5:45
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	75	0.0	75	0.0	0.216	8.0	LOS A	0.4	2.9	0.65	0.73	0.65	49.1
22	T1	59	0.0	59	0.0	0.216	5.4	LOS A	0.4	2.9	0.65	0.73	0.65	36.0
23	R2	31	0.0	31	0.0	0.216	10.8	LOS A	0.4	2.9	0.65	0.73	0.65	36.0
23u	U	1	0.0	1	0.0	0.216	12.8	LOS A	0.4	2.9	0.65	0.73	0.65	48.9
Approach		165	0.0	165	0.0	0.216	7.6	LOS A	0.4	2.9	0.65	0.73	0.65	44.5
NorthEast: Murray St														
24	L2	35	0.0	35	0.0	0.194	7.1	LOS A	0.4	2.9	0.64	0.71	0.64	44.5
25	T1	471	2.5	471	2.5	0.446	6.8	LOS A	1.2	8.7	0.70	0.66	0.71	52.3
26	R2	53	0.0	53	0.0	0.446	11.7	LOS A	1.2	8.7	0.72	0.64	0.72	38.1
26u	U	11	0.0	11	0.0	0.446	14.1	LOS A	1.2	8.7	0.72	0.64	0.72	38.1
Approach		568	2.0	568	2.0	0.446	7.4	LOS A	1.2	8.7	0.70	0.66	0.71	51.1
NorthWest: Peel St														
27	L2	193	1.1	193	1.1	0.249	5.4	LOS A	0.5	3.5	0.60	0.67	0.60	35.3
28	T1	51	0.0	51	0.0	0.451	4.3	LOS A	1.1	7.9	0.64	0.76	0.65	41.0
29	R2	438	0.5	438	0.5	0.451	9.8	LOS A	1.1	7.9	0.64	0.76	0.65	48.6
29u	U	1	0.0	1	0.0	0.451	11.8	LOS A	1.1	7.9	0.64	0.76	0.65	31.3
Approach		682	0.6	682	0.6	0.451	8.2	LOS A	1.1	7.9	0.63	0.73	0.63	46.4
SouthWest: Scott Rd														
30	L2	202	0.5	202	0.5	0.254	4.3	LOS A	0.6	4.3	0.35	0.45	0.35	51.2
31	T1	413	3.6	413	3.6	0.254	4.3	LOS A	0.6	4.3	0.36	0.46	0.36	50.5
32	R2	40	0.0	40	0.0	0.254	10.0	LOS A	0.6	4.3	0.37	0.46	0.37	54.1
32u	U	1	0.0	1	0.0	0.254	12.3	LOS A	0.6	4.3	0.37	0.46	0.37	57.9
Approach		656	2.4	656	2.4	0.254	4.7	LOS A	0.6	4.3	0.36	0.46	0.36	51.0
All Vehicles		2072	1.5	2072	1.5	0.451	6.8	LOS A	1.2	8.7	0.57	0.62	0.57	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 106 [Marius St & Murray St - PM 4:45-5:45 (Site Folder: Existing-PM)]

Network: N101 [Existing PM 4:45-5:45 (Network Folder: UNE Tamworth - Existing - PM)]

UNE Tamworth
27 July 2023 - PM Peak Period: 4:45-5:45
Site Category: Existing Design
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marius St														
21	L2	141	7.5	141	7.5	0.264	6.7	LOS A	0.7	5.6	0.66	0.66	0.66	39.1
22	T1	351	11.4	351	11.4	0.264	7.3	LOS A	0.7	5.6	0.67	0.68	0.67	44.8
23	R2	22	0.0	22	0.0	0.264	11.9	LOS A	0.7	5.3	0.68	0.70	0.68	46.7
23u	U	6	0.0	6	0.0	0.264	14.0	LOS A	0.7	5.3	0.68	0.70	0.68	48.5
Approach		520	9.7	520	9.7	0.264	7.4	LOS A	0.7	5.6	0.67	0.68	0.67	43.8
NorthEast: Murray St														
24	L2	24	0.0	24	0.0	0.266	6.2	LOS A	0.5	3.3	0.67	0.79	0.67	43.9
25	T1	112	0.9	112	0.9	0.266	7.5	LOS A	0.5	3.3	0.67	0.79	0.67	36.9
26	R2	46	0.0	46	0.0	0.266	12.1	LOS A	0.5	3.3	0.67	0.79	0.67	44.1
26u	U	1	0.0	1	0.0	0.266	14.3	LOS A	0.5	3.3	0.67	0.79	0.67	47.8
Approach		183	0.6	183	0.6	0.266	8.6	LOS A	0.5	3.3	0.67	0.79	0.67	40.3
NorthWest: Marius St														
27	L2	35	0.0	35	0.0	0.431	6.2	LOS A	1.1	7.7	0.72	0.71	0.77	42.2
28	T1	433	3.6	433	3.6	0.431	6.2	LOS A	1.1	7.7	0.72	0.75	0.77	43.2
29	R2	227	0.0	227	0.0	0.431	11.1	LOS A	1.0	7.3	0.73	0.89	0.79	29.9
29u	U	17	0.0	17	0.0	0.431	12.9	LOS A	1.0	7.3	0.73	0.89	0.79	40.6
Approach		712	2.2	712	2.2	0.431	7.9	LOS A	1.1	7.7	0.72	0.79	0.78	39.7
SouthWest: Murray St														
30	L2	215	0.5	215	0.5	0.458	6.8	LOS A	1.1	8.1	0.67	0.73	0.69	42.8
31	T1	205	0.5	205	0.5	0.458	6.9	LOS A	1.1	8.1	0.67	0.73	0.69	48.0
32	R2	391	4.3	391	4.3	0.459	11.3	LOS A	1.2	8.4	0.66	0.81	0.67	42.6
32u	U	63	0.0	63	0.0	0.459	13.2	LOS A	1.2	8.4	0.66	0.81	0.67	34.0
Approach		874	2.2	874	2.2	0.459	9.3	LOS A	1.2	8.4	0.66	0.77	0.68	43.3
All Vehicles		2288	3.8	2288	3.8	0.459	8.4	LOS A	1.2	8.4	0.68	0.76	0.71	42.1

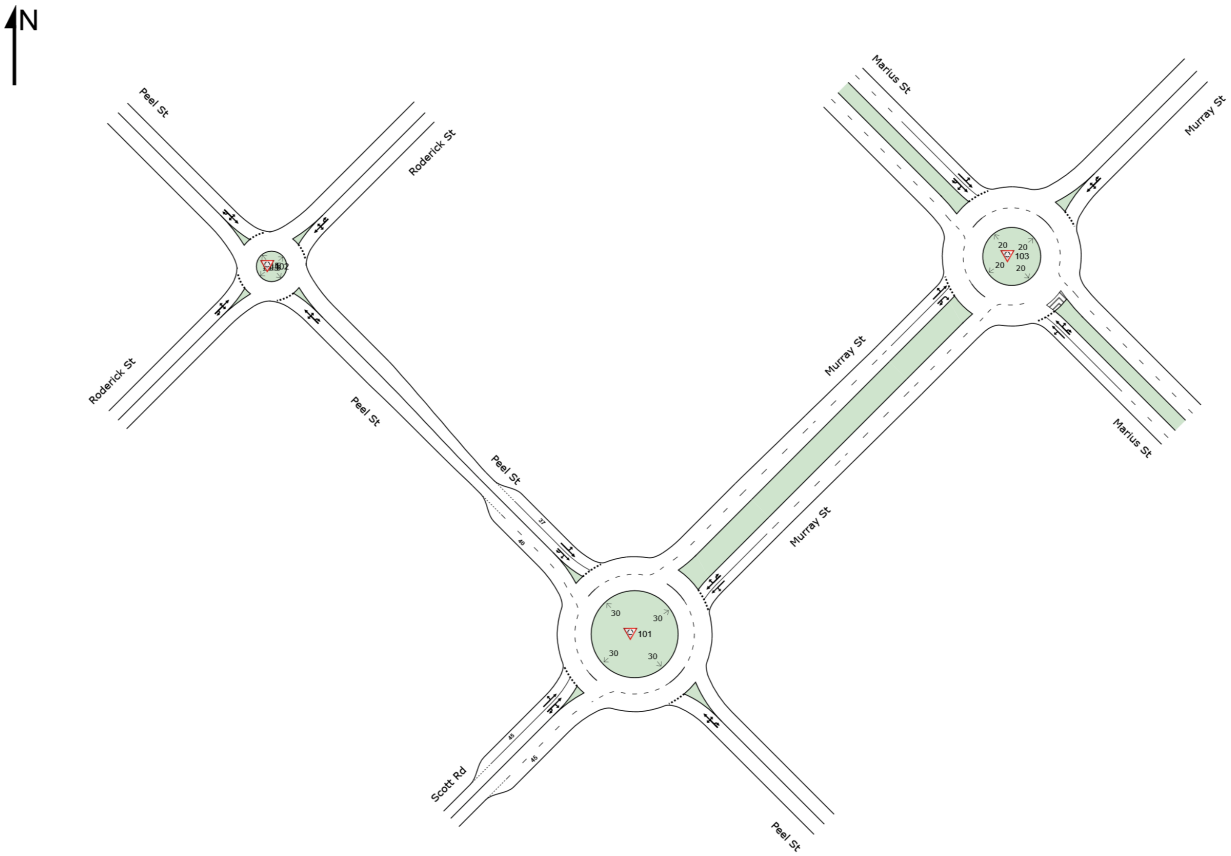
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK LAYOUT

Network: N101 [Proposed AM 8:00-9:00 (Network Folder: UNE Tamworth - Proposed - AM)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Peel St & Murray St & Scott Rd - AM 8:00-9:00
102	NA	Peel St & Roderick St - AM 8:00-9:00
103	NA	Marius St & Murray St - AM 8:00-9:00

MOVEMENT SUMMARY

Site: 101 [Peel St & Murray St & Scott Rd - AM 8:00-9:00 (Site Folder: Proposed-AM)]

Network: N101 [Proposed AM 8:00-9:00 (Network Folder: UNE Tamworth - Proposed - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	32	3.3	32	3.3	0.087	4.8	LOS A	0.1	0.9	0.44	0.53	0.44	50.3
22	T1	37	2.9	37	2.9	0.087	3.8	LOS A	0.1	0.9	0.44	0.53	0.44	38.3
23	R2	14	7.7	14	7.7	0.087	9.1	LOS A	0.1	0.9	0.44	0.53	0.44	38.3
23u	U	1	0.0	1	0.0	0.087	11.0	LOS A	0.1	0.9	0.44	0.53	0.44	51.2
Approach		83	3.8	83	3.8	0.087	5.1	LOS A	0.1	0.9	0.44	0.53	0.44	45.4
NorthEast: Murray St														
24	L2	29	0.0	29	0.0	0.138	4.9	LOS A	0.3	2.0	0.42	0.49	0.42	46.5
25	T1	398	3.7	398	3.7	0.316	4.8	LOS A	0.8	5.7	0.43	0.50	0.43	53.8
26	R2	99	0.0	99	0.0	0.316	10.0	LOS A	0.8	5.7	0.43	0.51	0.43	40.6
26u	U	5	0.0	5	0.0	0.316	12.4	LOS A	0.8	5.7	0.43	0.51	0.43	40.6
Approach		532	2.8	532	2.8	0.316	5.8	LOS A	0.8	5.7	0.43	0.50	0.43	52.1
NorthWest: Peel St														
27	L2	46	9.1	46	9.1	0.082	6.8	LOS A	0.1	1.1	0.62	0.69	0.62	32.7
28	T1	45	4.7	45	4.7	0.183	4.5	LOS A	0.4	2.8	0.61	0.71	0.61	42.0
29	R2	131	3.2	131	3.2	0.183	9.9	LOS A	0.4	2.8	0.61	0.71	0.61	49.4
29u	U	1	0.0	1	0.0	0.183	11.8	LOS A	0.4	2.8	0.61	0.71	0.61	32.3
Approach		223	4.7	223	4.7	0.183	8.2	LOS A	0.4	2.8	0.61	0.70	0.61	46.4
SouthWest: Scott Rd														
30	L2	385	0.5	385	0.5	0.390	4.6	LOS A	1.1	7.4	0.39	0.47	0.39	51.0
31	T1	620	3.2	620	3.2	0.390	4.5	LOS A	1.1	7.4	0.41	0.46	0.41	50.4
32	R2	18	0.0	18	0.0	0.390	10.1	LOS A	1.0	7.5	0.41	0.45	0.41	54.2
32u	U	1	0.0	1	0.0	0.390	12.5	LOS A	1.0	7.5	0.41	0.45	0.41	58.0
Approach		1024	2.2	1024	2.2	0.390	4.6	LOS A	1.1	7.5	0.40	0.46	0.40	50.7
All Vehicles		1862	2.7	1862	2.7	0.390	5.4	LOS A	1.1	7.5	0.44	0.51	0.44	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [Peel St & Roderick St - AM 8:00-9:00 (Site Folder: Proposed-AM)]

Network: N101 [Proposed AM 8:00-9:00 (Network Folder: UNE Tamworth - Proposed - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	157	2.0	157	2.0	0.371	4.3	LOS A	0.8	5.9	0.33	0.51	0.33	37.9
22	T1	245	0.9	245	0.9	0.371	4.2	LOS A	0.8	5.9	0.33	0.51	0.33	42.4
23	R2	63	0.0	63	0.0	0.371	7.5	LOS A	0.8	5.9	0.33	0.51	0.33	42.0
23u	U	1	0.0	1	0.0	0.371	9.1	LOS A	0.8	5.9	0.33	0.51	0.33	35.1
Approach		466	1.1	466	1.1	0.371	4.7	LOS A	0.8	5.9	0.33	0.51	0.33	41.0
NorthEast: Roderick St														
24	L2	39	0.0	39	0.0	0.142	4.8	LOS A	0.3	2.0	0.41	0.56	0.41	36.5
25	T1	81	2.6	81	2.6	0.142	4.8	LOS A	0.3	2.0	0.41	0.56	0.41	40.5
26	R2	26	4.0	26	4.0	0.142	8.2	LOS A	0.3	2.0	0.41	0.56	0.41	42.1
26u	U	3	33.3	3	33.3	0.142	10.4	LOS A	0.3	2.0	0.41	0.56	0.41	42.2
Approach		149	2.8	149	2.8	0.142	5.5	LOS A	0.3	2.0	0.41	0.56	0.41	40.1
NorthWest: Peel St														
27	L2	28	0.0	28	0.0	0.173	4.6	LOS A	0.3	2.5	0.37	0.52	0.37	41.3
28	T1	138	5.3	138	5.3	0.173	4.6	LOS A	0.3	2.5	0.37	0.52	0.37	37.2
29	R2	15	7.1	15	7.1	0.173	8.0	LOS A	0.3	2.5	0.37	0.52	0.37	40.2
29u	U	6	0.0	6	0.0	0.173	9.4	LOS A	0.3	2.5	0.37	0.52	0.37	43.7
Approach		187	4.5	187	4.5	0.173	5.0	LOS A	0.3	2.5	0.37	0.52	0.37	38.7
SouthWest: Roderick St														
30	L2	14	7.7	14	7.7	0.156	5.5	LOS A	0.3	2.3	0.48	0.66	0.48	36.9
31	T1	41	7.7	41	7.7	0.156	5.4	LOS A	0.3	2.3	0.48	0.66	0.48	38.4
32	R2	88	8.3	88	8.3	0.156	8.8	LOS A	0.3	2.3	0.48	0.66	0.48	27.7
32u	U	5	0.0	5	0.0	0.156	10.1	LOS A	0.3	2.3	0.48	0.66	0.48	27.7
Approach		148	7.8	148	7.8	0.156	7.6	LOS A	0.3	2.3	0.48	0.66	0.48	33.0
All Vehicles		952	3.1	952	3.1	0.371	5.3	LOS A	0.8	5.9	0.37	0.55	0.37	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [Marius St & Murray St - AM 8:00-9:00 (Site Folder: Proposed-AM)]

Network: N101 [Proposed AM 8:00-9:00 (Network Folder: UNE Tamworth - Proposed - AM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marius St														
21	L2	186	5.1	186	5.1	0.424	6.8	LOS A	1.3	9.7	0.69	0.68	0.69	38.7
22	T1	648	6.3	648	6.3	0.424	7.3	LOS A	1.3	9.7	0.71	0.70	0.71	44.6
23	R2	51	4.2	51	4.2	0.424	12.2	LOS A	1.2	9.2	0.72	0.73	0.72	45.7
23u	U	11	10.0	11	10.0	0.424	14.6	LOS B	1.2	9.2	0.72	0.73	0.72	46.4
Approach		896	6.0	896	6.0	0.424	7.5	LOS A	1.3	9.7	0.71	0.70	0.71	43.8
NorthEast: Murray St														
24	L2	33	3.2	33	3.2	0.294	5.7	LOS A	0.4	3.1	0.49	0.67	0.49	45.0
25	T1	156	1.4	156	1.4	0.294	5.8	LOS A	0.4	3.1	0.49	0.67	0.49	39.1
26	R2	82	1.3	82	1.3	0.294	10.5	LOS A	0.4	3.1	0.49	0.67	0.49	45.7
26u	U	1	0.0	1	0.0	0.294	12.6	LOS A	0.4	3.1	0.49	0.67	0.49	49.7
Approach		272	1.6	272	1.6	0.294	7.3	LOS A	0.4	3.1	0.49	0.67	0.49	42.5
NorthWest: Marius St														
27	L2	23	9.1	23	9.1	0.253	4.9	LOS A	0.5	4.1	0.57	0.54	0.57	42.0
28	T1	272	12.8	272	12.8	0.253	4.8	LOS A	0.5	4.1	0.57	0.57	0.57	43.3
29	R2	175	1.8	175	1.8	0.253	9.2	LOS A	0.5	3.8	0.57	0.71	0.57	31.6
29u	U	6	0.0	6	0.0	0.253	11.1	LOS A	0.5	3.8	0.57	0.71	0.57	42.2
Approach		476	8.4	476	8.4	0.253	6.5	LOS A	0.5	4.1	0.57	0.62	0.57	39.8
SouthWest: Murray St														
30	L2	302	2.4	302	2.4	0.610	9.7	LOS A	1.9	13.8	0.84	0.99	1.06	40.1
31	T1	197	0.0	197	0.0	0.610	9.7	LOS A	1.9	13.8	0.84	0.99	1.06	45.2
32	R2	171	9.9	171	9.9	0.347	14.6	LOS B	0.7	5.3	0.74	0.93	0.78	39.3
32u	U	6	0.0	6	0.0	0.347	16.2	LOS B	0.7	5.3	0.74	0.93	0.78	31.0
Approach		676	3.6	676	3.6	0.610	11.0	LOS A	1.9	13.8	0.81	0.98	0.99	41.2
All Vehicles		2319	5.3	2319	5.3	0.610	8.3	LOS A	1.9	13.8	0.68	0.76	0.73	42.0

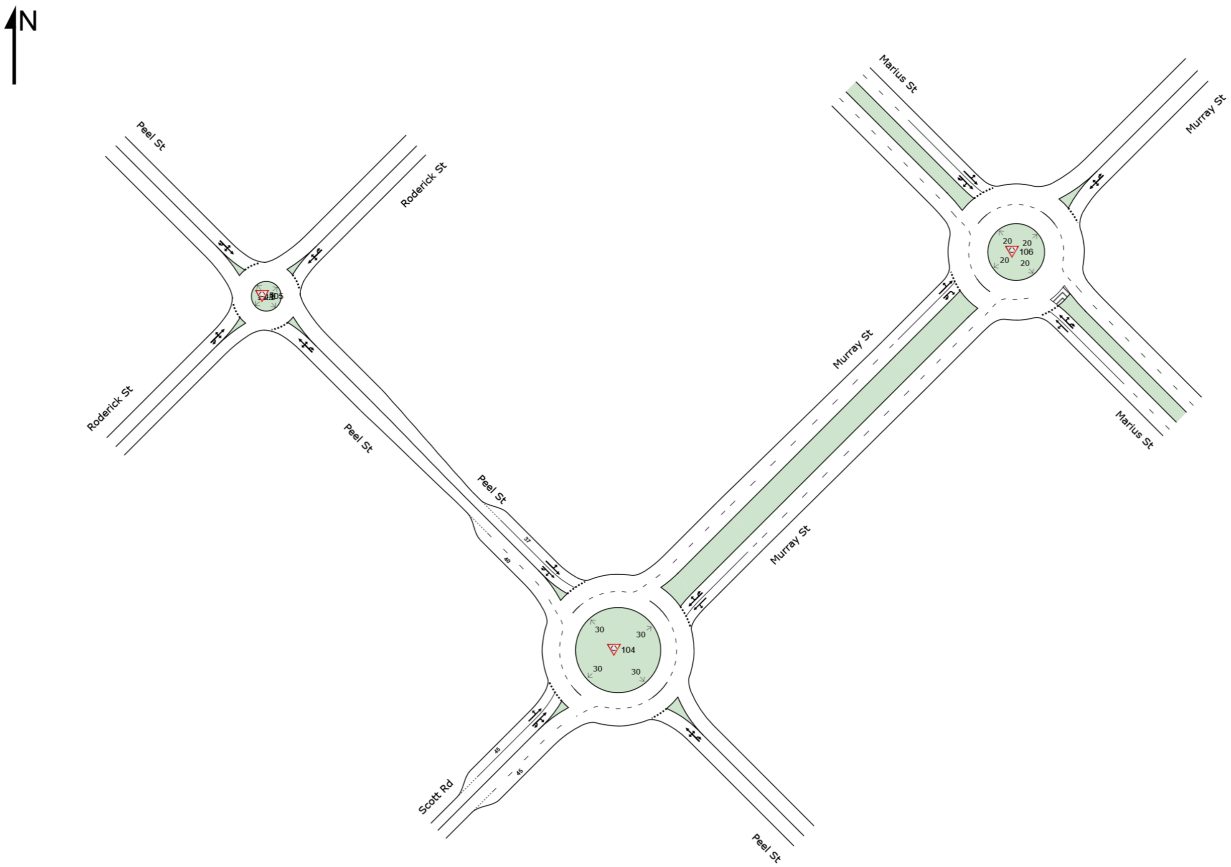
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

NETWORK LAYOUT

Network: N101 [Proposed PM 4:45-5:45 (Network Folder: UNE Tamworth - Proposed - PM)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
104	NA	Peel St & Murray St & Scott Rd - PM 4:45-5:45
105	NA	Peel St & Roderick St - PM 4:45-5:45
106	NA	Marius St & Murray St - PM 4:45-5:45

MOVEMENT SUMMARY

Site: 104 [Peel St & Murray St & Scott Rd - PM 4:45-5:45 (Site Folder: Proposed-PM)]

Network: N101 [Proposed PM 4:45-5:45 (Network Folder: UNE Tamworth - Proposed - PM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	75	0.0	75	0.0	0.221	8.3	LOS A	0.4	3.0	0.66	0.74	0.66	48.9
22	T1	59	0.0	59	0.0	0.221	5.6	LOS A	0.4	3.0	0.66	0.74	0.66	35.7
23	R2	31	0.0	31	0.0	0.221	11.0	LOS A	0.4	3.0	0.66	0.74	0.66	35.7
23u	U	1	0.0	1	0.0	0.221	13.0	LOS A	0.4	3.0	0.66	0.74	0.66	48.7
Approach		165	0.0	165	0.0	0.221	7.9	LOS A	0.4	3.0	0.66	0.74	0.66	44.3
NorthEast: Murray St														
24	L2	35	0.0	35	0.0	0.199	7.3	LOS A	0.4	3.0	0.66	0.73	0.66	44.4
25	T1	471	2.5	471	2.5	0.456	7.1	LOS A	1.3	9.2	0.72	0.68	0.74	52.1
26	R2	53	0.0	53	0.0	0.456	12.0	LOS A	1.3	9.2	0.74	0.67	0.76	37.9
26u	U	11	0.0	11	0.0	0.456	14.4	LOS A	1.3	9.2	0.74	0.67	0.76	37.9
Approach		568	2.0	568	2.0	0.456	7.7	LOS A	1.3	9.2	0.72	0.68	0.74	51.0
NorthWest: Peel St														
27	L2	219	1.0	219	1.0	0.275	5.4	LOS A	0.6	3.9	0.60	0.68	0.60	35.3
28	T1	51	0.0	51	0.0	0.474	4.5	LOS A	1.2	8.7	0.66	0.78	0.68	40.9
29	R2	463	0.5	463	0.5	0.474	10.0	LOS A	1.2	8.7	0.66	0.78	0.68	48.5
29u	U	1	0.0	1	0.0	0.474	12.0	LOS A	1.2	8.7	0.66	0.78	0.68	31.2
Approach		734	0.6	734	0.6	0.474	8.2	LOS A	1.2	8.7	0.64	0.75	0.66	46.3
SouthWest: Scott Rd														
30	L2	202	0.5	202	0.5	0.255	4.3	LOS A	0.6	4.3	0.35	0.45	0.35	51.2
31	T1	413	3.6	413	3.6	0.255	4.3	LOS A	0.6	4.3	0.36	0.46	0.36	50.5
32	R2	40	0.0	40	0.0	0.255	10.0	LOS A	0.6	4.3	0.37	0.46	0.37	54.1
32u	U	1	0.0	1	0.0	0.255	12.3	LOS A	0.6	4.3	0.37	0.46	0.37	57.9
Approach		656	2.4	656	2.4	0.255	4.7	LOS A	0.6	4.3	0.36	0.46	0.36	51.0
All Vehicles		2123	1.5	2123	1.5	0.474	6.9	LOS A	1.3	9.2	0.58	0.64	0.59	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 105 [Peel St & Roderick St - PM 4:45-5:45 (Site Folder: Proposed-PM)]

Network: N101 [Proposed PM 4:45-5:45 (Network Folder: UNE Tamworth - Proposed - PM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Peel St														
21	L2	93	1.1	93	1.1	0.264	4.3	LOS A	0.6	4.0	0.32	0.50	0.32	38.1
22	T1	193	0.0	193	0.0	0.264	4.1	LOS A	0.6	4.0	0.32	0.50	0.32	42.6
23	R2	33	0.0	33	0.0	0.264	7.5	LOS A	0.6	4.0	0.32	0.50	0.32	42.1
23u	U	3	0.0	3	0.0	0.264	9.0	LOS A	0.6	4.0	0.32	0.50	0.32	35.3
Approach		321	0.3	321	0.3	0.264	4.6	LOS A	0.6	4.0	0.32	0.50	0.32	41.4
NorthEast: Roderick St														
24	L2	149	1.4	149	1.4	0.336	7.4	LOS A	0.8	5.8	0.70	0.79	0.70	33.4
25	T1	76	1.4	76	1.4	0.336	7.4	LOS A	0.8	5.8	0.70	0.79	0.70	37.9
26	R2	39	0.0	39	0.0	0.336	10.7	LOS A	0.8	5.8	0.70	0.79	0.70	40.1
26u	U	2	0.0	2	0.0	0.336	12.2	LOS A	0.8	5.8	0.70	0.79	0.70	41.0
Approach		266	1.2	266	1.2	0.336	7.9	LOS A	0.8	5.8	0.70	0.79	0.70	36.3
NorthWest: Peel St														
27	L2	88	1.2	88	1.2	0.466	6.1	LOS A	1.2	8.6	0.64	0.69	0.64	40.1
28	T1	340	0.0	340	0.0	0.466	6.0	LOS A	1.2	8.6	0.64	0.69	0.64	35.4
29	R2	9	0.0	9	0.0	0.466	9.3	LOS A	1.2	8.6	0.64	0.69	0.64	39.3
29u	U	13	0.0	13	0.0	0.466	10.9	LOS A	1.2	8.6	0.64	0.69	0.64	42.4
Approach		451	0.2	451	0.2	0.466	6.2	LOS A	1.2	8.6	0.64	0.69	0.64	37.1
SouthWest: Roderick St														
30	L2	25	0.0	25	0.0	0.347	5.2	LOS A	0.8	5.7	0.50	0.67	0.50	37.1
31	T1	96	0.0	96	0.0	0.347	5.2	LOS A	0.8	5.7	0.50	0.67	0.50	38.6
32	R2	240	0.9	240	0.9	0.347	8.5	LOS A	0.8	5.7	0.50	0.67	0.50	27.7
32u	U	3	0.0	3	0.0	0.347	10.1	LOS A	0.8	5.7	0.50	0.67	0.50	23.4
Approach		364	0.6	364	0.6	0.347	7.4	LOS A	0.8	5.7	0.50	0.67	0.50	32.7
All Vehicles		1402	0.5	1402	0.5	0.466	6.5	LOS A	1.2	8.6	0.54	0.66	0.54	37.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 106 [Marius St & Murray St - PM 4:45-5:45 (Site Folder: Proposed-PM)]

Network: N101 [Proposed PM 4:45-5:45 (Network Folder: UNE Tamworth - Proposed - PM)]

UNE Tamworth
27 July 2023 - AM Peak Period: 8:00-9:00
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Marius St														
21	L2	141	7.5	141	7.5	0.264	6.7	LOS A	0.7	5.6	0.66	0.66	0.66	39.1
22	T1	351	11.4	351	11.4	0.264	7.3	LOS A	0.7	5.6	0.67	0.68	0.67	44.8
23	R2	22	0.0	22	0.0	0.264	11.9	LOS A	0.7	5.3	0.68	0.70	0.68	46.7
23u	U	6	0.0	6	0.0	0.264	14.0	LOS A	0.7	5.3	0.68	0.70	0.68	48.5
Approach		520	9.7	520	9.7	0.264	7.4	LOS A	0.7	5.6	0.67	0.68	0.67	43.8
NorthEast: Murray St														
24	L2	24	0.0	24	0.0	0.266	6.2	LOS A	0.5	3.3	0.67	0.79	0.67	43.9
25	T1	112	0.9	112	0.9	0.266	7.5	LOS A	0.5	3.3	0.67	0.79	0.67	36.9
26	R2	46	0.0	46	0.0	0.266	12.1	LOS A	0.5	3.3	0.67	0.79	0.67	44.1
26u	U	1	0.0	1	0.0	0.266	14.3	LOS A	0.5	3.3	0.67	0.79	0.67	47.8
Approach		183	0.6	183	0.6	0.266	8.6	LOS A	0.5	3.3	0.67	0.79	0.67	40.3
NorthWest: Marius St														
27	L2	35	0.0	35	0.0	0.431	6.2	LOS A	1.1	7.7	0.72	0.71	0.77	42.2
28	T1	433	3.6	433	3.6	0.431	6.2	LOS A	1.1	7.7	0.72	0.75	0.77	43.2
29	R2	227	0.0	227	0.0	0.431	11.1	LOS A	1.0	7.4	0.73	0.89	0.79	29.9
29u	U	17	0.0	17	0.0	0.431	13.0	LOS A	1.0	7.4	0.73	0.89	0.79	40.6
Approach		712	2.2	712	2.2	0.431	7.9	LOS A	1.1	7.7	0.72	0.79	0.78	39.7
SouthWest: Murray St														
30	L2	241	0.4	241	0.4	0.481	6.9	LOS A	1.3	8.9	0.68	0.74	0.71	42.8
31	T1	205	0.5	205	0.5	0.481	7.0	LOS A	1.3	8.9	0.68	0.74	0.71	48.0
32	R2	391	4.3	391	4.3	0.459	11.3	LOS A	1.2	8.4	0.66	0.81	0.67	42.6
32u	U	63	0.0	63	0.0	0.459	13.2	LOS A	1.2	8.4	0.66	0.81	0.67	34.0
Approach		900	2.1	900	2.1	0.481	9.3	LOS A	1.3	8.9	0.67	0.78	0.69	43.3
All Vehicles		2315	3.7	2315	3.7	0.481	8.4	LOS A	1.3	8.9	0.69	0.76	0.71	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix C

Green Travel Plan

Structural
Civil
Traffic
Façade

Green Travel Plan

UNE Tamworth Central Campus

Prepared for Architectus / 22 October 2024

221823

TTW (NSW) PTY LTD (ACN 649 974 112)
(ABN 74 649 974 112) I Consulting Engineers
Level 6, 73 Miller Street, North Sydney NSW 2060

Your Partner in Engineering

Contents

Revision Register

Rev	Date	Prepared By	Approved By	Remarks
0	16/10/2024	AA	GC	For review
1	21/10/2024	AA	GC	Final

1.0 Introduction

1.1 Background

This Green Travel Plan (GTP) aims to reduce the environmental impact of travel to and from the proposed development of the University of New England (UNE) located at 545 Peel Street, Tamworth. This includes encouraging alternate travel methods such as active transport, public transport, and car-pooling while reducing dependence on private vehicles. This Plan contains objectives and mode share targets for the development and management strategies intended to fulfil these.

This GTP forms part of the response to the Planning Panel's request for a Revised Traffic and Parking Analysis Strategy, dated 20 September 2024.

The project includes the construction of a contemporary four-storey educational building located adjacent to Roderick Street. Additionally, a car park with access from Peel Street, cultural grounds, and complementary landscaping will be established.

1.2 Objectives

A GTP is a way to sustainably manage the transport needs of a site, and to provide a clear plan of management for vehicle and pedestrian movements within and around the site.

This plan provides a review of existing facilities and travel habits, and overarching principles and objectives relating to sustainable travel. The plan details specific programs and actions that are proposed for UNE Tamworth Central Campus, which will assist in achieving sustainable travel outcomes. The document is intended to be dynamic and respond to employees, students and visitors behaviours once the buildings are operational.

1.3 Benefits

The aim of this Plan is to encourage active and sustainable travel behaviours. Environmental and social benefits commonly result from Green Travel Plans. These may include:

- Reducing congestion and pollution in the local area;
- Reducing greenhouse gas emissions;
- Reducing costs associated with car parking, fleet maintenance and travel;
- Reducing journey times;
- Increasing physical activity, leading to greater productivity and improved health and wellbeing;
- Increasing accessibility to a site; and
- Improving corporate image.

2.0 Site-Specific Transport Assessment

2.1 Site Location

The proposed campus location is at 545 Peel Street, Tamworth at the corner of Roderick and Peel Streets. The site is situated within the local government area of Tamworth Regional Council, in the northeast region of New South Wales.

Within the vicinity of the proposed site, Peel Street is aligned north-west to south-east, connecting with Roderick Street to the north-west and Scott Road to the south-east. Peel River is adjacent to the site from the south-west direction.

The site is surrounded predominantly by a mix of low-density residential properties and industrial premises to the north-east, agricultural land and Calala Creek to the south of the site. The Campus is approximately 20-minutes' walk from Tamworth train station and a 7 minutes' drive to Tamworth Hospital.

The site location and surrounding environs are shown in Figure ***2.1***.

Figure 2.1: Site Location within Local Context

2.2 Active Transport

2.2.1 Pedestrian and Cycling Facilities

Active transportation options near the site are limited to pathways on Roderick and Peel streets, as well as a shared route on Scott Road. Off-road cycling via a shared path is available along Scott Road.

Figure 2.2 identifies cycling routes map in the Tamworth within the vicinity of site.

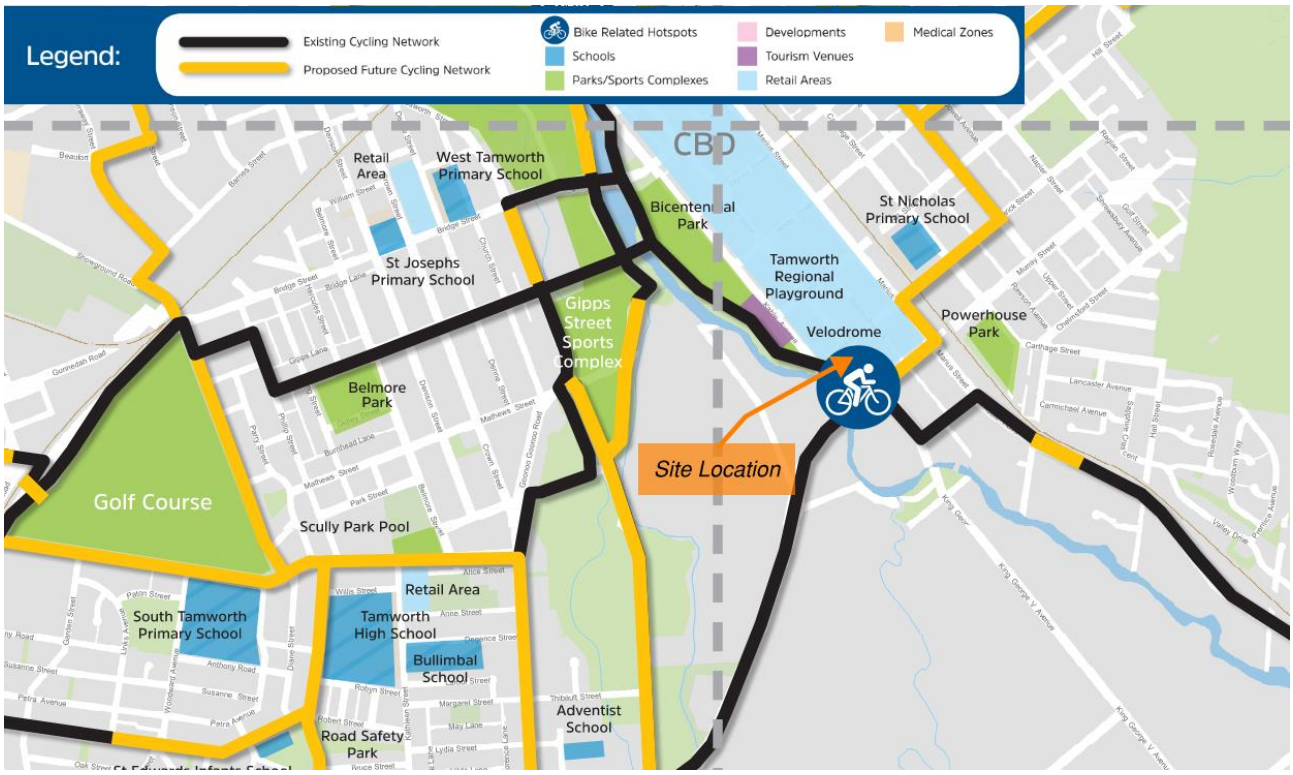


Figure 2.2: Existing and Proposed Cycling Infrastructure within Vicinity of the Site

Source: Tamworth Regional Council

2.3 Public Transport

There are 9 public bus routes operating in Tamworth as shown in the network map in Figure ***2.3***. These buses are operated by Tamworth Buslines Service. At the Marius Street bus stop, which is close to the Campus's main entrance, the bus route 430 stops every 2 hours throughout the week, Saturdays from 9am to 4pm only, and no scheduled trips on Sundays and public holidays. The bus routes and their frequencies are detailed in Table 2.1.

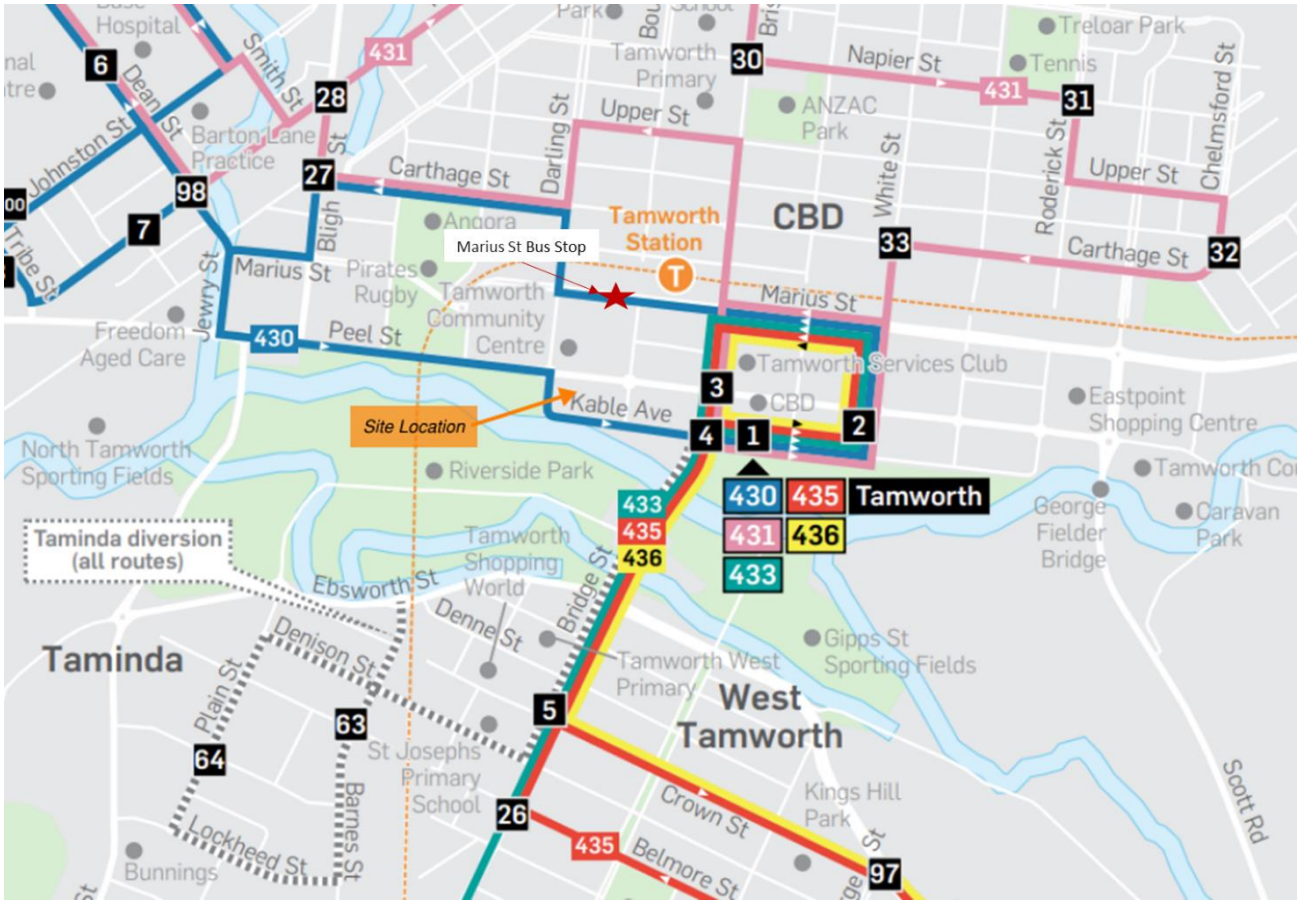


Figure 2.3: Tamworth Bus Service Network Map

Source: Tamworth Bus lines

Table 2.1: Bus Routes Services

Bus Number	Bus Route	Weekday Frequency
430	Tamworth to Oxley Vale via Tamworth Hospital (Loop Service)	1 service per hour
431	Tamworth to North Tamworth via Tamworth Hospital (Loop Service)	1 service per 2 hours
433	Tamworth to South Tamworth (Loop Service)	1 service per hour
435	Tamworth to Tamworth Sports Dome via South Tamworth (Loop Service)	1 service per hour
436	Tamworth to Calala via Goonoo Goonoo Rd & Tamworth Shopping world (Loop Service)	1 service per 1.5 hour

2.4 Car Parking

2.4.1 On-Street Parking

The surrounding area of the site offers mostly unrestricted on-street parking, particularly in the adjacent streets (Peel Street and Roderick Street).

The Tamworth Parking Strategy provides a detailed map displaying the network, including the locations of carparks, parking meters, time-restricted zones, and free on-street parking zones.

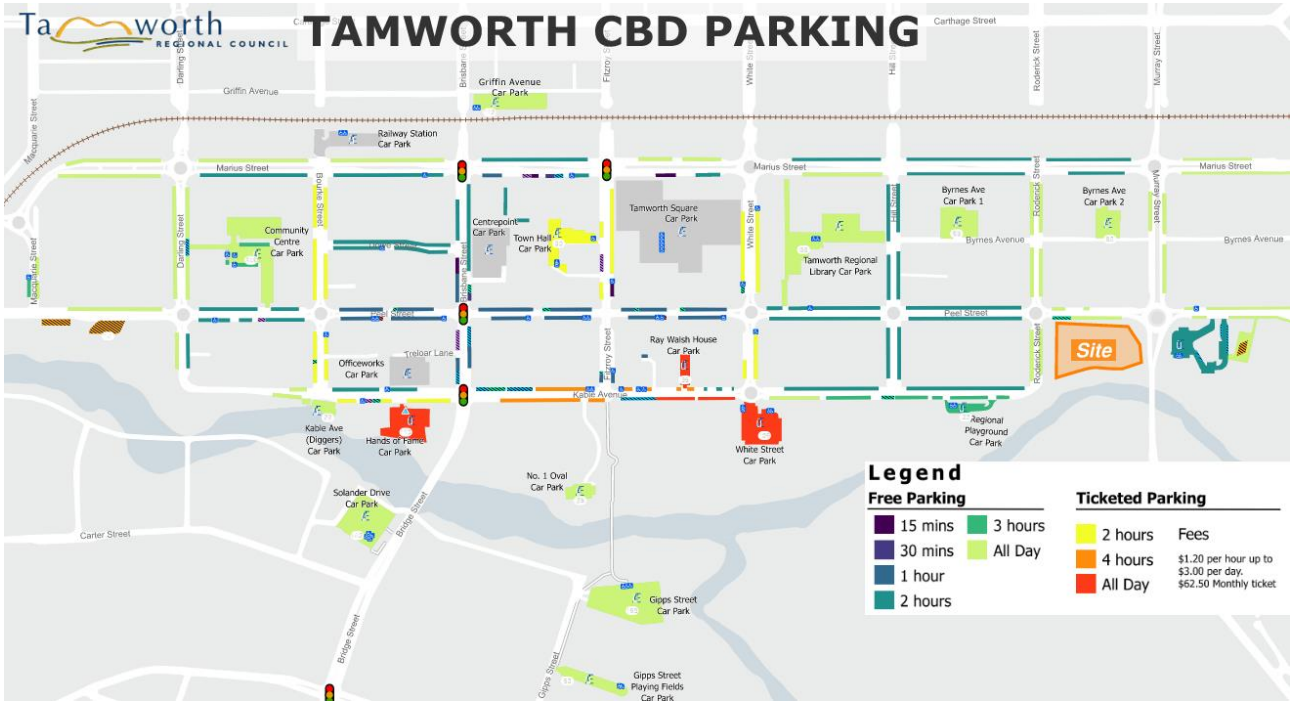


Figure 2.4: Tamworth Parking Strategy

Source: Tamworth Regional Council

Figure 2.5 shows the site's connections to public parking areas, including the footpath network links.

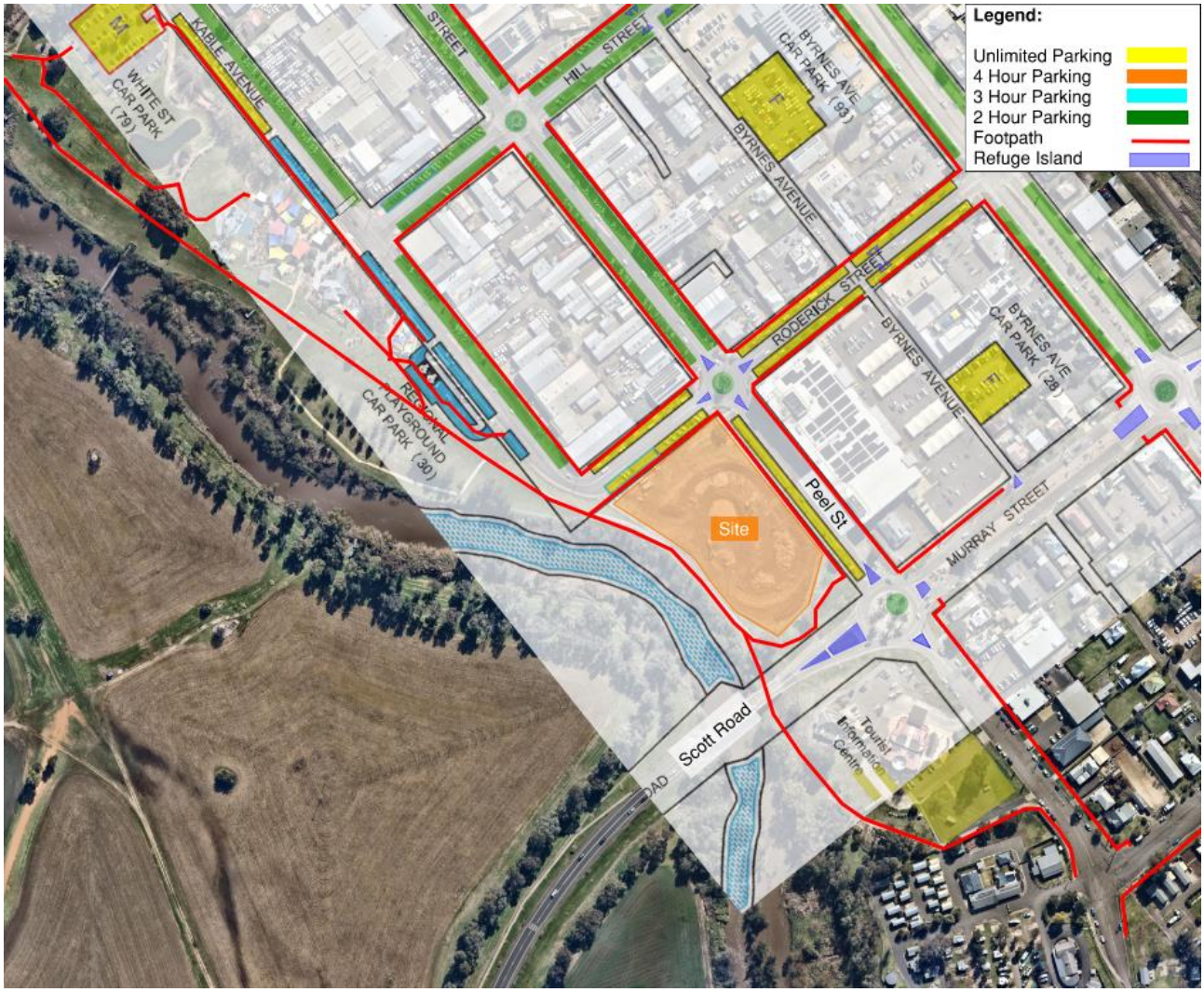


Figure 2.5: Linkages to Public Parking

2.5 Travel Characteristics

Journey to Work (JTW) data supplied by the 2016 Australian Census approximates the current mode share split for those who work in Tamworth and can be used to represent the travel modes of the staff working at the Campus. The JTW data is defined by Statistical Area Level 2 zones, and the site is located within the Tamworth - North region.

Table 2.2 demonstrates the breakdown of mode shares for each mode of travel. It is clear that private vehicle use is the favoured travel mode (as driver or passenger). In addition, while all other means of transportation show low usage, less than 1% take the train and bus combined and 3.3% of people walk to work.

Method of Travel (MTW15P) categorisation of travel modes (as listed in the left column of Table 2.2) is used for a clearer and simpler assessment of key travel modes through the allocation of a primary mode when multiple modes have been used in one trip.

Table 2.2: Journey to Work Data for Tamworth

Source: Australian Bureau of Statistics 2016 Census

Travel Mode	Mode Share (%)
Train	0.13%
Bus	0.58%
Taxi	0.26%
Car, as driver	86.97%
Car, as passenger	6.63%
Truck	0.87%
Motorbike/scooter	0.66%
Bicycle	0.46%
Walked only	3.33%
Other Mode	0.09%
Total	**100.0%**

Table 2.3 shows a summary of the above information into three main travel mode categories. Private vehicle usage is the most popular mode choice, with 95% share, followed by active transport and lastly public transport.

Table 2.3: Summarised Journey to Work Data

Mode Summary	Mode Share (%)
Private vehicle (car, truck, taxi, motorbike)	95.39%
Public transport (train, bus)	0.71%
Active transport (walk, bicycle)	3.79%
Total	**100.0%**

3.0 Proposed Development

3.1 Overall works

The project involves the construction of a contemporary four-storey educational building located adjacent to Roderick Street. Additionally, a car park with access from Peel Street, cultural grounds, and complementary landscaping will be established. This site is situated at the corner of Peel Street and Roderick Street as shown in Figure 3.1.

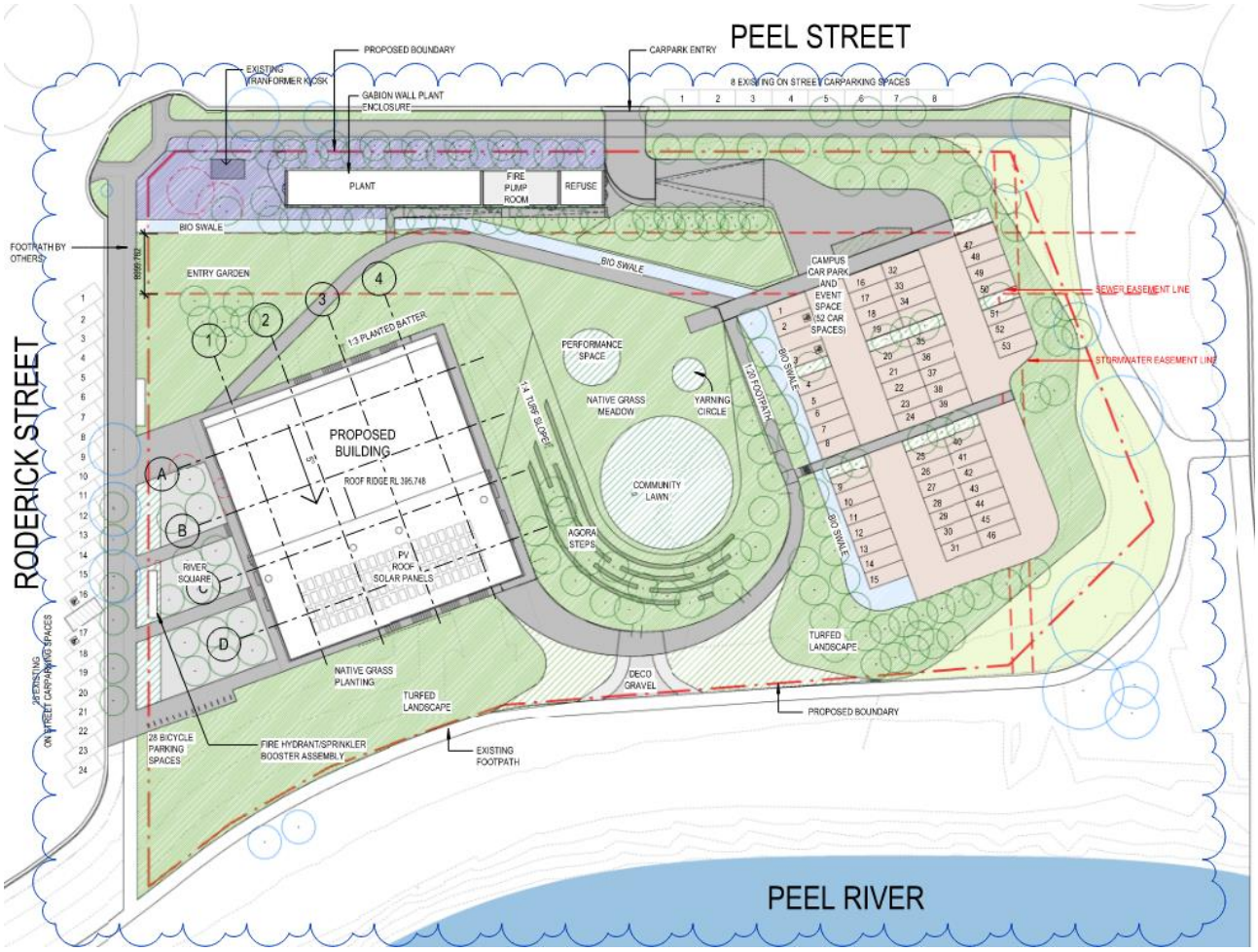


Figure 3.1: Concept Design

3.2 Site Access

The site has multiple pedestrian access points from Roderick Street and one access point from the existing levee-shared path as shown in Figure 3.2. The site has an internal walkway spanning the south-western end of the site. The main vehicle access is through Peel Street directly to the car park area. A shared service vehicle area, encompassing waste and delivery services, is located to the west of the site, with an entry/exit access point from Peel Street.

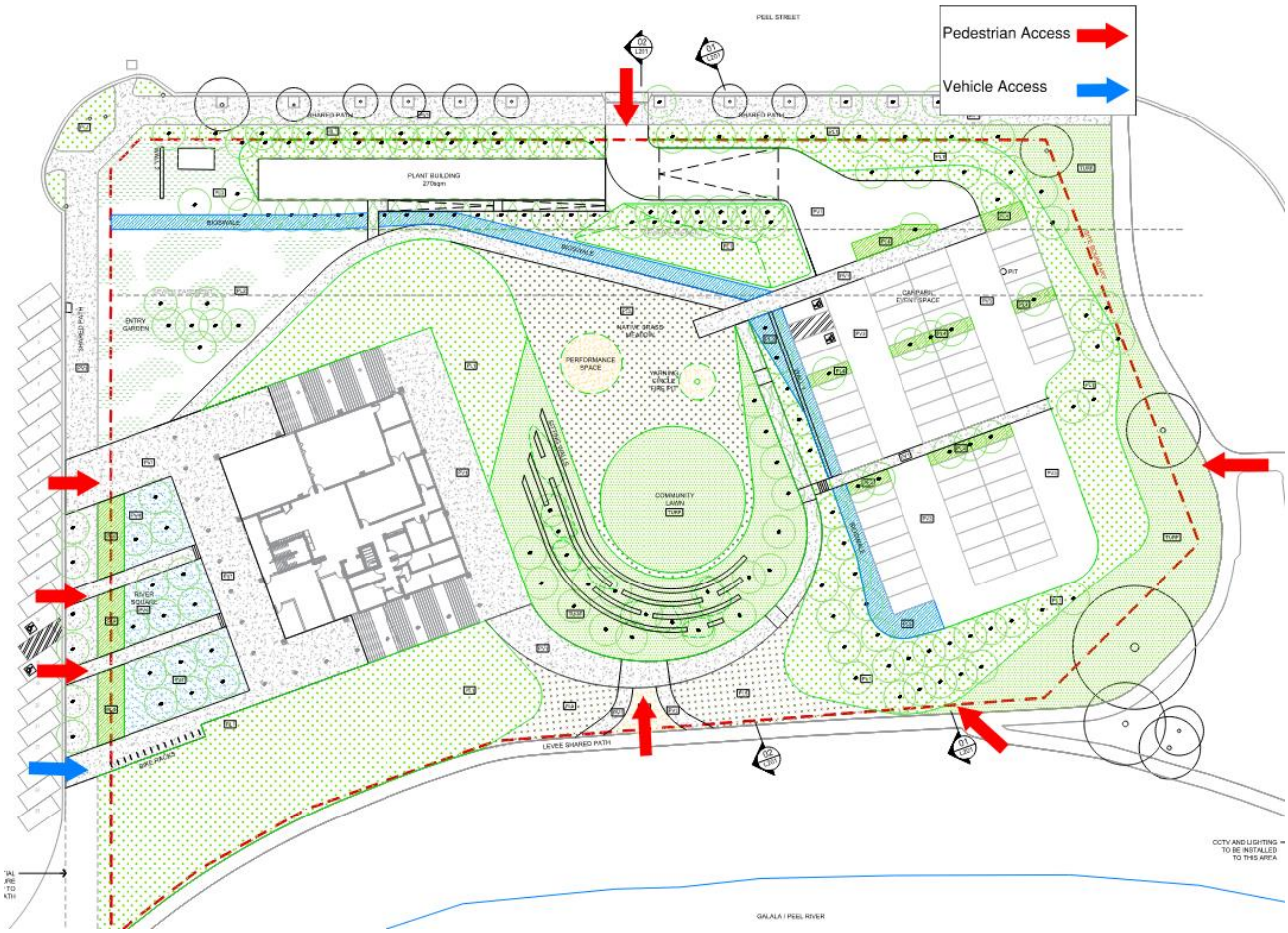


Figure 3.2: Site Access Points

3.3 Service and Loading

Service and loading vehicles will access the site through the vehicle access point connected to Peel Street. To efficiently manage waste disposal, dedicated waste facilities will be positioned to the north-west of the premises. The largest anticipated vehicle will be a medium rigid vehicle, primarily employed for on-site operations and waste collection purposes.

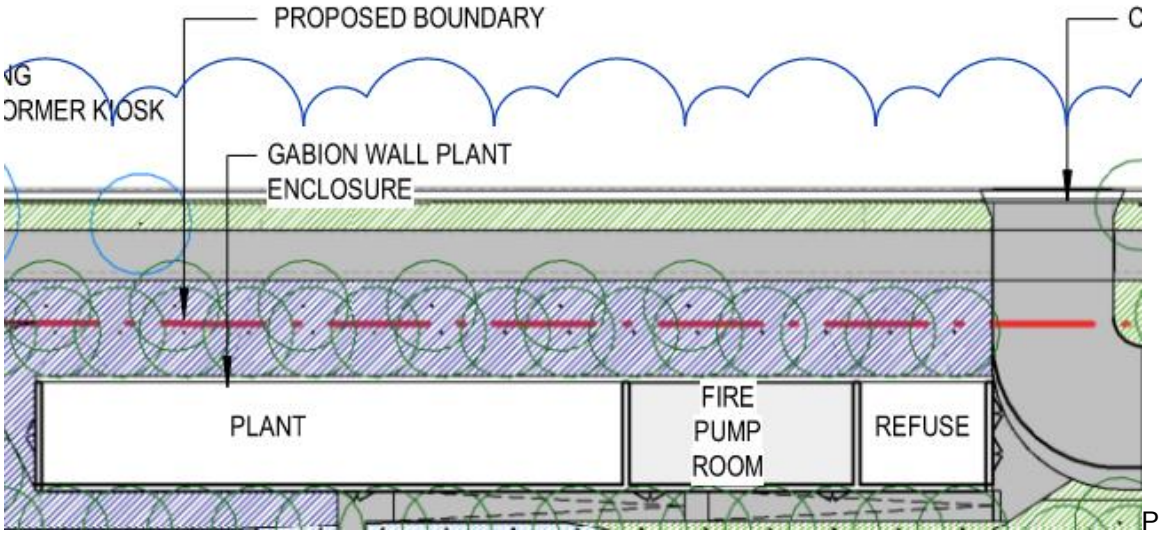


Figure 3.3: Service and Loading

3.4 Bicycle Parking

On-site cyclist facilities are available to ensure secure storage of bicycles and equipment. A total of 28 bicycle parking spaces is proposed, accessible from Roderick Street, along with an additional 3 undercover spaces located on the ground level near the entry door, as shown in Figure 3.4 and Figure 3.5.

Figure 3.4: Bicycle Parking

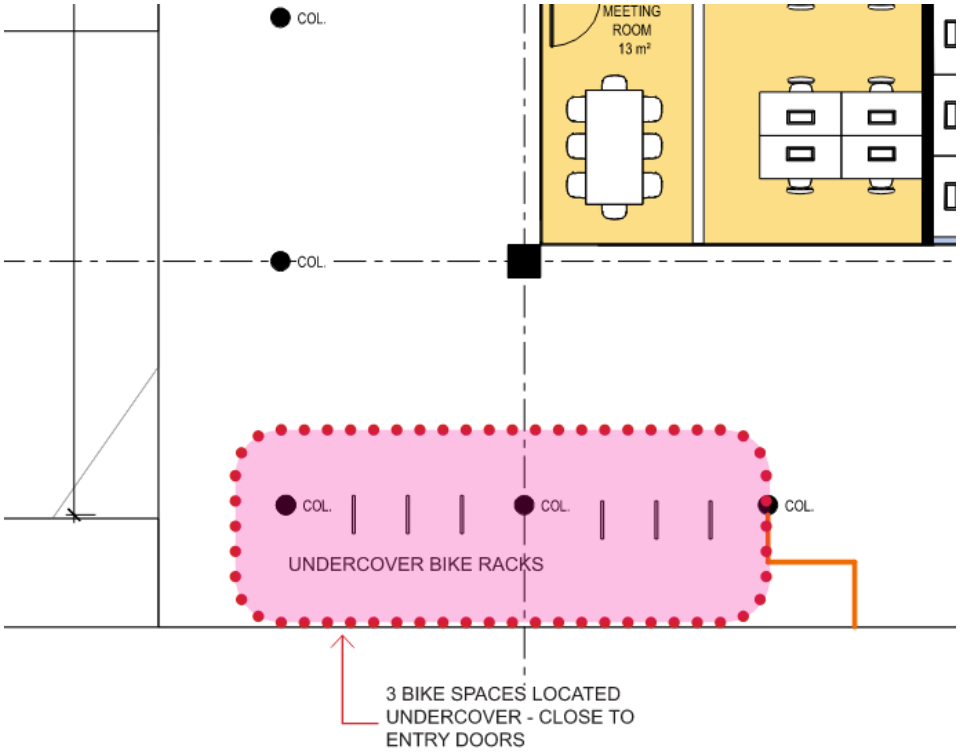


Figure 3.5: Undercover Bicycle Parking

3.5 Active Transport

3.5.1 Pedestrian and Cycling Linkages

The area is well-connected by footpaths; however, there are missing linkages along Peel and Roderick Streets in front of the site. The proposal includes the provision of shared paths adjacent to the site along these streets to ensure adequate connections to other off-site parking areas.

A new access point is proposed from the existing shared path on the levee that connects to the internal walkway running along the southwestern end of the site. Additionally, the connecting pathways underneath Scott Road leading to the car park area will be retained.

Figure 3.6 below illustrates the proposed works along Peel and Roderick Streets.

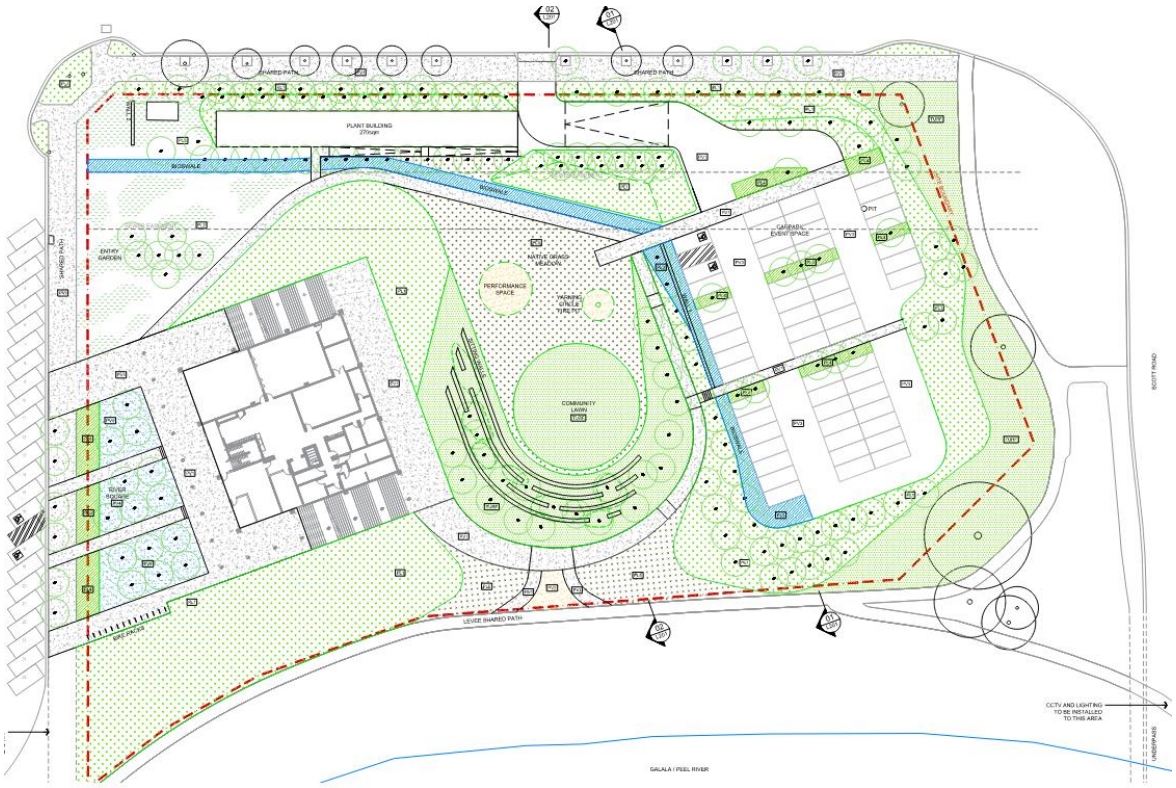


Figure 3.6: Pedestrian and Cycling Linkages

3.5.2 End-of-Trip Facilities

End-of-trip facilities, including two showers and 15 lockers, are proposed on the ground level, as shown in Figure 3.7

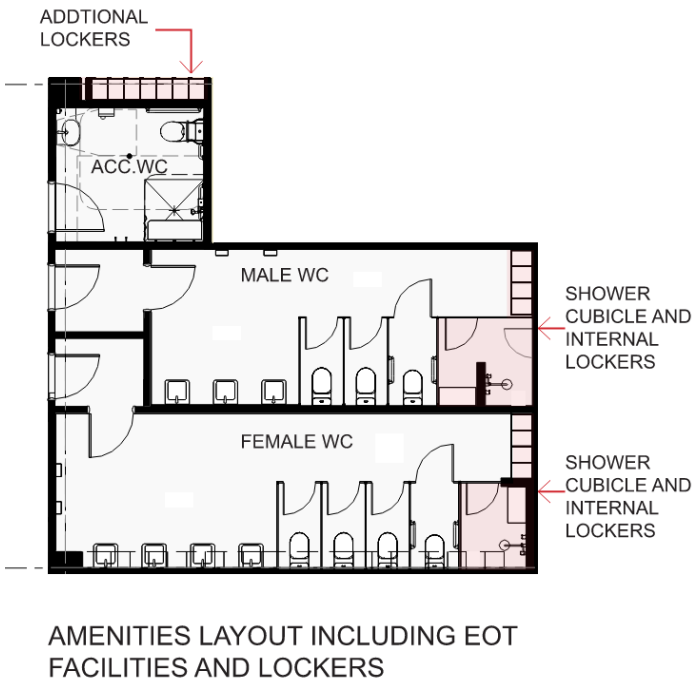


Figure 3.7: End-of-Trip Facilities

4.0 Travel Plan Objectives

4.1 Promote Alternative Transport Usage

As part of any long-term sustainable transport plan, the promotion of sustainable travel modes is a critical component. Users often face difficulties in using alternative modes due to a simple lack of awareness of their options. If these options can be presented to users in an easy-to-understand format, they may be more likely to change their travel behaviours.

To improve user understanding of alternative and sustainable transport, this GTP seeks to clearly and regularly inform all users including staff and students.

The promotion of sustainable travel modes assists in educating the community in their awareness of transport opportunities, travel safety, and becoming generally more comfortable with using modes other than a private car. This is of significant long-term benefit to the general public, by developing a community with a good understanding of transport and who are more likely to consider their transport choices in the future.

4.2 Improve Health and Wellbeing

It is the responsibility of the UNE to ensure the health and well-being of staff and students. A change from vehicular transport to active transport such as walking or cycling provides health benefits to users by increasing their amount of daily physical activity.

To improve the health and wellbeing of staff and students, this Travel Plan seeks to increase the use of active transport modes such as walking or cycling.

A reduction in vehicle usage will also create environmental benefits through reduced emissions, which provides further improvements to the health and well-being of the community more broadly.

4.3 Improve Student Safety

In the interest of student safety, it is critical that the volume of vehicles moving around the site is reduced as much as possible, especially as students are often exposed to traffic as they travel to the campus. This applies to vehicles interacting with pedestrians, and vehicles interacting with other vehicles. While pedestrian paths and crossings are provided around the site providing separation, mistakes and accidents can occur which cannot be foreseen or fully prevented.

To improve user safety for pedestrians and vehicles around the site, this Travel Plan seeks to reduce the total volume of vehicles travelling to the site.

We note that it is not only user safety but also the safety of the wider road network and community that shall be improved by a reduction in vehicle volumes.

4.4 Reduce Traffic Congestion

UNE Tamworth is located adjacent to Scott Road, Peel Street and Roderick Street and is surrounded by commercial centre. Traffic modelling results for the site indicates that the three intersections near the campus will maintain satisfactory performance in the future, with minor increases in delays. To alleviate congestion and potential delays for the University and the community, this GTP aims to decrease the overall number of vehicles commuting to the site.

Traffic congestion issues can be improved as students and staff shift away from private vehicle usage.

4.5 Encourage Carpooling

This GTP provides actions to encourage higher vehicle occupancy rates among the staff and students, to reduce the number of vehicles travelling to and from the UNE. As outlined in Objective 4.4, this has several benefits including a reduction in traffic congestion and parking impacts.

This objective is aimed at university students as well as the UNE staff.

4.6 Reduce Reliance on Private Vehicle Use

Reduction in the reliance on private vehicle use will also become critical for the long-term operation of the site. Local population growth also results in an increased level of background traffic, which may lead to worsening traffic congestion regardless of the site's operation and activities.

Furthermore, reduced dependence on private vehicles lessens the possibility for overflow parking to occur on local streets. This GTP seeks to reduce the total volume of vehicles being driven to site, and therefore alleviate any potential impacts.

4.7 Reduce the Environmental Footprint of the Development

Reducing the environmental footprint of a development is an essential component of any sustainable transport plan. The use of private vehicles by students and staff members is a major contributor to the environmental footprint of the UNE.

This Plan seeks to decrease the university environmental footprint by promoting and increasing the use of more sustainable travel options such as public and active transport and educate users about the importance of sustainable practices. These measures aim to decrease the overall environmental impact of the UNE Tamworth development, advocating the importance of sustainable behaviours to the students and staff attending the site and providing a sustainable future.

5.0 Mode Share Targets

Following a review of local Journey to Work (JTW) data and an analysis of the alternative transport provisions on-site, along with consideration of the UNE Armidale Campus travel mode split (which aligns with the JTW data), the anticipated mode share splits for staff and students at UNE Tamworth are outlined in Table 5.1.

In developing the GTP for the UNE Tamworth campus, the following key factors have been considered:

- Alignment with Tamworth Regional Council Sustainability Strategy & Action Plan 2022- 2026 which focuses on encouraging the community to use active transport options.
- The proposed works external to the site are aligned with the Tamworth Blueprint 100 Community Plan 2023–2033, which prioritises enhancing access to active transport options, promoting movement between key locations, and fostering increased use of sustainable transport modes.
- The availability of shared paths for cycling and walking, public transport options for staff and students, and strategies to encourage carpooling that can be implemented at UNE.

Table 5.1: Mode Share Targets

Note: totals may not add exactly to 100% due to rounding

Mode Summary	Mode Share (%)	Target Mode Share (%)	Mode Change (%)
Private vehicle (car, as driver, motorbike)	87.63%	75.00%	-12.63%
Private vehicle (car, as passenger/taxi)	6.89%	8.68%	+1.79%
Public transport (train, bus)	0.71%	5.22%	+4.51%
Active transport (walk, bicycle)	3.79%	10.14%	+6.35%
Other mode (truck)	0.96%	0.96%	0.00%
Total	**100%**	**100%**	**0%**

6.0 Actions

As previously discussed, the main objectives of this Green Travel Plan are to:

- Promote alternative transport usage;
- Improve health and wellbeing;
- Improve student safety;
- Reduce Traffic Congestion;
- Encourage Carpooling;
- Reduce reliance on private vehicle use and;
- Reduce the environmental footprint of the development.

In order to achieve these objectives, a number of initiatives and programs are recommended to be implemented as detailed in the following sections. Five base strategies are considered which aim to meet the objectives of the Plan:

1. Enable informed users
2. Encourage active transport
3. Encourage public transport
4. Encourage carpooling
5. Ongoing management of the GTP

Actions to encourage active transport, public transport and carpooling would help in reducing total vehicular demand and vehicle activity around the site. By ensuring users are enabled with the appropriate information and undertaking continued management of the sustainable travel strategies, the objectives of the Travel Plan can best be achieved over time.

Each strategy consists of a number of actions which should be implemented to achieve a shift toward the ultimate objectives of the Plan. The staff member responsible for travel (as recommended in these initiatives) should review this checklist periodically to reflect on the site's progress and opportunities.

6.1 Strategy 1: Enable Informed Users

6.1.1 Action 1: Provide a Transport Access Guide

Users often face difficulties in using sustainable travel modes due to a simple lack of awareness of their travel options. If these options can be presented to users in an easy-to-understand format, they may be more likely to change their travel behaviours.

It is recommended that a brochure or leaflet be developed that provides information on public and active transport facilities near the site. Brochures can easily be given to students, staff and visitors and can be developed in-house or by an external consultant. The brochure should also be uploaded to the UNE website to provide information for visitors. Additionally, a poster or Transport Access Guide may be displayed on notice boards around the UNE. A Transport Access Guide can be seen in Figure 6.1.

To reduce reliance on private vehicles, event attendees should be provided with the Transport Access Guide to make them aware of the public and active transport options available to them.

Figure 6.1: Transport Access Guide

Source: University of Wollongong

6.1.2 Action 2: Induction Information for New Users

It is important that both staff and students at the UNE are aware of the travel options available to them. Particularly for new users, the default option may be to drive to the site or be dropped off if they are unfamiliar with the area.

To ensure that users are aware of their options, a Transport Access Guide (discussed above) and any other relevant information such as health and activity leaflets should be distributed to all users. Distribution methods could include information being included in induction or orientation packages. Information provided directly in this manner results in users being more likely to engage in sustainable travel patterns, rather than being required to seek out information independently.

6.2 Strategy 2: Encourage Active Transport

6.2.1 Action 3: Cycling Infrastructure

The site proposes 31 bicycle parking spaces, aligning with the recommendations of the NSW Planning Guidelines for Walking and Cycling. This provision represents approximately 9% of the total number of staff and students.

The mode share targets aim for a 6.5% increase in bicycle usage among staff and students. It is important to note that the provision of these bicycle spaces is intended to encourage active transport rather than meet a specific requirement.

The following design considerations for bicycle facilities should be taken into account:

- Bicycle parking should be located at easily accessible and convenient locations around aquatic centre. Bicycle parking areas should be undercover.
- Bicycle storage areas should be maintained and kept to an appropriate standard, including any security or monitoring systems present. Usage of the storage should be monitored, and additional storage provided if demand increases.
- Installation of bicycle rails should be in accordance with Australian Standards AS2890.3 Bicycle parking, and any other specifications from authorities including Tamworth Regional Council.
- Bicycle storage areas should be well signposted within the site to assist with wayfinding for staff and students travelling via bicycle. Frequent signage can also bring awareness to the available cycling facilities.

Additionally, End-of-trip Facilities, including showers, change rooms, and lockers, play a crucial role in encouraging students and staff to use active transport options such as cycling and walking. These amenities are particularly important for individuals travelling longer distances or during warmer seasons.

To promote the use of these facilities, the following strategies could be implemented:

- Designating lockers exclusively for staff and students who commute via active transport modes to encourage uptake.
- Installing wayfinding signage to improve access to end-of-trip facilities.
- Promoting these facilities through internal communications, such as newsletters or staff meetings.

6.2.2 Action 4: ‘Ride2Work Day’ and Health Events

Various organisations and groups develop programs and events to encourage active transport. For example, Bicycle Network coordinates a Ride2Work Day each year. These events provide a good opportunity to

encourage cycling for staff and each event can also assist in influencing the travel behaviour of other groups through general publicity and awareness. These events could include organised preferred cycling routes, bike safety programs, bike maintenance instructions and more.

Subject to further discussion, incentives may include competitions or rewards. This and other events should be considered annually.

6.2.3 Action 5: Subsidised Carry Bags

The UNE may wish to investigate opportunities to provide subsidised backpacks or panniers (for bicycles) for students and staff who are committed to practice sustainable travel to and from UNE. Historically, educational staff have been reluctant to engage with sustainable transport options due to the large amount of resources requiring transportation each day. This strategy is proposed in response to this issue and should allow sustainable transport to become a more feasible option.

6.2.4 Action 6: Salary Sacrifice for Active Transport Purchases

This strategy involves providing the option for staff members to participate in salary sacrificing for the purchase of micro-mobility vehicles such as bicycles, e-bikes or electric scooters. By reducing the upfront cost of these types of vehicles, active transport may become more desirable and accessible.

6.2.5 Action 7: Reward Participating Students

The UNE could encourage students to participate in active transport by initiating some friendly competitions and challenges to reward students who choose to join in and use active travel modes.

6.3 Strategy 3: Encourage Public Transport

6.3.1 Action 8: Increased Public Transport Services

The UNE should remain up to date with any proposed plans by Council or TfNSW to increase the public transport services as the local area goes through future development. If the current public transport services are not meeting the demand from students and staff, the UNE may consult with Council and TfNSW about potential upgrades to the offered services.

6.4 Strategy 4: Encourage Carpooling

6.4.1 Action 9: Staff and Student Pairings

Staff and students could be encouraged to carpool by sharing information about potential carpooling pairs. Not all staff and students may be aware of others who live near to them, or along their travel route to the site. Note that carpooling is likely to occur either among staff or among students, with it being unlikely that staff and students would carpool together.

For staff, a meeting could be held to provide an opportunity for staff members to discuss carpooling options, including coordination of staff by region and place of residence. A similar system could be put into place for students, perhaps via an online register system. UNE is also considering offering incentives such as free parking for those who participate in carpooling.

Increasing the uptake in carpooling is an effective way to increase the average vehicle occupancy rate, which is one of the objectives of this Plan.

6.4.2 Action 10: Priority Parking

Staff committed to carpooling with others could be allocated priority parking spaces in an area of the car park. The provision of dedicated spaces, ensuring that these users will be able to find a space on-site, may encourage users to investigate carpooling.

6.5 Strategy 5: Ongoing Management

6.5.1 Action 11: Parking Management

To discourage reliance on private vehicle usage, a parking management strategy could be implemented. This strategy would operate parallel to the priority parking strategy above, in giving parking priority to those staff who participate in sustainable travel alternatives such as carpooling or car sharing.

6.5.2 Action 12: Regular Reviews of Travel Plan

This Green Travel Plan, and other associated documentation (such as a Transport Access Guide) should be reviewed regularly and updated as required. It is recommended that an annual review would be an appropriate update schedule. This annual review should include:

- Updating to reflect any travel-related changes in the local area such as bus services, new cycle routes or pedestrian crossings (this should occur as changes arise rather than annually)
- Reviewing progress against the proposed mode share targets and update targets if required
- Identification of any shortfalls in the Plan and an updated action plan to address these shortfalls
- An updated travel mode survey to be distributed to all students and staff. Collect student and staff data including residential postcodes to inform where students/staff are travelling from
- Consultation with staff
- Adjustments to initiatives and targets based on updated survey results and in response to any issues that may arise

6.5.3 Action 13: Transport Coordinator

To ensure that the ongoing review of this Plan is carried out as expected, responsibility of this task should be allocated to a specific staff member or Transport Coordinator. This staff member could form a sustainability group that would assist in updating the Green Travel Plan and champion the travel initiatives. Responsibilities of the Transport Coordinator may include:

- Implementation and promotion of the actions outlined in the GTP
- Monitoring the effectiveness of the actions
- Ongoing maintenance of the GTP
- Providing advice to students, staff, visitors or contractors about transport-related issues
- If required, liaising with external parties such as Council or public transport operators

6.5.4 Program Evaluation

This GTP it is to be maintained by the UNE and shall be distributed to all the concerned logistic personnel and managers. The UNE is also responsible for distributing appropriate information to staff, students, visitors, volunteers, and contractors as necessary. A copy of the GTP is always to be held on-site and available for review.

This GTP, and other associated documentation (such as a TAG) are to be reviewed regularly and updated as required. This review should include detailed observations of the transport operations of the site and adjustments to procedures where necessary.

To ensure that ongoing reviews of this GTP are carried out as expected, responsibility for this task should be allocated to the Travel Coordinator or a specific alternative staff member.

6.6 Governance Framework

6.6.1 Internal UNE Stakeholders

The list of internal stakeholders to be consulted by the Travel Coordinator includes:

- UNE Executive Staff as relevant
- Asset Management
- Grounds Management
- WHS Representative
- Facility Management

6.6.2 State and Local Government Stakeholders

The list of external stakeholders to be consulted by the Travel Coordinator includes:

- Tamworth Regional Council
- Transport for NSW

In the event of external consultation being required, various state and local stakeholders have provided a nominated contact person, either for addressing concerns and comments or for providing alternative best contacts for a specific issue.

The nominated point of contact at **Tamworth Regional Council** is as follows:

- Name:
  - To be advised by Council for inclusion in post-approval documentation.
- Role:
  - *TBC*
- Phone & Email:
  - *TBC*

The nominated point of contact at **Transport for NSW** is as follows:

- Name:
  - To be advised by TfNSW for inclusion in post-approval documentation.
- Role:
  - *TBC*
- Phone & Email:
  - *TBC*

7.0 Conclusion

A Green Travel Plan is a crucial initiative in fostering more sustainable travel practices for staff, and students at the UNE Tamworth. With the proposed development, there are opportunities to encourage active and public transport choices and shape travel behaviour as the UNE undergoes growth.

This document presents a Green Travel Plan with overarching objectives that delineate specific targets and actions. It is essential to view this document not as a rigid set of strategies and actions for the UNE, but rather as a suggested framework based on current investigations and habits.

The proposed targets aim to reduce reliance on private vehicles while encouraging greater use of public and active transport, as well as carpooling. The anticipated mode share splits for staff and students at UNE Tamworth target a reduction in private vehicle use by approximately 12%, with corresponding increases in active transport, public transport, and carpooling by 6%, 4%, and 2%, respectively.

Sustainable strategies and targeted actions to achieve these mode share goals have been outlined as part of the GTP. These measures aim to foster a shift towards more sustainable travel behaviours, supporting the campus's broader commitment to environmental sustainability and aligning with community transport priorities.

Importantly this document is a site-specific plan tailored to UNE Tamworth, with actions to be implemented in conjunction with standard sustainable transport plans. Foundational actions should include clear signposting of active and public transport infrastructure, ensuring adequate lighting and security in all areas, genuine collaboration with local agencies and authorities when opportunities arise, and other measures applicable to various development types.

Anticipating the need for a revised Green Travel Plan before the occupation of the new development, subject to any relevant consent conditions associated with the DA, regular updates are recommended. These updates should involve consultations with relevant stakeholders, especially staff, and external entities such as Tamworth Regional Council when necessary.

Prepared by
TTW (NSW) PTY LTD

AMMAR AHMED
Traffic Engineer

Authorised By
TTW (NSW) PTY LTD

GRACE CARPP
Associate (Traffic)

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