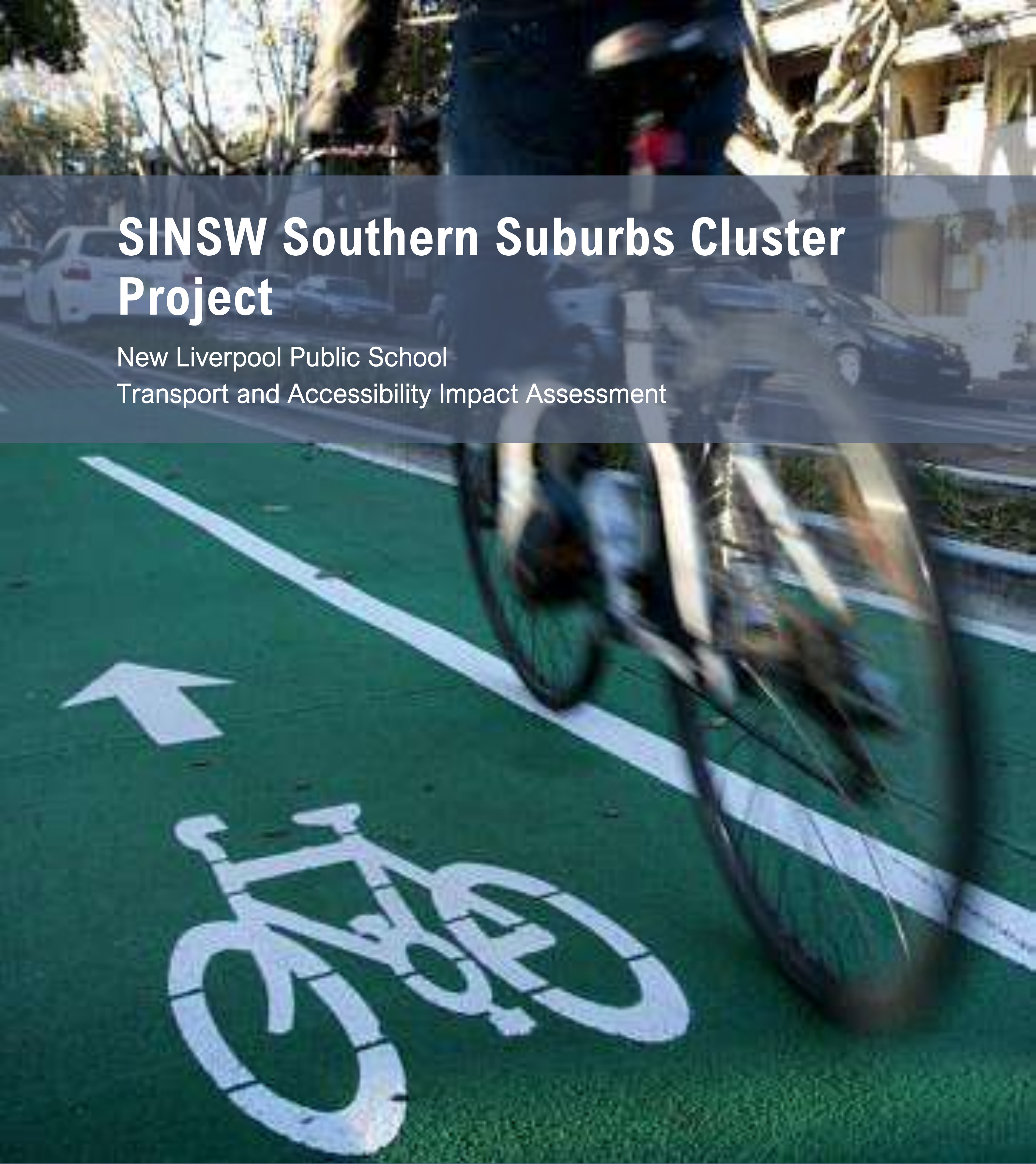

SINSW Southern Suburbs Cluster Project

New Liverpool Public School
Transport and Accessibility Impact Assessment

Prepared by: GTA Consultants (Group) Pty Ltd for School Infrastructure c/o CBRE
on 11/06/2021
Reference: N174701
Issue #: D

GTAconsultants now Stantec

SINSW Southern Suburbs Cluster Project

New Liverpool Public School
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Client: School Infrastructure c/o CBRE

on 11/06/2021

Reference: N174701

Issue #: D

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	12/05/2021	Final	Eric Ye	Karen McNatty	Karen McNatty	Karen McNatty
B	09/06/2021	Final	Eric Ye	Karen McNatty	Karen McNatty	Karen McNatty
C	10/06/2021	Final	Eric Ye	Karen McNatty	Karen McNatty	Karen McNatty
D	11/06/2021	Final	Eric Ye	Karen McNatty	Karen McNatty	

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EXECUTIVE SUMMARY

Overview

The School Infrastructure NSW (SINSW) Southern Suburbs Cluster New Liverpool Public School (NLPS) project proposes construction of new school buildings for core school facilities, teaching spaces and support units, as well as associated landscaping and open space areas.

As part of the development, the new school proposes a maximum capacity of 1280 students (comprising 1200 mainstream primary students, 40 support unit students, and 40 preschool students).

The school is expected to commence operation in Term 1, 2023.

A State Significant Development Application (SSDA) is to be lodged with the Department of Planning, Industry and Environment (DPIE). SINSW commissioned GTA Consultants (GTA) to provide transport advice and prepare a Transport and Accessibility Impact Assessment to support the SSDA.

Mode Share

Travel mode surveys were undertaken for comparable schools in Liverpool, Liverpool West Public School (LWPS) and Liverpool Public School (LPS), in November/ December 2019 to ascertain an indicative travel mode split for staff and students for the NLPS. The surveys indicate a car mode share for staff of 91 per cent, bus mode share of five per cent, train mode share of three per cent and walking mode share of one per cent for the existing primary schools.

As the proposed school will be a new development, there is greater opportunity to encourage a higher proportion of public and active transport among staff. As such a target car mode share of 51 per cent is adopted (34 per cent driving, 17 per cent passengers), with elevated mode share proportions for travel via bus, train, walking and cycling.

A low number of responses were received for the students; hence calculation of the mode share split was prepared based on a first principles approach of the student catchment of NLPS using available LPS depersonalised student residential data. This approach resulted in an indicative 45 per cent of students travelling to school via car, 2.5 per cent by bus, 2.5 per cent by bicycle and the remaining 50 per cent walking to school. Travel via other modes was assumed to be minimal.

Pedestrian Facilities

A high-level review of the existing pedestrian facilities near the school finds a moderate level of pedestrian accessibility. The roads near the school generally provide footpaths at least 1.2 metres wide on both sides of the road and the Lachlan Street frontage presents a wider footpath (around three metres). As part of the proposed development, the existing footpath on Burnside Drive (some 1.2 metres wide currently) is to be widened to 2.5 metres (this forms part of a separate approval).

Pedestrian crossing infrastructure is provided near the site in the form of a raised pedestrian crossing on the southern approach of the Forbes Street/ Lachlan Street intersection and a mid-block raised pedestrian crossing on Forbes Street. The transport assessment identified existing gaps in the pedestrian infrastructure, particularly along Lachlan Street. To address these gaps, a new school crossing is proposed on Lachlan Street, between Drummond Street and Lachlan Lane to facilitate north-south pedestrian connectivity across Lachlan Street. New pedestrian refuge islands are also proposed on the north approach of the Lachlan Street/ Forbes Street intersection and the Lachlan Street/ Drummond Street intersection to improve the east-west pedestrian connection on the northern side of Lachlan Street to the new pedestrian crossing.

The existing school zone, which terminates east of the Lachlan Street/ Hart Street/ Burnside Drive roundabout is proposed to be extended along the remainder of Burnside Drive along the western frontage of the school.

Further opportunity for footpath widening on Lachlan Street is investigated further in the Student Transport Plan (Appendix B).

Vehicle Access

Two new vehicular accesses are proposed on Burnside Drive, as part of a separate planning approval pathway to the SSD. The northern access will be for waste collection vehicle access only and the southern access will be for staff car parking access only. All student pick-up/ drop-off will occur kerbside along Burnside Drive.

Staff Parking

The proposed staff car park (to be provided under a separate planning approval pathway to the SSD) provides 33 car spaces. This reflects the strategy to reduce car mode share which is supported by a range of factors such as no pre-existing expectation to provide a high level of car parking (as NLPS is a new school), a high allocation of car parking to car-poolers, limited on-street parking availability (reducing attractiveness of driving), and additional initiatives outlined in the Student Transport Plan.

Additional measures to further disincentivise long-stay worker parking in the surrounding street environment may be considered through the extension of time-restricted parking along the school frontages of Forbes Street and Lachlan Street.

Pick-up/ Drop-off Parking

Indented parking is proposed along the western side of Burnside Drive to accommodate student pick-up/ drop-off. Burnside Drive will be widened by around 2.5 metres on the western side to accommodate pick up and drop off activity. These works are part of a separate planning approval pathway to the SSD, however described in this report to provide overall context.

Burnside Drive in its current configuration does not provide any turnaround opportunity at the southern end (near the Hospital) due to the permanent removal of the previous roundabout to facilitate construction of Hospital Multi-Storey Car Park. To enable school-related traffic to arrive at the western side of Burnside Drive (where drop off and pick up activity would occur), a new roundabout (to be provided under a separate planning approval pathway to the SSD) is proposed towards the southern end of Burnside Drive.

Comparison to a study for a similar primary school has been used to determine the amount of pick-up/ drop-off provision required (scaled by projected student population and estimated mode share). Based on the proposed mainstream student capacity of 1200 students, around 23 pick-up/ drop-off bays would be required. Support unit students and pre-school students are expected to be picked up and dropped off at a different time to the mainstream students.

The proposed kerbside parking provides 25 car spaces.

Bicycle/Rideables Parking

Surveys of the existing staff and students at the LWPS and LPS indicate the proportion who travel to school via bicycle to be near zero. Analysis of the student catchment finds that 68 per cent of students reside within a five-minute cycling catchment and 100 per cent of the proposed student catchment resides within the 10-minute cycling catchment. Hence there is potential for increased travel via bicycle/ rideables (e.g. scooters).

60 bicycle/ rideables spaces are provided located south of the support unit building.

Bus Zone

A bus zone is proposed on Lachlan Street, north of the existing Liverpool Boys High School. Lachlan Street has a carriageway of 12 metres which is sufficient in accommodating bus parking and a travel lane with sufficient width for a bus. The bus zone would accommodate up to two buses at a time.

This bus zone is currently proposed for school services only, however consideration for twice-a-day diversion of public bus services (for the 823 and 904 bus route) can be explored in consultation with the bus operators. The Student Transport Plan (Appendix B) provides further review on this opportunity.

As per NSW *Guide to Appointed School Bus Stops,* the proposed bus stop must first be appointed by Transport for NSW or a bus operator. Following this, the roads authority (Liverpool City Council) for the road approves the appointed bus stop.

Service Vehicle Access

A bin collection area and hardstand will be provided south of the school buildings (under a separate planning approval pathway to the SSD), accessed via a new crossover on Burnside Drive to facilitate waste collection. This area will be closed-off outside of collection times to discourage parking by other users.

For other servicing, loading and deliveries, the future indented kerbside parking zone on Burnside Drive can be allocated as a loading zone outside of student arrival/ departure periods.

Traffic Assessment

To determine the expected traffic impact related to the school development, an assessment of the anticipated staff and student numbers and the likely travel routes, proportion during peak hour, mode share, and vehicle occupancy is considered in the net traffic generation and distribution.

This results in an expected net development traffic generation (in 2023) of 14 vehicles during the AM peak and eight vehicles during the PM peak for staff (one-way trips), and 191 vehicles (382 vehicle movements) during the AM peak and 191 vehicles (382 vehicle movements) during the PM peak for students.

For the 10-year horizon (2033), the net development traffic generation is based on full student capacity. This would result in 18 vehicles during the AM peak and 10 vehicles during the PM peak for staff (one-way trips), and 249 vehicles (498 vehicle movements) during the AM peak and 249 vehicles (498 vehicle movements) during the PM peak for students.

To provide a robust assessment, a cumulative traffic assessment has been undertaken, considering the impact of the nearby Hospital redevelopment (i.e. construction of new multi storey car park) and proposed closure of Campbell Street between Goulburn Street and Forbes Street (both of which are expected to be finalised before the school opening year).

SIDRA network modelling has been undertaken for the 2019 existing scenario (considered more representative compared to 2021 data due to current decrease in Hospital-related traffic generation due to demolition of part of the existing at-grade parking for construction of the multi-storey car park), 2023 base and development scenarios and a 2033 development scenario with student projection to maximum capacity.

The modelling indicates that, in the 2023 development scenario, the Lachlan Street/ Forbes Street intersection would require additional capacity in the AM peak. The proposed left-in/ left-out treatment for the northern approach (comprising a new pedestrian refuge) provides mitigation, with the Level of Service improving to B.

In the 2033 development scenario, the Lachlan Street/ Burnside Drive/ Hart Street roundabout would operate at a Level of Service D (although the overall operation of the roundabout would be Level of Service B). An identified potential mitigation measure is to reduce the car mode share at the adjacent high schools and further separate school start times to distribute the peak traffic volumes. An alternate physical mitigation measure would be to provide an additional short approach lane on the northern approach of the roundabout. This has been assessed and would improve the operation of the intersection to a Level of Service A.

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Appendices

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Tables

1. INTRODUCTION

01

1.1. Background

This Transport and Accessibility Impact Assessment (TAIA) has been prepared by GTA, now Stantec for School Infrastructure for the SINSW Southern Suburb Cluster Project – New Liverpool Public School.

The New Liverpool Public School (NLPS) is located within the grounds of the existing Liverpool Boys and Girls High School in the Liverpool Central Business District (CBD), at 18 Forbes Street, Liverpool. The proposed NLPS is located in the eastern portion of the existing school grounds.

The site is legally described as Lot 1 in DP 1137425. The application seeks consent for the construction and operation of a new Primary School. This will include construction of a new school building for core school facilities, teaching spaces, support units, preschools as well as associated landscaping and open space improvements. A detailed description of development is provided by Ethos Urban within the EIS.

1.2. Purpose of This Report

This report sets out an assessment of the anticipated transport conditions near the NLPS and provides strategic design advice to ensure an appropriate transport network. This includes the consideration of the following:

- a detailed review of existing traffic and parking conditions both on site and around the site
- provision of adequate parking supply to meet future demands
- traffic generation of future demands and consideration of cumulative impact from the nearby Hospital redevelopment
- site accessibility
- pedestrian and bicycle considerations
- identification of the transport related constraints and opportunities.

1.3. Response to SEARs

The Secretary's Environmental Assessment Requirements (SEARs) outline the specific requirements for the TAIA for SSD-10391. Table 1.1 identifies the SEARs and relevant reference within this report.

Table 1.1: SEARs and relevant report reference

SEARs detail	Report reference
7. Transport and Accessibility Include a transport and accessibility impact assessment, which details, but not limited to the following:	
• accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development	Sections 3.3, 3.4, 3.5, 3.6, 3.7
• details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips	Sections 6.1, 6.2, 6.3, 6.4
• the adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development	Sections 4.7, 4.8, 4.9
• measures to integrate the development with the existing/ future public transport network	Appendix C
• the impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/ associated funding for, and details of, upgrades or road improvement works, if required (Traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Section 6.10
• the identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5 m wide travel lanes), additional bus stops or bus bays	Sections 4.6, 4.7
• details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan) and the provision of facilities to increase the non-car mode share for travel to and from the site	Appendix C
• the proposed walking and cycling access arrangements and connections to public transport services	Sections 4.7, 4.8, 4.9
• the proposed access arrangements, including car and bus pick-up/ drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones	Sections 4.4, 4.5, 4.6, 4.7, 4.8, 4.9
• proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	Section 4.9
• proposed number of on-site car parking spaces for teaching staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site	Sections 4.5, 5.1
• an assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development.	Sections 4.5, 4.7, 5.1, 5.2
• an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED.	Section 4.11

SEARs detail	Report reference
• emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Section 4.10
• an assessment of the proposed bus zone, traffic routes and turning requirements for any vehicles on Burnside Drive	Sections 4.4, 4.7, 6.5
• confirmation of no impact on existing Right of Access easement terms on Burnside Drive	Section 4.4
• the preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic addressing the following: o assessment of cumulative impacts associated with other construction activities (if any) o an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity o details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process o details of anticipated peak hour and daily construction vehicle movements to and from the site o details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle o details of temporary cycling and pedestrian access during construction o demonstrate how pedestrian and cycle rider movements along footways and cycleways are maintained at all times during construction activities. Should the development require closure to either facility, detail the adequate safety and diversion measures out in place to limit time delay and detour distances o details of any crane locations and road closures o details of any potential impact to the bus network and bus services.	Section 7

1.4. Agency Consultation

The project team has completed initial consultation with Transport for NSW and Liverpool City Council regarding the proposed development as outlined in Table 1.2.

Table 1.2: Agency Consultation

Date	Organisation	Details
17/02/2021	Transport for NSW	Transport for NSW requested that the following information be included in the Traffic Impact Assessment: o Outline of proposed school catchment and associated travel mode. o Traffic modelling to include Boys and Girls High School in baseline.
18/02/2021	Liverpool City Council Pre-DA meeting	o Council requested that traffic volume modelling be conducted for both options of a roundabout and turn bay traffic solution, including consideration of Hospital use of the road. o A new Student Transport Plan will be provided as part of the SSDA.
07/05/2021	Transport Working Group (project team, School Infrastructure, Council, Transport for New South Wales)	Project team provided an overview of the project to the TWG. o GTA confirmed the proposed left-in/ left-out is for the northern approach of the Lachlan Street/ Forbes Street intersection (hence not affecting school special bus routes for the high schools). o GTA confirmed the Lachlan Street/ Hart Street/ Burnside Drive roundabout can accommodate bus movements with minor overhang of the footpath. o Transport for NSW were agreeable to receiving SIDRA modelling ahead of submission. o Council requested that modelling be undertaken with and without the Campbell Street closure and other changes to the road network. o Transport for NSW queried coordination of bell times with high schools, project team advised that separated times would be preferrable to spread traffic impact. o Council recommended that a review of the cycle network be included. o Transport for NSW queried land ownership of the new roundabout, project team confirmed it is Health Infrastructure (HI) owned land and coordination with HI has been made and is ongoing. o Transport for NSW recommended that potential diversion of the 904 bus be reviewed. o Transport for NSW recommended consultation of the Green Travel Plan with the Customer Journey Planning division of Transport for NSW.

1.5. References

In preparing this report, reference has been made to the following:

- An inspection of the site and its surrounds undertaken on 22 October 2019, during the morning and afternoon peak periods.
- Liverpool Development Control Plan (DCP) 2008.
- Transport for NSW (formally Roads and Maritime Services) Schedule of Classified Roads and State and Regional Roads versions 2011/1.
- New South Wales Government Planning Guidelines for Walking and Cycling 2004.
- Traffic and car parking surveys undertaken by Matrix Traffic and Transport Data on Tuesday 22 October 2019 as referenced in the context of this report.
- Plans for the proposed development prepared by Fitzpatrick and Partners.
- Transport for NSW Guidelines for Public Transport Capable Infrastructure in Greenfield Sites July 2018.
- Transport for NSW Guidelines for the Planning of Bus Layover Parking September 2018.
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 1: Off-Street Car Parking AS/ NZS 2890.1:2004.
- Australian Standard, Parking Facilities, Part 2: Off-Street Commercial Vehicles Facilities AS 2890.2:2018.
- Australian Standard, Parking Facilities, Part 3: Bicycle Parking, AS 2890.3:2015.
- Australian Standard/ New Zealand Standard, Parking Facilities, Part 6: Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009.
- Other documents and data as referenced in this report.

2. STRATEGIC CONTEXT

02

This section provides an overview of the strategic context of the proposed development, including the relevant planning strategies and opportunities.

2.1. Future Transport 2056 and Supporting Plans

Reviews have been completed for the following supporting plans:

- Future Transport Strategy 2056
- Greater Sydney Services and Infrastructure Plan
- Regional NSW Services and Infrastructure Plan
- Road Safety Plan (Towards Zero).

To support the land use vision for Greater Sydney, the NSW Government developed a vision for the transport system that will enable people and goods to move conveniently around the city using:

- City-shaping corridors – Major trunk road and rail public transport corridors providing higher speed and volume linkages between our cities and centres that shape locational decisions of residents and businesses.
- City-serving corridors – Higher density corridors concentrated within ~10km of metropolitan centres providing high frequency access to metropolitan cities/ centres with more frequent stopping patterns.
- Centre-serving corridors – Local corridors that support buses, walking and cycling, to connect people with their nearest centre and transport node.

Some of the key initiatives of this vision include:

- Sydney Growth Trains (part of More Trains, More Services program), which is committed within the next 10 years.
- Trial of on-demand bus services on selected local bus routes, which is committed within the next 10 years.
- Introduction of higher frequency transport services across Greater Sydney, which is under investigations between now and the next 20 years.
- Providing education campaigns for public transport users that target behaviours around rail corridors and level crossings, school student travel, safe travel for older or less mobile passengers and travel training across the network.

The More Trains, More Services initiative includes a service capacity upgrade program designed to transform the existing rail system. This program aims to transform Sydney's busiest train lines over the next 10 years and beyond, through digital systems, advanced signalling and infrastructure upgrades.

2.2. Greater Sydney Commissions' Western City District Plan

2.2.1. Education

Schools are essential local infrastructure. The Department of Education's high-level *School Assets Strategic Plan Summary* coordinates planning for, and delivery of, both new and expanded schools. It encourages the joint and shared use of facilities with local governments and the private sector to develop innovative ways to provide school infrastructure. The NSW Government will spend $4.2 billion over the next four years on building and upgrading schools, including the addition of more than 1,500 new classrooms providing places for 32,000 students. Shared use of facilities and increased opportunities for students to walk and cycle to school will better connect schools with local communities.

Planning for early education and childcare facilities requires innovative approaches to the use of land and floor space, including co-location with compatible uses such as primary schools and office buildings, close to transport facilities.

2.2.2. Education and Child Care

The State Environmental Planning Policy (SEPP) for Educational Establishments and Child Care Facilities 2017 makes it easier for childcare providers, schools, TAFEs and universities to build new facilities and improve existing facilities. It streamlines approval processes, recognising the need for additional educational infrastructure with a focus on good design.

2.2.3. Joint and Shared Use

Joint and shared use of facilities is encouraged to make school assets available to the community outside school hours and to give schools access to community facilities. Each neighbourhood has facilities such as libraries, community centres, adult education, sport and recreation facilities that function to enhance and promote social connections and networks within the community. Schools are an important example of social connectors and where shared use of such facilities is achieved their function as a community hub is significantly enhanced.

2.3. Movement and Place

Movement and Place is a cross-government framework for planning and managing roads and streets across NSW. The framework delivers on NSW policy and strategy directions to create successful streets and roads by balancing the movement of people and goods with the amenity and quality of places. Movement and Place considers the whole street including footpaths, from property line to property line. It takes into account the needs of all users of this space including pedestrians, cyclists, deliveries, private vehicles and public transport, as well as people spending time in those places.

Qualities that contribute to a well-designed built environment have been grouped under five themes in the *Practitioner's Guide to Movement and Place*, a guideline which guides the design and planning around streets and roads for use on state government projects. These are:

- Access and Connection – enabling urban mobility through access to opportunity, services, and amenities with walkable neighbourhoods, cycle routes, and public transport.
- Amenity and Uses – providing a diversity of public and private spaces to accommodate a variety of activities at different times of the day and night; and a mix of land uses that permits daily activities to be accessed on foot (such as primary schools and local shops).
- Character and Form – the identification of a place perceived through its built form, landscape character and the contribution of local people over time.
- Green and Blue – Trees, landscapes and water for greening and cooling places in sustainable ways, improving people's comfort and experience, and providing open space for recreation and respite.
- Comfort and Safety – clear air, sun, shade, peaceful parks and active building frontages contributing to the liveability of places, including feelings of safety.

2.4. Better Placed

Better Placed is an integrated design policy prepared by the Government Architect of New South Wales, used to enhance the design quality of our built environment, and raising expectations and raising standards about working better and creating better environments. The policy outlines five elements of well-designed built environments:

- Healthy – for all members of our communities, promoting physical activity and walkable environments, social cohesion, and community safety and security to support people's well-being.
- Responsive – to the needs and aspirations of local people, now and into the future, inviting innovative use and habitation, interaction, productivity and enjoyment.
- Integrated – by drawing together the relationships between parts and elements, considering interfaces at multiple scales, and working to common goals and aspirations.
- Equitable – by presenting opportunities for all segments of our community so residents and visitors have access to and can move about freely between public domain, infrastructure, open space and buildings.
- Resilient – to the dynamic, challenging conditions of our time, to adapt and evolve while retaining essential qualities and values.

The policy also establishes seven distinct objectives to define the key considerations in the design of the built environment, being: better fit, better performance, better for community, better for people, better working, better value, and better look and feel.

2.5. Sydney's Cycling Future

The Sydney's Cycling Future 2013 has identified schools as part of the major neighbourhood destinations where links to these destinations should be prioritised.

Transport for New South Wales is developing a range of customer initiatives that will raise the profile of bicycle riding as a fun, healthy, easy and flexible transport option. Transport for NSW will provide information on how to plan a safe riding route and also introduce initiatives to improve compliance with the bicycle related road rules when riding or driving on the road.

- Travel choices: Transport for NSW will support programs designed for everyday destinations to inform customers of their travel choices and provide incentives for them to ride. These programs will help ease congestion around key destinations at peak times.
- Road Safety Education Program: this is a long-term integrated educational initiative. The program aims to increase students' road safety knowledge, understanding and skills and to develop positive road user attitudes and safe behaviours in children and adolescents. This includes safe bicycle riding.
- Community Bicycle and Road Safety Education facilities: Transport for NSW will continue to work to instil safe cycling practices into school age children. Many facilities exist for children to learn road skills and safe cycling practice away from live traffic.
- Support existing health programs: Transport for NSW will work with the Ministry of Health and the Office for Preventive Health on programs such as the Healthy Children Initiative, Active Travel to School and Healthy Workers Initiative.

2.6. Sydney's Walking Future

Transport for NSW will create a culture of walking as a viable and attractive transport choice, especially for getting to and from school. Transport for NSW would like to increase walking trips to school to reduce the pressure on our road network and public transport system.

The three pillars of Sydney's walking future include promoting benefits and providing information to increase walking trips to schools through programs that encourage more sustainable transport. Transport for NSW will encourage more people to walk during peak times to ease congestion on roads and free up capacity on public transport, particularly around schools as well as promoting the physical, emotional and social benefits of walking.

2.6.1. Road Safety Education Program

The Road Safety Education Program is a long-term integrated education initiative. The program aims to increase road safety knowledge, understanding and skills. Transport for NSW works closely with the Department of Education, the Association of Independent Schools of NSW and the Catholic Education Commission NSW to develop these programs. The NSW Government is committed to continuing the Road Safety Education program and encouraging more children to walk to school safely.

2.6.2. Safety around Schools Program

This program aims to reduce the number and severity of child casualties in 40 km/h school zones. Transport for NSW will continue to focus strongly on improving the visibility of school zones to increase driver awareness and compliance. School zones are designed to protect children on their journey to and from school. Measures include:

- dragon's teeth road markings in all school zones
- the replacement of old, damaged school zone signs with new fluorescent signs
- marked foot crossings
- raised pedestrian crossings
- pedestrian refuges and fencing
- traffic signal-controlled pedestrian crossings.

School zone flashing lights are designed to alert drivers that they are entering a 40 km/h school zone and to adjust their speed accordingly. School zone flashing lights have been rolled out across NSW as part of this program and the NSW Government has ensured that every school in NSW has at least one set of school zone flashing lights.

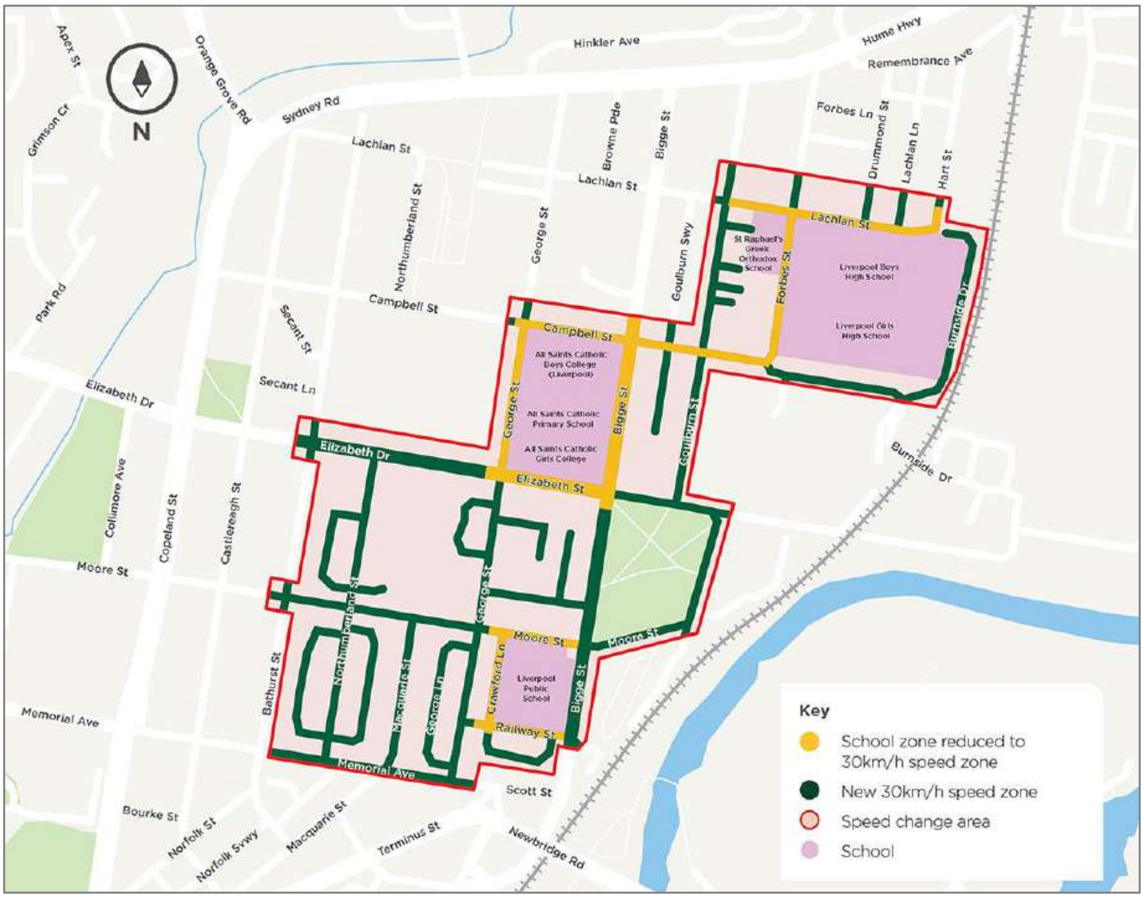
2.7. Sydney's Bus Future 2013

Transport for NSW introduced more than 4,900 extra weekly bus services over 2011 and 2012, in urban growth areas, on high demand routes and as extra school services. Local services will continue to provide peak express and limited stop services, school services, local shopping services, CBD shuttles, special event access and late-night services.

2.8. Liverpool CBD 30 km/h Speed Limit Zone

Transport for NSW introduced a 30 km/h speed zone for the Liverpool city centre in mid-July 2020 to provide a safer environment for pedestrians and cyclists, as well as for students attending schools in the city centre. A review of the trial will be undertaken 12 months from its implementation by Transport for NSW. As part of the trial, existing school zones within the new 30 km/h area have also been reduced to 30 km/h.

Figure 2.1: Liverpool CBD 30 km/h Speed Limit Zone



Base Image Source: Liverpool City Council, https://www.liverpool.nsw.gov.au/services/roads-traffic-and-parking/road-safety, accessed 4 March 2021

2.9. East-West Pedestrian Link

The redevelopment of the Liverpool Boys and Girls High School is the subject of a separate project (of which the scope is unresolved, and timing is currently unknown). Part of this project (and aligning with the aspirations for the Liverpool Innovation Precinct) was the creation of an East-West Link as shown in Figure 2.2.

The current layout of the Liverpool Boys and Girls High School buildings does not support the introduction of an East-West pedestrian link at this stage, however, the design of the New Liverpool Public School does not preclude the introduction of this link in the future.

Figure 2.2: East-West Pedestrian Link

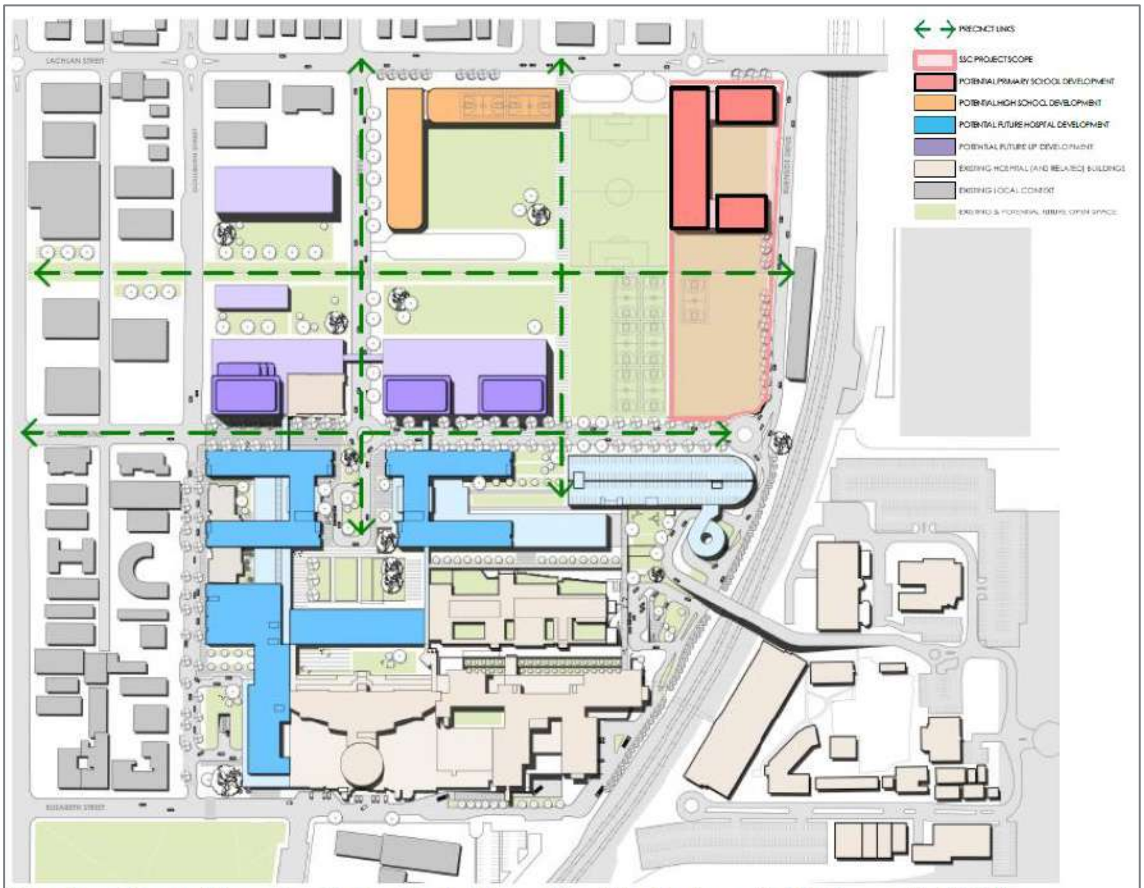


Figure 3 Liverpool Innovation Precinct Master Plan and Land Use Strategy with SSD Scope added (2018)

Source: CBRE, received 10 May 2021

3. EXISTING CONDITIONS

03

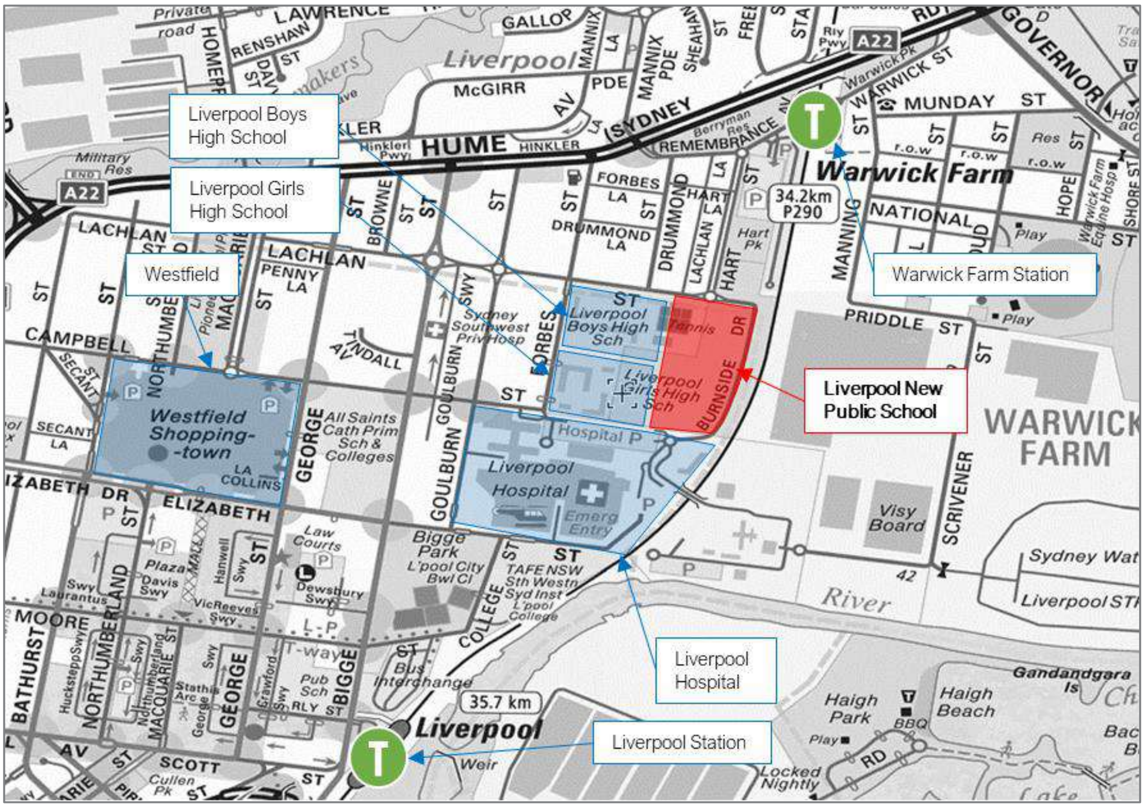
3.1. Site Location and Local Context

The NLPS is proposed to be located approximately one kilometre north-east of the Liverpool CBD. The proposed school is bounded by Lachlan Street to the north, Burnside Drive to the east, Liverpool Hospital to the south and the existing Liverpool Boys High School and Liverpool Girls High School to the west. Liverpool Station is located around 900 metres southwest of the school and Warwick Farm Station is located around 500 metres north of the school.

The site location is illustrated in Figure 3.1. The site is around 1.9 hectares.

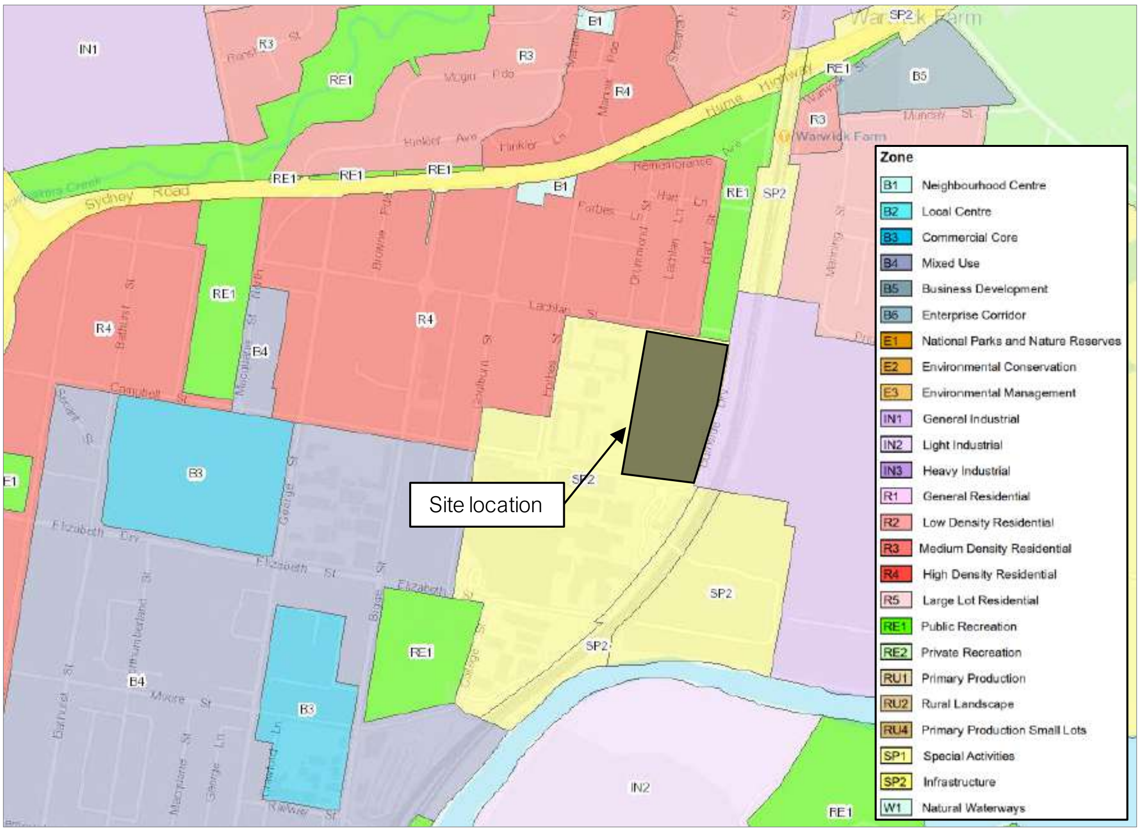
Located close to the Liverpool CBD, there is a variety of land zoning surrounding the site. To the north and west of the site is high density R4 zoning. To the east, over the rail line is IN1 general industrial zoning. SP2 infrastructure zoning is presented adjacent to the site, in the form of Liverpool Boys High School and Liverpool Girls High School to the west and Liverpool Hospital to the south. Further south east is B3 commercial core and B4 mixed use zoning, comprising most of the CBD business and retail activity.

Figure 3.1: Subject site and environs



Base Image Source: Sydway

Figure 3.2: Surrounding land zoning



Base Image Source: NSW Government ePlanning Spatial Viewer, https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address, accessed 1 March 2021

3.2. Road Network

This section provides an understanding of the current road network surrounding the site in terms of characteristics and operational performance.

3.2.1. Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules, most recently amended on 19 March 2018.

Transport for NSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility.

These road classes are:

Arterial Roads

Arterial roads are controlled by Transport for NSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

Sub-Arterial Roads

Sub-arterial roads are managed by either Council or Transport for NSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their purpose is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).

Collector Roads

Collector roads provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.

Local Roads

Local roads provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

3.2.2. Surrounding Road Network

Forbes Street

Forbes Street functions as a local road and is aligned in a north-south direction. It is a two-way road configured with one traffic lane and one parking lane in each direction within a 12.5-metre wide carriageway.

Kerbside parallel parking is permitted on both sides of the road. The kerbside parking on the eastern side of the road along the Liverpool Boys High School and Liverpool Girls High School frontage is subjected to Bus Zone restrictions during school days between 8:15am and 9:15am and 2:45pm and 3:45pm. The kerbside parking on the western side of the road has ‘No Parking’ during school days between 8:30am and 9:30am and 2:30pm and 3:30pm.

Forbes Street has a posted speed limit of 30 km/h due to being a high pedestrian activity area, with a 30 km/h school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Forbes Street currently carries around 4,000 vehicles per day[1].

There are two existing raised pedestrian crossings on Forbes Street. One located near the Lachlan Street/ Forbes Street intersection and another midblock between Lachlan Street and Campbell Street.

Forbes Street is shown in Figure 3.3 and Figure 3.4.

Lachlan Street

Lachlan Street functions as a collector road and is aligned in an east west direction. It is a two-way road configured with one traffic lane and one parking lane in each direction within a 12-metre wide carriageway. Kerbside parallel parking is permitted on both side of the road.

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[1] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

Lachlan Street has a posted speed limit of 30 km/h due to being a high pedestrian activity area with a 30 km/h school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Lachlan Street currently carries around 5,000 vehicles per day[2].

Low profile pedestrian refuges are provided on the east and western approaches of the Lachlan Street/ Forbes Street intersection. It is noted that the existing kerb ramp on the north-western corner of the Lachlan Street/ Forbes Street intersection is not aligned with the kerb ramp to the east, presenting a deficiency in the existing design.

Lachlan Street is shown in Figure 3.5 and Figure 3.6.

Burnside Drive

Burnside Drive functions as a collector road and is aligned in a north south direction. It is a two-way road configured with one travel lane in each direction within a seven-metre-wide carriageway. Kerbside parking is not permitted on both sides of the road. South of the Lachlan Street/ Hart Street/ Burnside Drive intersection, Burnside Drive is a private road, owned by Health Infrastructure.

Burnside Drive has a posted speed limit of 30 km/h in the Council-owned section. In the Health Infrastructure-owned section, the posted speed limit is 50 km/h. Burnside Drive currently carries around 6,000 vehicles per day[3].

The Lachlan Street/ Hart Street/ Burnside Drive roundabout provides pedestrian refuges on the eastern and western approaches only.

Burnside Drive is shown in Figure 3.7 and Figure 3.8.

Campbell Street

Campbell Street functions as a collector road and is aligned in an east west direction. It is a two-way road configured with one travel lane and one parking lane in each direction.

Kerbside parking is permitted on both sides of the road, subject to two-hour time restrictions during weekdays between 8:30am and 6:00pm and Saturday between 8:30am and 12:30pm.

Campbell Street has a posted speed limit of 30 km/h with a school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Campbell Street currently carries around 4,000 vehicles per day[4].

An existing midblock raised pedestrian crossing is present between Goulburn Street and Forbes Street.

Campbell Street is shown in Figure 3.9 and Figure 3.10.

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[2] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.
[3] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.
[4] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

Figure 3.3: Forbes Street (looking north)

Figure 3.4: Forbes Street (looking south)

Figure 3.5: Lachlan Street (looking east)

Figure 3.6: Lachlan Street (looking west)

Figure 3.7: Burnside Drive (looking north)

Figure 3.8: Burnside Drive (looking south)

Figure 3.9: Campbell Street (looking east)

Figure 3.10: Campbell Street (looking west)

3.2.3. Crash Analysis

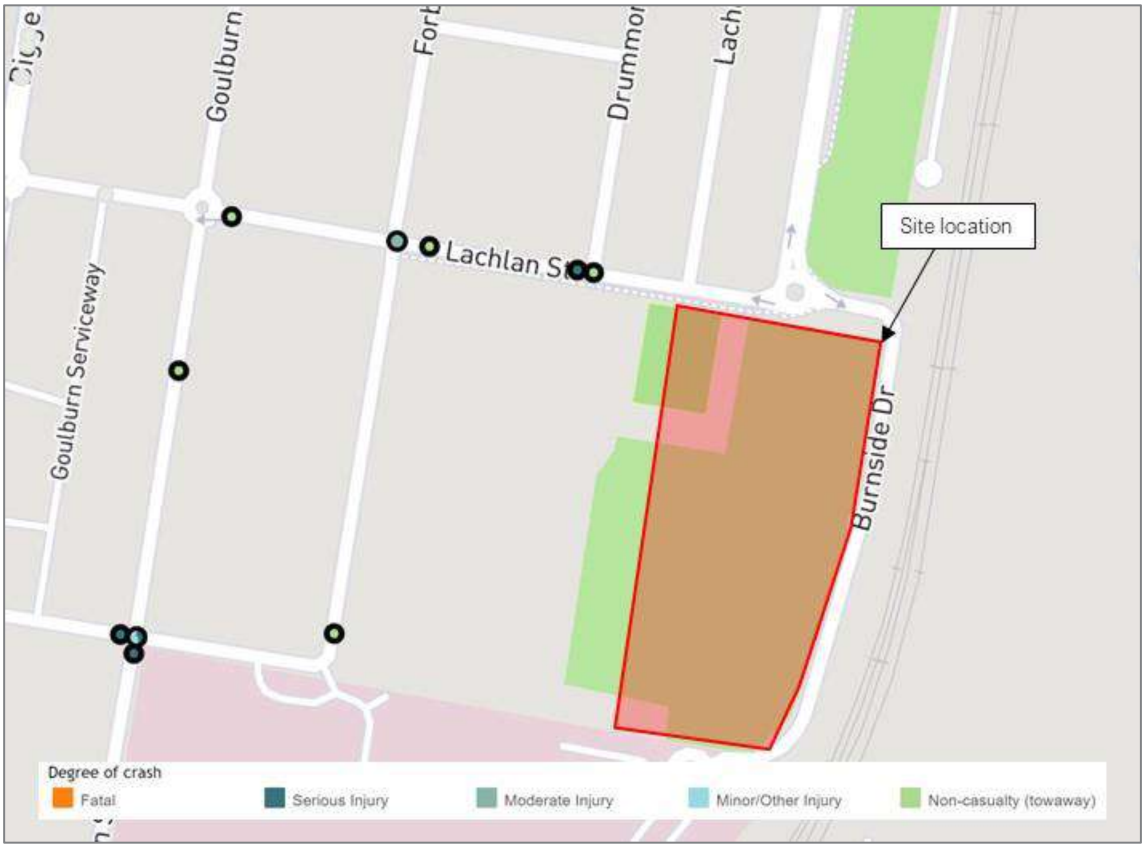
Historical crash data for the road network surrounding the site was sourced for the periods from January 2015 to December 2019. During this period 14 crashes occurred, including:

- 4 crashes resulting in serious injury
- 2 crashes resulting in moderate injury
- 1 crash resulting in minor injury/ other injuries
- 7 crashes non-casualty (towaway) crashes.

Of the 14 crashes that occurred, seven crashes (50 per cent) occurred along the Liverpool High School's frontage with four crashes on Lachlan Street, one crash on Forbes Street and two crashes at the Lachlan Street/ Forbes Street intersection. Two crashes occurred on Goulburn Street, one on Campbell Street and four crashes at the Goulburn Street/ Campbell Street intersection.

Figure 3.11 illustrates the locations of the crashes that occurred between January 2015 and December 2019.

Figure 3.11:Historical crashes, January 2014 to December 2018



Base image source: Transport for NSW Centre for Road Safety, https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4, accessed 1 March 2021

3.3. Traffic and Parking Surveys

3.3.1. Survey Scope

Surveys were undertaken on Tuesday 22 October 2019. The surveys were conducted for the following key intersections between 7:00am – 9:00am and 2:30pm – 5:30pm:

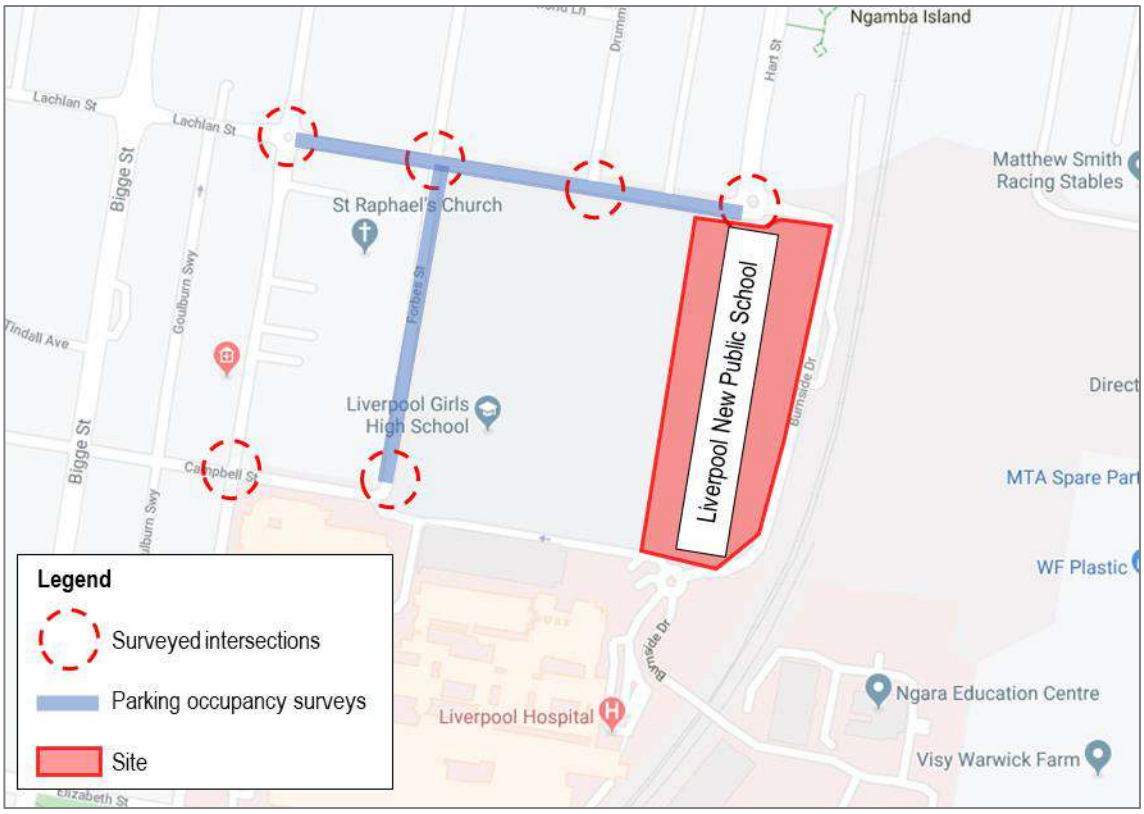
- Campbell Street/ Goulburn Street
- Campbell Street/ Forbes Street
- Lachlan Street/ Forbes Street
- Lachlan Street/ Goulburn Street
- Lachlan Street/ Drummond Street
- Lachlan Street/ Hart Street.

And the following key parking areas between 7:00am – 9:00am and 2:30pm – 4:30pm:

- Forbes Street between Drummond Lane and Campbell Street
- Lachlan Street between Goulburn Street and Hart Street.

A summary of the locations of the surveyed areas is provided in Figure 3.12.

Figure 3.12: Location of surveyed intersections and parking areas



Base image source: Google Images

3.3.2. Traffic Volumes

An AM school peak period of 8:00am-9:00am is adopted based on a school commencement time of 9:10am (see Table 4.3). A PM school peak of 2:45pm to 3:45pm is adopted based a school conclusion time of 3:10pm.

The existing AM and PM peak hour traffic volumes are provided in Appendix A.

3.3.3. Parking Occupancy

Parking occupancy surveys were undertaken within the nominated area on Tuesday 22 October 2019 from 7:00am to 9:00am and 2:30pm to 4:30pm. The results are summarised in Table 3.1 and Table 3.2.

Parking availability on unrestricted sections of Lachlan Street is typically low, with most spaces occupied prior to 7:00am. From 3:30pm onwards, minimal parking availability are observed.

Table 3.1: Existing parking supply and occupancy

Parking area	Restriction	Supply	Demand					
			7:00am	8:00am	9:00am	2:30pm	3:30pm	4:30pm
Lachlan Street, northern side	Unrestricted	32	29	31	30	28	24	24
Lachlan Street, southern side	Unrestricted	45	42	43	44	42	32	29
Forbes Street, eastern side	Unrestricted	15	15	15	15	14	14	14
	Bus Zone[1]	11	2	1	0	0	0	3
	Bus Zone[2]	1	0	0	0	0	0	1
	Loading Zone[3]	1	0	0	0	0	0	1
Forbes Street, western side	No Parking[4]	4	1	1	0	1	0	0
	No Parking[5]	3	0	1	1	2	0	3
	1/4P	14	3	4	11	8	6	11

[1] Bus Zone operates between 8:00am and 9:30am and 2:30pm and 4:00pm during School Days.
[2] Bus Zone operates between 8:00am and 4:00pm during School Days.
[3] Loading Zone operates between 8:15am and 3:45pm during School Days.
[4] No Parking Permit Holders Excepted Area A.
[5] No Parking between 8:00am and 9:30am and 2:30pm and 4:00pm during School Days.

Table 3.2: Summary of parking occupancy surveys

Parking area	Restriction	Supply	Demand					
			7:00am	8:00am	9:00am	2:30pm	3:30pm	4:30pm
Lachlan Street, northern side	Unrestricted	32	91%	97%	94%	88%	75%	75%
Lachlan Street, southern side	Unrestricted	45	93%	96%	98%	93%	71%	64%
Forbes Street, eastern side	Unrestricted	15	100%	100%	100%	93%	93%	93%
	Bus Zone[1]	11	18%	9%	0%	0%	0%	33%
	Bus Zone[2]	1	0%	0%	0%	0%	0%	100%
	Loading Zone[3]	1	0%	0%	0%	0%	0%	100%
Forbes Street, western side	No Parking[4]	4	25%	25%	0%	25%	0%	0%
	No Parking[5]	3	0%	33%	33%	66%	0%	100%
	1/4P	14	21%	29%	79%	57%	43%	79%

3.4. Intersection Operation

The operation of the key intersections within the study area have been assessed as a network model using SIDRA Intersection[5], a computer-based modelling package which calculates intersection performance.

3.4.1. Performance Criteria

The commonly used measure of intersection performance, as defined by Transport for NSW, is vehicle delay. SIDRA Intersection determines the average delay that vehicles encounter and provides a measure of the level of service. A Level of Service of D or better with a degree of saturation of less than 0.85 is generally considered acceptable operation.

Table 3.3 shows the criteria that SIDRA Intersection adopts in assessing the level of service.

Table 3.3: SIDRA Intersection level of service criteria

Level of Service	Average delay per vehicle (secs/ veh)	Traffic signals, roundabout	Give way, stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

[5] Program used under license from Akcelik & Associates Pty Ltd.

SIDRA models of the Goulburn Street/ Campbell Street signalised intersection were calibrated based on existing signal cycle times observed on site during peak periods. Models were checked to ensure calculated queues were similar to what was observed. Observations of queue lengths on-site were done based on recording maximum queues observed at each intersection over several minutes or traffic signal cycles (as required) throughout the peak periods. This then formed the basis of assessing the adequacy of 95th percentile queues as calculated in SIDRA.

3.4.2. Intersection Performance – Existing Scenario

Table 3.4 and Table 3.5 present a summary of the existing operation of the intersections. The intersections were modelled using SIDRA Network to determine the overall operation of the road network. The intersection counts obtained at the end of 2019 have been adopted as the volume inputs into the existing scenario as it is a more conservative representation of typical operation of existing intersections near the proposed school. This is because Liverpool Hospital have recently removed a portion of their existing at-grade car parking south of Burnside Drive in preparation to construct the new multi-storey car park. The temporary reduction in Hospital car parking is expected to have resulted in reduced vehicle generation compared to the survey results from 2019.

Table 3.4: Existing operating conditions – AM peak

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.45	16	26	B
Lachlan Street/ Goulburn Street	Priority	0.11	9	2	A
Lachlan Street/ Forbes Street	Priority	0.5	15	10	B
Lachlan Street/ Drummond Street	Priority	0.14	6	2	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.26	9	4	A
Forbes Street/ Campbell Street	Priority	0.02	7	<1	A

Table 3.5: Existing operating conditions – PM peak

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.28	16	15	B
Lachlan Street/ Goulburn Street	Priority	0.19	9	3	A
Lachlan Street/ Forbes Street	Priority	0.20	14	2	A
Lachlan Street/ Drummond Street	Priority	0.05	6	<1	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.19	7	3	A
Forbes Street/ Campbell Street	Priority	0.08	6	<1	A

All intersections assessed currently operate well with a Level of Service B or better with spare capacity during both AM and PM peak hours. This aligns with observations during the site visit on 22 October 2019 during the peak periods where minimal queuing was observed and traffic performance in the surrounding vicinity of the Liverpool Boys High School and Liverpool Girls High School was generally satisfactory. Moderately heightened traffic activity was observed in the PM peak immediately after the conclusion of school, however, dissipated quickly.

3.5. Public Transport

3.5.1. Train Services

The NLPS is located approximately 500 metres south of Warwick Farm Station and 1.3 kilometres north of Liverpool Station. Both Liverpool and Warwick Farm stations are on the T2 Inner West and Leppington Line, T3 Bankstown Line and T5 Cumberland Line, which provide services to the City and Richmond Area every 10 minutes during peak and 30 minutes during the off peak.

A review of train occupancy data for February 2019[6] found that occupancy levels on trains at Liverpool Station is generally low on arrival at Liverpool Station. Of the 8,184 services during that month (upon arrival at Liverpool station, excluding 09/02/2019 and 10/02/2019 which were missing the Liverpool data), 8,155 presented occupancy levels less than 65 per cent train capacity and 29 presented occupancy between 65 per cent and 105 per cent.

Similar results are presented for Warwick Farm Station for the same time period. Of the 8,181 services during that month (upon arrival at Warwick Farm station, excluding 09/02/2019 and 10/02/2019 which were missing the Warwick Farm data), 8,141 presented occupancy levels less than 65 per cent train capacity and 40 presented occupancy between 65 per cent and 105 per cent.

As both stations are within walking distance of the school and present opportunity for increased patronage, there is potential to encourage greater train mode share for the new school.

[6] Data sourced from TfNSW Open Data (https://opendata.transport.nsw.gov.au/dataset/train-occupancy-nov-2018-feb-2019), accessed on 18 March 2021

3.5.2. Bus Services

There are multiple bus services that operate near the site with the nearest stop located at Liverpool Boys High School on Forbes Street. The surrounding bus network services are detailed in Table 3.6 and shown indicatively in Figure 3.13.

Table 3.6: Bus service frequency[1]

Bus route number	Description	AM/ PM peak frequency	Off-peak frequency	School frequency
851[2]	Liverpool to Carnes Hill Marketplace via Cowpasture Road	None / 20 minutes	60 minutes	One service per day at 3:34pm
852[2]	Carnes Hill Marketplace to Liverpool via Greenway Drive and Cowpasture Road	30 minutes/ 30 minutes	60 minutes	One service per day at 7:43am
853[2]	Liverpool to Carnes Hill via Hoxton Park Road	20 minutes/ 20 minutes	60 minutes	One service per day at 3:36pm
854[2]	Liverpool to Carnes Hills via Greenway Drive and Hoxton Park Road	15 minutes/ 15 minutes	60 minutes	One service per day at 3:16pm
856[2]	Bringelly to Liverpool	Varies throughout day	-	One service per day at 7:15am
857	Liverpool to Narellan	30 minutes/ 30 minutes	60 minutes	One service per day at 3:25pm
865[2]	Casula to Liverpool via Lurnea Shops	30 minutes/ 30 minutes	30 minutes	One service per day at 8:01pm
866[2]	Casula to Liverpool	30 minutes/ 30 minutes	30 minutes	One service per day at 8:00am
1005	Bringelly and Allenby to Liverpool Schools	One service per day at 7:11am	-	One service per day at 7:11am
1040	West Hoxton, Hoxton Park to Liverpool	One service per day at 7:36am	-	One service per day at 7:36am
1048	Denham Court to Liverpool	One service per day at 7:31am	-	One service per day at 7:31am
1051	Greenway Park, Hoxton Park to Liverpool	One service per day at 7:42am		One service per day at 7:42am
2034	Liverpool to Casula (Churchill Gardens), Horningsea Park, Rossmore			One service per day at 3:12pm
3033	Macquarie Fields Shops to Liverpool Boys High School	One service per day at 7:36am	-	One service per day at 7:36am
9029	Emmasus College to Liverpool High School via Bonnyrigg Heights Public School and Freeman College	One service per day at 7:35am	-	One service per day at 7:35am
9201	Miller Shopping Centre to Liverpool High School	One service per day at 7:34am	-	One service per day at 7:34am
9311	Lord Howe Drive opposite Cape Baron Avenue to All Saints College	One service per day at 7:35am	-	One service per day at 7:35am
901	Holsworthy Station to Liverpool Interchange	30 minutes/ 30 minutes	60 minutes	-
902	Holsworthy Station to Liverpool Station	30 minutes/ 30 minutes	60 minutes	-

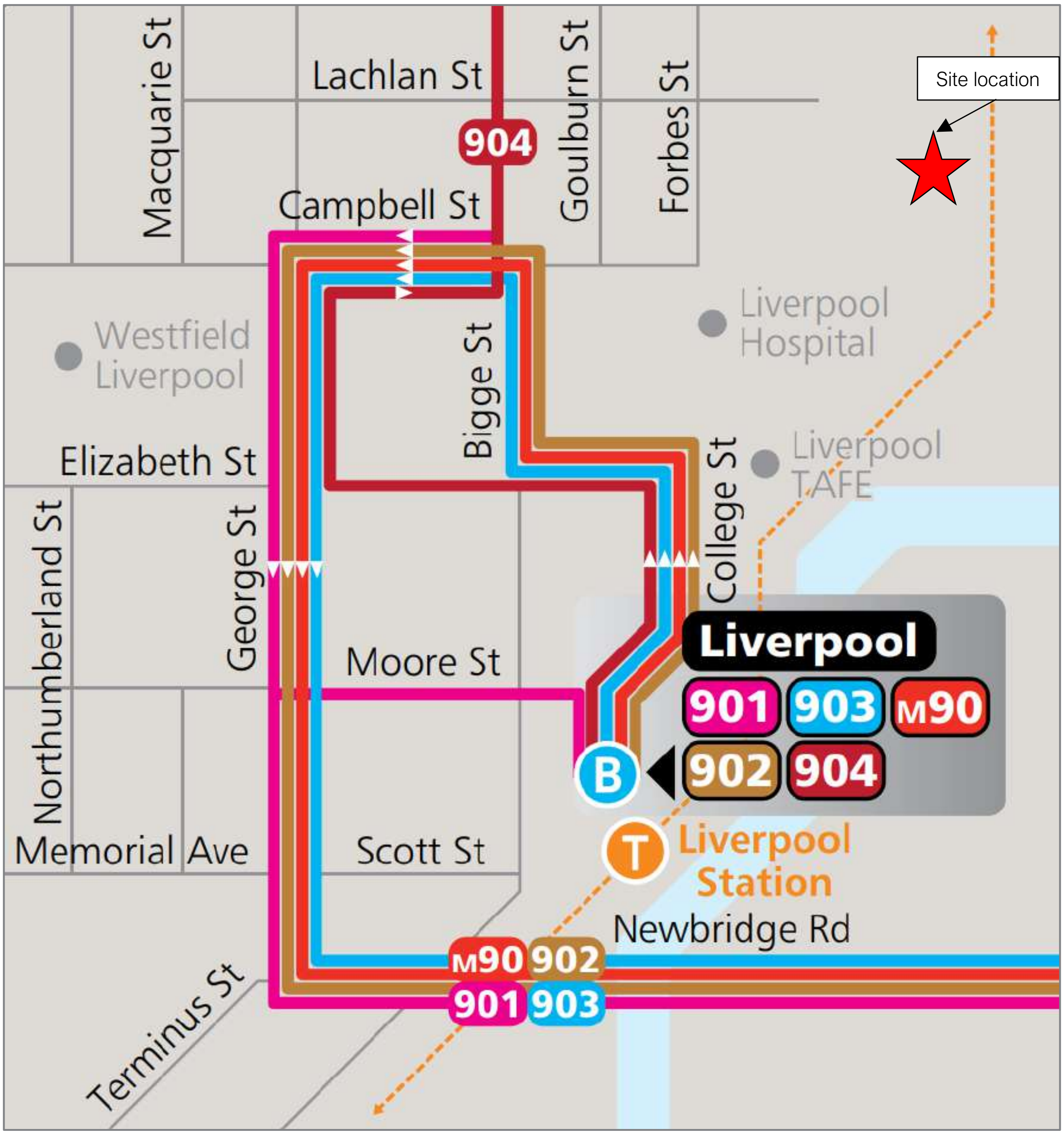
Bus route number	Description	AM/ PM peak frequency	Off-peak frequency	School frequency
903	Liverpool Interchange to Chipping Norton (loop service)	30 minutes/ 30 minutes	60 minutes	-
904	Fairfield Station to Liverpool Station	30 minutes/ 30 minutes	60 minutes	-
M90	Liverpool Station to Westfield Burwood	10 minutes/ 10 minutes	15 minutes	-
823	Liverpool Interchange to Warwick Farm (loop service)	30 minutes/ 30 minutes	60 minutes	-

Note:
1. Sourced from https://transportnsw.info/routes/bus, https://interlinebus.com.au/pdf/school_services/Liverpool%20Boys%20&%20Girls%20High%20School.pdf, https://static1.squarespace.com/static/5a668f1080bd5e34d18a7e76/t/5db6774ac853f67fa18c69f5/1572239186516/LIVERPOOL+BOYS+%26+GIRLS+HIGH+SCHOOL+14+OCT+19.pdf, https://www.transdevnsw.com.au/uploads/timetables/243/attachment/Liverpool%20.pdf, accessed 14 October 2019.
2. These bus services operate an alternate route that services the Forbes Street bus stop outside Liverpool Boys High School/ Liverpool Girls High School once per day.

Figure 3.13: Surrounding bus network (Interline)

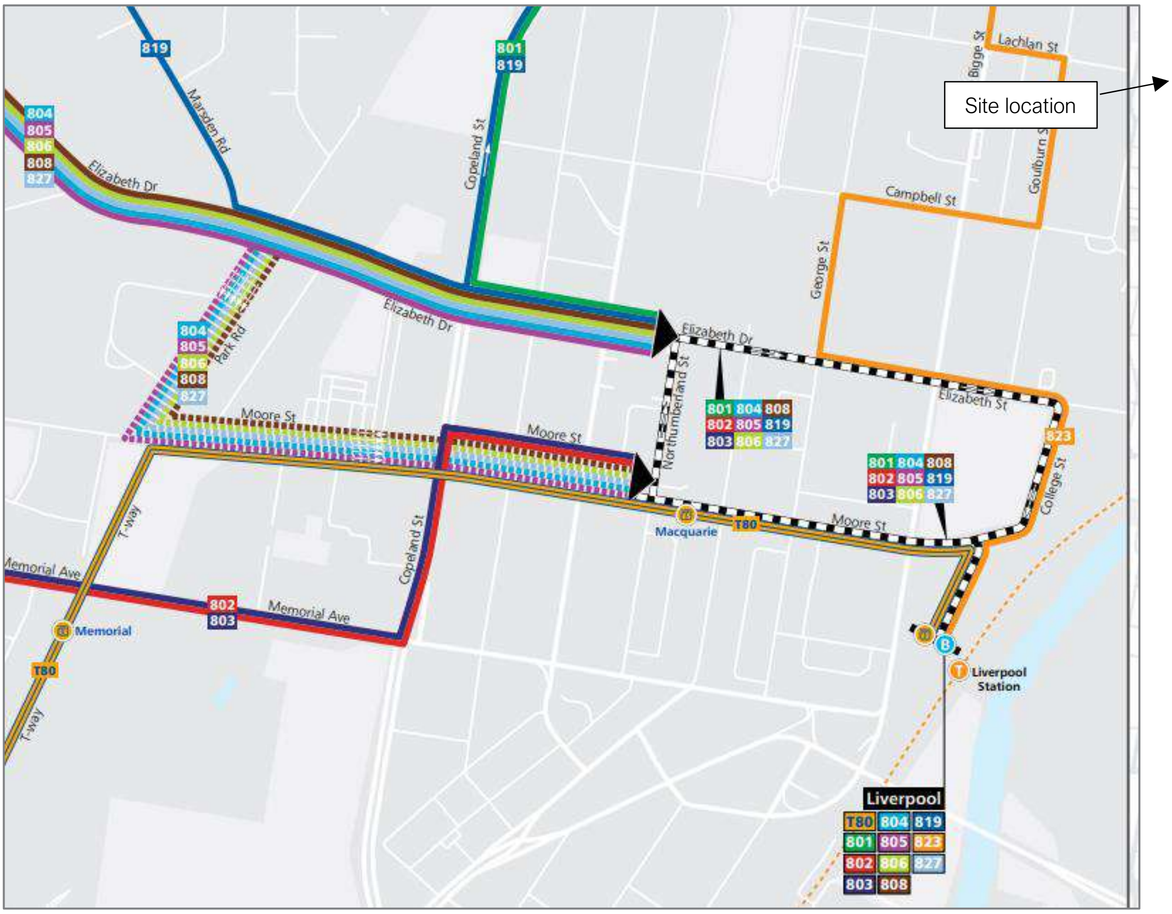
Base image source: https://interlinebus.com.au/img/Network_Map.jpg, accessed 10 May 2021

Figure 3.14: Surrounding bus network (Transdev)



Base source image: https://www.transdevnsw.com.au/ accessed 1 March 2021

Figure 3.15: Surrounding bus network (Transit Systems)



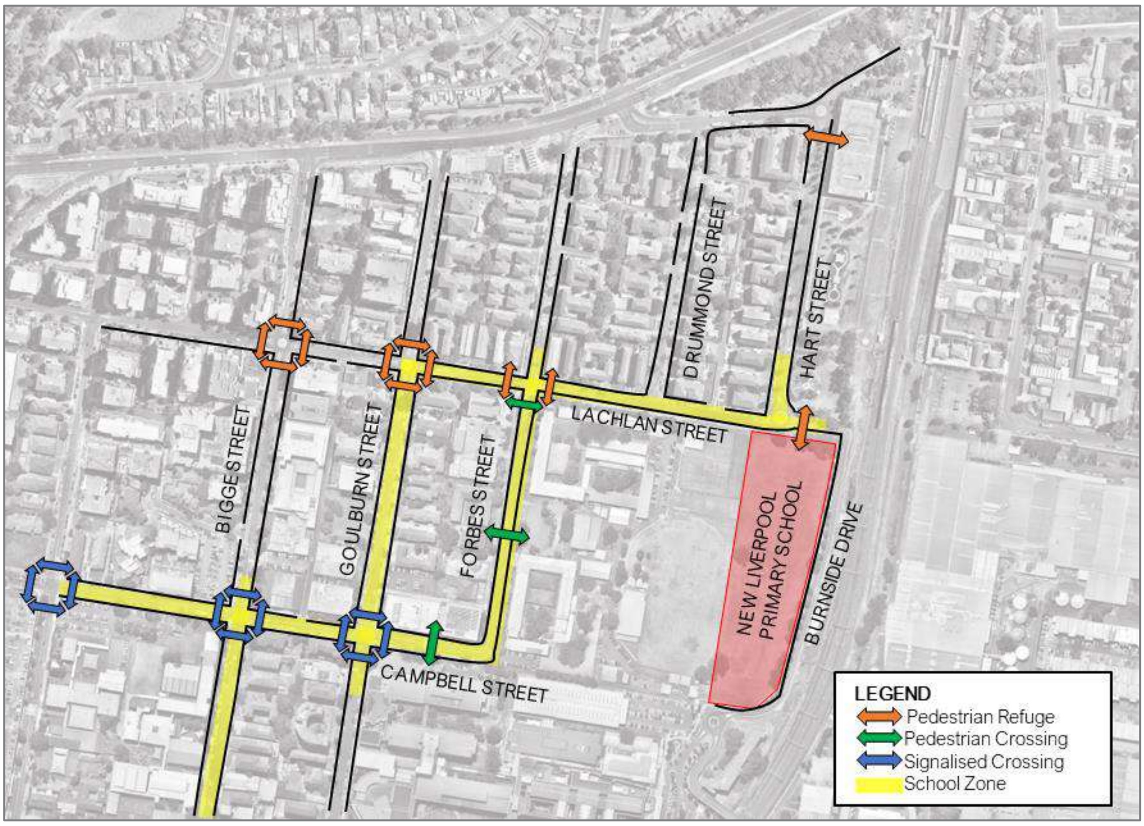
Base source image:
https://static1.squarespace.com/static/5a668f1080bd5e34d18a7e76/t/60762031dc5ee83e48116aef/1618354237661/21080_TS_R3_network_map_20210418.pdf, accessed 10 May 2021

3.6. Pedestrian Infrastructure

An overview of the existing pedestrian accessibility near the school is presented in Figure 3.16.

Generally, pedestrian amenity is moderate-high near the school, with a range of crossing facilities being signalised pedestrian crossings, pedestrian crossings and refuge islands. All nearby intersections present kerb ramps at each approach, except the western approach of the Lachlan Street/ Drummond Street intersection and the northern approach of the Lachlan Street/ Hart Street/ Burnside Drive roundabout. Existing 30 km/h school zones and 30 km/h high pedestrian activity zones are present near the site.

Figure 3.16: Pedestrian accessibility



Base map source: Nearmap

Roads near the school feature footpaths of at least 1.2 metres wide on both sides of the road. On some roads (such as the southern edge of Lachlan Street, and eastern edge of Forbes Street), the footpath width is wider (around three metres), facilitating higher amenity for pedestrians and increased capacity.

Pedestrian crossing infrastructure is provided near the site in the form of a raised pedestrian crossing on the southern approach of the Forbes Street/ Lachlan Street intersection and a mid-block raised pedestrian crossing on Forbes Street. Further south, another mid-block pedestrian crossing is provided on Campbell Street. The Goulburn Street/ Campbell Street intersection is the closest signalised intersection and provides signalised pedestrian crossings on all four legs.

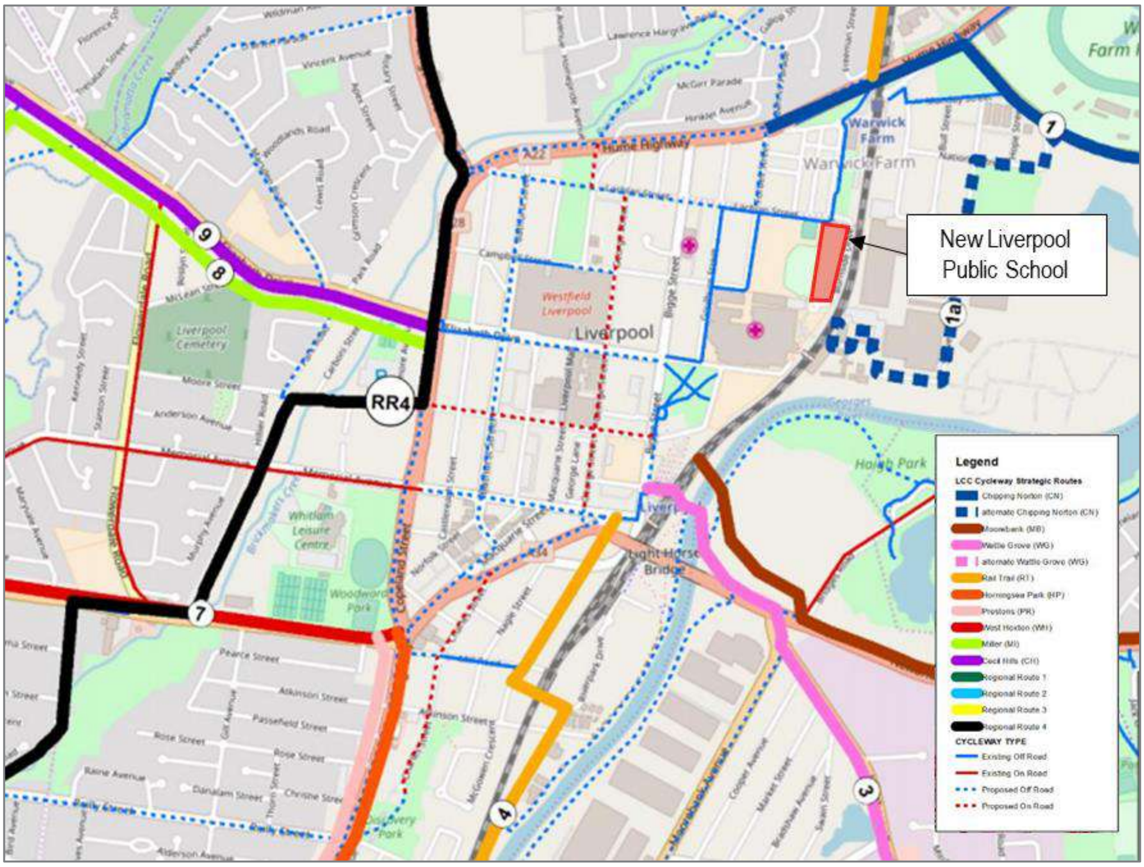
Proposed pedestrian facility upgrades are discussed in detail in Section 4.8.

3.7. Cyclist Infrastructure

The cycling network surrounding the site, including proposed on-road and off-road cycleways is shown in Figure 3.17.

There are existing off-road cycling facilities on the north west corner of the school on Lachlan Street and Forbes Street providing connectivity to Warwick Farm Station, Liverpool Hospital and Liverpool Station. As part of Liverpool Bike Plan, off-road cycling facilities are proposed along Forbes Street providing connectivity to Warwick Farm Public School. Furthermore, the cycling facilities on Lachlan Street will be extended from Goulburn Street to Hume Highway, providing connectivity to Westfield Liverpool.

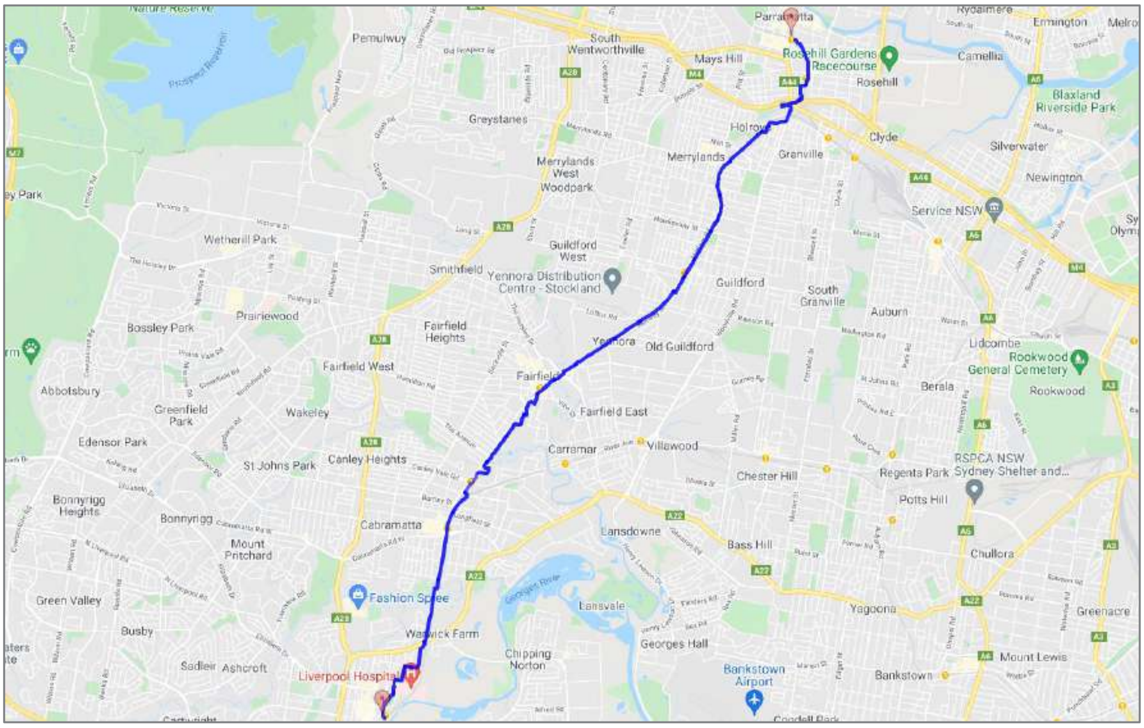
Figure 3.17:Liverpool bike network



Base image source: Liverpool Bike Plan 2018-2023, by Liverpool City Council, https://www.liverpool.nsw.gov.au/venues/parks-and-playgrounds/cycleways-and-walkways, accessed 1 March 2021

The Parramatta to Liverpool railside trail comprises a shared path that extends between Parramatta train Station and Liverpool Station and passes adjacent to the site along Lachlan Street.

Figure 3.18:Parramatta to Liverpool railside trail



Source: https://www.railtrails.org.au/trail-descriptions/nsw-and-act?view=trail&id=172, accessed 10 May 2021

3.8. Baseline School Travel Mode Share

As NLPS will be a new school, there is no data for an existing travel mode split. To provide a baseline, travel mode share surveys have been undertaken two primary schools in Liverpool, LPS and LWPS from 26 November 2019 to 3 December 2019. The average results from these two schools have been aggregated. These surveys were conducted via an online link distributed to staff and parents. The surveys indicate the following mode share split as summarised in Table 3.7, Table 3.8,Figure 3.21, and Figure 3.22.

3.8.1. Staff

79 staff responses were received (64 full-time staff and 15 part-time). Under the conservative assumption that part-time staff work half the equivalent hours of full-time staff, this equates to a response of 71.5 FTE staff out of 107.63 total FTE (based on LWPS and LPS 2018 annual report). This is a response rate of 66 per cent, hence the survey can be considered representative of the staff population.

Comparison is also drawn to 2016 Census data for the destination zone at which the school is located (refer to Figure 3.19). Car mode share for the school is greater than the average journey to work data for the destination zone, which presents an 82 per cent car mode share. This may be attributed to a higher preference for travel via car for the existing school staff within this destination zone compared to other employment.

Figure 3.19:ABS Census destination zone 115980011

Source: ABS Maps (https://itt.abs.gov.au/itt/r.jsp?ABSMaps), accessed 6 December 2019

Table 3.7: Staff Travel Mode Share

Mode	Responses	Percentage	Comparison to ABS JTW data[7]
Private car (driver)	72	91%	79%
Private car (passenger)	0	0%	3%
Picked-up/ dropped-off	0	0%	-
Motorcycle/ scooter	0	0%	0%
Bus	4	5%	1%
Train	2	3%	13%
Walk	1	1%	2%
Bicycle	0	0%	0%

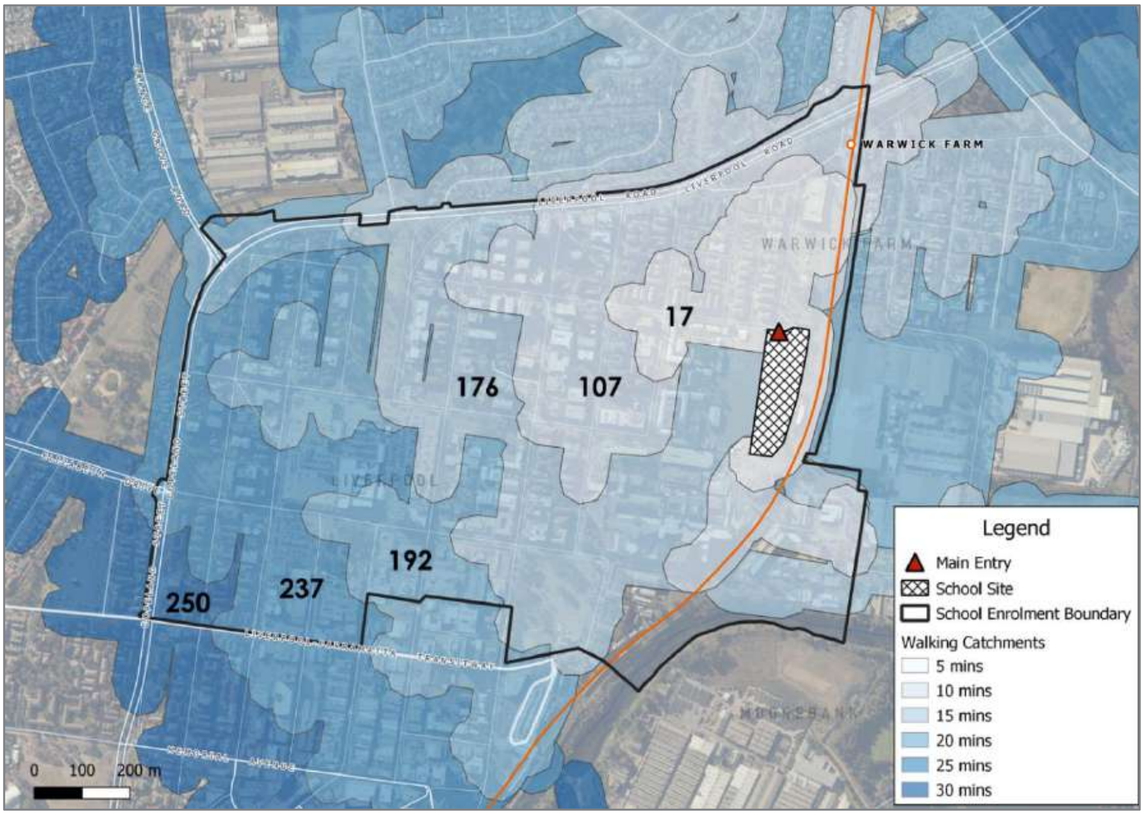
[7] Note: Australian Bureau of Statistics Journey to Work 2016 census data for destination zone 115980011,

Based on the surveys of LWPS and LPS, most staff travel to the school via private vehicle (91 per cent). Small proportions of staff travel via train, bus or walking. Comments from the surveys identify the primary reasons for travel via car to be convenience and using the car to travel elsewhere before or after school. Several respondents also identified infrequent or inconvenient bus services to be a limiting factor in adopting public transport to travel to school.

3.8.2. Students

Due to limited responses to the student travel mode surveys (18 responses), a first principles approach was adopted to derive the existing mode share. Depersonalised student residential data for the existing Liverpool Public School (LPS) within the proposed NLPS school catchment has been utilised for assessment, and the walking catchment is illustrated in Figure 3.20.

Figure 3.20:New Liverpool PS Walking Catchments



The analysis found that 43 per cent of students resided within an 800-metre walking distance of the proposed main school entry and 71 per cent of students resided within a 1200-metre walking distance (considered the upper limit comfortable walking distance).

Separately, data from GTA Consultants' *Trip Generation Surveys, Schools Analysis Report (2014)* found that, on average, primary schools within the Sydney Metropolitan area had a mode share split of 53 per cent walking, two per cent catching the bus, and 45 per cent travelling by car.

Based on the above, an indicative baseline walking mode share of 50 per cent is adopted. It is also envisaged that a minor proportion of students will also travel to school via bicycle or bus. No students are envisaged to travel via train as the catchment is comparatively small, and trains would not improve travel distance for anyone within the school catchment.

Based on this, the assumed baseline mode share is presented in Table 3.8.

Table 3.8: Student travel mode share

Mode	Percentage
Private car (parent/ guardian walks in with child)	45%
Motorcycle/ scooter	0%
Bus	2.5%
Train	0%
Walk	50%
Bicycle	2.5%

Figure 3.21:Staff travel mode share graph

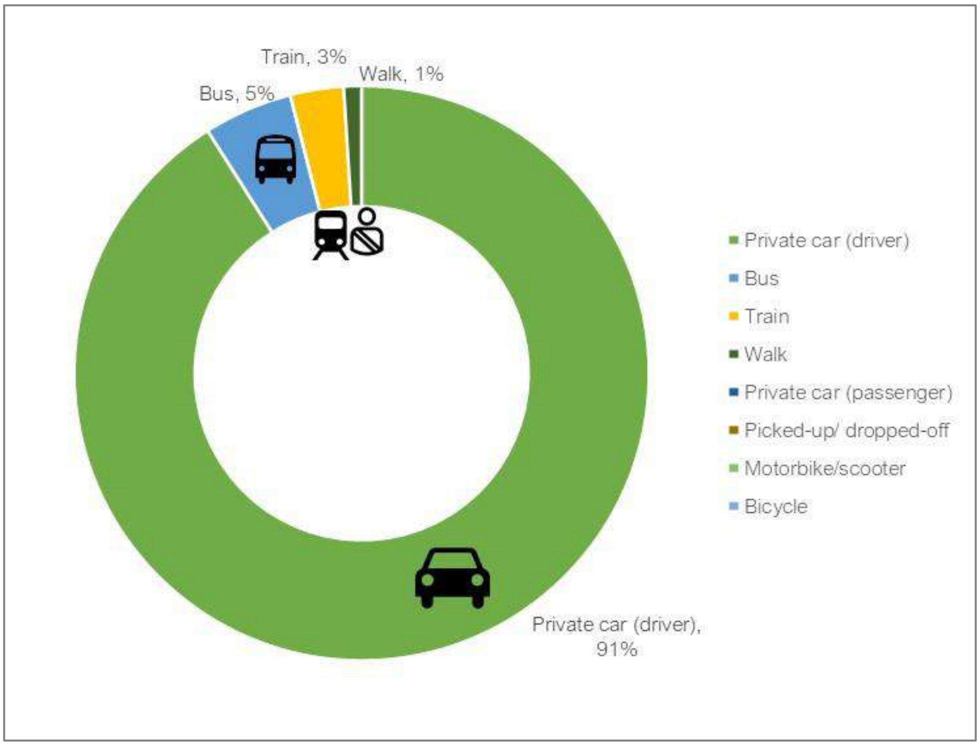
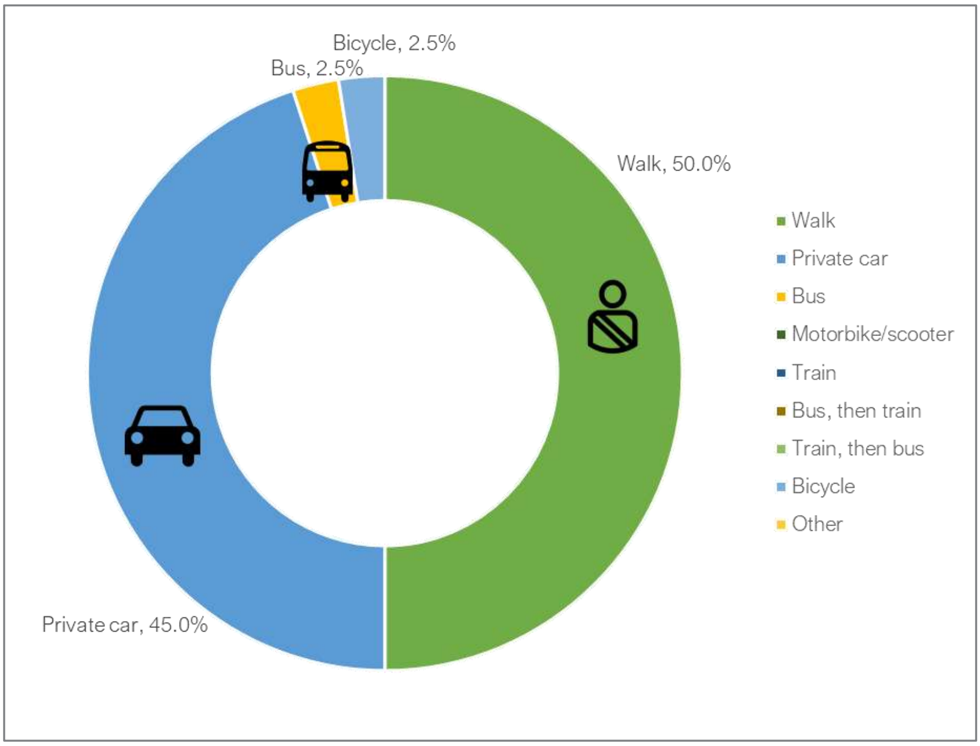


Figure 3.22: Student travel mode share graph



4. DEVELOPMENT PROPOSAL

04

4.1. Overview

The NLPS is located within the grounds of the existing Liverpool Boys and Girls High School in the Liverpool Central Business District (CBD), at 18 Forbes Street, Liverpool. The proposed NLPS is located in the eastern portion of the existing school grounds (refer to Figure 4.1).

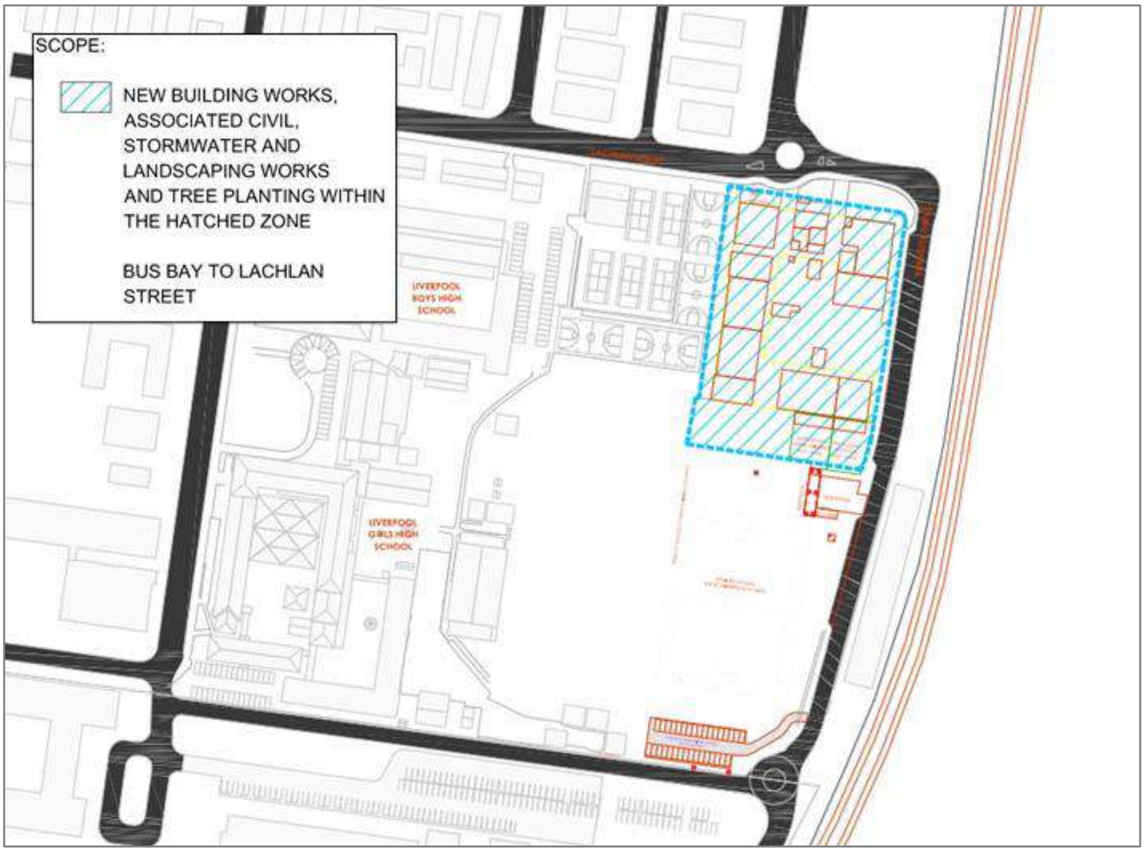
The site is legally described as Lot 1 in DP 1137425. The application seeks consent for the construction and operation of a new primary school. This will include construction of a new school building for core school facilities, teaching spaces, support units, preschools as well as associated landscaping and open space improvements. A detailed description of development is provided by Ethos Urban within the EIS.

The scope of works sought as part of the SSD approval is illustrated in Figure 4.2. Other works, including the construction of a new car park and hardstand areas, Burnside Drive widening for kerbside parking and a new roundabout are sought via separate planning approval pathways.

Figure 4.1: Context plan

Source: Fitpatrick + Partners, dated 0206/2021

Figure 4.2: SSDA Scope of Works



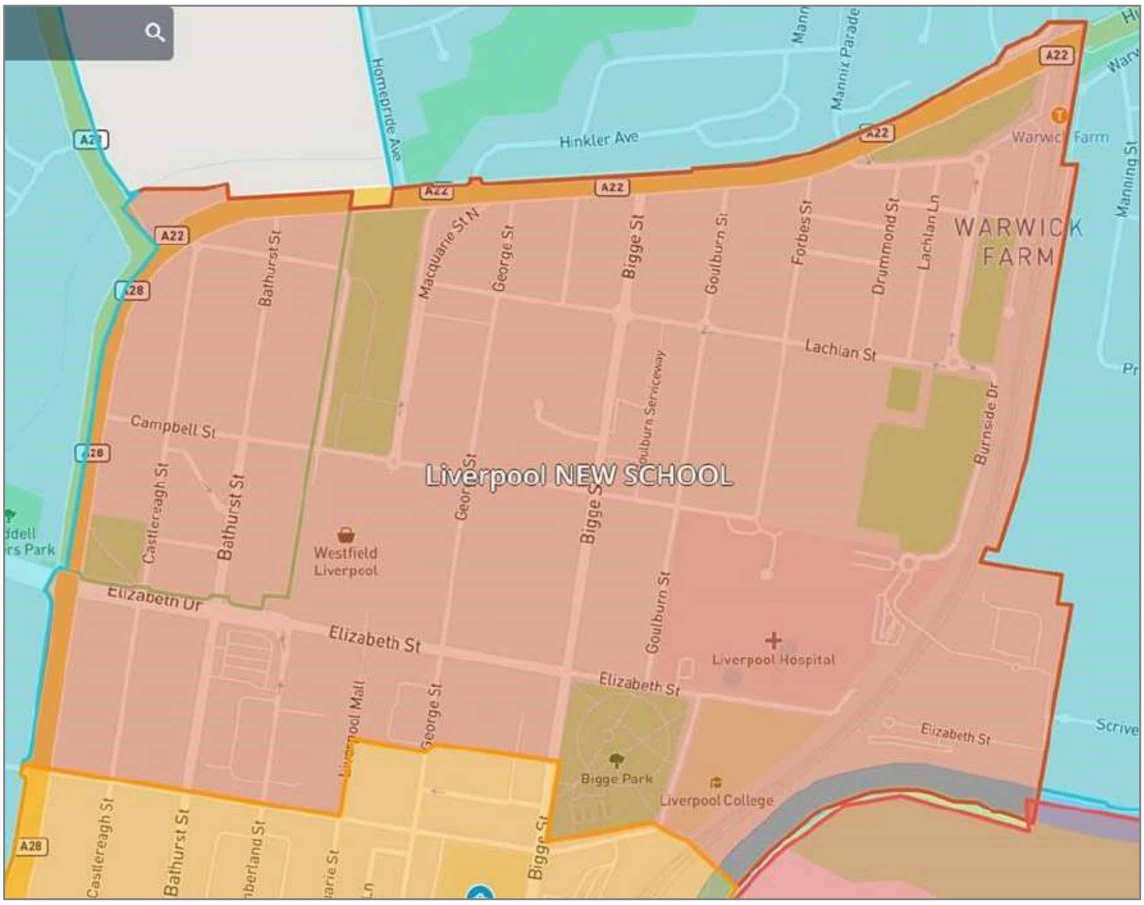
Base Image Source: ADCO, received 13/04/2021

4.2. School Catchment

The future school catchment for NLPS is illustrated in Figure 4.3. The catchment is bounded by Hume Highway to the north and west, the rail corridor to the east, and extends south to Moore Street. The catchment has been further overlaid on a map (Figure 4.4) illustrating the surrounding land zoning to highlight the residential areas and geographic location in relation to NLPS.

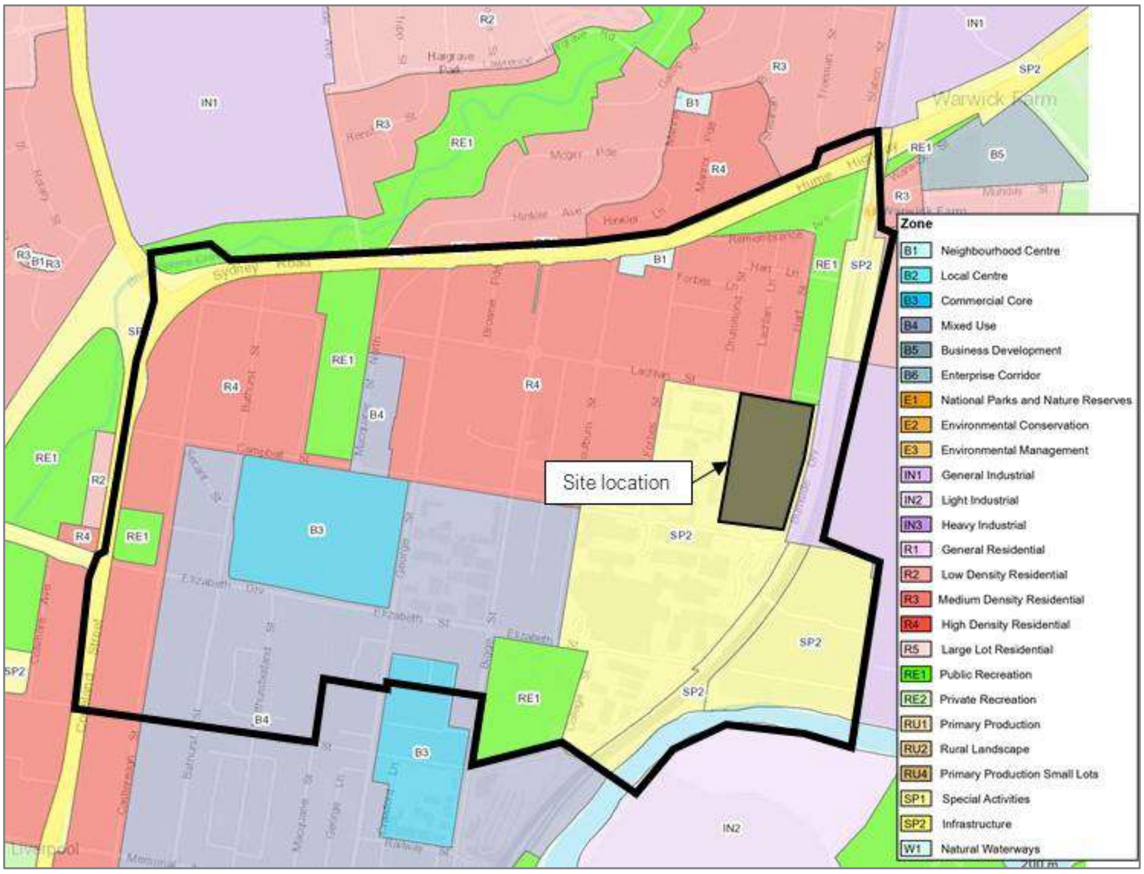
As seen, the majority of the residential catchment is located to the west and north-west of the proposed school (primarily high density residential zoning) and to the south-west (mixed use zoning).

Figure 4.3: School Catchment Boundary



Source: School Infrastructure, received 1 March 2021

Figure 4.4: Surrounding Land Zoning



Base Image Source: NSW Government ePlanning Spatial Viewer, https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address, accessed 1 March 2021

4.3. School Hours of Operation

In determining the NLPS's proposed hours of operation, the school hours of operation of the two adjacent schools (Liverpool Boys High School and Liverpool Girls High School, LBHS and LGHS) have been considered in order to disperse the peak demand and minimise the cumulative traffic and parking impact upon the local road network.

The existing hours of operation for LBHS and LGHS are summarised in Table 4.1 and Table 4.2.

Table 4.1: School hours of operation for Liverpool Boys High School

Day	School Commences	School Concludes
Monday	8:50am	1:30pm
Tuesday - Friday	8:50am	3:06pm

Table 4.2: School hours of operation for Liverpool Girls High School

Day	School Commences	School Concludes
Monday, Tuesday, Thursday Friday	8:50am	3:10pm
Wednesday	8:50am	2:35pm

The following school hours of operation are proposed for NLPS.

Table 4.3: School hours of operation for New Liverpool Public School

Day	School Commences	School Concludes
Monday to Friday	9:00am	3:10pm

To minimise the cumulative impact between the proposed and existing schools, it is proposed that the school commencement times for the high schools be adjusted to 8:40am to provide increased separation between primary school and high school activity. Likewise, it is proposed that the high school conclusion times are adjusted ten minutes earlier (generally 2:56pm for LBHS and 3:00pm for LGHS). We also recommend adjusting the NLPS school conclusion time to 3:20pm to provide increased separation to the high schools' finish times. Commitment to adjusted bell times and rationalisation across the three schools (NLPS, LGHS and LBHS) will be required in consultation with the three principals (noting NLPS principal is yet to be appointed).

The commencement and conclusion times will thereby be staggered by 20 minutes to allow for a proportion of the peak traffic and parking activity of the high schools to disperse prior to the peak traffic and parking activity of the NLPS.

Additionally, the school will have an out of school hours (OOSH) childcare, operating between the times of 6:30am – 9:10am and 3:10pm – 6:30pm.

Preschool will operate between 7:00am and 6:00pm.

To further manage peak pedestrian demand, stagged start times/ end times for NLPS can be considered (e.g. half the school commences at 8:55am and the other half 9:05am, half the school concludes at 3:15pm and the other half 3:25pm).

It is noted that the exact school hours, OOSH hours, and preschool hours are subject to change and will be finalised prior to the school's opening, in consultation with the adjacent high schools and the NLPS principal, once appointed.

4.4. Vehicle Access

Two new vehicular crossovers are proposed on Burnside Drive as part of a separate planning approval. One mid-way along Burnside Drive to provide access to the bin collection area for the waste collection vehicle only and a second towards the southern end of Burnside Drive to provide access to the staff-only car parking area.

All student pick-up/ drop-off will occur in the new kerbside parking area along Burnside Drive, with no parent/ guardian vehicles to enter the school site.

4.5. Car Parking

33 car parking spaces are proposed, to be delivered under a separate planning approval, located at the south-east corner of the site, accessed via a new vehicular crossover on Burnside Drive.

This provision has been calculated based on a strategic assessment to reduce reliance on private car trips and encouragement of active and public transport for school staff.

Further details and assessment of parking requirements is provided in Section 5.1.

4.6. Pick-up/ Drop-off Parking

25 pick-up/ drop-off spaces are proposed, to be delivered under a separate planning approval, located on the western side of Burnside Drive, on the eastern frontage of the proposed school.

To achieve this, widening is proposed on Burnside Drive (separate planning approval) to create new 2.5-metre-wide indented kerbside parking. The footpaths adjacent to the indented parking areas will also be further widened from the existing 1.2 metres to 2.5 metres.

Further details and assessment of parking requirements is provided in Section 5.1.

4.7. Bus Zones

A new bus zone is proposed on Lachlan Street west of the site, replacing existing on-street unrestricted parking. This location allows buses to access the bus zone from both the north (via Hart Street) and the south/ west (via Lachlan Street and then u-turning around the Lachlan Street/ Hart Street/ Burnside Drive roundabout). This proposal also minimises the impact to the existing road infrastructure due to the utilisation of the existing roundabout for turnaround and utilisation of the wide carriageway width along Lachlan Street.

Lachlan Street currently presents a carriageway width of around 12 metres which is indicatively suitable for a three metre parking lane to the south (suitable for buses), a 2.5 metre parking lane to the north (suitable for light vehicles) and 6.5 metres for the two travel lanes (car in one direction and bus in the other).

Lachlan Street also currently presents wide pedestrian paths (around three metres) on the southern side which provide a high level of pedestrian amenity and accessibility.

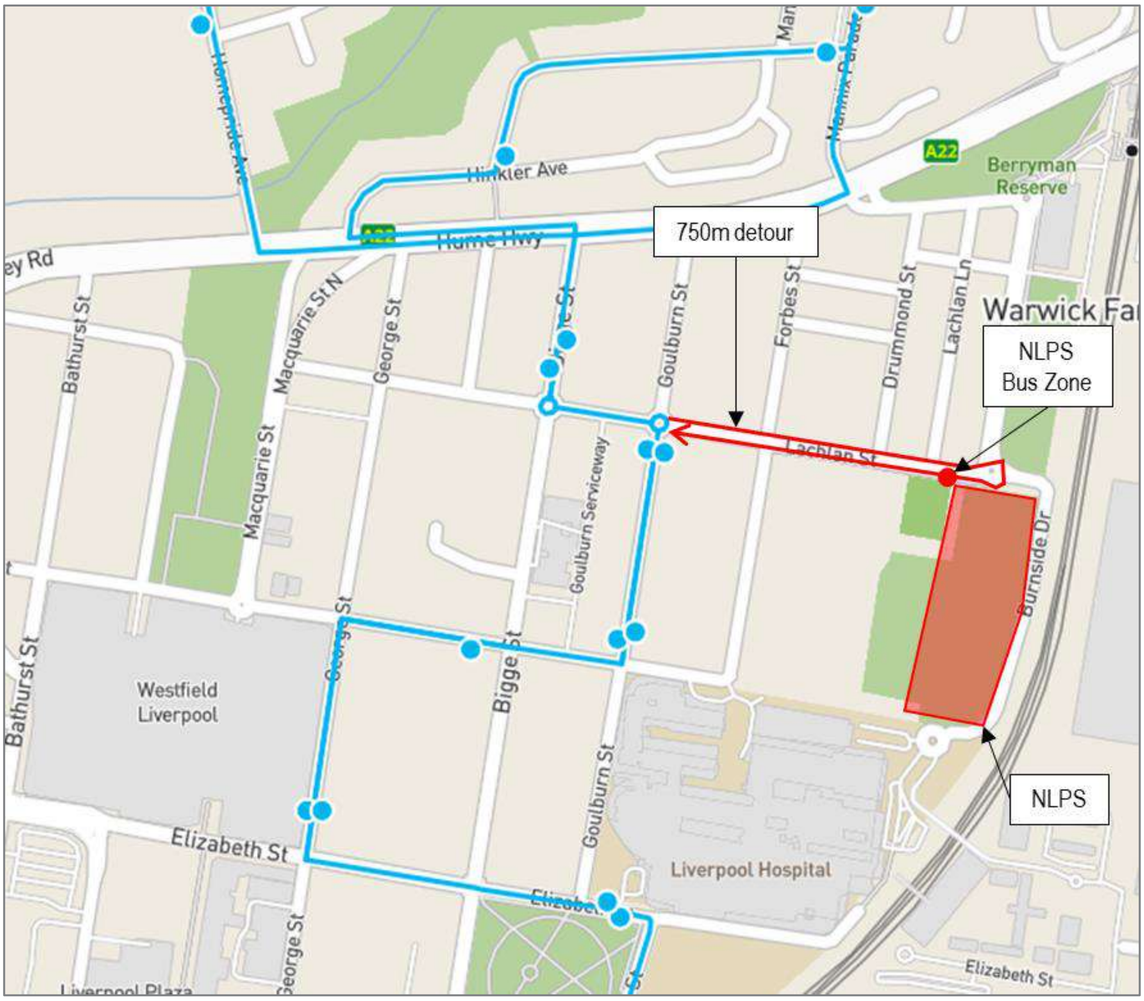
Indicatively, the proposed bus zone would cater for up to two buses simultaneously, requiring a minimum length of 48.5 metres to accommodate two buses and the required draw-in and draw-out lengths.

This bus zone is currently proposed for school services only, however consideration for twice-a-day diversion of public bus services (as an alternative route for two buses a day to service NLPS, similar to what is currently in place for the existing adjacent high schools) can be explored in consultation with the bus operators. Two potential services are identified, the 823 Liverpool to Warwick Farm (Loop Service) and the 904 Fairfield to Liverpool (and vice versa). This will require a 750-metre detour for the 823 service (approximately 1.5 minutes at 30 km/h, plus pick-up/ set-down time) and a 1000-metre detour for the 904 service (approximately 2 minutes at 30km/h, plus pick-up/ set-down time). This is indicatively illustrated in Figure 4.5, Figure 4.6, and Figure 4.7. These extensions would benefit students who live towards the south-west of the school catchment and provide them with a bus stop (at Westfield Liverpool, George Street) which would be within a 10-minute walk of their residence.

The Student Transport Plan (Appendix B) provides further review on this opportunity.

As per the NSW *Guide to Appointed School Bus* Stops, to establish a new bus stop, it must first be appointed by Transport for NSW or a bus operator. Following this, the roads authority for the road approves the appointed bus stop. Burnside Drive and Lachlan Street are classified as local roads hence the relevant authority is the local Council (i.e. Liverpool City Council).

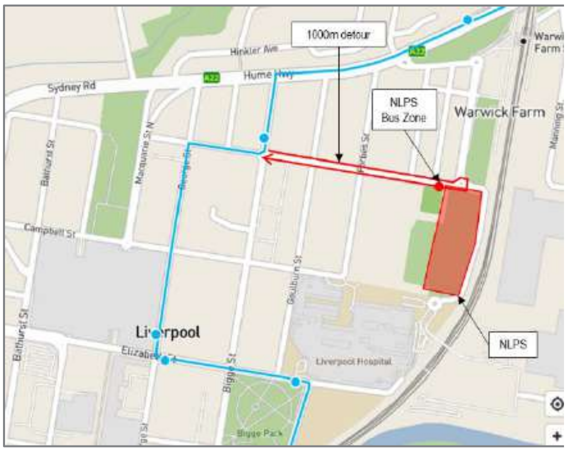
Figure 4.5: Liverpool to Warwick Farm (Loop Service) potential extension



Base Image Source: https://transportnsw.info/routes/details/sydney-buses-network/823/22823, accessed 10 May 2021

Figure 4.6: 904 Fairfield to Liverpool potential extension

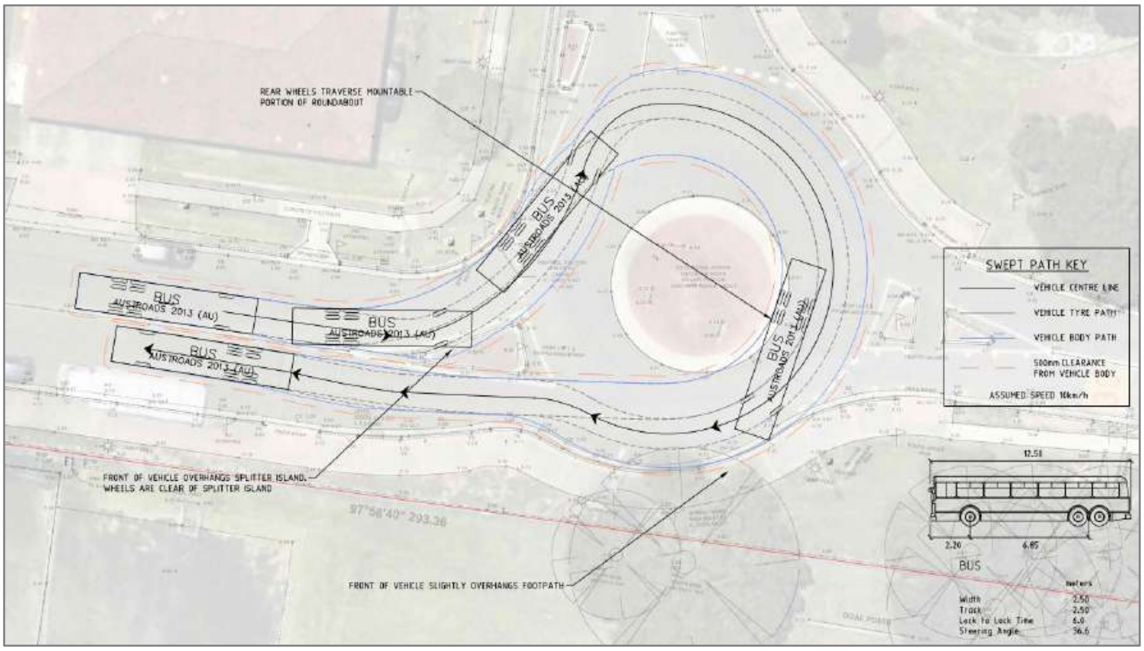
Figure 4.7: 904 Liverpool to Fairfield potential extension



Base Image Source: https://transportnsw.info/routes/details/sydney-buses-network/904/38904, accessed 10 May 2021

Swept path assessment for a bus undertaking the u-turn from Lachlan Street at the Hart Street/ Burnside Drive/ Lachlan Street roundabout is illustrated in Figure 4.8.

Figure 4.8: Bus Swept Path Assessment



4.8. Pedestrian Facilities

Primary pedestrian access is proposed on Burnside Drive, at the eastern frontage of the school. Secondary access will be provided on Burnside Drive, at the northern frontage of the school.

The existing footpath on the eastern frontage of the school (i.e. western side of Burnside Drive) is proposed to be widened from the existing 1.2 metres to 2.5 metres (separate planning approval) to accommodate the increased pedestrian volumes and provide suitable widths adjacent to the kerbside parking.

Footpath widening along Lachlan Street is also proposed to provide improved pedestrian access to and from the primary walking routes to the school. Details of this widening and pedestrian volumes assessment is provided in Appendix B: Student Transport Plan.

As noted in Section 3.6, there is no existing pedestrian priority crossing facility to the north, resulting in a gap in pedestrian connection for users arriving to the school from the areas north of Lachlan Street. A school crossing is proposed on Lachlan Street, between Drummond Street and Lachlan Lane to facilitate pedestrian connectivity across Lachlan Street. The provision of a school crossing rather than a formal pedestrian crossing will encourage safe pedestrian movement across Lachlan Street associated with the schools. A new crossing supervisor will be engaged by the school to operate this new school crossing.

Crossing supervisors will be instructed to monitor pedestrians and facilitate crossing in groups to maximise visibility of pedestrians and reduce traffic delays.

A new pedestrian refuge island is also proposed on the north approach of the Lachlan Street/ Forbes Street intersection to improve the east-west pedestrian movement across this intersection and to improve the alignment of the existing kerb ramps.

Additionally, the existing school zone, which terminates at the Lachlan Street/ Hart Street/ Burnside Drive roundabout is proposed to be extended along the length of Burnside Drive. This is to promote a low-speed environment conducive to safe student travel and pedestrian prioritisation.

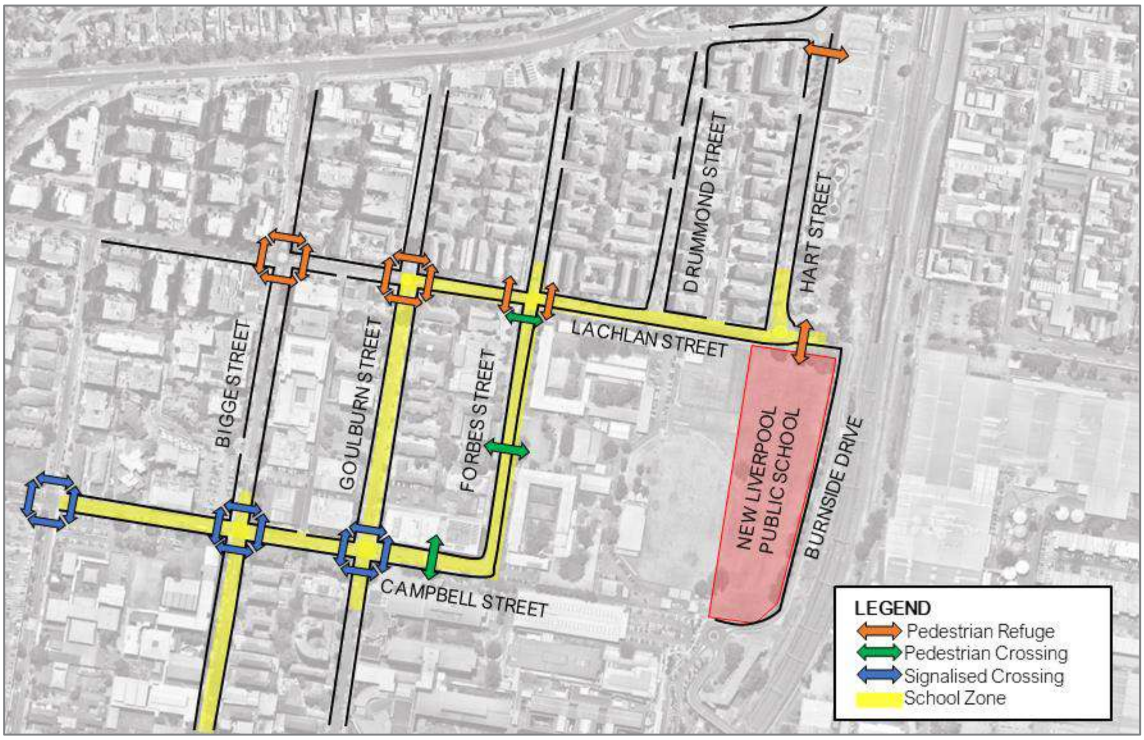
These proposed pedestrian facility upgrades are summarised in Table 4.4 and illustrated in Figure 4.10. Additional upgrades as recommended, are also summarised.

Table 4.4: Potential Pedestrian Infrastructure Upgrades Summary

No.	Location	Upgrade	Responsibility/ Action	Time Frame Recommendation
1	Lachlan Street/ Forbes Street intersection	Intersection improvements to Forbes Street (North) to provide left in/ left out only with island treatment on the northern approach to intersection to include a pedestrian refuge. Adjust kerb ramp on north-west corner to point across Forbes Street rather than into intersection.	School Infrastructure (SINSW)	Prior to school opening
2	Lachlan Street/ Drummond Street intersection	New refuge island on the northern approach of the Lachlan Street/ Drummond Street intersection	School Infrastructure (SINSW)	Prior to school opening
3	Lachlan Street (between Drummond Street and Lachlan Lane)	Install new school crossing and appoint crossing supervisor.	School Infrastructure (SINSW)	Prior to school opening
4	Burnside Drive	Extend school zone to Burnside Drive	Transport for NSW in consultation with Health Infrastructure	Prior to school opening
5	Burnside Drive footpath (western side)	Widen existing footpath to 2.5 metres	School Infrastructure (SINSW)	Prior to school opening
6	Lachlan Street footpath (at school boundary)	Widen existing footpath as detailed in the Student Transport Plan	School Infrastructure (SINSW)	Medium term (up to 5 years)

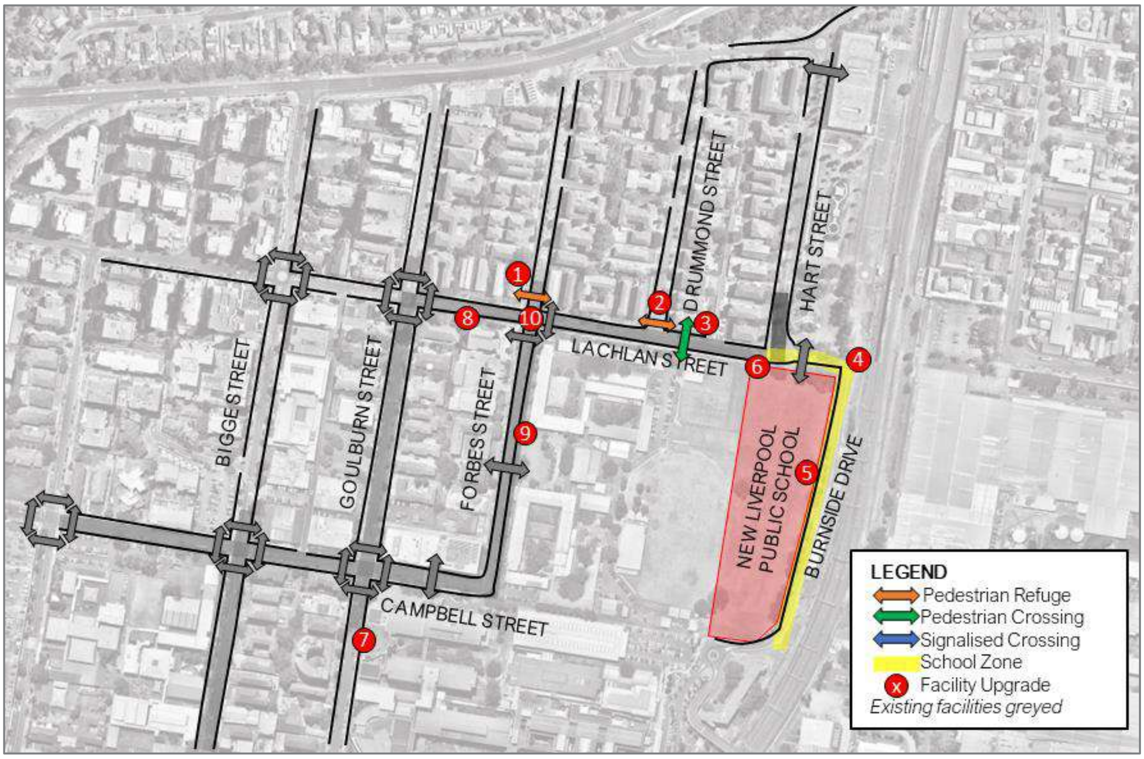
7	Goulburn Street footpath (eastern side) between Elizabeth Street and Lachlan Street	Refresh shared user path pavement marking	SINSW working in collaboration with Liverpool City Council will investigate	Short term (up to 2 years)
8	Lachlan Street between Goulburn Street and Hart Street	Refresh shared user path pavement marking	SINSW working in collaboration with Liverpool City Council will investigate	Short term (up to 2 years)
9	Forbes Street between Campbell Street and Lachlan Street	Refresh shared user path pavement marking	SINSW working in collaboration with Liverpool City Council will investigate	Short term (up to 2 years)
10	Lachlan Street/ Forbes Street intersection	Replace existing low-form refuge islands with compliant refuge island.	SINSW working in collaboration with Liverpool City Council will investigate	Short term (up to 2 years)
	Various locations	Construction of shared path infrastructure components as identified in the Liverpool Bike Plan and detailed in the Student Transport Plan	SINSW working in collaboration with Liverpool City Council will investigate	Medium term (up to 5 years)

Figure 4.9: Existing Pedestrian Facilities



Base map source: Nearmap

Figure 4.10: Pedestrian Facility Upgrades



Base map source: Nearmap

4.9. Bicycle/ Rideables Facilities

Bicycle parking is proposed for staff, students and visitors in the form of sixty bicycle/ rideables (e.g. scooters) spaces located south of the support unit building.

The suitability of the provisions is discussed in Section 5.3.

Currently, existing off-road shared paths provide cycling connections to and from the site to a limited scale, providing connectivity between Liverpool Station, through Bigge Street, Bigge Park, Goulburn Street, Forbes Street, Lachlan Street, Hart Street, and up to Warwick Farm Station. Connectivity to the west is currently limited and would see benefits through establishment of the off-road cycleways identified in the Liverpool Bike Plan 2018 – 2023 (refer to Figure 3.17).

As part of the Student Transport Plan, a review of the existing cycling network within the school catchment has been conducted, and various recommendations for extension of the existing facilities (in line with the proposed cycle paths as per the Liverpool Bike Plan) have been outlined. Further details are provided in Appendix B.

4.10. Loading Areas

Liverpool City Council response to SEARs (ref: SSD1-11/2019) requires that *"The proposed development shall be designed to be serviced by a medium rigid vehicle"*. The proposed bin storage and hardstand area (to be provided as part of a separate planning approval) will provide manoeuvring space to enable a medium rigid vehicle (MRV) to enter and exit the area in a forward manner and turnaround within the site boundary via a three-point-turn.

This area will be closed outside of waste collection vehicle arrival times to discourage parking by other users.

For other servicing, loading, and deliveries, on-street provision can be provided on Burnside Drive by signposting a portion of the new kerbside parking as a loading zone outside of typical student arrival/ departure periods to allow for loading and deliveries to occur within close proximity of the school without additional disruption to other existing on-street parking areas.

4.11. Crime Prevention through Environmental Design (CPTED)

There are four main principles of CPTED – natural surveillance, access control, territorial reinforcement and space management. The principles of CPTED can help create a safe and secure environment and assist in minimising the incidence of crime and contribute to perceptions of increased public safety within the school.

The following can be considered to incorporate the CPTED principles:

Table 4.5: CPTED Principles

	Guidelines
Natural Surveillance	• Configure the layout so cars are parked in grid like rows to allow for good sight lines between vehicles and through the car park. Do this in a way to maximise sight lines from areas with the most pedestrian and vehicular traffic, such as a nearby business or street. • Trim or remove foliage that is blocking sightlines into and through the car park. Any landscaping should be above head height, below waist height and set back from pedestrian pathways. • Remove or block secluded areas or hidden recesses, such as areas under stairs. • Ensure there is minimal obstruction to lines of sight including vehicles, and structure. • Lighting should at least meet minimum requirements under Australian Standards (AS 1158 for external lighting and AS 1680 for interior lighting). • Light fixtures should be reliable, easy to maintain, able to withstand the elements and vandal resistant. • Incorporate lighting into a regular maintenance plan to ensure lights are working, maintaining lux levels and are not obstructed in any way by signs, landscaping or other objects. • When selecting and positioning light fixtures, be considerate of glare. Also consider the brightness of the light and effect of passing from light to dark areas. • Install a quality, vandal resistant system which staff are thoroughly trained to use. • Display signage identifying that CCTV is operating. • Ensure the cameras are installed so as to maximise surveillance opportunities. • Ensure the camera views are not obstructed by anything such as landscaping or signposts. • Camera feeds should be recorded and stored.
Access Control	• Provide a dedicated singular point of entry and a dedicated singular point of exit to the car park. • Install boom gates or other access control devices to regulate vehicle movement. • Provide clear line marking or parking spaces. • If fencing is provided, install see-through fencing around the perimeter of the car park. • Provide clearly marked, open, visible pedestrian access ways. • Maintain landscaping along and near pedestrian access ways to ensure clear sightlines. Any landscaping should be above head height, below waist height and set back from pedestrian pathways. • Clearly delineate the boundary and perimeter of the car park • Implement circular movement of traffic around the car park so that vehicles cannot simply take the shortest route to and from the entry and exit. •
Territorial Reinforcement & Space Management	• Ensure a regular maintenance plan is in place including rubbish removal, graffiti removal, repair of light fixtures, maintenance of lux levels, trimming of vegetation and other necessary repairs. • All staff should undergo crime awareness training - what is suspicious behaviour and what are the reporting procedures for the location. • Crime statistics for the car park should be monitored by management and should inform crime prevention initiatives such as the timing and frequency of security patrols. • Advise users of installed security measures and where to find them (such as help points or intercom systems). • Reminds people to secure their vehicle and remove valuables. These signs should be simple to understand – use of images is best.

5. PARKING ASSESSMENT

05

5.1. Staff Car Parking

5.1.1. Context

With the aim of promoting increased uptake of sustainable travel mode choices (e.g. public transport, cycling, walking) and a decrease in reliance on private car trips, the following sections outline various statutory parking recommendations and parking provisions based on existing mode share profiles, and a targeted car parking provision strategy that seeks to achieve the above through a combination of infrastructure, policy, and strategic measures.

5.1.2. Liverpool Council Development Control Plan

The car parking requirements for different development types are set out in the *Liverpool Development Control Plan 2008* (DCP). The following rates are advised for educational establishments as summarised in Table 5.1.

Table 5.1: DCP car parking requirements

Land Use	DCP parking rate
Educational Establishments Rural, Residential & Industrial zones	1 space per 1 staff member, plus 1 space per 30 students
Educational Establishments Business zones	1 space per 35sqm of leasable floor area (LFA)
Car Parking in Liverpool City Centre All other development	1 space per 100sqm of floor area, plus 1 motorcycle space per 20 car spaces

As the proposed school will be located within the Liverpool City Centre, the *car parking in Liverpool City Centre – all other development* is an applicable category. However, this category encompasses all forms of development within the city centre which is not residential development. Car parking based on floor area is not appropriate for a school development as floor area and parking demand are not necessarily correlated at a rate comparable to other land uses typically present in a city centre (e.g., commercial/ business).

Additionally, the Liverpool DCP rate of one space per one staff member (outside of the City Centre) is also not appropriate as it encourages a 100 per cent car mode share which is not sustainable within the City Centre environment.

Instead, the parking provision should be related to staff numbers and targeted mode share. An empirical assessment based on travel mode share surveys is discussed further in this section to outline a more representative parking provision.

5.1.3. Other Council Development Control Plans

It is acknowledged that the Liverpool DCP parking rate for education establishments is particularly onerous. A comparison of educational establishment parking rates in other DCPs throughout metropolitan Sydney indicates that school rates are generally around one space per two staff, with a small provision also for students in year 12/ over 17 years old. This is demonstrated by the parking rates summarised in Table 5.2.

Table 5.2: Other DCP car parking requirements

Planning control	Staff rate	Student rate
Ryde DCP 2014	1 space per 2 staff members	1 space per 10 students over 17 years of age
Auburn DCP 2010	1 space per 2 staff members	1 space per 20 year 12 students
Marrickville DCP 2011	Between 1 space per 2 staff members and 1 space per 5 staff members (Dependant on location)	N/A
Willoughby DCP 2016	1 space per 2 staff members	1 space per 10 tertiary students plus 1 space per 10 seats in assembly hall

Table 5.2 indicates that providing parking at a rate of one space per two staff would be consistent with other Council DCPs around Sydney and would also encourage a mode shift away from private vehicle travel, which is important for this site considering its proximity to Liverpool CBD and availability of public transport options. No provision for students is considered as the school will only cater for primary school students.

5.1.4. Existing Mode Share

As outlined in Section 3.8, a comparable baseline mode share has been identified through comparison to two existing primary schools in Liverpool (LPS and LWPS), as well as through a review of the 2016 Census data for the relevant destination zone. These indicated private car mode shares of 91 per cent and 82 per cent respectively. The high proportion of private car travel at the compared schools can be attributed to a combination of high parking provision on-site and on-street parking availability (LWPS) and adoption of tandem-style parking (LPS).

The 82 per cent car mode share from the 2016 Census equally applies to professionals working in the Liverpool City Centre. Once the journey to work data is segmented out on an occupational basis so that a like-to-like comparison with teachers is made, the following is observed. In the Chatswood and Macquarie Park centres respectively, car mode share was 48 per cent and 55 per cent, public transport mode share was 42 percent and 39 per cent, and active travel was eight per cent and five per cent. These range of mode shares can be considered the baseline mode shares against which targeted sustainable transport measures should be implemented to further reduce the rate of private vehicle travel to and from the school.

5.1.5. Existing On-street Parking Availability

As outlined in Section 3.3.3, existing on-street parking availability is limited due to high demand from other surrounding land uses (the adjacent high schools and hospital). Surveys identified the unrestricted parking areas on Lachlan Street and Forbes Street to be heavily utilised, presenting 91-100 per cent occupancy at 7:00am and sustaining this level of occupancy throughout the day. From 3:30pm onwards, Lachlan Street saw slightly reduced levels of occupancy (64-75 per cent) whilst Forbes Street maintained a high occupancy level of 93 per cent. This factor will further disincentivise single-occupancy car travel to NLPS due to the perceived challenge of finding a parking spot near the school.

5.1.6. Strategic Measures

To further reduce reliance on single-occupancy private car travel, incentives such as the promotion of staff car pooling (or allocation of spaces for carpool vehicles only) and prioritisation of on-site parking to staff living in remote areas with limited public transport accessibility may be considered. As the school will be a new development, there is opportunity to drive a more sustainable mode share without encumbrance by historical parking provision, disruption to status quo, or perceived expectation of private car travel as the 'normal'. Furthermore, providing parking at a quantity that is substantially lower than comparable DCP rates that assume a 50 per cent car mode share (see Table 5.2) will provide the strategic signal to prospective staff that this will be a new school that requires a very low car mode share with a strong focus on public and active transport use. A reduction in parking spaces also will result in fewer vehicle trips generated, which in turn reduces the transport impacts on the surrounding road network and parking resources.

This approach was adopted in other new school developments and redevelopments, including the redeveloped Arthur Phillip High School and Parramatta Public School, which only maintained 30 parking spaces across both schools to support a total of 175 staff (i.e. 17 per cent car mode share), 2,000 high school students and 1,000 primary school students, which resulted in a net reduction in parking.[8]

Given the on-street parking constraints in the surrounding environment and a low provision of on-site staff parking, it is expected that prospective staff will be inclined towards those with reliable public or active transport access. Furthermore, consideration may be made to extend time-restricted parking along Forbes Street and Lachlan Street along the frontages of the schools, to further disincentivise long-stay worker parking in the surrounding street environment.

Additional incentives are discussed in the Appendix C: Student Transport Plan.

5.1.7. Staff Numbers

The projected number of FTE staff on day of opening is 75, increasing to 98 FTE staff upon full capacity of the school. This projection was based on existing staff-to-student ratios of a similar school (Liverpool Public School).

Based on the Liverpool Public School Annual Reports for 2016, 2017, 2018 and 2019, the average ratio of students to full-time equivalent (FTE) staff is 13.28. This equates to an indicative 75 FTE staff for the opening day enrolment forecast (1001 students including support unit and preschool[9]) and 98 FTE staff for the upper limit capacity for the school (1280 students including support unit and preschool).

5.1.8. Proposed Car Parking Provision

The school proposes car parking provision of 33 spaces in the south-east corner of the site with access via Burnside Drive It is noted that the delivery of this car park is part of a separate planning approval to the SSD.

Table 5.3 summarises the calculated parking provision based on the below scenarios:

- Staff parking in accordance with Liverpool DCP (1 space per FTE staff).
- Car mode share as per comparable school travel mode surveys (0.91 spaces per FTE staff).

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[8] Arthur Phillip High School and Parramatta Public School Transport Assessment, Arup, 2016

[9] Based on student enrolment projections provided by School Infrastructure 1 March 2021

- Car mode share as per 2016 Census data for the applicable destination zone (0.82 spaces per FTE staff).
- Provision similar to other council DCPs (0.5 spaces per FTE staff).
- Targeted car parking provision (0.34 spaces per FTE staff).

Table 5.3: Staff car parking provision

Parking provision based on Liverpool DCP	Parking provision based on comparable school mode share	Parking provision based on 2016 Census mode share	Parking provision based on other council DCPs	Target car parking provision
98 spaces	89 spaces	79 spaces	49 spaces	33 spaces

Staff parking in strict accordance with the Liverpool DCP results in a very high parking provision (98 spaces) that does not provide consideration for alternative modes of travel and multiple occupants in a car. It is noted that the Liverpool DCP rate is double that of some other council DCPs and therefore does not encourage any mode shift.

Similar commentary is presented for the car mode share based on LWPS and LPS and the 2016 Census data where the existing mode share is not considered an appropriate target in line with strategic objectives to promote sustainable travel modes.

The nominated provision of 33 on-site car spaces, representing an expected mode share of 34 per cent, is considered an achievable target, underpinned by sustainable travel policy and strategic framework. As noted above, this rate of provision will send clear expectations to staff that driving to school is to be an exception rather than the norm and will attract a staff cohort that will likely have reliable public or active transport connections to school rather than staff from more distant areas for whom driving is the only option. To reinforce this proposition, several proposed car spaces will be allocated to car-poolers only. The remaining bays will be allocated to those with accessibility requirements, senior staff, or staff with limited public transport/ active transport options.

Furthermore, consideration may be made to extend time-restricted parking along Forbes Street and Lachlan Street along the frontages of the schools, to further disincentivise long-stay worker parking in the surrounding street environment.

5.2. Pick-up/ Drop-off Parking

5.2.1. Provision

To derive a suitable amount of pick-up/ drop-off parking to provide, comparison is made to a case study prepared by Arup for Lindfield Public School. At the time of the study, this school had a student enrolment of 723 students, and a vehicle mode share of 43 percent. Along the school frontage was kerbside space for around 13 bays. This equates to 0.018 bays/ student, which was observed to be adequate for school pick-up/ drop-off use.

As the vehicle mode share for NLPS is anticipated to be slightly higher (45 per cent, refer to Section 3.8), this provision is adjusted accordingly to align with the proportionately greater car usage. Based on the above, a requirement of 23 on-street pick-up/ drop-off bays is calculated (based on upper limit of 1200 students – support unit and preschool excluded as it is assumed the pick-up/ drop-off time for these groups will be staggered from the mainstream students). The design provides for 25 on-street pick-up/ drop-off bays.

These pick up/ drop off bays are proposed on the western side of Burnside Drive. Road widening and footpath widening is required to provide a 2.5-metre-wide parking lane and a 2.5-metre-wide footpath as the road currently has no provision for kerbside parking and the existing footpath is 1.2 metres wide.

As the kerbside parking is located on the western side of Burnside Drive, a turnaround facility is required to enable vehicles (of which all arrive from the north) to turnaround and head northwards along Burnside Drive. As part of the school development, a new roundabout is proposed towards the south of Burnside Drive to facilitate this vehicular turnaround.

5.2.2. Management

The new kerbside parking on Burnside Drive will be appropriately signposted to enforce its intended use during student pick-up/ drop-off periods and allow for other parking uses outside of these periods.

'No Parking' restrictions will be provided along the length of the indented kerbside parking during school zone hours, providing a maximum two-minute parking duration. It is expected that prior to the school peaks, a P15 minute parking restriction will be in place for a portion of the northern spaces to cater for support unit and pre-school pick-up/ drop-off as these student groups require greater supervision/ assistance and parents/ carers accompanying students to and from the school.

Likewise, a portion of the northern spaces can also be signposted as a timed 'Loading Zone' to facilitate vehicle deliveries to the school, similar to what is currently provided along a section of the Forbes Street frontage of Liverpool Girls High School.

Outside of school peak hours, the parking can be utilised for public use, similar to the eastern side of Forbes Street along the Liverpool Boys and Girls High School frontages.

Further to this, active management measures will be developed in consultation with the future principal of the NLPS. Supervisors can be nominated to monitor and marshal students during key school pick-up/ drop-off times, to minimise vehicle dwell times. These supervisors can also facilitate faster turnover in the PM peak, by assisting in coordinating student movement to parent/ carer vehicles as they arrive.

Based on a provision of 25 kerbside spaces and an average dwell time of two minutes (consistent with the 'No Parking' time limit and GTA observations at schools with a level of active pick-up/ drop-off management), a capacity of 750 vehicles per hour is obtained. Up to 249 vehicles per hour are expected at maximum operating capacity of the school (see Section 6.4), hence the pick-up/ drop-off area is expected to operate well, with additional capability to accommodate variations in dwell time without adversely impacting the surrounding public road network.

5.3. Bicycle/ Rideables Parking

5.3.1. Bicycle Parking Rates

Liverpool Council Development Control Plan

The car parking requirements for different development types are set out in the *Liverpool Development Control Plan 2008* (DCP). The following rates are advised for educational establishments as summarised in Table 5.4.

Table 5.4: DCP bicycle parking requirements

Land Use	DCP parking rate
Educational Facilities	1 space per 10 staff members (Class 1 or 2 facility), plus 1 space per 10 students (Class 3 facilities)
Bicycle Parking in Liverpool City Centre	1 bicycle space per 200sqm of floor area, 15% of this requirement is to be accessible to visitors

The first rate (educational facilities) is more appropriate as the second rate (Bicycle Parking in Liverpool City Centre) is more applicable to developments where traffic and parking demands are more closely tied to floor area. The DCP rate assumes a bicycle mode share of 10 per cent.

NSW Planning Guidelines for Walking and Cycling

The *NSW Planning Guidelines for Walking and Cycling* recommends a bicycle parking provision of five per cent for staff and 10 per cent for students/ visitors.

Travel Mode Split

The travel mode share surveys identify the current bicycle mode share (based on comparison to LWPS and LPS) to be zero for both staff and students. In reality there is expected to be a nominal proportion of students riding to school as a small number of children's bicycles were observed during GTA's site visits in 2019.

5.3.2. Proposed Bicycle/ Rideables Parking Provision

To encourage increased cycling to school, a moderate bicycle/ rideables parking provision commensurate to the project demand is proposed.

Analysis of the student catchment finds that 68 per cent of students are within the five-minute cycling catchment, increasing to 100 per cent of the proposed student catchment within the ten-minute cycling catchment (for greater details refer to Appendix B). As such, the entire catchment is relatively accessible via bicycle, subject to cycling infrastructure improvement recommendations outlined in the Student Transport Plan.

To encourage greater travel via bicycle/ rideables, the proposed school will provide sixty bicycle/ rideables parking spaces in the form of racks on-site, south of the support unit building. This will cater for the anticipated demand (mode share target and student population) in the 'moderate' scenario. Refer to the Student Transport Plan for greater details.

In designing bicycle/ rideables parking facilities, sufficient amenity should be provided accordingly to the user group. Staff spaces should be designed to class 1 (bicycle lockers) or class 2 (bicycle cages) facilities. For student spaces, class 3 (e.g. bicycle rails/ racks) are appropriate. Consideration for shelter and passive surveillance should also be made and desire lines from access points to parking should ideally be separated from major pedestrian routes to avoid conflict.

6. TRANSPORT ASSESSMENT

06

6.1. Target Mode Share

6.1.1. Staff

The baseline staff travel mode share (based on comparable schools) and target staff travel mode share is summarised in Table 6.1. The target staff travel mode share splits have been developed as follows:

- Staff travel to the other existing primary schools in Liverpool (LWPS and LPS) is around 91 per cent.
- Mode share targets with substantial reductions in single-vehicle private car trips are targeted, underpinned by the analysis and incentives outlined in Section 5.1 and Appendix C: Student Transport Plan.
  - as NLPS will be a new school, there is no entrenched culture, precedence, or expectation to provide a high level of car parking for staff members
  - a proportion of parking may be allocated to car-poolers only, promoting multi-occupancy car trips, with an initial allocation of half of the spaces for car-poolers
  - limited on-street parking availability decreases the attractiveness to drive to school and self-selects for a staff cohort more inclined to travel via public or active transport
  - initiatives as outlined in the Student Transport Plan (see Appendix C) will assist in promoting sustainable modes of transport.
- The reduction in car mode share would be reflected in an uptake in public transport and active transport:
  - increased public transport patronage to around 40 per cent, aligning with similar utilisation seen in the Chatswood and Macquarie Park Centres for professionals (see Section 5.1.4)
  - increased active travel to around 10 per cent.

Table 6.1: Staff travel mode share

Mode	Base Mode Share (based on comparable schools)	Target Mode Share
Private car (driver)	91%	34%
Private car (passenger)	0%	17%
Dropped off (driver does not stay)	0%	0%
Motorcycle/ scooter	0%	0%
Bus	5%	5%
Train	3%	35%
Bus, then train	0%	0%
Train, then bus	0%	0%
Walk	1%	5%
Bicycle	0%	4%
Other	0%	0%

6.1.2. Student

The student mode share was calculated based on a first principles approach due to limited responses from the student travel mode surveys of comparable schools (refer to Section 3.8). It is anticipated that this derived mode share will be representative of the school travel mode split upon opening of the school.

Table 6.2: Student travel mode share

Mode	Target Mode Share
Private car	45%
Motorcycle/ scooter	0%
Bus	2.5%
Train	0%
Bus, then train	0%
Train, then bus	0%
Walk	50%
Bicycle	2.5%
Other	0%

6.2. Car Occupancy

6.2.1. Staff

The travel mode surveys of LWPS and LPS indicated an existing car occupancy of 1.16 people per car for staff (including the driver).

To reflect future initiatives to encourage carpooling, a future car occupancy of 1.5 (10 per cent increase, refer to assumption in Section 6.1.1) for staff travel is assumed.

6.2.2. Student

Due to limited responses to the student travel mode surveys, the vehicle occupancy rates from the *Roads and Maritime Trip Generation Surveys for Schools* (prepared by GTA for Roads and Maritime (now Transport for NSW) in February 2014) is adopted. The vehicle occupancy rates at various primary and secondary schools from these surveys were compiled and averaged across all primary schools and secondary schools. The data presented the following vehicle occupancy rates for primary and secondary students:

- Primary Students – two students per vehicle.
- Secondary students – 1.7 students per vehicle.

A car occupancy rate for of two students per vehicle is adopted.

6.3. Peak Hour Proportion

6.3.1. Staff

For the school peak periods (7:45am – 8:45am and 2:45pm – 3:45pm), the staff travel mode surveys (for LWPS and LPS) identify the following proportions of staff arriving/ departing during each peak period:

- AM peak: 54 per cent.
- PM peak: 31 per cent.

It is expected that this proportion will remain similar post-redevelopment.

For staff driving to/ from school, it is assumed that all trips during the AM school peak are inbound and all trips during the PM school peak are outbound.

6.3.2. Student

Due to limited responses for the student mode share surveys, comparison is drawn to a similar school project prepared by GTA for Meadowbank Schools[10]. For the primary school component of this school it was identified that 85 per cent of students arrive within the AM school peak hour and 60 per cent of students depart within the PM school peak hour. For conservativeness and in lieu of detailed information regarding after-school activities, the following rates are adopted:

- AM peak: 85 per cent.
- PM peak: 85 per cent.

For student trips, it is assumed that both the inbound and outbound trip occur within the peak hour (i.e. vehicle movements is double the number of vehicles).

6.4. Trip Generation

The trip generation has been calculated based on:

- The projected student count at school opening (2023)[11] and in the 10-year horizon (2033)
    - 1001 students (inclusive of support unit and preschool) in 2023
    - 1280 students (inclusive of support unit and preschool, maximum school capacity) is adopted for 2033.
- The projected FTE staff count at school opening (2023) and in the 10-year horizon (2033) (refer to Section 5.1.8)
    - 75 FTE staff in 2023
    - 98 FTE staff in 2033.
- The assumptions outlined in Sections 6.1, 6.2, 6.3, and 6.4.

[10] *Meadowbank Schools Transport and Accessibility Impact Assessment*, issue D, by GTA Consultants, dated 02/10/2019

[11] Based on student enrolment projections provided by School Infrastructure 1 March 2021

The calculation for the trip generation for the staff and students arriving by private vehicle during each peak hour is as follows:

Staff – AM School Peak (2023)

Staff vehicles = Mode share x staff FTE / car occupancy x percentage arrival at peak

Staff vehicles = 51% x 75 / 1.5 x 54%

Staff vehicles = 14 vehicles (14 vehicle movements).

Staff – PM School Peak (2023)

Staff vehicles = Mode share x staff FTE / car occupancy x percentage departing at peak

Staff one-way vehicle trips = 51% x 75 / 1.5 x 31%

Staff one-way vehicle trips = 8 vehicles (8 vehicle movements)

Student – AM and PM School Peak (2023)

Student vehicles = Mode share x student numbers / car occupancy x percentage arrival at peak

Student vehicles = 45% x 1001 / 2 x 85%

Student vehicles = 191 vehicles (382 vehicle movements)

Staff – AM School Peak (2033)

Staff vehicles = Mode share x staff FTE / car occupancy x percentage arrival at peak

Staff vehicles = 51% x 98 / 1.5 x 54%

Staff vehicles = 18 vehicles (18 vehicle movements)

Staff – PM School Peak (2033)

Staff vehicles = Mode share x staff FTE / car occupancy x percentage departing at peak

Staff vehicles = 51% x 98 / 1.5 x 31%

Staff vehicles = 10 vehicles (10 vehicle movements)

Student – AM and PM School Peak (2033)

Student vehicles = Mode share x student numbers / car occupancy x percentage arrival at peak

Student vehicles = 45% x 1280 / 2 x 85%

Student vehicles = 245 vehicles (490 vehicle movements).

6.5. Trip Distribution

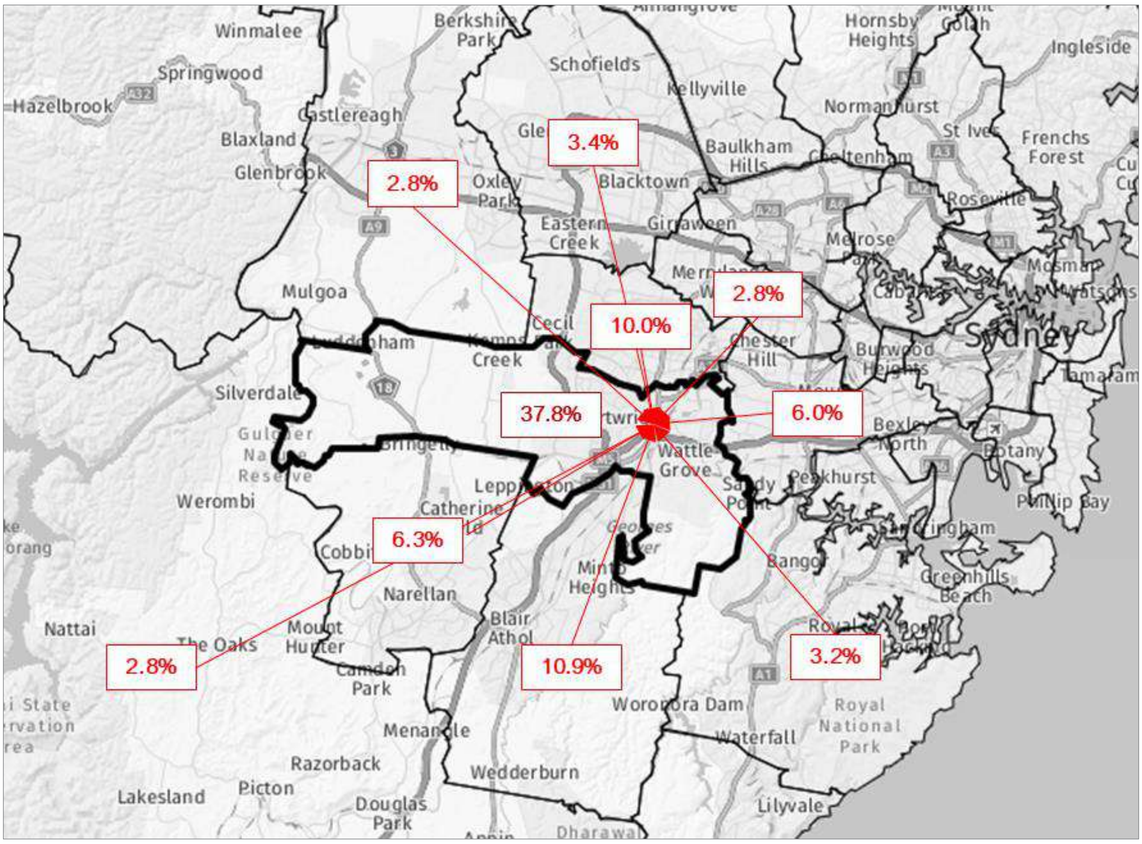
The directional distribution and assignment of traffic generated by the proposed development will be influenced by several factors, including the:

- configuration of the arterial road network near the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households near the site and the proposed school catchment areas
- likely distribution of staff residences in relation to the site
- configuration of access points to the site.

6.5.1. Staff

To determine the distribution of staff, reference is made to journey to work data from Profile ID[12]. Data from the 2016 Census is used to determine the proportion of people, working in Liverpool, who live locally or commute from other local government areas (LGAs). Figure 6.1 illustrates the proportion of workers and their place of residence in relation to Liverpool. It is assumed that this proportion is representative of the future staff employed at the school.

Figure 6.1: Worker's place of residence for Liverpool local government area



Source: Figure adapted from https://profile.id.com.au/liverpool/workers, accessed 27 November 2019

[12] Source: https://profile.id.com.au/liverpool/workers, accessed 27 November 2019

Simplification of this figure results in the following general split:

- North: 40 per cent
- East: 10 per cent
- South: 40 per cent
- West: 10 per cent.

This overall distribution is assessed in conjunction with the arterial and local road layout near the site and the following split is adopted:

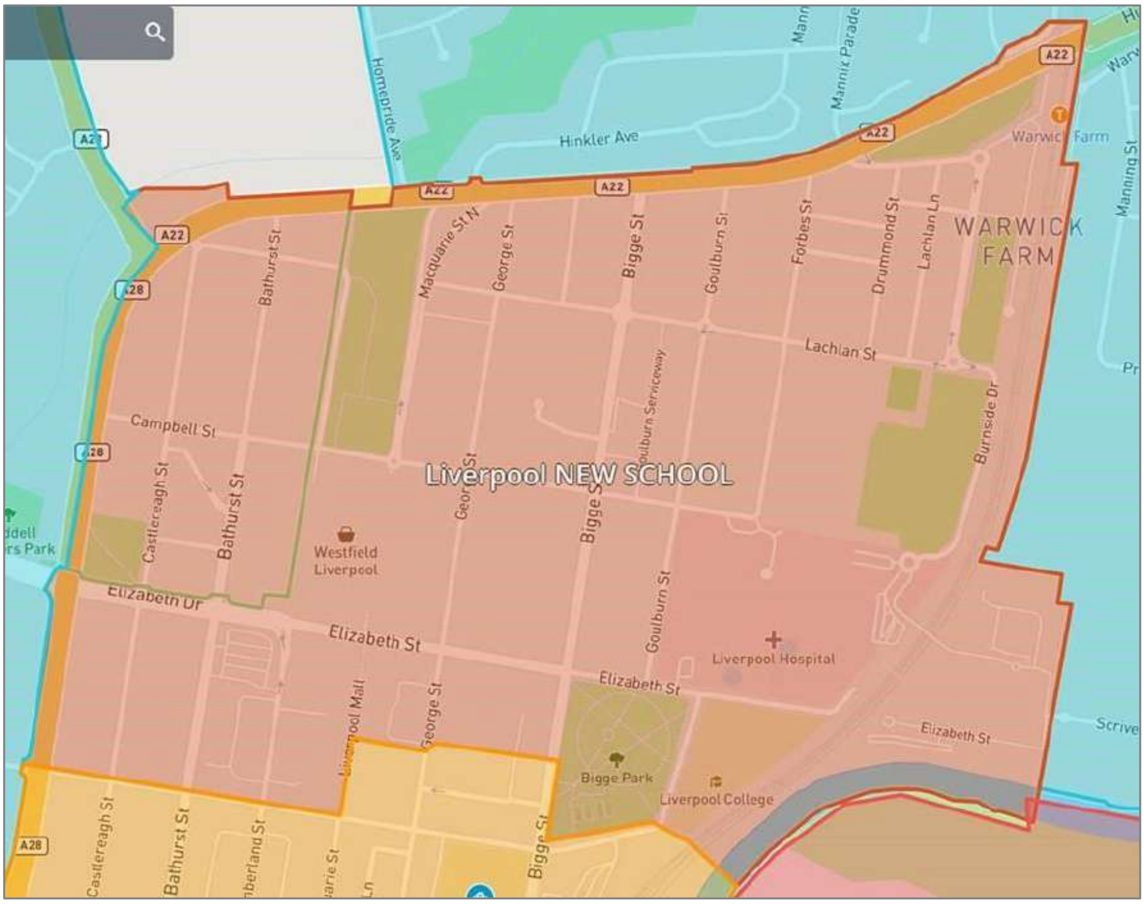
- Lachlan Street: 50 per cent
- Hart Street: 50 per cent.

Further, it is assumed that this distribution is identical for both the AM and PM peak periods.

6.5.2. Student

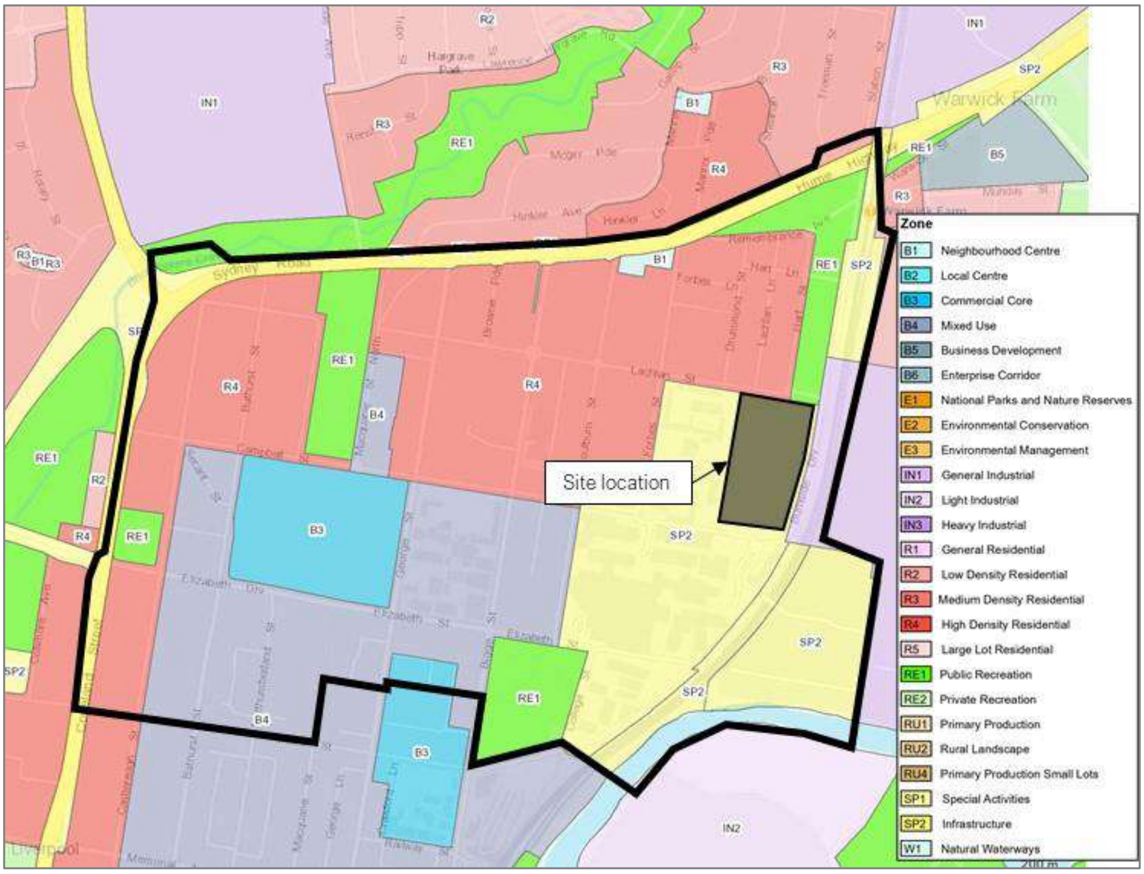
To determine the distribution of students, reference is made to the proposed school catchment and land zoning around the proposed school as provided in Figure 6.2 and Figure 6.3.

Figure 6.2: School Catchment Boundary



Source: School Infrastructure, received 1 March 2021

Figure 6.3: Surrounding Land Zoning



Base Image Source: NSW Government ePlanning Spatial Viewer, https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address, accessed 1 March 2021

Most of the residential zoning is located to the north and west of the site. Hence it is expected that most students within the future school catchment will reside in these areas. Students within walking distance of the school (i.e. immediately to the north) are unlikely to travel via car. Hence most trips will be expected from the west.

For the residential area north of Hume Highway, it is anticipated that the majority of these students would attend Warwick Farm Public School to the north as there is very minimal school catchment north of Hume Highway.

The above considerations are assessed in conjunction with the arterial and local road layout near the site and the following split is adopted:

- Lachlan Street: 70 per cent
- Goulburn Street: 20 per cent
- Hart Street: 10 per cent.

6.6. Cumulative Assessment

6.6.1. Liverpool Hospital Multi Storey Car Park

To provide a robust assessment, the traffic generation from the approved Liverpool Hospital Multi Storey Car Park (MSCP), scheduled for partial completion in February 2022 and full completion in May 2022 is considered. Hospital development trip generation has been sourced from the *Liverpool Health and Academic Precinct Main Works Transport and Accessibility Impact Assessment*, revision C, by GTA Consultants, dated 06/05/2020.

The AM peak hour for the hospital was also 7:45am – 8:45am (which coincides with the school peak hour. The PM peak hour for the hospital was 4:00pm – 5:00pm.

To accurately assess the hospital-related traffic generation for the school peak hour (2:45pm – 3:45pm), the hospital PM development traffic was scaled proportionately by comparing the westbound and eastbound volumes at the Hart Street/ Lachlan Street/ Burnside Drive roundabout between the 2:45pm – 3:45pm and 4:00pm – 5:00pm peak period. This is appropriate as all traffic heading to and from Burnside Drive is currently only hospital-related as there is no access to public roadways beyond Burnside Drive (without passing through access control).

The Hospital-related traffic has been added to the 2023 Base Scenario onwards.

6.6.2. Warrick Farm Commuter Car Park Upgrade

An additional two floors over the existing multi storey commuter car park at Warrick Farm Station is planned for construction, with planned commencement in early 2021 and completion in early 2022[13]. The project will add approximately 250 additional car parking spaces to increase the overall provision to 732 within the car park. The Traffic, Transport, and Access Impact Assessment by Beca, dated 26 August 2020 outlines that "[during] a typical weekday most of the formal car parking spaces are full by 8:00am". Thus, during the AM school peak (8:00am – 9:00am, refer to Section 3.3.2), there is negligible traffic generation from this car park.

As this is a commuter car park, the PM peak is expected to be later than 5:00pm, well detached from the school PM peak (2:45pm – 3:45pm, refer to Section 3.3.2). Therefore, similar commentary to the AM peak is made. As such, no additional traffic generation from this upgrade has been considered in the school modelling.

6.7. Road Network Changes

6.7.1. Campbell Street Closure

As part of the Liverpool Hospital redevelopment, Campbell Street is proposed to be closed between Goulburn Street and Forbes Street. As a result, existing or development trips passing through Campbell Street will be redistributed accordingly through Lachlan Street.

[13] https://www.transport.nsw.gov.au/projects/current-projects/warwick-farm-commuter-car-park, accessed 4 May 2021

6.7.2. Lachlan Street/ Forbes Street intersection

Due to the Campbell Street closure and redistribution of traffic through Lachlan Street, the predominant flow at this intersection will become east-west (currently north-south). As part of the Liverpool Hospital Transport and Accessibility Impact Statement, the existing priority at the Lachlan Street/ Forbes Street intersection was proposed to be reversed to improve the performance of this intersection. This adjustment is captured in the 2023 Base Scenario onwards.

6.7.3. School Roundabout

As part of the school development, a new roundabout is proposed at the southern end of Burnside Drive to facilitate turnaround for vehicles originating from the north on Burnside Drive. This is captured in the school development scenarios. This roundabout forms part of a separate application to this SSD application.

6.8. Vehicle Movement Diagrams

Based on Sections 6.1-6.7, vehicle movement diagrams have been prepared illustrating the anticipated increase in traffic volumes and vehicle movements near the site. The future scenarios considered are:

- 2023 Base Scenario (which captures future Hospital-related traffic as a result of the multi storey car park construction and effects of Campbell Street closure)
- 2023 Development Scenario (2023 Base Scenario plus school-related development traffic on opening)
- 2033 Development Scenario (2023 Development Scenario with school-related development traffic projected to maximum student capacity).

These are presented in Appendix A.

6.9. Modelling Set Up and Assumptions

6.9.1. Calibration

The following changes to the default settings in SIDRA were made to reflect the existing performance of the road network more accurately:

- At the Lachlan Street/ Forbes Street intersection, the two-way sign control calibration “Level of reduction with opposing flow rate” was adjusted to ‘None’ to ‘Low’ to reflect the gap acceptance of observed drivers on site.

6.9.2. Background Traffic Growth

No background traffic growth has been applied to the model. In reviewing the surrounding land uses near the site, it is expected that traffic growth would primarily result from a new significant development (such as this school) or intensification of the hospital (captured in this cumulative assessment). Nearby residential developments are already developed (high-density residential development) and the adjacent high schools are not expected to increase student capacity in the near future. Additionally, the cumulative assessment is highly conservative as the hospital-related trip generation is based on the number of car spaces in the new multi storey car park. This assumes full generation from the hospital on day one, which would not be the case. In reality, the hospital traffic generation will gradually ramp up to the assessed generation as the remainder of the hospital redevelopment is completed and operational.

6.10. Modelling Results

6.10.1. Intersection Performance – 2023 Base Scenario

The 2023 Base Scenario includes:

- existing volumes
- development trips from the new Hospital Multi Storey Car Park
- trip distribution influences from the Campbell Street closure
- Lachlan Street/ Forbes Street priority reversal.

Table 6.3 and Table 6.4 present a summary of the expected future operation of the intersections. Note that the Forbes Street/ Campbell Street intersection is excluded as, with the closure of Campbell Street, the only movements are through movements north and south.

Table 6.3: 2023 Operating Conditions – AM peak (Base Scenario)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.15	11	9	A
Lachlan Street/ Goulburn Street	Roundabout	0.10	15	2	B
Lachlan Street/ Forbes Street	Priority	0.40	26	4	B
Lachlan Street/ Drummond Street	Priority	0.20	10	2	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.62	13	17	A
Burnside Drive new roundabout	Roundabout	0.51	10	<1	A

Table 6.4: 2023 Operating Conditions – PM peak (Base Scenario)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.15	11	9	A
Lachlan Street/ Goulburn Street	Roundabout	0.16	9	<1	A
Lachlan Street/ Forbes Street	Priority	0.15	13	1	A
Lachlan Street/ Drummond Street	Priority	0.07	7	1	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.31	8	5	A
Burnside Drive new roundabout	Roundabout	0.07	10	<1	A

As noted in Table 6.3 and Table 6.4, the nearby intersections within the vicinity of the site are expected to operate well, with all assessed intersections presenting a Level of Service B or better.

6.10.2.Intersection Performance – 2023 Development Scenario

The 2023 Development Scenario includes:

- The 2023 Base Scenario.
- School-related development traffic on opening.

The expected future operation of the intersections is summarised in Table 6.5, Table 6.6, and Table 6.7.

Table 6.5: 2023 Operating Conditions – AM peak (with Development)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.18	10	10	A
Lachlan Street/ Goulburn Street	Roundabout	0.17	20	4	B
Lachlan Street/ Forbes Street	Priority	0.82	76	11	F
Lachlan Street/ Drummond Street	Priority	0.34	18	4	B
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.79	23	32	B
Burnside Drive new roundabout	Roundabout	0.63	10	<1	A

Table 6.6: 2023 Operating Conditions – PM peak (with Development)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.19	10	12	A
Lachlan Street/ Goulburn Street	Roundabout	0.24	11	4	A
Lachlan Street/ Forbes Street	Priority	0.24	21	2	B
Lachlan Street/ Drummond Street	Priority	0.11	12	1	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.22	9	4	A
Burnside Drive new roundabout	Roundabout	0.19	10	<1	A

In the 2023 with development scenario, the Lachlan Street/ Forbes Street intersection exceeds capacity in the AM peak period, deteriorating to a Level of Service F.

During the PM peak period, all assessed intersections operate well, with a Level of Service B or better.

To address the operation of the Lachlan Street/ Forbes Street intersection, a potential mitigation measure is to restrict the northern approach of Forbes Street to left-in/ left-out. This can be provided in conjunction with the proposed pedestrian refuge at this location (see Section 4.8). It is expected that southbound vehicles would divert through Drummond Lane and Drummond Street to instead turn right into Lachlan Street at that intersection, representing a 350-metre detour. There is expected to be minimal northbound traffic turning right at the Lachlan Street/ Forbes Street intersection following the closure of Campbell Street. This is reinforced with a right-turn ban (from Forbes Street (south) to Lachlan Street (east)) during the peak periods.

Table 6.7: 2023 Operating Conditions – AM peak (with Development + Mitigation)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.18	10	10	A
Lachlan Street/ Goulburn Street	Roundabout	0.17	20	4	B
Lachlan Street/ Forbes Street	Priority	0.04	14	<1	B
Lachlan Street/ Drummond Street	Priority	0.43	20	5	B
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.88	32	50	C
Burnside Drive new roundabout	Roundabout	0.67	10	<1	A

Table 6.8: 2023 Operating Conditions – PM peak (with Development + Mitigation)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.19	10	12	A
Lachlan Street/ Goulburn Street	Roundabout	0.24	11	4	A
Lachlan Street/ Forbes Street	Priority	0.01	10	<1	B
Lachlan Street/ Drummond Street	Priority	0.17	12	2	A
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.27	9	5	A
Burnside Drive new roundabout	Roundabout	0.21	10	<1	A

This improves the operation of the intersection to a Level of Service B whilst resulting in minimal impact on the adjacent Lachlan Street/ Drummond Street intersection. The Lachlan Street/ Burnside Drive/ Hart Street roundabout continues to operate satisfactorily at a Level of Service C.

Alternative mitigation treatment in the form of AM-peak right turn bans from Forbes Street (both north and south approaches) into Lachlan Street were investigated, however, did not adequately improve the operation of the intersection (improvement only to Level of Service E).

6.10.3.Intersection Performance – 2033 Development Scenario

The 2033 Development Scenario includes:

- The 2023 Development Scenario.
- School-related development traffic at maximum student capacity.
- The proposed left-in/ left-out mitigation measure at Lachlan Street/ Forbes Street intersection.

The expected future operation of the intersections is summarised in Table 6.9, Table 6.10, and Table 6.11.

Table 6.9: 2033 Operating conditions – AM peak (with Development)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.19	10	11	A
Lachlan Street/ Goulburn Street	Roundabout	0.19	22	4	B
Lachlan Street/ Forbes Street	Priority	0.04	15	<1	B
Lachlan Street/ Drummond Street	Priority	0.52	25	6	B
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.96	51	77	D
Burnside Drive new roundabout	Roundabout	0.70	10	<1	A

Table 6.10: 2033 Operating conditions – PM peak (with Development)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.20	10	12	A
Lachlan Street/ Goulburn Street	Roundabout	0.27	11	4	A
Lachlan Street/ Forbes Street	Priority	0.37	10	6	A
Lachlan Street/ Drummond Street	Priority	0.21	15	2	B
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.29	9	5	A
Burnside Drive new roundabout	Roundabout	0.25	10	<1	A

In the 2033 with Development scenario, similar observations can be made, with all assessed intersections operating well in the PM peak period (Level of Service B or better), and some intersections requiring additional capacity in the AM peak period.

The Lachlan Street/ Burnside Drive/ Hart Street roundabout identifies the need for additional capacity, displaying a Degree of Saturation of 0.96 and a Level of Service D for the worst approach (north approach). The average queue on the northern approach is around 77 metres, which extends up to Hart Park, however, does not impact any other intersections. Overall, the roundabout operates at a Level of Service B.

The western approach of the Lachlan Street/ Goulburn Street roundabout displays a Degree of Saturation of 0.91 and Level of Service A. The average queue length is around 71 metres which does not reach the adjacent Bigge Street/ Lachlan Street roundabout.

A potential mitigation measure to improve the operation of the Lachlan Street/ Burnside Drive/ Hart Street roundabout is to reduce the car mode share at the adjacent high schools and further separate school start times to distribute the peak traffic volumes. An alternate physical mitigation measure, in the form of an additional 10-metre-long short approach lane on the northern approach, has been assessed with results summarised in Table 6.11.

Table 6.11: 2033 Operating conditions – AM peak (with Development + Mitigation)

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Goulburn Street/ Campbell Street	Signalised	0.19	10	11	A
Lachlan Street/ Goulburn Street	Roundabout	0.19	22	4	B
Lachlan Street/ Forbes Street	Priority	0.04	15	<1	B
Lachlan Street/ Drummond Street	Priority	0.52	25	6	B
Lachlan Street/ Burnside Drive/ Hart Street	Roundabout	0.69	13	22	A
Burnside Drive new roundabout	Roundabout	0.70	10	<1	A

7. OVERVIEW CONSTRUCTION TRAFFIC MANAGEMENT PLAN

07

7.1. Overview

This overview of construction traffic impacts aims to ensure the safety of workers and road users in the vicinity of the construction site. The primary objectives of the Construction Traffic Management Plan (CTMP) includes the following:

- To identify the need for adequate and compliant traffic management requirements within the vicinity of the school.
- To ensure continuous, safe and efficient movement of traffic for both the general public and construction vehicles.
- Establishment of a safe pedestrian environment around the site.
- To inform the Contractor and set the ground rules for managing construction traffic associated with the site.

7.2. Key Objectives

The overall principles of traffic management during the construction activity include:

- Provide an appropriate and convenient environment for pedestrians.
- Minimise the impact on pedestrian movements.
- Maintain appropriate capacity for pedestrians at all times on footpaths around the site.
- Maintain appropriate public transport access.
- Maintain current levels of parking within the precinct.
- Maintain permanent access to/ from the hospital accesses for emergency services.
- Restrict construction vehicle movements to designated routes to/ from the site.
- Manage and control construction vehicle activity around the site.
- Minimise impacts to general traffic in the vicinity of the site.

7.3. Description of Construction Activities

The proposed works includes the construction of a new public school to cater for 1,280 students. The new school will provide 44 mainstream teaching spaces, four support units, four special programs units, two preschool units and core facilities.

The indicative programme for the works is summarised in Table 7.1

Table 7.1: Construction stages of the NLPS

Stage	Description	Start Date	Duration
SSD	Construction of the NLPS School	11 February 2022	10 months

7.4. Work Hours

It is anticipated that work associated with the development will generally be carried out between the following hours of construction:

- Monday to Friday 7:00am and 6:00pm
- Saturday 8:00am and 1:00pm
- Sunday/ public holiday no work.

In addition to regular work hours, there will be occasions where specific out-of-hours works are required. The contractor will be responsible for instructing and controlling all subcontractors regarding the hours of work. Any work outside the approved construction hours would be subject to specific prior approval from Council.

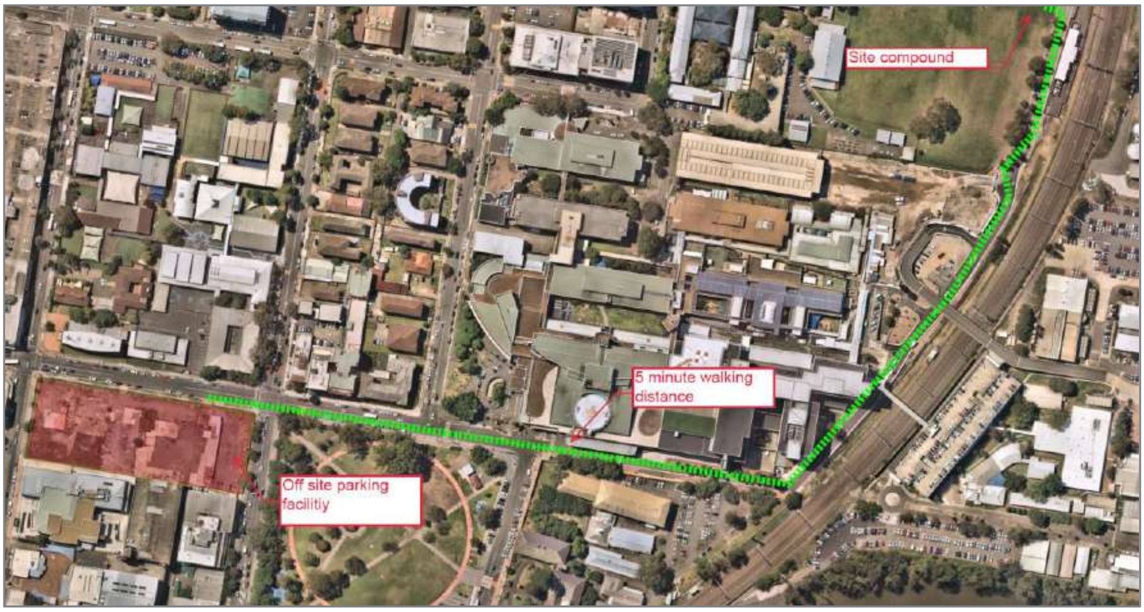
7.5. Construction Worker Parking and Traffic

The number of construction workers is expected to be up to 50 workers during peak construction.

Due to the size of the site all construction worker vehicles can be accommodated on site. Construction workers will not be permitted to park on local streets.

In the event that additional parking is required outside the on-site compound, an overflow car park will be provided, located approximately a five-minute walk from the site. See Figure 7.1.

Figure 7.1: Off-site parking facility



Source: ADCO, received 16 April 2021

Given the sites proximity to high frequency train services (Warwick Farm Station and Liverpool Station) with a range of origins/ destinations, workers would be encouraged to use public transport to access the site where practical. During site induction, workers would be informed of the existing bus and train network servicing the site. Appropriate arrangements should be made for any equipment/ tool storage and drop-off requirements.

Any construction worker arrivals and departures by vehicle would typically be outside of road network peak hours and as such is unlikely to impact the surrounding road network. The Principal Contractor would be required to outline a schedule of worker start and finish times and demonstrate that this does not have any significant impact on the adjacent high schools, local traffic activity as well as hospital staff arrivals and departures. It is also expected that the Principal Contractor would also be required to implement measures to reduce worker car travel, such as shuttle buses from key transport nodes or designated remote pick-up points.

7.6. Construction Traffic Volumes

The site will have various types of construction vehicles accessing the site. The largest standard construction vehicles regularly accessing the site would include 12.5-metre heavy rigid vehicles. It is likely that a limited number of larger special-purpose vehicles (e.g. floats for plant and equipment, large mobile cranes) will be required, however these would be subject to a separate oversize and over-mass application process, with analysis of the specific vehicle access and manoeuvring requirements.

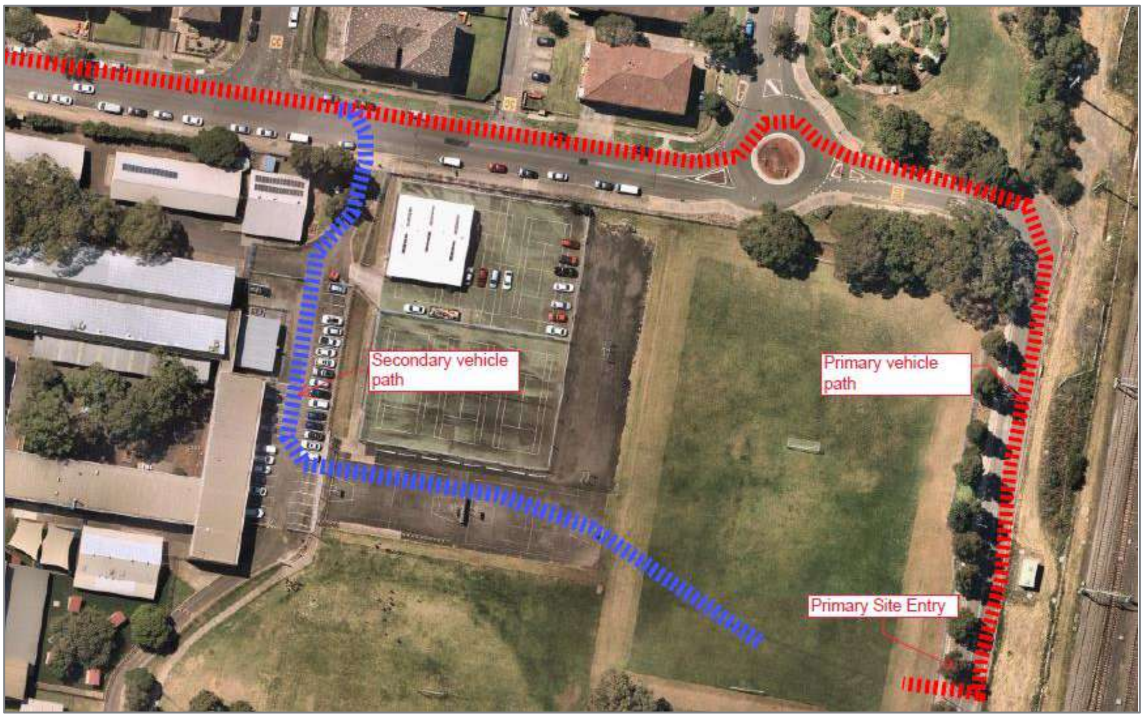
It is expected that for most of the project, 10 heavy vehicles (20 heavy vehicle movements) are expected per day. This is expected to peak at 20 heavy vehicles (40 heavy vehicle movements) during a peak period of two weeks during delivery of the modular buildings.

7.7. Site Access

Construction access is proposed at two locations (see Figure 7.2 and Figure 7.3). The primary access will be on Burnside Drive via a new vehicular crossover that will be created as part of other works separate to this SSD. A secondary access will be provided from the existing crossover on Lachlan Street which is currently used for staff parking at Liverpool Boys High School. It is anticipated that vehicle sizes to access this secondary access will be restricted to minimise impact upon other users.

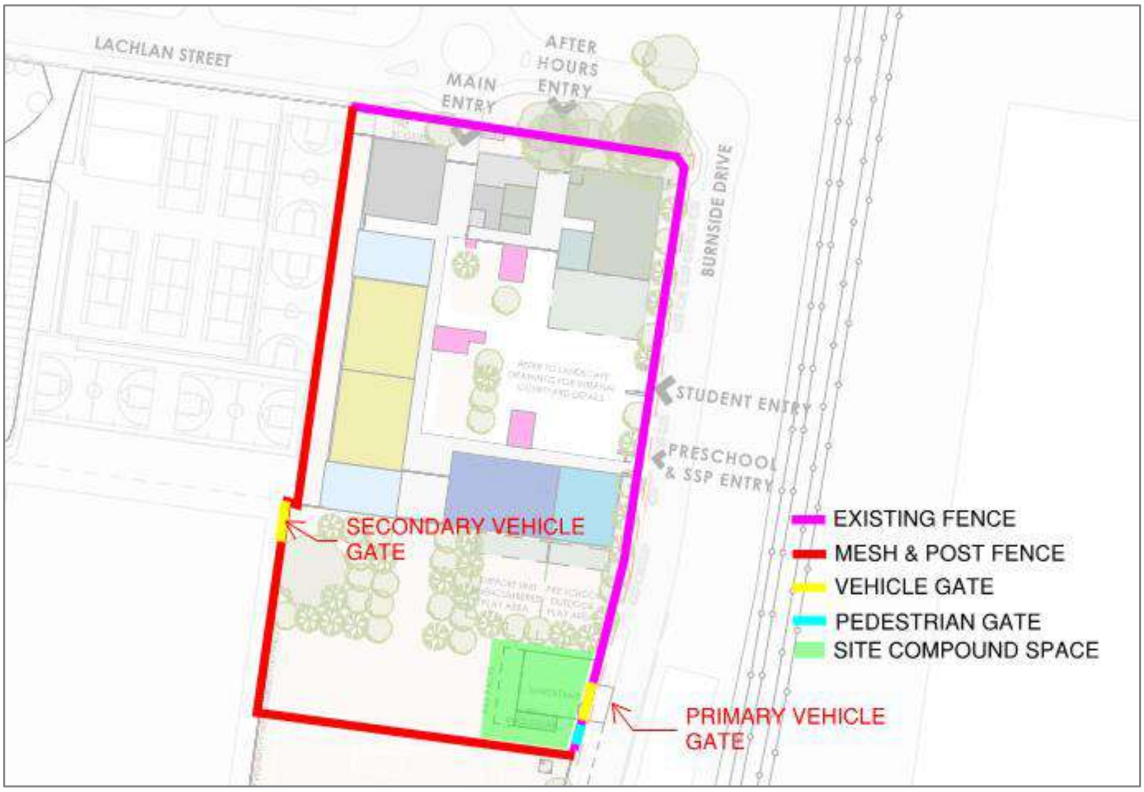
As part of the detailed CTMP, a traffic guidance scheme (formerly a traffic control plan) will be prepared in accordance with the principles of the Transport for NSW Traffic Control at Work Sites manual. The traffic guidance scheme (TGS) would primarily show where “Trucks” signs would be located at specific locations (such as uncontrolled intersections) along the approved truck routes to warn other road users of the increase in construction vehicle movements.

Figure 7.2: Site access



Source: ADCO, received 16 April 2021

Figure 7.3: Site fencing and gate locations



Source: ADCO, received 16 April 2021

7.8. On-Street Work Zones

No works zones are proposed at this stage, however, may change subject to proposed methodology of the appointed contractor.

7.9. Construction Vehicle Routes

Generally, construction vehicles will have origins and destinations from a wide variety of locations throughout Sydney. However, all construction vehicles will be restricted to the State and Regional Road network where practicable. It is expected that vehicles would approach the site from the Hume Highway and require use of local roads to reach the relevant access points.

The construction vehicle routes are detailed below and shown in Figure 7.4. No queuing or marshalling of construction vehicles will be permitted on public roads.

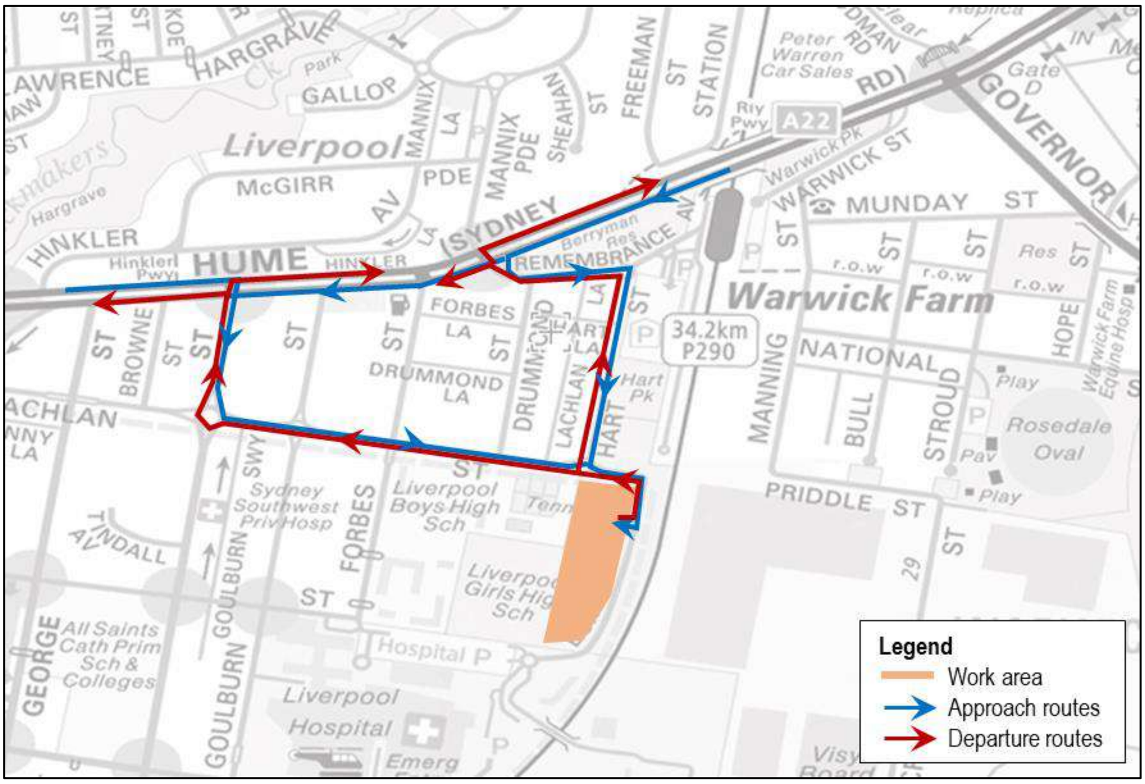
Approach Routes

- Hume Highway, Remembrance Avenue, Hart Street, Burnside Drive
- Hume Highway, Bigge Street, Lachlan Street, Burnside Drive.

Departure Routes

- Burnside Drive, Hart Street, Remembrance Avenue, Hume Highway
- Burnside Drive, Lachlan Street, Bigge Street, Hume Highway.

Figure 7.4: Construction vehicle Access Routes



Basemap source: Sydway

7.10. Traffic Guidance Scheme

Detailed information for work site operations is contained in the Traffic Control at Work Sites manual version 6.0 (Transport for NSW, 2020). The control of traffic at work sites must be undertaken with reference to WorkCover requirements and any other Workplace Health and Safety manuals.

The Principal Contractor will be required to provide TGSs for the proposed works which will generally consider the following:

- Construction vehicle activity, including the loading/ unloading of trucks to be conducted within the work site.
- Pedestrians and all passing vehicles will maintain priority.
- Clear definition of the work site boundary to be provided by erection of site fencing and/ or A and B Class hoardings around the site boundaries.
- All construction vehicle activity will be minimised during peak periods, where possible.

7.11. Pedestrian and Cyclist Management

During the construction period, pedestrian and cyclist movements are to be maintained as much as possible. Where works require the closure of an existing pedestrian route, a suitable alternative is to be provided. Class A hoarding/ ATF fencing would be provided between pedestrian paths and any work site. Where overhead works are occurring, B-Class hoarding will be provided where pedestrian movement is being maintained. It is not expected that cyclist routes will be impacted by the proposed construction works.

7.12. Public Transport

Given the infrequent heavy vehicle movements associated with the construction works, the overall impact to existing public transport services is expected to be negligible. This includes the impact on the identified local area bus services.

7.13. Emergency Vehicles and Heavy Vehicles

During construction, the Principal Contractor will ensure that there is no disruption to emergency vehicles on public and internal Hospital roads.

The sites' location, well distanced from emergency services and departments associated with Liverpool Hospital, will ensure any potential impacts on emergency access would be able to be effectively managed throughout the works.

7.14. Existing and Future Developments

It is the Principal Contractor's responsibility to liaise with Health Infrastructure, School Infrastructure and other landowners etc. should there be other potential future developments under construction at the same time. A coordinated approach to traffic management and wayfinding signage is logical in such instances.

7.15. Traffic Movements in Adjoining Areas

No adverse effects are expected from the movement of heavy vehicles through adjacent council areas.

8. CONCLUSION

08

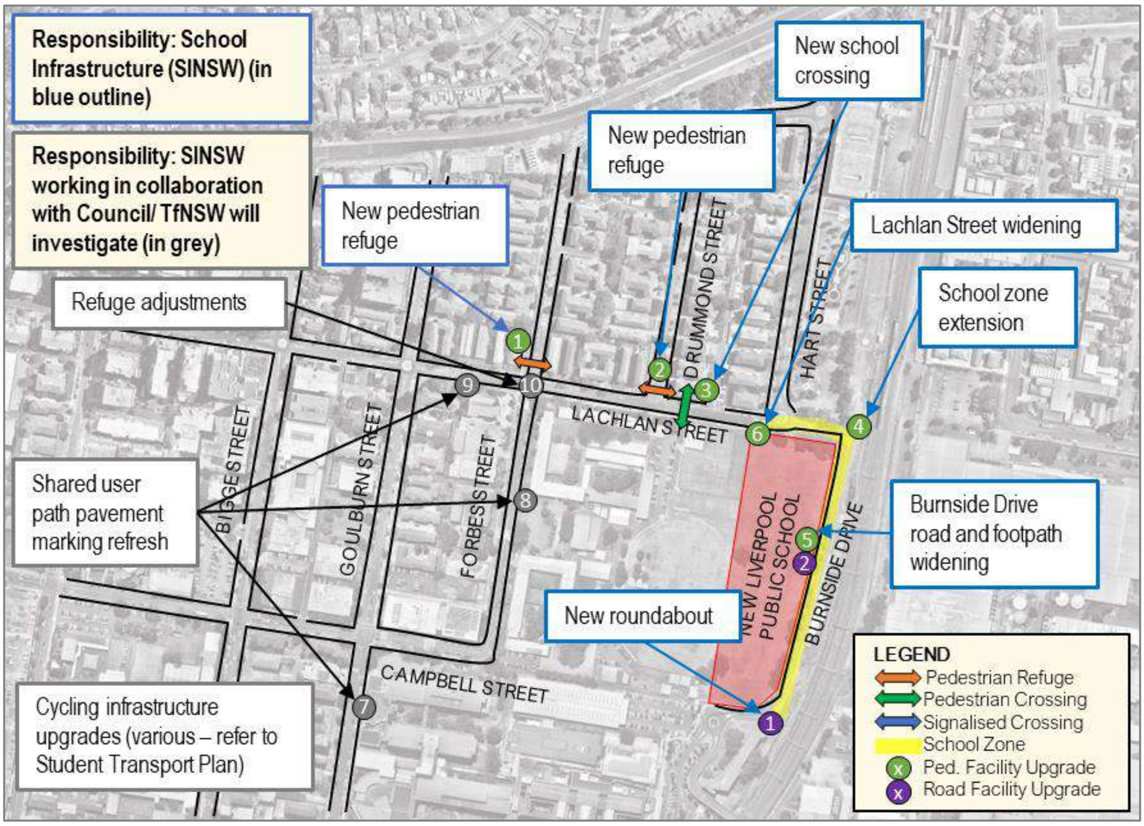
8.1. Conclusion

Based on the analysis and discussion presented within this report, the following conclusions are made:

1. Existing staff car mode share based on travel mode surveys of comparable schools is high (91 per cent). As the proposal is for a new school there is increased opportunity to promote public transport and active travel and a target car mode share of 51 per cent is adopted (34 per cent driving, 17 per cent as a passenger).
2. A first-principles approach, based on the comparable Liverpool Public School, to assess the student mode share split finds that an indicative 45 per cent of students will travel via car to school with the majority of the remainder walking and a minor proportion travelling by bus and cycling.
3. Pedestrian facilities near the site generally provide a moderate level of pedestrian accessibility and formalised pedestrian crossing points are provided around the site. As part of the proposal, a new school crossing is proposed on Lachlan Street, the existing school zone is proposed to be extended along Burnside Drive, and new refuge islands are proposed on Forbes Street and Drummond Street, north of Lachlan Street. Further opportunity for footpath widening on Lachlan Street is provided in the Student Transport Plan.
4. A new vehicular access will be provided towards the southern end of Burnside Drive for access to the proposed staff car park and a separate access will be provided mid-block along on Burnside Drive for waste vehicles. Both these vehicular accesses form part of a separate planning approval and are not included in this SSD.
5. Based on a target car mode share (drivers) of 34 per cent, a provision of 33 spaces is calculated based on estimated staff numbers at full student capacity of the school.
6. The proposed on-street pick-up/ drop-off on the western side of Burnside Drive for the full-scope proposal will require widening by 2.5 metres to provide the appropriate width for indented kerbside parking. Calculations based on a comparable school, and scaling based on student population and mode share differences, indicate a required provision of 23 spaces. The design provides for 25 spaces along Burnside Drive. This work forms part of a separate planning approval and is not included in this SSD.
7. A new roundabout is proposed at the southern end of Burnside Drive to facilitate vehicular turnaround for vehicles arriving from the north and enable these vehicles to access the kerbside pick-up/ drop-off parking spaces. This work forms part of a separate planning approval and is not included in this SSD.
8. Surveys of the existing staff and students indicate the proportion who travel to school via bicycle to be zero. To cater for future demand, 60 bicycle/ rideables parking spaces are provisioned.
9. The proposed bus zone on Lachlan Street appears to be able to be accommodated within the existing carriageway, requiring the conversion of existing on-street unrestricted parking spaces.
10. The proposal is expected to generate a net increase of 14 vehicle movements in the AM school peak and eight vehicle movements in the PM school peak for staff (in 2023), increasing to 18 and 10 vehicle movements for the AM and PM school peak in 2033.
11. The proposal is expected to generate a net increase of 191 vehicles (382 vehicle movements) in both the AM and PM school peaks for students in 2023, increasing to 249 vehicles (498 vehicle movements) for both peaks in 2033.
12. SIDRA network intersection modelling has been undertaken, which considers the traffic generation of the adjacent Liverpool Hospital redevelopment and impacts of the proposed Campbell Street closure between Goulburn Street and Forbes Street.

13. SIDRA modelling indicates that most assessed intersections will operate satisfactorily during the AM and PM peak periods in the 2023 development scenario. The minor approaches of the Lachlan Street/ Forbes Street intersection would likely operate at a Level of Service F without mitigation during the AM peak. A proposed left-in/ left-out restriction for the northern approach and a right turn ban (during peak periods) for the Forbes Street southern approach assist in an improvement to Level of Service B.
14. SIDRA modelling for the 2033 development scenario (10-year horizon) identifies that the Lachlan Street/ Burnside Drive/ Hart Street roundabout would operate at a Level of Service D (although the overall operation of the roundabout is Level of Service B). A potential mitigation measure to improve the operation of the Lachlan Street/ Burnside Drive/ Hart Street roundabout is to reduce the car mode share at the adjacent high schools and further separate school start times to distribute the peak traffic volumes. An alternate physical mitigation measure, in the form of an additional 10-metre-long short approach lane on the northern approach, has been assessed and would improve the roundabout to a Level of Service A.
15. A summary of infrastructure to be delivered by School Infrastructure as part of this project and infrastructure to be investigated by School Infrastructure working in collaboration with Council/ Transport for NSW is illustrated below.

Figure 8.1: Infrastructure Upgrades



A. TURNING MOVEMENT DIAGRAMS

A

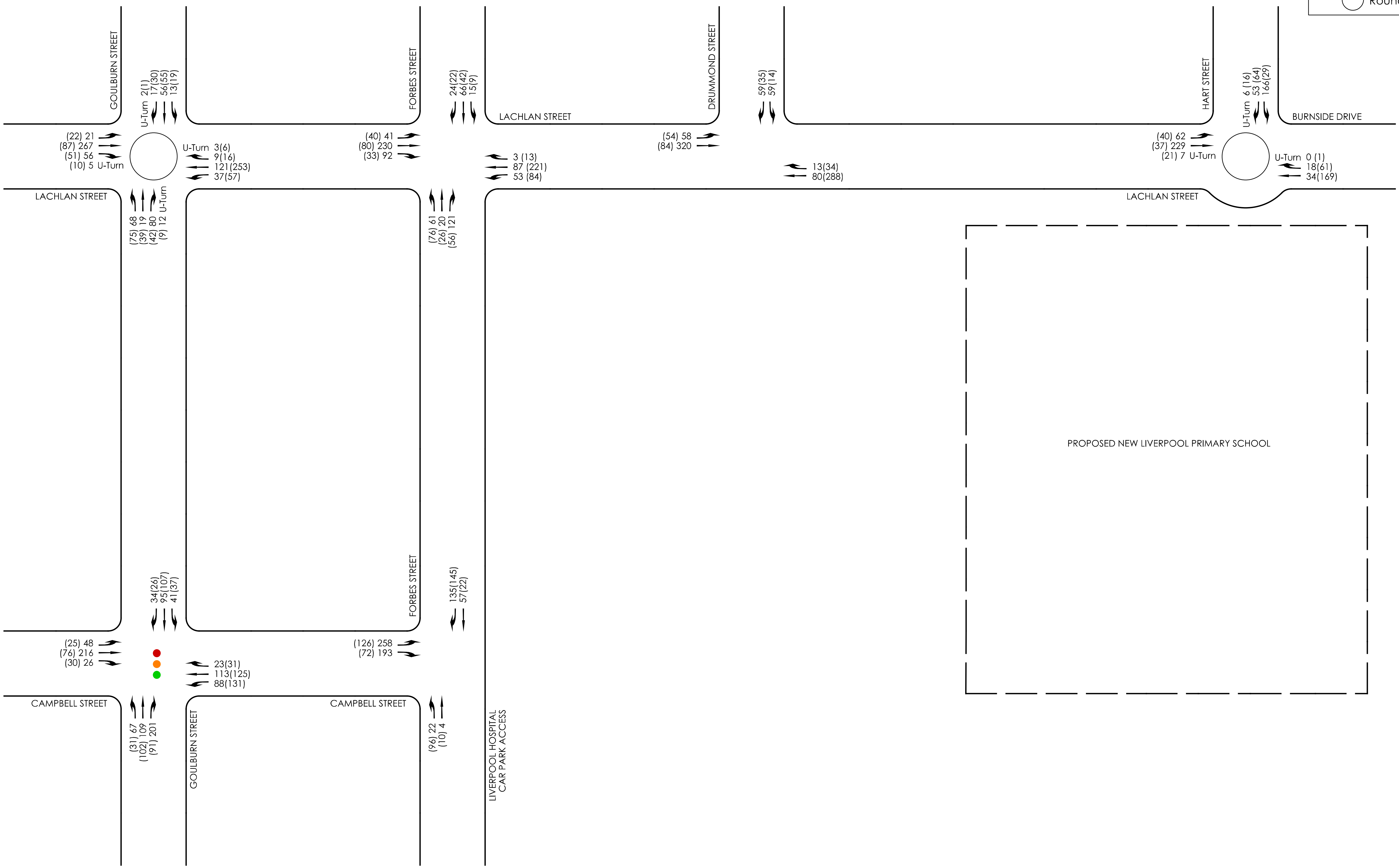
EXISTING TRAFFIC VOLUMES

LEGEND

10(10) = AM Peak (PM Peak)
AM Peak = 7:45AM - 8:45AM
PM Peak = 2:45PM - 3:45PM

Signalised Intersection

Roundabout



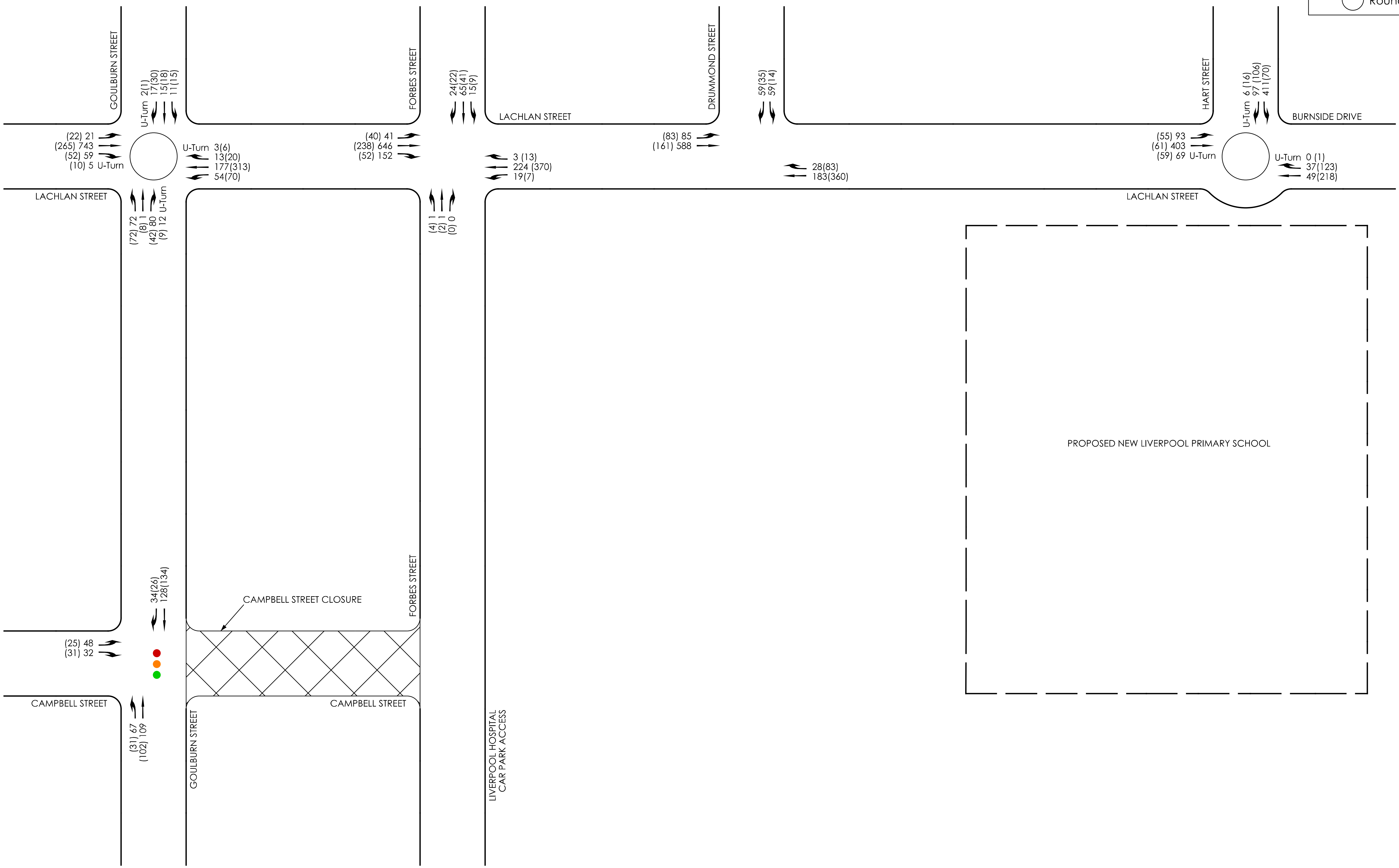
2023 BASE SCENARIO

LEGEND

10(10) = AM Peak (PM Peak)
AM Peak = 7:45AM - 8:45AM
PM Peak = 2:45PM - 3:45PM

Signalised Intersection

Roundabout



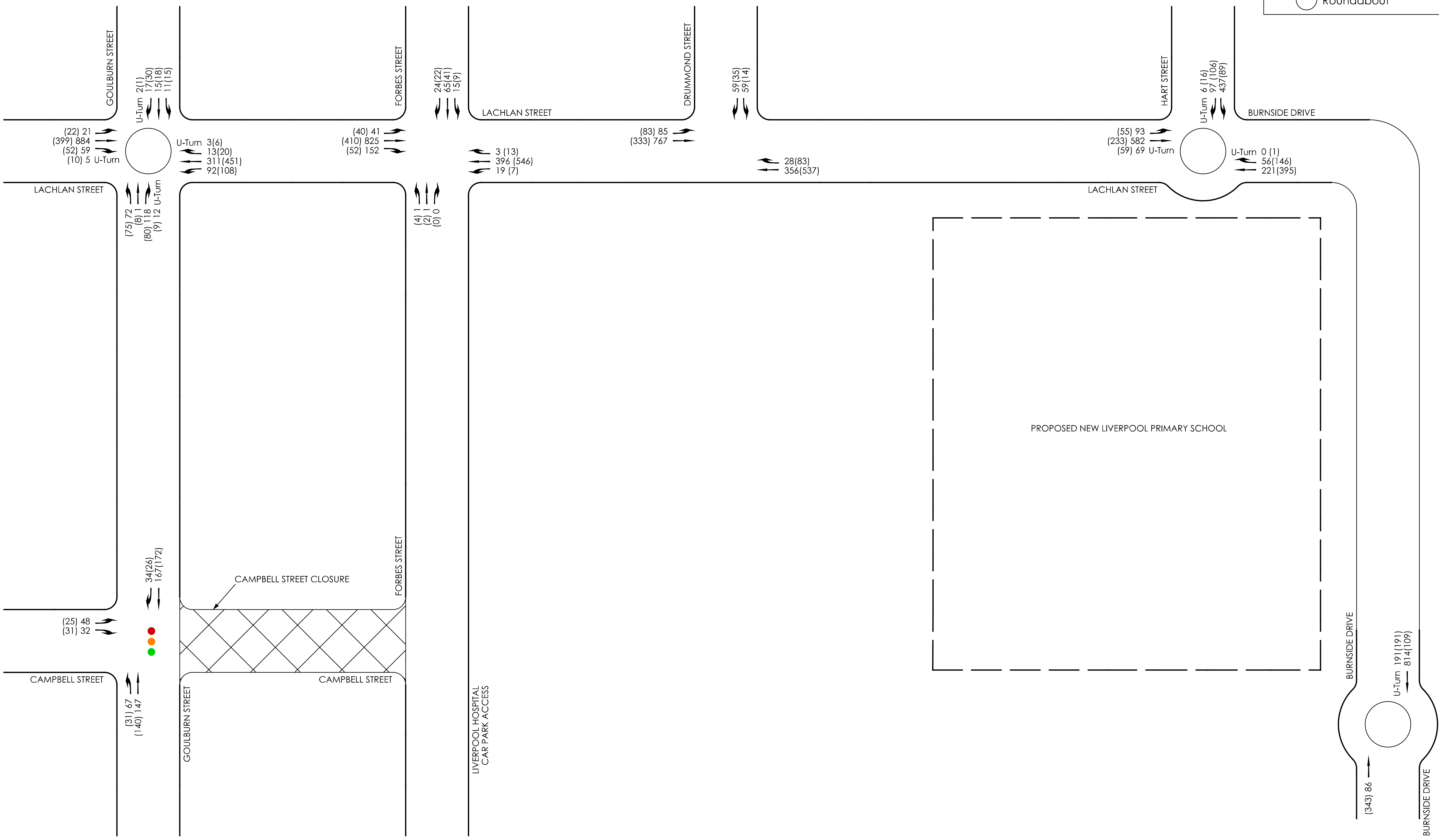
2023 DEVELOPMENT SCENARIO

LEGEND

10(10) = AM Peak (PM Peak)
AM Peak = 7:45AM - 8:45AM
PM Peak = 2:45PM - 3:45PM

Signalised Intersection

Roundabout



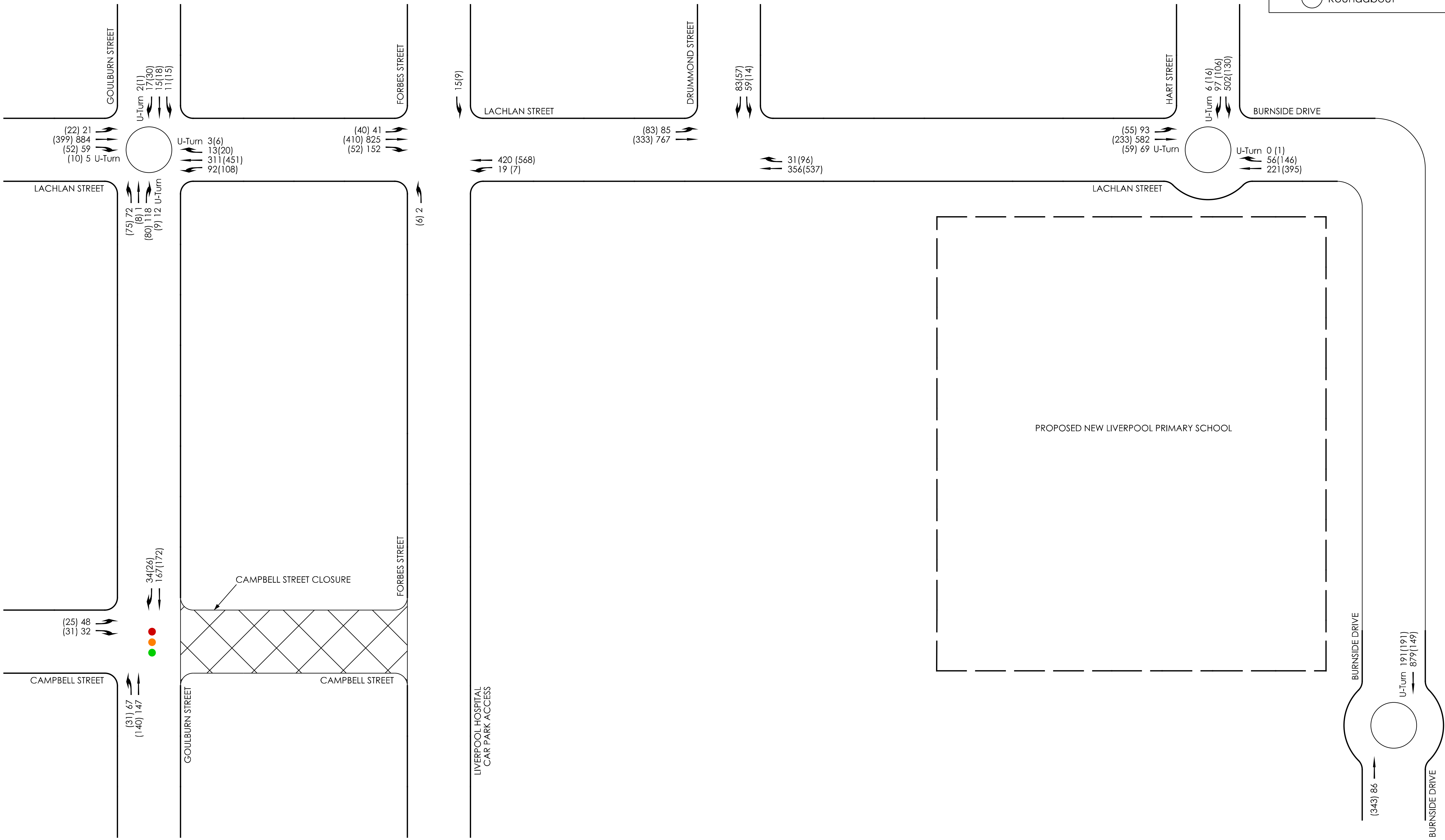
2023 DEVELOPMENT SCENARIO - MITIGATION

LEGEND

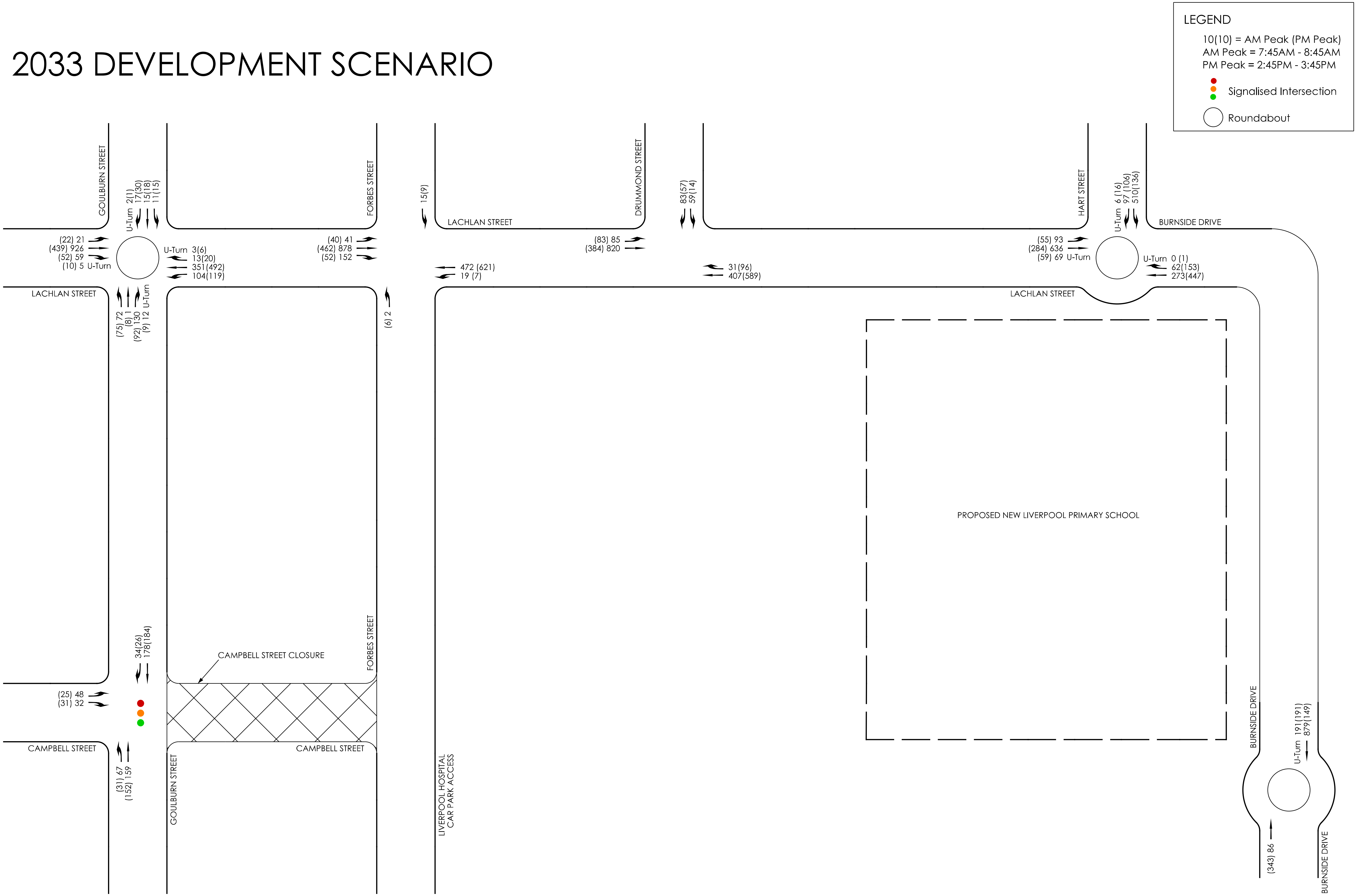
10(10) = AM Peak (PM Peak)
AM Peak = 7:45AM - 8:45AM
PM Peak = 2:45PM - 3:45PM

Signalised Intersection

Roundabout



2033 DEVELOPMENT SCENARIO



B. SIDRA MOVEMENT SUMMARIES

B

USER REPORT FOR NETWORK SITE

Project: 210407sid-N174700 Existing Conditions

Template: Default Site User Report

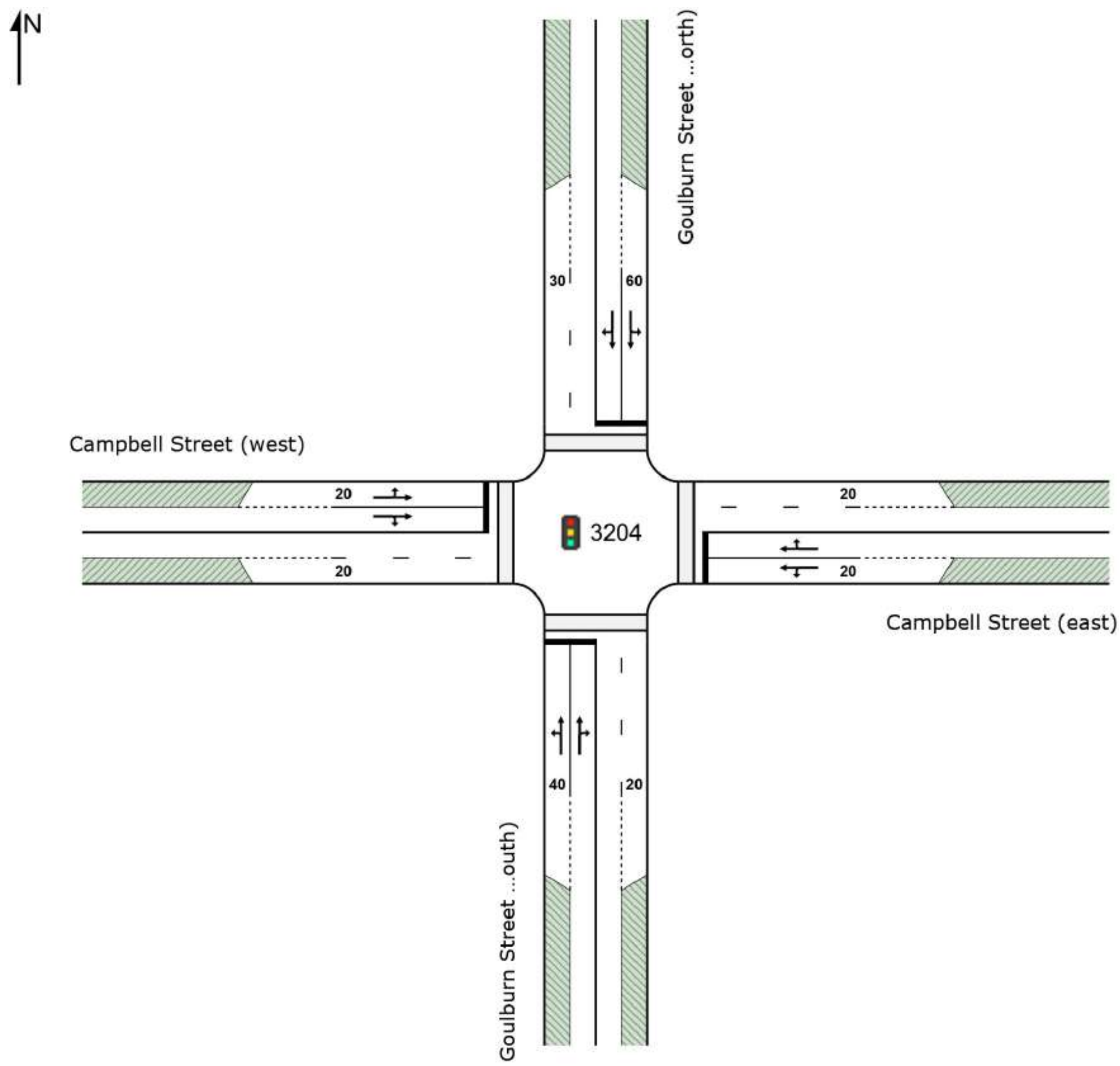
Site: 3204 [Goulburn Street/ Campbell Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

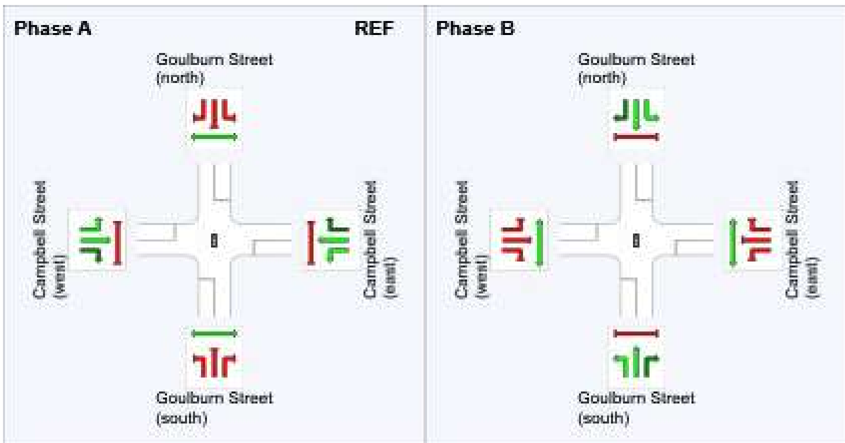


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Goulburn Street (south)														
1	L2	47	2.2	47	2.2	0.112	13.1	LOS A	1.0	6.9	0.59	0.56	0.59	30.1
2	T1	103	2.0	103	2.0	0.448	11.2	LOS A	3.5	24.8	0.67	0.65	0.67	25.6
3	R2	222	0.9	222	0.9	0.448	16.0	LOS B	3.5	24.8	0.73	0.73	0.73	24.4
Approach		373	1.4	373	1.4	0.448	14.3	LOS A	3.5	24.8	0.70	0.68	0.70	25.5
East: Campbell Street (east)														
4	L2	71	11.9	71	11.9	0.130	19.5	LOS B	0.9	7.1	0.75	0.69	0.75	25.3
5	T1	100	9.5	100	9.5	0.230	16.7	LOS B	1.6	12.3	0.77	0.64	0.77	21.6
6	R2	20	5.3	20	5.3	0.230	20.1	LOS B	1.6	12.3	0.77	0.64	0.77	15.1
Approach		191	9.9	191	9.9	0.230	18.1	LOS B	1.6	12.3	0.76	0.66	0.76	22.9
North: Goulburn Street (north)														
7	L2	44	2.4	44	2.4	0.056	14.0	LOS A	0.5	3.3	0.61	0.64	0.61	24.9
8	T1	88	6.0	88	6.0	0.172	10.1	LOS A	1.3	9.8	0.61	0.55	0.61	32.1
9	R2	39	5.4	39	5.4	0.172	13.5	LOS A	1.3	9.8	0.61	0.55	0.61	30.1
Approach		172	4.9	172	4.9	0.172	11.9	LOS A	1.3	9.8	0.61	0.57	0.61	30.3
West: Campbell Street (west)														
10	L2	53	4.0	53	4.0	0.103	20.8	LOS B	0.7	5.1	0.77	0.69	0.77	14.1
11	T1	227	0.5	227	0.5	0.437	17.1	LOS B	3.6	25.6	0.82	0.70	0.82	15.8
12	R2	27	3.8	27	3.8	0.437	20.6	LOS B	3.6	25.6	0.82	0.70	0.82	26.5
Approach		307	1.4	307	1.4	0.437	18.1	LOS B	3.6	25.6	0.81	0.70	0.81	17.0
All Vehicles		1042	3.5	1042	3.5	0.448	15.7	LOS B	3.6	25.6	0.73	0.67	0.73	24.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement

Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	**A**	**B**
Phase Change Time (sec)	0	26
Green Time (sec)	20	28
Phase Time (sec)	26	34
Phase Split	43%	57%

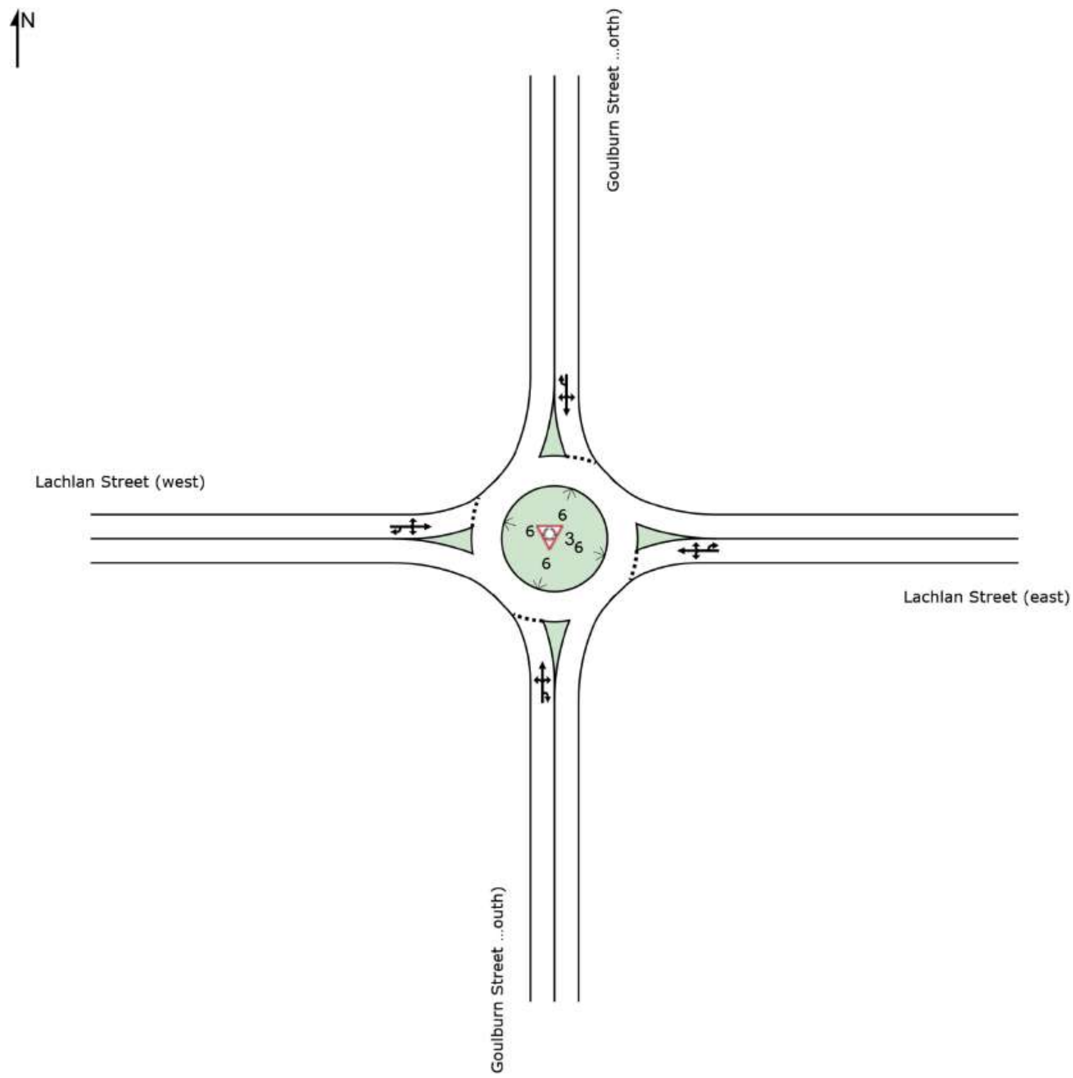
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Goulburn Street (south)														
1	L2	76	5.6	76	5.6	0.165	4.2	LOS A	0.3	2.2	0.31	0.55	0.31	36.9
2	T1	15	0.0	15	0.0	0.165	3.5	LOS A	0.3	2.2	0.31	0.55	0.31	37.5
3	R2	71	4.5	71	4.5	0.165	6.4	LOS A	0.3	2.2	0.31	0.55	0.31	32.5
3u	U	16	0.0	16	0.0	0.165	7.6	LOS A	0.3	2.2	0.31	0.55	0.31	32.5
Approach		177	4.2	177	4.2	0.165	5.3	LOS A	0.3	2.2	0.31	0.55	0.31	35.8
East: Lachlan Street (east)														
4	L2	37	0.0	37	0.0	0.162	4.1	LOS A	0.4	2.5	0.37	0.47	0.37	28.1
5	T1	128	0.8	128	0.8	0.162	3.5	LOS A	0.4	2.5	0.37	0.47	0.37	37.6
6	R2	11	0.0	11	0.0	0.162	6.3	LOS A	0.4	2.5	0.37	0.47	0.37	37.5
6u	U	2	0.0	2	0.0	0.162	7.6	LOS A	0.4	2.5	0.37	0.47	0.37	28.1
Approach		178	0.6	178	0.6	0.162	3.8	LOS A	0.4	2.5	0.37	0.47	0.37	36.9
North: Goulburn Street (north)														
7	L2	14	0.0	14	0.0	0.107	5.9	LOS A	0.2	1.7	0.59	0.63	0.59	35.3
8	T1	56	1.9	56	1.9	0.107	5.4	LOS A	0.2	1.7	0.59	0.63	0.59	35.3
9	R2	19	5.6	19	5.6	0.107	8.4	LOS A	0.2	1.7	0.59	0.63	0.59	37.8
9u	U	1	0.0	1	0.0	0.107	9.4	LOS A	0.2	1.7	0.59	0.63	0.59	38.1
Approach		89	2.4	89	2.4	0.107	6.2	LOS A	0.2	1.7	0.59	0.63	0.59	36.2
West: Lachlan Street (west)														
10	L2	18	23.5	18	23.5	0.334	4.2	LOS A	0.9	7.0	0.36	0.45	0.36	37.9
11	T1	309	6.1	309	6.1	0.334	3.3	LOS A	0.9	7.0	0.36	0.45	0.36	36.4
12	R2	66	6.3	66	6.3	0.334	6.2	LOS A	0.9	7.0	0.36	0.45	0.36	36.4
12u	U	8	0.0	8	0.0	0.334	7.3	LOS A	0.9	7.0	0.36	0.45	0.36	38.7
Approach		402	6.8	402	6.8	0.334	3.9	LOS A	0.9	7.0	0.36	0.45	0.36	36.6
All Vehicles		846	4.5	846	4.5	0.334	4.4	LOS A	0.9	7.0	0.37	0.49	0.37	36.5

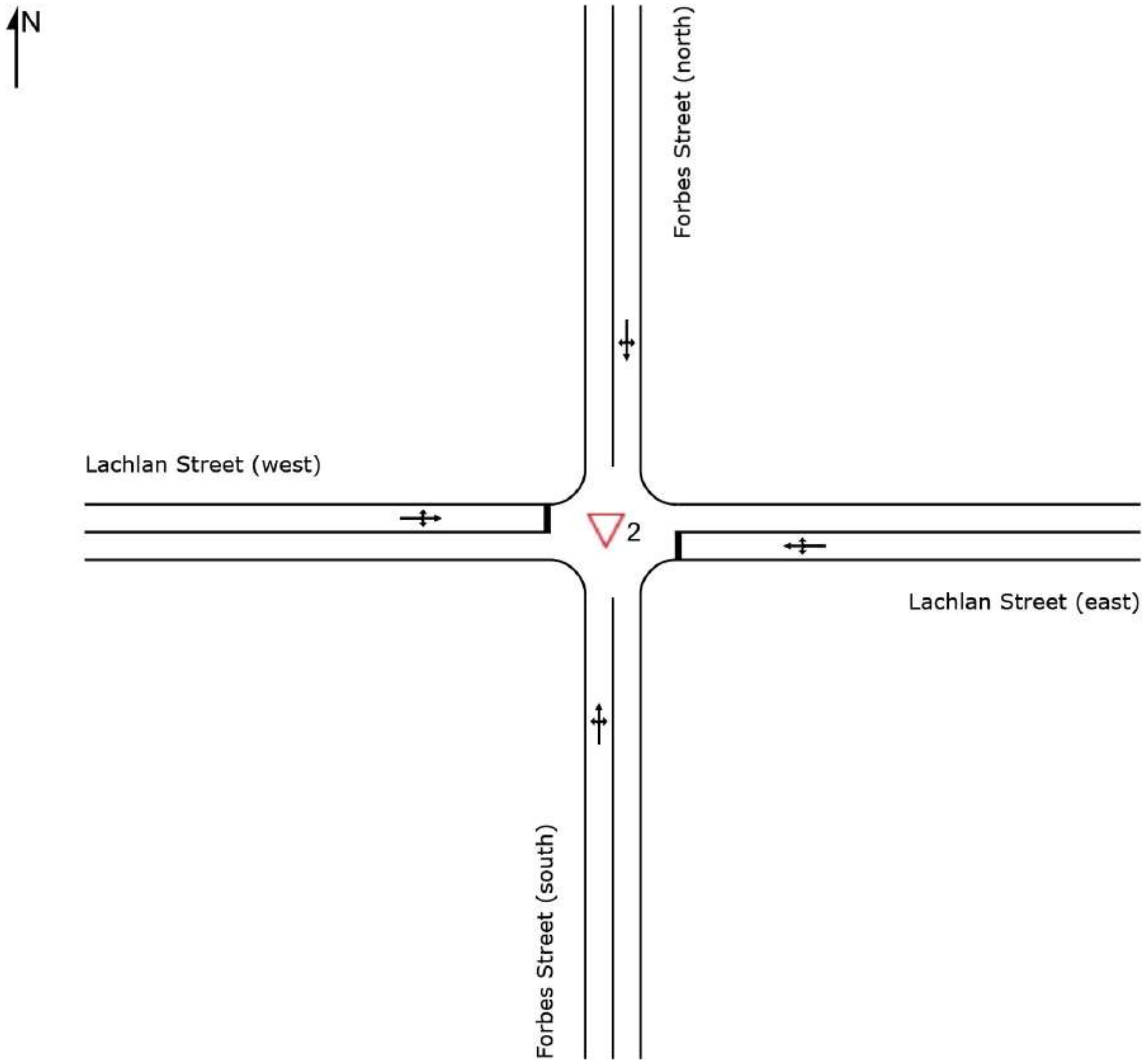
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total	HV	Total	HV				Vehicles	Distance				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	53	0.0	53	0.0	0.148	3.7	LOS A	0.3	2.1	0.22	0.42	0.22	34.1
2	T1	20	0.0	20	0.0	0.148	0.3	LOS A	0.3	2.1	0.22	0.42	0.22	37.8
3	R2	181	0.0	181	0.0	0.148	3.9	LOS A	0.3	2.1	0.22	0.42	0.22	34.1
Approach		254	0.0	254	0.0	0.148	3.5	NA	0.3	2.1	0.22	0.42	0.22	34.8
East: Lachlan Street (east)														
4	L2	52	0.0	52	0.0	0.163	7.0	LOS A	0.3	1.8	0.26	0.98	0.26	23.6
5	T1	97	1.1	97	1.1	0.163	8.8	LOS A	0.3	1.8	0.26	0.98	0.26	23.6
6	R2	3	0.0	3	0.0	0.163	11.5	LOS A	0.3	1.8	0.26	0.98	0.26	35.0
Approach		152	0.7	152	0.7	0.163	8.2	LOS A	0.3	1.8	0.26	0.98	0.26	24.4
North: Forbes Street (north)														
7	L2	22	0.0	22	0.0	0.069	3.6	LOS A	0.1	0.6	0.10	0.19	0.10	38.5
8	T1	76	0.0	76	0.0	0.069	0.1	LOS A	0.1	0.6	0.10	0.19	0.10	38.5
9	R2	31	0.0	31	0.0	0.069	3.7	LOS A	0.1	0.6	0.10	0.19	0.10	38.5
Approach		128	0.0	128	0.0	0.069	1.6	NA	0.1	0.6	0.10	0.19	0.10	38.5
West: Lachlan Street (west)														
10	L2	40	0.0	40	0.0	0.499	8.0	LOS A	1.4	10.0	0.28	1.08	0.40	33.9
11	T1	266	0.0	266	0.0	0.499	10.5	LOS A	1.4	10.0	0.28	1.08	0.40	19.7
12	R2	78	24.3	78	24.3	0.499	14.7	LOS B	1.4	10.0	0.28	1.08	0.40	19.7
Approach		384	4.9	384	4.9	0.499	11.1	LOS A	1.4	10.0	0.28	1.08	0.40	23.5
All Vehicles		918	2.2	918	2.2	0.499	7.2	NA	1.4	10.0	0.23	0.76	0.28	30.4

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

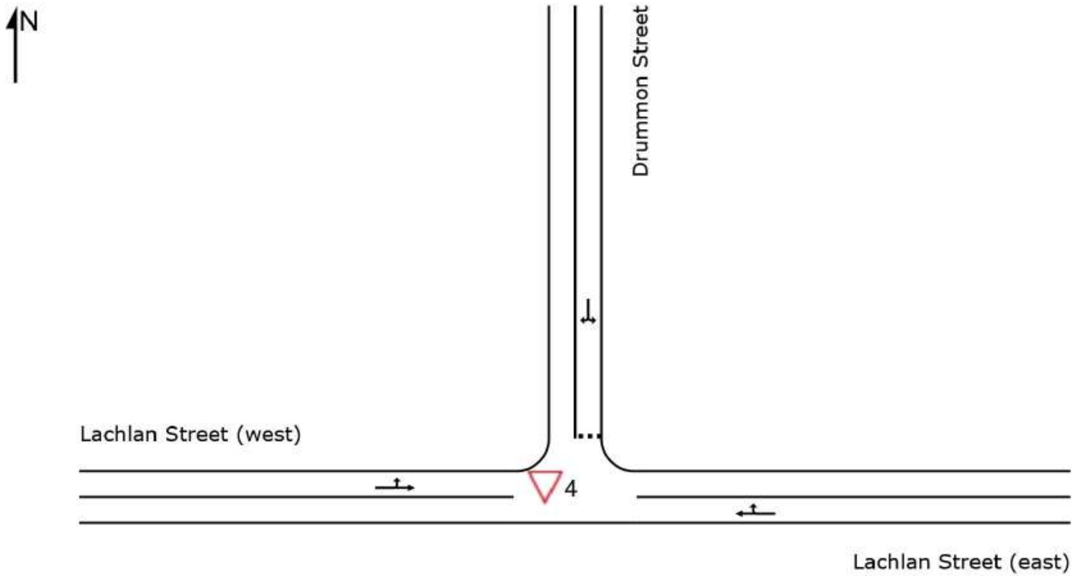
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Lachlan Street (east)														
5	T1	89	1.2	89	1.2	0.059	0.4	LOS A	0.1	0.4	0.16	0.07	0.16	35.9
6	R2	14	0.0	14	0.0	0.059	5.4	LOS A	0.1	0.4	0.16	0.07	0.16	38.9
Approach		103	1.0	103	1.0	0.059	1.1	NA	0.1	0.4	0.16	0.07	0.16	37.2
North: Drummon Street														
7	L2	66	0.0	66	0.0	0.144	5.0	LOS A	0.2	1.5	0.46	0.66	0.46	35.7
9	R2	63	0.0	63	0.0	0.144	6.3	LOS A	0.2	1.5	0.46	0.66	0.46	35.7
Approach		129	0.0	129	0.0	0.144	5.6	LOS A	0.2	1.5	0.46	0.66	0.46	35.7
West: Lachlan Street (west)														
10	L2	69	0.0	69	0.0	0.247	3.4	LOS A	0.0	0.0	0.00	0.07	0.00	39.9
11	T1	408	0.0	408	0.0	0.247	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	38.2
Approach		478	0.0	478	0.0	0.247	0.5	NA	0.0	0.0	0.00	0.07	0.00	39.0
All Vehicles		711	0.1	711	0.1	0.247	1.5	NA	0.2	1.5	0.11	0.18	0.11	37.5

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

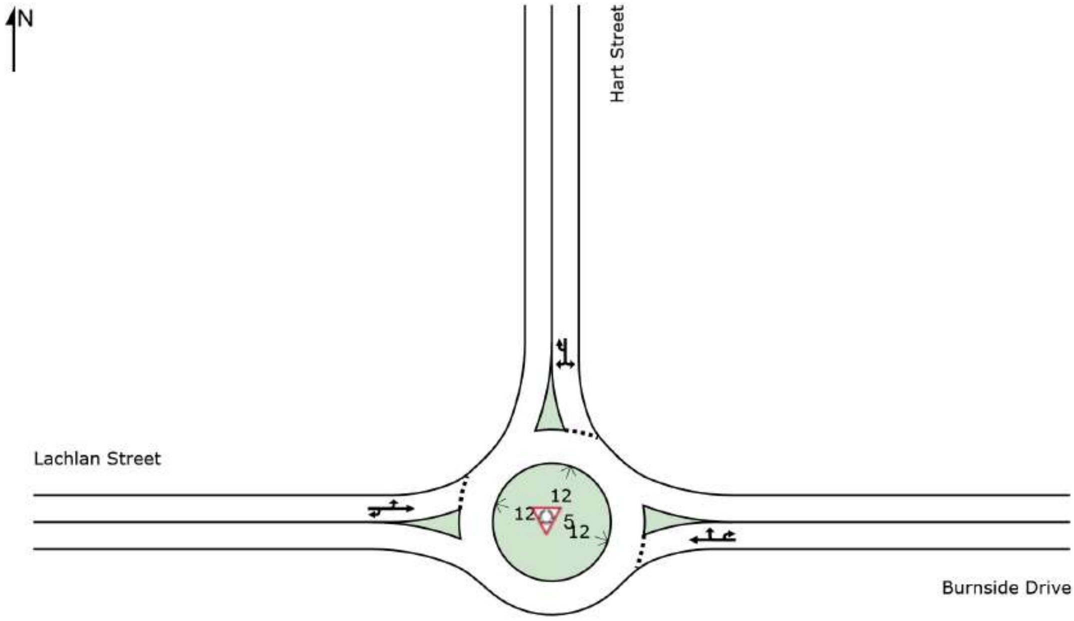
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Averag e Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Burnside Drive														
5	T1	41	0.0	41	0.0	0.050	2.4	LOS A	0.1	0.7	0.22	0.40	0.22	36.7
6	R2	20	0.0	20	0.0	0.050	5.8	LOS A	0.1	0.7	0.22	0.40	0.22	39.0
6u	U	1	0.0	1	0.0	0.050	7.2	LOS A	0.1	0.7	0.22	0.40	0.22	39.6
Approach		62	0.0	62	0.0	0.050	3.6	LOS A	0.1	0.7	0.22	0.40	0.22	37.9
North: Hart Street														
7	L2	197	0.0	197	0.0	0.258	4.2	LOS A	0.6	4.1	0.51	0.59	0.51	38.0
9	R2	61	1.7	61	1.7	0.258	7.4	LOS A	0.6	4.1	0.51	0.59	0.51	36.1
9u	U	4	0.0	4	0.0	0.258	8.7	LOS A	0.6	4.1	0.51	0.59	0.51	39.2
Approach		262	0.4	262	0.4	0.258	5.0	LOS A	0.6	4.1	0.51	0.59	0.51	37.7
West: Lachlan Street														
10	L2	81	0.0	81	0.0	0.259	2.4	LOS A	0.6	4.4	0.13	0.30	0.13	38.2
11	T1	304	0.0	304	0.0	0.259	2.2	LOS A	0.6	4.4	0.13	0.30	0.13	39.3
12u	U	5	0.0	5	0.0	0.259	6.9	LOS A	0.6	4.4	0.13	0.30	0.13	31.9
Approach		391	0.0	391	0.0	0.259	2.3	LOS A	0.6	4.4	0.13	0.30	0.13	39.0
All Vehicles		715	0.1	715	0.1	0.259	3.4	LOS A	0.6	4.4	0.28	0.42	0.28	38.3

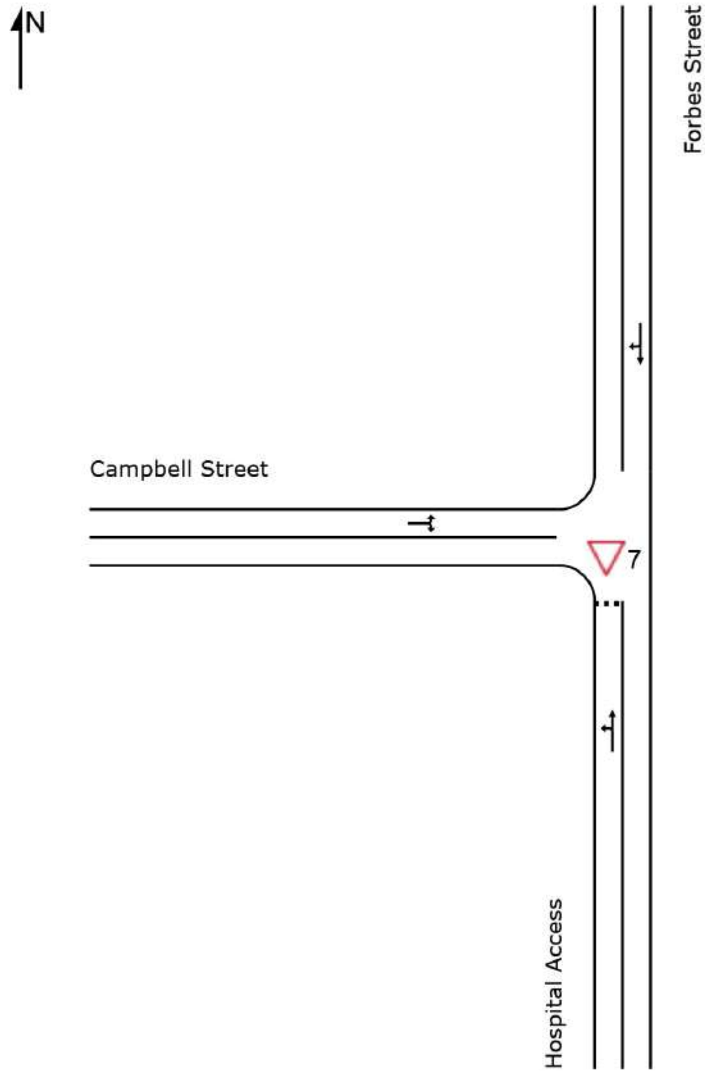
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 7 [Forbes Street/ Campbell Street - Existing AM]

Network: 9 [Existing AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Hospital Access														
1	L2	23	9.1	23	9.1	0.023	6.1	LOS A	0.0	0.3	0.25	0.55	0.25	49.8
2	T1	4	0.0	4	0.0	0.023	7.2	LOS A	0.0	0.3	0.25	0.55	0.25	49.8
Approach		27	7.7	27	7.7	0.023	6.3	LOS A	0.0	0.3	0.25	0.55	0.25	49.8
North: Forbes Street														
8	T1	60	0.0	60	0.0	0.134	0.8	LOS A	0.3	2.4	0.34	0.35	0.34	50.2
9	R2	141	13.4	141	13.4	0.134	4.4	LOS A	0.3	2.4	0.34	0.35	0.34	38.2
Approach		201	9.4	201	9.4	0.134	3.3	NA	0.3	2.4	0.34	0.35	0.34	44.1
West: Campbell Street														
10	L2	272	0.0	272	0.0	0.267	3.6	LOS A	0.4	3.1	0.11	0.48	0.11	30.3
12	R2	203	1.6	203	1.6	0.267	5.7	LOS A	0.4	3.1	0.11	0.48	0.11	48.0
Approach		475	0.7	475	0.7	0.267	4.5	NA	0.4	3.1	0.11	0.48	0.11	43.0
All Vehicles		703	3.4	703	3.4	0.267	4.2	NA	0.4	3.1	0.18	0.45	0.18	43.7

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

USER REPORT FOR NETWORK SITE

Project: 210407sid-N174700 Existing Conditions

Template: Default Site User Report

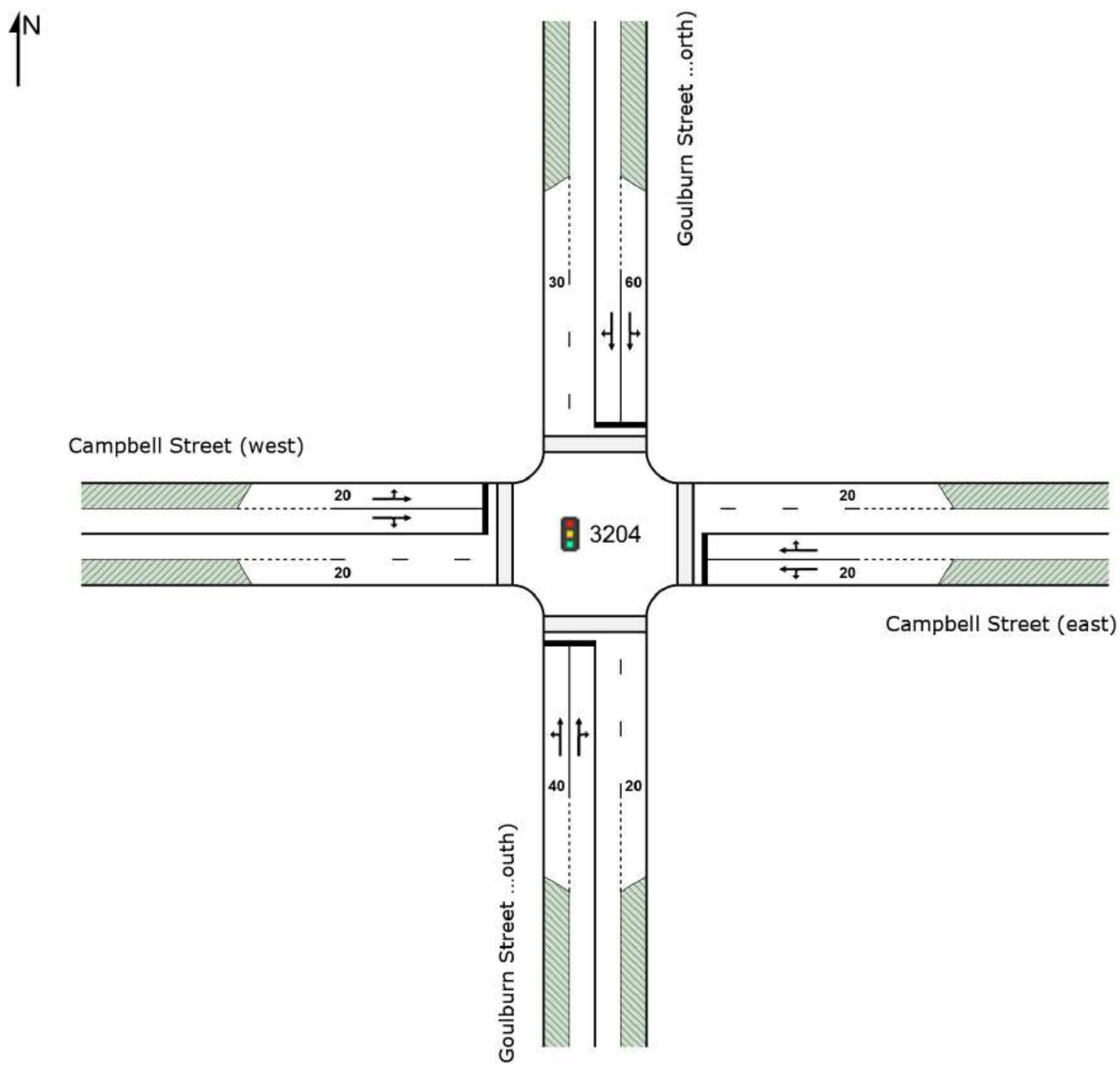
Site: 3204 [Goulburn Street/ Campbell Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

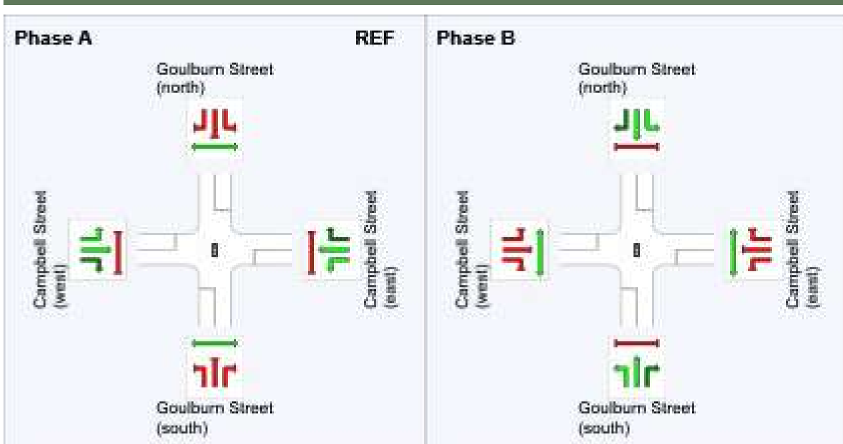


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Goulburn Street (south)														
1	L2	33	0.0	33	0.0	0.068	14.1	LOS A	0.6	4.1	0.61	0.57	0.61	29.3
2	T1	107	3.9	107	3.9	0.275	11.7	LOS A	2.1	15.2	0.67	0.63	0.67	25.5
3	R2	96	1.1	96	1.1	0.275	15.4	LOS B	2.1	15.2	0.68	0.64	0.68	25.3
Approach		236	2.2	236	2.2	0.275	13.6	LOS A	2.1	15.2	0.66	0.63	0.66	26.1
East: Campbell Street (east)														
4	L2	138	4.6	138	4.6	0.271	21.9	LOS B	2.0	14.4	0.82	0.74	0.82	24.2
5	T1	132	2.4	132	2.4	0.274	15.4	LOS B	2.2	15.4	0.76	0.64	0.76	22.3
6	R2	33	0.0	33	0.0	0.274	18.8	LOS B	2.2	15.4	0.76	0.64	0.76	15.8
Approach		302	3.1	302	3.1	0.274	18.7	LOS B	2.2	15.4	0.78	0.69	0.78	22.9
North: Goulburn Street (north)														
7	L2	39	2.7	39	2.7	0.049	14.0	LOS A	0.4	2.9	0.60	0.63	0.60	24.9
8	T1	113	5.6	113	5.6	0.184	10.8	LOS A	1.5	11.1	0.63	0.55	0.63	32.0
9	R2	27	3.8	27	3.8	0.184	14.2	LOS A	1.5	11.1	0.63	0.55	0.63	29.9
Approach		179	4.7	179	4.7	0.184	12.0	LOS A	1.5	11.1	0.63	0.57	0.63	30.6
West: Campbell Street (west)														
10	L2	26	8.0	26	8.0	0.050	19.7	LOS B	0.3	2.5	0.74	0.66	0.74	14.6
11	T1	80	2.6	80	2.6	0.231	17.5	LOS B	1.5	11.0	0.79	0.66	0.79	15.2
12	R2	32	0.0	32	0.0	0.231	20.9	LOS B	1.5	11.0	0.79	0.66	0.79	26.0
Approach		138	3.1	138	3.1	0.231	18.7	LOS B	1.5	11.0	0.78	0.66	0.78	18.8
All Vehicles		855	3.2	855	3.2	0.275	15.9	LOS B	2.2	15.4	0.72	0.64	0.72	25.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	**A**	**B**
Phase Change Time (sec)	0	27
Green Time (sec)	21	27
Phase Time (sec)	27	33
Phase Split	45%	55%

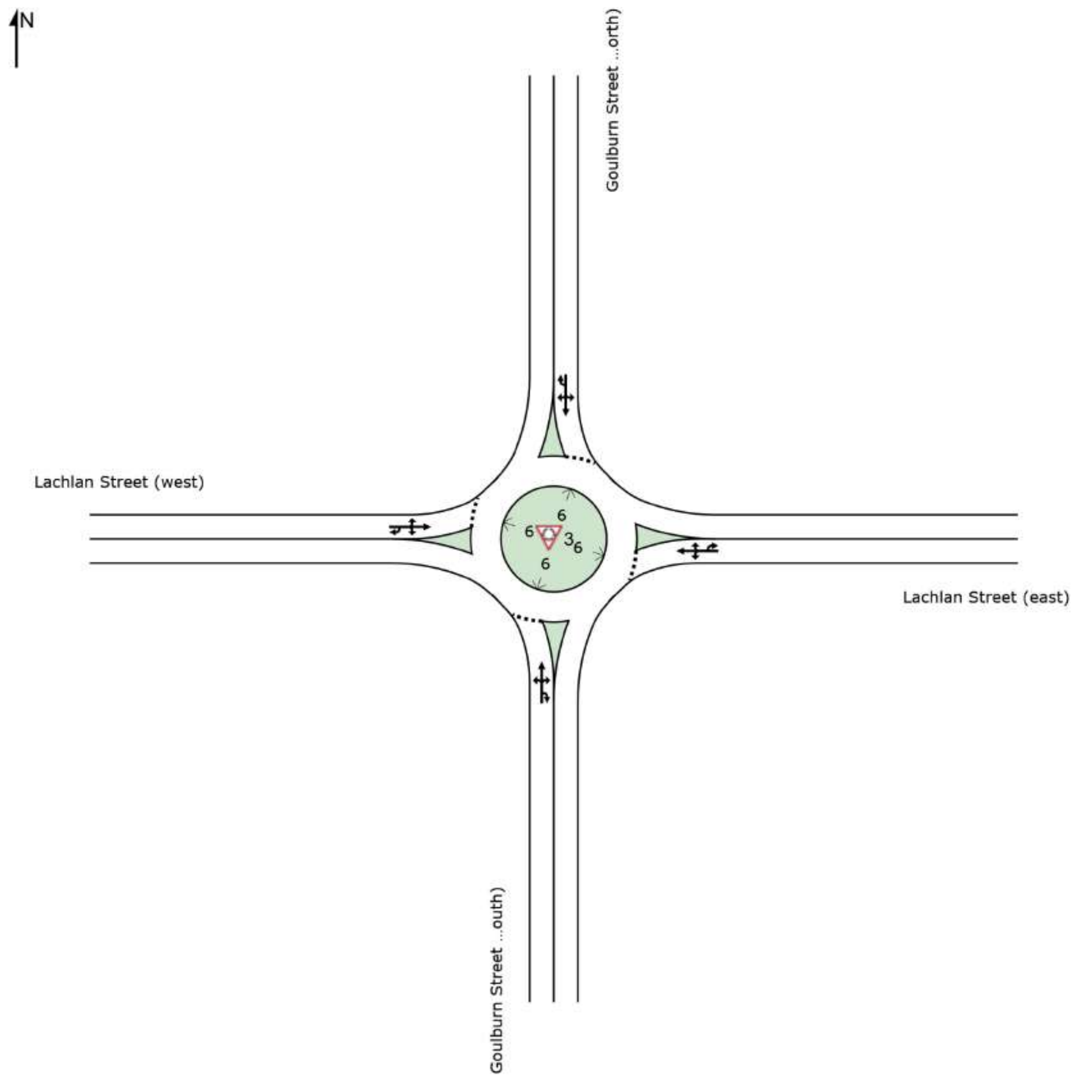
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	79	2.7	79	2.7	0.189	5.2	LOS A	0.4	2.6	0.43	0.60	0.43	36.7
2	T1	41	10.3	41	10.3	0.189	4.8	LOS A	0.4	2.6	0.43	0.60	0.43	37.3
3	R2	44	4.8	44	4.8	0.189	7.5	LOS A	0.4	2.6	0.43	0.60	0.43	31.9
3u	U	9	11.1	9	11.1	0.189	8.9	LOS A	0.4	2.6	0.43	0.60	0.43	31.9
Approach		174	5.5	174	5.5	0.189	5.9	LOS A	0.4	2.6	0.43	0.60	0.43	36.1
East: Lachlan Street (east)														
4	L2	60	0.0	60	0.0	0.307	4.2	LOS A	0.8	5.3	0.41	0.48	0.41	27.8
5	T1	266	0.8	266	0.8	0.307	3.6	LOS A	0.8	5.3	0.41	0.48	0.41	37.5
6	R2	17	6.3	17	6.3	0.307	6.6	LOS A	0.8	5.3	0.41	0.48	0.41	37.4
6u	U	6	0.0	6	0.0	0.307	7.7	LOS A	0.8	5.3	0.41	0.48	0.41	27.8
Approach		349	0.9	349	0.9	0.307	3.9	LOS A	0.8	5.3	0.41	0.48	0.41	36.9
North: Goulburn Street (north)														
7	L2	20	10.5	20	10.5	0.107	4.5	LOS A	0.2	1.6	0.41	0.52	0.41	36.0
8	T1	58	1.8	58	1.8	0.107	3.8	LOS A	0.2	1.6	0.41	0.52	0.41	36.0
9	R2	32	3.3	32	3.3	0.107	6.7	LOS A	0.2	1.6	0.41	0.52	0.41	38.2
9u	U	1	0.0	1	0.0	0.107	7.8	LOS A	0.2	1.6	0.41	0.52	0.41	38.5
Approach		111	3.8	111	3.8	0.107	4.8	LOS A	0.2	1.6	0.41	0.52	0.41	37.0
West: Lachlan Street (west)														
10	L2	23	0.0	23	0.0	0.161	3.8	LOS A	0.4	2.9	0.33	0.49	0.33	37.8
11	T1	92	11.5	92	11.5	0.161	3.3	LOS A	0.4	2.9	0.33	0.49	0.33	36.2
12	R2	54	13.7	54	13.7	0.161	6.2	LOS A	0.4	2.9	0.33	0.49	0.33	36.2
12u	U	11	0.0	11	0.0	0.161	7.3	LOS A	0.4	2.9	0.33	0.49	0.33	38.6
Approach		179	10.0	179	10.0	0.161	4.5	LOS A	0.4	2.9	0.33	0.49	0.33	36.8
All Vehicles		813	4.3	813	4.3	0.307	4.6	LOS A	0.8	5.3	0.40	0.52	0.40	36.7

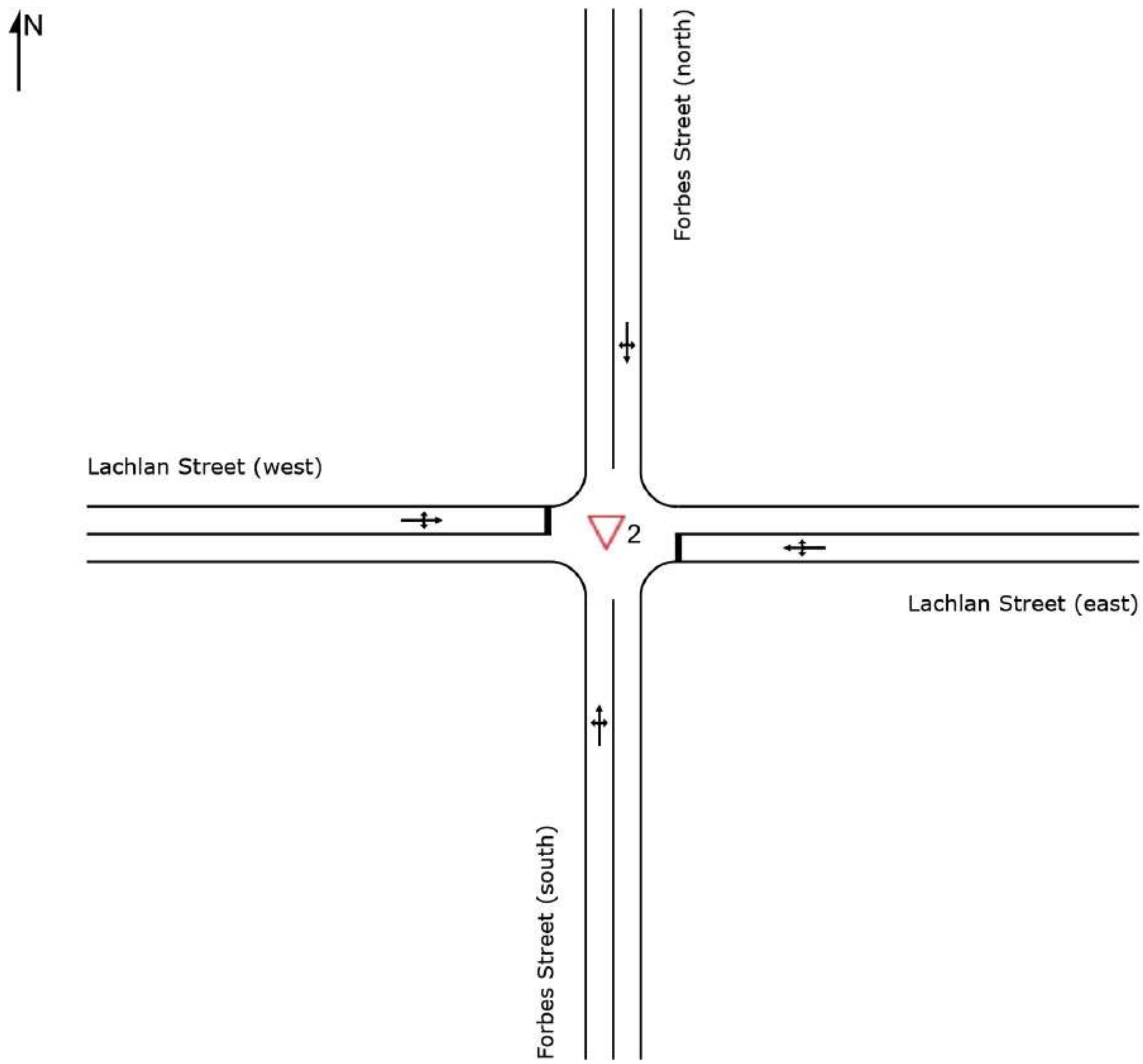
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	80	0.0	80	0.0	0.092	3.5	LOS A	0.1	1.0	0.11	0.36	0.11	35.0
2	T1	27	3.8	27	3.8	0.092	0.1	LOS A	0.1	1.0	0.11	0.36	0.11	38.1
3	R2	59	1.8	59	1.8	0.092	3.7	LOS A	0.1	1.0	0.11	0.36	0.11	35.0
Approach		166	1.3	166	1.3	0.092	3.0	NA	0.1	1.0	0.11	0.36	0.11	36.1
East: Lachlan Street (east)														
4	L2	88	0.0	88	0.0	0.329	6.9	LOS A	0.6	4.3	0.24	0.98	0.24	24.0
5	T1	233	1.4	233	1.4	0.329	8.2	LOS A	0.6	4.3	0.24	0.98	0.24	24.0
6	R2	14	0.0	14	0.0	0.329	8.7	LOS A	0.6	4.3	0.24	0.98	0.24	35.1
Approach		335	0.9	335	0.9	0.329	7.9	LOS A	0.6	4.3	0.24	0.98	0.24	25.4
North: Forbes Street (north)														
7	L2	9	0.0	9	0.0	0.042	3.7	LOS A	0.1	0.4	0.15	0.20	0.15	38.3
8	T1	44	0.0	44	0.0	0.042	0.2	LOS A	0.1	0.4	0.15	0.20	0.15	38.3
9	R2	23	0.0	23	0.0	0.042	3.8	LOS A	0.1	0.4	0.15	0.20	0.15	38.3
Approach		77	0.0	77	0.0	0.042	1.7	NA	0.1	0.4	0.15	0.20	0.15	38.3
West: Lachlan Street (west)														
10	L2	42	0.0	42	0.0	0.197	6.8	LOS A	0.3	2.3	0.16	1.01	0.16	35.0
11	T1	84	3.8	84	3.8	0.197	7.8	LOS A	0.3	2.3	0.16	1.01	0.16	22.1
12	R2	35	36.4	35	36.4	0.197	13.7	LOS A	0.3	2.3	0.16	1.01	0.16	22.1
Approach		161	9.8	161	9.8	0.197	8.8	LOS A	0.3	2.3	0.16	1.01	0.16	29.2
All Vehicles		739	2.8	739	2.8	0.329	6.3	NA	0.6	4.3	0.18	0.77	0.18	31.5

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

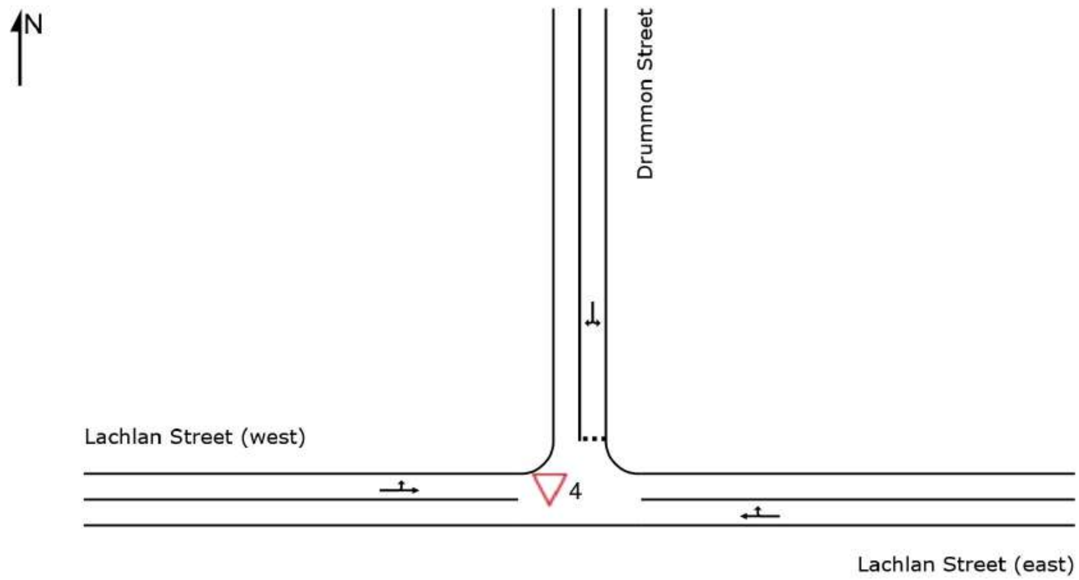
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	303	0.7	303	0.7	0.180	0.1	LOS A	0.1	0.8	0.07	0.05	0.07	37.5
6	R2	36	0.0	36	0.0	0.180	4.1	LOS A	0.1	0.8	0.07	0.05	0.07	39.2
Approach		339	0.6	339	0.6	0.180	0.5	NA	0.1	0.8	0.07	0.05	0.07	38.2
North: Drummon Street														
7	L2	15	7.1	15	7.1	0.053	3.7	LOS A	0.1	0.5	0.26	0.53	0.26	36.1
9	R2	35	3.0	35	3.0	0.053	5.6	LOS A	0.1	0.5	0.26	0.53	0.26	36.1
Approach		49	4.3	49	4.3	0.053	5.0	LOS A	0.1	0.5	0.26	0.53	0.26	36.1
West: Lachlan Street (west)														
10	L2	61	1.7	61	1.7	0.080	3.4	LOS A	0.0	0.0	0.00	0.19	0.00	39.2
11	T1	88	4.8	88	4.8	0.080	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	35.4
Approach		149	3.5	149	3.5	0.080	1.4	NA	0.0	0.0	0.00	0.19	0.00	38.3
All Vehicles		538	1.8	538	1.8	0.180	1.2	NA	0.1	0.8	0.07	0.14	0.07	37.8

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

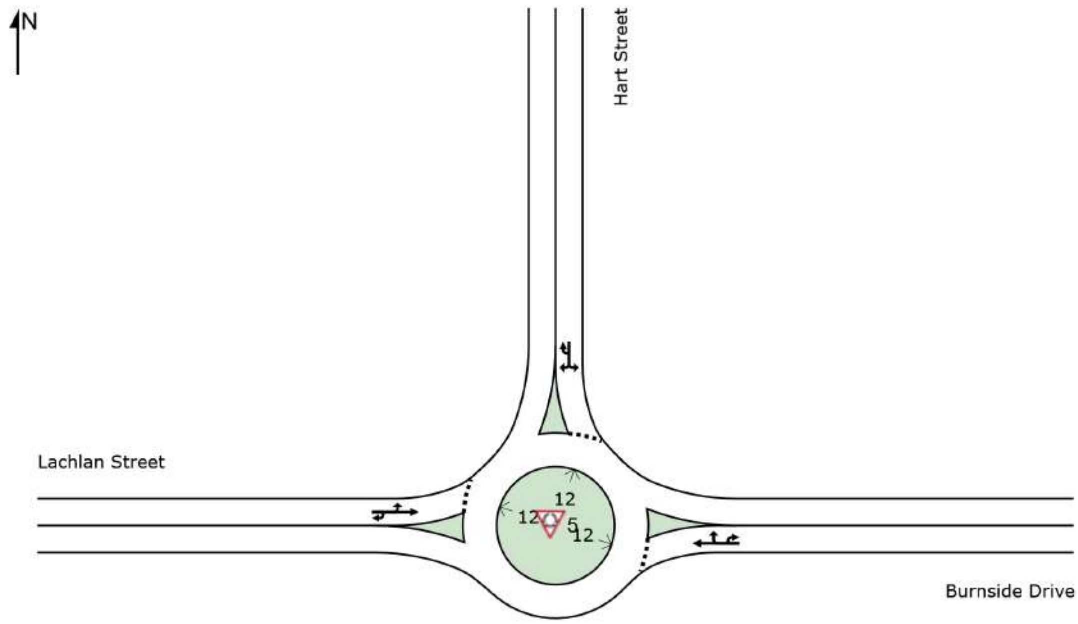
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	178	0.0	178	0.0	0.194	2.6	LOS A	0.4	3.0	0.29	0.42	0.29	36.7
6	R2	64	0.0	64	0.0	0.194	6.1	LOS A	0.4	3.0	0.29	0.42	0.29	39.0
6u	U	1	0.0	1	0.0	0.194	7.4	LOS A	0.4	3.0	0.29	0.42	0.29	39.5
Approach		243	0.0	243	0.0	0.194	3.5	LOS A	0.4	3.0	0.29	0.42	0.29	37.6
North: Hart Street														
7	L2	31	0.0	31	0.0	0.090	2.6	LOS A	0.2	1.3	0.20	0.52	0.20	37.8
9	R2	67	1.6	67	1.6	0.090	5.8	LOS A	0.2	1.3	0.20	0.52	0.20	35.8
9u	U	17	0.0	17	0.0	0.090	7.1	LOS A	0.2	1.3	0.20	0.52	0.20	39.0
Approach		115	0.9	115	0.9	0.090	5.1	LOS A	0.2	1.3	0.20	0.52	0.20	37.2
West: Lachlan Street														
10	L2	42	10.0	42	10.0	0.085	2.8	LOS A	0.2	1.3	0.23	0.42	0.23	37.3
11	T1	39	0.0	39	0.0	0.085	2.5	LOS A	0.2	1.3	0.23	0.42	0.23	38.4
12u	U	22	0.0	22	0.0	0.085	7.2	LOS A	0.2	1.3	0.23	0.42	0.23	29.2
Approach		103	4.1	103	4.1	0.085	3.6	LOS A	0.2	1.3	0.23	0.42	0.23	37.2
All Vehicles		461	1.1	461	1.1	0.194	4.0	LOS A	0.4	3.0	0.25	0.44	0.25	37.4

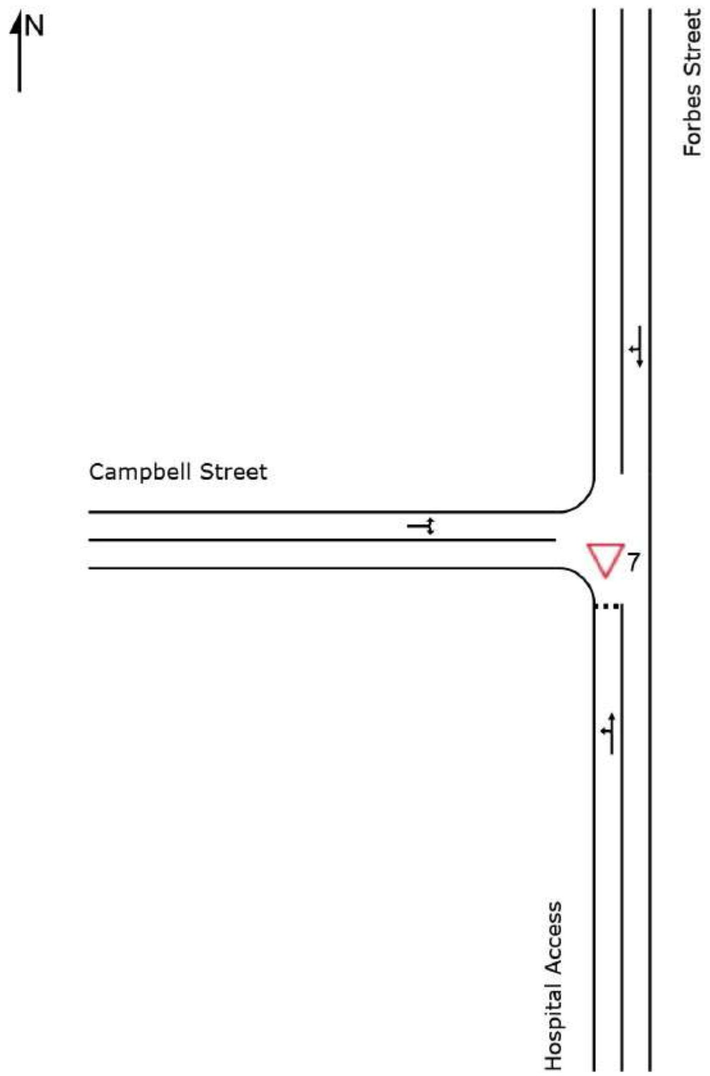
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 7 [Forbes Street/ Campbell Street - Existing PM]

Network: 11 [Existing PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hospital Access														
1	L2	101	1.0	101	1.0	0.082	6.0	LOS A	0.1	0.9	0.26	0.56	0.26	49.6
2	T1	11	0.0	11	0.0	0.082	5.7	LOS A	0.1	0.9	0.26	0.56	0.26	49.6
Approach		112	0.9	112	0.9	0.082	6.0	LOS A	0.1	0.9	0.26	0.56	0.26	49.6
North: Forbes Street														
8	T1	23	0.0	23	0.0	0.105	0.3	LOS A	0.2	1.8	0.18	0.41	0.18	48.9
9	R2	151	7.7	151	7.7	0.105	3.8	LOS A	0.2	1.8	0.18	0.41	0.18	36.0
Approach		174	6.7	174	6.7	0.105	3.4	NA	0.2	1.8	0.18	0.41	0.18	39.2
West: Campbell Street														
10	L2	133	1.6	133	1.6	0.114	3.5	LOS A	0.1	1.0	0.05	0.49	0.05	30.6
12	R2	75	0.0	75	0.0	0.114	5.5	LOS A	0.1	1.0	0.05	0.49	0.05	48.3
Approach		207	1.0	207	1.0	0.114	4.2	NA	0.1	1.0	0.05	0.49	0.05	42.3
All Vehicles		493	3.0	493	3.0	0.114	4.3	NA	0.2	1.8	0.14	0.48	0.14	43.3

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Base

Template: Default Site User Report

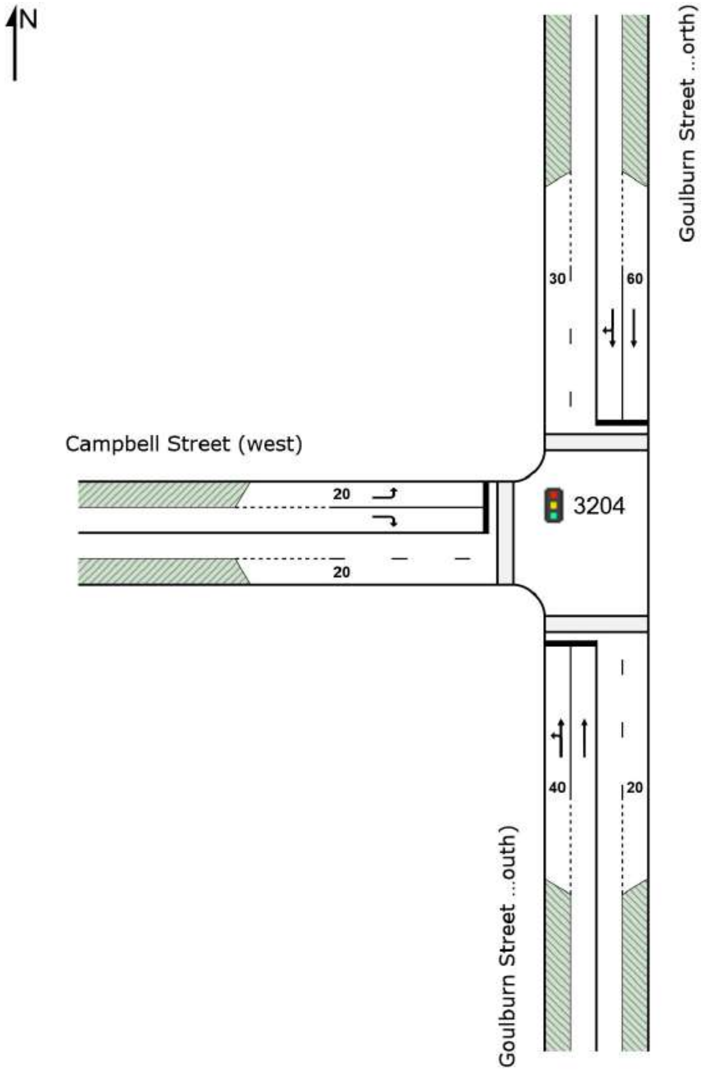
Site: 3204 [Goulburn Street/ Campbell Street - 2023 BASE AM]

Network: 9 [2023 BASE AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

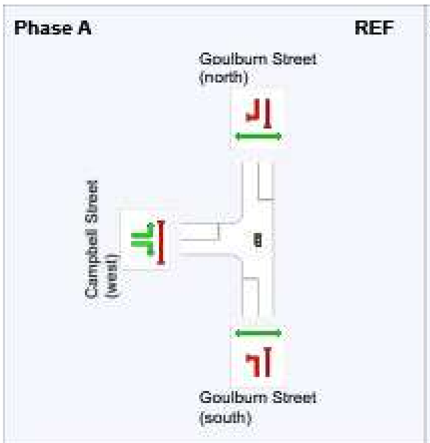


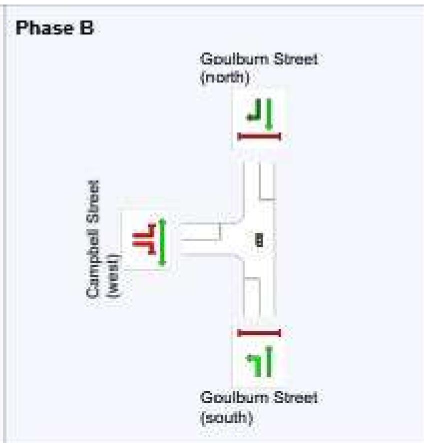
Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Goulburn Street (south)														
1	L2	71	2.2	71	2.2	0.070	10.2	LOS A	0.6	4.2	0.49	0.62	0.49	31.0
2	T1	115	2.0	115	2.0	0.105	6.4	LOS A	0.9	6.7	0.49	0.39	0.49	31.6
Approach		185	2.1	185	2.1	0.105	7.8	LOS A	0.9	6.7	0.49	0.48	0.49	31.3
North: Goulburn Street (north)														
8	T1	135	6.0	135	6.0	0.150	6.5	LOS A	1.2	8.5	0.49	0.44	0.49	34.6
9	R2	36	5.4	36	5.4	0.150	10.1	LOS A	1.2	8.5	0.50	0.47	0.50	32.8
Approach		171	5.8	171	5.8	0.150	7.3	LOS A	1.2	8.5	0.49	0.45	0.49	34.3
West: Campbell Street (west)														
10	L2	51	4.0	51	4.0	0.153	26.5	LOS B	0.8	5.7	0.87	0.71	0.87	12.0
12	R2	34	3.8	34	3.8	0.086	24.2	LOS B	0.5	3.6	0.83	0.69	0.83	23.5
Approach		84	3.9	84	3.9	0.153	25.5	LOS B	0.8	5.7	0.86	0.70	0.86	17.8
All Vehicles		440	3.9	440	3.9	0.153	11.0	LOS A	1.2	8.5	0.56	0.51	0.56	29.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence





REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	20
Green Time (sec)	14	34
Phase Time (sec)	20	40

Phase Split	33%	67%

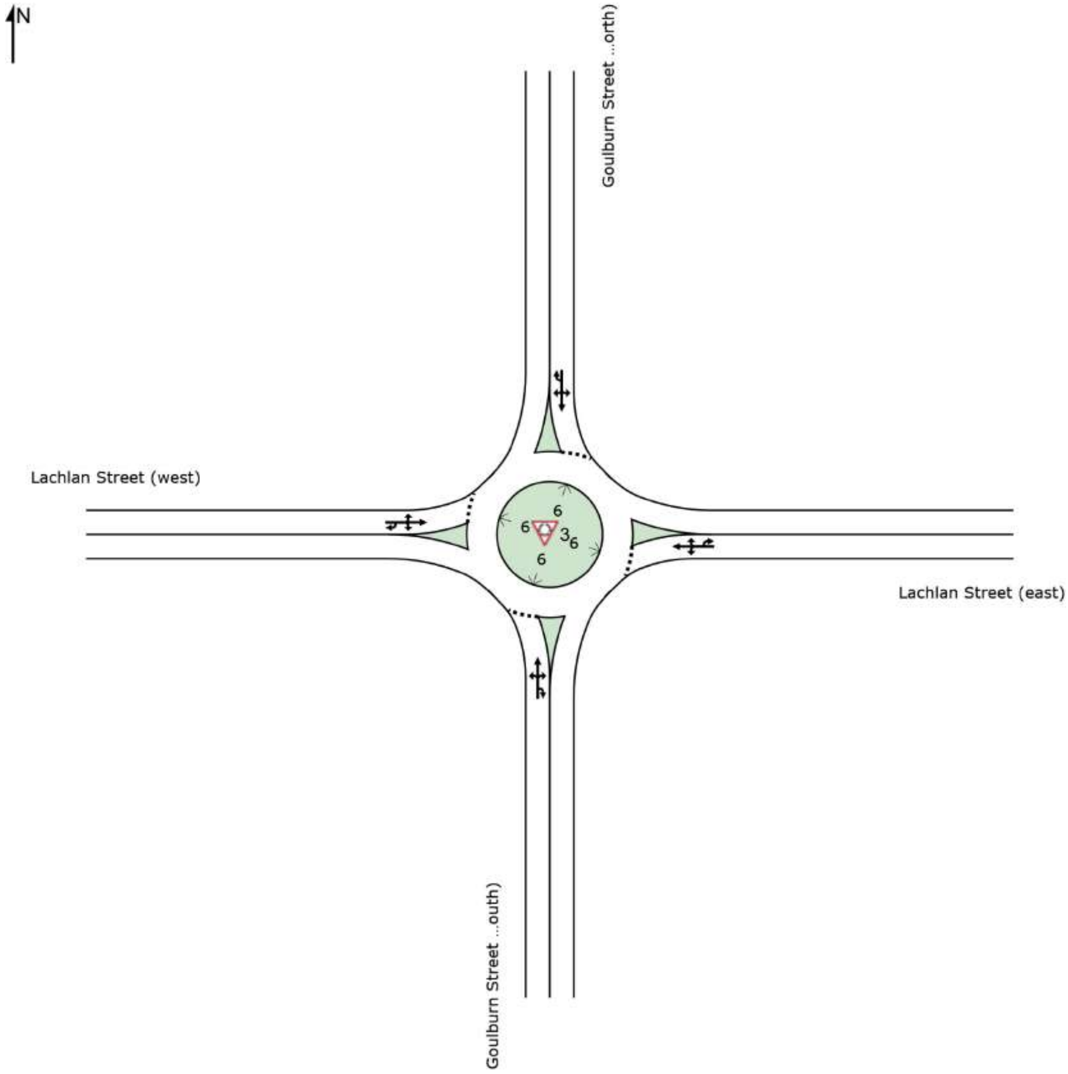
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 BASE AM]

Network: 9 [2023 BASE AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Goulburn Street (south)														
1	L2	76	4.4	76	4.4	0.171	4.5	LOS A	0.3	2.4	0.37	0.59	0.37	36.7
2	T1	1	0.0	1	0.0	0.171	3.9	LOS A	0.3	2.4	0.37	0.59	0.37	37.3
3	R2	84	3.8	84	3.8	0.171	6.8	LOS A	0.3	2.4	0.37	0.59	0.37	32.0
3u	U	13	0.0	13	0.0	0.171	7.9	LOS A	0.3	2.4	0.37	0.59	0.37	32.0
Approach		174	3.7	174	3.7	0.171	5.9	LOS A	0.3	2.4	0.37	0.59	0.37	35.1
East: Lachlan Street (east)														
4	L2	57	0.0	57	0.0	0.218	3.8	LOS A	0.5	3.6	0.33	0.44	0.33	28.5
5	T1	186	0.8	186	0.8	0.218	3.2	LOS A	0.5	3.6	0.33	0.44	0.33	37.7
6	R2	14	0.0	14	0.0	0.218	6.0	LOS A	0.5	3.6	0.33	0.44	0.33	37.6
6u	U	3	0.0	3	0.0	0.218	7.3	LOS A	0.5	3.6	0.33	0.44	0.33	28.5
Approach		260	0.6	260	0.6	0.218	3.5	LOS A	0.5	3.6	0.33	0.44	0.33	37.1
North: Goulburn Street (north)														
7	L2	12	0.0	12	0.0	0.103	11.3	LOS A	0.3	1.9	0.87	0.83	0.87	31.7
8	T1	16	1.8	16	1.8	0.103	10.8	LOS A	0.3	1.9	0.87	0.83	0.87	31.7
9	R2	18	5.9	18	5.9	0.103	13.9	LOS A	0.3	1.9	0.87	0.83	0.87	35.5
9u	U	2	0.0	2	0.0	0.103	14.7	LOS B	0.3	1.9	0.87	0.83	0.87	35.9
Approach		47	2.8	47	2.8	0.103	12.2	LOS A	0.3	1.9	0.87	0.83	0.87	33.9
West: Lachlan Street (west)														
10	L2	22	14.3	22	14.3	0.696	4.7	LOS A	3.3	24.6	0.60	0.49	0.60	37.6
11	T1	782	7.5	782	7.5	0.696	4.0	LOS A	3.3	24.6	0.60	0.49	0.60	35.8
12	R2	62	3.6	62	3.6	0.696	6.8	LOS A	3.3	24.6	0.60	0.49	0.60	35.8
12u	U	5	0.0	5	0.0	0.696	7.9	LOS A	3.3	24.6	0.60	0.49	0.60	38.4
Approach		872	7.3	872	7.3	0.696	4.2	LOS A	3.3	24.6	0.60	0.49	0.60	35.9
All Vehicles		1353	5.4	1353	5.4	0.696	4.6	LOS A	3.3	24.6	0.53	0.50	0.53	35.9

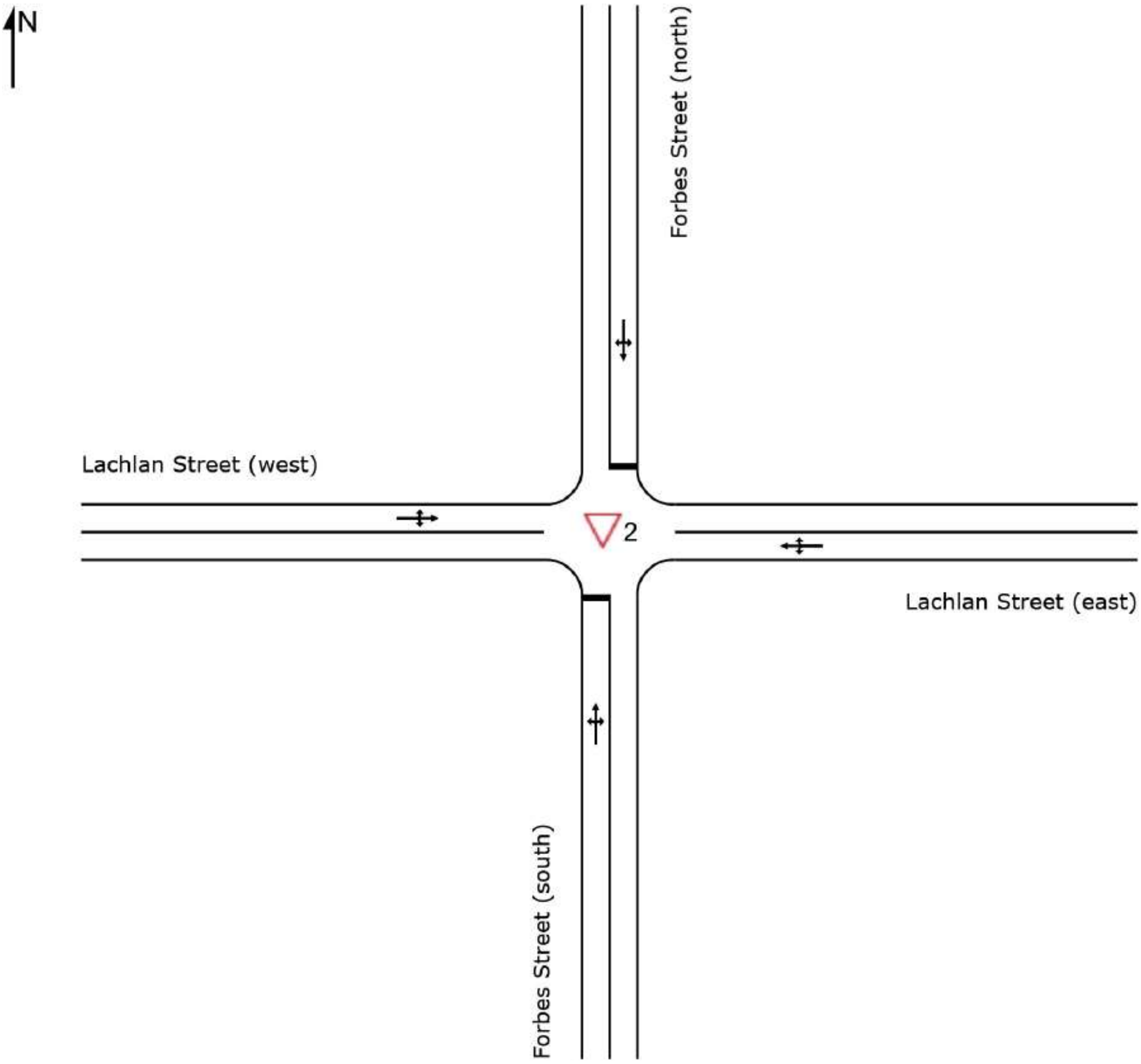
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 BASE AM]

Network: 9 [2023 BASE AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Forbes Street (south)														
1	L2	1	0.0	1	0.0	0.011	7.5	LOS A	0.0	0.1	0.62	0.90	0.62	24.5
2	T1	1	5.0	1	5.0	0.011	19.7	LOS B	0.0	0.1	0.62	0.90	0.62	32.8
3	R2	1	0.0	1	0.0	0.011	21.5	LOS B	0.0	0.1	0.62	0.90	0.62	24.5
Approach		3	1.7	3	1.7	0.011	16.2	LOS B	0.0	0.1	0.62	0.90	0.62	28.8
East: Lachlan Street (east)														
4	L2	20	1.9	20	1.9	0.136	4.1	LOS A	0.0	0.2	0.03	0.04	0.03	39.8
5	T1	236	1.1	236	1.1	0.136	0.1	LOS A	0.0	0.2	0.03	0.04	0.03	38.3
6	R2	3	0.0	3	0.0	0.136	7.2	LOS A	0.0	0.2	0.03	0.04	0.03	39.3
Approach		259	1.2	259	1.2	0.136	0.5	NA	0.0	0.2	0.03	0.04	0.03	38.6
North: Forbes Street (north)														
7	L2	16	13.3	16	13.3	0.401	14.7	LOS B	0.6	4.3	0.85	1.10	1.10	27.7
8	T1	68	0.0	68	0.0	0.401	23.0	LOS B	0.6	4.3	0.85	1.10	1.10	30.7
9	R2	25	0.0	25	0.0	0.401	25.5	LOS B	0.6	4.3	0.85	1.10	1.10	27.7
Approach		109	1.9	109	1.9	0.401	22.4	LOS B	0.6	4.3	0.85	1.10	1.10	29.8
West: Lachlan Street (west)														
10	L2	43	0.0	43	0.0	0.512	5.5	LOS A	1.3	9.1	0.28	0.12	0.33	38.9
11	T1	680	0.0	680	0.0	0.512	0.9	LOS A	1.3	9.1	0.28	0.12	0.33	33.6
12	R2	160	21.7	160	21.7	0.512	5.9	LOS A	1.3	9.1	0.28	0.12	0.33	37.1
Approach		883	3.9	883	3.9	0.512	2.0	NA	1.3	9.1	0.28	0.12	0.33	35.6
All Vehicles		1255	3.2	1255	3.2	0.512	3.5	NA	1.3	9.1	0.28	0.19	0.34	34.2

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

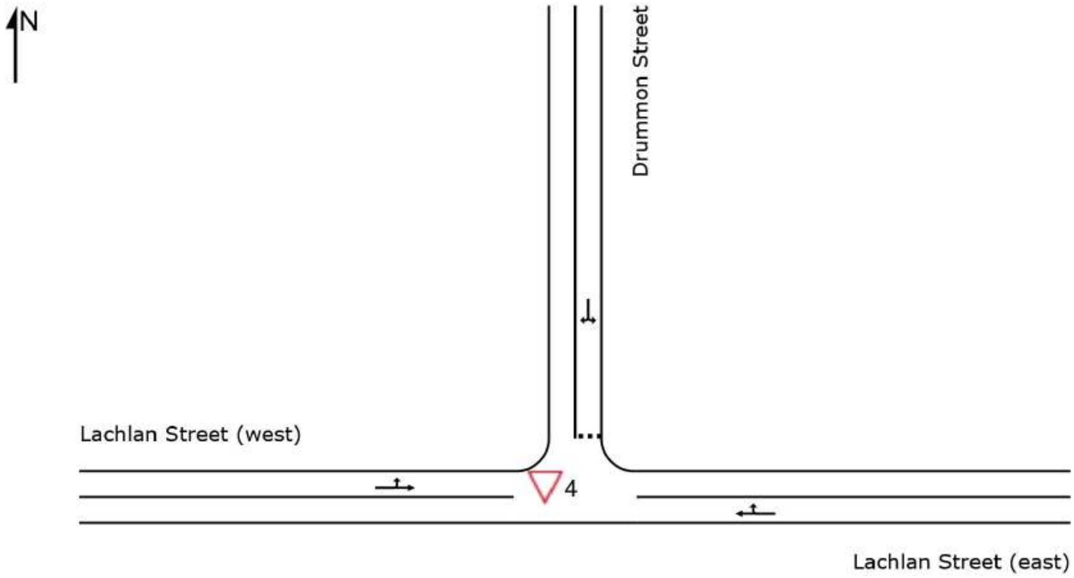
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 BASE AM]

Network: 9 [2023 BASE AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Averag e Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Lachlan Street (east)														
5	T1	193	2.5	193	2.5	0.141	1.2	LOS A	0.2	1.4	0.24	0.08	0.24	33.1
6	R2	29	7.7	29	7.7	0.141	7.9	LOS A	0.2	1.4	0.24	0.08	0.24	38.2
Approach		222	3.2	222	3.2	0.141	2.1	NA	0.2	1.4	0.24	0.08	0.24	35.3
North: Drummon Street														
7	L2	62	0.0	62	0.0	0.203	6.4	LOS A	0.3	2.0	0.61	0.79	0.61	34.1
9	R2	62	0.0	62	0.0	0.203	9.7	LOS A	0.3	2.0	0.61	0.79	0.61	34.1
Approach		124	0.0	124	0.0	0.203	8.0	LOS A	0.3	2.0	0.61	0.79	0.61	34.1
West: Lachlan Street (west)														
10	L2	89	0.0	89	0.0	0.368	3.4	LOS A	0.0	0.0	0.00	0.06	0.00	39.9
11	T1	619	0.9	619	0.9	0.368	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	38.4
Approach		708	0.8	708	0.8	0.368	0.4	NA	0.0	0.0	0.00	0.06	0.00	39.0
All Vehicles		1055	1.2	1055	1.2	0.368	1.7	NA	0.3	2.0	0.12	0.15	0.12	36.9

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

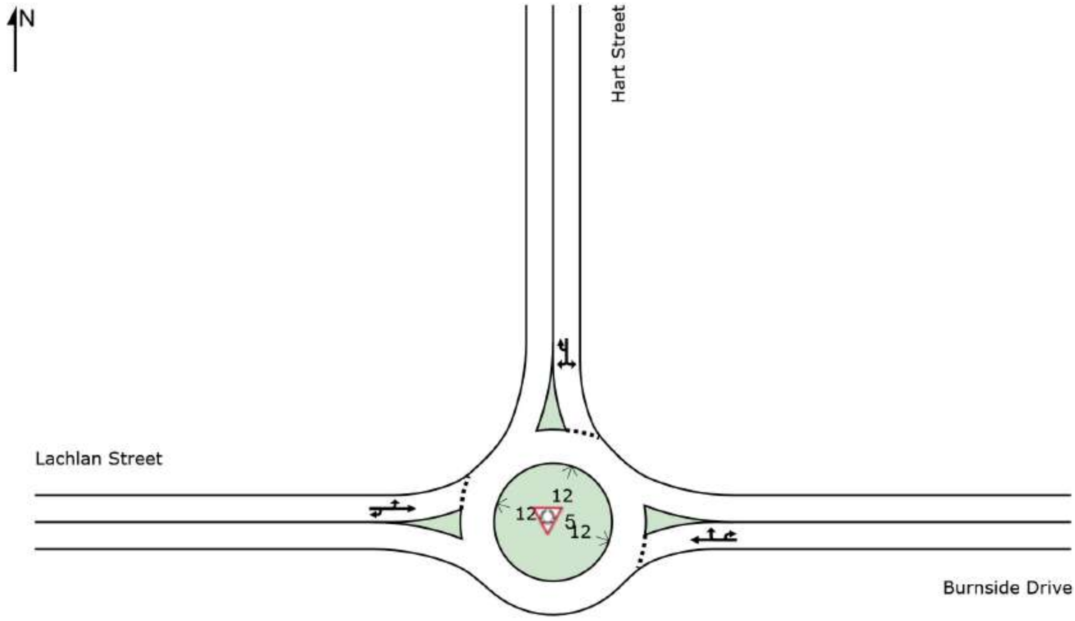
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 BASE AM]

Network: 9 [2023 BASE AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Burnside Drive														
5	T1	52	2.9	52	2.9	0.083	3.0	LOS A	0.2	1.3	0.37	0.49	0.37	34.2
6	R2	39	0.0	39	0.0	0.083	6.4	LOS A	0.2	1.3	0.37	0.49	0.37	38.4
6u	U	1	0.0	1	0.0	0.083	7.7	LOS A	0.2	1.3	0.37	0.49	0.37	34.2
Approach		92	1.7	92	1.7	0.083	4.5	LOS A	0.2	1.3	0.37	0.49	0.37	36.8
North: Hart Street														
7	L2	433	0.6	433	0.6	0.621	8.8	LOS A	2.5	17.2	0.82	0.95	1.02	33.2
9	R2	102	0.0	102	0.0	0.621	12.0	LOS A	2.5	17.2	0.82	0.95	1.02	33.2
9u	U	6	0.0	6	0.0	0.621	13.3	LOS A	2.5	17.2	0.82	0.95	1.02	37.4
Approach		541	0.5	541	0.5	0.621	9.5	LOS A	2.5	17.2	0.82	0.95	1.02	33.3
West: Lachlan Street														
10	L2	98	1.6	98	1.6	0.408	2.6	LOS A	1.2	8.6	0.23	0.36	0.23	37.6
11	T1	424	0.0	424	0.0	0.408	2.3	LOS A	1.2	8.6	0.23	0.36	0.23	30.0
12u	U	73	0.0	73	0.0	0.408	7.1	LOS A	1.2	8.6	0.23	0.36	0.23	30.0
Approach		595	0.3	595	0.3	0.408	3.0	LOS A	1.2	8.6	0.23	0.36	0.23	33.4
All Vehicles		1227	0.5	1227	0.5	0.621	5.9	LOS A	2.5	17.2	0.50	0.63	0.59	33.7

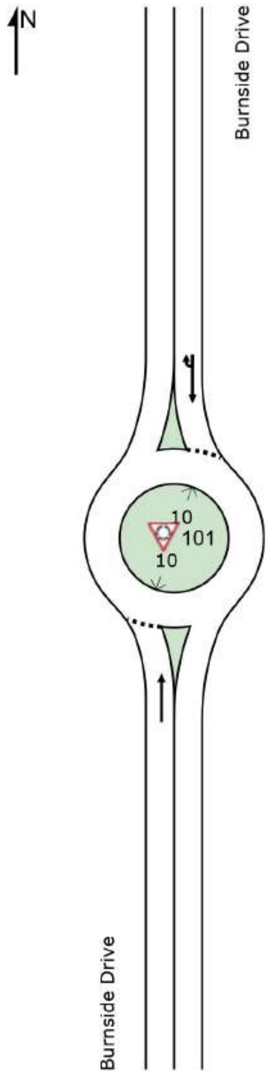
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 BASE AM]

Network: 9 [2023 BASE AM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Burnside Drive														
2	T1	91	0.0	91	0.0	0.055	4.7	LOS A	0.1	0.7	0.01	0.48	0.01	52.1
Approach		91	0.0	91	0.0	0.055	4.7	LOS A	0.1	0.7	0.01	0.48	0.01	52.1
North: Burnside Drive														
8	T1	857	0.0	857	0.0	0.507	4.7	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
9u	U	1	0.0	1	0.0	0.507	9.5	LOS A	0.0	0.0	0.00	0.49	0.00	48.5
Approach		858	0.0	858	0.0	0.507	4.7	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
All Vehicles		948	0.0	948	0.0	0.507	4.7	LOS A	0.1	0.7	0.00	0.48	0.00	54.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Base

Template: Default Site User Report

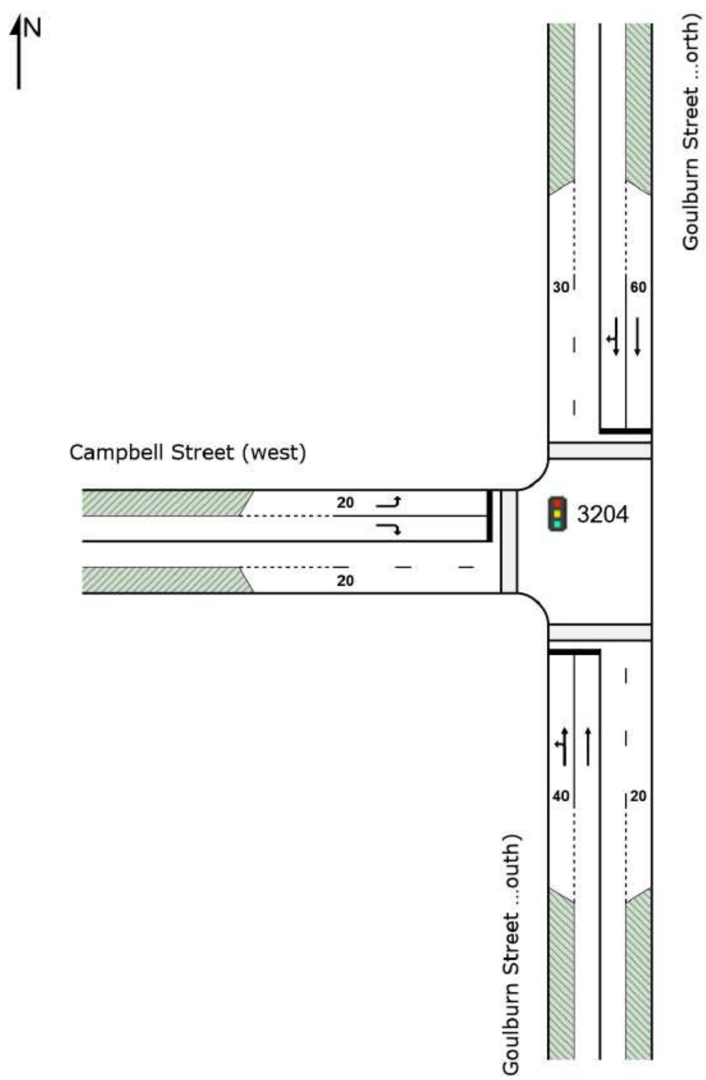
Site: 3204 [Goulburn Street/ Campbell Street - 2023 BASE PM]

Network: 11 [2023 BASE PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

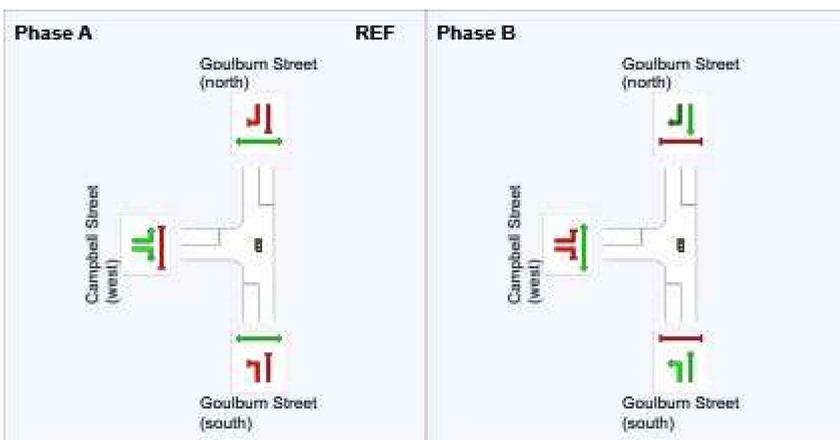


Movement Performance - Vehicles

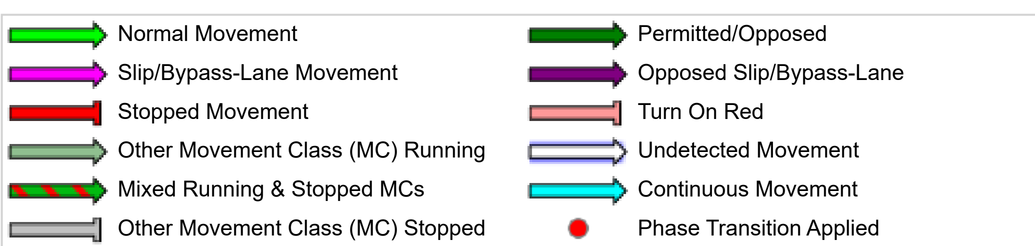
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	33	0.0	33	0.0	0.035	11.6	LOS A	0.3	2.1	0.53	0.61	0.53	30.0
2	T1	107	3.9	107	3.9	0.106	7.4	LOS A	0.9	6.9	0.52	0.42	0.52	30.5
Approach		140	3.0	140	3.0	0.106	8.4	LOS A	0.9	6.9	0.52	0.46	0.52	30.4
North: Goulburn Street (north)														
8	T1	141	5.6	141	5.6	0.152	7.5	LOS A	1.2	9.1	0.53	0.46	0.53	34.0
9	R2	27	3.8	27	3.8	0.152	11.1	LOS A	1.2	9.1	0.54	0.48	0.54	32.1
Approach		168	5.3	168	5.3	0.152	8.1	LOS A	1.2	9.1	0.53	0.46	0.53	33.7
West: Campbell Street (west)														
10	L2	26	8.0	26	8.0	0.069	24.1	LOS B	0.4	2.9	0.82	0.68	0.82	12.8
12	R2	33	0.0	33	0.0	0.088	25.1	LOS B	0.5	3.4	0.84	0.69	0.84	23.1
Approach		59	3.6	59	3.6	0.088	24.6	LOS B	0.5	3.4	0.84	0.68	0.84	19.7
All Vehicles		367	4.2	367	4.2	0.152	10.9	LOS A	1.2	9.1	0.58	0.50	0.58	30.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	22
Green Time (sec)	16	32
Phase Time (sec)	22	38
Phase Split	37%	63%

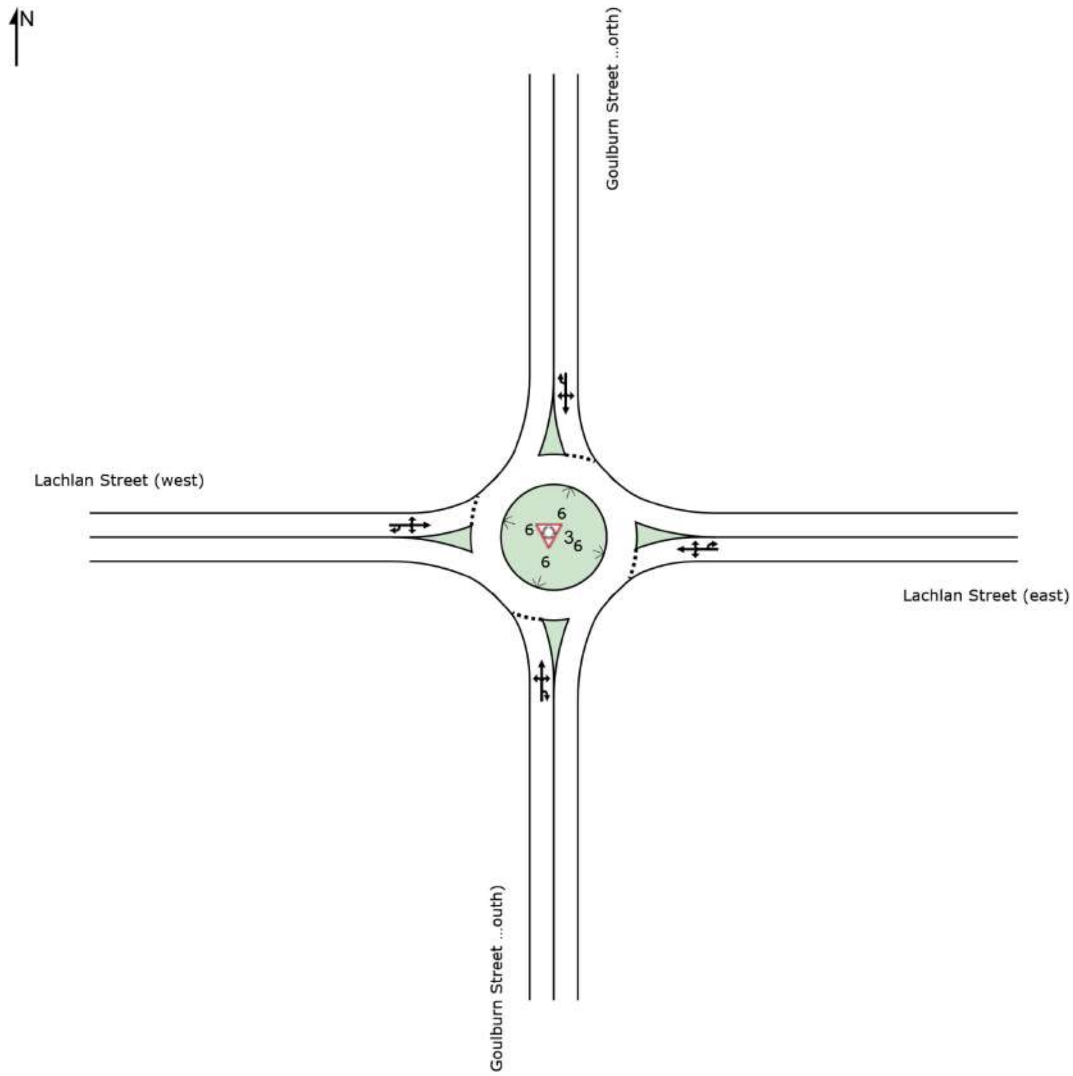
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 BASE PM]

Network: 11 [2023 BASE PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	76	2.7	76	2.7	0.157	5.6	LOS A	0.3	2.2	0.48	0.64	0.48	36.4
2	T1	8	10.3	8	10.3	0.157	5.1	LOS A	0.3	2.2	0.48	0.64	0.48	36.9
3	R2	44	4.8	44	4.8	0.157	7.9	LOS A	0.3	2.2	0.48	0.64	0.48	31.2
3u	U	9	11.1	9	11.1	0.157	9.3	LOS A	0.3	2.2	0.48	0.64	0.48	31.2
Approach		138	4.4	138	4.4	0.157	6.5	LOS A	0.3	2.2	0.48	0.64	0.48	35.4
East: Lachlan Street (east)														
4	L2	74	0.0	74	0.0	0.355	4.0	LOS A	0.9	6.6	0.38	0.46	0.38	28.1
5	T1	329	0.8	329	0.8	0.355	3.4	LOS A	0.9	6.6	0.38	0.46	0.38	37.6
6	R2	21	6.3	21	6.2	0.355	6.3	LOS A	0.9	6.6	0.38	0.46	0.38	37.5
6u	U	6	0.0	6	0.0	0.355	7.4	LOS A	0.9	6.6	0.38	0.46	0.38	28.1
Approach		431	0.9	431	0.9	0.355	3.7	LOS A	0.9	6.6	0.38	0.46	0.38	37.1
North: Goulburn Street (north)														
7	L2	16	10.5	16	10.5	0.078	5.7	LOS A	0.2	1.2	0.54	0.63	0.54	35.1
8	T1	19	1.8	19	1.8	0.078	4.9	LOS A	0.2	1.2	0.54	0.63	0.54	35.1
9	R2	32	3.3	32	3.3	0.078	7.8	LOS A	0.2	1.2	0.54	0.63	0.54	37.6
9u	U	1	0.0	1	0.0	0.078	8.9	LOS A	0.2	1.2	0.54	0.63	0.54	38.0
Approach		67	4.5	67	4.5	0.078	6.5	LOS A	0.2	1.2	0.54	0.63	0.54	36.7
West: Lachlan Street (west)														
10	L2	23	0.0	23	0.0	0.303	3.7	LOS A	0.8	6.2	0.32	0.44	0.32	38.0
11	T1	279	11.5	279	11.5	0.303	3.2	LOS A	0.8	6.2	0.32	0.44	0.32	36.5
12	R2	55	13.7	55	13.7	0.303	6.1	LOS A	0.8	6.2	0.32	0.44	0.32	36.5
12u	U	11	0.0	11	0.0	0.303	7.1	LOS A	0.8	6.2	0.32	0.44	0.32	38.8
Approach		367	10.8	367	10.8	0.303	3.8	LOS A	0.8	6.2	0.32	0.44	0.32	36.8
All Vehicles		1003	5.2	1003	5.2	0.355	4.3	LOS A	0.9	6.6	0.38	0.49	0.38	36.7

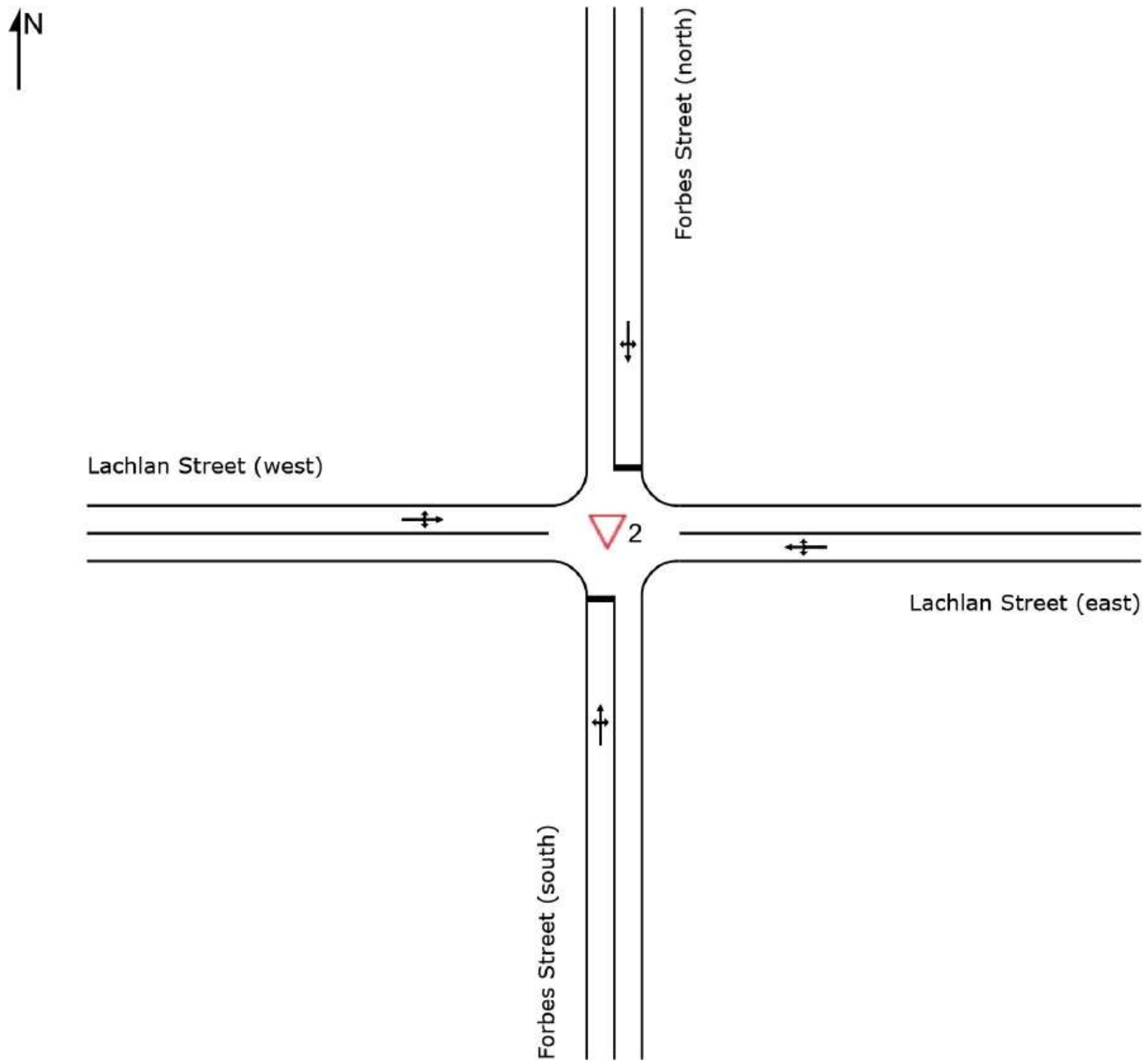
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 BASE PM]

Network: 11 [2023 BASE PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	4	0.0	4	0.0	0.011	8.3	LOS A	0.0	0.1	0.49	0.88	0.49	29.2
2	T1	2	3.8	2	3.8	0.011	11.8	LOS A	0.0	0.1	0.49	0.88	0.49	35.4
3	R2	1	1.8	1	1.8	0.011	12.6	LOS A	0.0	0.1	0.49	0.88	0.49	29.2
Approach		7	1.4	7	1.4	0.011	9.9	LOS A	0.0	0.1	0.49	0.88	0.49	32.2
East: Lachlan Street (east)														
4	L2	7	0.0	7	0.0	0.216	4.3	LOS A	0.1	0.4	0.04	0.03	0.04	40.0
5	T1	389	1.4	389	1.4	0.216	0.1	LOS A	0.1	0.4	0.04	0.03	0.04	38.8
6	R2	14	0.0	14	0.0	0.216	4.7	LOS A	0.1	0.4	0.04	0.03	0.04	39.4
Approach		411	1.3	411	1.3	0.216	0.3	NA	0.1	0.4	0.04	0.03	0.04	38.9
North: Forbes Street (north)														
7	L2	9	0.0	9	0.0	0.145	7.7	LOS A	0.2	1.4	0.57	1.00	0.57	32.6
8	T1	43	0.0	43	0.0	0.145	11.9	LOS A	0.2	1.4	0.57	1.00	0.57	34.6
9	R2	23	0.0	23	0.0	0.145	12.9	LOS A	0.2	1.4	0.57	1.00	0.57	32.6
Approach		76	0.0	76	0.0	0.145	11.6	LOS A	0.2	1.4	0.57	1.00	0.57	33.9
West: Lachlan Street (west)														
10	L2	42	0.0	42	0.0	0.216	5.3	LOS A	0.3	2.5	0.27	0.12	0.27	38.8
11	T1	251	3.8	251	3.8	0.216	0.8	LOS A	0.3	2.5	0.27	0.12	0.27	33.2
12	R2	55	36.4	55	36.4	0.216	6.3	LOS A	0.3	2.5	0.27	0.12	0.27	36.8
Approach		347	8.4	347	8.4	0.216	2.2	NA	0.3	2.5	0.27	0.12	0.27	36.0
All Vehicles		841	4.1	841	4.1	0.216	2.2	NA	0.3	2.5	0.19	0.16	0.19	36.2

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

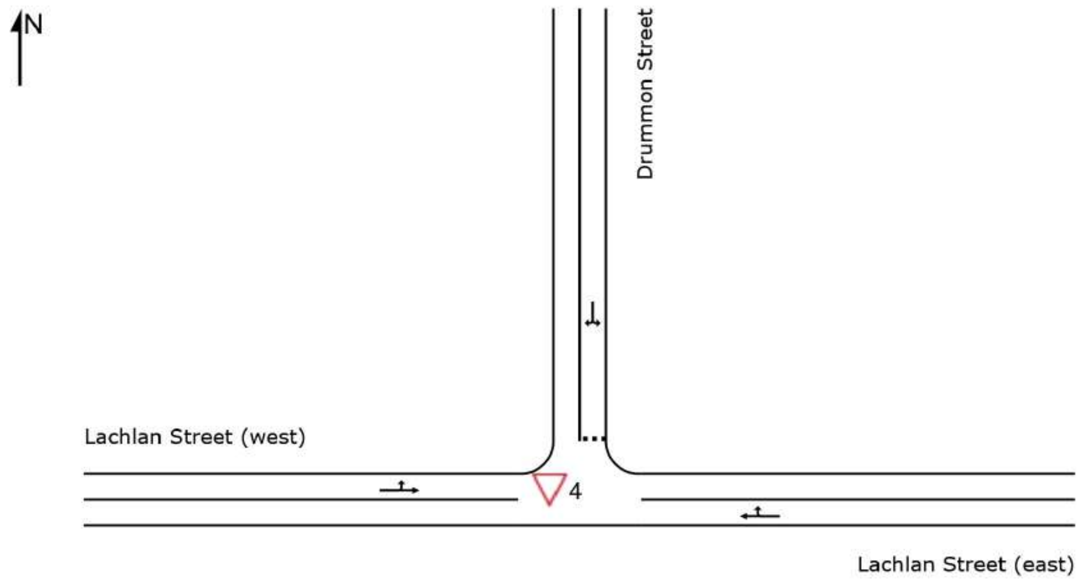
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 BASE PM]

Network: 11 [2023 BASE PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	379	0.7	379	0.7	0.259	0.3	LOS A	0.3	2.1	0.18	0.10	0.18	35.1
6	R2	87	0.0	87	0.0	0.259	4.7	LOS A	0.3	2.1	0.18	0.10	0.18	38.7
Approach		466	0.6	466	0.6	0.259	1.1	NA	0.3	2.1	0.18	0.10	0.18	37.1
North: Drummon Street														
7	L2	15	7.1	15	7.1	0.070	4.0	LOS A	0.1	0.7	0.39	0.62	0.39	35.2
9	R2	37	3.0	37	3.0	0.070	7.2	LOS A	0.1	0.7	0.39	0.62	0.39	35.2
Approach		52	4.2	52	4.2	0.070	6.3	LOS A	0.1	0.7	0.39	0.62	0.39	35.2
West: Lachlan Street (west)														
10	L2	87	1.7	87	1.7	0.137	3.4	LOS A	0.0	0.0	0.00	0.16	0.00	39.4
11	T1	169	4.8	169	4.8	0.137	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	36.1
Approach		257	3.7	257	3.7	0.137	1.2	NA	0.0	0.0	0.00	0.16	0.00	38.4
All Vehicles		775	1.9	775	1.9	0.259	1.5	NA	0.3	2.1	0.14	0.15	0.14	37.3

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

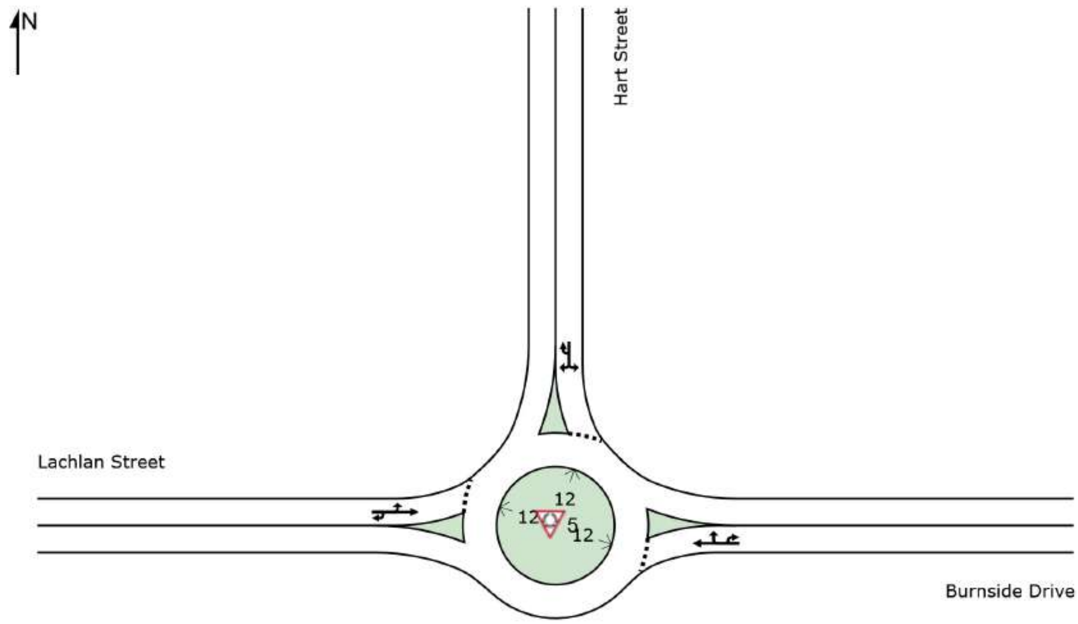
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 BASE PM]

Network: 11 [2023 BASE PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	229	0.0	229	0.0	0.313	3.3	LOS A	0.8	5.4	0.43	0.51	0.43	34.2
6	R2	129	0.0	129	0.0	0.313	6.7	LOS A	0.8	5.4	0.43	0.51	0.43	38.3
6u	U	1	0.0	1	0.0	0.313	8.0	LOS A	0.8	5.4	0.43	0.51	0.43	34.2
Approach		360	0.0	360	0.0	0.313	4.5	LOS A	0.8	5.4	0.43	0.51	0.43	36.5
North: Hart Street														
7	L2	74	0.0	74	0.0	0.170	3.0	LOS A	0.4	2.7	0.32	0.53	0.32	35.8
9	R2	112	1.6	112	1.6	0.170	6.2	LOS A	0.4	2.7	0.32	0.53	0.32	35.8
9u	U	17	0.0	17	0.0	0.170	7.5	LOS A	0.4	2.7	0.32	0.53	0.32	39.0
Approach		202	0.9	202	0.9	0.170	5.1	LOS A	0.4	2.7	0.32	0.53	0.32	36.2
West: Lachlan Street														
10	L2	58	10.0	58	10.0	0.162	3.2	LOS A	0.4	2.6	0.35	0.50	0.35	36.7
11	T1	64	0.0	64	0.0	0.162	2.9	LOS A	0.4	2.6	0.35	0.50	0.35	27.7
12u	U	62	0.0	62	0.0	0.162	7.6	LOS A	0.4	2.6	0.35	0.50	0.35	27.7
Approach		184	3.1	184	3.1	0.162	4.6	LOS A	0.4	2.6	0.35	0.50	0.35	33.4
All Vehicles		746	1.0	746	1.0	0.313	4.7	LOS A	0.8	5.4	0.38	0.51	0.38	35.9

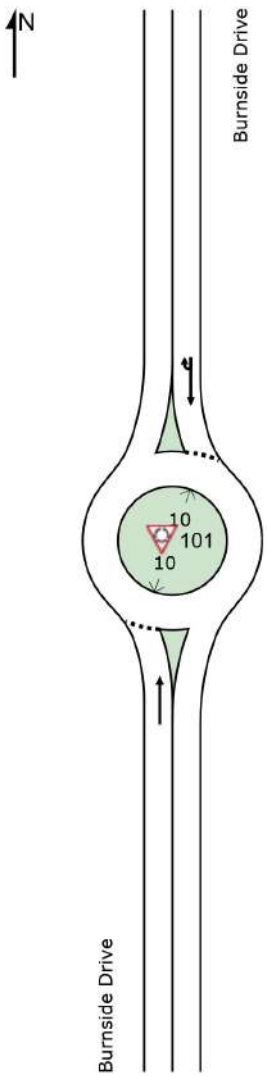
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 BASE PM]

Network: 11 [2023 BASE PM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	361	0.0	361	0.0	0.214	4.7	LOS A	0.5	3.2	0.02	0.48	0.02	52.1
Approach		361	0.0	361	0.0	0.214	4.7	LOS A	0.5	3.2	0.02	0.48	0.02	52.1
North: Burnside Drive														
8	T1	115	0.0	115	0.0	0.068	4.7	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
9u	U	1	0.0	1	0.0	0.068	9.5	LOS A	0.0	0.0	0.00	0.49	0.00	48.5
Approach		116	0.0	116	0.0	0.068	4.7	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
All Vehicles		477	0.0	477	0.0	0.214	4.7	LOS A	0.5	3.2	0.01	0.48	0.01	52.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Development

Template: Default Site User Report

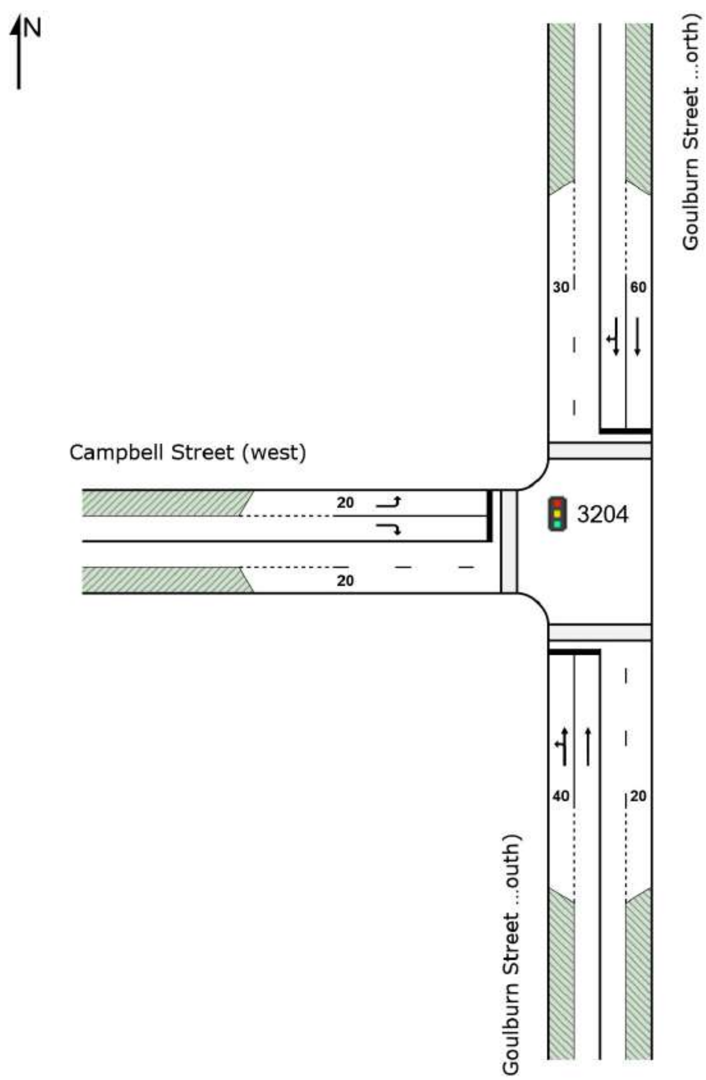
Site: 3204 [Goulburn Street/ Campbell Street - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

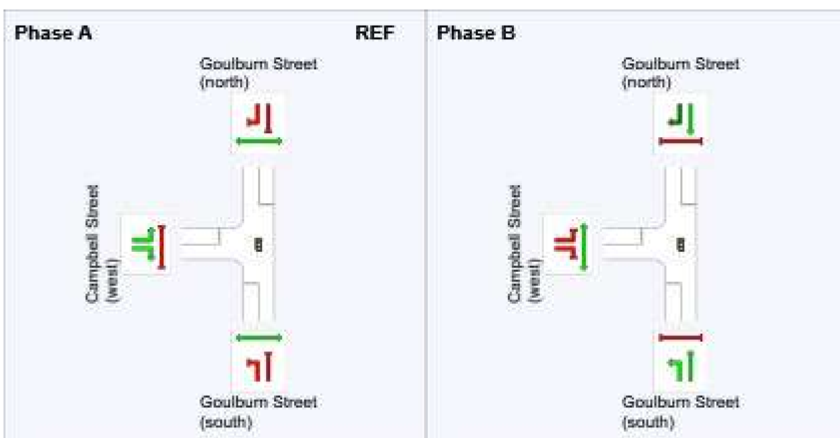


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Goulburn Street (south)														
1	L2	71	2.2	71	2.2	0.068	9.7	LOS A	0.6	4.0	0.47	0.61	0.47	31.3
2	T1	155	2.0	155	2.0	0.138	6.1	LOS A	1.3	8.9	0.48	0.39	0.48	31.9
Approach		225	2.1	225	2.1	0.138	7.2	LOS A	1.3	8.9	0.48	0.46	0.48	31.7
North: Goulburn Street (north)														
8	T1	176	6.0	176	6.0	0.178	6.1	LOS A	1.4	10.4	0.48	0.43	0.48	34.9
9	R2	36	5.4	36	5.4	0.178	9.7	LOS A	1.4	10.4	0.49	0.46	0.49	33.2
Approach		212	5.9	212	5.9	0.178	6.7	LOS A	1.4	10.4	0.48	0.43	0.48	34.7
West: Campbell Street (west)														
10	L2	51	4.0	51	4.0	0.168	27.5	LOS B	0.8	5.9	0.89	0.72	0.89	11.7
12	R2	34	3.8	34	3.8	0.093	25.1	LOS B	0.5	3.7	0.85	0.69	0.85	23.1
Approach		84	3.9	84	3.9	0.168	26.6	LOS B	0.8	5.9	0.87	0.71	0.87	17.4
All Vehicles		521	3.9	521	3.9	0.178	10.1	LOS A	1.4	10.4	0.54	0.49	0.54	30.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	**A**	**B**
Phase Change Time (sec)	0	19
Green Time (sec)	13	35
Phase Time (sec)	19	41
Phase Split	32%	68%

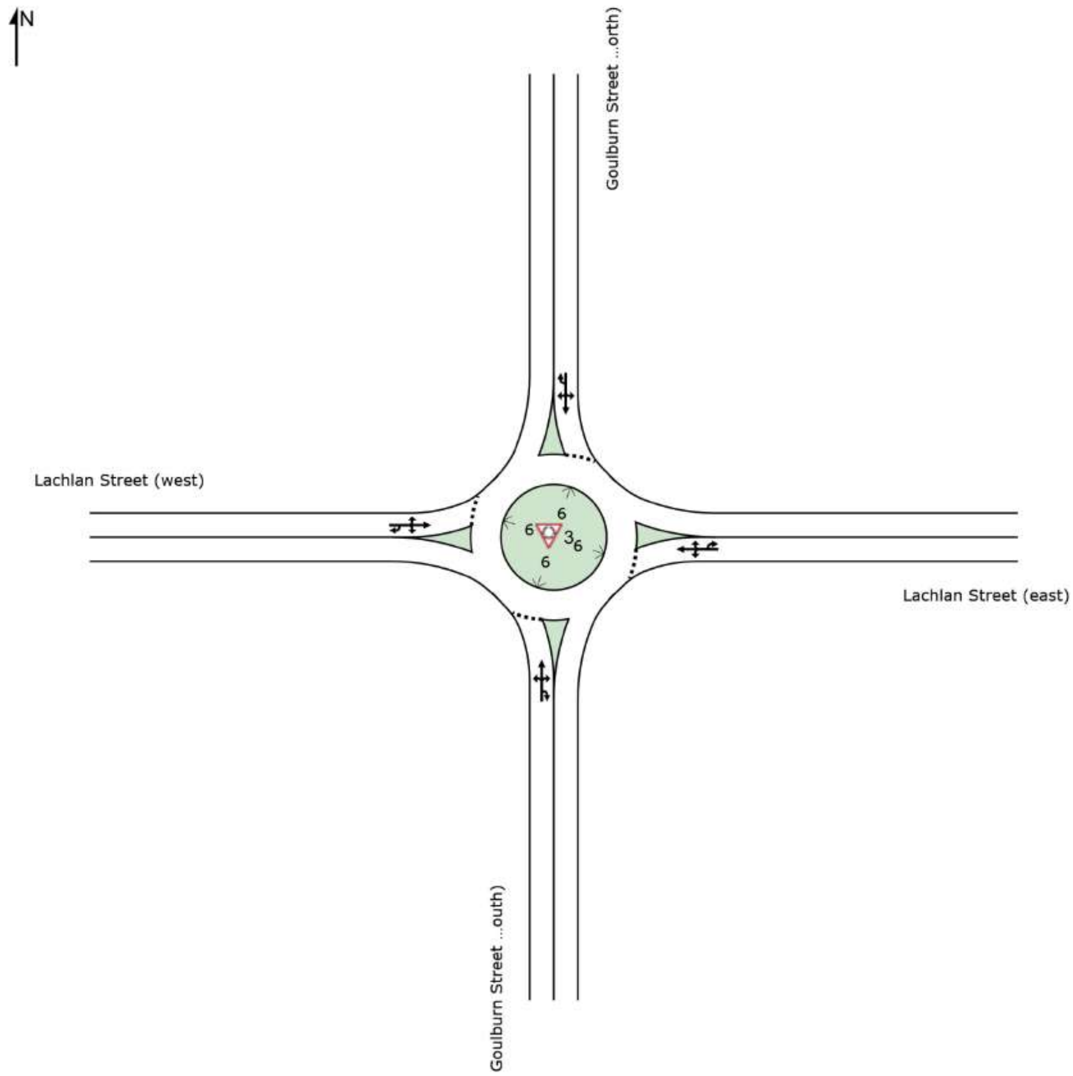
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	76	4.4	76	4.4	0.239	5.6	LOS A	0.5	3.5	0.49	0.67	0.49	36.1
2	T1	1	0.0	1	0.0	0.239	4.9	LOS A	0.5	3.5	0.49	0.67	0.49	36.7
3	R2	124	3.8	124	3.8	0.239	7.8	LOS A	0.5	3.5	0.49	0.67	0.49	30.7
3u	U	13	0.0	13	0.0	0.239	8.9	LOS A	0.5	3.5	0.49	0.67	0.49	30.7
Approach		214	3.7	214	3.7	0.239	7.1	LOS A	0.5	3.5	0.49	0.67	0.49	33.9
East: Lachlan Street (east)														
4	L2	97	0.0	97	0.0	0.360	3.9	LOS A	1.0	7.3	0.39	0.45	0.39	28.0
5	T1	327	0.8	327	0.8	0.360	3.3	LOS A	1.0	7.3	0.39	0.45	0.39	37.6
6	R2	14	0.0	14	0.0	0.360	6.1	LOS A	1.0	7.3	0.39	0.45	0.39	37.5
6u	U	3	0.0	3	0.0	0.360	7.3	LOS A	1.0	7.3	0.39	0.45	0.39	28.0
Approach		441	0.6	441	0.6	0.360	3.5	LOS A	1.0	7.3	0.39	0.45	0.39	36.9
North: Goulburn Street (north)														
7	L2	12	0.0	12	0.0	0.168	16.0	LOS B	0.5	3.5	1.00	0.94	1.00	29.3
8	T1	16	1.8	16	1.8	0.168	15.6	LOS B	0.5	3.5	1.00	0.94	1.00	29.3
9	R2	18	5.9	18	5.9	0.168	18.7	LOS B	0.5	3.5	1.00	0.94	1.00	34.0
9u	U	2	0.0	2	0.0	0.168	19.5	LOS B	0.5	3.5	1.00	0.94	1.00	34.3
Approach		47	2.8	47	2.8	0.168	17.0	LOS B	0.5	3.5	1.00	0.94	1.00	31.9
West: Lachlan Street (west)														
10	L2	22	14.3	22	14.3	0.859	7.8	LOS A	6.7	49.8	0.96	0.68	1.03	36.9
11	T1	931	7.5	931	7.5	0.859	7.0	LOS A	6.7	49.8	0.96	0.68	1.03	34.6
12	R2	62	3.6	62	3.6	0.859	9.8	LOS A	6.7	49.8	0.96	0.68	1.03	34.6
12u	U	5	0.0	5	0.0	0.859	10.9	LOS A	6.7	49.8	0.96	0.68	1.03	37.7
Approach		1020	7.4	1020	7.4	0.859	7.2	LOS A	6.7	49.8	0.96	0.68	1.03	34.8
All Vehicles		1722	5.1	1722	5.1	0.859	6.5	LOS A	6.7	49.8	0.76	0.63	0.80	35.0

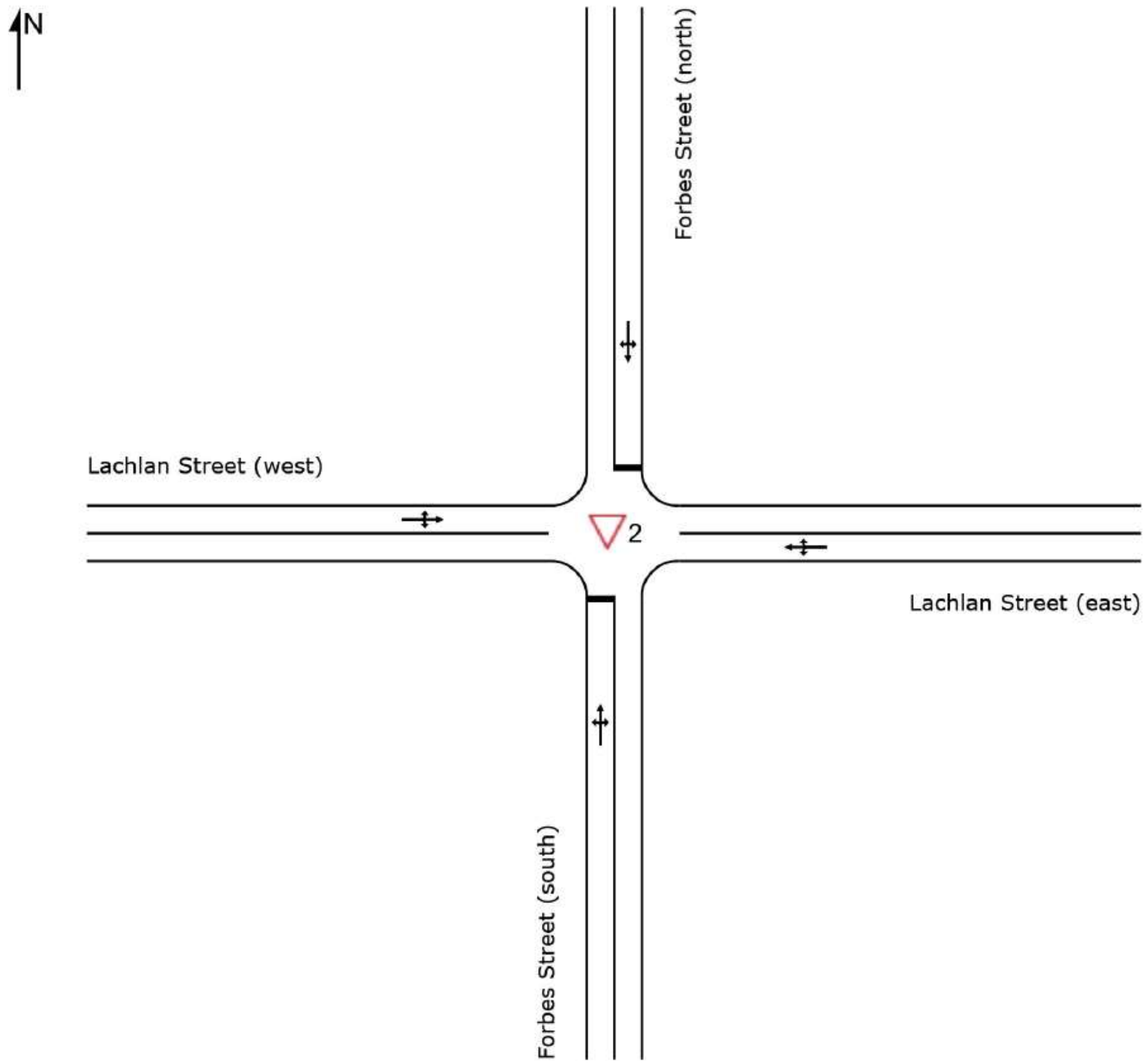
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	1	0.0	1	0.0	0.021	8.4	LOS A	0.0	0.2	0.83	0.92	0.83	19.1
2	T1	1	5.0	1	5.0	0.021	35.9	LOS C	0.0	0.2	0.83	0.92	0.83	29.0
3	R2	1	0.0	1	0.0	0.021	38.6	LOS C	0.0	0.2	0.83	0.92	0.83	19.1
Approach		3	1.7	3	1.7	0.021	27.7	LOS B	0.0	0.2	0.83	0.92	0.83	23.9
East: Lachlan Street (east)														
4	L2	20	1.9	20	1.9	0.231	4.9	LOS A	0.0	0.3	0.03	0.02	0.03	39.9
5	T1	417	1.1	417	1.1	0.231	0.1	LOS A	0.0	0.3	0.03	0.02	0.03	38.6
6	R2	3	0.0	3	0.0	0.231	10.1	LOS A	0.0	0.3	0.03	0.02	0.03	39.4
Approach		440	1.2	440	1.2	0.231	0.4	NA	0.0	0.3	0.03	0.02	0.03	38.7
North: Forbes Street (north)														
7	L2	16	13.3	16	13.3	0.817	48.5	LOS D	1.5	10.7	0.97	1.35	2.03	16.4
8	T1	68	0.0	68	0.0	0.817	70.1	LOS E	1.5	10.7	0.97	1.35	2.03	20.3
9	R2	25	0.0	25	0.0	0.817	75.7	LOS F	1.5	10.7	0.97	1.35	2.03	16.4
Approach		109	1.9	109	1.9	0.817	68.3	LOS E	1.5	10.7	0.97	1.35	2.03	19.0
West: Lachlan Street (west)														
10	L2	43	0.0	43	0.0	0.637	8.5	LOS A	2.2	15.7	0.38	0.12	0.60	38.0
11	T1	868	0.0	868	0.0	0.637	2.0	LOS A	2.2	15.7	0.38	0.12	0.60	30.1
12	R2	160	21.7	160	21.7	0.637	9.2	LOS A	2.2	15.7	0.38	0.12	0.60	35.7
Approach		1072	3.2	1072	3.2	0.637	3.4	NA	2.2	15.7	0.38	0.12	0.60	32.8
All Vehicles		1624	2.6	1624	2.6	0.817	7.0	NA	2.2	15.7	0.32	0.18	0.54	28.7

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

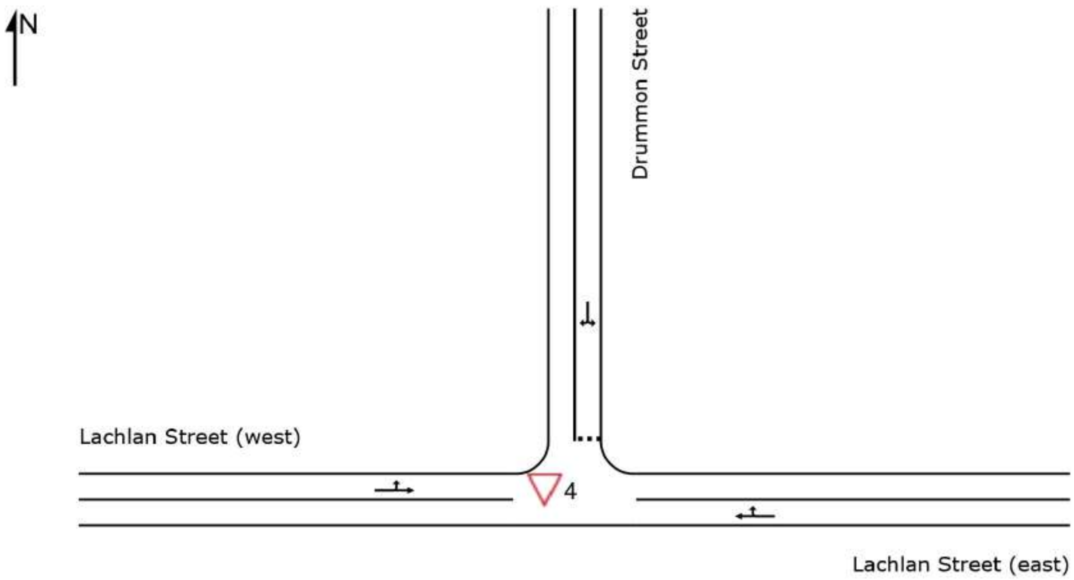
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	375	2.5	375	2.5	0.252	1.6	LOS A	0.4	2.6	0.22	0.04	0.25	32.4
6	R2	29	7.7	29	7.7	0.252	11.7	LOS A	0.4	2.6	0.22	0.04	0.25	38.0
Approach		404	2.9	404	2.9	0.252	2.3	NA	0.4	2.6	0.22	0.04	0.25	33.9
North: Drummon Street														
7	L2	62	0.0	62	0.0	0.336	9.5	LOS A	0.5	3.5	0.79	0.96	0.98	30.7
9	R2	62	0.0	62	0.0	0.336	18.3	LOS B	0.5	3.5	0.79	0.96	0.98	30.7
Approach		124	0.0	124	0.0	0.336	13.9	LOS A	0.5	3.5	0.79	0.96	0.98	30.7
West: Lachlan Street (west)														
10	L2	89	0.0	89	0.0	0.465	3.4	LOS A	0.0	0.0	0.00	0.05	0.00	39.9
11	T1	807	0.9	807	0.9	0.465	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	38.7
Approach		897	0.8	897	0.8	0.465	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.2
All Vehicles		1425	1.3	1425	1.3	0.465	2.1	NA	0.5	3.5	0.13	0.13	0.16	35.7

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

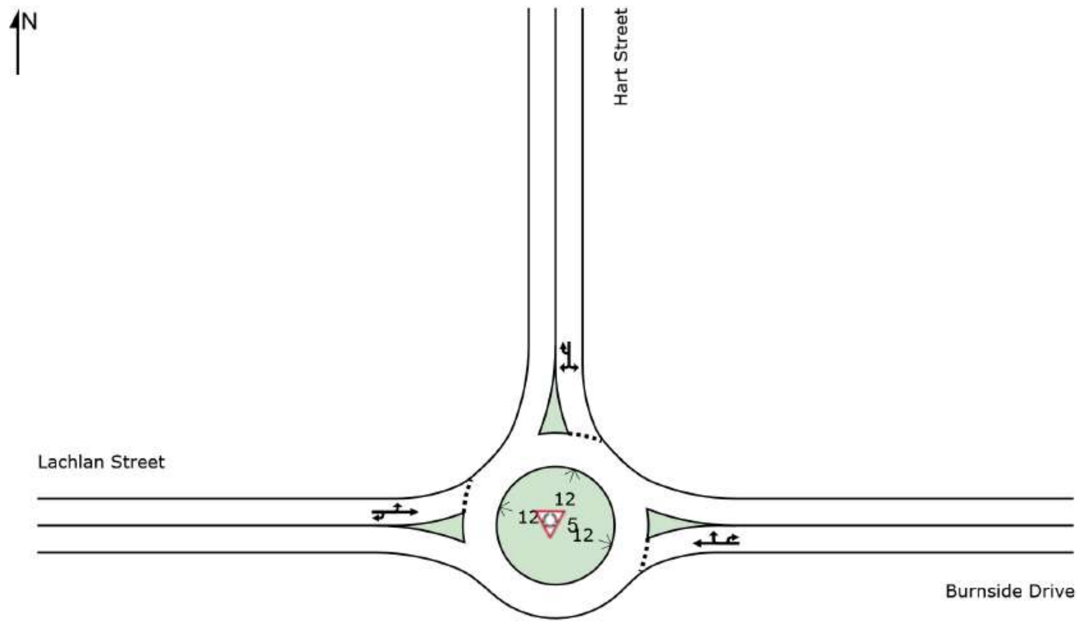
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	233	2.9	233	2.9	0.264	3.2	LOS A	0.7	4.8	0.44	0.48	0.44	34.5
6	R2	59	0.0	59	0.0	0.264	6.6	LOS A	0.7	4.8	0.44	0.48	0.44	38.5
6u	U	1	0.0	1	0.0	0.264	7.9	LOS A	0.7	4.8	0.44	0.48	0.44	34.5
Approach		293	2.3	293	2.3	0.264	3.9	LOS A	0.7	4.8	0.44	0.48	0.44	35.9
North: Hart Street														
7	L2	460	0.6	460	0.6	0.789	18.3	LOS B	4.6	32.3	1.00	1.39	1.71	28.4
9	R2	102	0.0	102	0.0	0.789	21.5	LOS B	4.6	32.3	1.00	1.39	1.71	28.4
9u	U	6	0.0	6	0.0	0.789	22.8	LOS B	4.6	32.3	1.00	1.39	1.71	34.1
Approach		568	0.5	568	0.5	0.789	18.9	LOS B	4.6	32.3	1.00	1.39	1.71	28.5
West: Lachlan Street														
10	L2	98	1.6	98	1.6	0.551	2.8	LOS A	2.1	14.5	0.35	0.38	0.35	37.3
11	T1	613	0.0	613	0.0	0.551	2.6	LOS A	2.1	14.5	0.35	0.38	0.35	29.1
12u	U	73	0.0	73	0.0	0.551	7.3	LOS A	2.1	14.5	0.35	0.38	0.35	29.1
Approach		783	0.2	783	0.2	0.551	3.0	LOS A	2.1	14.5	0.35	0.38	0.35	32.1
All Vehicles		1644	0.7	1644	0.7	0.789	8.7	LOS A	4.6	32.3	0.59	0.74	0.83	30.8

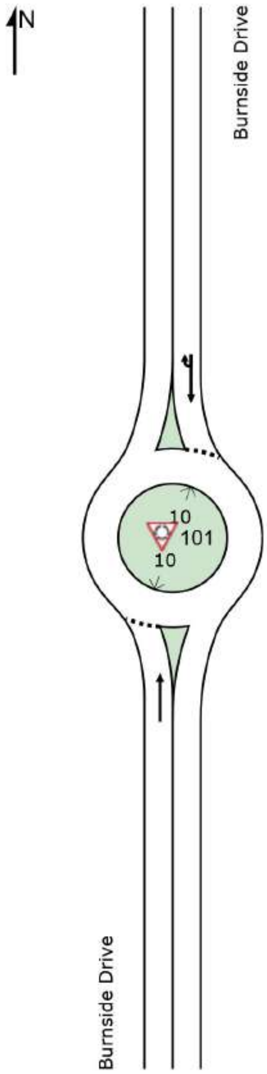
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 DEVELOPMENT AM]

Network: 9 [2023 DEVELOPMENT AM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burnside Drive														
2	T1	91	0.0	91	0.0	0.084	5.7	LOS A	0.2	1.1	0.36	0.52	0.36	49.7
Approach		91	0.0	91	0.0	0.084	5.7	LOS A	0.2	1.1	0.36	0.52	0.36	49.7
North: Burnside Drive														
8	T1	857	0.0	857	0.0	0.625	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	53.3
9u	U	201	0.0	201	0.0	0.625	9.5	LOS A	0.0	0.0	0.00	0.55	0.00	46.9
Approach		1058	0.0	1058	0.0	0.625	5.6	LOS A	0.0	0.0	0.00	0.55	0.00	52.7
All Vehicles		1148	0.0	1148	0.0	0.625	5.6	LOS A	0.2	1.1	0.03	0.55	0.03	52.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Development

Template: Default Site User Report

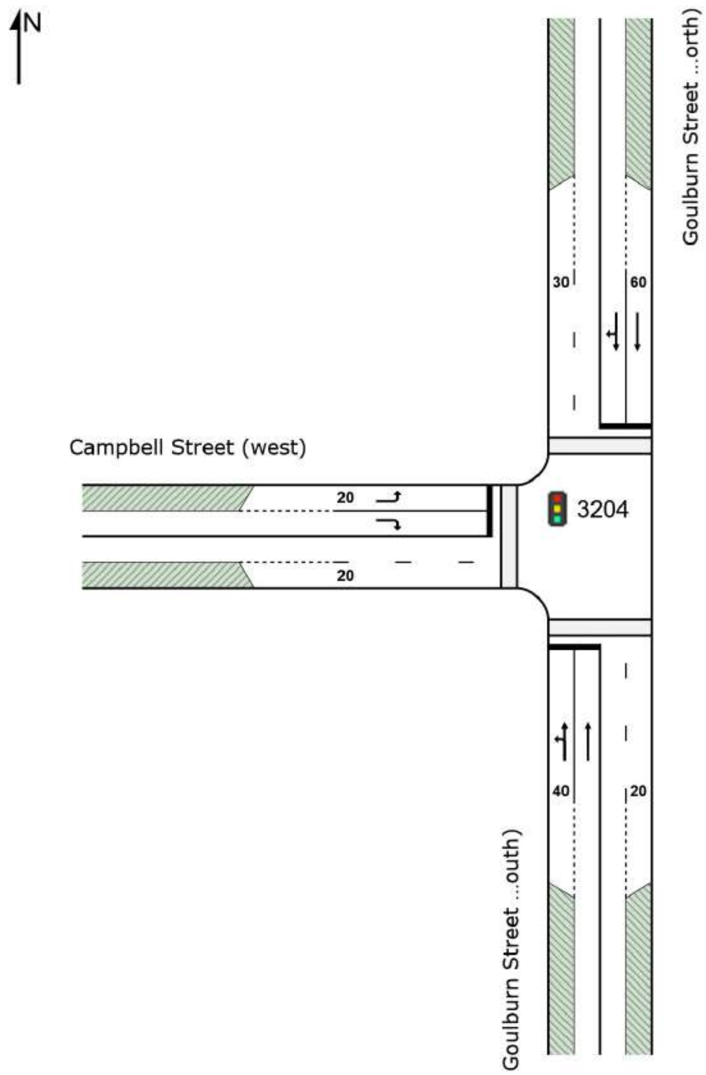
Site: 3204 [Goulburn Street/ Campbell Street - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

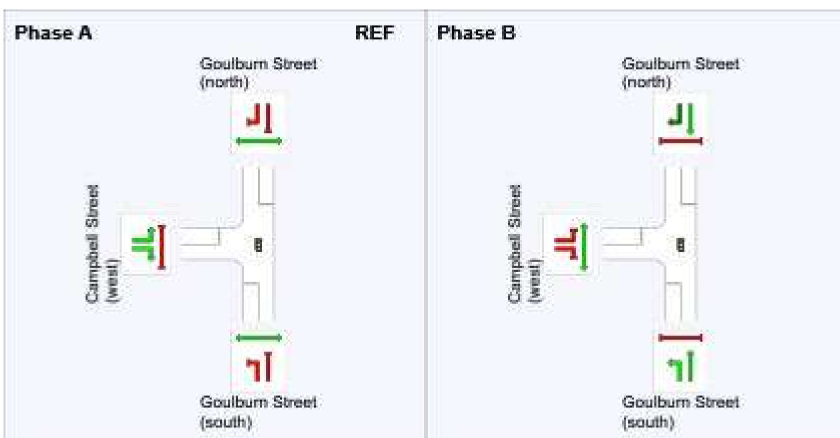


Movement Performance - Vehicles

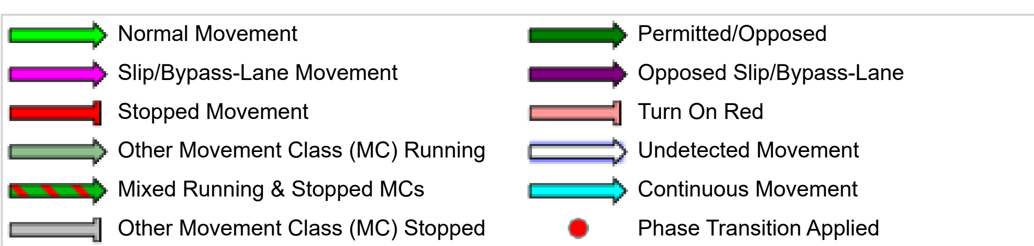
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	33	0.0	33	0.0	0.036	11.0	LOS A	0.3	2.1	0.51	0.60	0.51	30.4
2	T1	147	3.9	147	3.9	0.145	7.6	LOS A	1.3	9.6	0.53	0.44	0.53	30.3
Approach		180	3.2	180	3.2	0.145	8.2	LOS A	1.3	9.6	0.53	0.47	0.53	30.4
North: Goulburn Street (north)														
8	T1	181	5.6	181	5.6	0.186	7.7	LOS A	1.6	11.5	0.54	0.46	0.54	33.9
9	R2	27	3.8	27	3.8	0.186	11.3	LOS A	1.6	11.5	0.55	0.49	0.55	32.1
Approach		208	5.4	208	5.4	0.186	8.2	LOS A	1.6	11.5	0.54	0.47	0.54	33.8
West: Campbell Street (west)														
10	L2	26	8.0	26	8.0	0.069	24.1	LOS B	0.4	2.9	0.82	0.68	0.82	12.8
12	R2	33	0.0	33	0.0	0.088	25.1	LOS B	0.5	3.4	0.84	0.69	0.84	23.1
Approach		59	3.6	59	3.6	0.088	24.6	LOS B	0.5	3.4	0.84	0.68	0.84	19.7
All Vehicles		447	4.3	447	4.3	0.186	10.4	LOS A	1.6	11.5	0.57	0.49	0.57	30.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	**A**	**B**
Phase Change Time (sec)	0	22
Green Time (sec)	16	32
Phase Time (sec)	22	38
Phase Split	37%	63%

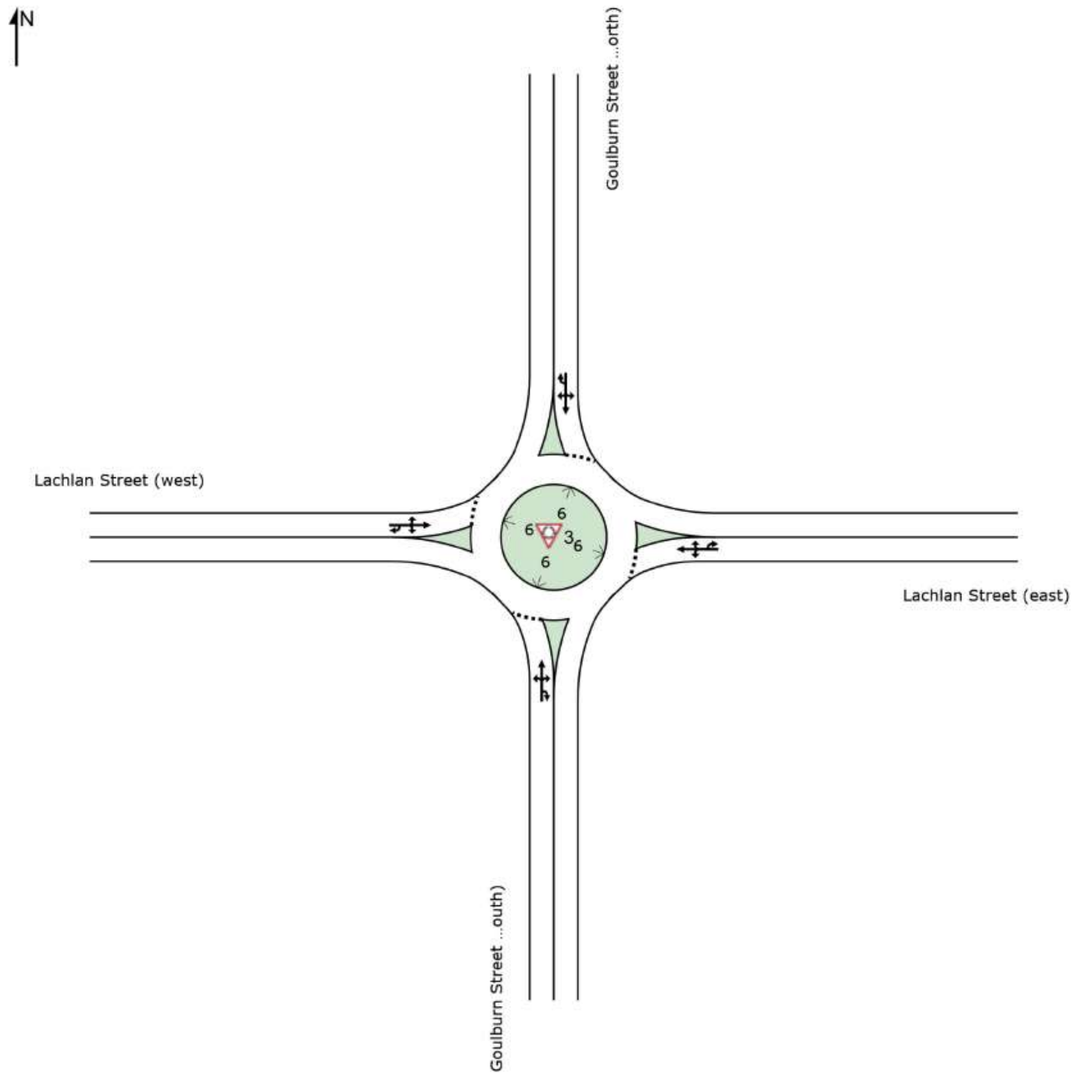
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	79	2.7	79	2.7	0.238	6.8	LOS A	0.5	3.7	0.58	0.73	0.58	35.6
2	T1	8	10.3	8	10.3	0.238	6.5	LOS A	0.5	3.7	0.58	0.73	0.58	36.2
3	R2	84	4.8	84	4.8	0.238	9.2	LOS A	0.5	3.7	0.58	0.73	0.58	29.7
3u	U	9	11.1	9	11.1	0.238	10.6	LOS A	0.5	3.7	0.58	0.73	0.58	29.7
Approach		181	4.4	181	4.4	0.238	8.1	LOS A	0.5	3.7	0.58	0.73	0.58	33.9
East: Lachlan Street (east)														
4	L2	114	0.0	114	0.0	0.497	4.1	LOS A	1.6	11.1	0.45	0.47	0.45	27.6
5	T1	475	0.8	475	0.8	0.497	3.6	LOS A	1.6	11.1	0.45	0.47	0.45	37.4
6	R2	21	6.3	21	6.3	0.497	6.5	LOS A	1.6	11.1	0.45	0.47	0.45	37.3
6u	U	6	0.0	6	0.0	0.497	7.6	LOS A	1.6	11.1	0.45	0.47	0.45	27.6
Approach		616	0.8	616	0.8	0.497	3.8	LOS A	1.6	11.1	0.45	0.47	0.45	36.8
North: Goulburn Street (north)														
7	L2	16	10.5	16	10.5	0.094	7.2	LOS A	0.2	1.5	0.66	0.70	0.66	34.2
8	T1	19	1.8	19	1.8	0.094	6.3	LOS A	0.2	1.5	0.66	0.70	0.66	34.2
9	R2	32	3.3	32	3.3	0.094	9.2	LOS A	0.2	1.5	0.66	0.70	0.66	37.1
9u	U	1	0.0	1	0.0	0.094	10.3	LOS A	0.2	1.5	0.66	0.70	0.66	37.4
Approach		67	4.5	67	4.5	0.094	8.0	LOS A	0.2	1.5	0.66	0.70	0.66	36.0
West: Lachlan Street (west)														
10	L2	23	0.0	23	0.0	0.441	4.1	LOS A	1.4	10.6	0.45	0.48	0.45	37.9
11	T1	420	11.5	420	11.5	0.441	3.6	LOS A	1.4	10.6	0.45	0.48	0.45	36.2
12	R2	55	13.7	55	13.7	0.441	6.6	LOS A	1.4	10.6	0.45	0.48	0.45	36.2
12u	U	11	0.0	11	0.0	0.441	7.6	LOS A	1.4	10.6	0.45	0.48	0.45	38.6
Approach		508	11.0	508	11.0	0.441	4.1	LOS A	1.4	10.6	0.45	0.48	0.45	36.4
All Vehicles		1373	5.2	1373	5.2	0.497	4.7	LOS A	1.6	11.1	0.48	0.52	0.48	36.2

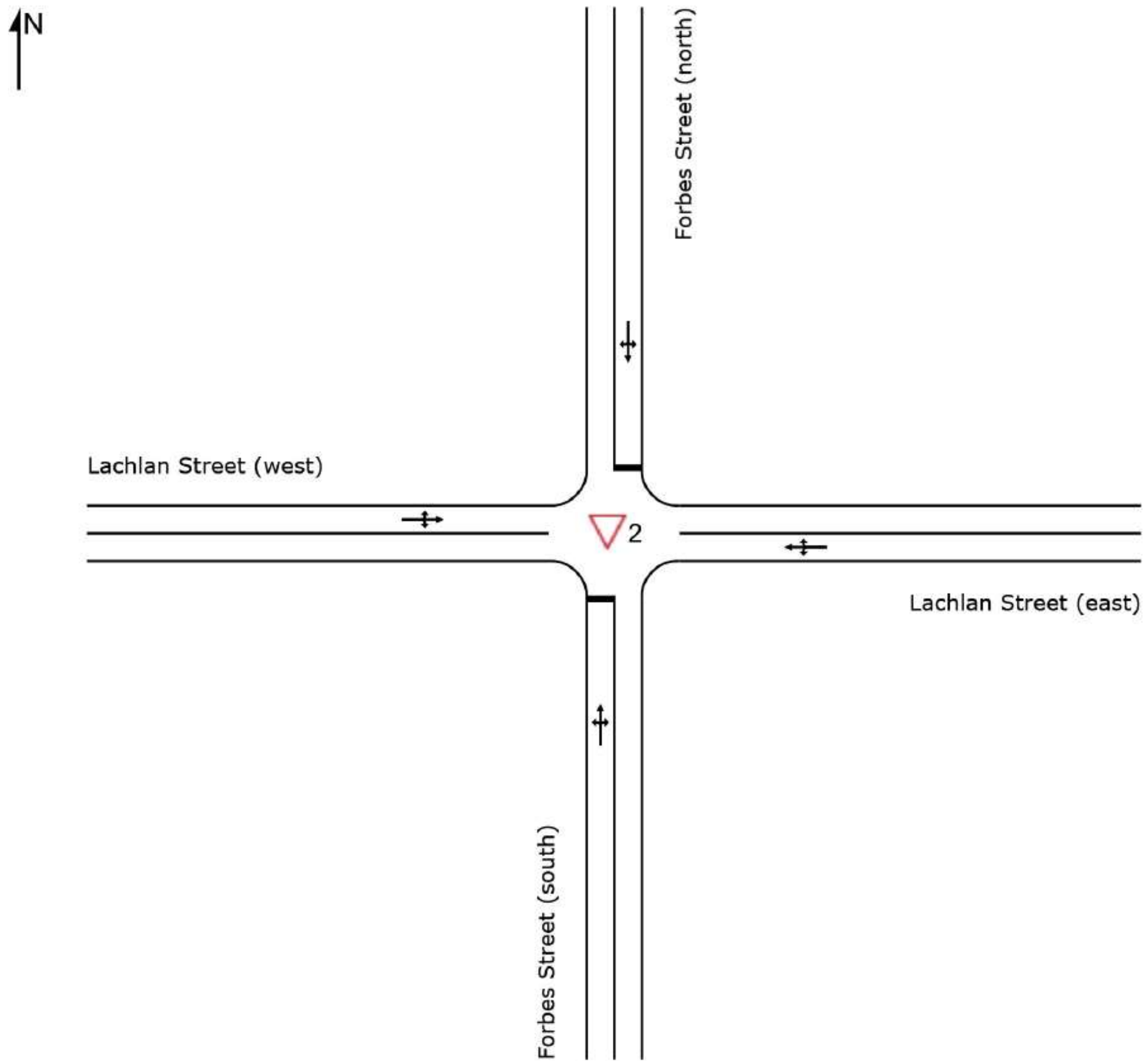
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	4	0.0	4	0.0	0.017	9.4	LOS A	0.0	0.2	0.64	0.92	0.64	26.8
2	T1	2	3.8	2	3.8	0.017	17.3	LOS B	0.0	0.2	0.64	0.92	0.64	34.1
3	R2	1	1.8	1	1.8	0.017	19.4	LOS B	0.0	0.2	0.64	0.92	0.64	26.8
Approach		7	1.4	7	1.4	0.017	13.1	LOS A	0.0	0.2	0.64	0.92	0.64	30.3
East: Lachlan Street (east)														
4	L2	7	0.0	7	0.0	0.313	5.4	LOS A	0.1	0.6	0.04	0.02	0.05	40.0
5	T1	575	1.4	575	1.4	0.313	0.1	LOS A	0.1	0.6	0.04	0.02	0.05	38.9
6	R2	14	0.0	14	0.0	0.313	6.1	LOS A	0.1	0.6	0.04	0.02	0.05	39.5
Approach		596	1.3	596	1.3	0.313	0.3	NA	0.1	0.6	0.04	0.02	0.05	39.0
North: Forbes Street (north)														
7	L2	9	0.0	9	0.0	0.242	9.5	LOS A	0.3	2.4	0.77	1.04	0.86	29.6
8	T1	43	0.0	43	0.0	0.242	18.3	LOS B	0.3	2.4	0.77	1.04	0.86	32.3
9	R2	23	0.0	23	0.0	0.242	20.7	LOS B	0.3	2.4	0.77	1.04	0.86	29.6
Approach		76	0.0	76	0.0	0.242	17.9	LOS B	0.3	2.4	0.77	1.04	0.86	31.3
West: Lachlan Street (west)														
10	L2	42	0.0	42	0.0	0.328	7.5	LOS A	0.6	4.4	0.26	0.09	0.32	38.5
11	T1	432	3.8	432	3.8	0.328	1.3	LOS A	0.6	4.4	0.26	0.09	0.32	32.1
12	R2	55	36.4	55	36.4	0.328	8.9	LOS A	0.6	4.4	0.26	0.09	0.32	36.3
Approach		528	6.8	528	6.8	0.328	2.6	NA	0.6	4.4	0.26	0.09	0.32	34.5
All Vehicles		1207	3.6	1207	3.6	0.328	2.5	NA	0.6	4.4	0.19	0.12	0.22	35.1

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

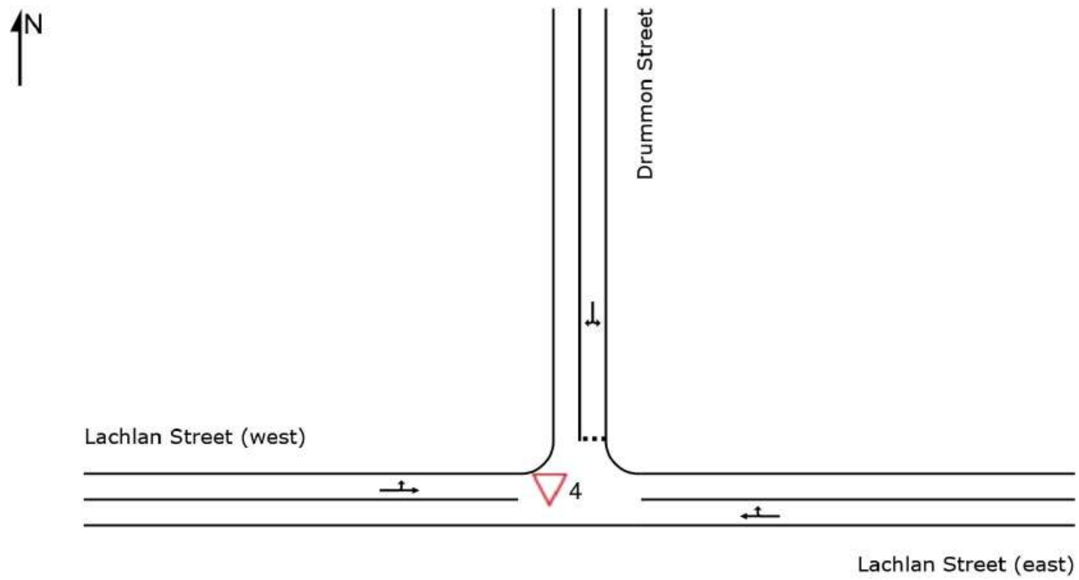
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	565	0.7	565	0.7	0.369	0.7	LOS A	0.5	3.5	0.21	0.08	0.24	35.0
6	R2	87	0.0	87	0.0	0.369	6.2	LOS A	0.5	3.5	0.21	0.08	0.24	38.7
Approach		653	0.6	653	0.6	0.369	1.4	NA	0.5	3.5	0.21	0.08	0.24	36.6
North: Drummon Street														
7	L2	15	7.1	15	7.1	0.112	4.8	LOS A	0.1	1.0	0.61	0.75	0.61	33.1
9	R2	37	3.0	37	3.0	0.112	11.6	LOS A	0.1	1.0	0.61	0.75	0.61	33.1
Approach		52	4.2	52	4.2	0.112	9.7	LOS A	0.1	1.0	0.61	0.75	0.61	33.1
West: Lachlan Street (west)														
10	L2	87	1.7	87	1.7	0.233	3.4	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
11	T1	351	4.8	351	4.8	0.233	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	37.6
Approach		438	4.2	438	4.2	0.233	0.7	NA	0.0	0.0	0.00	0.09	0.00	38.7
All Vehicles		1142	2.1	1142	2.1	0.369	1.5	NA	0.5	3.5	0.15	0.12	0.17	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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

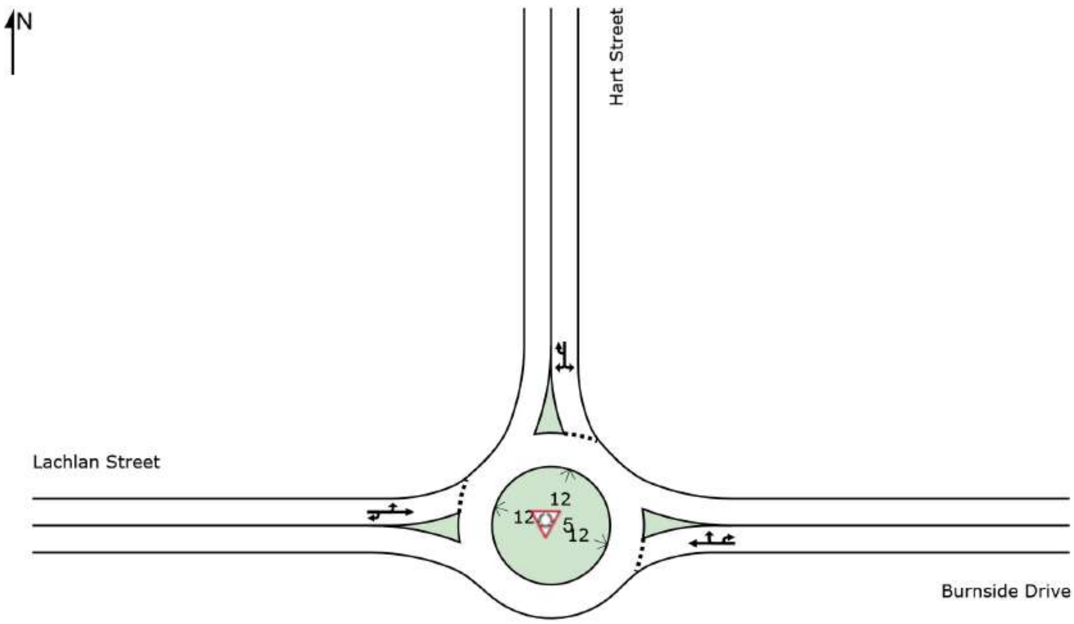
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	416	0.0	416	0.0	0.486	3.5	LOS A	1.5	10.5	0.53	0.53	0.53	33.9
6	R2	154	0.0	154	0.0	0.486	6.9	LOS A	1.5	10.5	0.53	0.53	0.53	38.2
6u	U	1	0.0	1	0.0	0.486	8.3	LOS A	1.5	10.5	0.53	0.53	0.53	33.9
Approach		571	0.0	571	0.0	0.486	4.4	LOS A	1.5	10.5	0.53	0.53	0.53	35.9
North: Hart Street														
7	L2	94	0.0	94	0.0	0.223	4.1	LOS A	0.5	3.7	0.52	0.63	0.52	35.4
9	R2	112	1.6	112	1.6	0.223	7.3	LOS A	0.5	3.7	0.52	0.63	0.52	35.4
9u	U	17	0.0	17	0.0	0.223	8.7	LOS A	0.5	3.7	0.52	0.63	0.52	38.8
Approach		222	0.8	222	0.8	0.223	6.1	LOS A	0.5	3.7	0.52	0.63	0.52	35.8
West: Lachlan Street														
10	L2	58	10.0	58	10.0	0.316	3.5	LOS A	0.8	5.9	0.44	0.48	0.44	36.9
11	T1	245	0.0	245	0.0	0.316	3.1	LOS A	0.8	5.9	0.44	0.48	0.44	27.9
12u	U	62	0.0	62	0.0	0.316	7.9	LOS A	0.8	5.9	0.44	0.48	0.44	27.9
Approach		365	1.6	365	1.6	0.316	4.0	LOS A	0.8	5.9	0.44	0.48	0.44	31.6
All Vehicles		1158	0.7	1158	0.7	0.486	4.6	LOS A	1.5	10.5	0.50	0.53	0.50	35.1

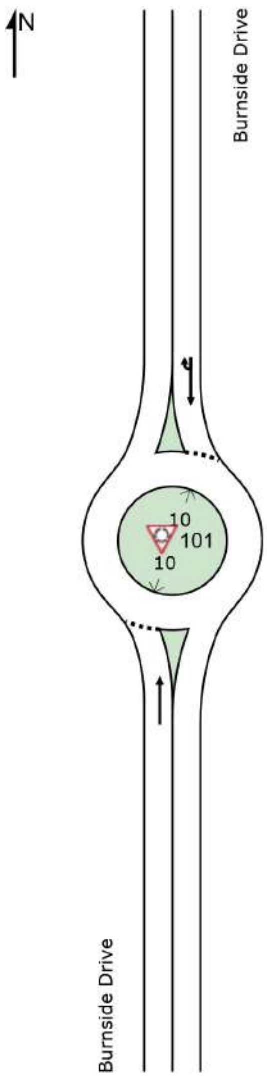
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 DEVELOPMENT PM]

Network: 11 [2023 DEVELOPMENT PM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burnside Drive														
2	T1	361	0.0	361	0.0	0.324	6.0	LOS A	0.8	5.4	0.43	0.56	0.43	49.2
Approach		361	0.0	361	0.0	0.324	6.0	LOS A	0.8	5.4	0.43	0.56	0.43	49.2
North: Burnside Drive														
8	T1	115	0.0	115	0.0	0.187	4.7	LOS A	0.0	0.0	0.00	0.67	0.00	51.4
9u	U	201	0.0	201	0.0	0.187	9.5	LOS A	0.0	0.0	0.00	0.67	0.00	43.6
Approach		316	0.0	316	0.0	0.187	7.8	LOS A	0.0	0.0	0.00	0.67	0.00	47.8
All Vehicles		677	0.0	677	0.0	0.324	6.8	LOS A	0.8	5.4	0.23	0.61	0.23	48.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Development

Template: Default Site User Report

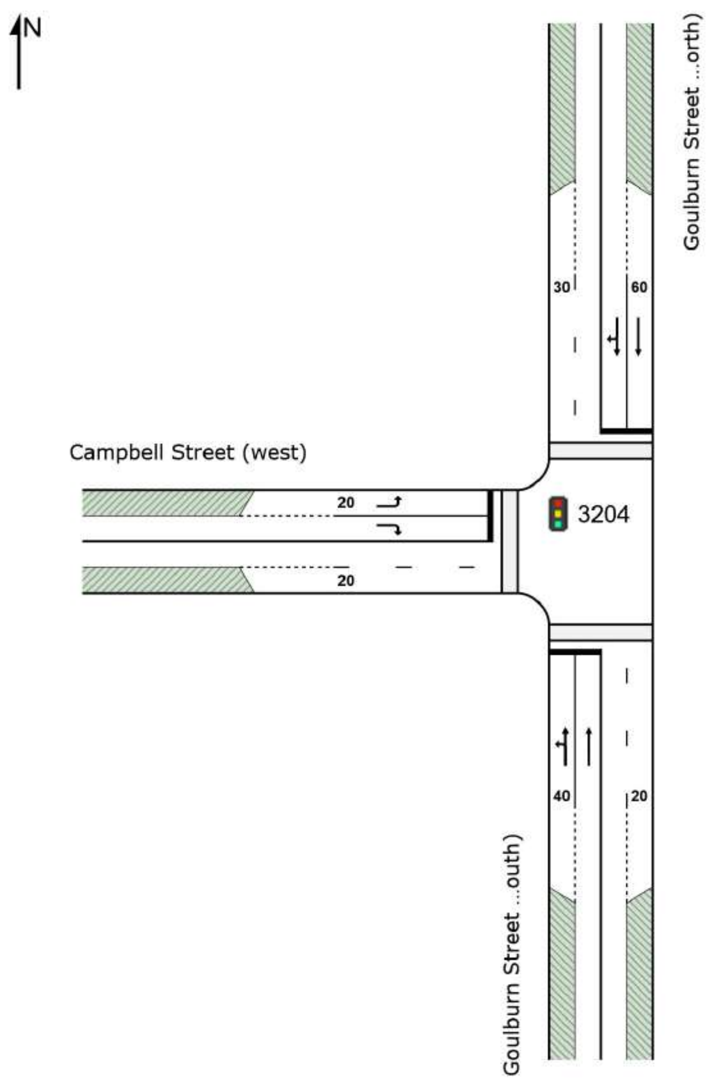
Site: 3204 [Goulburn Street/ Campbell Street - 2023 DEVELOPMENT AM]

Network: 15 [2023 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

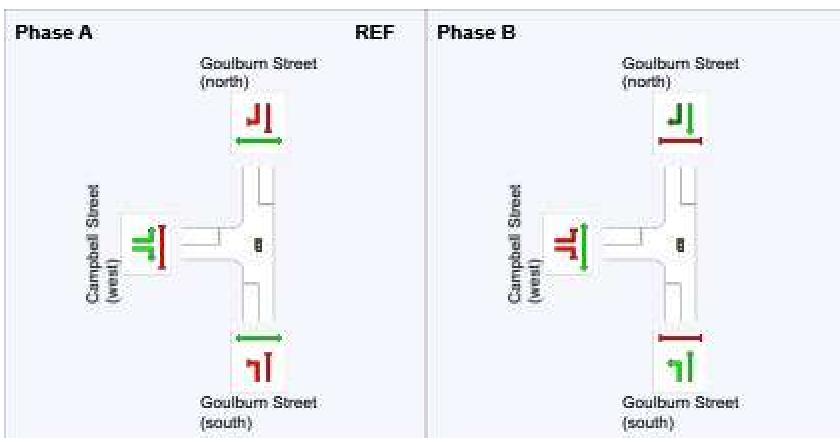


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	71	2.2	71	2.2	0.068	9.7	LOS A	0.6	4.0	0.47	0.61	0.47	31.3
2	T1	155	2.0	155	2.0	0.138	6.1	LOS A	1.3	8.9	0.48	0.39	0.48	31.9
Approach		225	2.1	225	2.1	0.138	7.2	LOS A	1.3	8.9	0.48	0.46	0.48	31.7
North: Goulburn Street (north)														
8	T1	176	6.0	176	6.0	0.178	6.1	LOS A	1.4	10.4	0.48	0.43	0.48	34.9
9	R2	36	5.4	36	5.4	0.178	9.7	LOS A	1.4	10.4	0.49	0.46	0.49	33.2
Approach		212	5.9	212	5.9	0.178	6.7	LOS A	1.4	10.4	0.48	0.43	0.48	34.7
West: Campbell Street (west)														
10	L2	51	4.0	51	4.0	0.168	27.5	LOS B	0.8	5.9	0.89	0.72	0.89	11.7
12	R2	34	3.8	34	3.8	0.093	25.1	LOS B	0.5	3.7	0.85	0.69	0.85	23.1
Approach		84	3.9	84	3.9	0.168	26.6	LOS B	0.8	5.9	0.87	0.71	0.87	17.4
All Vehicles		521	3.9	521	3.9	0.178	10.1	LOS A	1.4	10.4	0.54	0.49	0.54	30.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

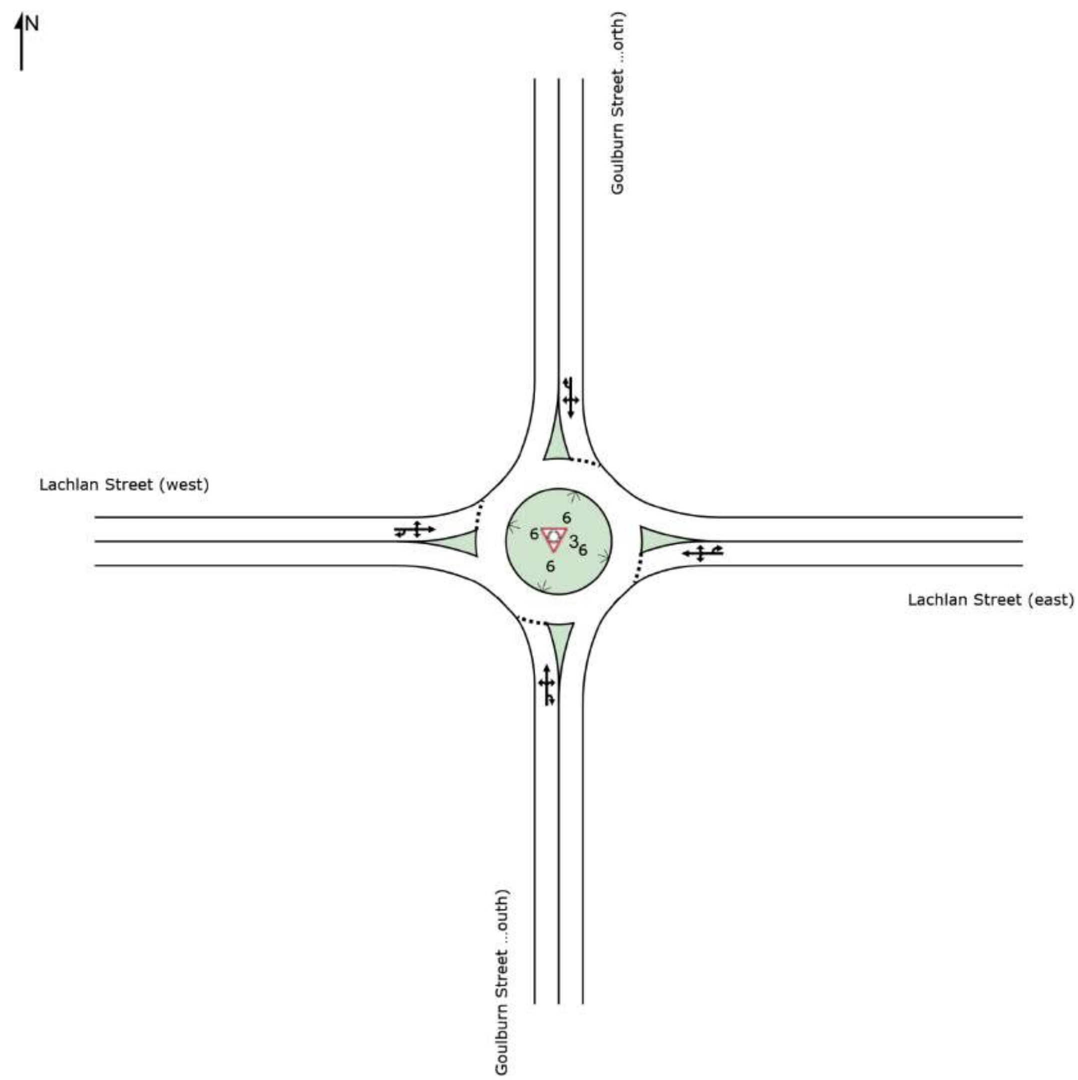
Phase	**A**	**B**
Phase Change Time (sec)	0	19
Green Time (sec)	13	35
Phase Time (sec)	19	41
Phase Split	32%	68%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 DEVELOPMENT AM] Network: 15 [2023 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	76	4.4	76	4.4	0.239	5.6	LOS A	0.5	3.5	0.49	0.67	0.49	36.1
2	T1	1	0.0	1	0.0	0.239	4.9	LOS A	0.5	3.5	0.49	0.67	0.49	36.7
3	R2	124	3.8	124	3.8	0.239	7.8	LOS A	0.5	3.5	0.49	0.67	0.49	30.7
3u	U	13	0.0	13	0.0	0.239	8.9	LOS A	0.5	3.5	0.49	0.67	0.49	30.7
Approach		214	3.7	214	3.7	0.239	7.1	LOS A	0.5	3.5	0.49	0.67	0.49	33.9
East: Lachlan Street (east)														
4	L2	97	0.0	97	0.0	0.360	3.9	LOS A	1.0	7.3	0.39	0.45	0.39	28.0
5	T1	327	0.8	327	0.8	0.360	3.3	LOS A	1.0	7.3	0.39	0.45	0.39	37.6
6	R2	14	0.0	14	0.0	0.360	6.1	LOS A	1.0	7.3	0.39	0.45	0.39	37.5
6u	U	3	0.0	3	0.0	0.360	7.3	LOS A	1.0	7.3	0.39	0.45	0.39	28.0
Approach		441	0.6	441	0.6	0.360	3.5	LOS A	1.0	7.3	0.39	0.45	0.39	36.9
North: Goulburn Street (north)														
7	L2	12	0.0	12	0.0	0.168	16.0	LOS B	0.5	3.5	1.00	0.94	1.00	29.3
8	T1	16	1.8	16	1.8	0.168	15.6	LOS B	0.5	3.5	1.00	0.94	1.00	29.3
9	R2	18	5.9	18	5.9	0.168	18.7	LOS B	0.5	3.5	1.00	0.94	1.00	34.0
9u	U	2	0.0	2	0.0	0.168	19.5	LOS B	0.5	3.5	1.00	0.94	1.00	34.3
Approach		47	2.8	47	2.8	0.168	17.0	LOS B	0.5	3.5	1.00	0.94	1.00	31.9
West: Lachlan Street (west)														
10	L2	22	14.3	22	14.3	0.859	7.8	LOS A	6.7	49.8	0.96	0.68	1.03	36.9
11	T1	931	7.5	931	7.5	0.859	7.0	LOS A	6.7	49.8	0.96	0.68	1.03	34.6
12	R2	62	3.6	62	3.6	0.859	9.8	LOS A	6.7	49.8	0.96	0.68	1.03	34.6
12u	U	5	0.0	5	0.0	0.859	10.9	LOS A	6.7	49.8	0.96	0.68	1.03	37.7
Approach		1020	7.4	1020	7.4	0.859	7.2	LOS A	6.7	49.8	0.96	0.68	1.03	34.8
All Vehicles		1722	5.1	1722	5.1	0.859	6.5	LOS A	6.7	49.8	0.76	0.63	0.80	35.0

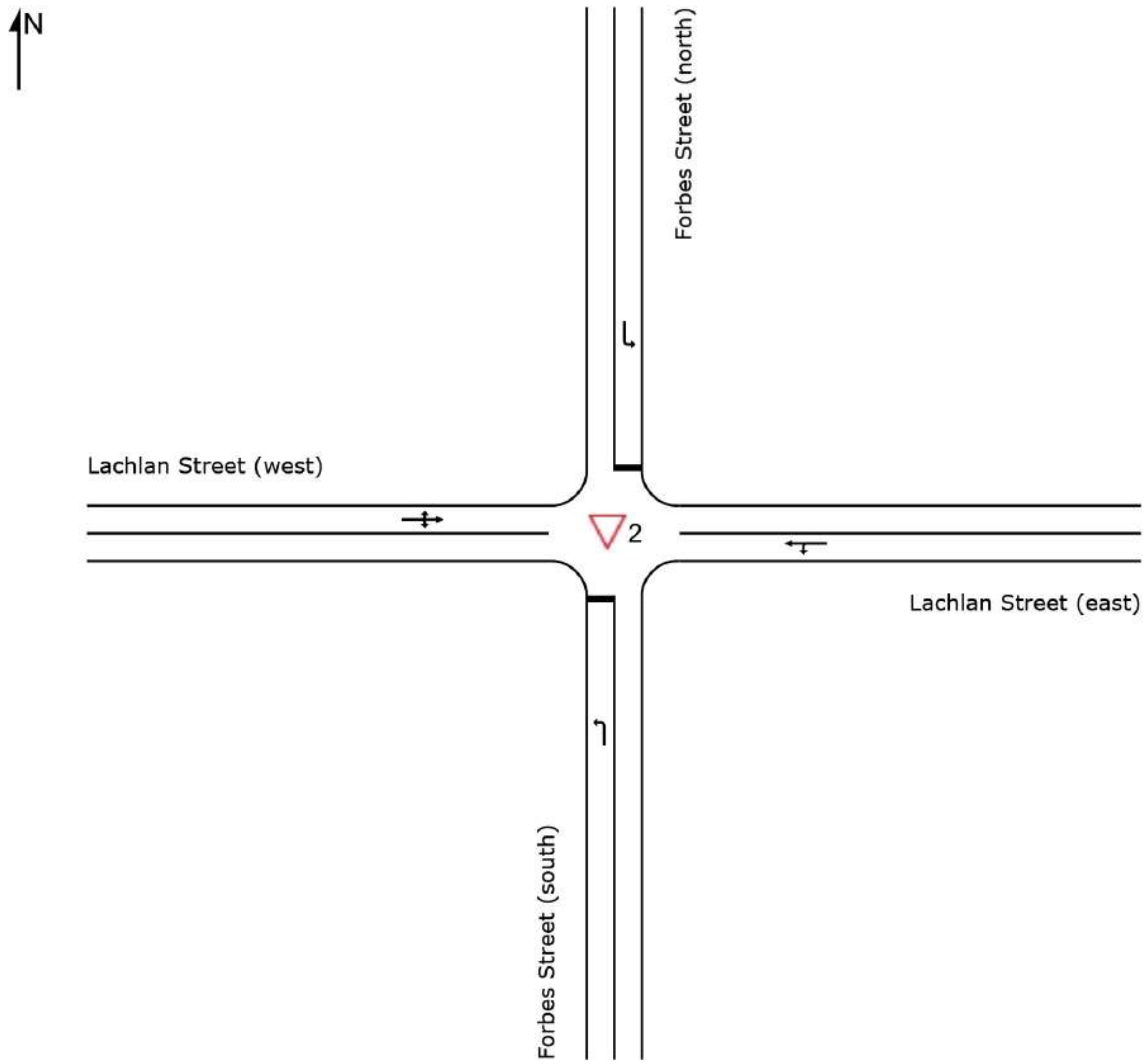
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 DEVELOPMENT AM MITI]

Network: 15 [2023 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	1	0.0	1	0.0	0.001	8.5	LOS A	0.0	0.0	0.45	0.79	0.45	30.4
Approach		1	0.0	1	0.0	0.001	8.5	LOS A	0.0	0.0	0.45	0.79	0.45	30.4
East: Lachlan Street (east)														
4	L2	20	1.9	20	1.9	0.239	3.4	LOS A	0.0	0.0	0.00	0.02	0.00	40.2
5	T1	442	1.1	442	1.1	0.239	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.4
Approach		462	1.2	462	1.2	0.239	0.2	NA	0.0	0.0	0.00	0.02	0.00	39.5
North: Forbes Street (north)														
7	L2	16	13.3	16	13.3	0.037	14.2	LOS A	0.0	0.4	0.71	1.00	0.71	31.7
Approach		16	13.3	16	13.3	0.037	14.2	LOS A	0.0	0.4	0.71	1.00	0.71	31.7
West: Lachlan Street (west)														
10	L2	43	0.0	43	0.0	0.642	8.9	LOS A	2.3	16.3	0.39	0.12	0.64	37.8
11	T1	868	0.0	868	0.0	0.642	2.2	LOS A	2.3	16.3	0.39	0.12	0.64	29.7
12	R2	160	21.7	160	21.7	0.642	9.6	LOS A	2.3	16.3	0.39	0.12	0.64	35.5
Approach		1072	3.2	1072	3.2	0.642	3.6	NA	2.3	16.3	0.39	0.12	0.64	32.4
All Vehicles		1551	2.7	1551	2.7	0.642	2.7	NA	2.3	16.3	0.28	0.10	0.45	33.8

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

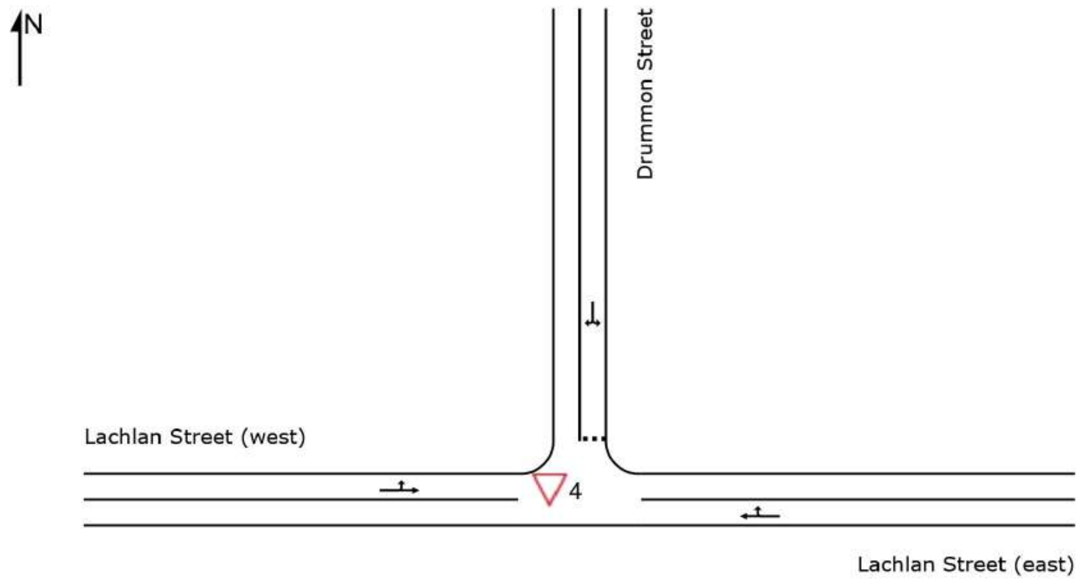
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 DEVELOPMENT AM MITI]

Network: 15 [2023 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	375	2.5	375	2.5	0.258	1.8	LOS A	0.4	2.8	0.24	0.05	0.28	31.8
6	R2	33	7.7	33	7.7	0.258	11.8	LOS A	0.4	2.8	0.24	0.05	0.28	37.9
Approach		407	2.9	407	2.9	0.258	2.6	NA	0.4	2.8	0.24	0.05	0.28	33.6
North: Drummon Street														
7	L2	62	0.0	62	0.0	0.435	10.7	LOS A	0.7	4.8	0.83	1.02	1.13	29.7
9	R2	87	0.0	87	0.0	0.435	19.8	LOS B	0.7	4.8	0.83	1.02	1.13	29.7
Approach		149	0.0	149	0.0	0.435	16.0	LOS B	0.7	4.8	0.83	1.02	1.13	29.7
West: Lachlan Street (west)														
10	L2	89	0.0	89	0.0	0.465	3.4	LOS A	0.0	0.0	0.00	0.05	0.00	39.9
11	T1	807	0.9	807	0.9	0.465	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	38.7
Approach		897	0.8	897	0.8	0.465	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.2
All Vehicles		1454	1.3	1454	1.3	0.465	2.6	NA	0.7	4.8	0.15	0.15	0.19	35.0

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

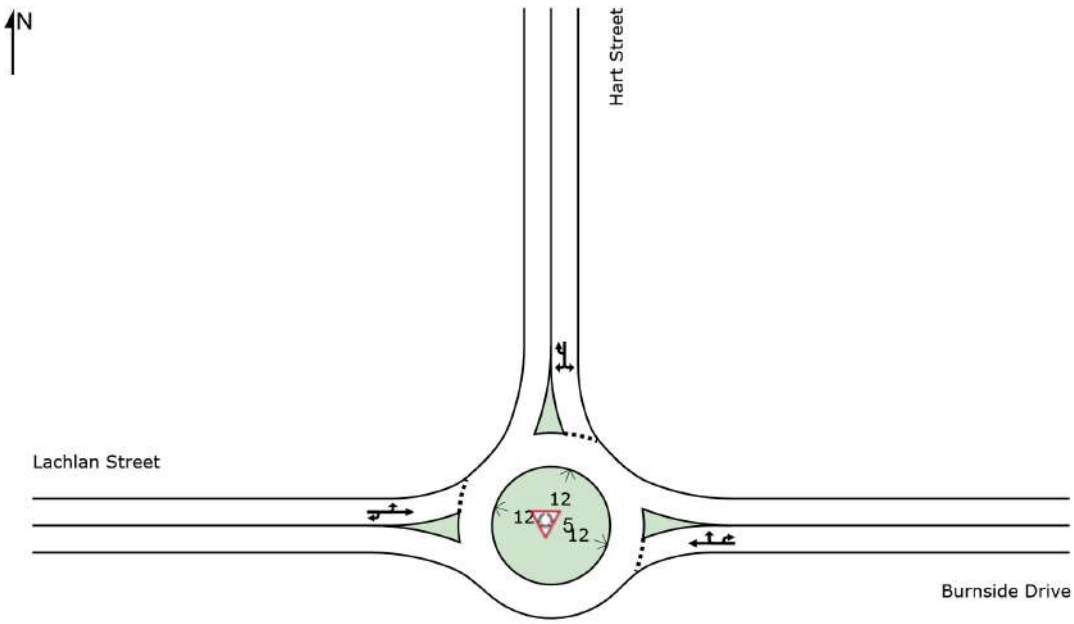
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 DEVELOPMENT AM MITI]

Network: 15 [2023 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	233	2.9	233	2.9	0.264	3.2	LOS A	0.7	4.8	0.44	0.48	0.44	34.5
6	R2	59	0.0	59	0.0	0.264	6.6	LOS A	0.7	4.8	0.44	0.48	0.44	38.5
6u	U	1	0.0	1	0.0	0.264	7.9	LOS A	0.7	4.8	0.44	0.48	0.44	34.5
Approach		293	2.3	293	2.3	0.264	3.9	LOS A	0.7	4.8	0.44	0.48	0.44	35.9
North: Hart Street														
7	L2	528	0.6	528	0.6	0.884	27.1	LOS B	7.1	50.2	1.00	1.68	2.24	25.1
9	R2	102	0.0	102	0.0	0.884	30.2	LOS C	7.1	50.2	1.00	1.68	2.24	25.1
9u	U	6	0.0	6	0.0	0.884	31.6	LOS C	7.1	50.2	1.00	1.68	2.24	31.6
Approach		637	0.5	637	0.5	0.884	27.6	LOS B	7.1	50.2	1.00	1.68	2.24	25.2
West: Lachlan Street														
10	L2	98	1.6	98	1.6	0.551	2.8	LOS A	2.1	14.5	0.35	0.38	0.35	37.3
11	T1	613	0.0	613	0.0	0.551	2.6	LOS A	2.1	14.5	0.35	0.38	0.35	29.1
12u	U	73	0.0	73	0.0	0.551	7.3	LOS A	2.1	14.5	0.35	0.38	0.35	29.1
Approach		783	0.2	783	0.2	0.551	3.0	LOS A	2.1	14.5	0.35	0.38	0.35	32.1
All Vehicles		1713	0.7	1713	0.7	0.884	12.3	LOS A	7.1	50.2	0.61	0.88	1.07	28.4

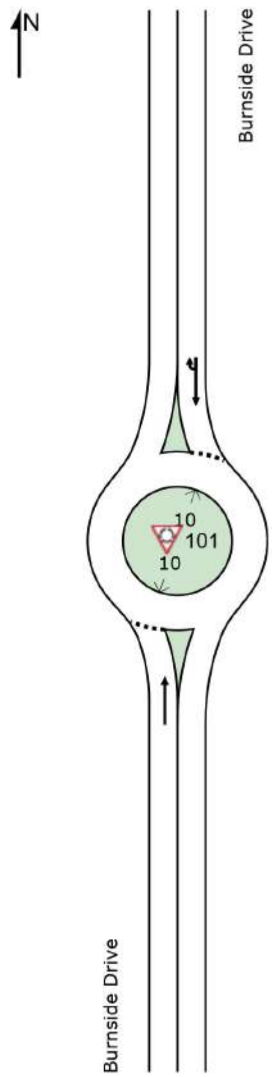
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 DEVELOPMENT AM MITI]

Network: 15 [2023 DEVELOPMENT AM MITI]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	91	0.0	91	0.0	0.084	5.7	LOS A	0.2	1.1	0.36	0.52	0.36	49.7
Approach		91	0.0	91	0.0	0.084	5.7	LOS A	0.2	1.1	0.36	0.52	0.36	49.7
North: Burnside Drive														
8	T1	925	0.0	925	0.0	0.665	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	53.3
9u	U	201	0.0	201	0.0	0.665	9.5	LOS A	0.0	0.0	0.00	0.55	0.00	47.0
Approach		1126	0.0	1126	0.0	0.665	5.5	LOS A	0.0	0.0	0.00	0.55	0.00	52.8
All Vehicles		1217	0.0	1217	0.0	0.665	5.6	LOS A	0.2	1.1	0.03	0.54	0.03	52.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2023 Development — **Template: Default Site User Report**

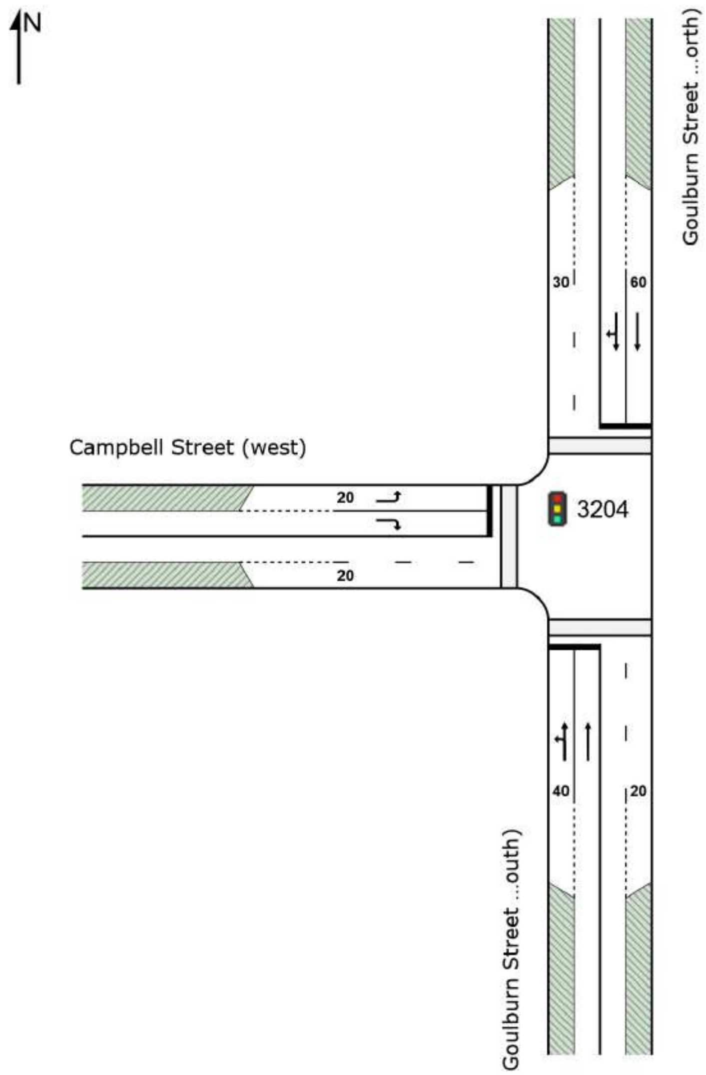
Site: 3204 [Goulburn Street/ Campbell Street - 2023 DEVELOPMENT PM]

Network: 17 [2023 DEVELOPMENT PM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

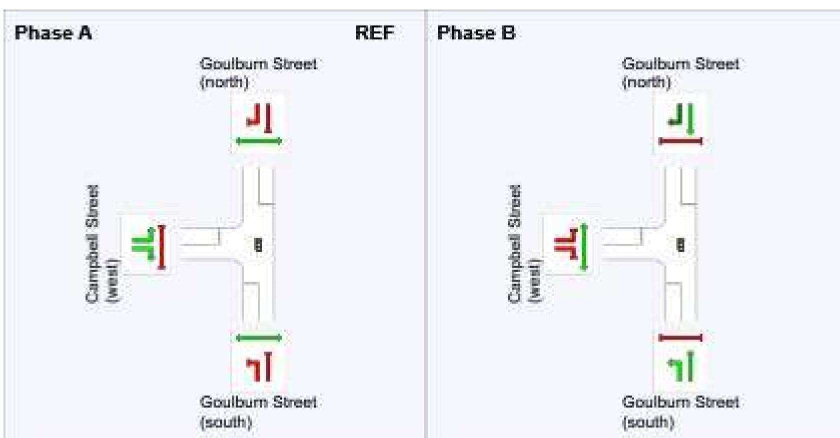


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	33	0.0	33	0.0	0.036	11.0	LOS A	0.3	2.1	0.51	0.60	0.51	30.4
2	T1	147	3.9	147	3.9	0.145	7.6	LOS A	1.3	9.6	0.53	0.44	0.53	30.3
Approach		180	3.2	180	3.2	0.145	8.2	LOS A	1.3	9.6	0.53	0.47	0.53	30.4
North: Goulburn Street (north)														
8	T1	181	5.6	181	5.6	0.186	7.7	LOS A	1.6	11.5	0.54	0.46	0.54	33.9
9	R2	27	3.8	27	3.8	0.186	11.3	LOS A	1.6	11.5	0.55	0.49	0.55	32.1
Approach		208	5.4	208	5.4	0.186	8.2	LOS A	1.6	11.5	0.54	0.47	0.54	33.8
West: Campbell Street (west)														
10	L2	26	8.0	26	8.0	0.069	24.1	LOS B	0.4	2.9	0.82	0.68	0.82	12.8
12	R2	33	0.0	33	0.0	0.088	25.1	LOS B	0.5	3.4	0.84	0.69	0.84	23.1
Approach		59	3.6	59	3.6	0.088	24.6	LOS B	0.5	3.4	0.84	0.68	0.84	19.7
All Vehicles		447	4.3	447	4.3	0.186	10.4	LOS A	1.6	11.5	0.57	0.49	0.57	30.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	22
Green Time (sec)	16	32
Phase Time (sec)	22	38
Phase Split	37%	63%

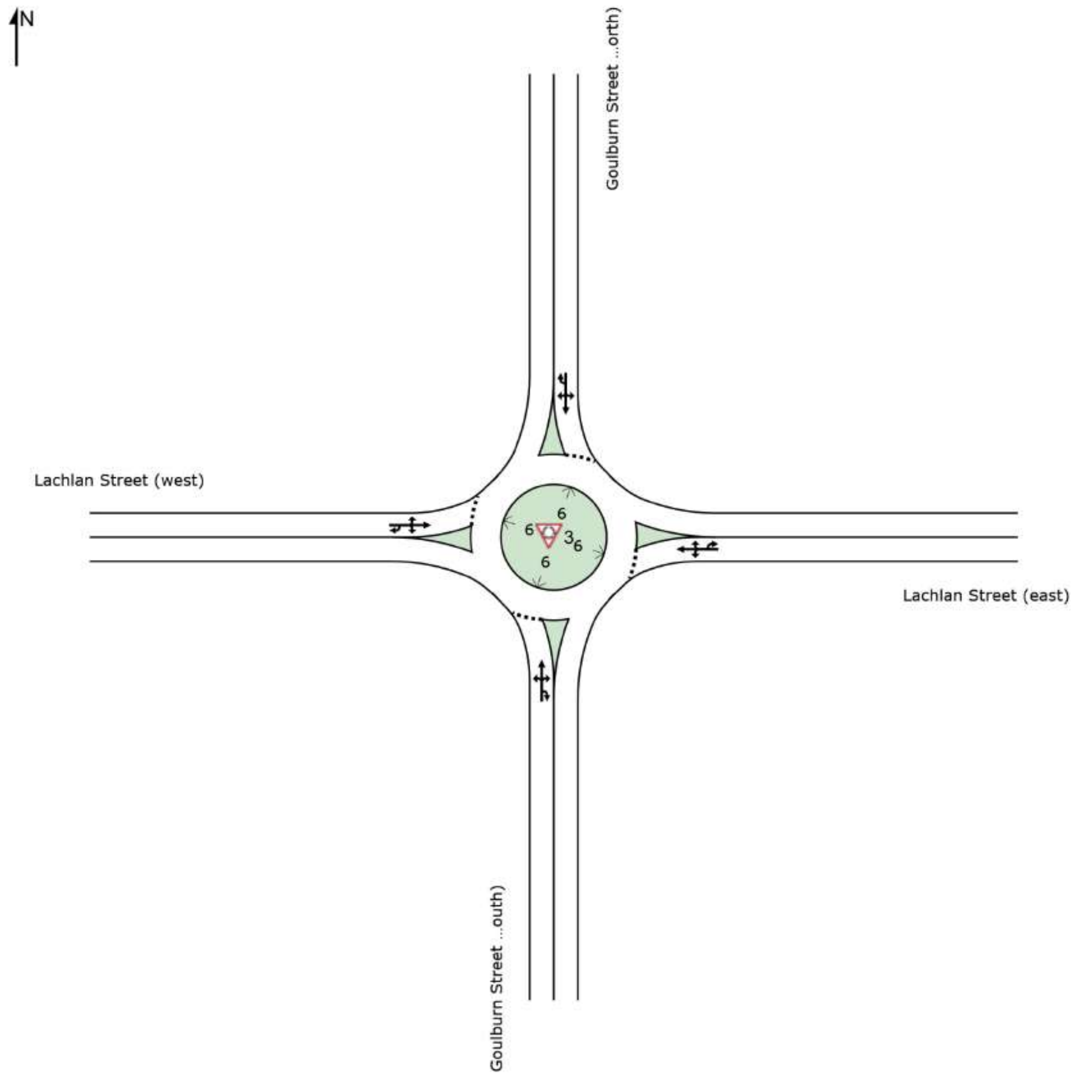
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2023 DEVELOPMENT PM]

Network: 17 [2023 DEVELOPMENT PM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	79	2.7	79	2.7	0.238	6.8	LOS A	0.5	3.7	0.58	0.73	0.58	35.6
2	T1	8	10.3	8	10.3	0.238	6.5	LOS A	0.5	3.7	0.58	0.73	0.58	36.2
3	R2	84	4.8	84	4.8	0.238	9.2	LOS A	0.5	3.7	0.58	0.73	0.58	29.7
3u	U	9	11.1	9	11.1	0.238	10.6	LOS A	0.5	3.7	0.58	0.73	0.58	29.7
Approach		181	4.4	181	4.4	0.238	8.1	LOS A	0.5	3.7	0.58	0.73	0.58	33.9
East: Lachlan Street (east)														
4	L2	114	0.0	114	0.0	0.497	4.1	LOS A	1.6	11.1	0.45	0.47	0.45	27.6
5	T1	475	0.8	475	0.8	0.497	3.6	LOS A	1.6	11.1	0.45	0.47	0.45	37.4
6	R2	21	6.3	21	6.3	0.497	6.5	LOS A	1.6	11.1	0.45	0.47	0.45	37.3
6u	U	6	0.0	6	0.0	0.497	7.6	LOS A	1.6	11.1	0.45	0.47	0.45	27.6
Approach		616	0.8	616	0.8	0.497	3.8	LOS A	1.6	11.1	0.45	0.47	0.45	36.8
North: Goulburn Street (north)														
7	L2	16	10.5	16	10.5	0.094	7.2	LOS A	0.2	1.5	0.66	0.70	0.66	34.2
8	T1	19	1.8	19	1.8	0.094	6.3	LOS A	0.2	1.5	0.66	0.70	0.66	34.2
9	R2	32	3.3	32	3.3	0.094	9.2	LOS A	0.2	1.5	0.66	0.70	0.66	37.1
9u	U	1	0.0	1	0.0	0.094	10.3	LOS A	0.2	1.5	0.66	0.70	0.66	37.4
Approach		67	4.5	67	4.5	0.094	8.0	LOS A	0.2	1.5	0.66	0.70	0.66	36.0
West: Lachlan Street (west)														
10	L2	23	0.0	23	0.0	0.441	4.1	LOS A	1.4	10.6	0.45	0.48	0.45	37.9
11	T1	420	11.5	420	11.5	0.441	3.6	LOS A	1.4	10.6	0.45	0.48	0.45	36.2
12	R2	55	13.7	55	13.7	0.441	6.6	LOS A	1.4	10.6	0.45	0.48	0.45	36.2
12u	U	11	0.0	11	0.0	0.441	7.6	LOS A	1.4	10.6	0.45	0.48	0.45	38.6
Approach		508	11.0	508	11.0	0.441	4.1	LOS A	1.4	10.6	0.45	0.48	0.45	36.4
All Vehicles		1373	5.2	1373	5.2	0.497	4.7	LOS A	1.6	11.1	0.48	0.52	0.48	36.2

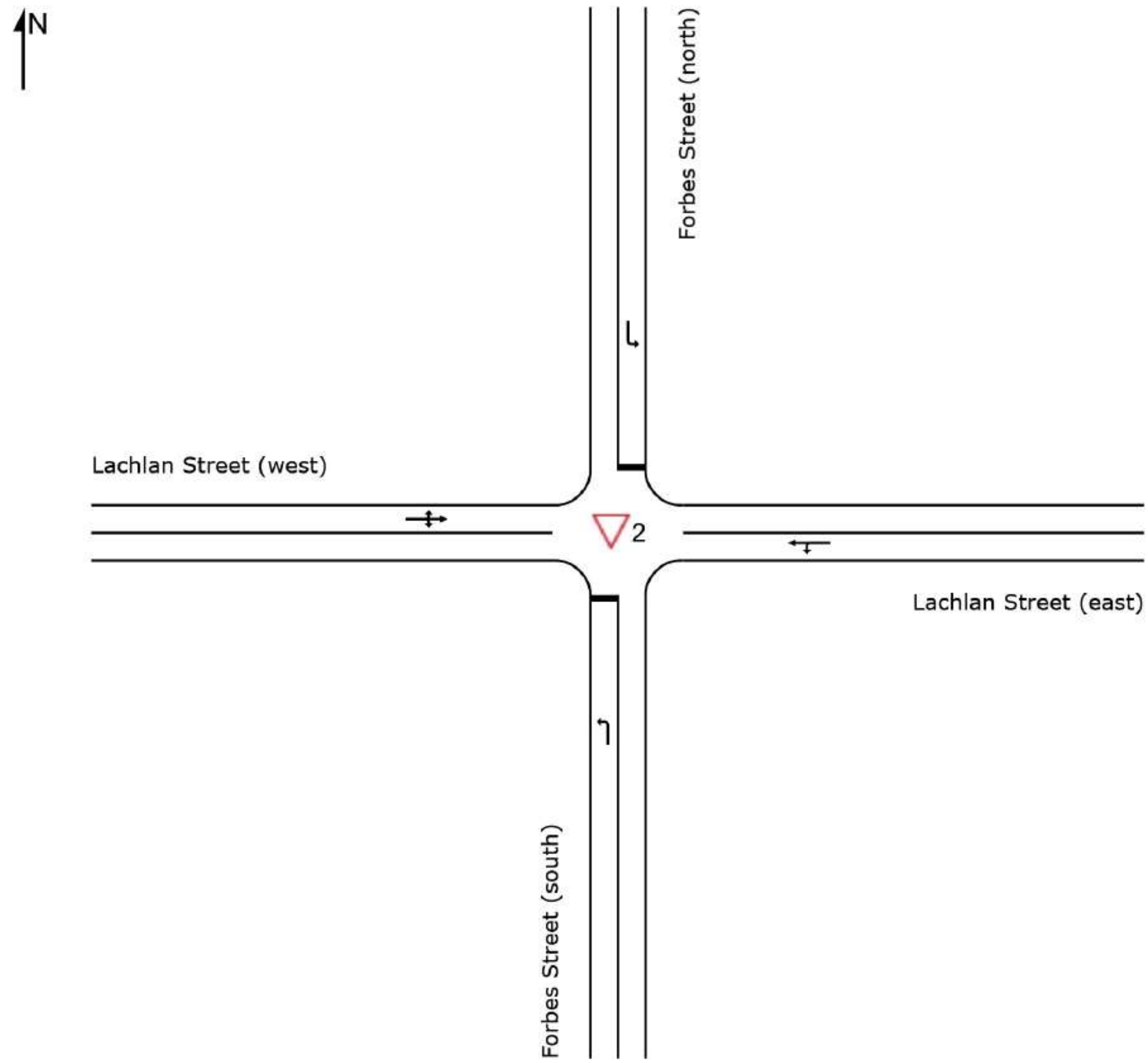
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2023 DEVELOPMENT PM MITI]

Network: 17 [2023 DEVELOPMENT PM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	6	0.0	6	0.0	0.008	9.6	LOS A	0.0	0.1	0.53	0.85	0.53	29.5
Approach		6	0.0	6	0.0	0.008	9.6	LOS A	0.0	0.1	0.53	0.85	0.53	29.5
East: Lachlan Street (east)														
4	L2	7	1.9	7	1.9	0.313	3.4	LOS A	0.0	0.0	0.00	0.01	0.00	40.3
5	T1	598	1.1	598	1.1	0.313	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		605	1.2	605	1.2	0.313	0.1	NA	0.0	0.0	0.00	0.01	0.00	39.8
North: Forbes Street (north)														
7	L2	9	13.3	9	13.3	0.011	9.2	LOS A	0.0	0.1	0.46	0.86	0.46	34.2
Approach		9	13.3	9	13.3	0.011	9.2	LOS A	0.0	0.1	0.46	0.86	0.46	34.2
West: Lachlan Street (west)														
10	L2	42	0.0	42	0.0	0.315	6.9	LOS A	0.5	3.7	0.25	0.09	0.30	38.7
11	T1	432	0.0	432	0.0	0.315	1.1	LOS A	0.5	3.7	0.25	0.09	0.30	32.7
12	R2	55	21.7	55	21.7	0.315	8.2	LOS A	0.5	3.7	0.25	0.09	0.30	36.7
Approach		528	2.3	528	2.3	0.315	2.3	NA	0.5	3.7	0.25	0.09	0.30	35.0
All Vehicles		1149	1.8	1149	1.8	0.315	1.2	NA	0.5	3.7	0.12	0.06	0.14	36.8

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

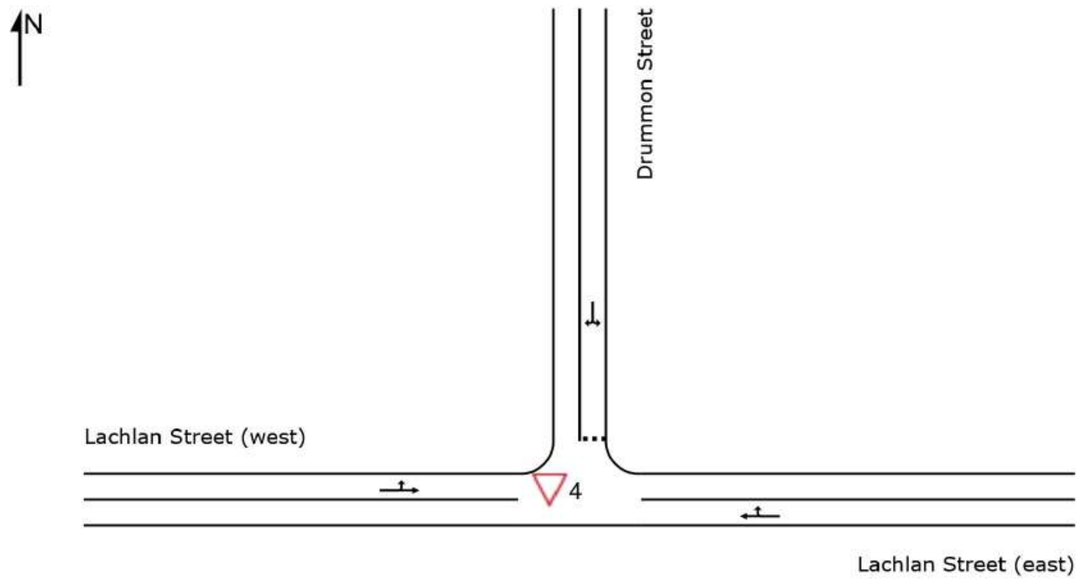
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2023 DEVELOPMENT PM MITI]

Network: 17 [2023 DEVELOPMENT PM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles															
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	565	2.5	565	2.5	0.390	0.9	LOS A	0.6	4.7	0.25	0.09	0.29	34.1
6	R2	101	7.7	101	7.7	0.390	6.6	LOS A	0.6	4.7	0.25	0.09	0.29	38.4
Approach		666	3.3	666	3.3	0.390	1.8	NA	0.6	4.7	0.25	0.09	0.29	36.1
North: Drummon Street														
7	L2	15	0.0	15	0.0	0.173	4.7	LOS A	0.2	1.5	0.66	0.79	0.66	32.6
9	R2	60	0.0	60	0.0	0.173	11.8	LOS A	0.2	1.5	0.66	0.79	0.66	32.6
Approach		75	0.0	75	0.0	0.173	10.4	LOS A	0.2	1.5	0.66	0.79	0.66	32.6
West: Lachlan Street (west)														
10	L2	87	0.0	87	0.0	0.228	3.4	LOS A	0.0	0.0	0.00	0.09	0.00	39.7
11	T1	351	0.9	351	0.9	0.228	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	37.6
Approach		438	0.8	438	0.8	0.228	0.7	NA	0.0	0.0	0.00	0.09	0.00	38.8
All Vehicles		1179	2.1	1179	2.1	0.390	1.9	NA	0.6	4.7	0.18	0.14	0.21	36.5

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

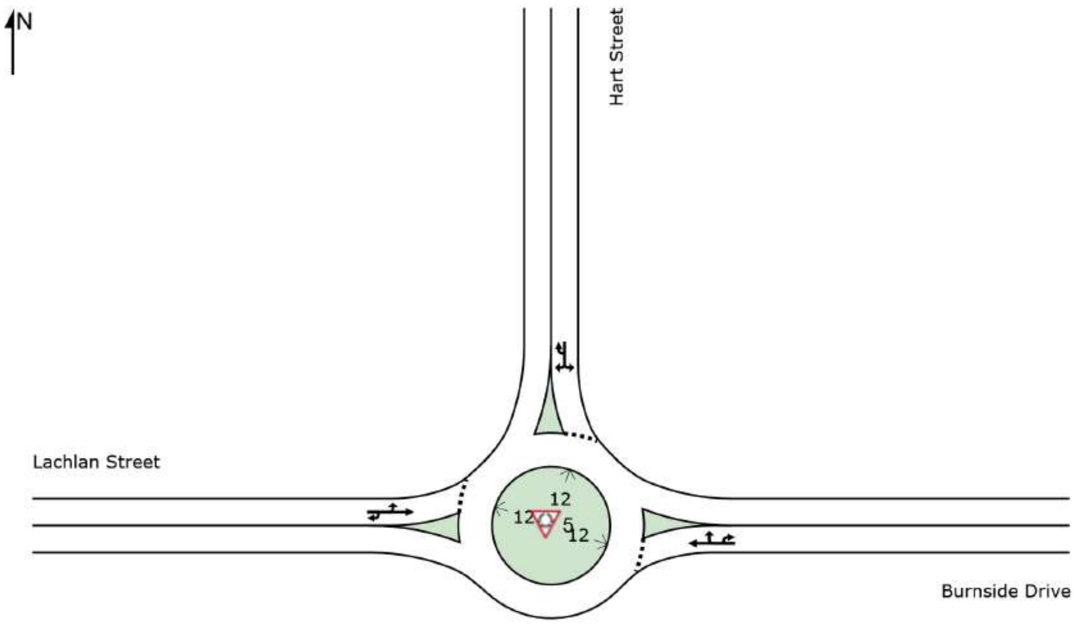
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2023 DEVELOPMENT PM MITI]

Network: 17 [2023 DEVELOPMENT PM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	416	2.9	416	2.9	0.492	3.5	LOS A	1.5	10.9	0.53	0.53	0.53	33.9
6	R2	154	0.0	154	0.0	0.492	6.9	LOS A	1.5	10.9	0.53	0.53	0.53	38.2
6u	U	1	0.0	1	0.0	0.492	8.3	LOS A	1.5	10.9	0.53	0.53	0.53	33.9
Approach		571	2.1	571	2.1	0.492	4.5	LOS A	1.5	10.9	0.53	0.53	0.53	35.8
North: Hart Street														
7	L2	137	0.6	137	0.6	0.266	4.2	LOS A	0.7	4.6	0.54	0.63	0.54	35.6
9	R2	112	0.0	112	0.0	0.266	7.4	LOS A	0.7	4.6	0.54	0.63	0.54	35.6
9u	U	17	0.0	17	0.0	0.266	8.7	LOS A	0.7	4.6	0.54	0.63	0.54	38.9
Approach		265	0.3	265	0.3	0.266	5.8	LOS A	0.7	4.6	0.54	0.63	0.54	35.9
West: Lachlan Street														
10	L2	58	1.6	58	1.6	0.314	3.4	LOS A	0.8	5.8	0.44	0.48	0.44	36.9
11	T1	245	0.0	245	0.0	0.314	3.1	LOS A	0.8	5.8	0.44	0.48	0.44	27.9
12u	U	62	0.0	62	0.0	0.314	7.9	LOS A	0.8	5.8	0.44	0.48	0.44	27.9
Approach		365	0.3	365	0.3	0.314	4.0	LOS A	0.8	5.8	0.44	0.48	0.44	31.7
All Vehicles		1201	1.2	1201	1.2	0.492	4.6	LOS A	1.5	10.9	0.51	0.54	0.51	35.2

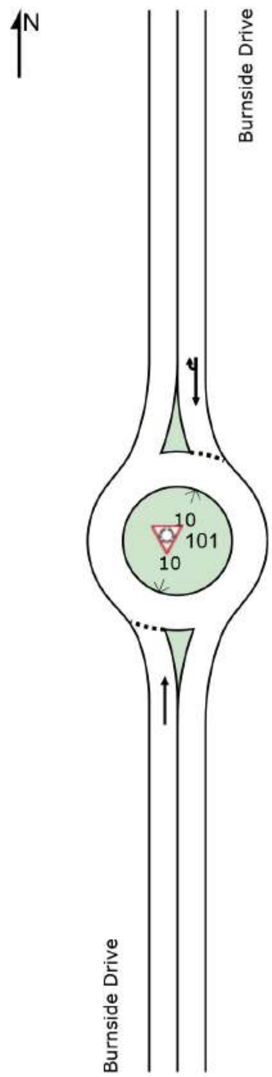
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2023 DEVELOPMENT PM MITI]

Network: 17 [2023 DEVELOPMENT PM MITI]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	361	0.0	361	0.0	0.324	6.0	LOS A	0.8	5.4	0.43	0.56	0.43	49.2
Approach		361	0.0	361	0.0	0.324	6.0	LOS A	0.8	5.4	0.43	0.56	0.43	49.2
North: Burnside Drive														
8	T1	157	0.0	157	0.0	0.211	4.7	LOS A	0.0	0.0	0.00	0.65	0.00	51.7
9u	U	201	0.0	201	0.0	0.211	9.5	LOS A	0.0	0.0	0.00	0.65	0.00	44.1
Approach		358	0.0	358	0.0	0.211	7.4	LOS A	0.0	0.0	0.00	0.65	0.00	48.8
All Vehicles		719	0.0	719	0.0	0.324	6.7	LOS A	0.8	5.4	0.22	0.61	0.22	49.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2033 Development

Template: Default Site User Report

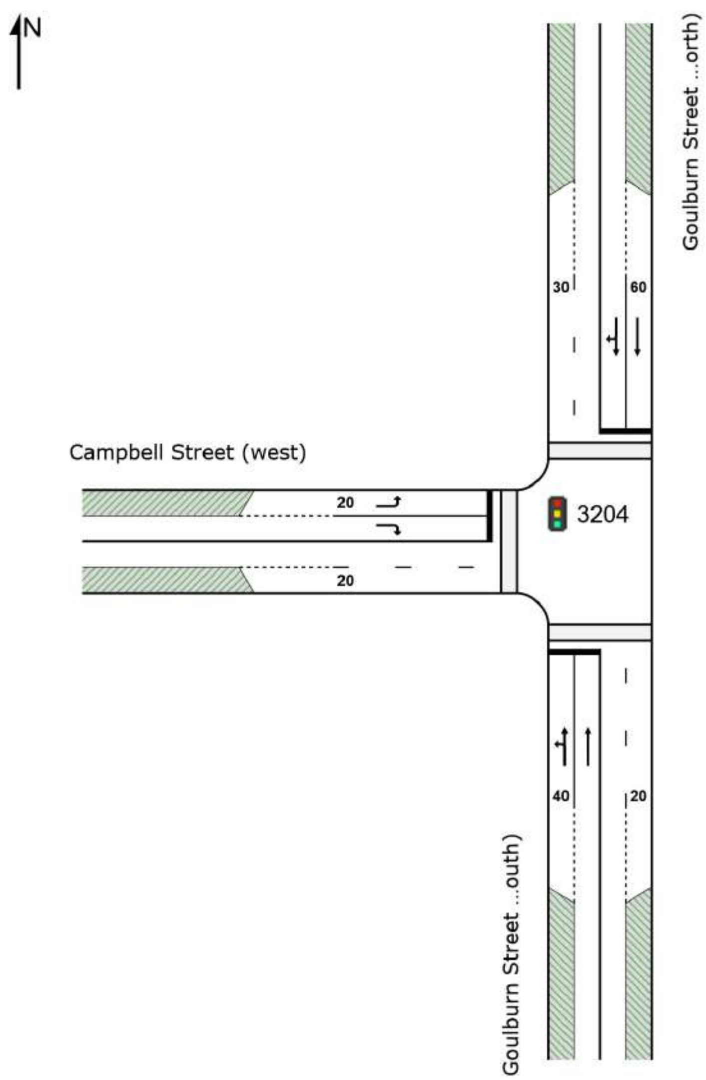
Site: 3204 [Goulburn Street/ Campbell Street - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

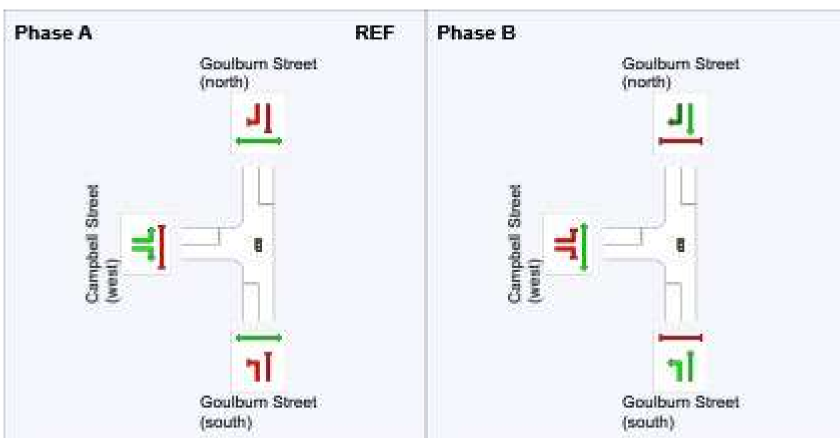


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	71	2.2	71	2.2	0.066	9.2	LOS A	0.5	3.9	0.45	0.60	0.45	31.7
2	T1	167	2.0	167	2.0	0.145	5.6	LOS A	1.3	9.3	0.46	0.38	0.46	32.4
Approach		238	2.1	238	2.1	0.145	6.7	LOS A	1.3	9.3	0.46	0.45	0.46	32.1
North: Goulburn Street (north)														
8	T1	187	6.0	187	6.0	0.182	5.7	LOS A	1.4	10.6	0.46	0.42	0.46	35.2
9	R2	36	5.4	36	5.4	0.182	9.3	LOS A	1.4	10.6	0.48	0.45	0.48	33.6
Approach		223	5.9	223	5.9	0.182	6.3	LOS A	1.4	10.6	0.47	0.42	0.47	35.0
West: Campbell Street (west)														
10	L2	51	4.0	51	4.0	0.187	28.7	LOS C	0.8	6.0	0.91	0.72	0.91	11.3
12	R2	34	3.8	34	3.8	0.102	26.2	LOS B	0.5	3.8	0.86	0.70	0.86	22.7
Approach		84	3.9	84	3.9	0.187	27.7	LOS B	0.8	6.0	0.89	0.71	0.89	17.0
All Vehicles		545	3.9	545	3.9	0.187	9.8	LOS A	1.4	10.6	0.53	0.48	0.53	30.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	**A**	**B**
Phase Change Time (sec)	0	18
Green Time (sec)	12	36
Phase Time (sec)	18	42
Phase Split	30%	70%

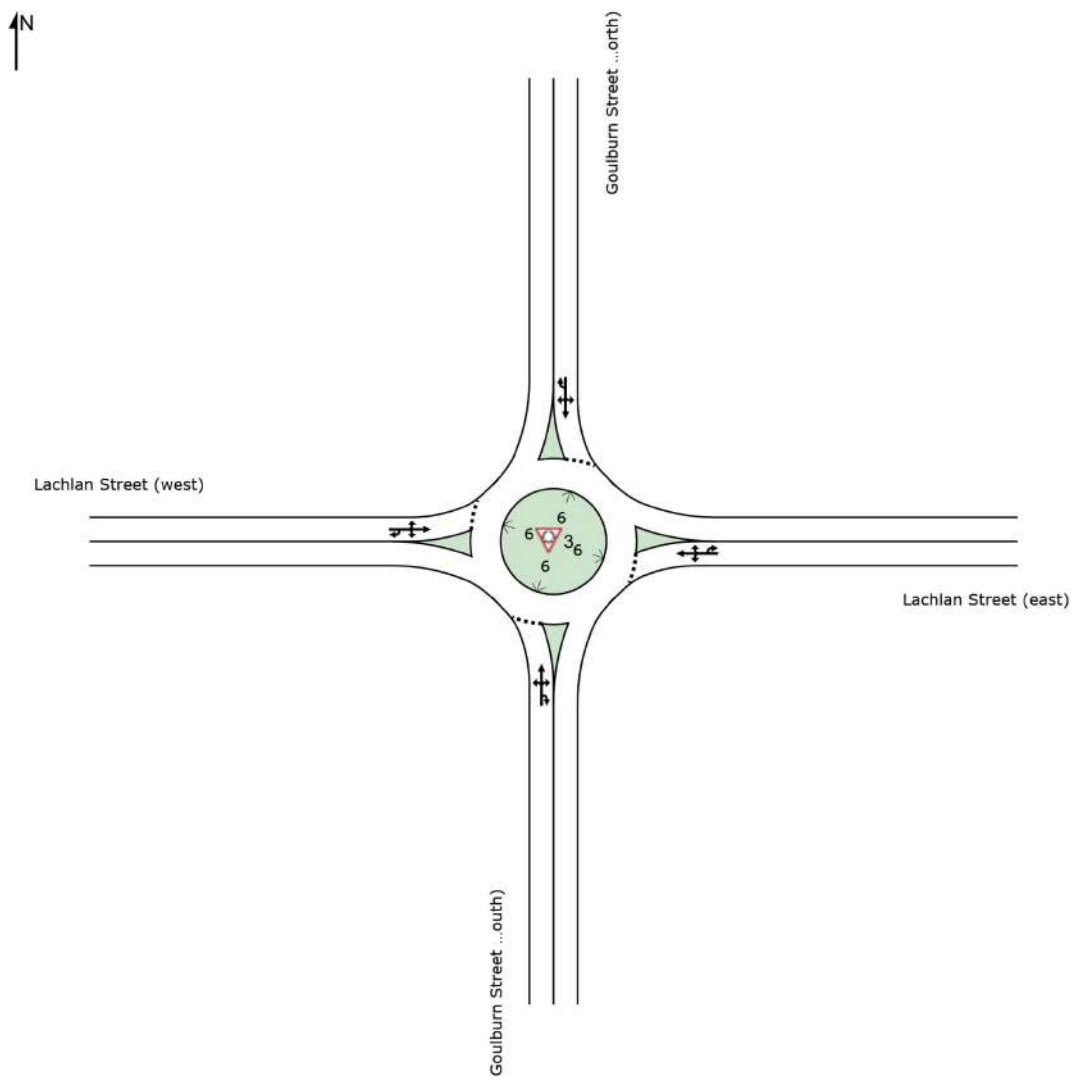
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	76	4.4	76	4.4	0.263	5.9	LOS A	0.6	4.0	0.53	0.69	0.53	35.9
2	T1	1	0.0	1	0.0	0.263	5.2	LOS A	0.6	4.0	0.53	0.69	0.53	36.5
3	R2	137	3.8	137	3.8	0.263	8.2	LOS A	0.6	4.0	0.53	0.69	0.53	30.3
3u	U	13	0.0	13	0.0	0.263	9.3	LOS A	0.6	4.0	0.53	0.69	0.53	30.3
Approach		226	3.7	226	3.7	0.263	7.5	LOS A	0.6	4.0	0.53	0.69	0.53	33.5
East: Lachlan Street (east)														
4	L2	109	0.0	109	0.0	0.402	3.9	LOS A	1.2	8.6	0.41	0.45	0.41	27.9
5	T1	369	0.8	369	0.8	0.402	3.3	LOS A	1.2	8.6	0.41	0.45	0.41	37.5
6	R2	14	0.0	14	0.0	0.402	6.2	LOS A	1.2	8.6	0.41	0.45	0.41	37.4
6u	U	3	0.0	3	0.0	0.402	7.4	LOS A	1.2	8.6	0.41	0.45	0.41	27.9
Approach		496	0.6	496	0.6	0.402	3.6	LOS A	1.2	8.6	0.41	0.45	0.41	36.9
North: Goulburn Street (north)														
7	L2	12	0.0	12	0.0	0.191	18.1	LOS B	0.6	4.1	1.00	0.96	1.00	28.4
8	T1	16	1.8	16	1.8	0.191	17.7	LOS B	0.6	4.1	1.00	0.96	1.00	28.4
9	R2	18	5.9	18	5.9	0.191	20.9	LOS B	0.6	4.1	1.00	0.96	1.00	33.3
9u	U	2	0.0	2	0.0	0.191	21.6	LOS B	0.6	4.1	1.00	0.96	1.00	33.6
Approach		47	2.8	47	2.8	0.191	19.2	LOS B	0.6	4.1	1.00	0.96	1.00	31.1
West: Lachlan Street (west)														
10	L2	22	14.3	22	14.3	0.911	11.5	LOS A	9.6	71.2	1.00	0.80	1.20	35.6
11	T1	975	7.5	975	7.5	0.911	10.6	LOS A	9.6	71.2	1.00	0.80	1.20	32.5
12	R2	62	3.6	62	3.6	0.911	13.3	LOS A	9.6	71.2	1.00	0.80	1.20	32.5
12u	U	5	0.0	5	0.0	0.911	14.4	LOS A	9.6	71.2	1.00	0.80	1.20	36.4
Approach		1064	7.4	1064	7.4	0.911	10.8	LOS A	9.6	71.2	1.00	0.80	1.20	32.6
All Vehicles		1834	5.0	1834	5.0	0.911	8.6	LOS A	9.6	71.2	0.78	0.70	0.90	33.7

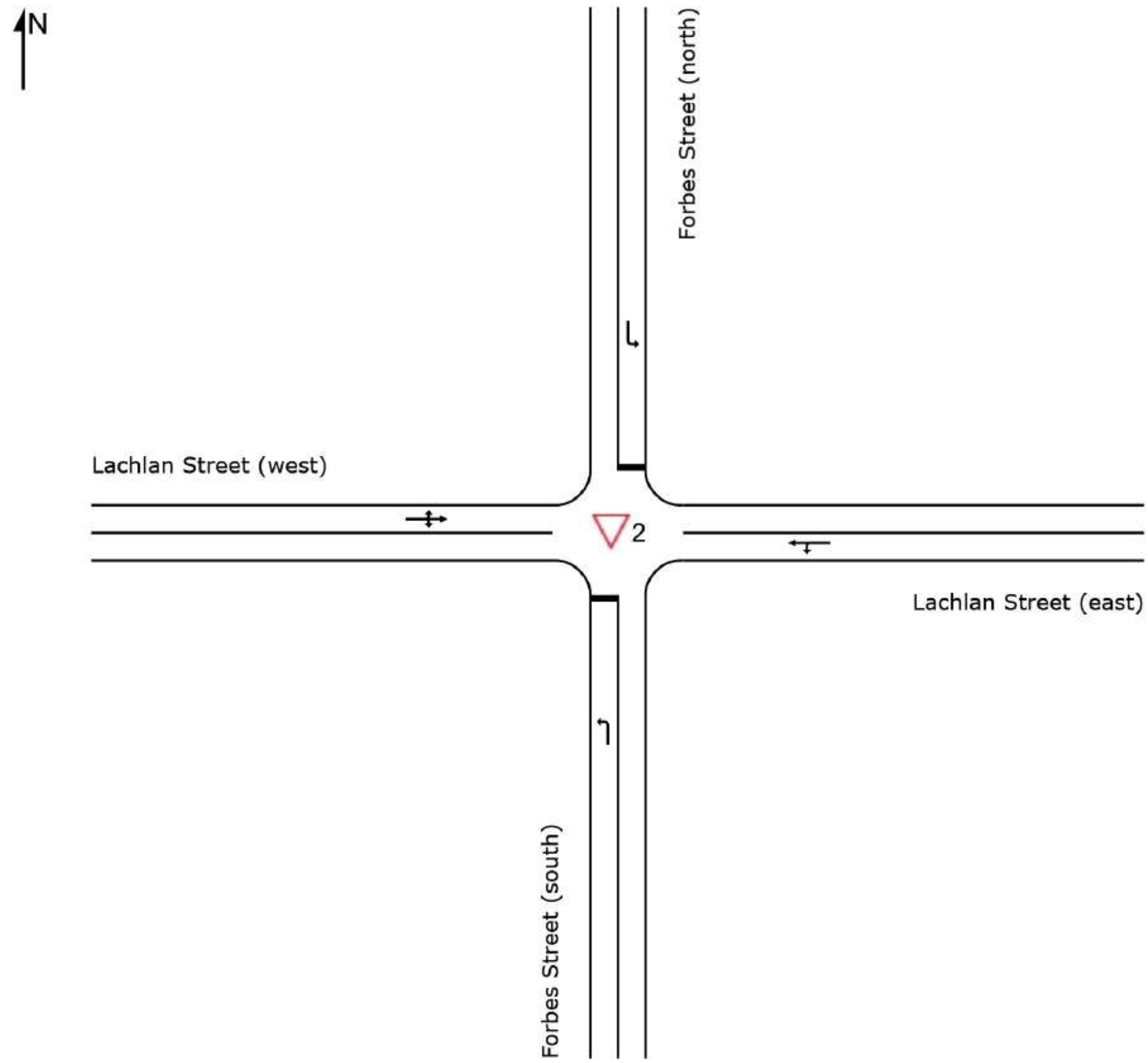
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	2	0.0	2	0.0	0.002	8.8	LOS A	0.0	0.0	0.48	0.80	0.48	30.1
Approach		2	0.0	2	0.0	0.002	8.8	LOS A	0.0	0.0	0.48	0.80	0.48	30.1
East: Lachlan Street (east)														
4	L2	20	1.9	20	1.9	0.268	3.4	LOS A	0.0	0.0	0.00	0.02	0.00	40.2
5	T1	497	1.1	497	1.1	0.268	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.5
Approach		517	1.2	517	1.2	0.268	0.1	NA	0.0	0.0	0.00	0.02	0.00	39.6
North: Forbes Street (north)														
7	L2	16	13.3	16	13.3	0.041	15.3	LOS B	0.1	0.4	0.74	1.01	0.74	31.1
Approach		16	13.3	16	13.3	0.041	15.3	LOS B	0.1	0.4	0.74	1.01	0.74	31.1
West: Lachlan Street (west)														
10	L2	43	0.0	43	0.0	0.682	10.3	LOS A	2.6	18.9	0.45	0.12	0.77	37.4
11	T1	924	0.0	924	0.0	0.682	2.7	LOS A	2.6	18.9	0.45	0.12	0.77	28.3
12	R2	160	21.7	160	21.7	0.682	11.2	LOS A	2.6	18.9	0.45	0.12	0.77	34.9
Approach		1127	3.1	1127	3.1	0.682	4.2	NA	2.6	18.9	0.45	0.12	0.77	31.2
All Vehicles		1662	2.6	1662	2.6	0.682	3.0	NA	2.6	18.9	0.31	0.10	0.53	33.0

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

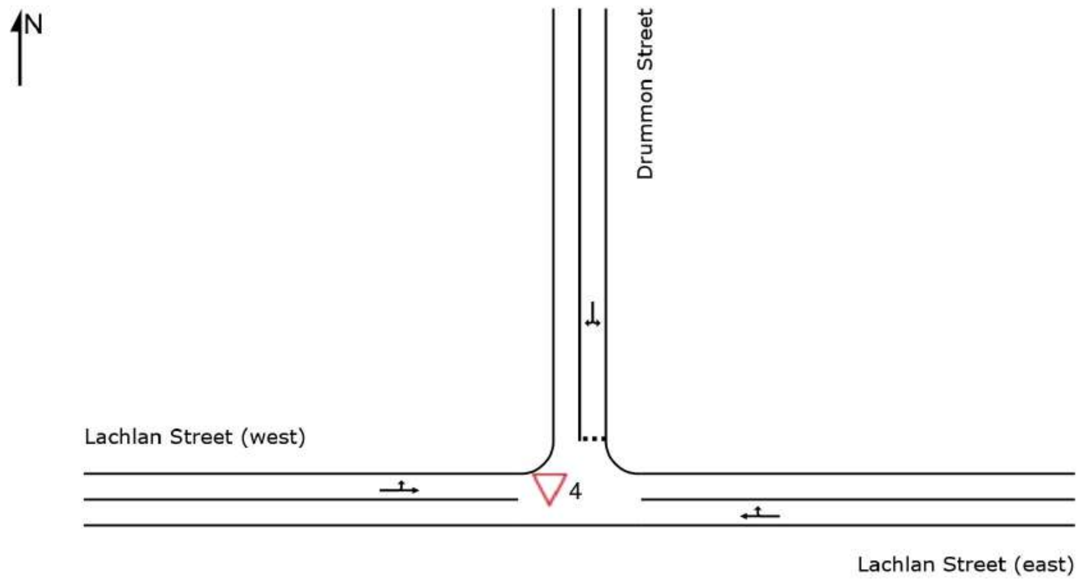
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	428	2.5	428	2.5	0.293	2.1	LOS A	0.5	3.5	0.24	0.04	0.30	31.1
6	R2	33	7.7	33	7.7	0.293	13.5	LOS A	0.5	3.5	0.24	0.04	0.30	37.7
Approach		461	2.9	461	2.9	0.293	2.9	NA	0.5	3.5	0.24	0.04	0.30	32.8
North: Drummon Street														
7	L2	62	0.0	62	0.0	0.524	13.4	LOS A	0.8	5.9	0.87	1.08	1.29	27.7
9	R2	87	0.0	87	0.0	0.524	25.5	LOS B	0.8	5.9	0.87	1.08	1.29	27.7
Approach		149	0.0	149	0.0	0.524	20.5	LOS B	0.8	5.9	0.87	1.08	1.29	27.7
West: Lachlan Street (west)														
10	L2	89	0.0	89	0.0	0.494	3.4	LOS A	0.0	0.0	0.00	0.04	0.00	39.9
11	T1	863	0.9	863	0.9	0.494	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	38.8
Approach		953	0.8	953	0.8	0.494	0.3	NA	0.0	0.0	0.00	0.04	0.00	39.2
All Vehicles		1563	1.4	1563	1.4	0.524	3.0	NA	0.8	5.9	0.16	0.14	0.21	34.1

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

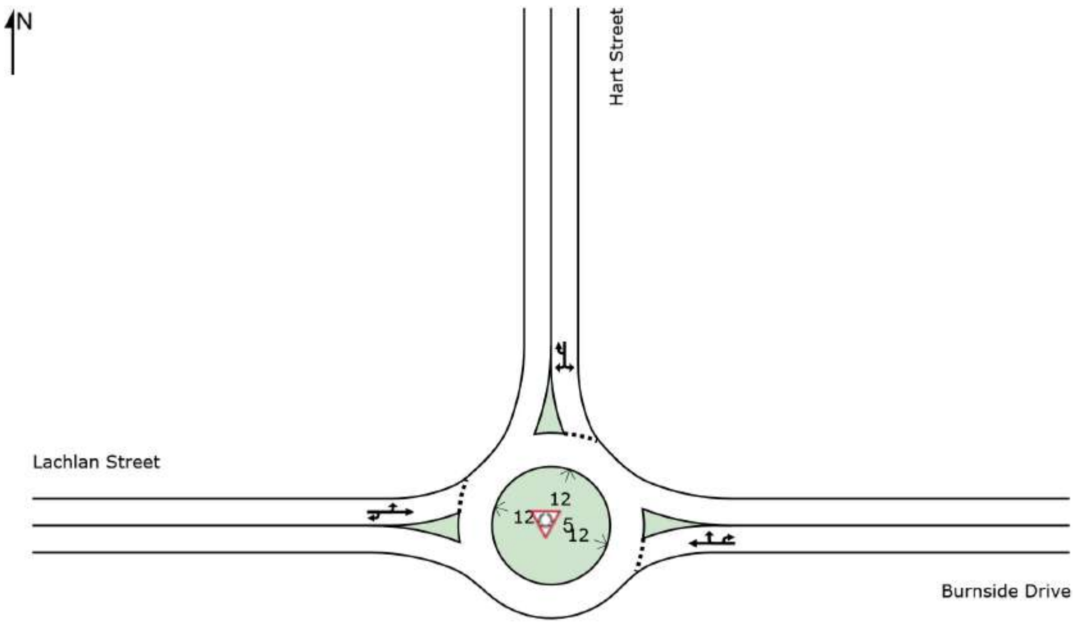
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	287	2.9	287	2.9	0.315	3.2	LOS A	0.8	6.0	0.46	0.48	0.46	34.4
6	R2	65	0.0	65	0.0	0.315	6.6	LOS A	0.8	6.0	0.46	0.48	0.46	38.5
6u	U	1	0.0	1	0.0	0.315	8.0	LOS A	0.8	6.0	0.46	0.48	0.46	34.4
Approach		354	2.4	354	2.4	0.315	3.9	LOS A	0.8	6.0	0.46	0.48	0.46	35.8
North: Hart Street														
7	L2	537	0.6	537	0.6	0.957	46.1	LOS D	10.9	76.7	1.00	2.20	3.21	19.9
9	R2	102	0.0	102	0.0	0.957	49.2	LOS D	10.9	76.7	1.00	2.20	3.21	19.9
9u	U	6	0.0	6	0.0	0.957	50.6	LOS D	10.9	76.7	1.00	2.20	3.21	27.1
Approach		645	0.5	645	0.5	0.957	46.6	LOS D	10.9	76.7	1.00	2.20	3.21	20.0
West: Lachlan Street														
10	L2	98	1.6	98	1.6	0.595	2.9	LOS A	2.4	16.9	0.39	0.39	0.39	37.2
11	T1	669	0.0	669	0.0	0.595	2.7	LOS A	2.4	16.9	0.39	0.39	0.39	28.7
12u	U	73	0.0	73	0.0	0.595	7.5	LOS A	2.4	16.9	0.39	0.39	0.39	28.7
Approach		840	0.2	840	0.2	0.595	3.1	LOS A	2.4	16.9	0.39	0.39	0.39	31.6
All Vehicles		1839	0.7	1839	0.7	0.957	18.5	LOS B	10.9	76.7	0.62	1.04	1.40	24.8

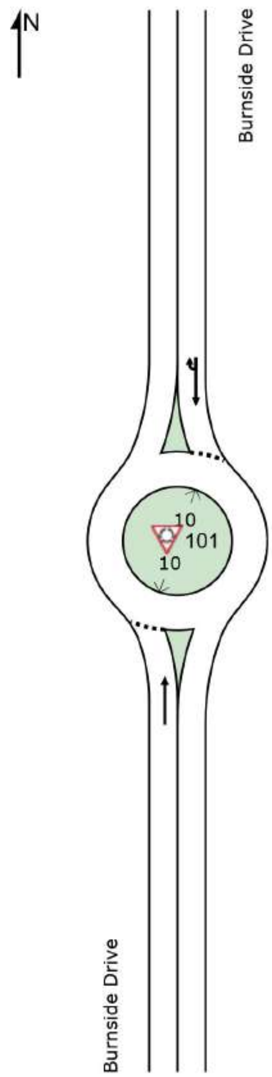
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2033 DEVELOPMENT AM]

Network: 15 [2033 DEVELOPMENT AM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	91	0.0	91	0.0	0.088	6.1	LOS A	0.2	1.2	0.41	0.55	0.41	49.4
Approach		91	0.0	91	0.0	0.088	6.1	LOS A	0.2	1.2	0.41	0.55	0.41	49.4
North: Burnside Drive														
8	T1	925	0.0	925	0.0	0.702	4.7	LOS A	0.0	0.0	0.00	0.56	0.00	53.1
9u	U	262	0.0	262	0.0	0.702	9.5	LOS A	0.0	0.0	0.00	0.56	0.00	46.6
Approach		1187	0.0	1187	0.0	0.702	5.7	LOS A	0.0	0.0	0.00	0.56	0.00	52.4
All Vehicles		1278	0.0	1278	0.0	0.702	5.8	LOS A	0.2	1.2	0.03	0.56	0.03	52.2

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2033 Development — **Template: Default Site User Report**

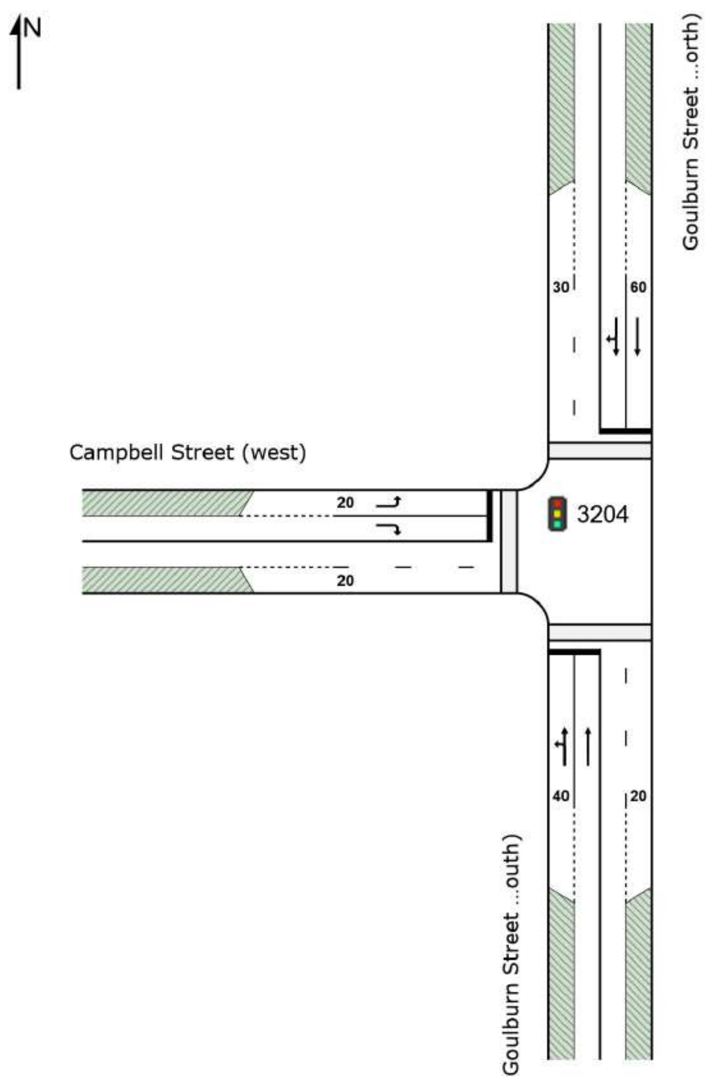
Site: 3204 [Goulburn Street/ Campbell Street - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

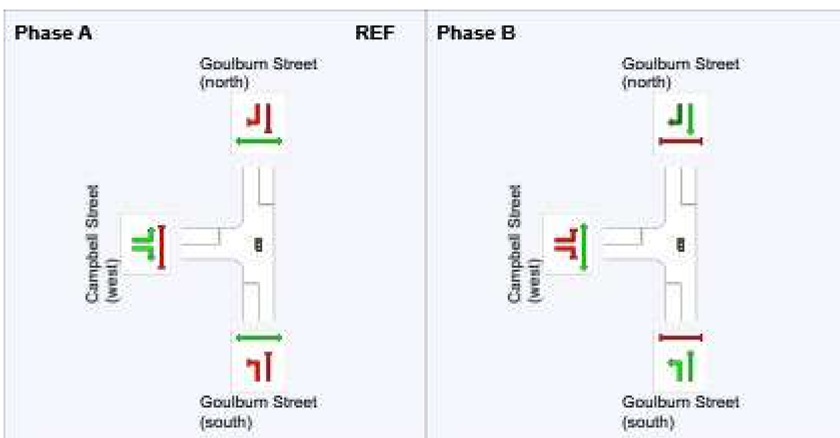


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	33	0.0	33	0.0	0.038	11.0	LOS A	0.3	2.2	0.51	0.59	0.51	30.6
2	T1	160	3.9	160	3.9	0.154	7.7	LOS A	1.4	10.3	0.54	0.44	0.54	30.3
Approach		193	3.3	193	3.3	0.154	8.2	LOS A	1.4	10.3	0.53	0.47	0.53	30.3
North: Goulburn Street (north)														
8	T1	194	5.6	194	5.6	0.197	7.7	LOS A	1.7	12.3	0.54	0.47	0.54	33.9
9	R2	27	3.8	27	3.8	0.197	11.3	LOS A	1.7	12.3	0.55	0.49	0.55	32.1
Approach		221	5.4	221	5.4	0.197	8.2	LOS A	1.7	12.3	0.54	0.47	0.54	33.8
West: Campbell Street (west)														
10	L2	26	8.0	26	8.0	0.069	24.1	LOS B	0.4	2.9	0.82	0.68	0.82	12.8
12	R2	33	0.0	33	0.0	0.088	25.1	LOS B	0.5	3.4	0.84	0.69	0.84	23.1
Approach		59	3.6	59	3.6	0.088	24.6	LOS B	0.5	3.4	0.84	0.68	0.84	19.7
All Vehicles		473	4.3	473	4.3	0.197	10.3	LOS A	1.7	12.3	0.57	0.50	0.57	30.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	22
Green Time (sec)	16	32
Phase Time (sec)	22	38
Phase Split	37%	63%

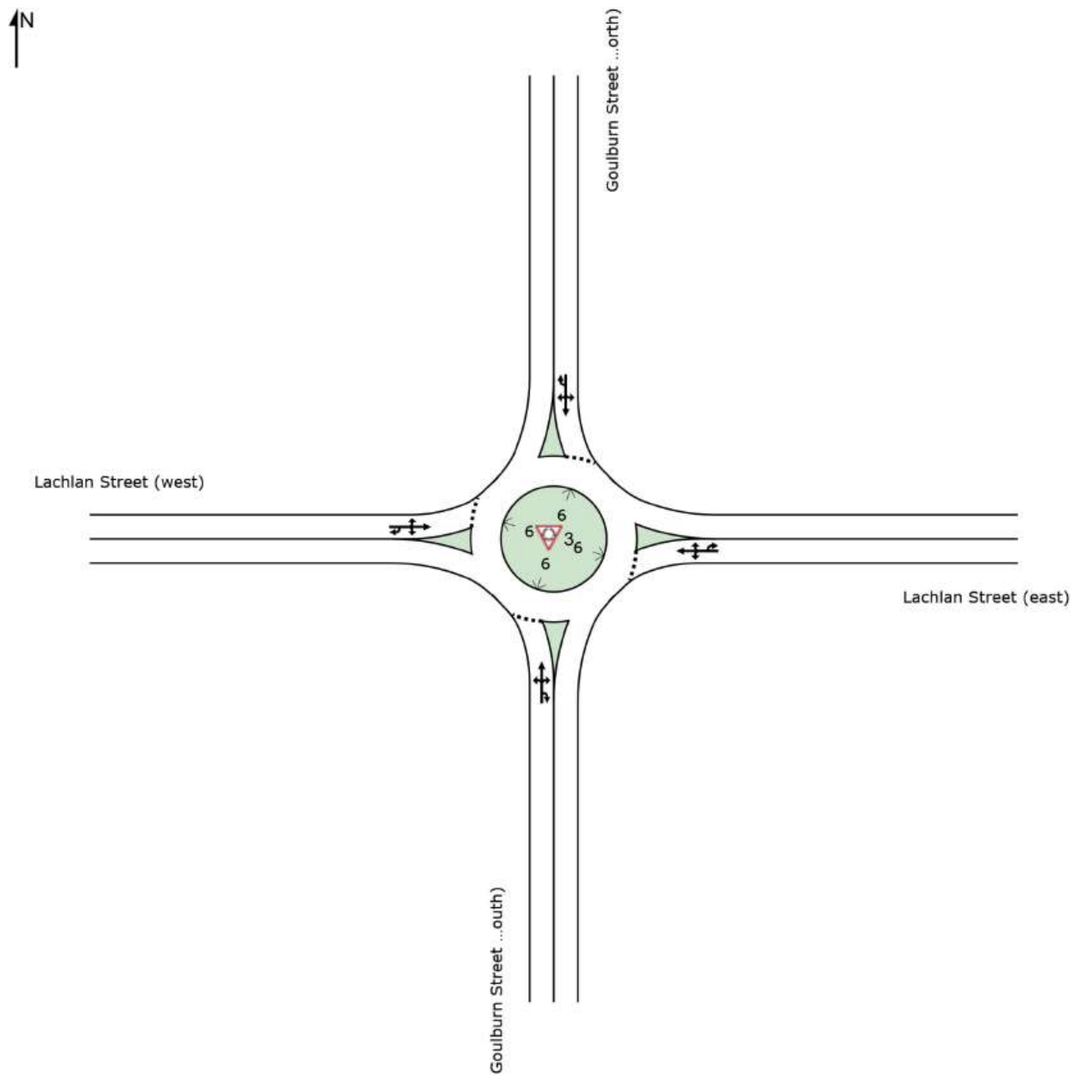
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	79	2.7	79	2.7	0.267	7.3	LOS A	0.6	4.2	0.61	0.75	0.61	35.4
2	T1	8	10.3	8	10.3	0.267	6.9	LOS A	0.6	4.2	0.61	0.75	0.61	35.9
3	R2	97	4.8	97	4.8	0.267	9.6	LOS A	0.6	4.2	0.61	0.75	0.61	29.2
3u	U	9	11.1	9	11.1	0.267	11.1	LOS A	0.6	4.2	0.61	0.75	0.61	29.2
Approach		194	4.5	194	4.5	0.267	8.6	LOS A	0.6	4.2	0.61	0.75	0.61	33.4
East: Lachlan Street (east)														
4	L2	125	0.0	125	0.0	0.539	4.2	LOS A	1.8	12.8	0.47	0.48	0.47	27.4
5	T1	518	0.8	518	0.8	0.539	3.6	LOS A	1.8	12.8	0.47	0.48	0.47	37.3
6	R2	21	6.3	21	6.3	0.539	6.6	LOS A	1.8	12.8	0.47	0.48	0.47	37.2
6u	U	6	0.0	6	0.0	0.539	7.7	LOS A	1.8	12.8	0.47	0.48	0.47	27.4
Approach		671	0.8	671	0.8	0.539	3.9	LOS A	1.8	12.8	0.47	0.48	0.47	36.8
North: Goulburn Street (north)														
7	L2	16	10.5	16	10.5	0.100	7.8	LOS A	0.2	1.7	0.70	0.73	0.70	33.9
8	T1	19	1.8	19	1.8	0.100	6.9	LOS A	0.2	1.7	0.70	0.73	0.70	33.9
9	R2	32	3.3	32	3.3	0.100	9.8	LOS A	0.2	1.7	0.70	0.73	0.70	36.9
9u	U	1	0.0	1	0.0	0.100	10.9	LOS A	0.2	1.7	0.70	0.73	0.70	37.2
Approach		67	4.5	67	4.5	0.100	8.5	LOS A	0.2	1.7	0.70	0.73	0.70	35.8
West: Lachlan Street (west)														
10	L2	23	0.0	23	0.0	0.485	4.2	LOS A	1.6	12.3	0.50	0.50	0.50	37.8
11	T1	462	11.5	462	11.5	0.485	3.8	LOS A	1.6	12.3	0.50	0.50	0.50	36.1
12	R2	55	13.7	55	13.7	0.485	6.7	LOS A	1.6	12.3	0.50	0.50	0.50	36.1
12u	U	11	0.0	11	0.0	0.485	7.7	LOS A	1.6	12.3	0.50	0.50	0.50	38.5
Approach		551	11.0	551	11.0	0.485	4.2	LOS A	1.6	12.3	0.50	0.50	0.50	36.3
All Vehicles		1482	5.2	1482	5.2	0.539	4.8	LOS A	1.8	12.8	0.51	0.54	0.51	36.1

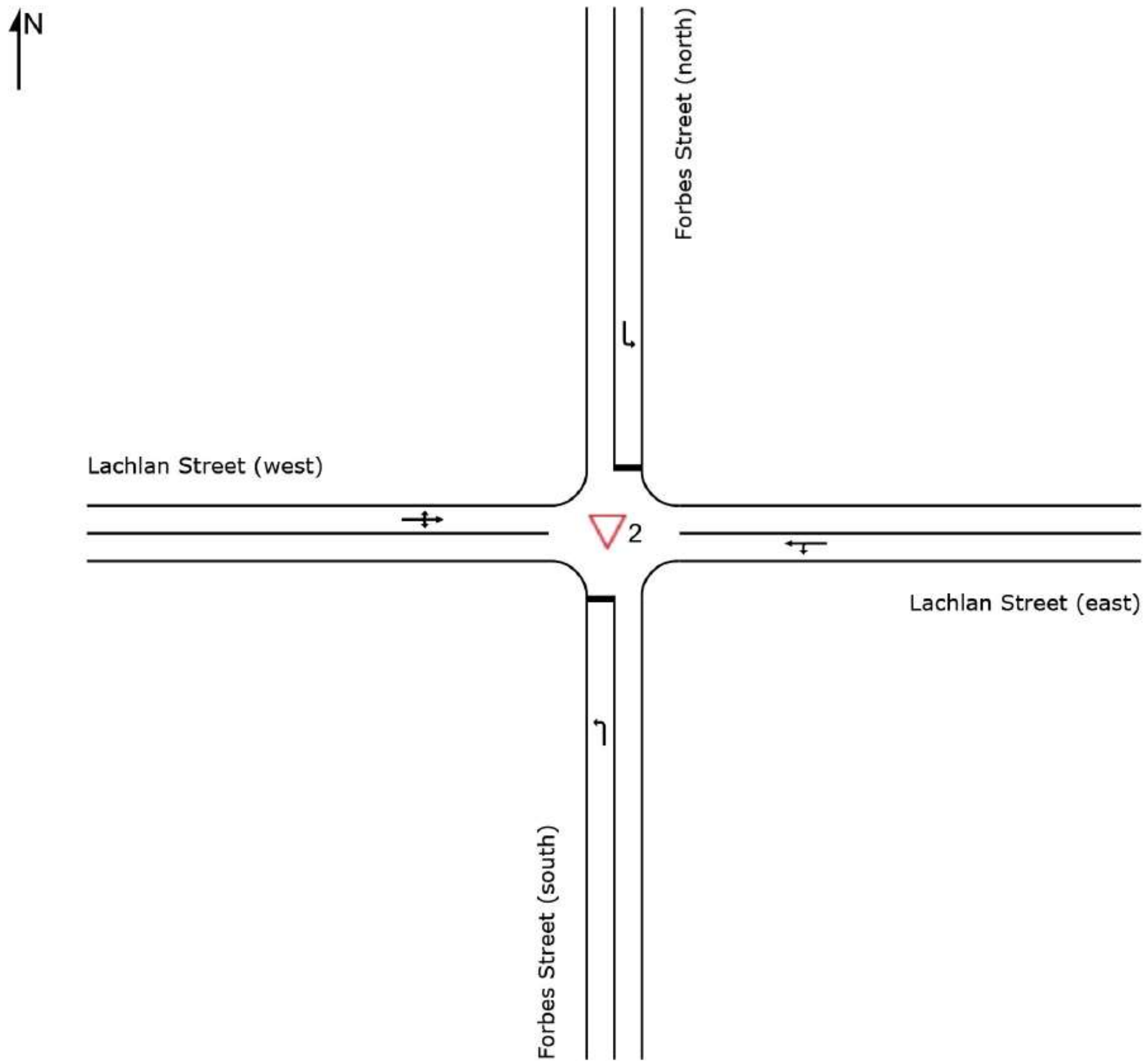
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	6	0.0	6	0.0	0.009	10.1	LOS A	0.0	0.1	0.55	0.87	0.55	29.1
Approach		6	0.0	6	0.0	0.009	10.1	LOS A	0.0	0.1	0.55	0.87	0.55	29.1
East: Lachlan Street (east)														
4	L2	7	0.0	7	0.0	0.342	3.4	LOS A	0.0	0.0	0.00	0.01	0.00	40.3
5	T1	654	1.4	654	1.4	0.342	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	39.8
Approach		661	1.3	661	1.3	0.342	0.0	NA	0.0	0.0	0.00	0.01	0.00	39.8
North: Forbes Street (north)														
7	L2	9	0.0	9	0.0	0.011	8.9	LOS A	0.0	0.1	0.48	0.85	0.48	34.2
Approach		9	0.0	9	0.0	0.011	8.9	LOS A	0.0	0.1	0.48	0.85	0.48	34.2
West: Lachlan Street (west)														
10	L2	42	0.0	42	0.0	0.366	8.8	LOS A	0.7	5.5	0.28	0.08	0.37	38.2
11	T1	486	3.8	486	3.8	0.366	1.7	LOS A	0.7	5.5	0.28	0.08	0.37	31.0
12	R2	55	36.4	55	36.4	0.366	10.4	LOS A	0.7	5.5	0.28	0.08	0.37	35.9
Approach		583	6.5	583	6.5	0.366	3.0	NA	0.7	5.5	0.28	0.08	0.37	33.6
All Vehicles		1260	3.7	1260	3.7	0.366	1.5	NA	0.7	5.5	0.14	0.05	0.18	36.0

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

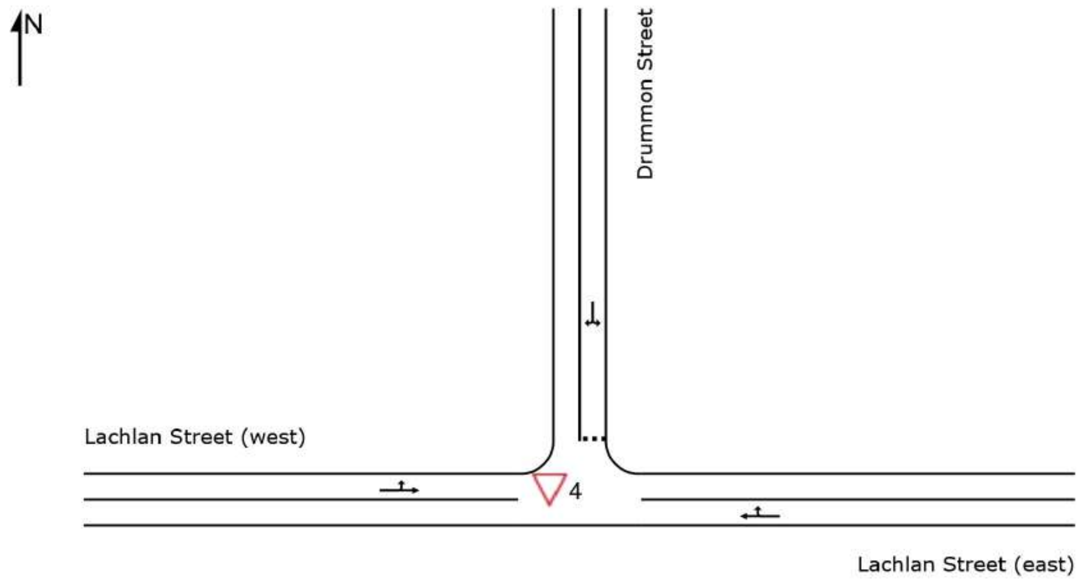
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	620	0.7	620	0.7	0.415	1.0	LOS A	0.7	5.0	0.25	0.09	0.32	33.8
6	R2	101	0.0	101	0.0	0.415	7.0	LOS A	0.7	5.0	0.25	0.09	0.32	38.4
Approach		721	0.6	721	0.6	0.415	1.8	NA	0.7	5.0	0.25	0.09	0.32	35.8
North: Drummon Street														
7	L2	15	7.1	15	7.1	0.211	5.4	LOS A	0.3	2.0	0.73	0.86	0.77	31.3
9	R2	60	3.0	60	3.0	0.211	14.6	LOS B	0.3	2.0	0.73	0.86	0.77	31.3
Approach		75	3.8	75	3.8	0.211	12.8	LOS A	0.3	2.0	0.73	0.86	0.77	31.3
West: Lachlan Street (west)														
10	L2	87	1.7	87	1.7	0.261	3.4	LOS A	0.0	0.0	0.00	0.08	0.00	39.8
11	T1	404	4.8	404	4.8	0.261	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	37.8
Approach		492	4.2	492	4.2	0.261	0.6	NA	0.0	0.0	0.00	0.08	0.00	38.8
All Vehicles		1287	2.2	1287	2.2	0.415	2.0	NA	0.7	5.0	0.18	0.13	0.22	36.2

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

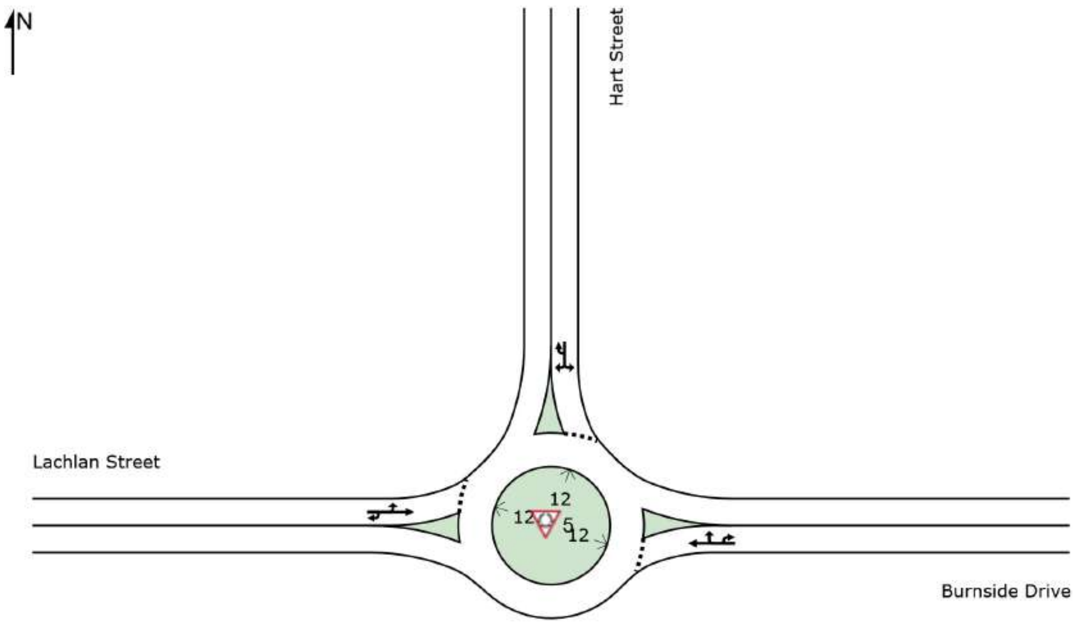
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Burnside Drive														
5	T1	499	0.0	499	0.0	0.561	3.6	LOS A	1.9	13.4	0.58	0.54	0.58	33.8
6	R2	161	0.0	161	0.0	0.561	7.1	LOS A	1.9	13.4	0.58	0.54	0.58	38.1
6u	U	1	0.0	1	0.0	0.561	8.4	LOS A	1.9	13.4	0.58	0.54	0.58	33.8
Approach		661	0.0	661	0.0	0.561	4.5	LOS A	1.9	13.4	0.58	0.54	0.58	35.6
North: Hart Street														
7	L2	143	0.0	143	0.0	0.287	4.6	LOS A	0.7	5.1	0.59	0.66	0.59	35.3
9	R2	112	1.6	112	1.6	0.287	7.8	LOS A	0.7	5.1	0.59	0.66	0.59	35.3
9u	U	17	0.0	17	0.0	0.287	9.1	LOS A	0.7	5.1	0.59	0.66	0.59	38.7
Approach		272	0.6	272	0.6	0.287	6.2	LOS A	0.7	5.1	0.59	0.66	0.59	35.7
West: Lachlan Street														
10	L2	58	10.0	58	10.0	0.365	3.6	LOS A	1.0	7.2	0.47	0.49	0.47	36.8
11	T1	299	0.0	299	0.0	0.365	3.2	LOS A	1.0	7.2	0.47	0.49	0.47	27.8
12u	U	62	0.0	62	0.0	0.365	8.0	LOS A	1.0	7.2	0.47	0.49	0.47	27.8
Approach		419	1.4	419	1.4	0.365	4.0	LOS A	1.0	7.2	0.47	0.49	0.47	31.2
All Vehicles		1352	0.6	1352	0.6	0.561	4.7	LOS A	1.9	13.4	0.55	0.55	0.55	34.9

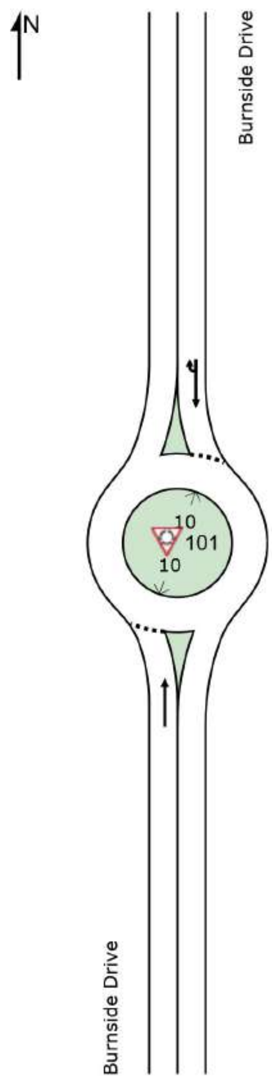
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 101 [Burnside Drive Roundabout - 2033 DEVELOPMENT PM]

Network: 11 [2033 DEVELOPMENT PM]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	361	0.0	361	0.0	0.347	6.5	LOS A	0.8	5.8	0.50	0.61	0.50	48.8
Approach		361	0.0	361	0.0	0.347	6.5	LOS A	0.8	5.8	0.50	0.61	0.50	48.8
North: Burnside Drive														
8	T1	157	0.0	157	0.0	0.248	4.7	LOS A	0.0	0.0	0.00	0.67	0.00	51.4
9u	U	262	0.0	262	0.0	0.248	9.5	LOS A	0.0	0.0	0.00	0.67	0.00	43.6
Approach		419	0.0	419	0.0	0.248	7.7	LOS A	0.0	0.0	0.00	0.67	0.00	48.0
All Vehicles		780	0.0	780	0.0	0.347	7.2	LOS A	0.8	5.8	0.23	0.64	0.23	48.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

USER REPORT FOR NETWORK SITE

Project: 210505sid-N174700 2033 Development

Template: Default Site User Report

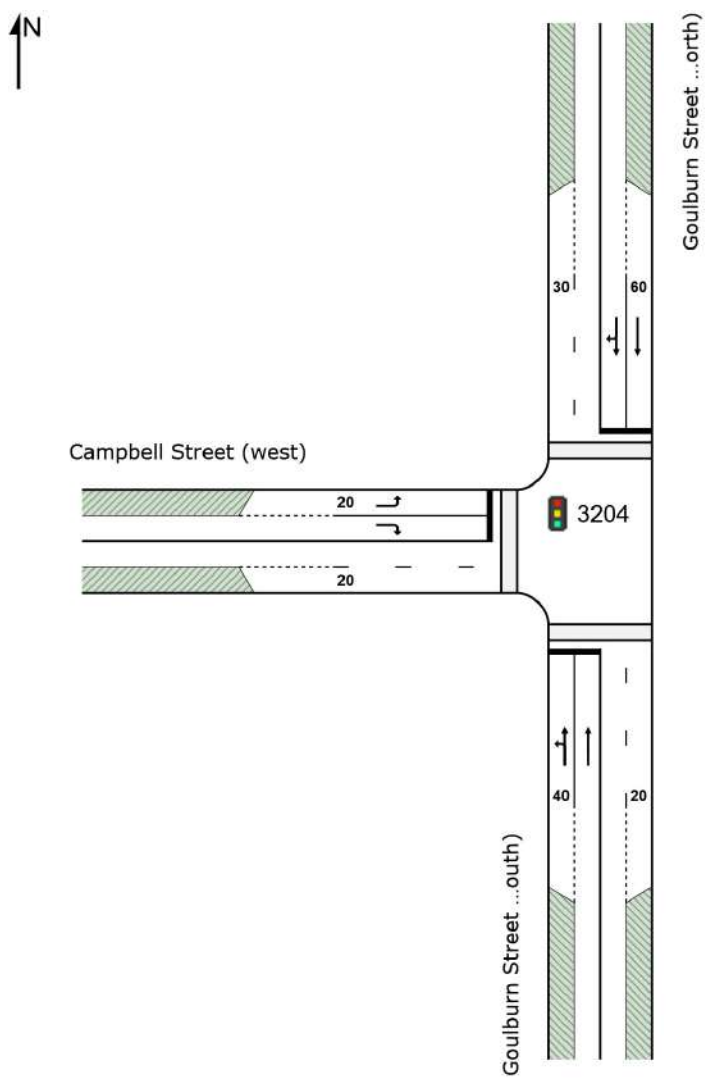
Site: 3204 [Goulburn Street/ Campbell Street - 2033 DEVELOPMENT AM]

Network: 16 [2033 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Signals - Fixed Time Isolated   Cycle Time = 60 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: VV3204_1A
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Site Layout

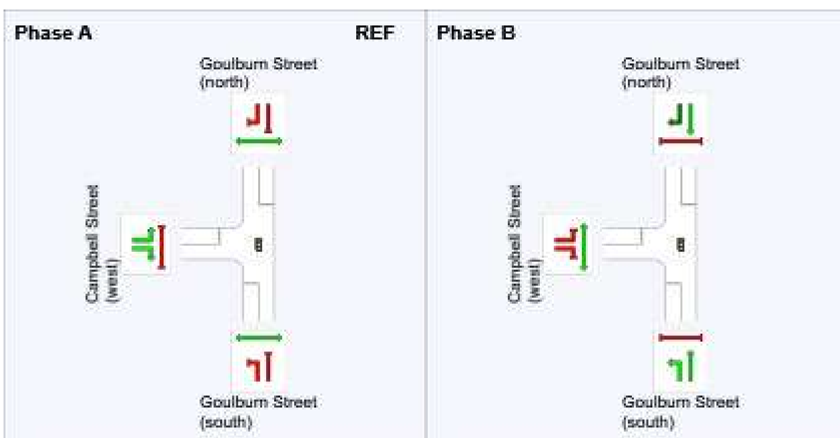


Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	71	2.2	71	2.2	0.066	9.2	LOS A	0.5	3.9	0.45	0.60	0.45	31.7
2	T1	167	2.0	167	2.0	0.145	5.6	LOS A	1.3	9.3	0.46	0.38	0.46	32.4
Approach		238	2.1	238	2.1	0.145	6.7	LOS A	1.3	9.3	0.46	0.45	0.46	32.1
North: Goulburn Street (north)														
8	T1	187	6.0	187	6.0	0.182	5.7	LOS A	1.4	10.6	0.46	0.42	0.46	35.2
9	R2	36	5.4	36	5.4	0.182	9.3	LOS A	1.4	10.6	0.48	0.45	0.48	33.6
Approach		223	5.9	223	5.9	0.182	6.3	LOS A	1.4	10.6	0.47	0.42	0.47	35.0
West: Campbell Street (west)														
10	L2	51	4.0	51	4.0	0.187	28.7	LOS C	0.8	6.0	0.91	0.72	0.91	11.3
12	R2	34	3.8	34	3.8	0.102	26.2	LOS B	0.5	3.8	0.86	0.70	0.86	22.7
Approach		84	3.9	84	3.9	0.187	27.7	LOS B	0.8	6.0	0.89	0.71	0.89	17.0
All Vehicles		545	3.9	545	3.9	0.187	9.8	LOS A	1.4	10.6	0.53	0.48	0.53	30.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

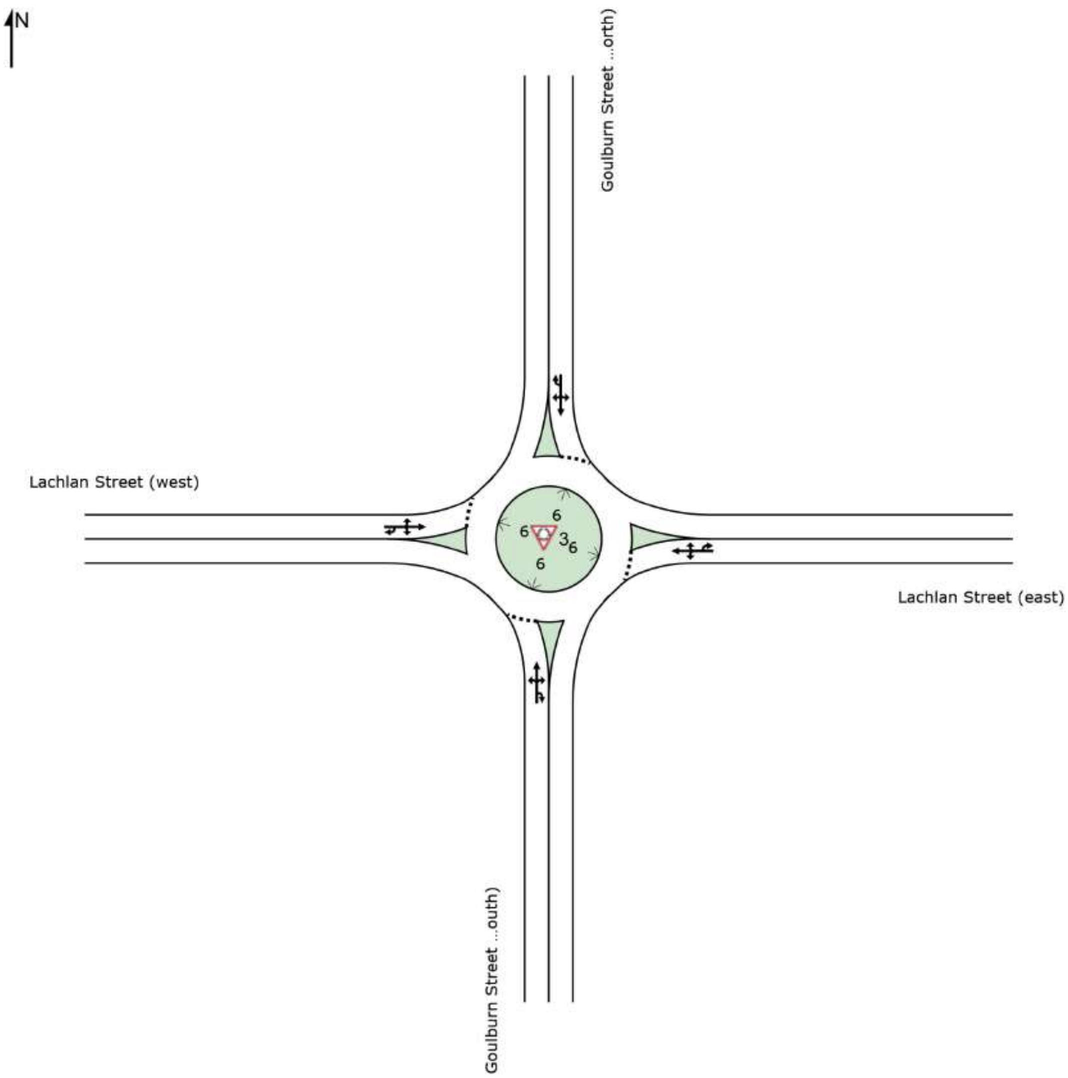
Phase	**A**	**B**
Phase Change Time (sec)	0	18
Green Time (sec)	12	36
Phase Time (sec)	18	42
Phase Split	30%	70%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 3 [Lachlan Street/ Goulburn Street - 2033 DEVELOPMENT AM]   Network: 16 [2033 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Goulburn Street (south)														
1	L2	76	4.4	76	4.4	0.263	5.9	LOS A	0.6	4.0	0.53	0.69	0.53	35.9
2	T1	1	0.0	1	0.0	0.263	5.2	LOS A	0.6	4.0	0.53	0.69	0.53	36.5
3	R2	137	3.8	137	3.8	0.263	8.2	LOS A	0.6	4.0	0.53	0.69	0.53	30.3
3u	U	13	0.0	13	0.0	0.263	9.3	LOS A	0.6	4.0	0.53	0.69	0.53	30.3
Approach		226	3.7	226	3.7	0.263	7.5	LOS A	0.6	4.0	0.53	0.69	0.53	33.5
East: Lachlan Street (east)														
4	L2	109	0.0	109	0.0	0.402	3.9	LOS A	1.2	8.6	0.41	0.45	0.41	27.9
5	T1	369	0.8	369	0.8	0.402	3.3	LOS A	1.2	8.6	0.41	0.45	0.41	37.5
6	R2	14	0.0	14	0.0	0.402	6.2	LOS A	1.2	8.6	0.41	0.45	0.41	37.4
6u	U	3	0.0	3	0.0	0.402	7.4	LOS A	1.2	8.6	0.41	0.45	0.41	27.9
Approach		496	0.6	496	0.6	0.402	3.6	LOS A	1.2	8.6	0.41	0.45	0.41	36.9
North: Goulburn Street (north)														
7	L2	12	0.0	12	0.0	0.191	18.1	LOS B	0.6	4.1	1.00	0.96	1.00	28.4
8	T1	16	1.8	16	1.8	0.191	17.7	LOS B	0.6	4.1	1.00	0.96	1.00	28.4
9	R2	18	5.9	18	5.9	0.191	20.9	LOS B	0.6	4.1	1.00	0.96	1.00	33.3
9u	U	2	0.0	2	0.0	0.191	21.6	LOS B	0.6	4.1	1.00	0.96	1.00	33.6
Approach		47	2.8	47	2.8	0.191	19.2	LOS B	0.6	4.1	1.00	0.96	1.00	31.1
West: Lachlan Street (west)														
10	L2	22	14.3	22	14.3	0.911	11.5	LOS A	9.6	71.2	1.00	0.80	1.20	35.6
11	T1	975	7.5	975	7.5	0.911	10.6	LOS A	9.6	71.2	1.00	0.80	1.20	32.5
12	R2	62	3.6	62	3.6	0.911	13.3	LOS A	9.6	71.2	1.00	0.80	1.20	32.5
12u	U	5	0.0	5	0.0	0.911	14.4	LOS A	9.6	71.2	1.00	0.80	1.20	36.4
Approach		1064	7.4	1064	7.4	0.911	10.8	LOS A	9.6	71.2	1.00	0.80	1.20	32.6
All Vehicles		1834	5.0	1834	5.0	0.911	8.6	LOS A	9.6	71.2	0.78	0.70	0.90	33.7

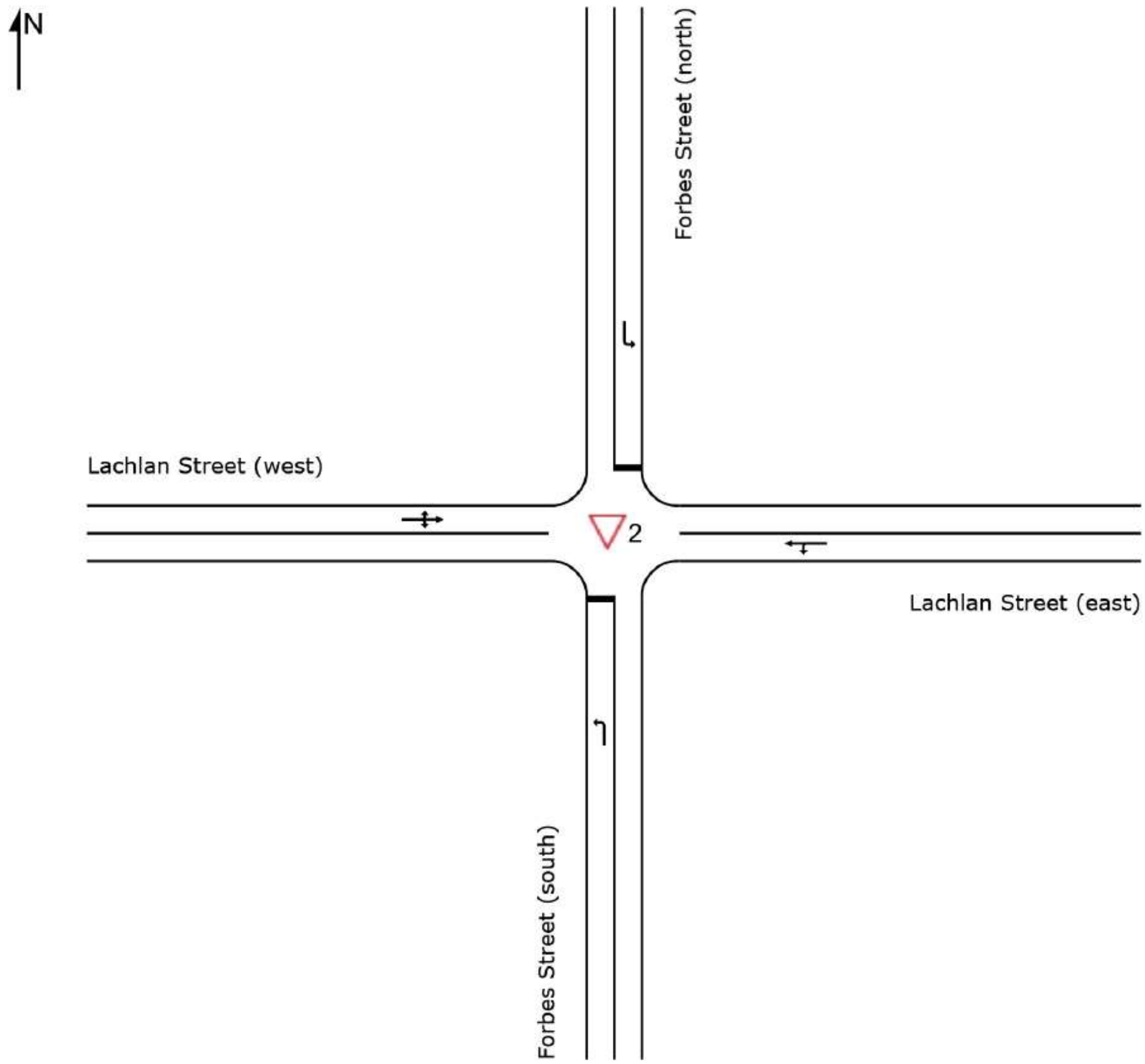
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 2 [Lachlan Street/ Forbes Street - 2033 DEVELOPMENT AM]

Network: 16 [2033 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Forbes Street (south)														
1	L2	2	0.0	2	0.0	0.002	8.8	LOS A	0.0	0.0	0.48	0.80	0.48	30.1
Approach		2	0.0	2	0.0	0.002	8.8	LOS A	0.0	0.0	0.48	0.80	0.48	30.1
East: Lachlan Street (east)														
4	L2	20	1.9	20	1.9	0.268	3.4	LOS A	0.0	0.0	0.00	0.02	0.00	40.2
5	T1	497	1.1	497	1.1	0.268	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	39.5
Approach		517	1.2	517	1.2	0.268	0.1	NA	0.0	0.0	0.00	0.02	0.00	39.6
North: Forbes Street (north)														
7	L2	16	13.3	16	13.3	0.041	15.3	LOS B	0.1	0.4	0.74	1.01	0.74	31.1
Approach		16	13.3	16	13.3	0.041	15.3	LOS B	0.1	0.4	0.74	1.01	0.74	31.1
West: Lachlan Street (west)														
10	L2	43	0.0	43	0.0	0.682	10.3	LOS A	2.6	18.9	0.45	0.12	0.77	37.4
11	T1	924	0.0	924	0.0	0.682	2.7	LOS A	2.6	18.9	0.45	0.12	0.77	28.3
12	R2	160	21.7	160	21.7	0.682	11.2	LOS A	2.6	18.9	0.45	0.12	0.77	34.9
Approach		1127	3.1	1127	3.1	0.682	4.2	NA	2.6	18.9	0.45	0.12	0.77	31.2
All Vehicles		1662	2.6	1662	2.6	0.682	3.0	NA	2.6	18.9	0.31	0.10	0.53	33.0

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

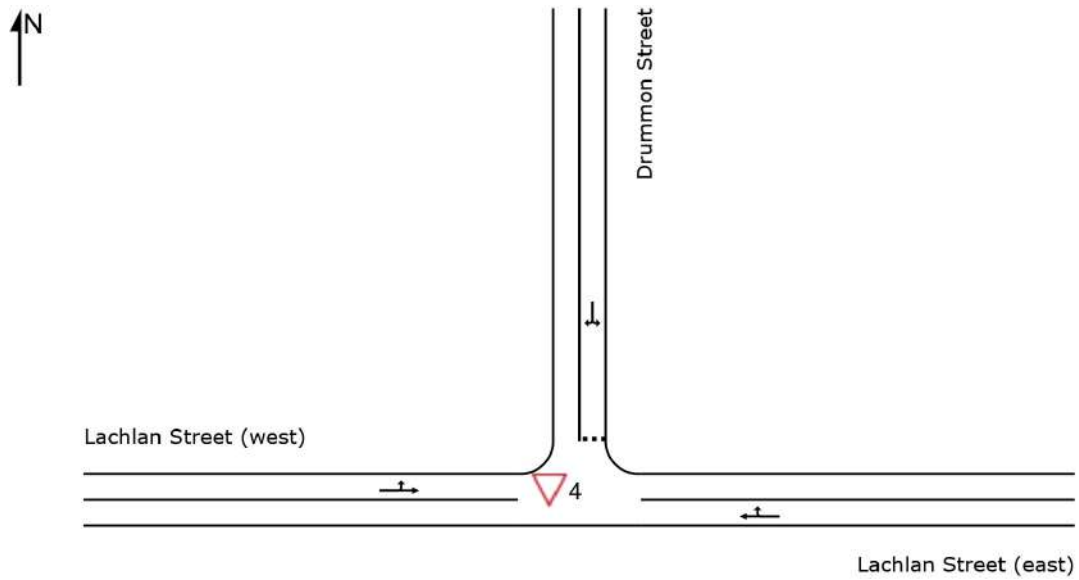
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 4 [Lachlan Street/ Drummond Street - 2033 DEVELOPMENT AM]

Network: 16 [2033 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Lachlan Street (east)														
5	T1	428	2.5	428	2.5	0.293	2.1	LOS A	0.5	3.5	0.24	0.04	0.30	31.1
6	R2	33	7.7	33	7.7	0.293	13.5	LOS A	0.5	3.5	0.24	0.04	0.30	37.7
Approach		461	2.9	461	2.9	0.293	2.9	NA	0.5	3.5	0.24	0.04	0.30	32.8
North: Drummon Street														
7	L2	62	0.0	62	0.0	0.524	13.4	LOS A	0.8	5.9	0.87	1.08	1.29	27.7
9	R2	87	0.0	87	0.0	0.524	25.5	LOS B	0.8	5.9	0.87	1.08	1.29	27.7
Approach		149	0.0	149	0.0	0.524	20.5	LOS B	0.8	5.9	0.87	1.08	1.29	27.7
West: Lachlan Street (west)														
10	L2	89	0.0	89	0.0	0.494	3.4	LOS A	0.0	0.0	0.00	0.04	0.00	39.9
11	T1	863	0.9	863	0.9	0.494	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	38.8
Approach		953	0.8	953	0.8	0.494	0.3	NA	0.0	0.0	0.00	0.04	0.00	39.2
All Vehicles		1563	1.4	1563	1.4	0.524	3.0	NA	0.8	5.9	0.16	0.14	0.21	34.1

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.

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

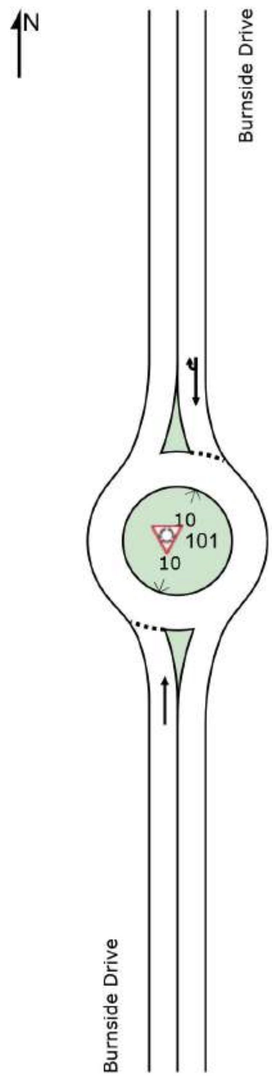
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [Burnside Drive Roundabout - 2033 DEVELOPMENT AM]

Network: 16 [2033 DEVELOPMENT AM MITI]

New Site
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	Demand Flows HV	Arrival Flows Total	Arrival Flows HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Aver. Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Burnside Drive														
2	T1	91	0.0	91	0.0	0.088	6.1	LOS A	0.2	1.2	0.41	0.55	0.41	49.4
Approach		91	0.0	91	0.0	0.088	6.1	LOS A	0.2	1.2	0.41	0.55	0.41	49.4
North: Burnside Drive														
8	T1	925	0.0	925	0.0	0.702	4.7	LOS A	0.0	0.0	0.00	0.56	0.00	53.1
9u	U	262	0.0	262	0.0	0.702	9.5	LOS A	0.0	0.0	0.00	0.56	0.00	46.6
Approach		1187	0.0	1187	0.0	0.702	5.7	LOS A	0.0	0.0	0.00	0.56	0.00	52.4
All Vehicles		1278	0.0	1278	0.0	0.702	5.8	LOS A	0.2	1.2	0.03	0.56	0.03	52.2

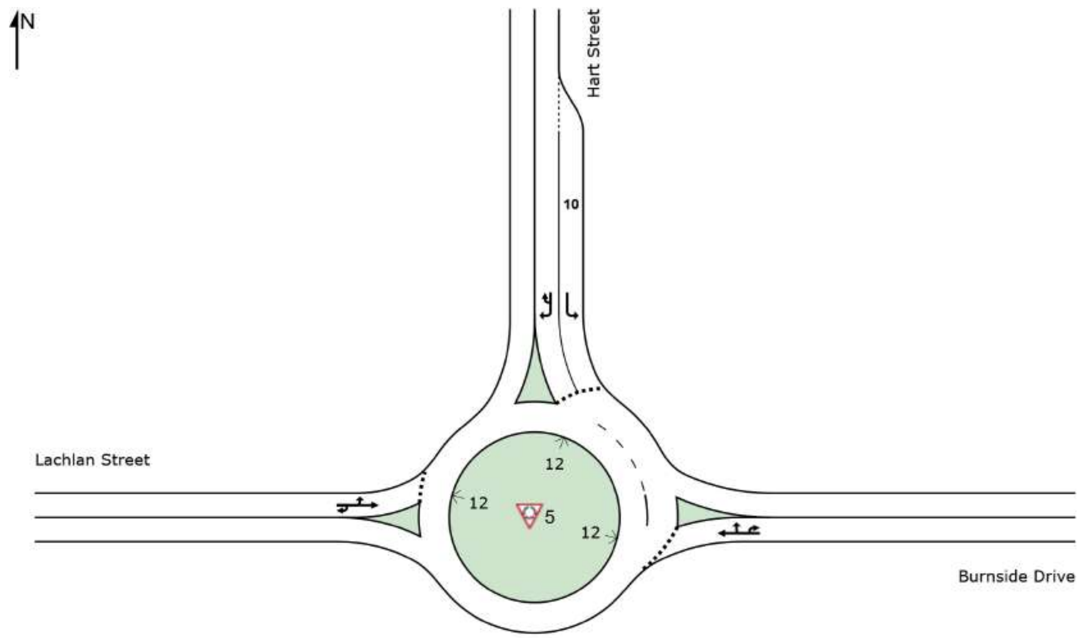
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity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

Site: 5 [Lachlan Street/ Burnside Drive/ Hart Street - 2033 DEVELOPMENT AM MITI]

Network: 16 [2033 DEVELOPMENT AM MITI]

AM peak 7:45am - 8:45am
PM peak 2:45pm - 3:45pm
Site Category: (None)
Roundabout

Site Layout



Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Burnside Drive														
5	T1	287	2.9	287	2.9	0.347	3.2	LOS A	0.8	5.6	0.41	0.48	0.41	34.6
6	R2	65	0.0	65	0.0	0.347	6.6	LOS A	0.8	5.6	0.41	0.48	0.41	38.6
6u	U	1	0.0	1	0.0	0.347	7.9	LOS A	0.8	5.6	0.41	0.48	0.41	34.6
Approach		354	2.4	354	2.4	0.347	3.8	LOS A	0.8	5.6	0.41	0.48	0.41	36.0
North: Hart Street														
7	L2	537	0.6	537	0.6	0.693	13.4	LOS A	3.1	21.9	0.94	1.16	1.38	31.0
9	R2	102	0.0	102	0.0	0.208	12.1	LOS A	0.5	3.3	0.76	0.86	0.76	32.0
9u	U	6	0.0	6	0.0	0.208	13.4	LOS A	0.5	3.3	0.76	0.86	0.76	36.5
Approach		645	0.5	645	0.5	0.693	13.2	LOS A	3.1	21.9	0.91	1.11	1.27	31.2
West: Lachlan Street														
10	L2	98	1.6	98	1.6	0.595	2.9	LOS A	2.4	16.6	0.39	0.39	0.39	37.2
11	T1	669	0.0	669	0.0	0.595	2.7	LOS A	2.4	16.6	0.39	0.39	0.39	28.8
12u	U	73	0.0	73	0.0	0.595	7.5	LOS A	2.4	16.6	0.39	0.39	0.39	28.8
Approach		840	0.2	840	0.2	0.595	3.1	LOS A	2.4	16.6	0.39	0.39	0.39	31.6
All Vehicles		1839	0.7	1839	0.7	0.693	6.8	LOS A	3.1	21.9	0.58	0.66	0.70	32.3

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: GTA CONSULTANTS | Created: Tuesday, 11 May 2021 2:03:51 PM
Project: \\gta.com.au\projectfiles\ProjectFilesSyd\N17400-17499\N174701 LEP - New Liverpool Primary (Lachlan St)\Modelling\210505sid-N174700 2033 Development.sip8

C. STUDENT TRANSPORT PLAN

C

New Liverpool Public School

Student Transport Plan

Prepared by: GTA Consultants (Group) Pty Ltd for NSW Department of Education
on 11/06/2021
Reference: N174701
Issue #: A

New Liverpool Public School

Student Transport Plan

Client: NSW Department of Education

on 11/06/2021

Reference: N174701

Issue #: A

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	11/06/2021	Final	Liam Clark Eric Ye	Anthony Leung	Volker Buhl	

GTAconsultants now Stantec

Melbourne | Sydney | Brisbane
Adelaide | Perth

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1. TRANSPORT ASSESSMENT

01

1.1. School Context

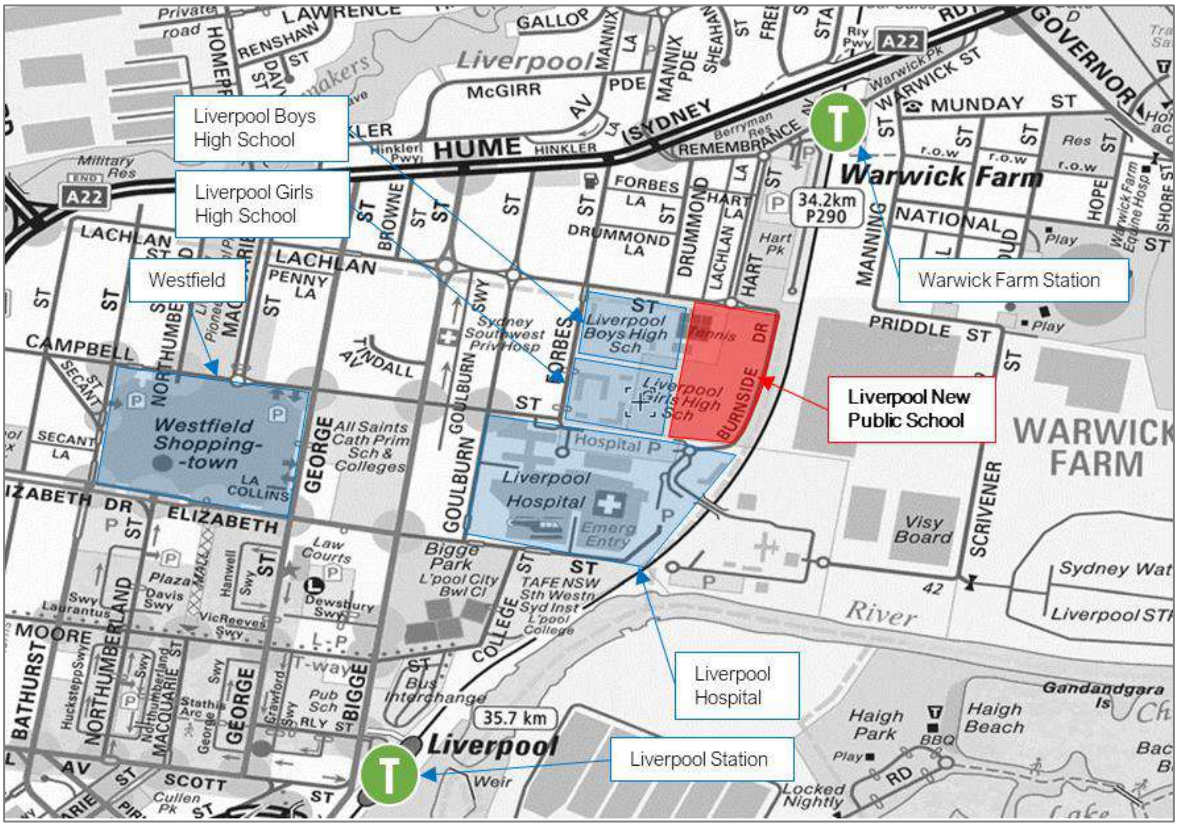
1.1.1. Overview

The New Liverpool Public School (NLPS) is a new primary school proposed within Liverpool, located approximately 25 kilometres south west of Sydney CBD. The proposed school is bounded by Lachlan Street to the north, Burnside Drive to the east, Liverpool Hospital to the south and the existing Liverpool Boys High School and Liverpool Girls High School to the west. Liverpool Station is located around 900 metres southwest of the school and Warwick Farm Station is located around 500 metres north of the school.

High density residential is located north of the site and the railway corridor is to the east of the site. On the opposite side of the rail corridor there is a mix of low density residential and industrial development. West of the site is the existing Liverpool Boys/ Girls High School.

The site location is illustrated in Figure 1.1.

Figure 1.1: Site and Surrounding Environment

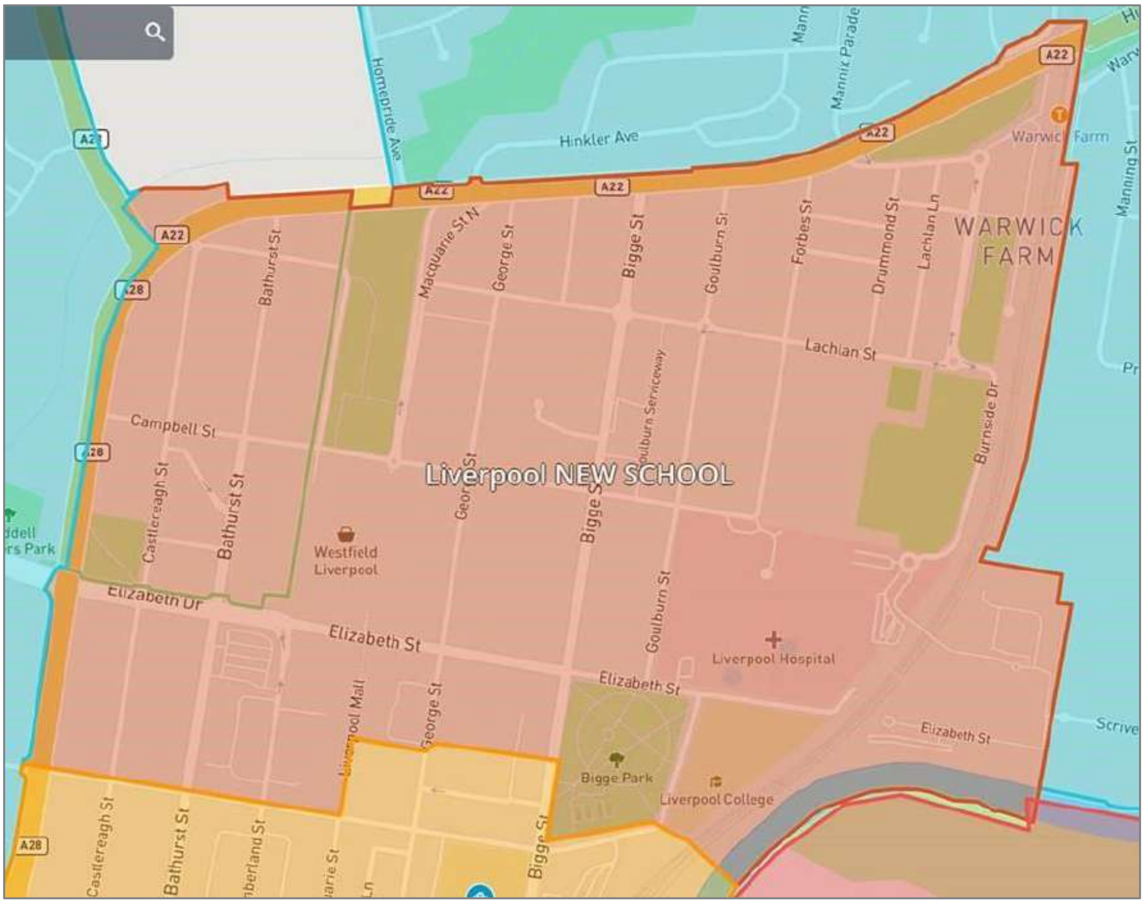


1.1.2. School Catchment Boundary

The future school catchment boundary for NLPS is illustrated in Figure 1.2. The catchment is bounded by Hume Highway to the north and west, the rail corridor to the east, and extends south to Moore Street. The catchment has been further overlaid on a map (Figure 1.3) illustrating the surrounding land zoning to highlight the residential areas and geographic location in relation to NLPS.

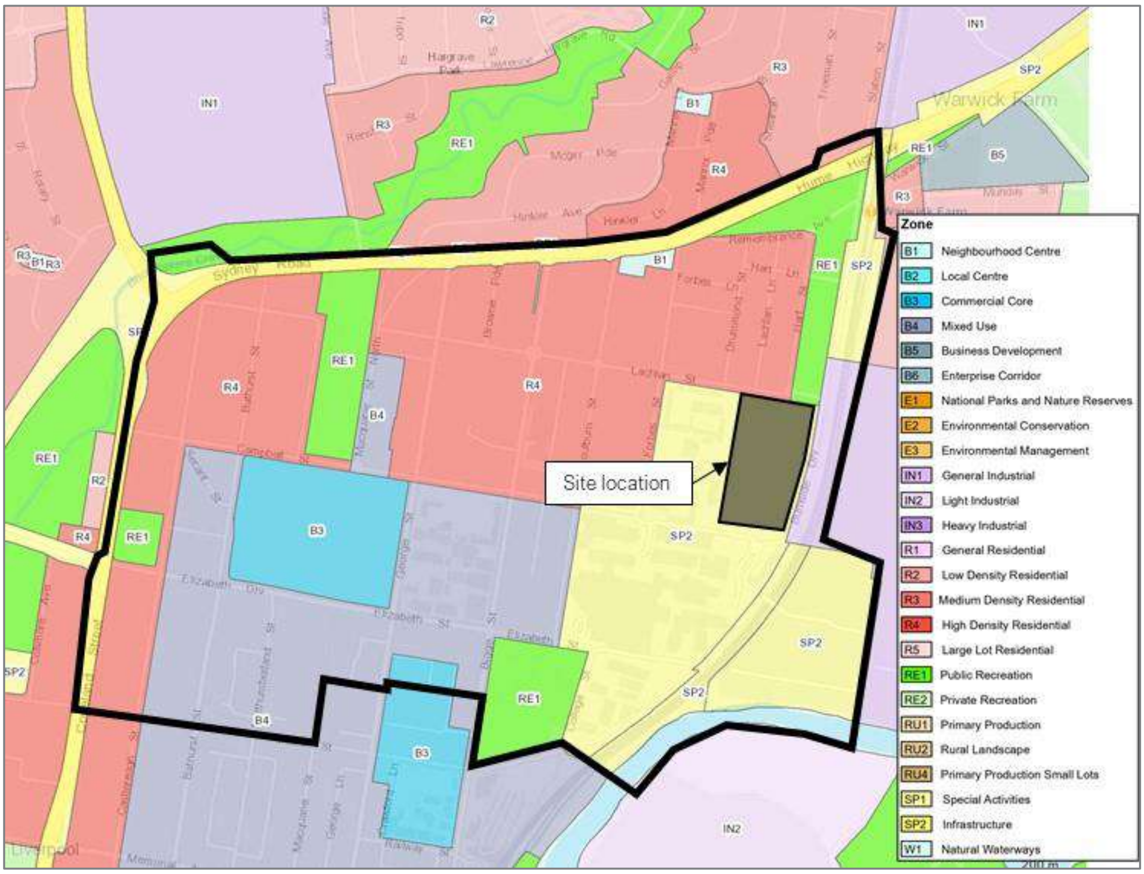
As seen, the majority of the residential catchment is located to the west and north-west of the proposed school (primarily high-density residential zoning) and to the south-west (mixed use zoning).

Figure 1.2: School Catchment Boundary



Source: School Infrastructure, received 1 March 2021

Figure 1.3: Surrounding Land Zoning



Base Image Source: NSW Government ePlanning Spatial Viewer, https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address, accessed 1 March 2021

1.1.3. Proposed Development

The NLPS is located within the grounds of the existing Liverpool Boys and Girls High School in the Liverpool Central Business District (CBD), at 18 Forbes Street, Liverpool. The proposed NLPS is located in the eastern portion of the existing school grounds (refer to Figure 1.4).

The site is legally described as Lot 1 in DP 1137425. The application seeks consent for the construction and operation of a new primary school. This will include construction of a new school building for core school facilities, teaching spaces, support units, preschools as well as associated landscaping and open space improvements.

Figure 1.4: Context Plan

Source: Fitpatrick + Partners, dated 0206/2021

1.2. Strategic Context

This section provides an overview of the strategic context of the proposed development, including the relevant planning strategies and opportunities.

1.2.1. Future Transport 2056 and Supporting Plans (2018)

Reviews have been completed for the following Transport for NSW supporting plans:

- Future Transport Strategy 2056
- Greater Sydney Services and Infrastructure Plan
- Regional NSW Services and Infrastructure Plan
- Road Safety Plan (Towards Zero).

To support the land use vision for Greater Sydney, the NSW Government developed a vision for the transport system that will enable people and goods to move conveniently around the city using:

- City-shaping corridors – Major trunk road and rail public transport corridors providing higher speed and volume linkages between our cities and centres that shape locational decisions of residents and businesses.
- City-serving corridors – Higher density corridors concentrated within ~10km of metropolitan centres providing high frequency access to metropolitan cities/ centres with more frequent stopping patterns.
- Centre-serving corridors – Local corridors that support buses, walking and cycling, to connect people with their nearest centre and transport node.

Some of the key initiatives of this vision include:

- Sydney Growth Trains (part of More Trains, More Services program), which is committed within the next 10 years.
- Trial of on-demand bus services on selected local bus routes, which is committed within the next 10 years
- Introduction of higher frequency transport services across Greater Sydney, which is under investigations between now and the next 20 years
- Providing education campaigns for public transport users that target behaviours around rail corridors and level crossings, school student travel, safe travel for older or less mobile passengers and travel training across the network.

The More Trains, More Services initiative includes a service capacity upgrade program designed to transform the existing rail system. This program aims to transform Sydney's busiest train lines over the next 10 years and beyond, through digital systems, advanced signalling and infrastructure upgrades.

1.2.2. Greater Sydney Commission's Western City District Plan (2018)

Education

Schools are essential local infrastructure. The Department of Education's high-level *School Assets Strategic Plan Summary* coordinates planning for, and delivery of, both new and expanded schools. It encourages the joint and shared use of facilities with local governments and the private sector to develop innovative ways to provide school infrastructure. The NSW Government will spend $4.2 billion over the next four years on building and upgrading schools, including the addition of more than 1,500 new classrooms providing places for 32,000 students. Shared use of facilities and increased opportunities for students to walk and cycle to school will better connect schools with local communities.

Planning for early education and childcare facilities requires innovative approaches to the use of land and floor space, including co-location with compatible uses such as primary schools and office buildings, close to transport facilities.

Education and Child Care

The State Environmental Planning Policy (SEPP) for Educational Establishments and Child Care Facilities 2017 makes it easier for childcare providers, schools, TAFEs and universities to build new facilities and improve existing facilities. It streamlines approval processes, recognising the need for additional educational infrastructure with a focus on good design.

Joint and Shared Use

Joint and shared use of facilities is encouraged to make school assets available to the community outside school hours and to give schools access to community facilities. Each neighbourhood has facilities such as libraries, community centres, adult education, sport and recreation facilities that function to enhance and promote social connections and networks within the community. Schools are an important example of social connectors and where shared use of such facilities is achieved their function as a community hub is significantly enhanced.

1.2.3. Movement and Place

Movement and Place is a cross-government framework for planning and managing roads and streets across NSW. The framework delivers on NSW policy and strategy directions to create successful streets and roads by balancing the movement of people and goods with the amenity and quality of places. Movement and Place considers the whole street including footpaths, from property line to property line. It takes into account the needs of all users of this space including pedestrians, cyclists, deliveries, private vehicles and public transport, as well as people spending time in those places.

Qualities that contribute to a well-designed built environment have been grouped under five themes in the *Practitioner's Guide to Movement and Place*, a guideline which guides the design and planning around streets and roads for use on state government projects. These are:

- Access and Connection – enabling urban mobility through access to opportunity, services, and amenities with walkable neighbourhoods, cycle routes, and public transport.
- Amenity and Uses – providing a diversity of public and private spaces to accommodate a variety of activities at different times of the day and night; and a mix of land uses that permits daily activities to be accessed on foot (such as primary schools and local shops).
- Character and Form – the identification of a place perceived through its built form, landscape character and the contribution of local people over time.
- Green and Blue – Trees, landscapes and water for greening and cooling places in sustainable ways, improving people's comfort and experience, and providing open space for recreation and respite.
- Comfort and Safety – clear air, sun, shade, peaceful parks and active building frontages contributing to the liveability of places, including feelings of safety.

1.2.4. Better Placed

Better Placed is an integrated design policy prepared by the Government Architect of New South Wales, used to enhance the design quality of our built environment, and raising expectations and raising standards about working better and creating better environments. The policy outlines five elements of well-designed built environments:

- Healthy – for all members of our communities, promoting physical activity and walkable environments, social cohesion, and community safety and security to support people's well-being.
- Responsive – to the needs and aspirations of local people, now and into the future, inviting innovative use and habitation, interaction, productivity and enjoyment.
- Integrated – by drawing together the relationships between parts and elements, considering interfaces at multiple scales, and working to common goals and aspirations.
- Equitable – by presenting opportunities for all segments of our community so residents and visitors have access to and can move about freely between public domain, infrastructure, open space and buildings.
- Resilient – to the dynamic, challenging conditions of our time, to adapt and evolve while retaining essential qualities and values.

The policy also establishes seven distinct objectives to define the key considerations in the design of the built environment, being: better fit, better performance, better for community, better for people, better working, better value, and better look and feel.

1.2.1. Road Safety Education Program

The Road Safety Education Program is a long-term integrated education initiative. The program aims to increase road safety knowledge, understanding and skills.

Transport for New South Wales works closely with the Department of Education, the Association of Independent Schools of NSW and the Catholic Education Commission NSW to develop these programs. The NSW Government is committed to continuing the Road Safety Education program and encouraging more children to walk to school safely.

1.2.2. Safety Around Schools Program

This program aims to reduce the number and severity of child casualties in 40 km/h school zones. Transport for New South Wales will continue to focus strongly on improving the visibility of school zones to increase driver awareness and compliance. School zones are designed to protect children on their journey to and from school. Measures include:

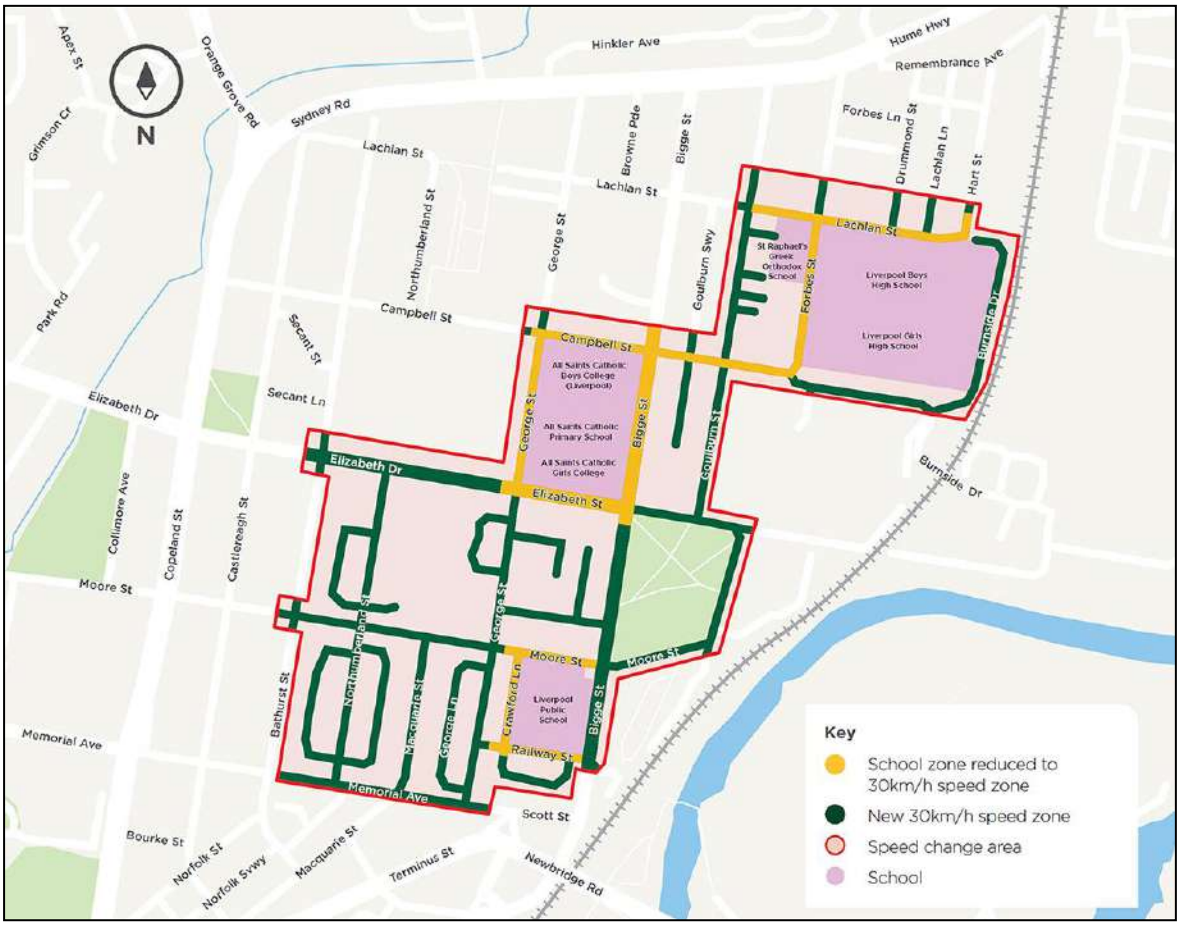
- dragon’s teeth road markings in all school zones
- the replacement of old, damaged school zone signs with new fluorescent signs
- marked foot crossings
- raised pedestrian crossings
- pedestrian refuges and fencing
- traffic signal-controlled pedestrian crossings.

School zone flashing lights are designed to alert drivers that they are entering a 40 km/h school zone and to adjust their speed accordingly. School zone flashing lights have been rolled out across NSW as part of this program and the NSW Government has ensured that every school in NSW has at least one set of school zone flashing lights.

1.2.3. Liverpool CBD 30 km/h Speed Limit Zone

Transport for New South Wales introduced a 30 km/h speed zone for the Liverpool city centre in mid-July 2020 to provide a safer environment for pedestrians and cyclists, as well as for students attending schools in the city centre. A review of the trial will be undertaken 12 months from its implementation by Transport for New South Wales. As part of the trial, existing school zones within the new 30 km/h area have also been reduced to 30 km/h.

Figure 1.5: Liverpool CBD 30 km/h Speed Limit Zone



Base Image Source: Liverpool City Council, https://www.liverpool.nsw.gov.au/services/roads-traffic-and-parking/road-safety, accessed 4 March 2021

1.3. East-West Pedestrian Link

The redevelopment of the Liverpool Boys and Girls High School is the subject of a separate project (of which the scope is unresolved, and timing is currently unknown). Part of this project (and aligning with the aspirations for the Liverpool Innovation Precinct) was the creation of an East-West Link as shown in Figure 1.6.

The current layout of the Liverpool Boys and Girls High School buildings does not support the introduction of an East-West pedestrian link at this stage, however, the design of the New Liverpool Public School does not preclude the introduction of this link in the future.

Figure 1.6: East-West Pedestrian Link

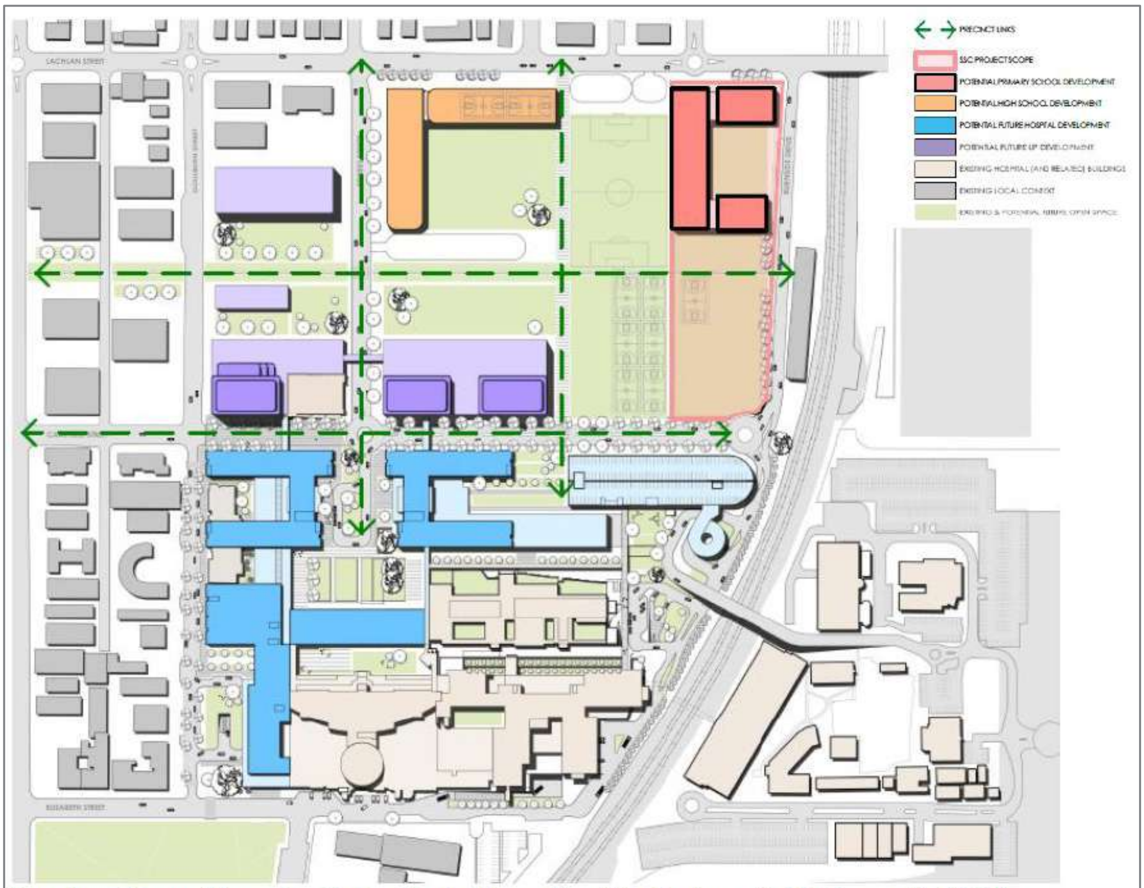


Figure 3 Liverpool Innovation Precinct Master Plan and Land Use Strategy with SSD Scope added (2018)

Source: CBRE, received 10 May 2021

1.4. Existing Transport Network and Operations

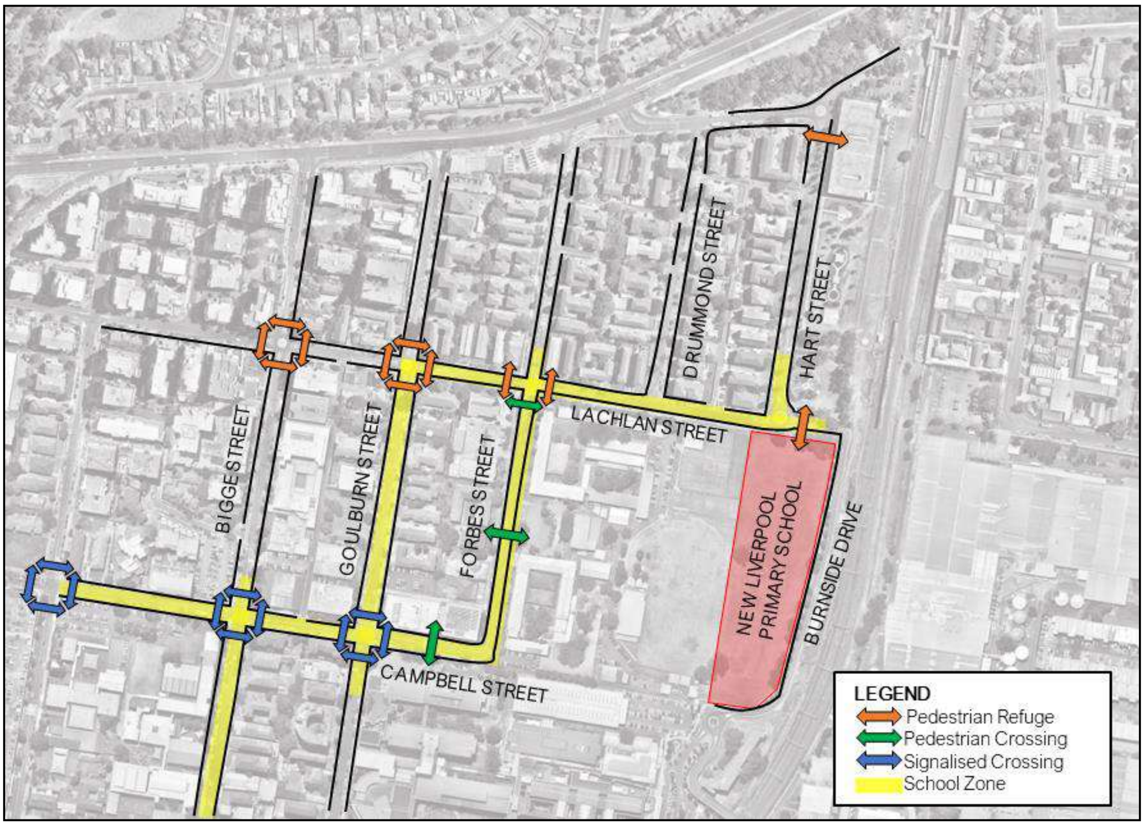
Elements of the following existing transport network and operations have been informed by the *Transport and Accessibility Impact Statement for New Liverpool Public School* (TAIA) documents prepared by GTA Consultants (2021). Transport features of the proposed school development are also included in this section, as they form part of the baseline scenario at the school's opening date.

1.4.1. Pedestrian Infrastructure

An overview of the existing pedestrian accessibility near the school is presented in Figure 1.7.

Generally, pedestrian amenity is moderate to high near the school, with a range of crossing facilities being signalised pedestrian crossings, zebra crossings and refuge islands. All nearby intersections present kerb ramps at each approach, except the western approach of the Lachlan Street/ Drummond Street intersection and the northern approach of the Lachlan Street/ Hart Street/ Burnside Drive roundabout. Existing 30 km/h school zones and 30 km/h high pedestrian activity zones are present near the site.

Figure 1.7: Existing Pedestrian Accessibility



Base map source: Nearmap

Roads near the school feature footpaths of at least 1.2 metres wide on both sides of the road. On some roads (such as the southern edge of Lachlan Street, and eastern edge of Forbes Street), the footpath width is wider (around three metres), providing greater footpath capacity.

Pedestrian crossing infrastructure is provided near the site in the form of a raised pedestrian crossing on the southern approach of the Forbes Street/ Lachlan Street intersection and a mid-block raised pedestrian crossing on Forbes Street. Further south, another mid-block pedestrian crossing is provided on Campbell Street. The Goulburn Street/ Campbell Street intersection is the closest signalised intersection and provides signalised pedestrian crossings on all four legs.

Development Proposal

Primary pedestrian access is proposed on Burnside Drive, at the eastern frontage of the school. Secondary access will be provided on Lachlan Street, at the northern frontage of the school.

The existing footpath on the eastern frontage of the school (i.e. western side of Burnside Drive) is proposed to be widened from the existing 1.2 metres to 2.5 metres (subject to a separate planning approval) to accommodate the increased pedestrian volumes and provide suitable widths adjacent to the kerbside parking.

As noted earlier, there is no existing pedestrian priority crossing facility to the north, resulting in a gap in pedestrian connection for users arriving to the school from the areas north of Lachlan Street. A school crossing is proposed on Lachlan Street, between Drummond Street and Lachlan Lane to facilitate pedestrian connectivity across Lachlan Street. The provision of a school crossing rather than a formal pedestrian crossing will encourage safe pedestrian movement across Lachlan Street associated with the schools before and after school bell times.

A new crossing supervisor will be engaged by the school to operate this new school crossing. Crossing supervisors will be instructed to monitor pedestrians and facilitate crossing in groups to maximise visibility of pedestrians and reduce traffic delays.

A new pedestrian refuge island is also proposed on the north approach of the Lachlan Street/ Forbes Street intersection to improve the east-west pedestrian movement across this intersection and to improve the alignment of the existing kerb ramps.

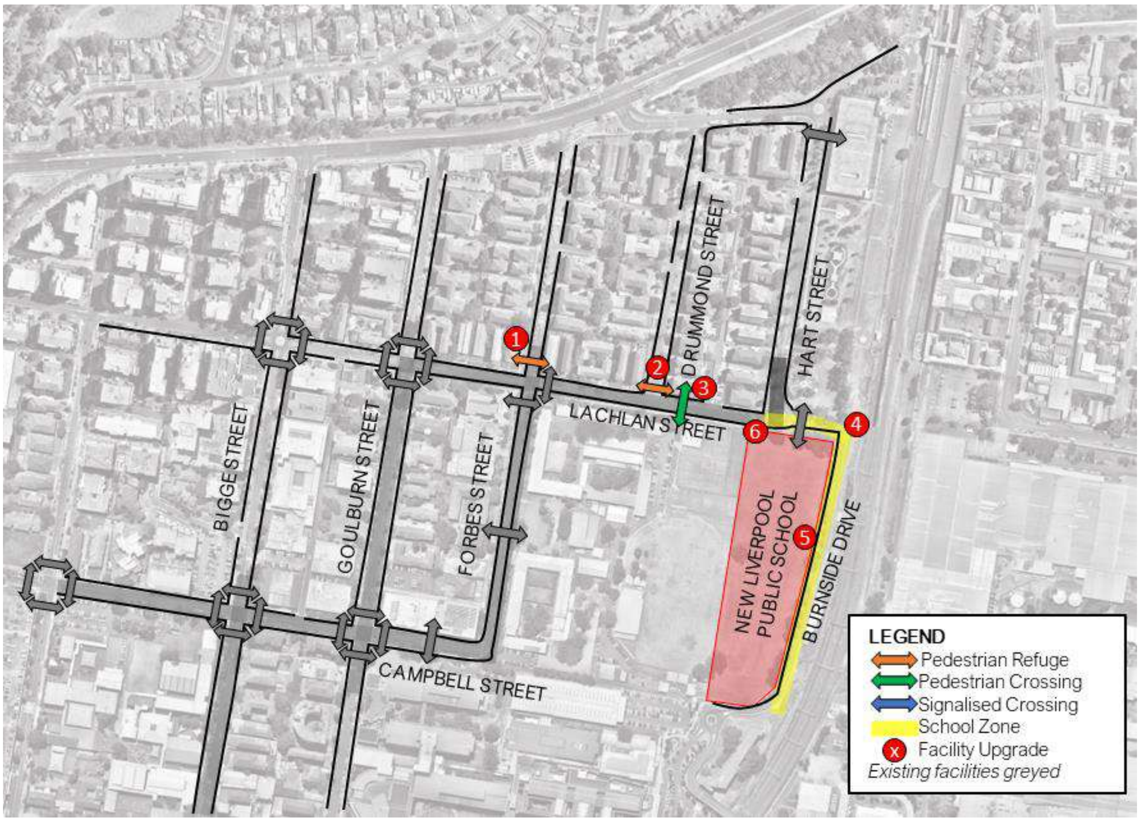
Additionally, the existing school zone, which terminates at the Lachlan Street/ Hart Street/ Burnside Drive roundabout is proposed to be extended along the length of Burnside Drive. This is to promote a low-speed environment conducive to safe student travel and pedestrian prioritisation.

These proposed pedestrian facility upgrades are summarised in Table 4.4 and illustrated in Figure 4.9.

Table 1.1: Proposed Pedestrian Infrastructure Upgrades Summary

No.	Location	Upgrade	Responsibility/ Action	Time Frame Recommendation
1	Lachlan Street/ Forbes Street intersection	Intersection improvements to Forbes Street (North) to provide left in/ left out only with island treatment on the northern approach to intersection to include a pedestrian refuge. Adjust kerb ramp on north-west corner to point across Forbes Street rather than into intersection.	School Infrastructure	Prior to school opening
2	Lachlan Street/ Drummond Street intersection	New refuge island on the northern approach of the Lachlan Street/ Drummond Street intersection	School Infrastructure	Prior to school opening
3	Lachlan Street (between Drummond Street and Lachlan Lane)	Install new school crossing and appoint crossing supervisor.	School Infrastructure	Prior to school opening
4	Burnside Drive	Extend school zone to Burnside Drive	Transport for NSW in consultation with Health Infrastructure	Prior to school opening
5	Burnside Drive footpath (western side)	Widen existing footpath to 2.5 metres	School Infrastructure	Prior to school opening
6	Lachlan Street footpath (at school boundary)	Widen existing footpath to 3.0-4.0 metres (see Section 1.7.1)	School Infrastructure	Medium term (up to 5 years)

Figure 1.8: Proposed Pedestrian Facility Upgrades



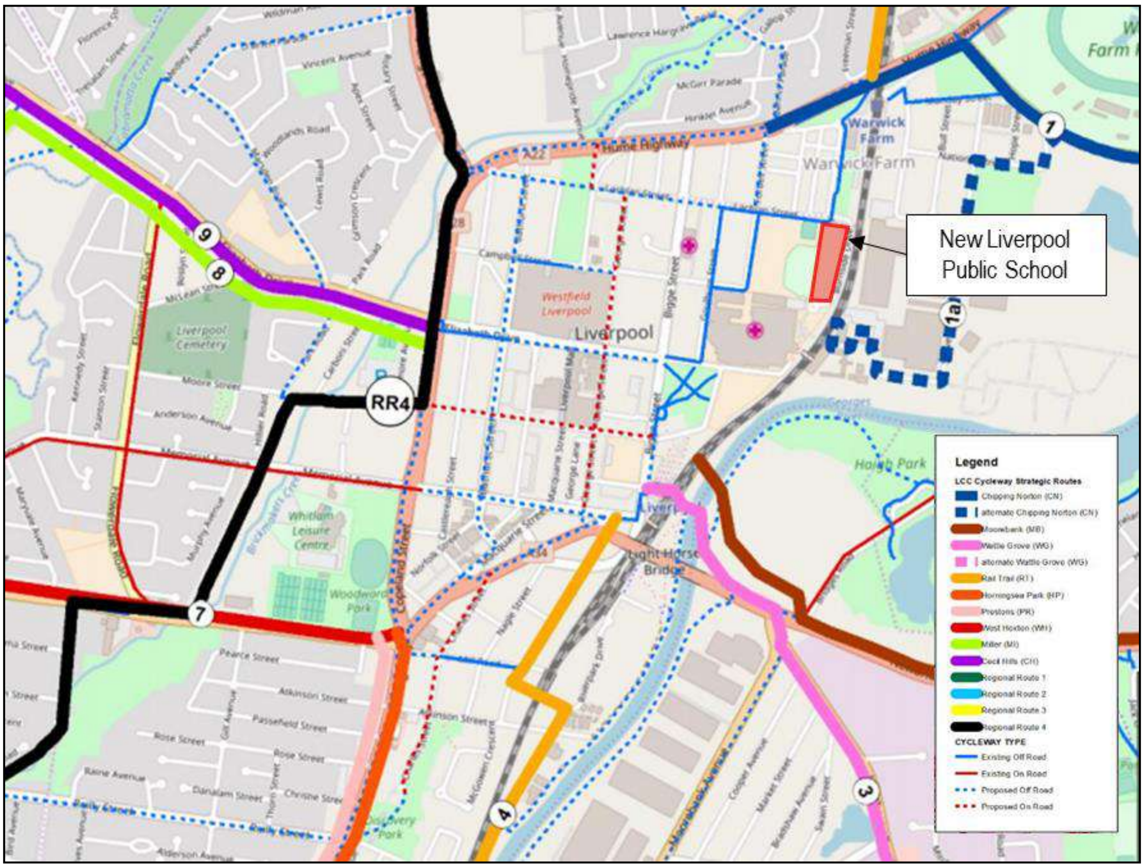
Base map source: Nearmap

1.4.2. Cycling Infrastructure

The cycling network surrounding the site, including proposed on-road and off-road cycleways is shown in Figure 1.9.

There are existing off-road cycling facilities on the northwest corner of the school on Lachlan Street and Forbes Street providing connectivity to Warwick Farm Station, Liverpool Hospital and Liverpool Station. As part of the Liverpool Bike Plan, off-road cycling facilities are proposed along Forbes Street providing connectivity to Warwick Farm Public School. Furthermore, the cycling facilities on Lachlan Street are proposed to be extended from Goulburn Street to Hume Highway, providing connectivity to Westfield Liverpool.

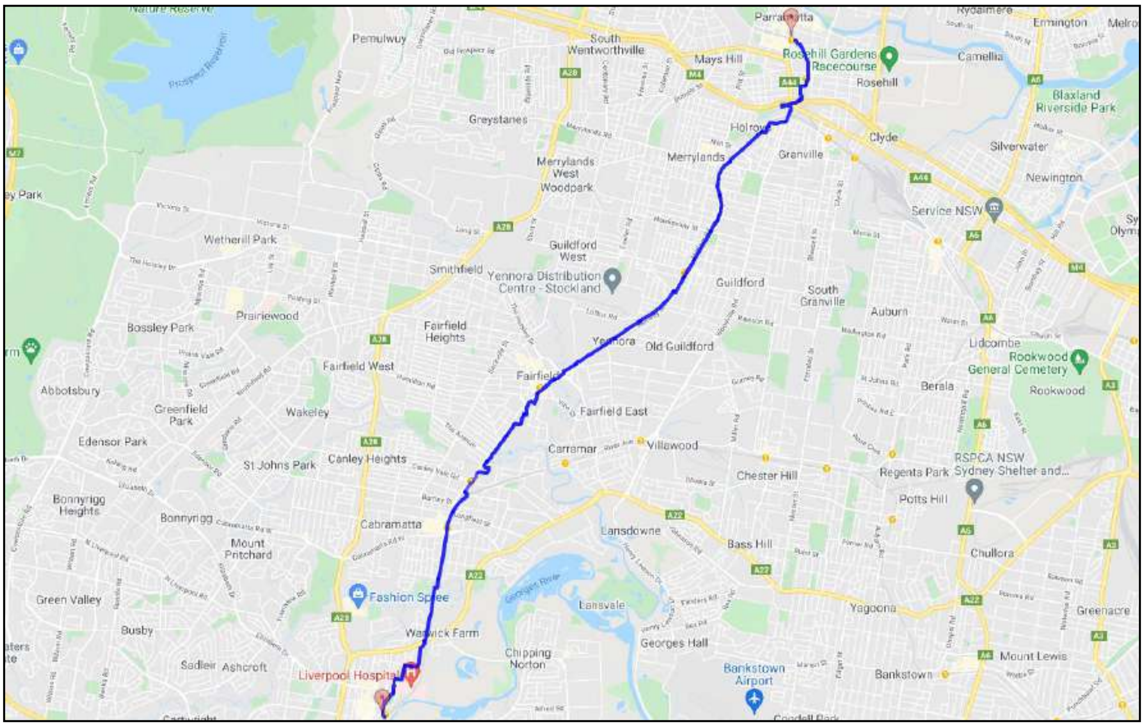
Figure 1.9: Liverpool Cycle Network



Base image source: Liverpool Bike Plan 2018-2023, by Liverpool City Council, https://www.liverpool.nsw.gov.au/venues/parks-and-playgrounds/cycleways-and-walkways, accessed 1 March 2021

The Parramatta to Liverpool rail-side trail comprises a shared path and on-street cycling links that extend between Parramatta train Station and Liverpool Station and passes adjacent to the site along Lachlan Street.

Figure 1.10:Parramatta to Liverpool railside trail



Source: https://www.railtrails.org.au/trail-descriptions/nsw-and-act?view=trail&id=172, accessed 10 May 2021

1.4.3. Train Services

The NLPS is located approximately 500 metres south of Warwick Farm Station and 1.3 km north of Liverpool Station. Both Liverpool and Warwick Farm stations are on the T2 Inner West and Leppington Line, T3 Bankstown Line and T5 Cumberland Line, which provide services to the City and Richmond Area every 10 minutes during on peak and 30 minutes during the off peak.

A review of train occupancy data for February 2019[1] found that occupancy levels on trains at Liverpool Station is generally low on arrival at Liverpool Station. Of the 8,184 services during that month (upon arrival at Liverpool station, excluding 09/02/2019 and 10/02/2019 which were missing the Liverpool data), 8,155 services had occupancy levels less than 65 per cent train capacity and 29 services presented occupancy between 65 per cent and 105 percent.

Similar results were found for Warwick Farm Station for the same period. Of the 8,181 services during that month (upon arrival at Warwick Farm station, excluding 09/02/2019 and 10/02/2019 which were missing the Warwick Farm data), 8,141 services had occupancy levels less than 65 per cent train capacity and 40 services had occupancy between 65 per cent and 105 percent.

As both stations are within walking distance of the school and train services can accommodate increased patronage, there is potential to encourage greater train mode share for the new school.

1.4.4. Bus Services

There are multiple bus services that operate near the site with the nearest stop located at Liverpool Boys High School on Forbes Street. The surrounding bus network services are detailed in Table 1.2 and shown indicatively in Figure 1.11.

[1] Data sourced from TfNSW Open Data (https://opendata.transport.nsw.gov.au/dataset/train-occupancy-nov-2018-feb-2019), accessed on 18 March 2021

Table 1.2: Bus service frequency[1]

Route No.	Description	AM/ PM peak frequency	Off-peak frequency	School frequency
851[2]	Liverpool to Carnes Hill Marketplace via Cowpasture Road	None / 20 minutes	60 minutes	One service per day at 3:34pm
852[2]	Carnes Hill Marketplace to Liverpool via Greenway Drive and Cowpasture Road	30 minutes/ 30 minutes	60 minutes	One service per day at 7:43am
853[2]	Liverpool to Carnes Hill via Hoxton Park Road	20 minutes/ 20 minutes	60 minutes	One service per day at 3:36pm
854[2]	Liverpool to Carnes Hills via Greenway Drive and Hoxton Park Road	15 minutes/ 15 minutes	60 minutes	One service per day at 3:16pm
856[2]	Bringelly to Liverpool	Varies throughout day	-	One service per day at 7:15am
857	Liverpool to Narellan	30 minutes/ 30 minutes	60 minutes	One service per day at 3:25pm
865[2]	Casula to Liverpool via Lurnea Shops	30 minutes/ 30 minutes	30 minutes	One service per day at 8:01pm
866[2]	Casula to Liverpool	30 minutes/ 30 minutes	30 minutes	One service per day at 8:00am
1005	Bringelly and Allenby to Liverpool Schools	One service per day at 7:11am	-	One service per day at 7:11am
1040	West Hoxton, Hoxton Park to Liverpool	One service per day at 7:36am	-	One service per day at 7:36am
1048	Denham Court to Liverpool	One service per day at 7:31am	-	One service per day at 7:31am
1051	Greenway Park, Hoxton Park to Liverpool	One service per day at 7:42am		One service per day at 7:42am
2034	Liverpool to Casula (Churchill Gardens), Horningsea Park, Rossmore			One service per day at 3:12pm
3033	Macquarie Fields Shops to Liverpool Boys High School	One service per day at 7:36am	-	One service per day at 7:36am
9029	Emmaus College to Liverpool High School via Bonnyrigg Heights Public School and Freeman College	One service per day at 7:35am	-	One service per day at 7:35am
9201	Miller Shopping Centre to Liverpool High School	One service per day at 7:34am	-	One service per day at 7:34am
9311	Lord Howe Drive opposite Cape Baron Avenue to All Saints College	One service per day at 7:35am	-	One service per day at 7:35am
901	Holsworthy Station to Liverpool Interchange	30 minutes/ 30 minutes	60 minutes	-
902	Holsworthy Station to Liverpool Station	30 minutes/ 30 minutes	60 minutes	-
903	Liverpool Interchange to Chipping Norton (loop service)	30 minutes/ 30 minutes	60 minutes	-

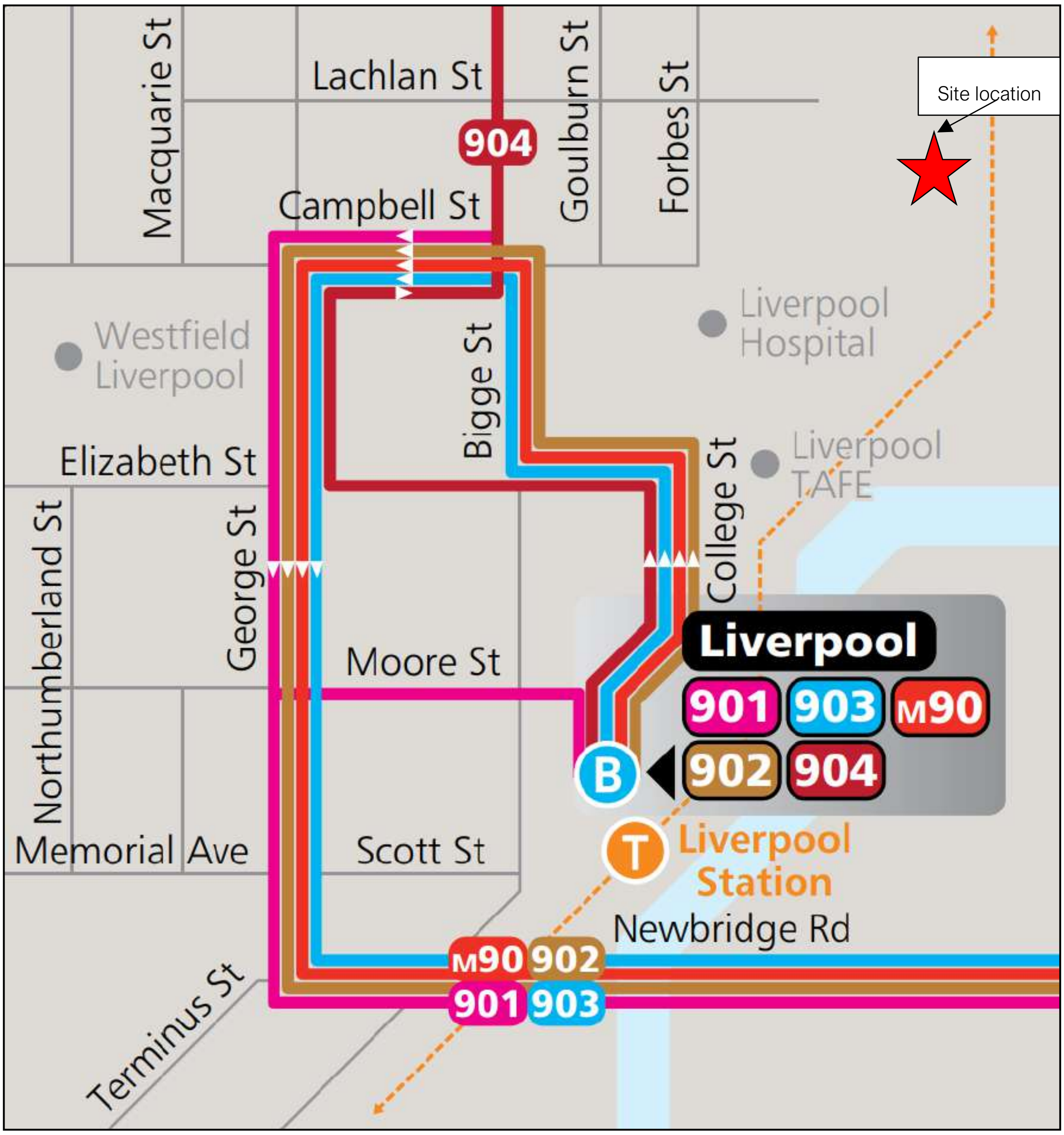
Route No.	Description	AM/ PM peak frequency	Off-peak frequency	School frequency
904	Fairfield Station to Liverpool Station	30 minutes/ 30 minutes	60 minutes	-
M90	Liverpool Station to Westfield Burwood	10 minutes/ 10 minutes	15 minutes	-
823	Liverpool Interchange to Warwick Farm (loop service)	30 minutes/ 30 minutes	60 minutes	-

Note:
1. Sourced from https://transportnsw.info/routes/bus, https://interlinebus.com.au/pdf/school_services/Liverpool%20Boys%20&%20Girls%20High%20School.pdf, https://static1.squarespace.com/static/5a668f1080bd5e34d18a7e76/t/5db6774ac853f67fa18c69f5/1572239186516/LIVERPOOL+BOYS+%26+GIRLS+HIGH+SCHOOL+14+OCT+19.pdf, https://www.transdevnsw.com.au/uploads/timetables/243/attachment/Liverpool%20.pdf, accessed 14 October 2019.
2. These bus services operate an alternate route that services the Forbes Street bus stop outside Liverpool Boys High School/ Liverpool Girls High School once per day.

Figure 1.11:Surrounding Bus Network (Interline)

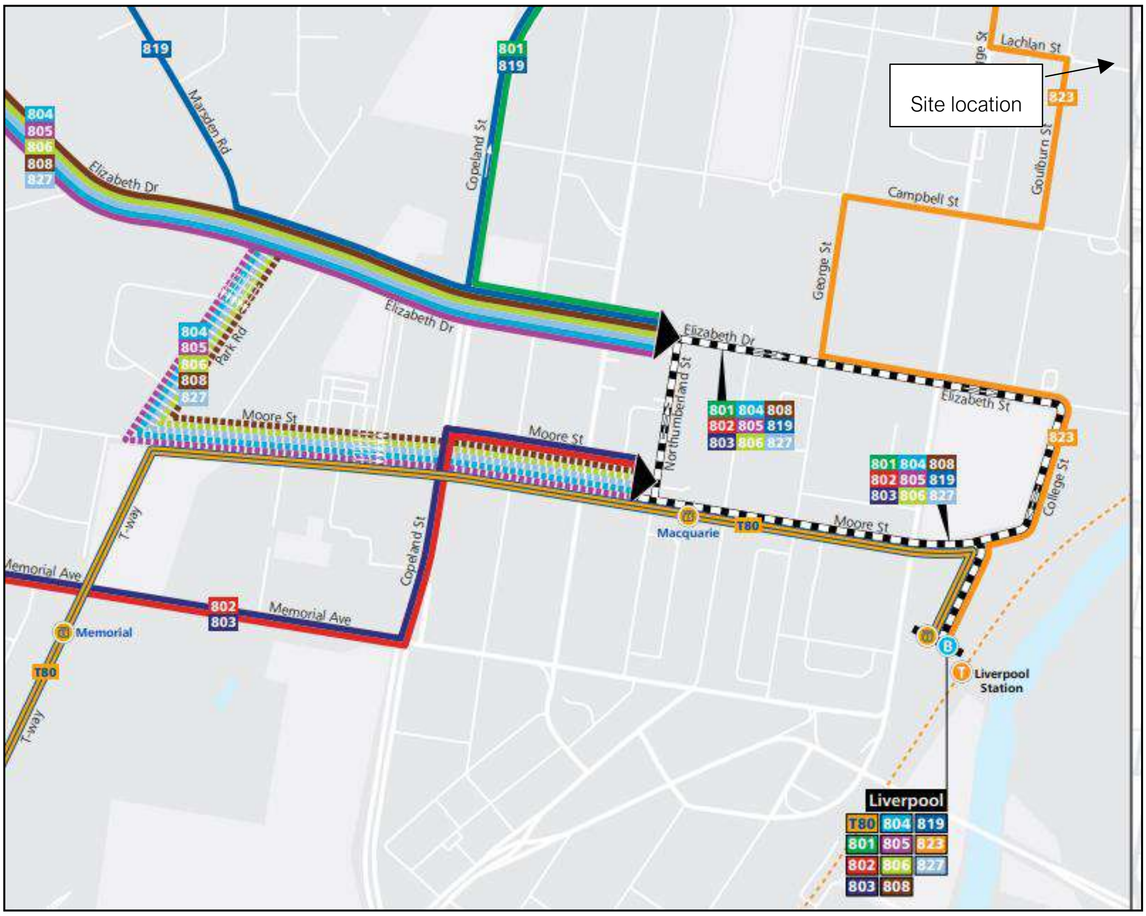
Base image source: https://interlinebus.com.au/img/Network_Map.jpg, accessed 10 May 2021

Figure 1.12:Surrounding Bus Network (Transdev)



Base source image: https://www.transdevnsw.com.au/ accessed 1 March 2021

Figure 1.13:Surrounding Bus Network (Transit Systems)



Base source image:
https://static1.squarespace.com/static/5a668f1080bd5e34d18a7e76/t/60762031dc5ee83e48116aef/1618354237661/21080_TS_R3_network_map_20210418.pdf, accessed 10 May 2021

Development Proposal

A new bus zone is proposed on Lachlan Street west of the site, replacing existing on-street unrestricted parking. This location allows buses to access the bus zone from both the north (via Hart Street) and the south/ west (via Lachlan Street and then u-turning around the Lachlan Street/ Hart Street/ Burnside Drive roundabout). This proposal also minimises the impact to the existing road infrastructure due to the utilisation of the existing roundabout for turnaround and utilisation of the wide carriageway width along Lachlan Street.

Lachlan Street currently has a carriageway width of around 12 metres which is suitable for a three metre parking lane to the south (suitable for buses), a 2.5 metre parking lane to the north (suitable for light vehicles) and 6.5 metres for the two travel lanes (car in one direction and bus in the other).

Lachlan Street also currently has wide pedestrian paths (around three metres) on the southern side which provide a high level of pedestrian amenity and accessibility.

Indicatively, the proposed bus zone would cater for up to two buses simultaneously, requiring a minimum length of 48.5 metres to accommodate two buses and the required draw-in and draw-out lengths.

1.4.5. Road Network

Forbes Street

Forbes Street functions as a local road and is aligned in a north-south direction. It is a two-way road configured with one traffic lane and one parking lane in each direction within a 12.5-metre wide carriageway.

Kerbside parallel parking is permitted on both sides of the road. The kerbside parking on the eastern side of the road along the Liverpool Boys High School and Liverpool Girls High School frontage is subjected to Bus Zone restrictions during school days between 8:15am and 9:15am and 2:45pm and 3:45pm. The kerbside parking on the western side of the road has No Parking during school days between 8:30am and 9:30am and 2:30pm and 3:30pm.

Forbes Street has a posted speed limit of 30 km/h due to being a high pedestrian activity area, with a 30 km/h school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Forbes Street currently carries around 4,000 vehicles per day[2].

There are two existing raised pedestrian crossings on Forbes Street. One located near the Lachlan Street/ Forbes Street intersection and another midblock between Lachlan Street and Campbell Street.

Forbes Street is shown in Figure 1.14 and Figure 1.15.

Lachlan Street

Lachlan Street functions as a collector road and is aligned in an east west direction. It is a two-way road configured with one traffic lane and one parking lane in each direction within a 12-metre wide carriageway. Kerbside parallel parking is permitted on both side of the road.

Lachlan Street has a posted speed limit of 30 km/h due to being a high pedestrian activity area with a 30 km/h school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Lachlan Street currently carries around 5,000 vehicles per day[3].

Low profile pedestrian refuges are provided on the east and western approaches of the Lachlan Street/ Forbes Street intersection. It is noted that the existing kerb ramp on the north-western corner of the Lachlan Street/ Forbes Street intersection is not aligned with the kerb ramp to the east, presenting a deficiency in the existing design.

Lachlan Street is shown in Figure 1.16 and Figure 1.17.

Burnside Drive

Burnside Drive functions as a collector road and is aligned in a north south direction. It is a two-way road configured with one travel lane in each direction within a seven-metre-wide carriageway. Kerbside parking is not permitted on both sides of the road. South of the Lachlan Street/ Hart Street/ Burnside Drive intersection, Burnside Drive is a private road, owned by Health Infrastructure.

Burnside Drive has a posted speed limit of 30 km/h in the Council-owned section. In the Health Infrastructure-owned section, the posted speed limit is 50 km/h. Burnside Drive currently carries around 6,000 vehicles per day[4].

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[2] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

[3] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

[4] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

The Lachlan Street/ Hart Street/ Burnside Drive roundabout provides pedestrian refuges on the eastern and western approaches only.

Burnside Drive is shown in Figure 1.18 and Figure 1.19.

Campbell Street

Campbell Street functions as a collector road and is aligned in an east west direction. It is a two-way road configured with one travel lane and one parking lane in each direction.

Kerbside parking is permitted on both side of the road, subject to two-hour time restrictions during weekdays between 8:30am and 6:00pm and Saturday between 8:30am and 12:30pm.

Campbell Street has a posted speed limit of 30 km/h with a school zone operating between 8:00am-9:30am and 2:30pm-4:00pm. Campbell Street currently carries around 4,000 vehicles per day[5].

An existing midblock raised pedestrian crossing is present between Goulburn Street and Forbes Street.

Campbell Street is shown in Figure 1.20 and Figure 1.21.

Figure 1.14:Forbes Street (looking north)

Figure 1.15:Forbes Street (looking south)

Figure 1.16:Lachlan Street (looking east)

Figure 1.17:Lachlan Street (looking west)

[5] Based on the peak hour traffic counts undertaken by GTA on 22 October 2019 and assuming a peak-to-daily ratio of 8% for arterial roads and 10% for local roads.

Figure 1.18:Burnside Drive (looking north)

Figure 1.19:Burnside Drive (looking south)

Figure 1.20:Campbell Street (looking east)

Figure 1.21:Campbell Street (looking west)

Crash Analysis

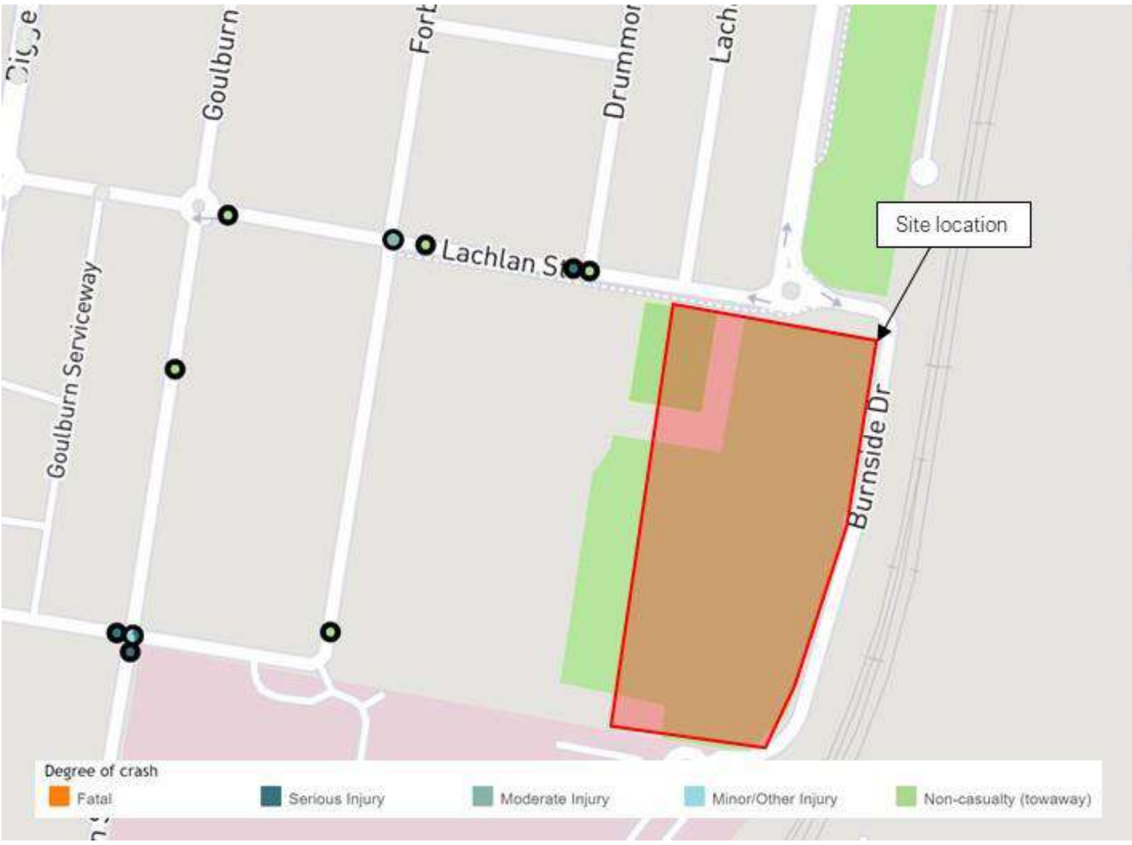
Historical crash data for the road network surrounding the site was sourced for the periods from January 2015 to December 2019. During this period 14 crashes occurred, including:

- 4 crashes resulting in serious injury
- 2 crashes resulting in moderate injury
- 1 crash resulting in minor injury/ other injuries
- 7 crashes non-casualty (towaway) crashes.

Of the 14 crashes that occurred, seven crashes (50 per cent) occurred along the Liverpool High School's frontage with four crashes on Lachlan Street, one crash on Forbes Street and two crashes at the Lachlan Street/ Forbes Street intersection. Two crashes occurred on Goulburn Street, one on Campbell Street and four crashes at the Goulburn Street/ Campbell Street intersection. No crashes involved pedestrians.

Figure 1.22 illustrates the locations of the crashes that occurred between January 2015 and December 2019.

Figure 1.22:Historical crashes, January 2014 to December 2018



Base image source: Transport for NSW Centre for Road Safety, https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4, accessed 1 March 2021

Development Proposal

Two new vehicular crossovers are proposed on Burnside Drive as part of a separate planning approval. One mid-way along Burnside Drive to provide access to the bin collection area for the waste collection vehicle only and a second towards the southern end of Burnside Drive to provide access to the staff-only car parking area.

All student pick-up/ drop-off will occur in the new kerbside parking area along Burnside Drive, with no parent/ guardian vehicles to enter the school site. Refer to the TAIA for further detail.

1.5. Travel Patterns and Travel Demand

1.5.1. Introduction

Our assessment process to evaluate existing travel patterns and demand is informed by the SINSW guidelines; it involves the geospatial analysis of depersonalised student enrolment address data against the underlying walking, cycling and public transport networks. This analysis consequently produces a visualisation and calculation of how many students live within selected walking, cycling and public transport catchments to the school. This data in turn informs the potential maximum number of students that could theoretically use these travel modes to travel to and from school.

1.5.2. Pedestrian Demand

Based on Figure 1.23 and Table 1.3, 71 per cent of existing students live within a 1,200 metre (15 minute) walk from the new school, representing a majority of students who reside within a reasonable walking distance to school. The existing student numbers are based on enrolments at Liverpool Public School that are within NLPS' school catchment.

Figure 1.23:New Liverpool PS Walking Catchments

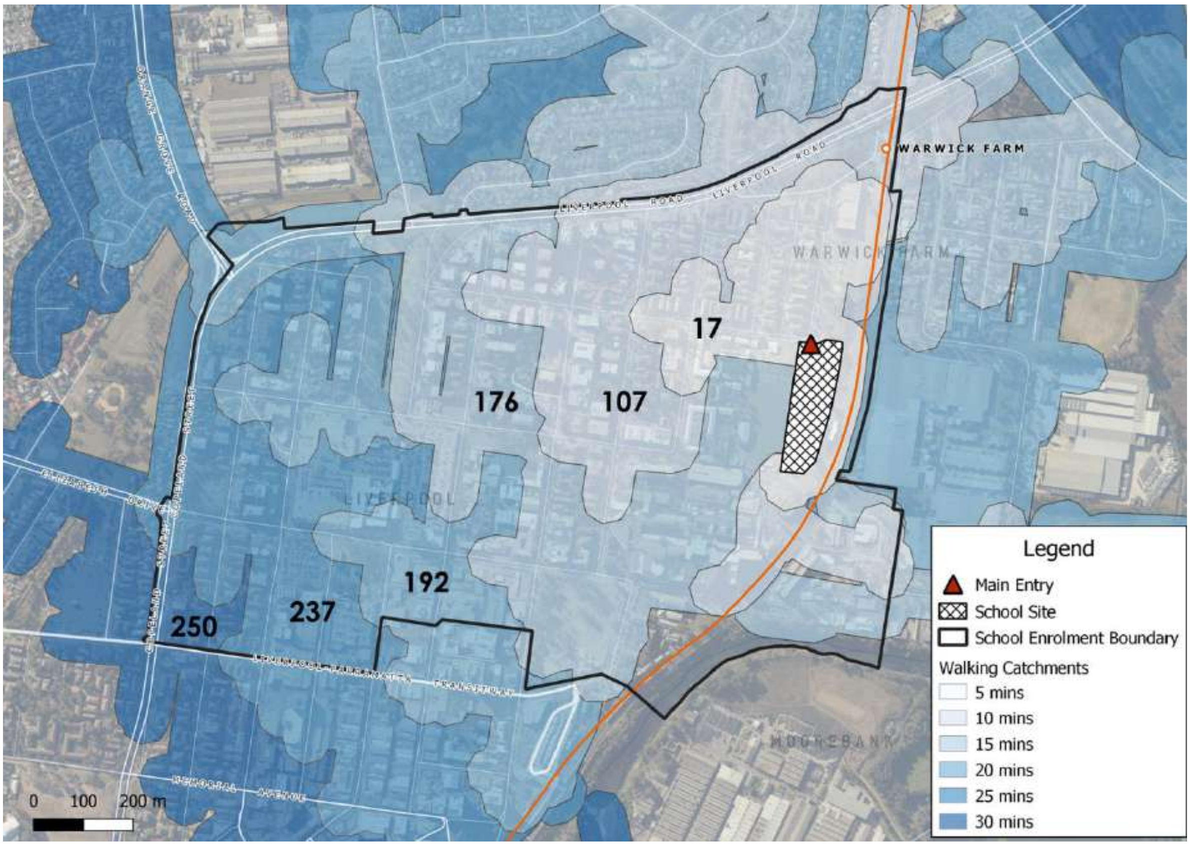


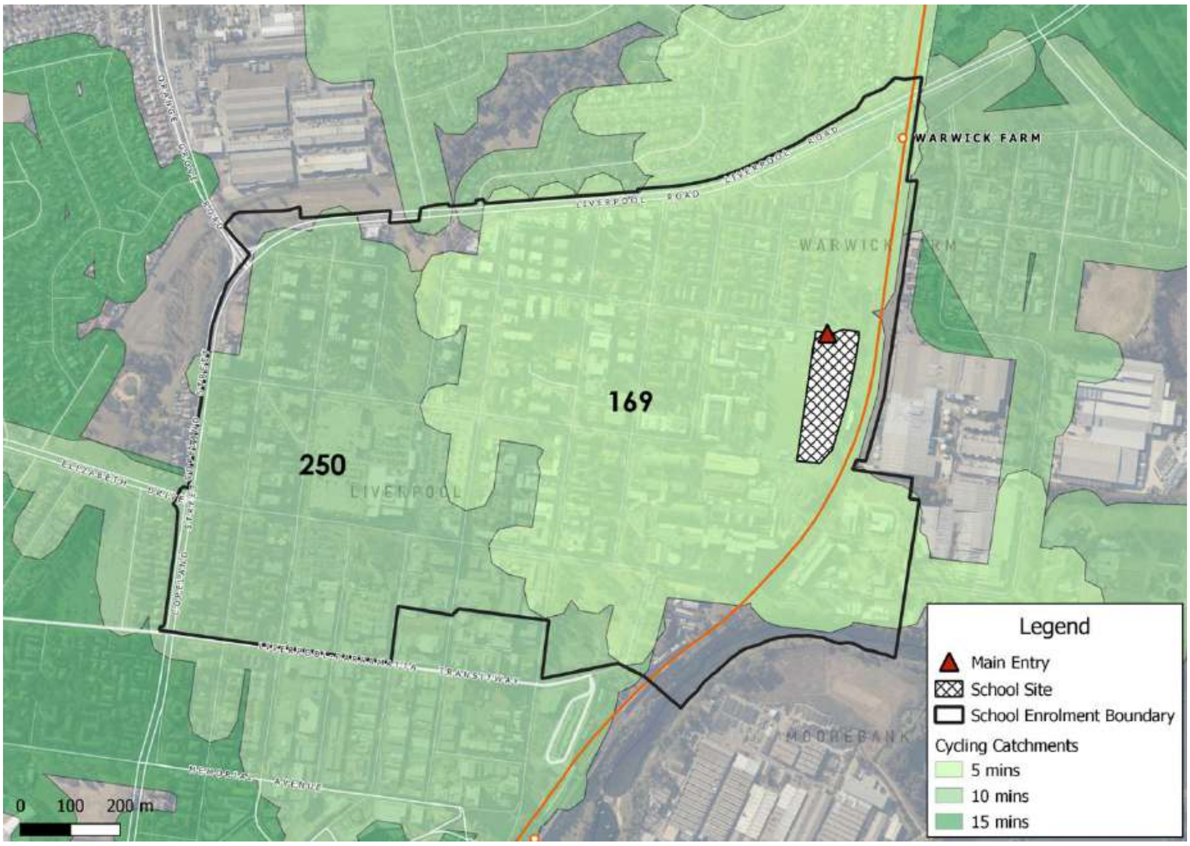
Table 1.3: Summary of existing students living within walking catchments to New Liverpool Public School

Boundary	No. of Students	% Students	Cumulative %
Within 400m	17	7%	7%
Within 401m-800m	90	36%	43%
Within 801m-1200m	69	28%	71%
Within 1201m-1600m	16	6%	77%
Outside 1600m	58	23%	100%
Total	250[6]	100%	

1.5.3. Cycling Demand

Figure 1.24 shows 5 and 10-minute on-path cycling catchments, representing likely durations primary school aged children are likely to cycle to get to school. Whilst this analysis takes into account all students it should be noted that generally Year 5 and Year 6 students are more likely to cycle to school than students of younger years.

Figure 1.24: New Liverpool PS Cycling Catchments



[6] Only includes students whose registered address is within the school enrolment boundary, based on current enrolments at Liverpool Public School

Table 1.4: Summary of existing students living within cycling catchments to New Liverpool Public School

Boundary	No. of Students	% Students
Students within 5-minute cycling catchment	169	68%
Students within 10-minute cycling catchment	81	32%
Total	**250**	**100%**

As shown in Figure 1.24 and Table 1.4, more than two-thirds of students within the enrolment catchment live within a reasonably bikeable five-minute trip to school, and this extends to 100 per cent of the catchment for a ten-minute cycling trip, notwithstanding any infrastructural or safety barriers that may discourage cycling.

1.5.4. Public Transport Demand

As shown in Figure 1.25, the School Student Transport Scheme (SSTS) catchments – both the 1.6km straight line distance and 2.3km walking distance – extend beyond the school's enrolment boundary. As such, no students will be eligible for a free school travel bus pass; they would be eligible for a $55 per term school term bus pass instead.

Figure 1.25:SSTS Catchments

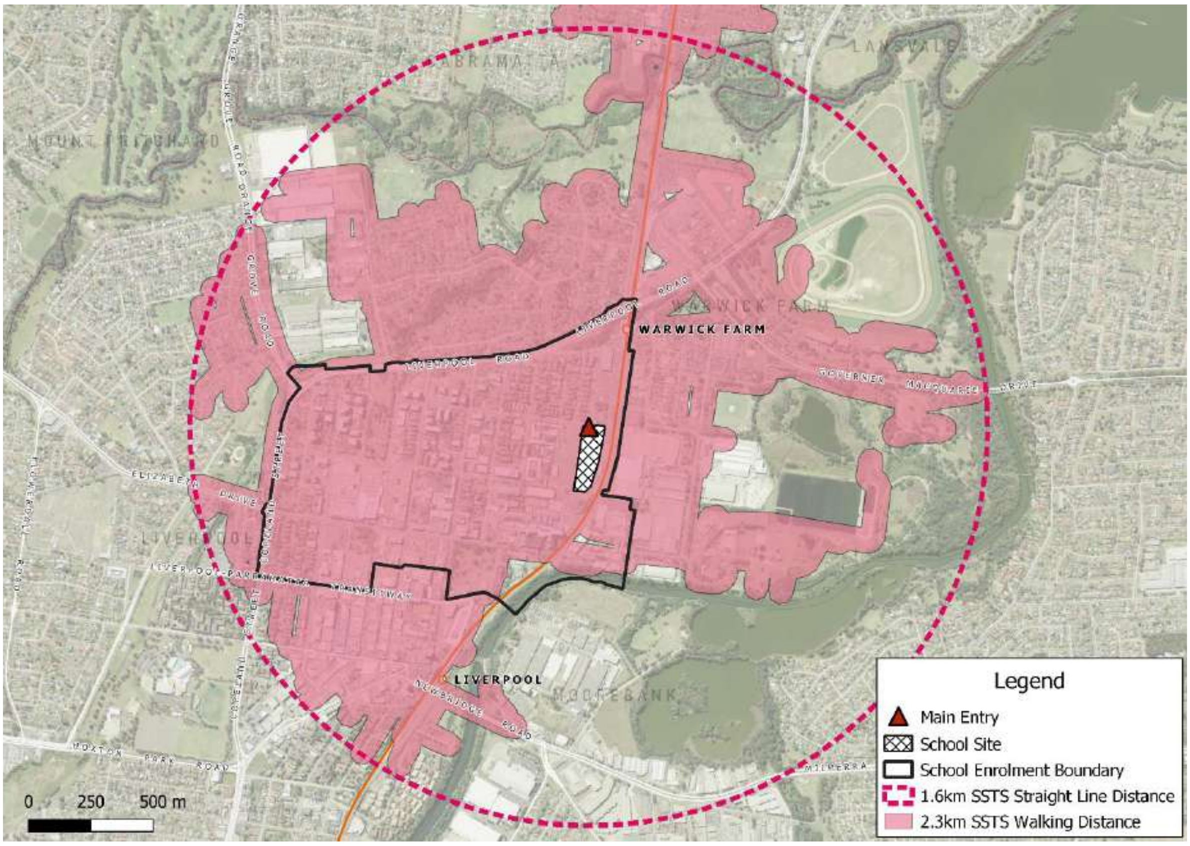


Figure 1.26 shows the 400-metre walking catchment to bus stops that provide a one-seat bus trip to school. As there are no dedicated school buses, these are stops for public bus routes that stop at the nearby bus stops on Forbes Street and Goulburn Street. Based on the spatial analysis carried out to produce Figure 1.26, Table 1.5 shows the number of students within a 400-metre walking catchment to bus stops that are within the school enrolment boundary.

Figure 1.26: Walking catchment to bus stops providing a one-seat bus trip to NLPS

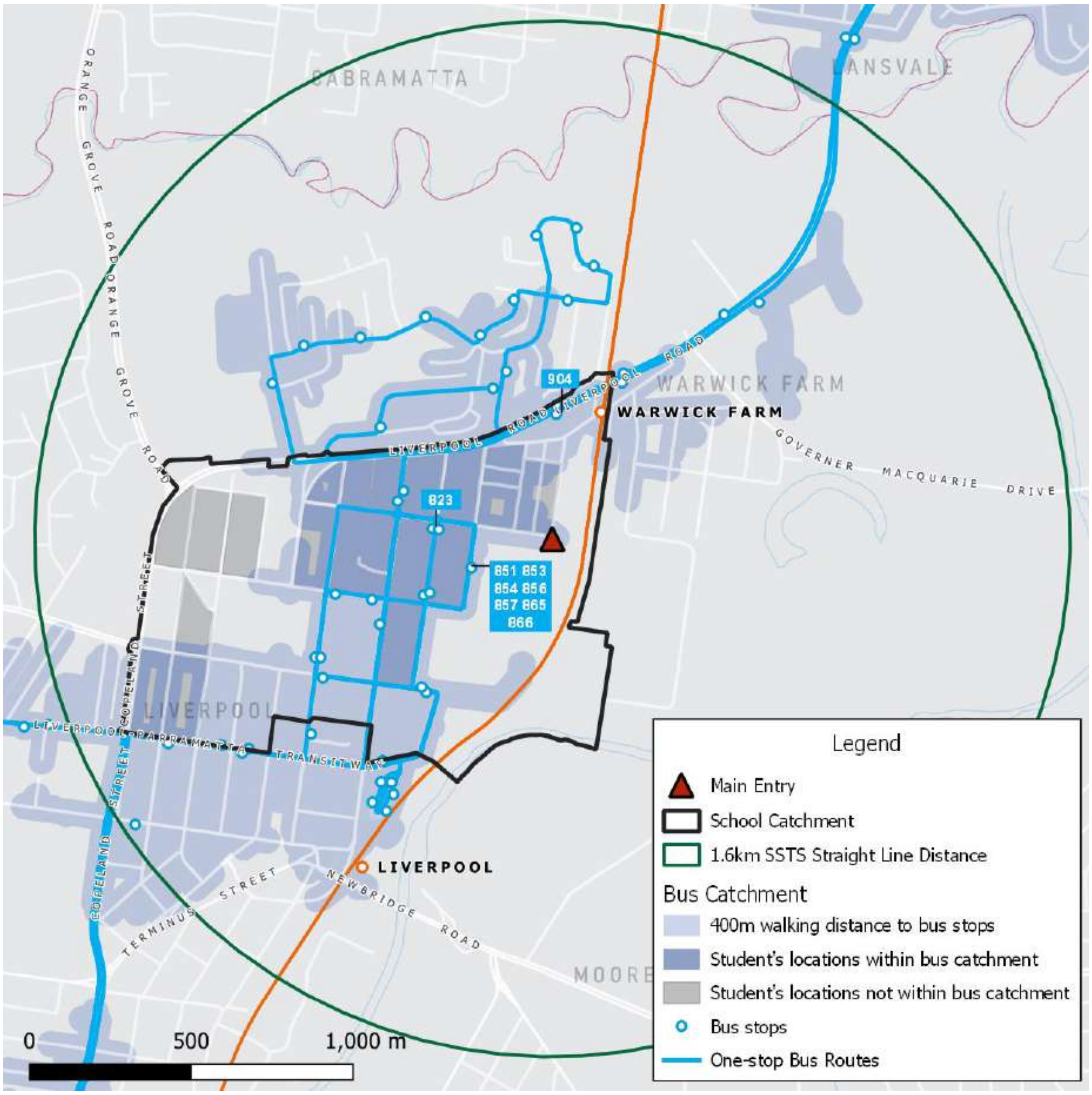


Table 1.5: Number of students within a walking catchment to bus stops

Location	Within 400m Bus Catchment	Not within 400m Bus Catchment
Within 1200m walking catchment	173	19
Not within 1200m walking catchment	45	13
Total	218	32

As shown in Table 1.5, 45 students (or 18 per cent of total) live beyond the 1200m walking catchment to school *and* within a 400m walking catchment to a bus stop. These students, while not eligible for a free bus pass, can still obtain a subsidised school term bus pass for $55 per term.

1.6. Mode Share Targets

1.6.1. Student Targets

As the proposed school is a new development, the 'base case' mode share was prepared using a first principles approach. Data from GTA Consultants' *Trip Generation Surveys, Schools Analysis Report (2014)* was used to show the average modal split of trips to and from primary schools in Metropolitan Sydney. It was found that travel to and from primary schools were primarily comprised of either car or active transport (mainly walking), with a small percentage of public transport usage. A range of mode share usage was noted in the surveyed schools, a result of the built environment characteristics and nature of the families and the jobs they have to do in their daily lives.

The average statistics from the GTA Consultants' *Trip Generation Surveys, Schools Analysis Report (2014)* for Primary Schools within the Sydney Metropolitan area are reproduced in Table 1.6 below:

Table 1.6: Average Sydney Primary School Mode Share

Walk	Bus	Car
53%	2%	45%

With regard to the de-personalised student data, the walking, cycling and bus catchments in Section 1.5 and the Sydney-wide school mode share patterns, the expected mode choice of students based upon their age and distance from school is shown in Table 1.7.

Table 1.7: Expected Use of Mode by Distance from School

Catchment	Walk	Cycle	Bus	Car
Kindergarten to Year 4				
1-400m	High	Low	Low	Low
401m-800m	High	Low	Low	Moderate
801m-1200m	Moderate	Low	Low	Moderate
1201m-1600m	Low	Low	Low	High
1601m+	Low	Low	Low	High
Year 5 and Year 6				
1-400m	High	Low	Low	Low
401m-800m	High	Low	Low	Low
801m-1200m	High	Low	Low	Moderate
1201m-1600m	Low	Low	Low	High
1601m+	Low	Low	Moderate	High

By understanding what kind of transport choices students and their parents are likely to make based on the student's age and distance from the school, an initial base case mode share scenario has been developed. These targets, in Table 1.8, are generally in accordance with the average mode split of primary schools in the Sydney Metropolitan Area.

Table 1.8: New Liverpool Public School Base Case Mode Share

Walk	Cycle	Bus	Car
50%	2.5%	2.5%	45%

However, it is also valuable to understand the shifted mode share that could be achieved in the long-term with the implementation of active transport infrastructure, adjusted public transport services and other sustainable travel programs, as later described in Section 2.2. Table 1.9 depicts the increased propensity of sustainable transport choices and decreased likelihood of private car travel.

Table 1.9: Future Use of Mode by Distance from School

Catchment	Walk	Cycle	Bus	Car
Kindergarten to Year 4				
1-400m	High	Low	Low	Low
401m-800m	High	Low	Low	Low
801m-1200m	High	Low	Low	Low
1201m-1600m	Low	Low	Moderate	High
1601m+	Low	Low	Moderate	High
Year 5 and Year 6				
1-400m	High	Low	Low	Low
401m-800m	High	Low	Low	Low
801m-1200m	High	Moderate	Low	Low
1201m-1600m	Low	Moderate	Moderate	Low
1601m+	Low	Moderate	High	Low

Using this future mode choice likelihood matrix, ‘moderate’ target and ‘reach’ target mode share scenarios have been developed. The moderate target mode share is set between the base case and reach target and is considered a realistic target to strive for in the short-term (e.g. one to two years after opening), while the reach target is an aspirational long-term goal. The reach target is considered a ‘best case scenario’ and reflects the maximum number of students living within reasonable walking and cycling distances to the school or a short walking distance to a bus stop that takes students to school. Accordingly, these aspirational mode share targets are summarised in Table 1.10.

Table 1.10: Future Mode Share Targets

Scenario	Walk	Cycle	Bus	Car
Moderate	60% (+10%)	5% (+2.5%)	5% (+2.5%)	30% (-15%)
Reach	70% (+20%)	7.5% (+5%)	7.5% (+5%)	15% (-30%)

Discussion

Table 1.10 shows a ‘reach’ sustainable transport (active and public transport) mode share target of 85 per cent, with less than one-in-five students travelling to school by private car. While these targets are certainly ambitious, the relatively small school catchment boundary and higher residential density means that most students are within a reasonable walking and cycling distance of the school.

1.6.2. Staff Targets

As stated before, the school is a new development, meaning that there is no existing mode share for both future students and staff. A survey of nearby primary schools – Liverpool Public School (LPS) and Liverpool West Public School (LWPS) – was conducted from 26 November 2019 to 3 December 2019.

79 staff responses were received (64 full-time and 15 part-time), for which 91 per cent travelled to school by private car. Comparing the survey results to the 2016 Census 'Journey to Work' data for the Destination Zone (DZ) shown in Figure 1.27, this indicates that car mode share for the nearby schools' staff is greater than the car mode share for all employees working in the DZ. The full survey results are included in Table 1.11.

Figure 1.27: ABS Census destination zone 115980011

Source: ABS Maps (https://itt.abs.gov.au/itt/r.jsp?ABSMaps), accessed 6 December 2019

Table 1.11: Staff Travel Mode Share – 2019 Survey Results

Mode	Responses	Percentage	Comparison to ABS JTW data[7]
Private car (driver)	72	91%	79%
Private car (passenger)	0	0%	3%
Motorcycle/ Scooter	0	0%	0%
Bus	4	5%	1%
Train	2	3%	13%
Walk	1	1%	2%
Bicycle	0	0%	0%

[7] Note: Australian Bureau of Statistics Journey to Work 2016 census data for destination zone 115980011

Comments from the surveys identify the primary reasons for travel via car to be convenience and using the car to travel elsewhere before or after school. Several respondents also identified infrequent or inconvenient bus services to be a limiting factor in adopting public transport to travel to school.

The target staff travel mode share splits have been developed as follows:

- Mode share targets with substantial reductions in single-vehicle private car trips are targeted, underpinned by the school's development features:
  - as NLPS will be a new school, there is no entrenched culture, precedence, or expectation to provide a high level of car parking for staff members
  - a proportion of parking may be allocated to car-poolers only, promoting multi-occupancy car trips, with an initial allocation of half of the spaces for car-poolers
  - limited on-street and on-site parking availability (33 staff parking spaces only) decreases the attractiveness to drive to school and self-selects for a staff cohort more inclined to travel via public or active transport.
- The reduction in car mode share would be reflected in an uptake in public transport and active transport:
  - increased public transport patronage to 40 per cent, aligning with similar utilisation seen in the Chatswood and Macquarie Park Centres for professionals
  - increased active travel to around 10 per cent.

Table 1.12: Staff Mode Share

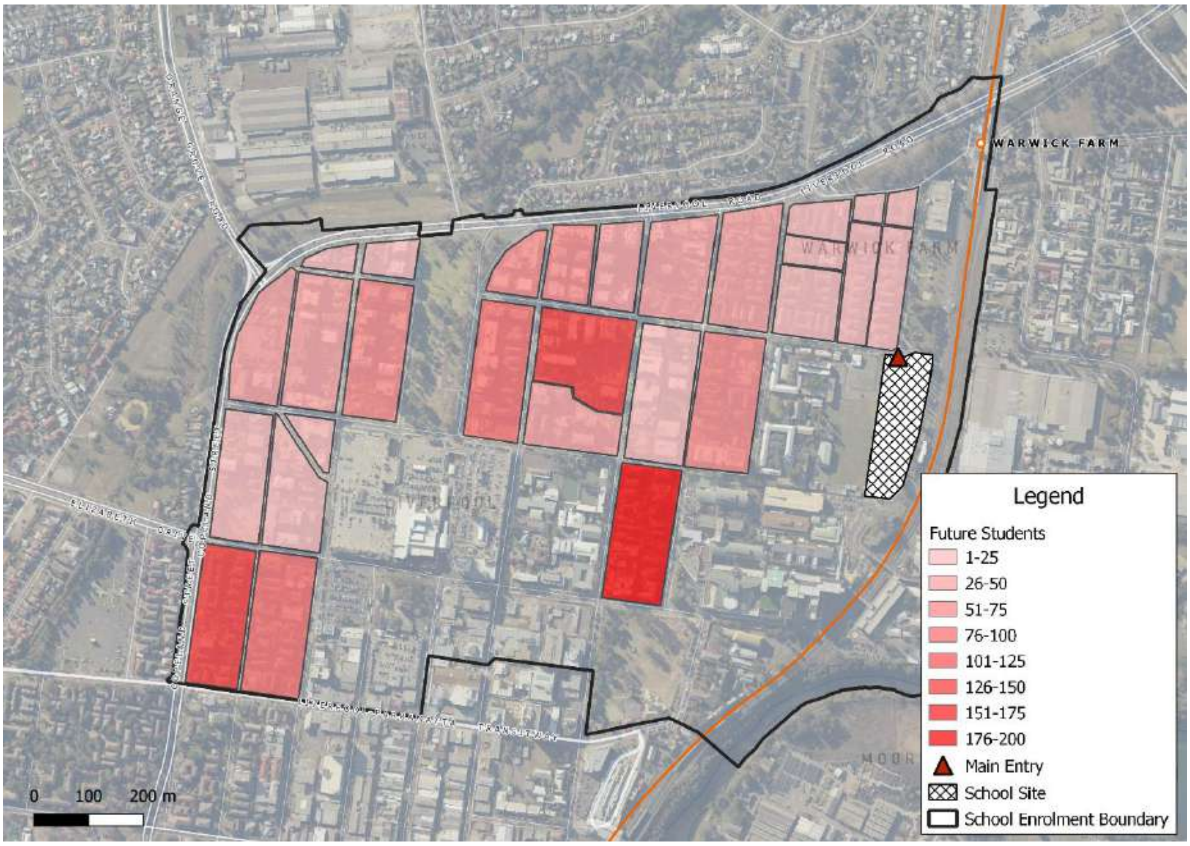
Mode	Base Case Mode Share (based on comparable schools)	Target Mode Share
Private car (driver)	91%	34%
Private car (passenger)	0%	17%
Dropped off (driver does not stay)	0%	0%
Motorcycle/ Scooter	0%	0%
Bus	5%	5%
Train	3%	35%
Bus, then train	0%	0%
Train, then bus	0%	0%
Walk	1%	5%
Bicycle	0%	4%
Other	0%	0%

1.7. Site Access Transport Provisions

1.7.1. Pedestrian Access

While there are currently only 250 students within the proposed school enrolment catchment, residential growth in the Liverpool CBD is anticipated to meet the school's upper limit capacity of 1,200 (excluding pre-school and support unit students). Using the current density and distribution of students, a multiplier of 4.8 to existing street block populations has been applied as a proxy for the future distribution of NLPS students, shown in Figure 1.28.

Figure 1.28: Estimated Future Student Population Distribution



As the 1200-metre walking catchment – shown in Figure 1.29 and Figure 1.30 – only extends as far as Macquarie Street, it is only street blocks to the east of Macquarie Street that are relevant for further analysis. In order to understand what pedestrian infrastructure may be appropriate for the NLPS, the future street block density data has informed the development of the 'moderate' and 'reach' scenario pedestrian volumes. In alignment with the mode share targets set in Table 1.10 prior, the volumes reflect the 'moderate' target of 60% walking and 'reach' target of 70%. Figure 1.29 and Figure 1.30 show the 'journey to school' morning volumes for each footpath segment, accumulating to higher numbers with the increasing proximity to the school.

Additionally, the base case crossing facilities are shown existing crossing facilities in blue, and the development proposal's new crossings in purple. Note that the volumes shown are associated with high-level estimated walking activity to the school only; they do not incorporate other walking activity that would also be present.

Figure 1.29:Projected NLPS Student Pedestrian Volumes – Moderate Scenario

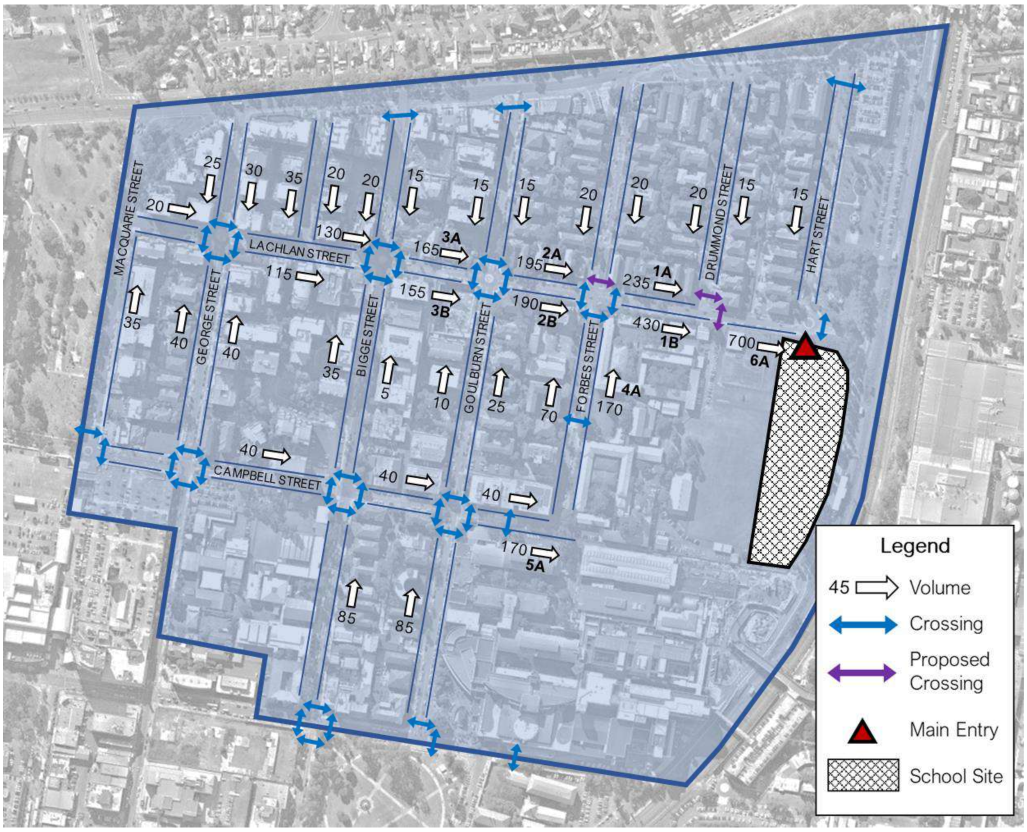
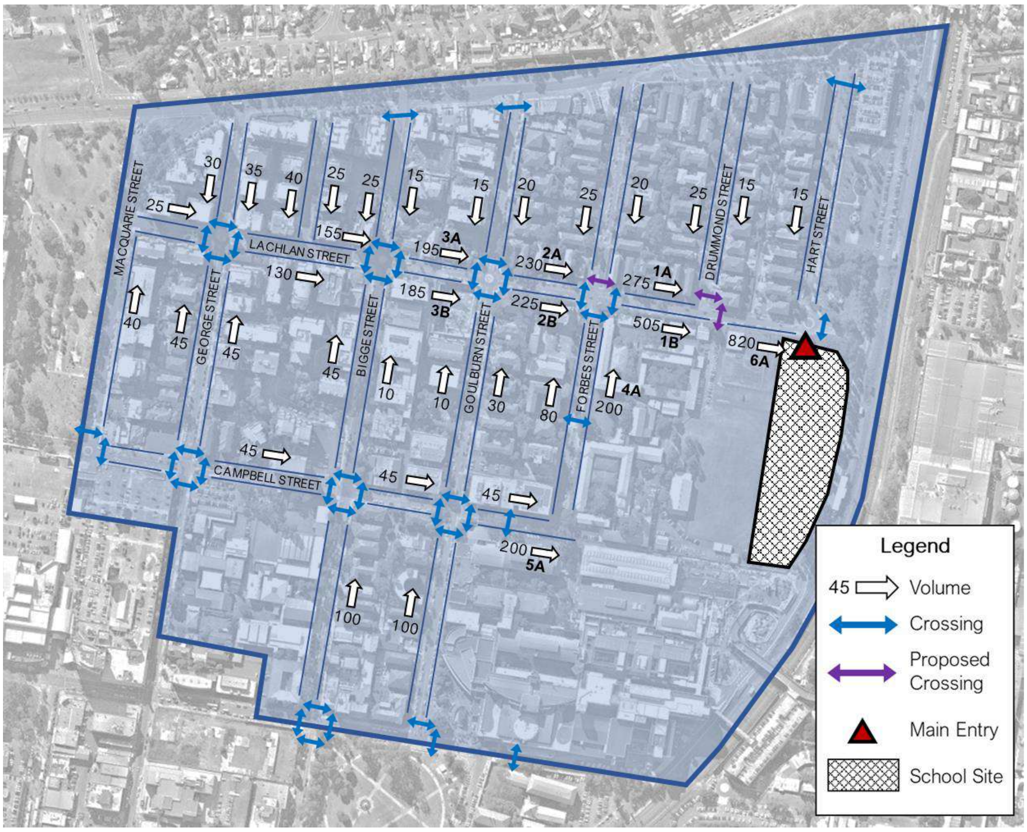


Figure 1.30:Projected NLPS Student Pedestrian Volumes – Reach Scenario



The high-volume footpath segments – and their corresponding volumes by scenario – are summarised in Table 1.13. The reference codes (e.g. 1A) are used as shorthand to easily identify the specific footpath segments and recur throughout the remainder of this section.

Table 1.13: Future Projected High Volume Footpath Segments

Ref	Street	Side	From	To	Students		
					Base	Moderate	Reach
1A	Lachlan Street	North	Forbes Street	Drummond Street	195	235	275
1B	Lachlan Street	South	Forbes Street	Drummond Street	360	430	505
2A	Lachlan Street	North	Goulburn Street	Forbes Street	165	195	230
2B	Lachlan Street	South	Goulburn Street	Forbes Street	160	190	225
3A	Lachlan Street	North	Bigge Street	Goulburn Street	140	165	195
3B	Lachlan Street	South	Bigge Street	Goulburn Street	130	155	185
4A	Forbes Street	East	Campbell Street	Lachlan Street	145	170	200
5A	Campbell Street	South	Goulburn Street	Forbes Street	145	170	200
6A	Lachlan Street	South	Drummond Street	School Entry	585	700	820

Adequacy of Footpath Widths

To assess the adequacy of the existing footpath widths on expected high-volume streets, a Fruin Level of Service (LOS) assessment can be used to understand the performance of pedestrian space under certain conditions. The levels of service are categorised between LOS A (free flow conditions) and F (a complete breakdown in flow). The Fruin LOS criteria is typically applied to areas where pedestrians are traversing, such as footpaths. These criteria are summarised in Figure 1.31.

Figure 1.31:Fruin Level of Service criteria

Level of Service	**Flow Rate** *(pedestrian/minute/meter)*	**Density** *(pedestrian per squared meter)*
A	≤ 7	≤ 0.08
B	7 - 23	0.08 - 0.27
C	23 - 33	0.27 - 0.45
D	33 - 49	0.45 - 0.69
E	49 - 82	0.69 - 1.66
F	≥ 82	≥ 1.66

Source: Fruin (1971)

Considering the Fruin Level of Service criteria, Table 1.14 shows the varied LOS criteria for each of the high-volume footpaths within the walking catchment.

Table 1.14: Future Projected Level of Service Criteria by Footpath Segment

Ref	Existing Width (m)	LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
1A	1.2	0-8	8-28	28-40	40-59	59-98	98+
1B	3.0	0-21	21-69	69-99	99-147	147-246	246+
2A	1.2	0-8	8-28	28-40	40-59	59-98	98+
2B	3.0	0-21	21-69	69-99	99-147	147-246	246+
3A	1.8	0-13	13-41	41-54	54-88	88-148	148+
3B	2.0	0-14	14-46	46-66	66-98	98-164	164+
4A	3.0	0-21	21-69	69-99	99-147	147-246	246+
5A	3.0	0-21	21-69	69-99	99-147	147-246	246+
6A	2.7	0-19	19-62	62-89	89-132	132-221	221+

Note: values shown as ppm (person per minute).

Regarding the analysis for this STP, it should be noted that the analysis of pedestrian volumes *only* involves the expected students of the NLPS and their parents/ carers; i.e. it does not consider other students or pedestrians. Recognising that students in grades Kindergarten to Year 4 (five of the seven grades) are highly likely to be accompanied by a parent, and that these parents will walk both to *and* from the school in a single journey (either morning drop-off or afternoon pick-up), the following multiplier has been applied to the projected volumes:

$$student\ pedestrian\ volume + \left(student\ pedestrian\ volume \times \frac{5}{7}\ grades \times 2\ trips\right) = final\ pedestrian\ volume$$

To then understand the flow rate (persons per minute), the final volume is divided by 30, as it is expected that all trips will be distributed over a half an hour period. Demonstrating this methodology for the footpath 6A 'reach' scenario, for example, shows the flow rate calculation as follows:

$$820\ students\ walking + \left(820 \times \frac{5}{7}\ grades \times 2\ trips\right) \div 30\ minutes = 66.4\ persons\ per\ minute$$

In the above example, 66 persons per minute on footpath 6A results in a LOS C.

Applying the Fruin LOS criteria to footpaths 1A to 6A, Table 1.15 shows the LOS of existing footpath widths for all three scenarios, assuming that all walking trips occur evenly within a half-hour period before and after school. Figure 1.32 depicts the expected LOS results for the high-volume footpaths in the 'reach' scenario.

Table 1.15: Existing Widths and Expected Level of Service by Scenario

Ref	Existing Width (m)	Base LOS	Moderate LOS	Reach LOS
1A	1.2	B	B	B
1B	3.0	B	B	B
2A	1.2	B	B	B
2B	3.0	A	A	A
3A	1.8	A	B	B
3B	2.0	A	A	B
4A	3.0	A	A	A
5A	3.0	A	A	A
6A	2.7	B	B	C

Figure 1.32: Expected Reach Scenario Level of Service

In the 'moderate' scenario, the expected NLPS student volumes equate to LOS A or B for all of the high-volume footpaths. However, in the 'reach' scenario, the increased volumes shift footpath 6A from LOS B to LOS C, meaning that there is slightly restricted circulation and difficulty passing others. However, the existing footpath widths are adequate and meet minimum requirements for the base scenario.

In anticipation of achieving the 'reach' scenario, it is recommended that footpath 6A is increased to a width between 3.0m and 4.0 metres. Further, if student walking volumes are higher than expected, or if students are regularly observed to be walking on the grass verge, it is recommended that footpaths are considered for widening.

Finally, the two north-south median refuge crossings at the Lachlan Street – Forbes Street intersection are not compliant with current best practice and do not provide sufficient safety for children walking to and from school. Using the *Australasian Pedestrian Facility Selection Tool [V2.2]*[8], a zebra crossing, kerb extension or signalised crossing are not appropriate within the local context.

Alternatively, it is recommended that the existing low-form refuge islands are replaced with standards-compliant refuges, ensuring that enough width is provided in the crossing gap for both pedestrians and cyclists.

Figure 1.33:Non-Compliant Island at Lachlan Street

1.7.2. Cycling Access

To encourage students to cycle to and from school, and to reach the 'moderate' scenario target mode share of 5%, delivery of additional cycling infrastructure will be required. The existing facilities are fragmented and do not sufficiently provide key trunks of safe cycling infrastructure, appropriate for all ages. Figure 1.34 shows the recommended cycling infrastructure, in alignment with the Liverpool City Council *Bike Plan*.

[8] *Austroads Pedestrian Facility Selection Tool:* https://austroads.com.au/pedestrian-tool/assets/docs/Feasibility-diagrams_V2-2.pdf?fbclid=IwAR2GfmnYAm_-FNMCu7ZlylIYlHy2tVGFyGwMcA4DpBn_5HRVEzunflvf56E

Figure 1.34:Moderate Scenario Cycling Infrastructure

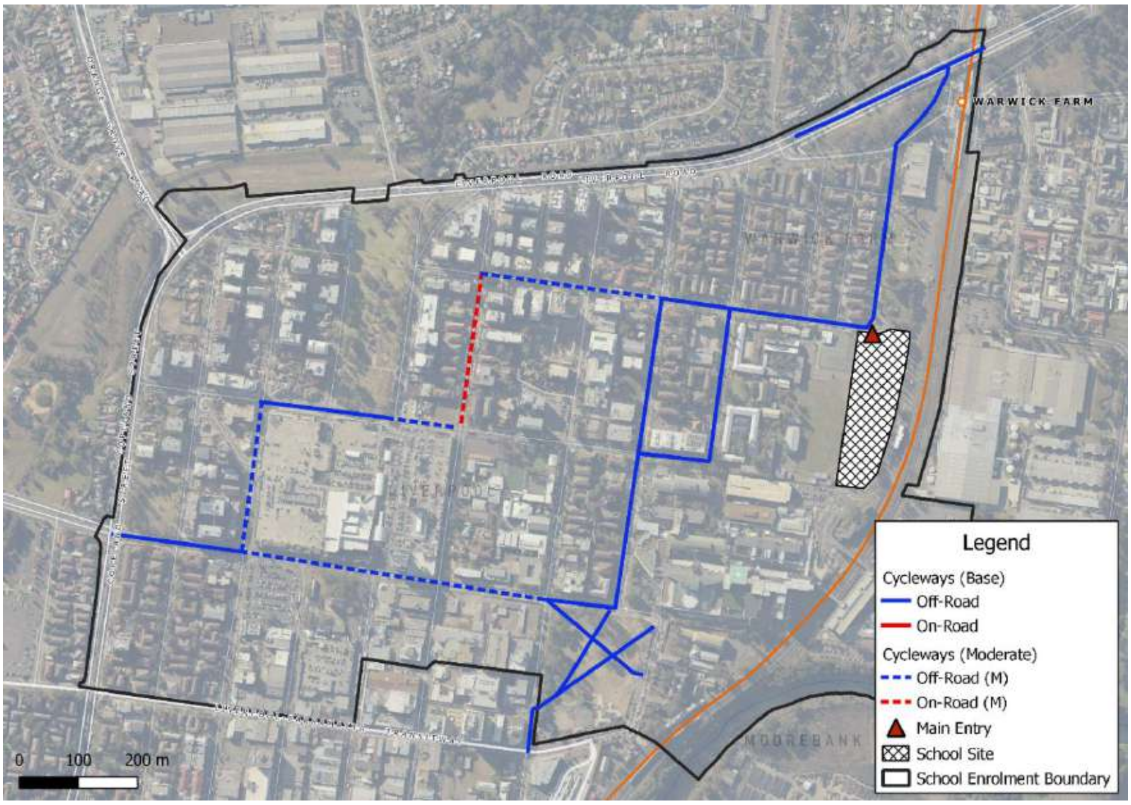


Table 1.16: Summary of Proposed Cycling Works – Moderate Scenario

Street	From	To	Typology	Responsibility
Lachlan Street	Goulburn Street	George Street	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
George Street	Lachlan Street	Campbell Street	On-Road	SINSW working in collaboration with Liverpool City Council will investigate
Campbell Street	Macquarie Street	George Street	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Bathurst Street	Campbell Street	Elizabeth Drive	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Elizabeth Drive	Bathurst Street	Bigge Street	Off-Road	SINSW working in collaboration with Transport for NSW will investigate (Principal Bicycle Network route)

It should be noted that while the recommendation of George Street as an on-road cycling facility is to ensure congruence with Liverpool Council's *Bike Plan*, consideration should be given to its delivery as an off-road facility, providing additional safety and comfort for the NLPS students that may ride to school.

The 'reach' scenario recommended infrastructure involves full delivery of Council's proposed cycling network within the school enrolment boundary.

Critical to delivery of this stage is a *new* signalised pedestrian and cyclist crossing at the intersection of Lachlan Street and Macquarie Street, without which there is no safe and direct east-west access between the school and the residences to the west of Liverpool Pioneers' Memorial Park.

Figure 1.35:Reach Scenario Cycling Infrastructure

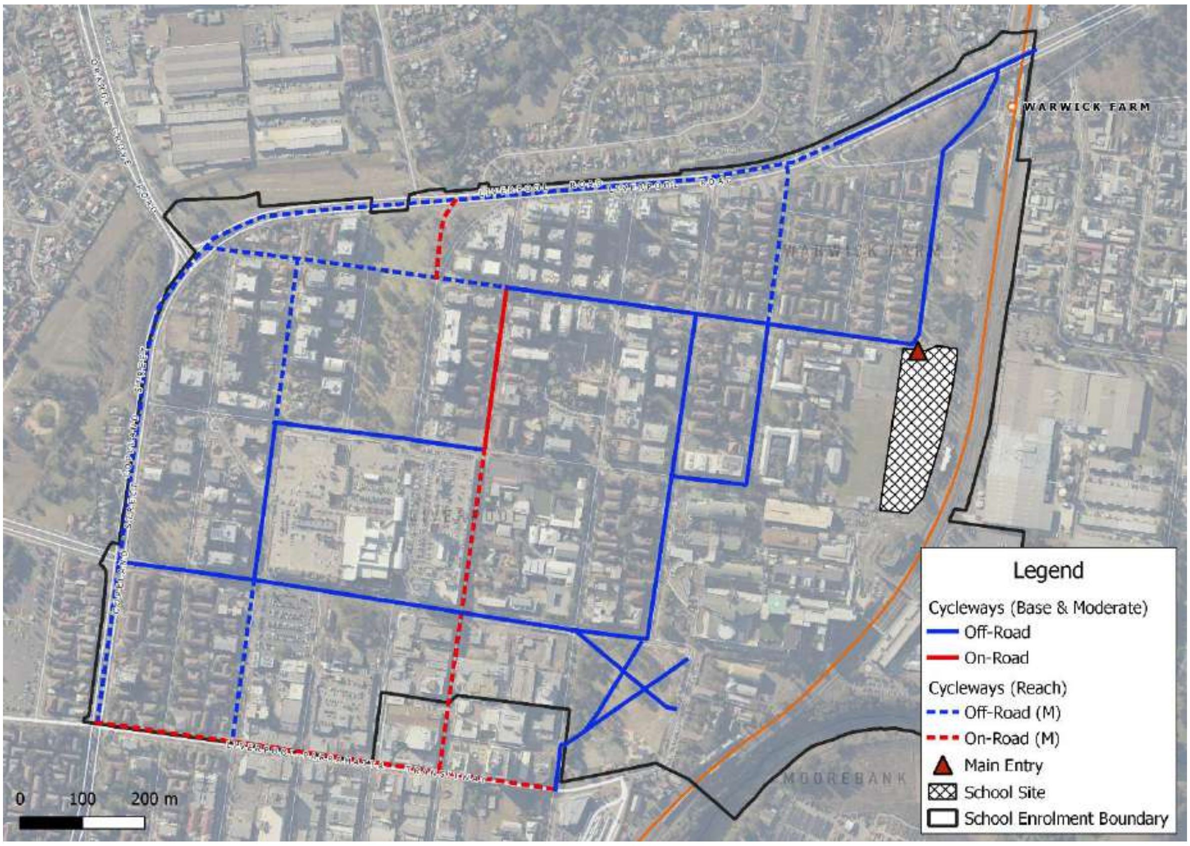


Table 1.17: Summary of Proposed Cycling Works – Reach Scenario

Street	From	To	Typology	Responsibility
Forbes Street	Lachlan Street	Hume Highway	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Bathurst Street	Moore Street	Elizabeth Drive	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Bathurst Street	Campbell Street	Lachlan Street	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Lachlan Street	George Street	Hume Highway	Off-Road	SINSW working in collaboration with Liverpool City Council will investigate
Moore Street	Hume Highway	Bigge Street	On-Road	SINSW working in collaboration with Liverpool City Council will investigate
George Street	Moore Street	Campbell Street	On-Road	SINSW working in collaboration with Liverpool City Council will investigate

Street	From	To	Typology	Responsibility
Macquarie Street	Lachlan Street	Hume Highway	On-Road	SINSW working in collaboration with Liverpool City Council will investigate
Hume Highway	Moore Street	Remembrance Avenue	Off-Road	SINSW working in collaboration with Transport for NSW will investigate (Principal Bicycle Network route)
Signalised Crossing	Intersection of Lachlan Street and Macquarie Street			SINSW working in collaboration with Liverpool City Council and Transport for NSW will investigate

Bicycle/ Rideables Parking Provision

As part of the development proposal, 60 bicycle/ rideables (e.g. scooters) parking spaces are provided south of the support unit building. Table 1.18 shows that this level of provision is sufficient to meet not only the base case prediction of 30 cyclists/ riders, but also the moderate scenario figure of 50. If New Liverpool Public School were to effectively meet its moderate cycling mode share target, consideration should then be given to the introduction of an additional 40 bicycle/ rideables parking spaces to meet the long-term reach target.

Table 1.18: Parking Provision

Facility	Development Proposal	Base Case	Moderate Scenario	Reach Scenario	Responsibility
Bicycle/ Rideables Racks	60	30	50	90	SINSW

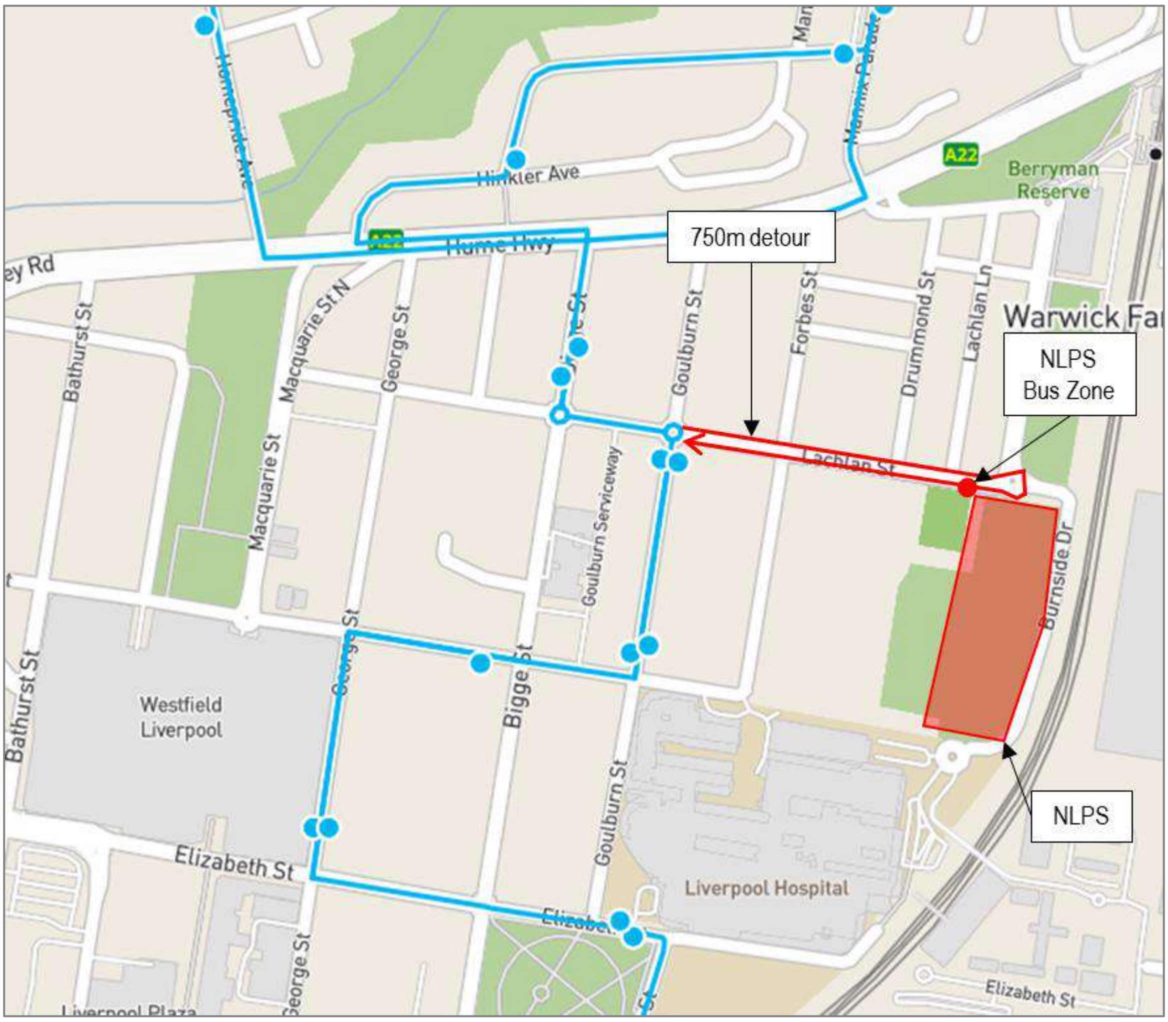
1.7.3. Public Transport Access

The proposed bus zone – described in Section 1.4.4 – is currently proposed for school excursion coaches only, however consideration for twice-a-day diversion of public bus services can be explored in consultation with the bus operators. It is recommended that such a diversion is at least considered, for both the ‘moderate’ and ‘reach’ scenarios.

Two potential bus services are identified, the 823 Liverpool to Warwick Farm (Loop Service) and the 904 Fairfield to Liverpool (and vice versa). This would require a 750-metre detour for the 823 service (approximately 1.5 minutes at 30 km/h, plus pick-up/ set-down time) and a 1000-metre detour for the 904 service (approximately 2 minutes at 30km/h, plus pick-up/ set-down time). This is indicatively illustrated in Figure 1.36, Figure 1.37, and Figure 1.38. These extensions would benefit students who live towards the south-west of the school catchment and provide them with a bus stop (at Westfield Liverpool, George Street) which would be within a 10-minute walk of their residence.

As per the NSW *Guide to Appointed School Bus Stops*, to establish a new bus stop, it must first be appointed by Transport for NSW or a bus operator. Following this, the roads authority for the road approves the appointed bus stop. Burnside Drive and Lachlan Street are classified as local roads hence the relevant authority is Liverpool City Council.

Figure 1.36:Route 823 Liverpool to Warwick Farm (Loop Service) potential extension



Base Image Source: https://transportnsw.info/routes/details/sydney-buses-network/823/22823, accessed 10 May 2021

Figure 1.37:904 Fairfield to Liverpool potential extension

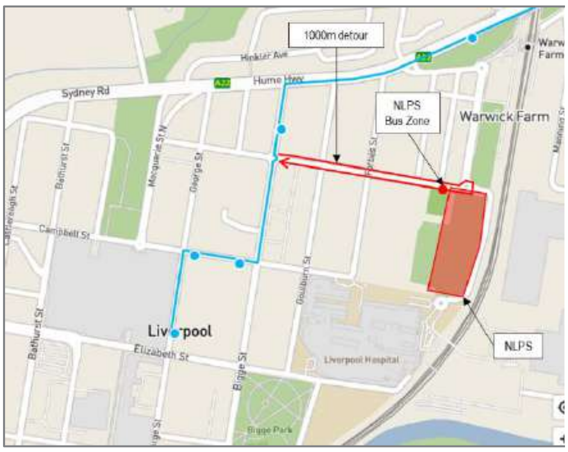
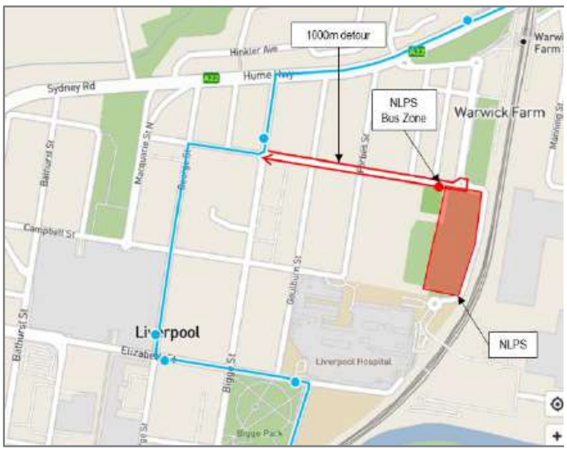


Figure 1.38:904 Liverpool to Fairfield potential extension



Base Image Source: https://transportnsw.info/routes/details/sydney-buses-network/904/38904, accessed 10 May 2021

2. STUDENT TRANSPORT PLAN

02

2.1. Executive Summary

This Student Transport Plan addresses the State Significant Development Application requirements for the development of the New Liverpool Public School (NLPS), which will result in a full student body of 1200 (excluding pre-school and support unit students). This Student Transport Plan has been prepared with reference to the Department of Education Transport Assessment Background and Reporting Requirements, Section C: School Transport Plan.

This Student Transport Plan has been informed by the preceding transport assessment, which comprised a spatial analysis of student enrolments and the geographic distribution of students in relation to the school, desktop-based site investigations, the setting of base case, moderate and reach travel mode share targets and a discussion of potential site access infrastructure associated with these target scenarios.

While the proposed targets for active and sustainable travel are aspirational, there is an opportunity to shift and shape active and sustainable travel behaviours through the school's development. With a mindset of actively encouraging and promoting sustainable travel, the NLPS can become an exemplar for use of active and public transport modes for similar schools in the nearby region.

Proposed measures include:

- Sustainable transport encouragement programs to increase the rate of walking and cycling to school
- Efforts to increase registration into the School Student Transport Scheme (SSTS), which is used by school bus operators and Transport for NSW to measure the demand for a dedicated school bus
- Communications program to convey positive road safety messaging and expected standards of behaviour for kiss and drop near the school.

2.2. Action Plan

2.2.1. Transport Objectives

Achievable and aspirational transport objectives and mode share targets have been designed with the following guiding principle:

1. Support the implementation of the sustainable travel program with resources to enable the aspirational sustainable travel targets to be achieved in the future through increased uptake of public transport and increased active travel modes like walking and cycling to NLPS.

Accordingly, the Student Transport Plan's objectives are:

1. To proactively identify and meet school travel demand safely, efficiently and sustainably;
2. To maximise the use of active and public transport modes to reduce car traffic before and after school day start and end times;
3. To increase active travel to and from school in a safe transport environment; and
4. To enhance connectedness to neighbourhood and community through safe travel to and from school.

2.2.2. Mode Share Targets

A range of mode share targets were explored in the preceding transport assessment, comprising the base case, moderate and reach targets. Based on this assessment, the moderate target has been used for school travel in the short-term, for example, following the end of the development construction and the first few years after school opening. The moderate targets are shown in Table 2.1.

Table 2.1: Moderate Scenario NLPS Mode Share Targets (assuming a roll of 1000 students)

Walk	Cycle	School Bus	Car (kiss and drop)
60%	5%	5%	30%
600 students	50 students	50 students	300 students

However, it is also valuable to understand the mode share that could be achieved in the long-term with the implementation of a coordinated and resourced suite of sustainable travel programs as will be proposed later in this Student Transport Plan. Using the reach target as the future aspirational mode share and with support of the proposed programs, it is foreseeable that as many as 70 per cent of students and 7.5 per cent of students walk and cycle respectively to school. These aspirational mode share targets are summarised in Table 2.2.

Table 2.2: Reach Scenario Mode Share Targets (assuming a roll of 1200 students)

Walk	Cycle	School Bus	Car (kiss and drop)
70%	7.5%	7.5%	15%
840 students	90 students	90 students	180 students

2.2.3. Programs

The following Sustainable Travel Action Plan includes a range of initiatives and actions, including some to be completed and implemented prior to the opening of the new school buildings, that will help to achieve the mode share targets and reduce the overall car travel associated with the school. Unless explicitly stated as a 'reach' scenario intervention/initiative, all proposals included in the Action Plan have developed to achieve the 'moderate' scenario mode share targets.

Travel Coordinator

As recommended in the SINSW guidelines for Transport Assessments and Student Transport Plans, a School Travel Coordinator is required for the duration of construction and first year of post-occupancy and transport programs must be implemented to achieve travel behaviour change.

A fundamental enabler of a successful program to uplift increased use of public transport and uptake of active travel to school is adequate resourcing.

While the implementation of programs such as Independent Travel Training and Walk Safely to School Day have traditionally been the responsibility of the School Principal, it is recommended that the School Principal is supported with a resource to assist implement, measure and monitor the active travel programs to reduce the administrative burden on school staff.

The role of the Travel Coordinator would include implementing the Sustainable Travel Action Plan and Communications Plan as outlined in this Student Transport Plan, measuring the participation of the program and collecting data on the way staff and students travel to/ from school and then recommending improvements to the program to assist NLPS meet its moderate and reach travel mode share targets.

This role is typically initially funded by the project during delivery. After year 1, subsequent arrangements for carriage of this role should be discussed between SINSW, Department of Education and TfNSW.

The actions need to be reviewed on a regular basis, at least annually, to review the actions and refine as the school community needs may change over time.

Table 2.3: Sustainable Travel Action Plan

Strategy	Action	Target Audience	Timeframe	Responsibility
Enabling active travel through resourcing				
Travel Coordinator	Progress the appointment of a Travel Coordinator for the New Liverpool Public School. This would include scoping the role and procuring a contractor, or other to promote, coordinate and monitor the implementation of the sustainable travel initiatives.	N/A	Prior to school opening	Department of Education led by Project Director and School Principal
Recurrent funding submission	Department of Education to confirm a budget for recurrent funding to enable mode shift from car to active which would fund Travel Coordinator and associated program costs (communications, participation costs).	N/A	Prior to school opening	Department of Education led by Project Director and School Principal
Sustainable Transport Programs to be coordinated by a Travel Coordinator				
Ride-to-School day	School participates in Ride-To-School day. This provides an opportunity for students, parents and teachers to try riding, walking, skating or scooting to school as well as celebrating the regular walkers and riders. Further information: www.bicyclenetwork.com.au	Staff, parents and students	In first year of opening and then annually	Travel Coordinator
Walking buddy program	Pair older students (year 5&6) with younger students who live close together to walk to school as a pair or small group.	Parents and students	In first year of opening and ongoing	Travel Coordinator
Walking School Bus (WSB) scheme	Research a sustainable alternative to walking school buses as this is volunteer dependent and may not have ongoing support. The concept is an organised group who walk to schools guided by two adults.	Parents and students	In first year of opening and ongoing	Travel Coordinator
Walk Safely to School Day	Promote and take part in ‘Walk Safely to School Day’. Further information: www.walk.com.au	Staff and students	In first year of opening and then annually	Travel Coordinator
School Student Transport Scheme (SSTS)	Promote this scheme among the school community. Applications to the SSTS, for subsidised school term bus pass (students living within 1.6km from the school), are used as an indicator for demand for a dedicated school bus by Transport for NSW. Therefore, there needs to be an uplift in applications to the scheme to justify a dedicated school bus or the proposed selected diversions to the public buses to help achieve the proposed school travel targets.	Parents and students	Prior to opening and ongoing	Travel Coordinator
Reduce car travel				
Staff car-pooling	Establish a car-pooling scheme that enables staff to share their car trip to the school with more than 1 person in the car, reducing cars travelling to the school.	All staff	In first year of opening and ongoing	Travel Coordinator
Parents Car Pooling initiative	Discuss the idea of a car-pooling scheme for parents to share the transport of students to/ from school and encouraging more than 1 student in the car for each drop-off and pick up	All parents	In first year of opening and ongoing	Travel Coordinator

Strategy	Action	Target Audience	Timeframe	Responsibility
Seek assistance from Transport for NSW for school bus services				
Dedicated school bus service	Depending on the uptake of the SSTS from the school community as facilitated by the Travel Coordinator, liaise with Transport for NSW's Travel Demand Management and Short-Term Bus Service Planning teams to explore the feasibility of a dedicated school bus or proposed diversions to the public buses.	Students	Within three years after school opening	Travel Coordinator, relevant staff at Transport for NSW
Infrastructure and environmental elements to encourage active travel to school				
Widened footpaths	Deliver the recommended footpath widening works on Lachlan Street. ['Reach' scenario only]	Students and parents	Within five years after school opening	SINSW, Liverpool City Council
Replacement of refuge islands at Lachlan Street - Forbes Street intersection	Replace existing low-form refuge islands with new best practice-compliant refuges, providing sufficient safety for children walking to and from school.	Students and parents	Prior to school opening	SINSW
Cycling infrastructure	Deliver off-road cycling infrastructure, as per the 'moderate' (Figure 1.34) and 'reach' (Figure 1.35) scenarios, creating a viable network for students to safely cycle to and from school.	Students	Within three years after school opening	SINSW, Liverpool City Council
Signalised intersection	Investigate delivery of a new signalised pedestrian and cyclist crossing at the intersection of Lachlan Street and Macquarie Street. ['Reach' scenario only]	Students	Within three years after school opening	SINSW, TfNSW, Liverpool City Council
Additional actions				
Inspire the school community towards active transport to school as a vision for the school and its community	Communicate to Staff and Students key messages to promote sustainable travel including targets and actions outlined in the Student Transport Plan, through the Communications Plan (see below). Travel Coordinator to prepare messaging for School Principal	Staff, students and parents	Per communication plan	Travel Coordinator to prepare messaging for the School Principal to send out
Transport Access Guide (TAG)	Prepare a transport access guide for New Liverpool Public School and publish on the school website and other school communication mediums so that it is easy to understand the options to travel to school using active modes or public transport.	Staff, students and parents	Per communication plan	Travel Coordinator

2.2.4. Communication Plan

This Communication Plan provides a guide for some of the messages that the School Principal may communicate to promote uptake of walking, cycling and bus to school, which the Travel Coordinator will prepare in advance.

Table 2.4: New Liverpool Public School Communication Plan

What	When	Which Channel	To Whom
Share the vision and targets for the number of children targeted to walk, ride or catch a bus to school.	Before school opens and periodically throughout the year	Online school communication channels (e.g. Facebook page)	Staff, parents and students
Share the walking, cycling and bus transport options to get to New Liverpool Public School, drawing from the TAG. Note: Public school websites also have standardised transport information available to parents and students.	On the school website at all times	Facebook School website	Staff, parents and students
Promote that students would be able to access discounted or free travel by signing up to the SSTS to encourage use of public transport as a sustainable travel option.	Regular periodic updates	Facebook	Parents
Promote and encourage participation in National Ride2School Day.	Prior to the annual event in March.	Facebook	Staff, parents and students
Promote Walk Safely to School Day. Materials available at walk.com.au	Prior to the annual event in May	Facebook	Staff, students and parents
Communicating expected standards of behaviour for Kiss n Drop and Road Safety (use road safety information supplied by Liverpool City Council).	Regularly, multiple times each term.	Facebook	Students and parents
Communicate links to NSW Department of Education Road Safety Website, which is typically included in all Public School Websites.	Regularly, multiple times each term	School website and Facebook	Students and parents
Communicate road safety education YouTube video links including: Safety - https://youtu.be/OcNgdmniL8E School Zone - https://www.youtube.com/watch?v=I7Le_k0R0PY&feature=youtu.be School Crossings - https://youtu.be/ih0rXAqxSZg	Regularly, multiple times each term	School website Facebook page	Students and parents

2.3. Evaluation Plan

2.3.1. Data Collection Methodology

The Student Transport Plan is recommended to be evaluated periodically during year 1 post-construction and as a minimum biennially to increase the success of increasing sustainable travel mode share to school. It is recommended that data is collected biennially in Terms 3 to enable refinements to be made to the program in time to influence behaviour changes.

The School Principal will delegate the evaluation of the Student Transport Plan to the Travel Coordinator.

The data that can be collected to review whether the sustainable travel participation targets are realistic and being achieved are available from:

1. Department of Education Enrolment de-personalised data together with a GIS analysis of the student catchment to assess whether travel modes are aligned with those set out in this document.
2. A Journey to School survey at regular intervals to understand whether students are arriving and departing from school by walking, riding, scooting, bus or private vehicle (including how many children travel to school in that car for drop-off or pick up). Other information that might be gathered includes access points used into the school and times of travel.
3. A record of the number of students participating in the active travel program events such as Walk to School.
4. Targeted interviews with parents, teachers and students participating in the active travel plan actions to understand which elements of the active travel program are assisting them in their daily lives and what might be done to make the program more relevant/helpful to them.

2.3.2. Data Evaluation Methodology

The data should evaluate whether the sustainable travel mode shares are being met or are on track to being met.

Recommendations on how the Student Transport Plan, with a focus on the Action Plan and Communications Plan might be improved to assist with reaching the targets and aspirational targets should be provided as a result of the data analysis. If the targets are on track to be met, consideration might be given to increasing the active mode share target. The Action Plan and Communications Plan might also be subsequently re-shaped based on parent interviews and feedback.

2.3.3. Ongoing Feedback Framework

The School Principal will delegate the ongoing feedback framework to the Travel Coordinator to continuously improve the oversight of sustainable travel outcomes for Harrington Park Public School in concert with school stakeholders. This may include activities such as:

- Reviewing the adequacy of bicycle racks required periodically – are more required?
- Observing road safety activity beyond the school grounds to identify any improvements required.
- Observing how pathways are being used, or whether pathway design is inadequate or in the wrong location (for example if ‘goat tracks’ are worn through particular areas, should a request to Council be put in to improve the pathway in future works programs.
- Observing the operation of any future school buses and the drop off/ pick up facilities for any potential safety concerns. Make recommendations up to the School Principal, Transport for NSW, Liverpool City Council and the bus operator accordingly.

- Liaising with the Liverpool City Council Road Safety Officer with respect to the management of parking behaviours around the school.
- Any other feedback from Transport for NSW, Police, Residents, Teachers, Parents or Students that might arise from time to time.

2.4. Governance Framework

2.4.1. Stakeholders

The table of contacts below identify the stakeholders who will deliver actions to support the New Liverpool Student Transport Plan.

Table 2.5: New Liverpool Public Student Transport Plan Contacts

Contacts	Role	Phone	Email
TBC	Liverpool City Council Road Safety Officer	TBC	TBC
TBC	Department of Education Road Safety Education Officer	TBC	TBC
TBC	Transport for NSW	TBC	TBC
TBC	Project Director, Department of Education	TBC	TBC
Rebecca Lehman	Sustainable Transport Technical Advisor, Department of Education	0432 427 766	rebecca.lehman@det.nsw.edu.au

A. STAKEHOLDER ENGAGEMENT REGISTER

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APPENDIX: STAKEHOLDER ENGAGEMENT REGISTER

Stakeholder	Engagement Date	Summary of engagement	Outcome
School Infrastructure (including Rebecca Lehman, Sustainable Transport Technical Advisor, Department of Education)	10 June 2021	Internal meeting between the project team and School Infrastructure.	• Updated wording on stakeholder responsibility regarding proposed infrastructure upgrades. • Update bicycle parking sections to include rideables (e.g. scooters) • Addition of section regarding East-West pedestrian link