Transport and Accessibility Impact Assessment

Glenwood High School

SSD-23512960

Prepared for School Infrastructure NSW

11 November 2021

Revision 1

211530

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Executive Summary

This Transport and Accessibility Impact Assessment (TAIA) assesses the traffic and transport impacts and design elements of the proposed Glenwood High School redevelopment. The project seeks to cater for a permanent student capacity of 1,820 students, with an estimated 133 staff employed on the site.

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

- **Pedestrians**
  - Provide a new pedestrian entry to Glenwood Park Drive
- **Cyclists**
  - Provide new bicycle storage for students
  - Provide new bicycle storage and end-of-trip facilities for staff
- **Public transport**
  - No change; existing provisions to be retained
  - Usage of public transport to be encouraged through School Transport Plan and improved through ongoing consultation and governance measures
- **Freight & deliveries**
  - No change; existing provisions to be retained
- **Kiss & ride**
  - No change; existing provisions to be retained
  - Usage of kiss & ride to be discouraged through School Transport Plan and improved through ongoing consultation and governance measures
- **Car parking**
  - No change; existing provisions to be retained
  - Final parking provision of 93 spaces equates to approximately 0.7 spaces per staff member

This strategy has been proposed to, and discussed with, both Blacktown City Council and Transport for NSW during ongoing liaison through a Transport Working Group for the project. The project team has met with this group three times since August 2021 and the transport strategy for the project has been refined during that period in response to feedback received.

Pedestrian improvements are provided in the form of a new pedestrian entry to the northeast of the site. This will improve the pedestrian accessibility of the site at one of the locations which currently has poor access to the site and will also be closest to the new build proximity, thereby servicing the highest number of students and staff.

Cyclist improvements include expanding the existing bicycle storage to EFSG standards, which could allow for up to 4.6% mode share for students. Additionally, end-of-trip facilities in the form of 4 showers and 10 lockers are to be provided for staff.

No change is proposed to public transport infrastructure or accessibility. Existing infrastructure including the on-site bus bay are regular and will allow for continued servicing of the school. Future consultation will be required with Transport for NSW during the life of the project, particularly if catchment boundaries change in the future to accommodate the growth of other surrounding school catchments.

No change is proposed to kiss & ride infrastructure or function. The local road network could accommodate the additional traffic volumes anticipated as a result of the project; however, this activity should not be encouraged under a sustainable and safe transport strategy. The pedestrian and cyclist improvements for students being provided as part of this project, and ongoing management measures under a School Transport Plan, should assist in reducing private vehicle volumes around the site.

Car parking is considered the lowest priority mode in accordance with state government policy such as the Road User Space Allocation Policy (TfNSW, January 2021) and other relevant strategies and guidelines. Considering the combination of active and public transport improvements, a reduced parking demand for staff is expected to be achieved. The existing parking capacity will be retained at 93 spaces, approximately 0.7 spaces per staff member.

Following determination of the SSDA, it is anticipated that a Construction Traffic and Pedestrian Management Plan (CTPMP) and School Transport Plan (STP) would be fully developed, prior to construction and operation of the school, respectively. Preliminary versions of these documents have been provided as part of this TAIA.

These final documents and other detailed design elements can be reasonably expected to be finalised as a condition of development consent.

The proposed alterations and additions to Glenwood High School are considered suitable on consideration of the traffic and transport elements of the site and its surrounds, and the transport strategy proposed for its management.

Contents

Revision Register

Rev	Date	Prepared by	Reviewed by	Approved by	Remarks
0	14/10/2021	MG, MB	MB	-	Draft for comment
0.1	29/10/2021	MG, MB	MB	-	Revised draft
0.2	05/11/2021	MG, MB	MB	-	Revised draft
1.0	11/11/2021	MG, MB	MB	PY	Issue for SSDA

1.0 Introduction

This Transport and Accessibility Impact Assessment accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of a State Significant Development Application (SSD-23512960).

The development is for upgrading works comprising alterations and additions to Glenwood High School at 85 Forman Avenue, Glenwood. The site is legally described as Lot 5227 DP 868693.

The site is roughly rectangular in shape, with a total area of 60,790m^2 and street frontages to Forman Avenue to the south and Glenwood Drive to the east. Glenwood Reserve adjoins the northern and western boundaries of the school.

This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs), which have been detailed in Section 1.2 of this report.

1.1 Scope

TTW has been engaged by School Infrastructure NSW (SINSW) to provide traffic engineering consultancy services for the proposed redevelopment.

This TAIA has been developed to assess and address the traffic and transport impacts of the proposed development. This report covers the following areas:

- Site access
- Active transport (pedestrians and cyclists)
- Public transport
- Service and loading
- Pick-up and drop-off (kiss & ride)
- Car parking
- Road network performance
- Sustainable travel (green travel)
- Operational transport management
- Construction traffic management

A School Transport Plan (STP) and a Construction Traffic and Pedestrian Management Plan (CTPMP) have been prepared and included as part of this document. These plans are considered preliminary in nature for the purposes of the SSDA and would be finalised post-approval as a condition of consent.

1.2 Response to SEARs

The Secretary's Environmental Assessment Requirements (SEARs) issued in respect of SSD-23512960 were issued on 20 July 2021 following the Department of Planning, Industry and Environment's (DPIE) consultation with relevant authorities and stakeholders. The requirements for a Transport and Accessibility Impact Assessment are shown in Table 1.1 and have been addressed in various sections of this report as referenced.

Table 1.1: Response to SEARs

Requirements	Comments and References
5. Transport and Accessibility Include a transport and accessibility impact assessment, which includes, but is not limited to the following:	
Analysis of the existing transport network, including:	Section 2.0
• Road hierarchy	Section 02.4
• Pedestrian, cycle and public transport infrastructure	Section 2.2, Section 2.5, Section 2.6
• Details of current daily and peak hour vehicle movements based on traffic surveys and / or existing traffic studies relevant to the locality	Section 2.11
• Existing transport operation for 1hr before and after (existing or proposed) bell times such as span of service, frequency for public transport and school buses, pedestrian phasing for signals	Section 2.9
• Existing performance levels of nearby intersections utilising appropriate traffic modelling methods (such as SIDRA network modelling)	Section 2.9
Details of the proposed development, including:	Section 3.0
• A map of the proposed access which identifies public roads, bus routes, footpaths and cycleways	Section 3.1
• Pedestrian site access and vehicular access arrangements, including for service and emergency vehicles and loading/unloading, including swept path analysis demonstrating the largest design vehicle entering and leaving the site and moving in each direction through intersections along the proposed transport routes	Section 3.2
• Car and motorcycle parking, bicycle parking and end-of-trip facilities	Section 3.4, Section 3.7
• Drop-off / pick-up zone(s) and arrival/departure bus bay(s)	Section 3.6
• Pedestrian, public transport or road infrastructure improvements or safety measures	Section 3.3, Section 3.5
Analysis of the impacts due to the operation of the proposed development, including:	
• Proposed modal split for all users of the development including vehicle, pedestrian, bicycle riders, public	Section 2.11, Section 4.1, Section 4.6

Requirements	Comments and References
transport, school buses and other sustainable travel modes	
• Estimated total daily and peak hour vehicular trip generation	Section 4.6.1
• A clear explanation and justification of the: o Assumed growth rate applied o Volume and distribution of proposed trips to be generated o Type and frequency of design vehicles accessing the site	Section 4.6, Section 4.7
• Details of performance of nearby intersections with the additional traffic generated by the development both at the commencement of operation and in a 10-year time period (using SIDRA network modelling)	Section 2.11, Section 4.6.3
• Cumulative traffic impacts from any surrounding approved development(s)	Section 6.2
• Adequacy of pedestrian, bicycle and public transport infrastructure to accommodate the development	Section 4.2, Section 4.3, Section 4.4
• Adequacy of car and motorcycle parking and bicycle parking provisions when assessed against the relevant car / bicycle parking codes and standards	Section 4.7
• Adequacy of the drop-off / pick-up zone(s) and bus bay(s), including assessment of any related queuing during peak-hour access	Section 4.4, Section 4.5
• Adequacy of the existing / proposed pedestrian infrastructure to enable convenient and safe access to and from the site for all users	Section 3.3
Measures to ameliorate any adverse traffic and transport impacts due to the development based on the above analysis, including:	
• A preliminary School Transport Plan: o An operational traffic and access management plan for the site, pedestrian entries, the drop-off / pick-up zone(s) and bus bay(s) o Travel demand management programs to increase sustainable transport	Section 5.0 (included in School Transport Plan)
• Arrangements for the Travel Coordinator roles	
• Governance arrangements or relationships with state and local government transport providers to update roads safety.	

Requirements	Comments and References
• Infrastructure improvements, including details of timing and method of delivery	Section 3.0
Analysis of the impacts of the traffic generated during construction of the proposed development, including:	
• Construction vehicle routes, types and volumes	Section 6.2
• Construction program (duration and milestones)	Section 6.1.1
• On-site car parking and access arrangements for construction, emergency and construction worker vehicles	Section 6.2
• Cumulative impacts associated with other construction activities in the locality (if any)	Section 4.6.1
• Road safety at identified intersections near the site due to conflicts between construction vehicles and existing traffic in the locality	Section 6.2
• Measures to mitigate impacts, including to ensure the safety of pedestrians and cyclists during construction	Section 6.2
A preliminary Construction Traffic and Pedestrian Management Plan.	Section 6.0

1.3 Authority Consultation

This report has been prepared following consultation between the design team and relevant stakeholders, including the Transport Working Group which was assembled for the project. This group included project team and client representatives, Council, and TfNSW. Consultation events and outcomes occurred as follows:

- **5 August 2021**
    - The meeting included representatives from Council and Transport for NSW.
    - The project was introduced to the Transport Working Group, and the overall strategic concept of moving away from traditional car-based assessment towards more sustainable transport options.
    - Key feedback included observations of high demand for car usage at school sites, discussion of potential future changes to bus servicing upon extension of the Metro in 2024, and queries around pedestrian access opportunities to the northeast and northwest of the site. It was noted that there would be no major issues with some reasonable level of car parking usage at the adjacent Sports Field, provided that usage times would not conflict.
- **2 September 2021**
    - The meeting included representatives from Council and Transport for NSW.
    - The existing travel mode splits were reviewed based on data from the school, including the forecast changes to demand for each travel mode. The proposed car parking strategy (i.e. retain existing parking) was presented and discussed. Given the constraints of data collection

during COVID-19 lockdown periods, an alternative data source (Intelematics) was discussed. The proposed construction traffic strategy (access generally from Pebble Crescent) was presented.

- Key feedback included comments around potential pressure on local streets as a result of increased parking demand. Council noted that comment could not be provided on construction access strategies. It was agreed that Intelematics data would be suitable for traffic modelling in the absence of alternatives. The project team noted that the student (and staff) numbers would increase gradually over time, and further detail on this element was requested.

- **30 September 2021**
  - The meeting included representatives from Council and Transport for NSW.
  - Revised detail around car parking rates was provided, based on revised staffing forecasts. Justification and mitigation measures were presented in relation to the car parking and kiss & ride strategies (and the targeted reduction of these modes), and a possible kiss & ride median island treatment was discussed. Future growth projections were provided to the TWG, demonstrating that some spare capacity is expected and this may cater for surrounding catchment areas such as Quakers Hill HS.
  - Key feedback included comments around the usage of on-street car parking capacity and that Council does not consider this suitable as it should be kept available for residents, including potential future residents from developments such as granny flats. The kiss & ride median treatment had no further comment from Council other than this being a potential option only. TfNSW noted that a potential future extension of the school catchment along existing bus routes would be useful and beneficial, and recommended a future meeting with the Travel Demand Management team.

1.4 Guidelines and References

This report has been prepared in the context of and with knowledge of a variety of relevant documents, standards, and guidelines:

- Blacktown Development Control Plan 2015 (DCP 2015)
- Blacktown Local Environmental Plan 2015 (LEP 2015)
- NSW Department of Education Educational Facilities Standards & Guidelines (EFSG)
- Future Transport 2056
- *Road User Space Allocation Policy* (TfNSW, January 2021)
- Australian Standards, including but not limited to:
  - AS2890 – Parking facilities
- Austroads Guidelines, including but not limited to:
  - Guide to Road Design
  - Guide to Road Safety
  - Guide to Traffic Management
  - Cycling Aspects of Austroads Guides
- RMS Guides to Traffic Generating Developments, including:
  - Roads and Maritime Service Trip Generating Surveys – Schools – Analysis Report (GTA, 25 August 2014)
- *Planning guidelines for walking and cycling* (Department of Infrastructure, Planning and Natural Resources, 2004)
- *EIS Guideline – Roads and Related Facilities* (Department of Urban Affairs and Planning, 1996)

2.0 Existing Conditions

2.1 The Site

Glenwood High School (GHS) is on a 6.08 Ha site, located in the suburb of Glenwood in north Western Sydney and falls within Blacktown City Local Government Area, between Bella Vista and Stanhope Gardens. The property is legally identified as Lot 5227, DP 868693. Figure 2.1 shows the site location.

GHS is surrounded by Glenwood Reserve and recreational fields to the west, Glenwood Park Drive to the east, Forman Avenue to the south and Glenwood Reserve to the north. There are also low-density residential areas in south and east side of the school.

The school operation hours start at 8:40am and finish at 2:10pm on Mondays, 3:00pm on Tuesdays, Thursdays and Fridays, and 2:50pm on Wednesdays. On the other hand, there will be Out of School Hour Care (OOSHC) activities operating out of school bell time; therefore, it has no conflict with school traffic flow circulation related to pick-up/drop-off or staff car parking entrance/exit.

Figure 2.1: Site extents
Source: SIX Maps

2.2 Site Access

There are six existing access gates into Glenwood High School catering for pedestrians, vehicles, and service vehicles; two gates are at Glenwood Park Dive and three gates are at Forman Avenue, shown in Figure 2.2.

Figure 2.2 : Access gateways into Glenwood High School

2.2.1 Pedestrian Access

There is pedestrian access on the eastern side of the site, adjacent to the off-street bus bay on Glenwood Park Drive. The main school buildings can be accessed from this point via stairs. Figure 2.3 shows this accessway.

Figure 2.3: Glenwood Park Drive Pedestrian Access

There is a pedestrian access point at the southern side of the site on Forman Avenue, shown in Figure 2.4. This gate provides access to the main school buildings via stairs and an accessible ramp.

Figure 2.4: Forman Avenue Eastern Pedestrian Access

A smaller pedestrian gate shown in Figure 2.5 is located on Forman Avenue in the south-west corner of the site, providing access to the back of the main school buildings. Stairs are provided at this point.

Figure 2.5: Forman Avenue Western Pedestrian Access

2.2.2 Vehicle Access

There is a vehicle access gateway at the eastern side of the site on Glenwood Park Drive, labelled Gate F. This gated driveway joins an internal road leading to the main school buildings. As shown in Figure 2.6, this access point is also connected to an unpaved road, which staff drive along to park informally on the grass.

Figure 2.6: Glenwood Park Drive Vehicle Access

Figure 2.7 contains the vehicle access point on Forman Avenue at the southern side of the site, labelled Gate D. This point leads to the staff car park and access is restricted to permitted staff and service vehicles. The driveway provides a two-way entry and exit, with a width of approximately 7 metres. The gate can be closed to restrict access.

Figure 2.7: Forman Avenue Eastern Vehicle Access

There is a vehicle access driveway in the south-west corner of the campus on Forman Avenue, providing the secondary staff car parking access. This driveway is approximately 7 metres in width, providing two-way vehicle access. The driveway is shared with Goodstart Early Learning Child Care. To access the Glenwood High School staff car park, vehicles are required to enter through the gates indicated in Figure 2.8. This gate is controlled by a ticketed system only to allow staff and service vehicles to enter.

Figure 2.8: Forman Avenue Western Vehicle Access

2.3 School Catchment

While it is acknowledged that some existing students live outside the catchment boundary (refer to Section 2.10 for further assessment), for the purposes of this transport assessment, only the catchment area is considered. Future student intakes can reasonably be expected to live within the catchment (in accordance with state government and School policy).

Figure 2.9 shows the current school catchment intake boundary.

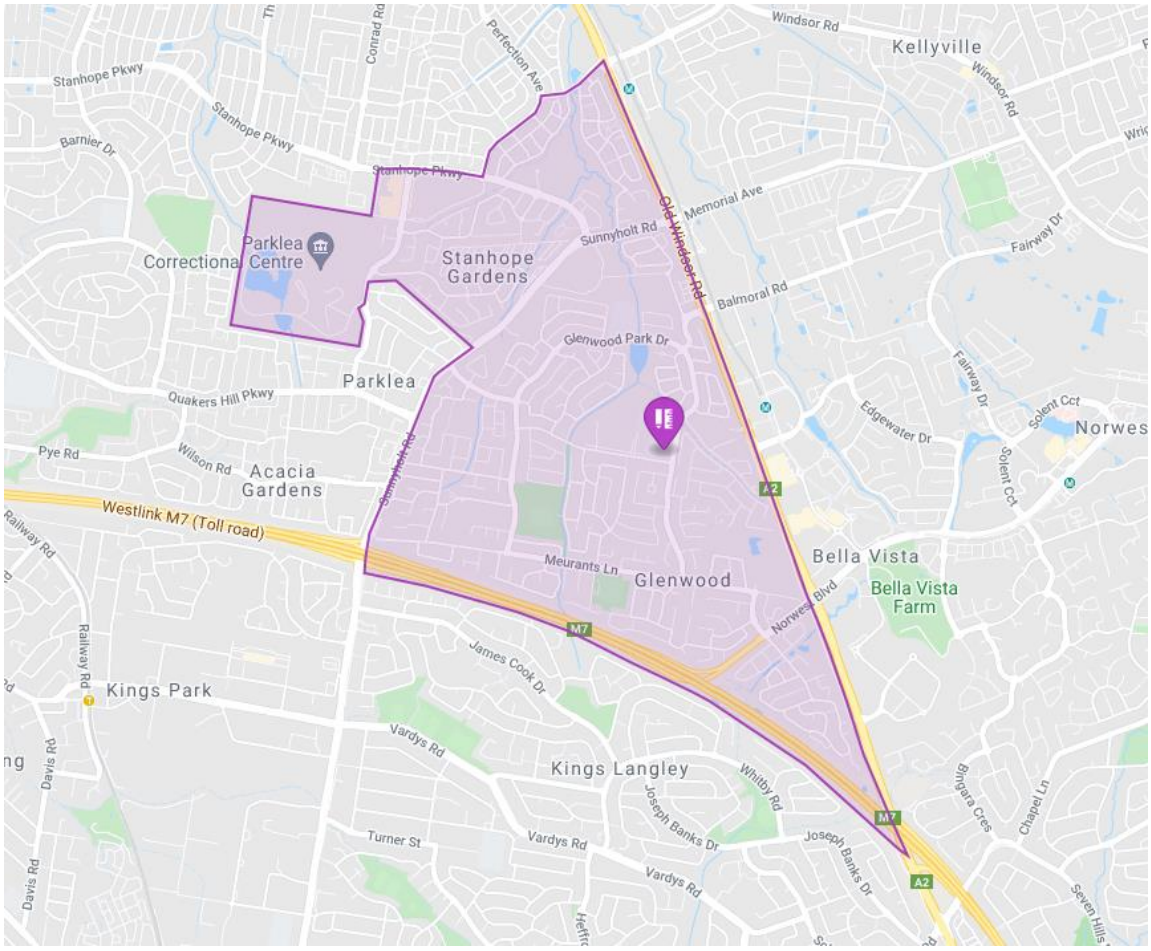

Figure 2.9: School catchment boundary

Source: NSW Public School Finder (https://schoolfinder.education.nsw.gov.au/). Accessed 2 August 2021.

There may be some future changes to this catchment boundary to accommodate the excess capacity of the surrounding schools, as a result of the spare capacity of Glenwood High School post-development (see Section 4.1). These potential changes are not yet known and would be dealt with on an ongoing basis, as would any catchment boundary change which can occur from time to time.

2.4 Road Network

2.4.1 State Roads

The state and regional roads in the vicinity of the site can be seen in Figure 2.10.

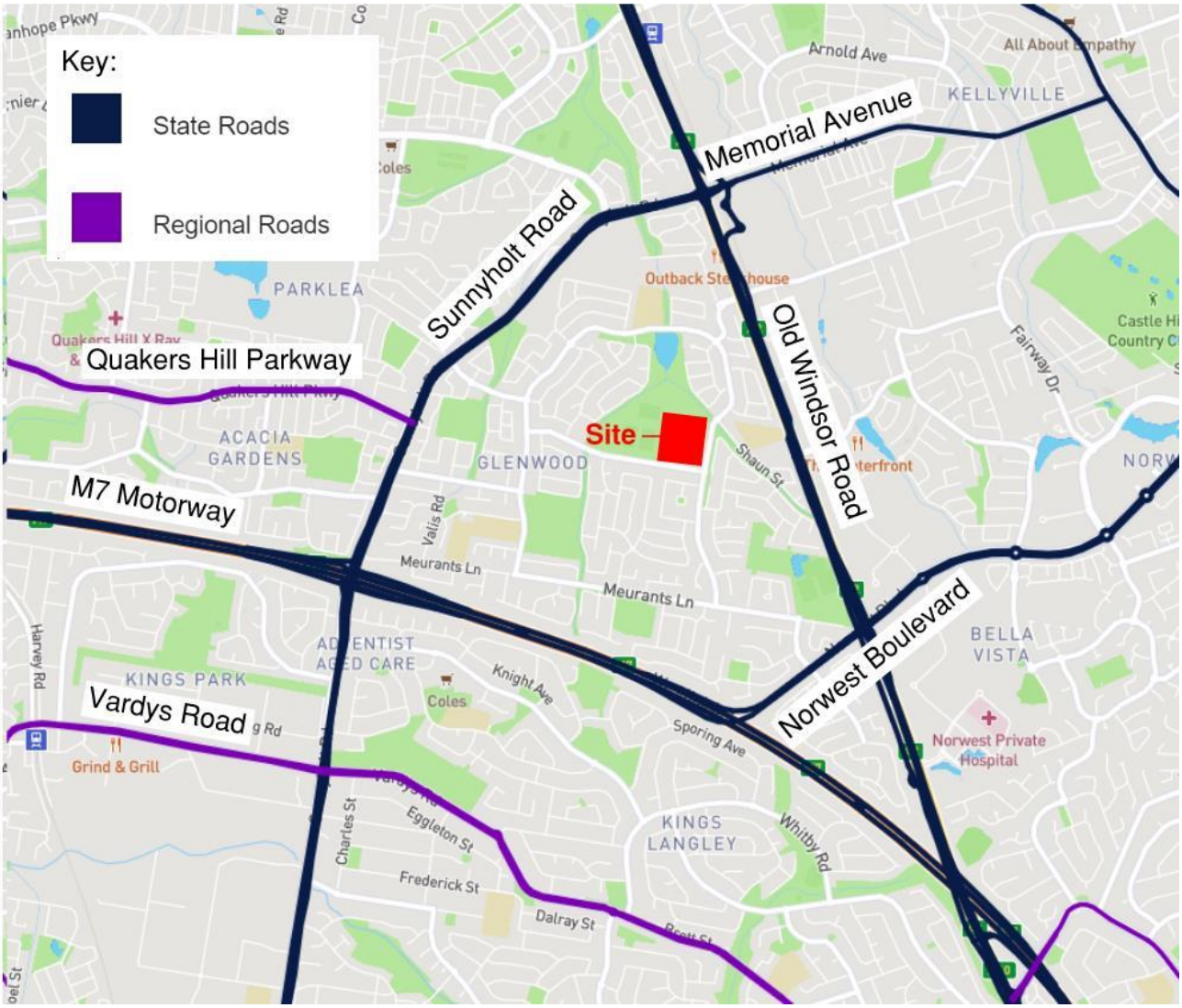

Figure 2.10: Classified road network

Source: NSW Road Network Classifications map, Transport for NSW 2021

Sunnyholt Road is a major arterial road at the north and west GHS that links the suburb of Stanhope Gardens in the north, to Blacktown Train Station. Parking is not allowed along Sunnyholt Road in both directions. There are typically two travel lanes in each direction, with a maximum speed limit of 70 km/hr with a Bus lane at each direction near intersections.

Old Windsor Road is a north-south state road at the east GHS that connects the suburb of Mulgrave to the Westmead Hospital. The road has two lanes in each direction at GHS nearby, with an 80 km/hr general speed limit.

M7 Motorway is a 40-kilometre state road located at the south GHS that connects the suburb of Prestons in the south-west to the suburb of Bella Vista with a general speed limit of 100 km/hr.

Norwest Boulevard is located in the south GHS that links three other state roads, including M7 Motorway, Old Windsor Road and Windsor Road. Norwest Boulevard has two lanes per direction, and roundabout sat its level crossings with other roads. It is equipped with traffic signals at its intersection with Old Windsor Road and Windsor Road, and the speed limit is mostly 70 km/hr along the boulevard.

2.4.2 Local Roads

The local roads surrounding the school site and the type of intersection control (if any) can be seen in Figure 2.11.

Figure 2.11: Intersection controls in the local road network
Background image source: Nearmap

Forman Avenue is a local street running south of the school, which provides access to pedestrians, staff vehicles and service vehicles into GHS. There is a single travel lane in each direction with various parking restrictions in the westbound direction. The general speed limit along Forman Avenue is 50 km/hr; however, it is also subject to a 40 km/hr School Zone at the relevant times (8:00 – 9:30 am, 2:30 – 4:00 pm).

Glenwood Park Drive is also a local street located east of the campus that provides both vehicles' accessway and access of pedestrians into GHS. There is a single travel lane in each direction with some parking spaces in the kerbside lanes, a general speed limit of 50 km/hr, and the signage for 40 km/hr School Zone at the relevant times (8:00 – 9:30 am, 2:30 – 4:00 pm).

Figure 2.12 indicates the locations of the surrounding school zones. The school zones associated with Glenwood High School cover the length of the site along Forman Avenue and Glenwood Park Drive. A smaller school zone is located north of Glenwood Park Drive, adjacent to Parklea Public School.

Figure 2.12: School Zone extents
Background image source: Nearmap

2.5 Public Transport

2.5.1 Public Buses

The nearest bus stops to Glenwood High School serviced by the 730 and 745 lines are located at Forman Avenue and Glenwood Park Drive.

The relevant services and destinations in the vicinity of the site are listed in Table 2.1, with all local routes shown in Figure 2.13 in the school context and the existing catchment boundary.

Table 2.1: Bus routes surrounding the school

Bus Number	Bus Route	Morning Times	Afternoon Times
730	Castle Hill to Blacktown via Norwest & Glenwood	7:39am 8:01am 8:26am	3:16pm
730	Blacktown to Castle Hill via Norwest & Glenwood	7:52am 8:17am 8:41am	3:15pm 3:44pm
745	St Marys to Norwest Hospital via Stanhope Gardens	8:15am	2:50pm 3:51pm
745	Norwest Hospital to St Marys via Stanhope Gardens	7:53am 8:20am	3:36pm
616X	Kellyville Ridge to City QVB	Every 1 – 5 mins from 7:14am to 8:19am 8:26am 8:29am 8:36am	Does not run
616X	City QVB to Kellyville Ridge	Does not run	4:01pm
663	Rouse Hill Station to Parramatta via Kellyville Ridge	7:50am 8:00am 8:10am 8:19am 8:29am	3:26pm 3:36pm 3:51pm
663	Parramatta to Rouse Hill Station via Kellyville Ridge	7:53am 8:16am 8:36am	3:07pm 3:27pm 3:40pm 3:50pm

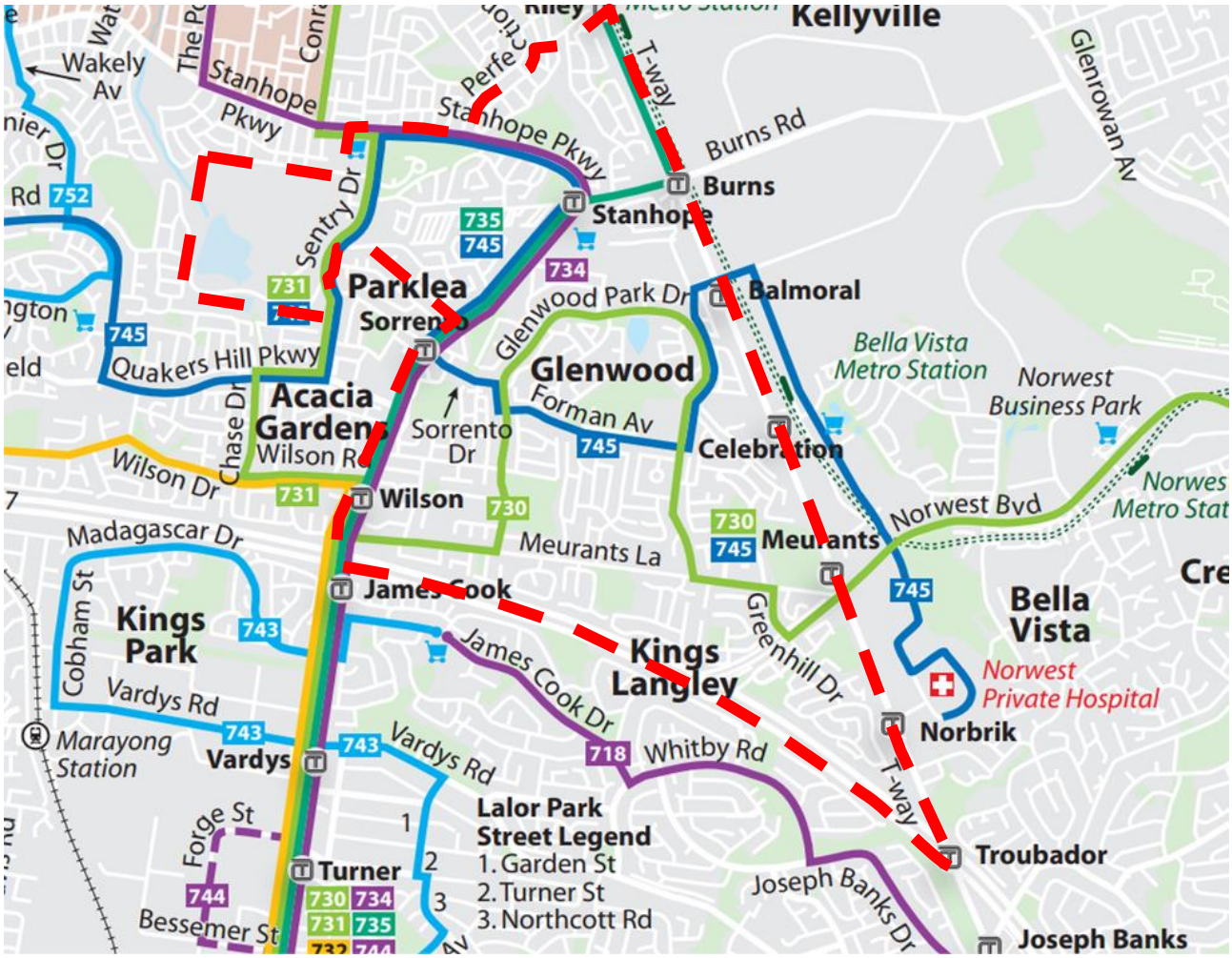

Figure 2.13: Local bus routes

Source: Greater Western Sydney Bus Network Map (Transport for NSW), Effective April 2021

2.5.2 School Buses

Busways and Hillsbus provide several school bus routes servicing Glenwood High School, as seen in Table 2.2. All school buses use the bus bay on Glenwood Park Drive.

Table 2.2: School Buses Servicing Glenwood High School

Bus Provider	Bus Number	Bus Route	Morning Times	Afternoon Times
Busways	6058	The Ponds to Glenwood HS	8:09am	Does not run
	6028	Stanhope Gardens to Glenwood HS	8:12am	Does not run
	6015	Kellyville Ridge to Glenwood HS	8:18am	Does not run
	6038	Stanhope Parkway to Glenwood HS	8:22am	Does not run
	6595	Glenwood HS to Stanhope Gardens & Kellyville Ridge	Does not run	2:15pm Monday
	6592	Glenwood HS to Stanhope Gardens & Kellyville Ridge	Does not run	3:07pm

Bus Provider	Bus Number	Bus Route	Morning Times	Afternoon Times
	6593	Glenwood HS to Parklea & Stanhope Gardens	Does not run	3:08pm
	6601	Glenwood HS to Stanhope Gardens & Kellyville Ridge	Does not run	3:09pm
	6527	Glenwood HS to Glenwood and The Ponds	Does not run	3:15pm
Hillsbus	2508	Glenwood HS to Kellyville Ridge via Parklea	Does not run	2:19pm Monday 3:09pm Tues - Fri
	2608	Glenwood HS to Kellyville Ridge via Parklea	Does not run	2:19pm Monday

2.5.3 Train and Metro

Glenwood High School is a 25-minute walk from Bella Vista metro station, which is a walking distance of 2 kilometres. The station can also be reached via bus route 663, 730 and 745, with travel times between 5 – 20 minutes. Bella Vista metro station connects into the Metro North West Line, connecting Tallawong and Chatswood, providing connections to the T9 Northern, T9 Gordon, and T1 North Shore and Western lines.

The closest train station to the school is Blacktown train station, accessible via a bus ride of upwards of 25 minutes. Blacktown train station provides access to the T5 Richmond and T1 Western lines, with these services providing connections across Sydney. These train and metro services can be seen in Figure 2.14.

Figure 2.14: Sydney Trains and Metro Network

2.6 Active Transport

2.6.1 Pedestrian Facilities

Figure 2.15 shows the pedestrian facilities available within a walking distance radius of approximately 800 to 1200 metres from the school site. There are existing footpaths on both sides of Forman Avenue and Glenwood Park Drive. Both pedestrian site access points have a raised pedestrian crossing servicing each access. Other raised and non-raised pedestrian crossings and pedestrian refuges are available at intervals along Glenwood Park Drive and Forman Avenue. The majority of the minor roads within the residential areas have a footpath on at least one side of the road, but some are missing footpaths on both sides.

Figure 2.15: Pedestrian facilities in the local road network
Background image source: Nearmap

2.6.2 Cycling Facilities

There are currently no bicycle paths connecting directly to the site, as indicated in Figure 2.16. There is a nearby cycleway on Moulmein Terrace, consisting of both on-road and off-road bike paths. This route has a proposed off-road cycleway connecting into the existing cycleway adjacent to the M7 motorway. Another cycleway close to the school site exists along Teawa Crescent, connecting into Glenwood Park Drive and leading to Windsor Road. There is a proposed on-road cycleway connecting these two existing cycleways together via Honnyeater Terrace.

Additionally, there are existing cycleways along the major roads in this area, including the M7 motorway, Sunnyholt Road and Windsor Road. Considering the existing and proposed cycleways within the larger

network, routes to Blacktown train station, Seven Hills train station and Quakers Hill train station will eventually be available.

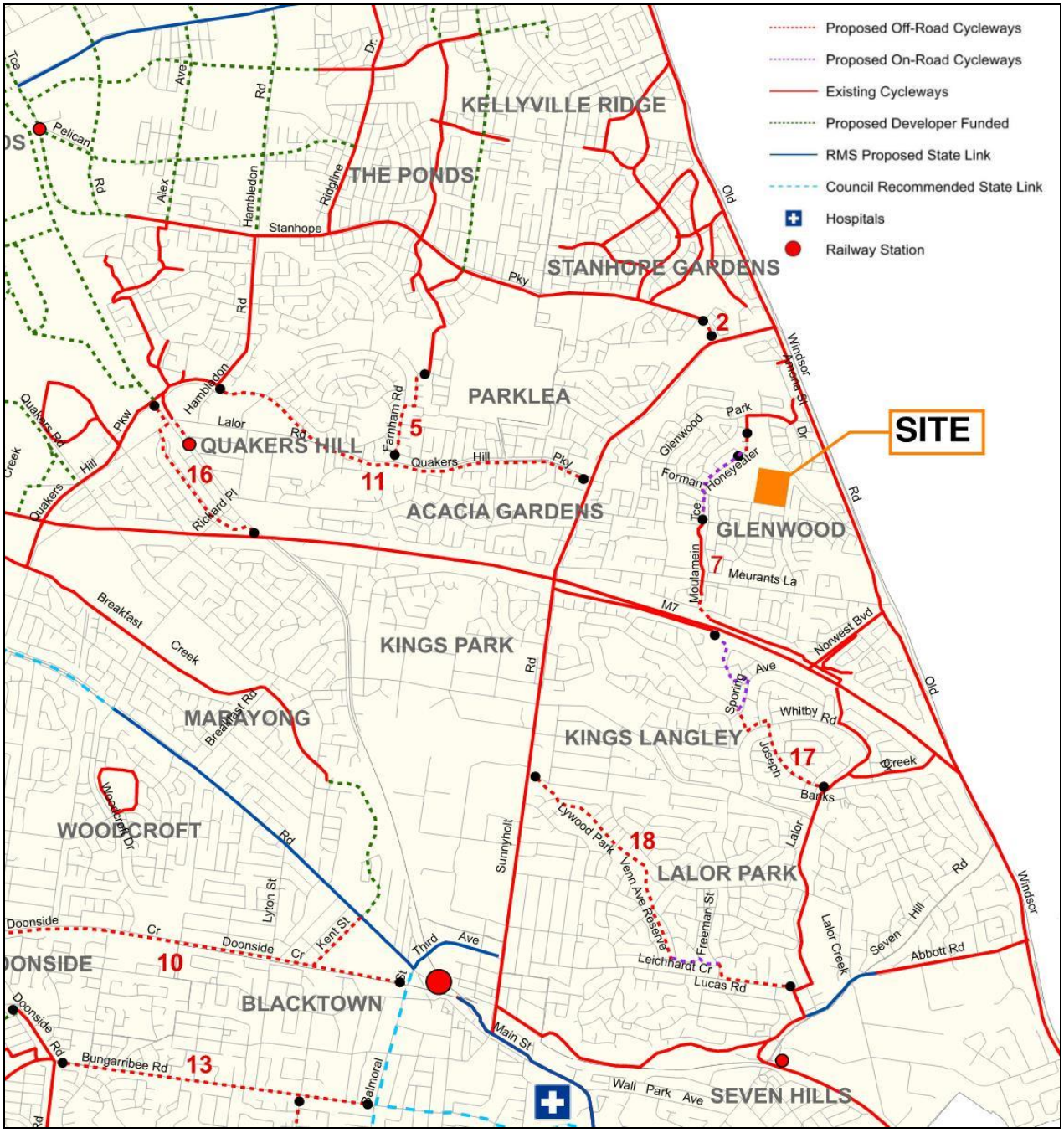

Figure 2.16: Existing and Future proposed cycling network
Source: Blacktown City Council, 2016 Bike Plan

The school site currently contains 56 bicycle parking spaces, located near the south-east car park.

The existing staff facilities have limited provision of end-of-trip facilities. 1 shower is available, and some unassigned lockers are located in the staffroom.

2.7 Car Parking

2.7.1 Off-Street Parking

The school has two designated staff car parks, one in the south-east corner of the site and one along the western side of the site. These are both accessible via Forman Avenue, as shown in Figure 2.17. They are both controlled by a two-way gated driveway, approximately 7 metres in width, allowing vehicles to enter and exit. The existing on-site car parking capacity provides 93 parking spaces, including one accessible parking space. 30 of these spaces are available in the south-eastern car park and the remaining 63 on the western side of the site.

Figure 2.17: Off-Street Parking Provisions

Car parking associated with the Goodstart Early Learning centre is within the legal property boundary of the site but is not counted towards the school's provisions in this assessment.

Historical aerial imagery available from Nearmap has been assessed to determine the long-term trends in occupancy, including comparing school days and non-school days. For the purposes of this analysis, 'school days' are defined as those data points which clearly show high levels of usage of the on-site car park.

Summary details for the off-street parking areas are shown in Table 2.3. Statistics for the 'total' row are the on-site totals recorded for each date, not a sum of statistics for individual areas (therefore should not be added).

Table 2.3: Off-street parking occupancy
Source: Nearmap imagery

	School Days			Non-School Days		
	Minimum	**Average**	**Maximum**	**Minimum**	**Average**	**Maximum**
West Car Park	39	58.7	65	0	2.5	15
East Car Park	26	31.1	36	0	0.1	2
Total	70	89.9	99	0	2.5	17

Based on the historical data, the car park occupancy on school days is fairly steady, and some informal parking occurs on a rare basis beyond the marked capacity of 93 spaces. The average occupancy reaches the marked capacity.

The full set of historical parking analysis is provided at **Appendix C** - Historical Parking Occupancy (via Nearmap).

2.7.2 On-Street Parking

On-street parking in the vicinity of the site is generally unrestricted. Similar to the off-street parking, on-street parking in the vicinity of the site has been reviewed to assess long-term usage trends.

The extent and description of on-street zones used for the detailed analysis is shown below in Figure 2.18. The assumed occupancy of each zone is based on approximate distances between driveways, and accounting for other parking restrictions, and represents an estimate only. All on-street parking spaces in the vicinity are unmarked, meaning that capacity may vary from day-to-day.

Figure 2.18: On-street and off-street parking areas for analysis

Summary details for the on-street parking areas are shown in Table 2.4. Statistics for the 'Occupied' and 'Available' rows are inverse data (therefore should not be added).

Table 2.4: Off-street parking occupancy
Source: Nearmap imagery

		School Days			Non-School Days		
		Minimum	**Average**	**Maximum**	**Minimum**	**Average**	**Maximum**
On-Street	**Occupied**	30	52.6	75	13	25.5	66
	Available	73	95.4	118	82	122.5	135
	Capacity	148					
Glenwood Reserve	**Occupied**	10	19.0	28	0	23.3	85
	Available	104	113.0	122	47	108.7	132
	Capacity	132					
Total	**Occupied**	44	71.6	101	16	48.8	147
	Available	179	208.4	236	133	231.2	264
	Capacity	280					

The analysis shows that there is generally adequate availability of parking in the vicinity of the site and within the assessed zones.

Noting the overall capacity in the assessed on-street zones (excluding the reserve) of 148 spaces, on school days there is an average occupancy rate of around 36%, or a maximum rate of 51%, suggesting that on-street parking usage could increase by approximately double within the fixed capacity. However, it is acknowledged that 100% occupancy is highly undesirable and that parking areas are often considered to be at or near their practical capacity at around 85% of their physical capacity. This would suggest that in the period of the highest observed occupancy (75 vehicles), another 50 or so vehicles could potentially be accommodated, bringing the precinct occupancy to 85%.

Looking at the reserve on school days, there is an average occupancy rate of around 14% or a maximum rate of 20%, showing substantial spare capacity for community usage. On the busiest school days, another 85 or so vehicles could be accommodated to bring the precinct occupancy to 85%.

The full set of historical parking analysis is provided at **Appendix C** - Historical Parking Occupancy (via Nearmap).

2.8 Drop-off and Pick-up (Kiss & Ride)

The school currently operates with one indented kiss & ride zone along Forman Avenue, allowing parents to pick up and drop off their children in front of the school. The overall length of this zone is around 60 metres. This kiss & ride zone on Forman Avenue is shown in Figure 2.19. This zone is signposted 'No Parking' zone between 8:00-9:30 am and 2:30-4:00 pm.

Figure 2.19: Forman Avenue kiss & ride bay

Additionally, there are further on-street kiss & ride (No Parking) zones along Forman Avenue, both east and west of the indented bay, with the overall length of 90 metres, shown in Figure 2.20.

Figure 2.20: Forman Avenue kiss & ride zones

2.9 Intersection Performance

2.9.1 Traffic Data Collection Scope

To analyse the existing traffic conditions around the site, both intersections of Glenwood Park Drive/Forman Avenue located east and west of the campus have been modelled. To this end, the intersection movement counts were extracted from the data provided by Intelematics. It should be noted that traffic survey is not possible since COVID 19 lockdown restrictions have affected traffic demands. Intersections traffic modelling was undertaken during three peak hours, including AM peak hour (7:45-8:45 am), PM peak hour (4:45-5:45 pm), and school PM peak hour (2:15-3:15 pm) on Wednesday 16 June 2021.

The location of this intersection is shown in Figure 2.21. The scope of these intersections studies was reviewed and agreed with the Transport Working Group.

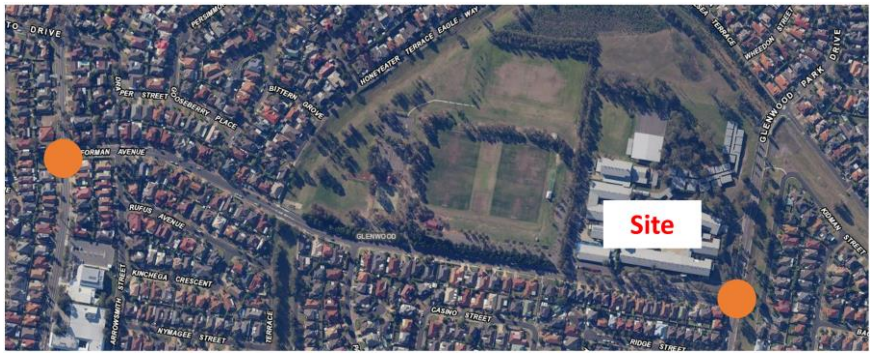

Figure 2.21: Location of traffic data collection

2.9.2 Intersection Traffic Movements

Intelematics provides traffic data for each link per direction at unsignalised intersections, shown in Figure 2.22. Therefore, several calculations have been undertaken to determine all the movements volume at each intersection separately.

The method applied to calculate the number of vehicles for each movement at the intersections was based on the volume entering and exiting each approach. Consequently, six simultaneous equations were created and solved for each intersection.

Figure 2.22: 15-minute traffic data during 24 hours - Wednesday 16 June 2021

Figure 2.23 and Figure 2.24 show hourly traffic volumes extracted from Intelematics data for the east and west intersection of Glenwood Park Drive and Forman Avenue related to Wednesday 16 June 2021. According to the data for one day, AM and PM peak hours as a whole and related to school hours were determined. As shown in Figure 2.23 and Figure 2.24, AM peak hour is between 7:30 am and 9 am, which is compatible with the school start time; however, the PM peak hour of the intersection starts after school hours. Therefore, we consider two PM peak hours for modelling the intersection to investigate GHS development impact on the intersection traffic operation.

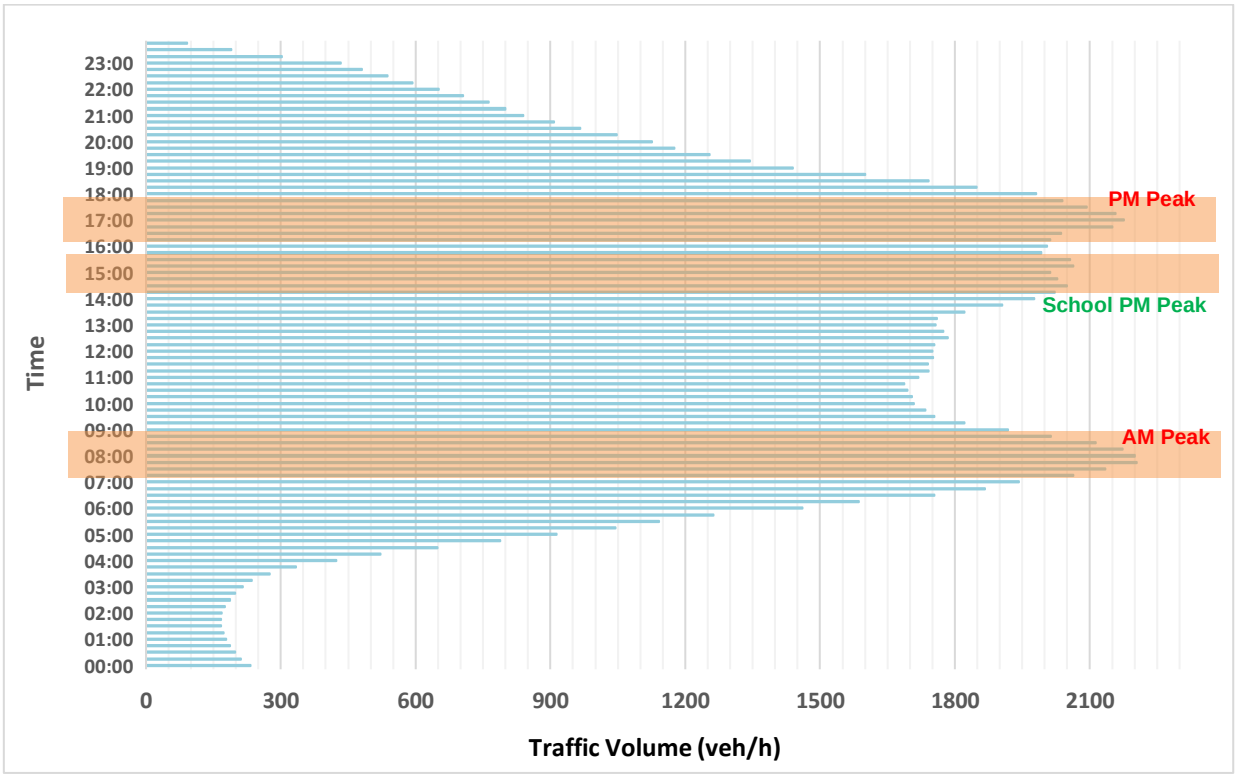

Figure 2.23: Intelematics traffic counts during 24 hours for the east intersection of Glenwood Park Drive/Forman Avenue - Wednesday 16 June 2021

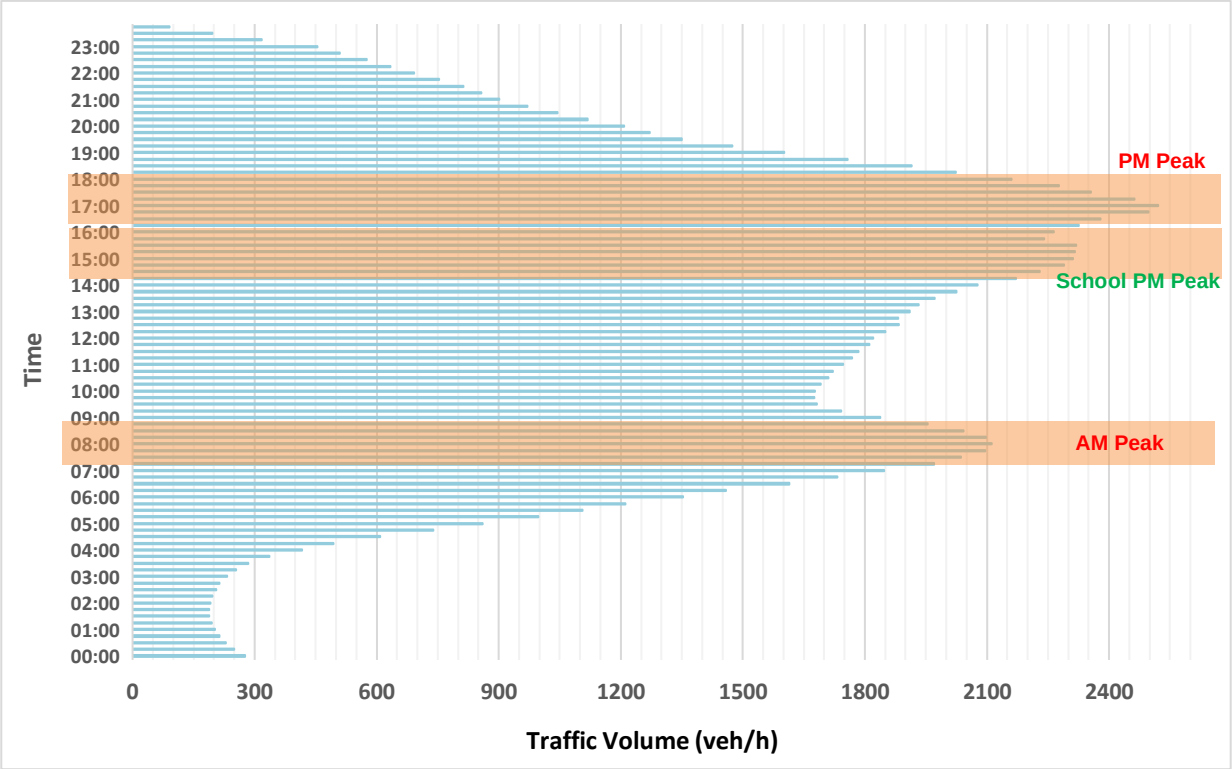

Figure 2.24: Intelematics traffic counts during 24 hours for the west intersection of Glenwood Park Drive/Forman Avenue - Wednesday 16 June 2021

Intersections' total traffic volumes on the nominated study intersection are summarised in Table 2.5.

Table 2.5: Traffic volumes summary for the east intersection of Glenwood Park Drive and Forman Avenue

Movement	Peak Hour		Total Volume
Northbound – Through	AM	07:45-08:45	1
	PM	16:45- 17:45	1
	School PM	14:15 – 15:15	54
Northbound – Left Turn	AM	07:45-08:45	356
	PM	16:45- 17:45	382
	School PM	14:15 – 15:15	304
Southbound – Through	AM	07:45-08:45	268
	PM	16:45- 17:45	258
	School PM	14:15 – 15:15	257
Southbound – Right Turn	AM	07:45-08:45	57
	PM	16:45- 17:45	1
	School PM	14:15 – 15:15	1

Movement	Peak Hour		Total Volume
Eastbound - Left Turn	AM	07:45-08:45	315
	PM	16:45- 17:45	315
	School PM	14:15 – 15:15	261
Eastbound – Right Turn	AM	07:45-08:45	99
	PM	16:45- 17:45	64
	School PM	14:15 – 15:15	110

Table 2.6: Traffic volumes summary for the west intersection of Glenwood Park Drive and Forman Avenue

Movement	Peak Hour		Total Volume
Northbound – Through	AM	07:45-08:45	247
	PM	16:45- 17:45	339
	School PM	14:15 – 15:15	299
Northbound – Right Turn	AM	07:45-08:45	61
	PM	16:45- 17:45	38
	School PM	14:15 – 15:15	41
Southbound – Through	AM	07:45-08:45	1
	PM	16:45- 17:45	99
	School PM	14:15 – 15:15	32
Southbound – Left Turn	AM	07:45-08:45	365
	PM	16:45- 17:45	379
	School PM	14:15 – 15:15	371
Eastbound - Left Turn	AM	07:45-08:45	315
	PM	16:45- 17:45	320
	School PM	14:15 – 15:15	326
Eastbound – Right Turn	AM	07:45-08:45	118
	PM	16:45- 17:45	206
	School PM	14:15 – 15:15	128

2.9.3 Traffic Modelling

Traffic modelling of the existing conditions has been undertaken using SIDRA 9 intersection modelling software to accurately determine and demonstrate the current performance of the road network nearby Glenwood High School.

For modelling purposes, pedestrian volumes have been determined based on the number of students commuting between their homes and the school by walking and cycling, which is equal to 37% (assumed 40%) of the total number of students. In this TAIA, it is assumed that the number of pedestrians crossing the east intersection is 250 during school hours i.e. AM and school PM peak hours.

The east and west intersection of Glenwood Park Drive and Forman Avenue plus the pedestrian crossing has been modelled, as illustrated in Figure 2.25.

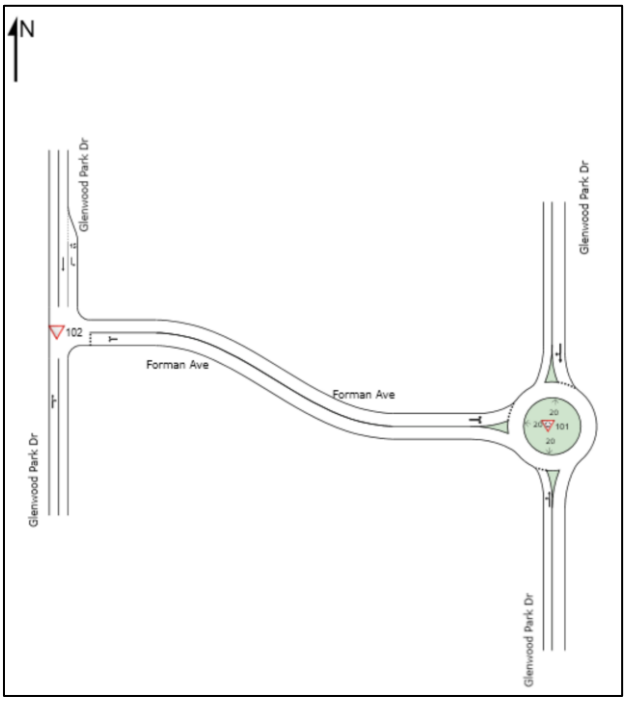

Figure 2.25: SIDRA study intersection layout
Diagram is indicative of connections only; not to scale.

The summary results of the intersection modelling are shown in Table 2.7.

Table 2.7: SIDRA modelling results

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
East intersection of Glenwood Park Dr/Forman Ave	**AM**	0.279	5.9	3.5	**A**
	PM	0.193	5.7	2.5	**A**
	School PM	0.227	5.9	2.9	**A**
West intersection of Glenwood Park Dr/Forman Ave	**AM**	0.397	10.0	5.8	**A**
	PM	0.662	17.8	21.5	**B**
	School PM	0.447	11.4	7.5	**A**

Some notable results requiring further explanation are as follows:

- The most congested approach of the east intersection is right turning movements from north Glenwood Park Drive with highest delay and degree of saturation during peak hours among other movements.
- The highest delay and degree of saturation at the west intersection is related to the right turning movements from east Forman Avenue.

It is acknowledged that not all of the congestions issues that occur on the site during a typical day could be observed and modelled since the COVID 19 lockdown has restricted daily trips and site inspection.

2.10 School Catchment Access Analysis

Figure 2.26 shows the school catchment (in black) and the approximate walking distance catchments for the 400m, 800m, 1200m, and 2400m walk (shaded colours). These are roughly equivalent to the 5-minute, 10-minute, 15-minute, and 30-minute walking catchment, respectively. A 1200m walk and 2400m walk are also approximately equal to a 5-minute and 10-minute cycling catchment, respectively.

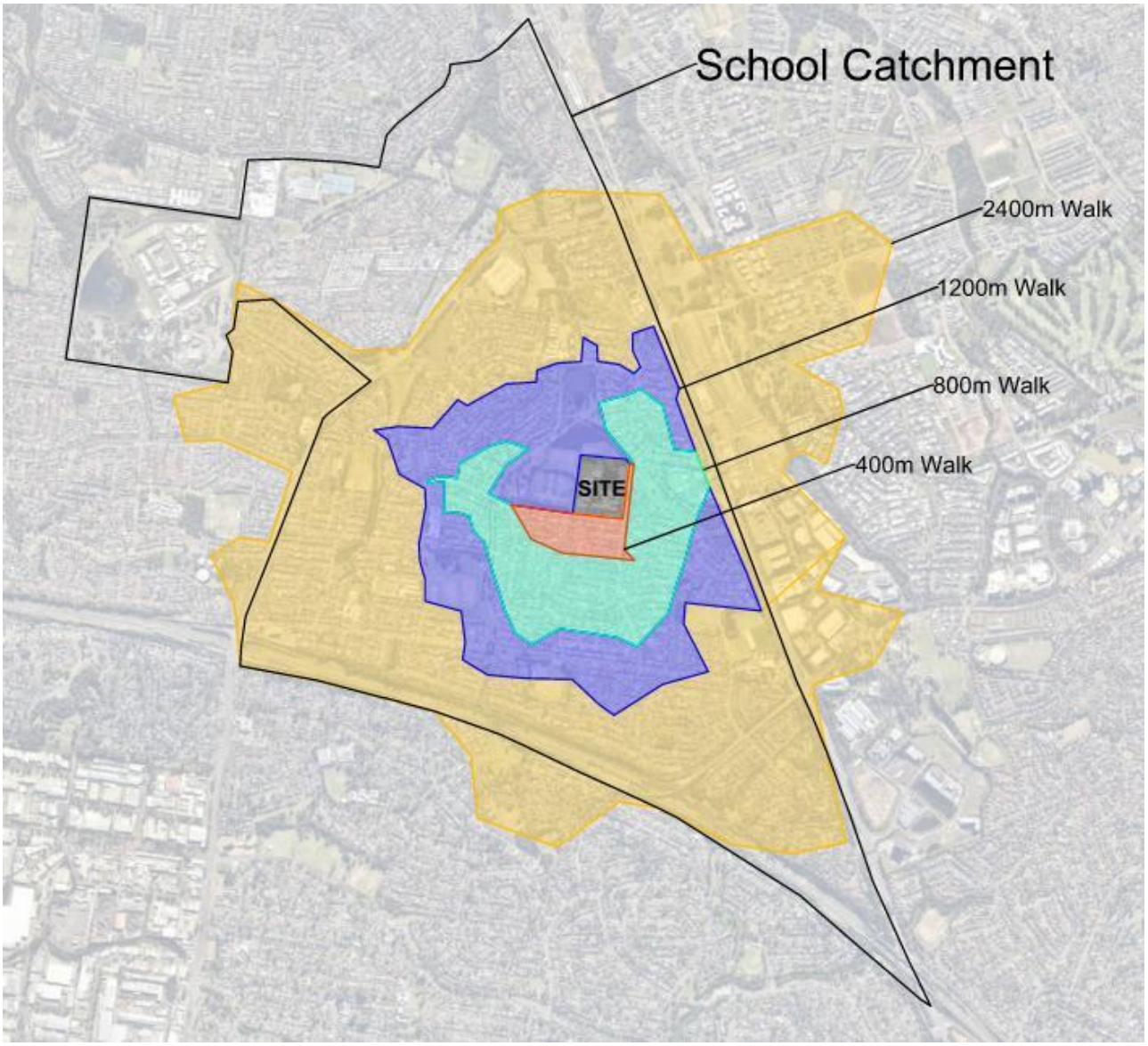

Figure 2.26: School Catchment and Walking Catchments

Based on depersonalised student location data provided by SINSW, an analysis of the catchment coverage within these walking and cycling distances has been undertaken, as provided in Table 2.8. This analysis indicates that most students live 1200m or further from the school site. Currently, only approximately 3% of students live within a 5-minute walking distance from the school. As pictured in Figure 2.26, the areas to the north and west of the school site do not fall within a 400m walking distance due to a lack of available pedestrian accesses at these points. This effect flows outward, affecting the number of students residing within an 800m walking distance of the site as well. Additional pedestrian accesses to the north-west and north-east of the site are anticipated to facilitate larger student numbers residing within a 400m and 800m walking distance. This option is discussed further in Section 3.3.

Table 2.8: School Catchment and Walking Catchment Student Coverage

Walking Distance (m)	Number of current students	Portion of current students (%)	Cumulative #	Cumulative %
0 – 400 (5-min walk)	37	2.60%	37	2.6%
400 – 800 (10-min walk)	226	15.93%	263	18.5%
800 – 1200 (15-min walk)	192	13.53%	455	32.1%
1200 – 2400 (10-min cycle)	548	38.62%	1003	70.7%
> 2400	416	29.32%	1419	100%
Total	**1419**	**100%**		

2.11 Travel Mode Survey

The travel mode survey results contained in this section are derived from a questionnaire completed by the Glenwood High School Principal. This questionnaire provides an indication of the current modal split for the journey to and from the school for both students and staff. The full questionnaire can be found in **Appendix B** - Travel Mode Survey Questionnaire.

2.11.1 Student Travel Mode Split

The questionnaire provided the student travel mode split as shown below in Figure 2.27. It is clear that the two most common travel modes are walking and kiss & ride, with a mode split of 36% and 40% respectively. Public transport is somewhat utilised, with 12% of students travelling on the bus, but close to none travelling via train. Approximately 8% of students drive and park as the driver, indicating that a considerable proportion of year 12 students choose to drive to school. Along with the train, other low-demand travel modes include cycling and driving as a passenger to park nearby.

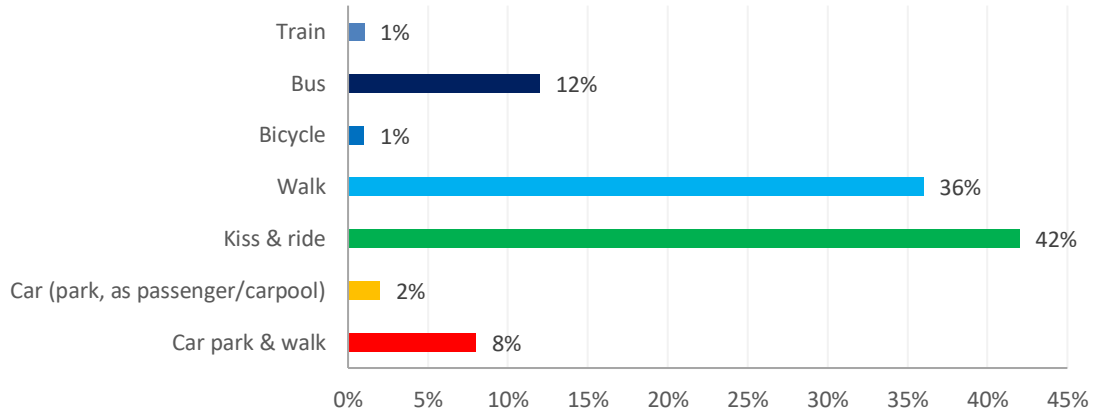

Figure 2.27: Student Travel Mode Split

2.11.2 Staff Travel Mode Split

Figure 2.28 summarises the travel mode split of the Glenwood High School staff. It is clear that a vast majority of staff drive to school and park, with an estimated modal split of 92%. All other transport modes including active and public transport have very low usage among the staff. No staff are anticipated to drive as a passenger or engage in carpooling.

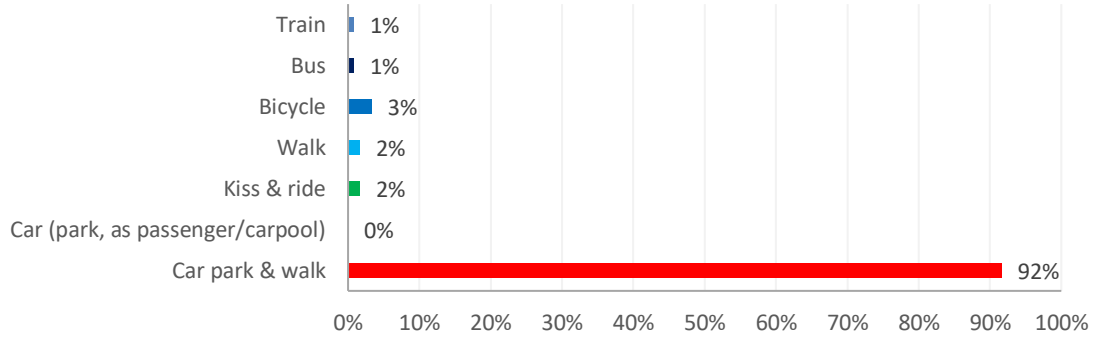

Figure 2.28: Staff Travel Mode Split

2.11.3 Journey to Work Data

Journey to Work (JTW) data supplied by the 2016 Australian Census approximates the current mode share split for those who work in Glenwood more broadly, beyond just the high school itself. The JTW data is defined by Statistical Area Level 2 zones, and Glenwood High School is located within the Glenwood region. Table 2.9 demonstrates the breakdown of travel modes used by those who work in Glenwood. It is clear that private vehicle use is the favoured travel mode, followed by walking and catching the bus.

Table 2.9: Journey to Work Data
Source: Australian Bureau of Statistics 2016 Census

Travel Mode	Mode Share (%)
Train	1.6%
Bus	3.3%
Taxi	1.0%
Car, as driver	79.8%
Car, as passenger	6.7%
Truck	1.1%
Motorbike/scooter	0.2%
Bicycle	0.7%
Walked only	4.5%
Other Mode	1.2%
Total	**100%**

Table 2.10 shows a summary of the above information into three main travel mode categories. Private vehicle usage is the most popular mode choice, with a 90% share, followed by active transport and lastly public transport.

Table 2.10: Summarised Journey to Work Data

Mode Summary	Mode Share (%)
Private vehicle (car, truck, taxi, motorbike)	89.9%
Public transport (train, bus)	4.9%
Active transport (walk, bicycle)	5.2%
Total	**100%**

3.0 Proposed Development

3.1 Overall Works

The proposed development seeks to upgrade Glenwood High School. The upgrade consists of the following alterations and additions:

- Construction of a new three-storey building at the north-eastern portion of the site facing Glenwood Park Drive which will accommodate new learning spaces;
- Construction of one storey performance pavilion;
- Refurbishment of existing Building Block A (ground floor only) to provide one new support unit within the space of an existing general learning space;
- Refurbishment of Building Block D (ground floor only) to provide an additional office space and storeroom;
- Refurbishment of Building Block E to re-purpose it on the ground floor for computer learning spaces, staff and administration spaces as well as upgrades to the library on the first floor;
- Refurbishment of Building Block J to re-purpose it from visual arts and performing arts to learning spaces and workshops for food tech and woods/metal unit;
- Demolition of existing botany room and construction of a new single storey pavilion comprising of interview rooms and end-of trip facilities; and
- The proposed development will also involve ancillary works at the site associated with the proposed upgrades.

Table 3.1 summarises the proposed increase in student and staff numbers for Glenwood High School.

Table 3.1: Student and Staff Existing and Proposed Capacity

	Existing (Permanent)	Existing (Enrolment)	Proposed
Students	980	1410[1]	1,820
Staff	77[2]	106[2]	133[2]

The proposed site plan is shown in Figure 3.1, with the new buildings located to the north-east of the site.

[1] *As advised by GHS (13 August 2021)*
[2] *Calculated as per School Infrastructure NSW staffing entitlement methodology*

Figure 3.1: Proposed site plan
Source: PTW Architects

3.2 Site Access

3.2.1 Pedestrian

A new pedestrian access to the campus is proposed to be provided at Glenwood Park Drive adjacent to the new build. The new entry will improve the pedestrian accessibility of the site, particularly to the northeast part of the catchment, and will connect to the existing footpath network.

All other existing pedestrian entry points will be retained in their existing configuration.

3.2.2 Cyclists

Cyclist access will be available at all existing access points to the site, and they will be maintained in its existing configuration.

3.2.3 Car Parking

The car park access points will be maintained with no change.

3.2.4 Service Vehicles

There will be no change in existing service vehicles access into GHS. The existing eastern service vehicle driveway from Glenwood Park Drive is adjacent to the proposed new pedestrian entry, and this area will be carefully treated to ensure pedestrian and vehicle separation.

3.3 Pedestrian Facilities

To encourage an increased uptake of the walk-only travel mode to the site, and to improve connectivity between the new build and the public footpath network, a new pedestrian entry point is proposed at Glenwood Park Drive.

The existing pedestrian entry points to the site would require a notable travel distance for users approaching from the northeast, potentially requiring 400m of walking distance from a point on the footpath to an immediately adjacent point within the site in the new build zone. This distance will be reduced to zero through provision of the new access point, which is shown in Figure 3.2.

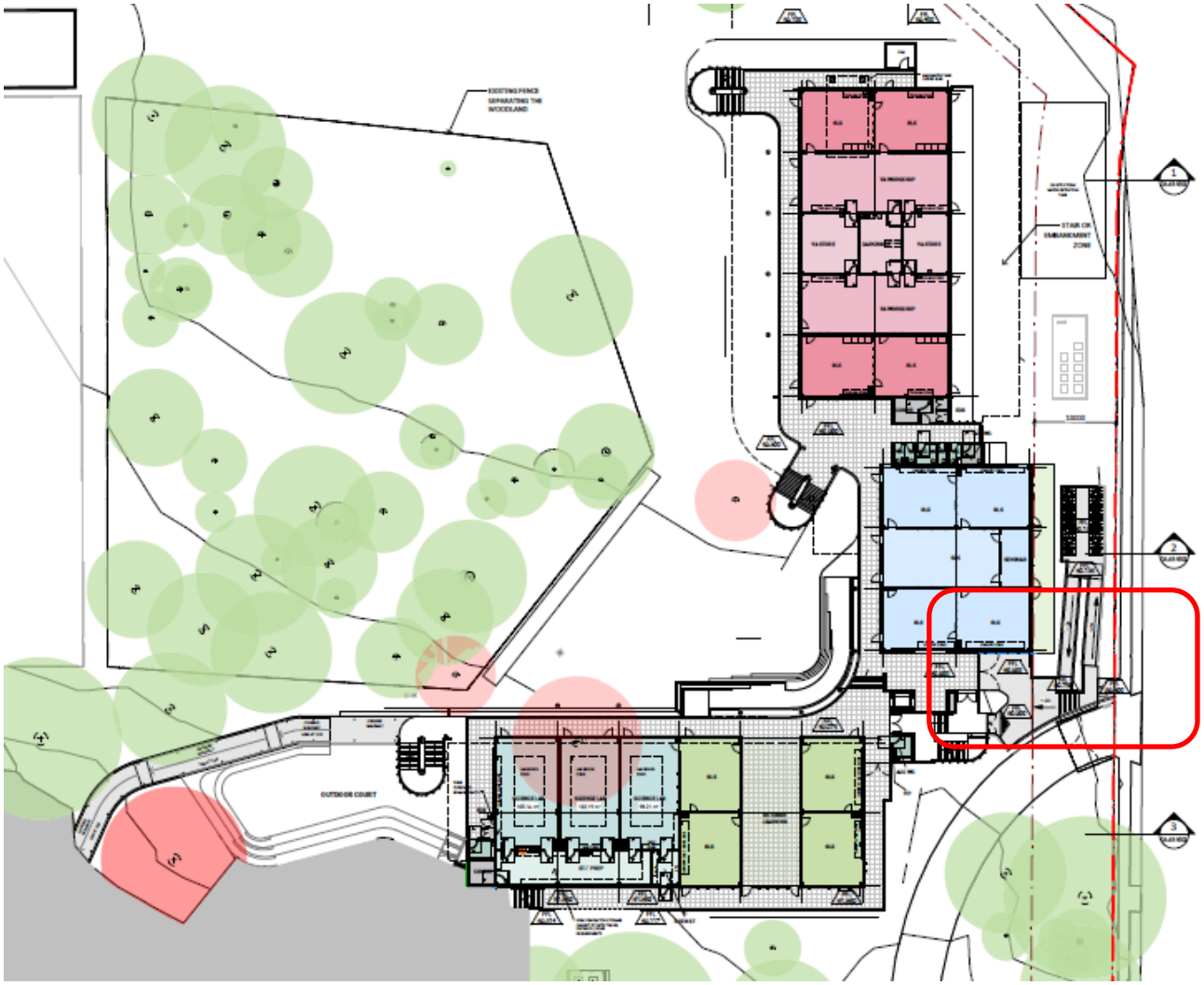

Figure 3.2: New proposed pedestrian access point

The existing eastern service vehicle driveway from Glenwood Park Drive is adjacent to the proposed new pedestrian entry. The existing high fencing along the service driveway will be retained, to ensure pedestrian and vehicle separation.

3.4 Cyclist Facilities

Additional end-of-trip facilities (EOTF) for staff are proposed as follows:

- 2 female showers and 2 male showers
- 1 unisex accessible WC
- 18 lockers

This indicative layout of the end-of-trip facilities is shown in Figure 3.3.

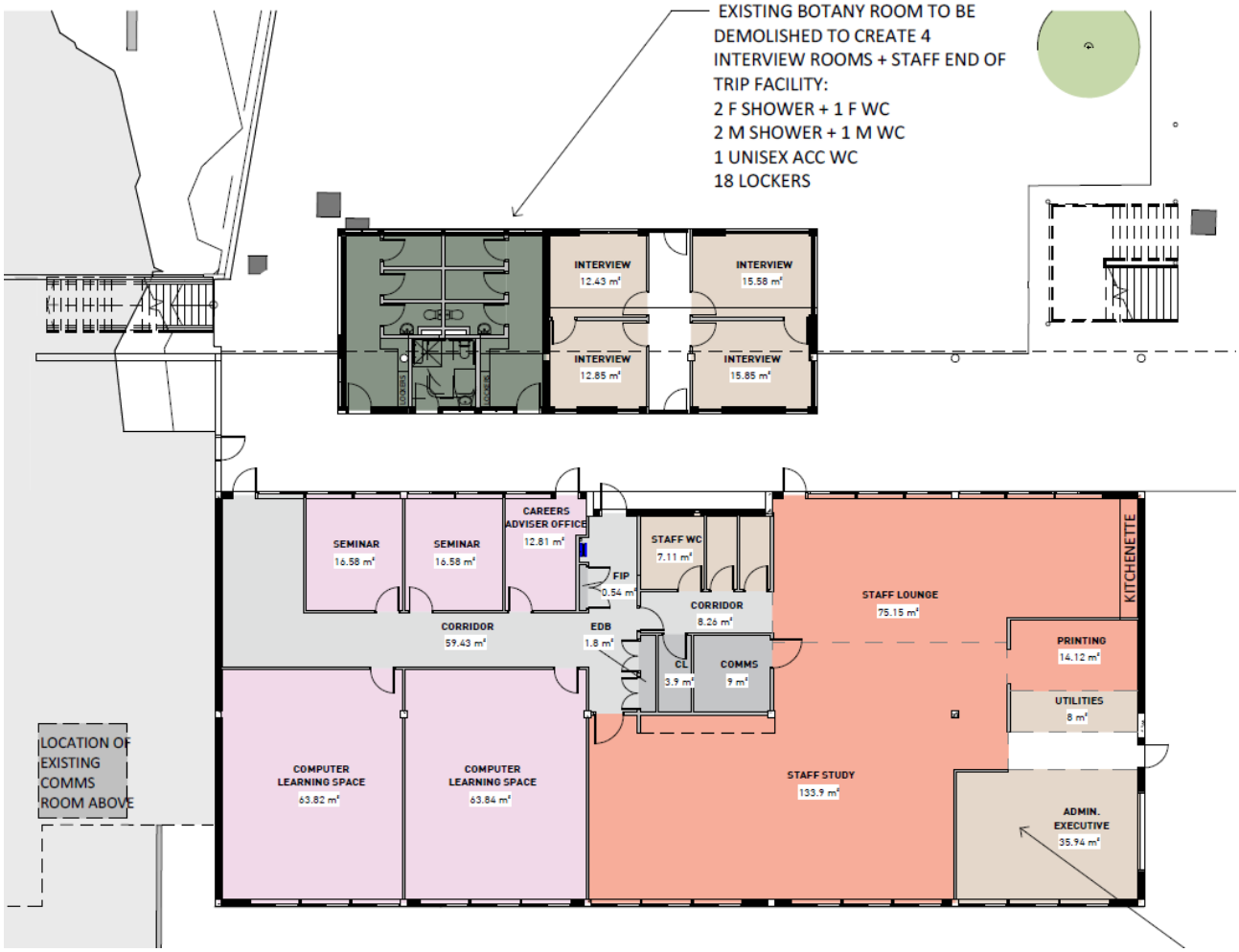

Figure 3.3: Proposed layout of the end-of-trip facilities
Source: PTW Architects

It is proposed to provide 28 new bike parking spaces, which its final location and configuration (including selection of storage products such as bike rails) will be finalised prior to construction and will be in accordance with Australian Standard AS2890.3. The indicative location of the proposed bike parking are shown in Figure 3.4.

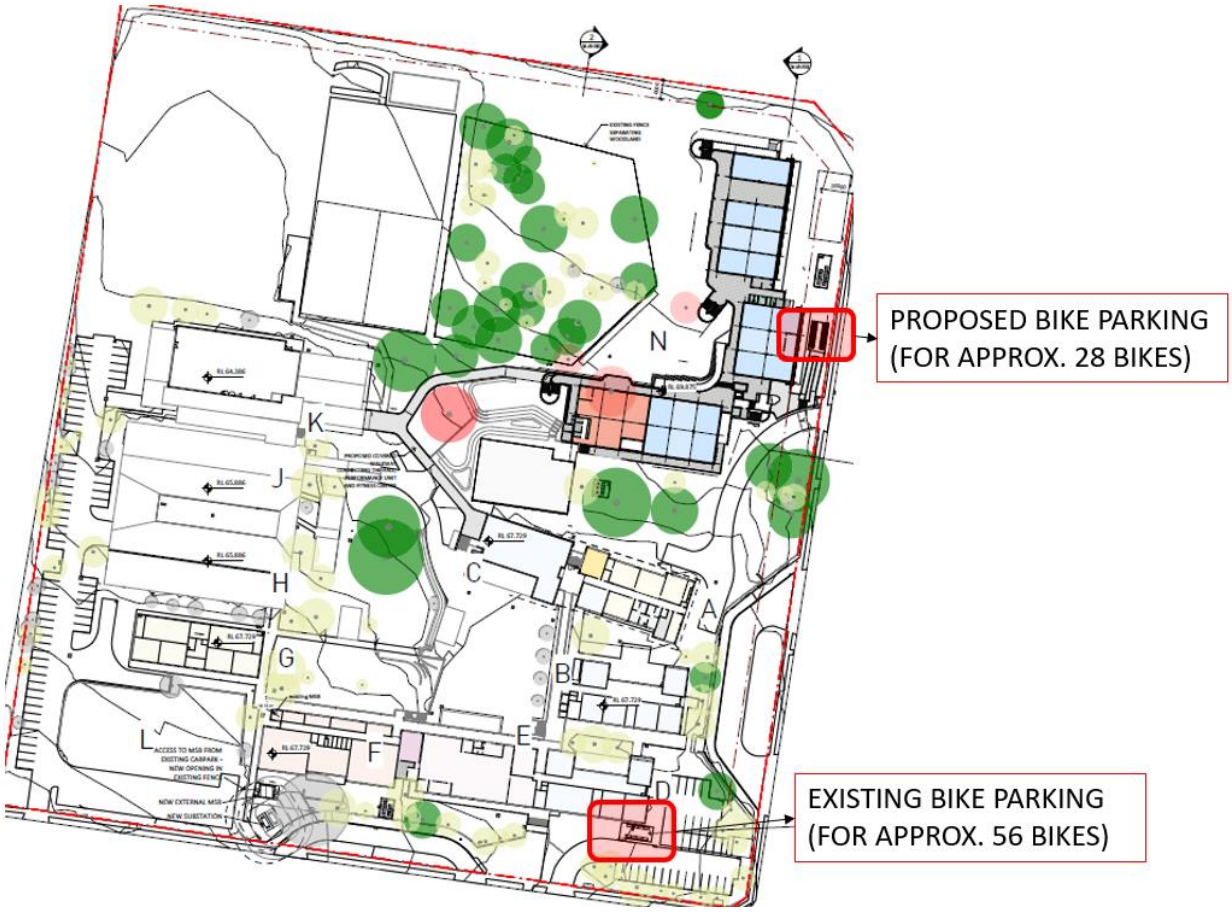

Figure 3.4: Existing and proposed bike parking location
Source: PTW Architects

3.5 Public Transport Access

There are no changes proposed to public transport access. The existing on-site bus bay on Glenwood Park Drive will be retained in its current configuration.

3.6 Pick-up and Drop-off (Kiss & Ride)

As detailed in Section 2.8, the primary kiss & ride zone is provided with a capacity of 10 vehicles (60 metres), and the secondary zones, with “No Parking” signage, nearby the main kiss & ride zone, with a capacity of 15 vehicles (90 metres). This could achieve an overall physical capacity of approximately 25 vehicles, while limiting the impacts (to traffic flow and kerbside allocation) in any individual location. There are no changes proposed to pick-up and drop-off facilities. The existing on-site bay and “No Parking” zones on Forman Avenue would be retained in their current configuration.

3.7 Car Parking

There are no changes proposed to car parking provision. The existing on-site car parks with a capacity of 93 spaces would be retained in their current configuration.

4.0 Operational Impacts

4.1 Overall Travel Demand

As detailed in Section 3.1 the student capacity is proposed to increase to 1,820 students, from the current operation of 1,410 students (as of August 2021), or an increase of approximately 29%. As a result of this growth, the anticipated staffing allowance would increase from approximately 106 staff to 133 staff, or an increase of approximately 25%.

Accordingly, the anticipated increases in travel demands can be estimated as shown in Table 4.1. Mode splits are based on the existing travel habits as estimated and advised by the School, see Section 2.11.

Table 4.1: Travel mode splits and volume forecasts

Values may not add to 100% due to rounding.

	Students				Staff			
Travel Mode	**Mode Split**	**Existing Volumes**	**Forecast Volumes**	**Growth**	**Mode Split**	**Existing Volumes**	**Forecast Volumes**	**Growth**
Car (park, as driver)	8%	113	146	33	92%	97	122	25
Car (park, as passenger/carpool)	2%	28	36	8	0%	0	0	0
Car (drop-off)	40%	564	728	164	2%	2	2	0
Walk only	36%	508	655	148	2%	2	2	0
Scooter / skateboard	0%	0	0	0	0%	0	0	0
Bicycle	1%	14	18	4	3%	4	4	1
Motorbike	0%	0	0	0	0%	0	0	0
Bus	12%	169	218	49	1%	1	1	0
Train	1%	14	18	4	1%	1	1	0
Total	**100%**	**1,410**	**1,820**	**410**	**100%**	**106**	**133**	**27**

The growth outlined in Table 4.1 and the analysis in this section of the report assume that mode splits remain consistent post-development. However, the School Transport Plan (see Section 5.0) seeks to change this mode split to reduce car-based travel and achieve a shift towards active and public transport modes.

It should be noted that the growth in student population (and therefore the growth in travel demands) is expected to occur gradually over a period of time.

4.2 Pedestrian

As detailed in Table 4.1, a growth of approximately 148 additional pedestrians (148 students and 0 staff) could be expected as a result of the development.

In general, this growth in pedestrian activity is expected to be able to be accommodated on the local pedestrian network. There is good provision of existing pedestrian infrastructure in the of pedestrian zebra crossings on both Forman Avenue and Glenwood Park Drive, plus pedestrian refuge islands at various locations.

The additional pedestrian entry to the northeast on Glenwood Park Drive will assist in distributing pedestrian load around the site, including for existing pedestrian volumes. This will improve the pedestrian amenity and volumes along the pedestrian links immediately adjacent to the site.

4.3 Cyclists

As detailed in Table 4.1, a growth of approximately 5 additional cyclists (4 students and 1 staff) could be expected as a result of the development.

To encourage uptake of cycling by staff (and allow for staff walking or other usage) end-of-trip facilities are proposed as detailed in Section 3.4, including showers and lockers.

The NSW Department of Education Educational Facilities Standards & Guidelines (EFSG) nominate the following requirements for bicycle storage:

Table 4.2: EFSG bicycle storage requirements
Source: NSW Department of Education

School core size	2	3	4	5	6	7	9	12
Number of bikes	24	30	36	42	48	54	66	84

The proposed provision of 28 new bicycle spaces (adding to the existing 56) shall meet the EFSG requirements for a Stream 12 school (84 spaces).

4.4 Public Transport

As detailed in Table 4.1, a growth of approximately 49 additional bus passengers (49 students and 0 staff) could be expected as a result of the development.

The additional demand is roughly equal to 1 bus worth of students. Noting the gradual rate at which the student population would grow, and the likelihood that this would grow into areas with existing bus services available, this is considered a reasonable growth which could be addressed by TfNSW and the local operator as part of normal procedure.

Transport for NSW provides the School Student Transport Scheme (SSTS), which gives school students free or subsidised travel between home and school on all public transport modes including buses, trains, ferries and light rail. The minimum distance requirements for high school students applying the SSTS are as follows[3]:

- Years 7 to 12 (Secondary): 2 kilometres straight line distance or 2.9 kilometres walking or further.

Where students are not eligible for the School Travel Pass, the School Term Bus Pass offers discounted travel on buses between home and school for a whole school term, for a cost of $55 per term.

Based on the size and configuration of the current catchment intake boundary, almost all students are within the 2.9km exclusion zone (for Years 7 to 12). Therefore, the most likely users of public transport would be students with a School Term Bus Pass. Opportunities for applying for the School Term Bus Pass, and available bus routes, would be made clear in a Travel Access Guide to be provided as part of the final School Transport Plan (see Section 5.5.3).

Noting the scale of increases in public transport demand that are expected, including with an increased uptake in the future, the proposed development will result in minimal impacts to public transport operations. Existing physical infrastructure (including the on-site bus bay along Glenwood Park Drive) will continue to suitably service the School.

[3] Transport for NSW: https://apps.transport.nsw.gov.au/ssts/#/whoIsEligible

4.5 Pick-up and Drop-off

As detailed in Table 4.1, a growth of approximately 164 additional drop-off and pick-up users (164 students and 0 staff) could be expected as a result of the development. The growth in the number of students accommodated by the proposed development is approximately 29% relative to existing operations. At an estimated rate of 1.5 students per vehicle, this could represent approximately overall number of 486 vehicles including 110 additional vehicles using the kiss & ride areas on Forman Avenue. The functional capacity of the kiss & ride zone is assessed as follows:

- Total capacity: 25 vehicles (as detailed in Section 3.6)
- Peak period: 30 minutes
- Vehicle turnover time: 90 seconds
- Vehicle cycles: 20 per peak period
- Vehicle flow capacity: 500 vehicles per peak period

This capacity will be sufficient to cater for the forecast usage levels. It is also noted that kiss & ride demand is generally lower in the afternoon than the morning (resulting in lower total demands).

The relative growth and the net number of additional vehicles are both considered reasonable growth which could be accommodated within the local road network. Impacts to the road network are considered further in Section 4.6.

Additionally, through the provision of new infrastructure such as the new pedestrian entry, and improved management and communications under the School Transport Plan, it is anticipated that the usage of private vehicle could reduce in the future. For current volumes to remain consistent under the increased student capacity, kiss & ride usage would need to decrease from the existing 40% to approximately 31%, which is considered to be an achievable reduction.

4.6 Traffic Conditions

4.6.1 Traffic Generation

As detailed in Table 4.1, a growth of approximately 58 additional vehicles (33 students and 25 staff) could be expected to generate parking demand. Additionally, approximately 200 additional drop-off and pick-up users (200 students and 0 staff) could be expected, or approximately 134 vehicles at a rate of 1.5 students per vehicle. Total vehicular trip generation for the site is therefore around 159 (say 160) vehicles.

While there is a small level of traffic generation for the car park, most traffic for the kiss & ride would generate two trips, say 160 arrivals and 160 departures in total during the drop-off or pick-up period.

4.6.2 Trip Distribution

According to the students' residential address, enrolling at GHS, they have been distribted approximately equally at north and south of the campus within the catchment area. The distribution is around 47% at north and 53% at the south of the campus. On this basis, it is approximated that traffic will be split roughly evenly between the north and south approaches of each intersection to the School.

Additionally, for the purposes of intersections modelling at each intersection, approximately 50% of new traffic, or 80 arrivals and 80 departures, would be estimated to use each of the two intersections.

Overall trip distribution assumptions for the two intersections of Glenwood Park Drive and Forman Avenue for AM and school PM peak are shown in Figure 4.1.

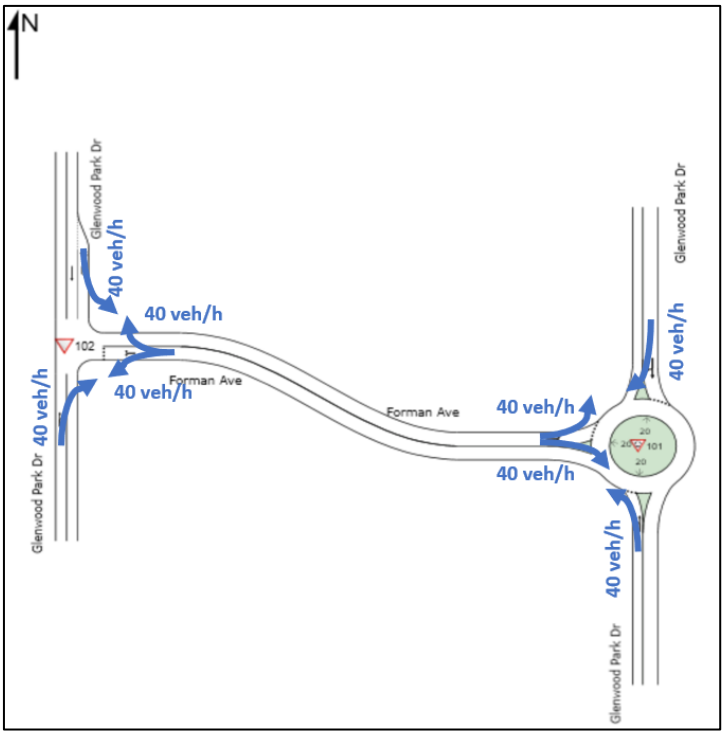

Figure 4.1: Trip distribution of the additional demand due to the development

Both school time peak hours have the same traffic distribution proportion since the main effective mode in creating the additional demand is defined by the drop-off and pick-up mode share.

4.6.3 Future Traffic Condition

The east and west intersections of Glenwood Park Drive and Forman Avenue have been modelled with traffic growth of 1.5% in 2026 and 2031 considering the addition of the development traffic as described above. The results of the traffic modelling at this intersection with and without the new development of GHS are as follows.

Table 4.3: SIDRA modelling results for 2026 without development

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	**AM**	0.302	6.0	3.9	**A**
	PM	0.209	5.7	2.8	**A**
	School PM	0.247	6.0	3.2	**A**
The west intersection of Glenwood Park Dr/Forman Ave	**AM**	0.440	10.8	6.6	**A**
	PM	0.755	22.4	31.1	**B**
	School PM	0.499	13.1	10.9	**A**

Table 4.4: SIDRA modelling results for 2026 with development

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	**AM**	0.386	6.2	4.7	**A**
	PM	0.209	5.7	2.8	**A**
	School PM	0.323	6.2	4.0	**A**
The west intersection of Glenwood Park Dr/Forman Ave	**AM**	0.564	14.3	15.8	**A**
	PM	0.755	22.4	31.1	**B**
	School PM	0.638	17.6	22.2	**B**

Table 4.5: SIDRA modelling results for 2031 without development

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	**AM**	0.327	6.0	4.3	**A**
	PM	0.225	5.8	3.1	**A**
	School PM	0.267	6.0	3.5	**A**
The west intersection of Glenwood Park Dr/Forman Ave	**AM**	0.490	12.3	9.4	**A**
	PM	0.866	32.1	51.7	**C**
	School PM	0.561	15.4	15.5	**B**

Table 4.6: SIDRA modelling results for 2031 with development

Data for unsignalised intersections is manoeuvre with worst delay

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	**AM**	0.414	6.3	5.2	**A**
	PM	0.225	5.8	3.1	**A**
	School PM	0.346	6.3	4.4	**A**
The west intersection of Glenwood Park Dr/Forman Ave	**AM**	0.623	16.7	21.7	**B**
	PM	0.866	32.1	51.7	**C**
	School PM	0.712	21.4	31.0	**B**

As expected, the proposed development has slightly changed the traffic operation of the modelled intersection in AM and School PM peak hours due to low additional demand. There will be no increase in traffic demand during the PM commuter peak hour; therefore, traffic performance remains constant. The worst LOS, highest delay and degree of saturation at the west intersection are related to the PM commuter peak hour, and the development would not impact this period performance. AM and School PM peak periods will experience highest delay, adegree of saturation and level of service at the east intersection, and the development would

cause slight increase in these traffic parameters because of negligible extra demand. Overal, modelling results demonstrated that both intersections operate at an acceptable level of service after the development.

4.7 Car Parking

As detailed in Table 4.1, a growth of approximately 58 additional vehicles (33 students and 25 staff) could be expected as a result of the development.

The anticipated increase in parking demand will result in some additional demand for on-street parking spaces. However, given the significant levels of available capacity in the surrounding street network (see Section 2.7.2), this additional demand could be accommodated and would not create unreasonable impacts on local residents. The usage of on-street parking by residents is currently low (as shown by non-school day occupancy of on-street parking).

The Blacktown DCP 2015 notes the following recommended rates for the provision of parking at primary and secondary schools:

- 1 space per staff member, plus
- 1 space per 100 students, plus
- 1 space per five Year 12 students, plus
- 1 space for delivery vehicles, drop-off area and buses as appropriate

Based on the capacity of 1,820 students, an estimated 133 staff, and an estimated 300 Year 12 students, the total on-site parking requirement based on the DCP rates would be 181 spaces. No parking for students is to be provided on any Department of Education site; the parking requirement considering staff only would be 133 spaces.

On completion of the proposed works, the development would accommodate 93 on-site staff car parking spaces for the high school (plus separate provisions for the ELC). This would be equivalent to a rate of 0.7 spaces per staff member, with no provision for visitor parking on-site, which is lower than the DCP rate.

However, as noted in Part A, Section 6.2 of the Blacktown DCP 2015, car parking provision should be determined with consideration of:

- The size and type of the development and its traffic generation
- The availability and accessibility of other public parking
- Traffic volumes on the street network, including expected future traffic volumes relating to the City's road hierarchy
- Hours of operation and any other specific characteristics of the development proposal.

The increase in size of the development relative to today's existing conditions will be gradual allowing users to adjust their behaviour over time as the size of the development increases. As the type of development is for a school, it is critical to increase the amount of available on-site open play space and reduced levels of on-site car parking assist in achieving this.

The availability of on-street car parking is shown to be adequate, based on the analysis presented in Section 2.7.2. The addition of the full 58 vehicles (in a worst-case and full-capacity scenario) could be accommodated in the surrounding parking areas, including on-street and off-street carparks, which show an average available capacity of 208 spaces and a minimum at any time of 179 spaces.

It is acknowledged that during peak school periods, traffic volumes are high, however these periods of congestion are typically short (15-20 minutes). The school also only operates during school hours, with staff generally arriving from around 8am and departing by around 4pm, meaning that all on-street parking remains available for residents and their visitors outside these hours and during weekends and school holidays.

On balance, the proposed parking capacity is considered acceptable for the proposed development.

In accordance with Section D3.5 of the Building Code of Australia (BCA), accessible parking for schools (Class 9b) is required at a rate of 1 accessible space per 100 parking spaces or part thereof, which is a requirement of 1 accessible space for this development. The BCA requirements are therefore satisfied in this proposal, which includes 1 existing accessible space.

4.8 Service and Loading

The requirements for service and loading will be modified relative to the existing conditions, with multiple waste streams being implemented to address sustainability requirements. This will result in smaller and more regular collections of the individual waste streams.

The existing service vehicle area can accommodate vehicles up to and including Heavy Rigid Vehicles (HRVs), which can enter and exit the site in a forward direction. It needs to be noted the most expected size would be Medium Rigid Vehicles (MRVs).

4.9 Emergency Vehicles

There shall be no change to emergency vehicle access to or around the site. Ambulances are able to enter the site via the vehicle access points on Glenwood Park Drive and Forman Avenue. Ambulances needing to access the playing fields at the north end of the site can utilise the staff car park adjacent to the western site boundary to access this area of the school. Fire brigade vehicles may similarly use these access points or operate from the indented bus bay or pick-up and drop-off zone.

4.10 Social Impacts

As part of the EIS for the proposed works, a Social Impact Assessment (SIA) has been prepared by Elton Consulting. The SIA identifies and analyses the potential positive and negative social impacts associated with a development proposal. It involves a detailed and independent study to outline social impacts, identify mitigation measures, and provide recommendations in accordance with professional standards and statutory obligations.

In relation to traffic and parking, the SIA consultation revealed the following feedback for the existing situation:

- Way of life
- Community
- Accessibility
- Culture
- Health and wellbeing
- Surroundings
- Livelihoods

The SIA consultation revealed the following feedback for the proposed project:

- There will be a shortage of on-site car parking and some staff might not be able to park. However this can be accommodated in the local area and effects on staff or the local area should not be significant;
- With significant pedestrian activity around the site (including children), there are concerns about safety due to traffic and machinery however a Preliminary CTPMP identifies that there will be manned supervision of all vehicle access points during construction to maximise safety;
- There are multiple worker parking options that could be implemented with likely no major social impact on the school or local community. One option could impact on staff access;
- There will be no access to the school's open space during construction for students to play during school hours and for extracurricular activities;

- There are concerns about traffic and machinery around a school site however a Preliminary CTPMP identifies that there will be manned supervision of all vehicle access points during construction to maximise safety;

The SIA consultation revealed the following suggestions for the design:

- Explore the feasibility of greater servicing of the school by public transport.
- Improve safety or entry and exits to the school, and ensure streets are safe for students walking/riding, as well as a scooter rack

4.10.1 Response to Social Impact Assessment

In response to the findings of the SIA and the recommendations put forward, the following comments are noted:

- The existing local transport network, and the physical space available for it, are constrained in the local residential area. This includes provision for all modes of transport including private vehicles, public transport, and active transport (walking and cycling).
- The existing traffic and parking issues around the school, including management of the drop-off and pick-up area, have been observed and noted as major issues to be considered in this project.
- Therefore, on consideration of these two notes, the transport strategy put forward for this development is to reduce private vehicle as far as practical, by providing feasible alternatives for both staff and students.
- The improvements being provided under this project for alternative travel modes include new pedestrian access to the school, on-site bicycle storage and end-of-trip facilities for staff. These facilities will make cycling and walking to site a safer and more attractive option, thereby allowing for an increased active transport mode share.
- The operation of the School will include a strong communications platform in the School Transport Plan, of which a preliminary version has been included in this TAIA. Messages to staff and parents will include identifying safe routes to school, identifying available facilities (such as bicycle storage), discussing relevant events or road safety courses, and important messages relating to operation of on-site facilities (such as the kiss & ride zones). School Infrastructure has also recently standardised a Travel Access Guide document for all schools to improve the distribution of this information (refer Section 5.5.3).
- A reduction in private vehicle usage (and uptake in active travel modes in particular) and therefore reductions in traffic congestion and improvements to road safety, are considered realistic and achievable because:
    - While approximately 36% of students currently walk to site, analysis of the school catchment shows that approximately 32% of the student catchment population lives within a 1200-metre walking distance, roughly equivalent to a 15-minute walk, and 71% of students within a 10-minute cycle, allowing for vast improvements for the active transport.
    - Due to the relatively low increase in student population which can be accommodated by the proposed works, only a low shift in travel mode would be required to achieve a net zero change in existing vehicular traffic conditions.
    - In order to increase the usage of public transport, additional bus services could be made available following further discussions with bus services providers.

5.0 School Transport Plan

A School Transport Plan (STP) is a way to sustainably manage the transport needs of staff, students, volunteers and visitors to a development. The aim of the Plan is to reduce the environmental impact of travel to and from the site and to provide a clear plan of management for vehicle and pedestrian movements within and around the site.

This Plan contains travel plan objectives for the development, the proposed design features that contribute to meeting these objectives, and management strategies intended to fulfil the outlined objectives.

This preliminary STP has been prepared to support the development and future operation of the school, and to satisfy conditions of the SEARs issued by the Department of Planning, requiring the provision of an STP and strategies to improve infrastructure.

This document is preliminary in nature and is intended to be dynamic and respond to the future operation of the site. It is anticipated that this preliminary STP will be developed into a more comprehensive and final STP prior to commencement of operations of the new development. This document may also form a reference point for further development of new operational plans in the future.

5.1 Transport Goals

5.1.1 Vision and Objectives

The main vision and objectives of this preliminary STP for Glenwood High School are:

- To proactively identify and meet the school travel demand safely, efficiently and sustainably
- To deliver transport infrastructure to meet school travel demand and improve accessibility
- To decongest the road network around the school
- To empower children and young people to be safe and transport users now and into the future

5.1.2 Mode Share Targets

The mode share targets for the site are outlined in Table 5.1. The volume change identified is between the forecast conditions based on existing travel habits (i.e. as outlined in Table 5.1), and the potential forecast conditions with mode shift achieved.

Table 5.1: Travel mode forecasts

Values may not add to 100% due to rounding.

Travel Mode	Existing Mode Split	Mode Split Target	Volume Change	Existing Mode Split	Mode Split Target	Volume Change
Walk	36%	40%	+73	2%	5%	+5
Bicycle	<1%	10%	+164	3%	10%	+12
Scooter	0%	<1%	+9	0%	0%	-
Bus/Train	12%	12%	-	<2%	3%	+3
Drop-off & pick-up	42%	32.5%	-164	2%	2%	-
Park & walk (passenger)	<2%	1%	-9	0%	0%	-
Car (driver)	8%	4%	-73	92%	80%	-21
Total	**100%**	**100%**	**-**	**100%**	**100%**	**-**

These mode share targets are considered reasonable and achievable as:

- Approximately 32% of the student catchment population is within a 1200-metre walking distance of the site.
- On-site bike storage for 10% of staff and 10% of students could be provided, plus end of trip facilities for staff.

On-site car parking is deliberately restricted and will be allocated and managed, encouraging staff to use alternative means of transport.

5.2 Policies and Procedures

The transport policies and procedures to be implemented for the school are:

- Prioritise multi-model transport access
- Access policies for car parking in the staff car park
- Information campaigns to staff, students, and visitors
- Group travel to be coordinated by schools, utilising dedicated transport

5.3 School Transport Operations

5.3.1 Emergency Vehicles

Emergency vehicles are the highest priority vehicle types requiring access to the school. Ambulances will be able to access the school through the access points at Glenwood Park Drive and Forman Avenue during and after the development. Demountables that will be temporarily placed in north west of the site may restrict access to the existing sport grounds, but ambulances will still have access into the site.

5.3.2 Active Transport

Active transport modes include walking and cycling and other non-motorised means of transport. For the purposes of this Plan, active transport also considers pedestrian movements to and from vehicles parked on-street and on-site, vehicles at the pick-up and drop-off area, and within the bus zone. These movements result in some level of conflict and crossover between pedestrians and vehicles, therefore requiring safe management. For this reason, active transport is a higher priority mode than all other non-emergency movements.

5.3.3 Public Transport

The primary public transport services utilised by the school includes the bus routes stopping in the bus zone along Glenwood Park Drive. Currently, only about 12% of students and 1% of staff travel via the bus, even though sufficient bus services are provided in the morning and afternoon school peak times. Therefore, promotion of the public transport services and availabilities should be prioritised.

The travel demands for students and staff travelling to the site via train or metro are expected to be minimal, reflected in the travel survey in Section 2.11. This is mainly due to the unavailability of train and metro services within the vicinity of the site.

5.3.4 Pick-up and Drop-off

Pick-up and drop-off is the most popular mode of travel for the students of Glenwood High School, with 42% travelling via this mode. The pick-up and drop-off facility at the School (on Forman Avenue) currently attract very high volumes of private vehicles, which is due to the low walkability of the catchment (32% of students within a 1200-metre walk). These demands occur for short periods of time in the morning and afternoon, creating high levels of congestion in the road network.

Activities relating to pick-up and drop-off can produce significant safety concerns and impacts on the local traffic condition. Accordingly, PUDO zones require deliberate management to ensure user safety and maintain an acceptable traffic flow.

5.3.5 Car Parking

Travel by car for the purposes of car parking is considered a low-priority transport mode. While the demand volumes for car parking are high for this site location, the safety and sustainability of private vehicle travel result in this being a low priority mode. Nevertheless, to ensure operation of the site it is critical to manage the car parking in an efficient way, for example to allow staff to access the facility in a timely manner.

5.3.6 Service and Loading

Service and loading functions are a key component of the operation of the school. However, given the importance of other travel mode types, particularly the risk of other movements becoming unsafe or congested, service vehicles are considered the lowest priority transport type for the school site.

Delivery and service vehicles will enter the site in a forward direction via Glenwood Park Drive. On completion of unloading or servicing activities, the truck will exit the site from the same access in a forward motion. Trucks staying on-site for any period of time are to park in the nominated service bay. The final arrangements for internal movement of delivery and service vehicles will be finalised in the detailed design stage, and this would also need to be coordinated through the operating life of the school with individual contractors, as the service needs may change over time.

All delivery and service trucks are to be fitted with reversing alarms, and should be fitted with cameras, to assist truck drivers in performing reverse manoeuvres and avoiding any conflict with other vehicles such as parked cars. Given that deliveries are generally occurring outside of school hours, there is a minimal chance for any such conflict to occur. However, some deliveries may be required to occur during school hours. In any case, as a minimum safety requirement delivery and service vehicles should be fitted with the above recommended safety features.

Wherever practical, all deliveries should be scheduled at least 15 minutes apart to avoid any conflicts and allow a buffer for unexpected delays. Additionally, deliveries are recommended to be scheduled outside of school hours either before 8:00am or after 4:00pm.

Other considerations for the scheduling of deliveries include:

- Personnel to be available to marshal vehicles through the site for access to the main loading areas (to manage conflict and movements across the external pedestrian footpath)
- Nominated external personnel (if available) to be recorded and provided with induction information if necessary
- Relevant staff in departments or classrooms near loading areas to be advised of any scheduled activities which may be noisy or disruptive to classes.
- Once deliveries are completed, a record of deliveries is to be kept, to assist with future planning or any incidents which may occur.
- Vehicle size to be determined, and necessary traffic control measures to be considered if necessary and planned for within the scheduling system.
- Vehicle requirements (e.g. reversing alarms) are to be made clear to construction or delivery contractors.

5.4 Transport Programs

5.4.1 Ride 2 School Day and Other Health Events

Various organisations and groups develop programs and events to encourage active transport. For example, Bicycle Network coordinates a Ride2Work and Ride2School Day each year. These events provide a good opportunity for organisations to encourage staff and students to participate in cycling. Additionally, these

initiatives create awareness and are useful for influencing the school community's travel behaviours. It is recommended that the school should investigate avenues to promote this event and encourage staff participation. An additional suggestion is to introduce incentives such as competitions or rewards.

Bicycle training workshops can also be a component of these programs to enable users to become familiar with bicycle maintenance, recommended cycling routes and general bicycle and road safety. Rideability is an example of a cycling education service that delivers workshops in schools with an emphasis on road safety and cycling skills.

Other health events encouraging active transport include Bike Week, Walk Safely to School Day and Health and Wellness Fairs. These initiatives expose staff and students to the many benefits of choosing active transport.

Annually hosting these events provides the community with a continual reminder and is therefore more likely to influence their behaviour.

5.4.2 Carpooling

A strategy to encourage staff to carpool involves a pairing system that notifies staff members of other staff who live in nearby areas or along their travel route. Initiating this system might involve a meeting to provide an opportunity for staff members to discuss carpooling options, including coordination of staff by local area. Off-the-shelf alternatives such as the Liftango app may also be an option for staff to utilise.

5.4.3 Priority Parking

A strategy to encourage carpooling further is to allocate priority parking spaces to those staff committed to carpooling. Since it is expected that the total demand for parking may exceed the on-site provision, priority parking ensures that carpooling staff will be able to park on-site, while other staff members may be required to utilise on-street parking. This may act as an incentive for others to investigate carpooling opportunities. Priority spaces could also come with other benefits, such as a prime location with good accessibility as further encouragement.

5.4.4 Electric Vehicle Charging

There are four types of electric vehicles (EVs): battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), fuel cell electric vehicles (FCEVs), and non-plug-in hybrid EVs (HEVs). The number of EVs is expected to grow in Australia due to its benefits, including air pollution reduction, eliminating greenhouse gas emissions, lower maintenance costs, etc.[4] These benefits would be consistent with the visions and objectives of this School Transport Plan, including the aim to meet school travel demands in a sustainable manner.

Therefore, it is suggested that EV charging stations could be considered in the future for this site in order to provide for more sustainable school travel. EV charging stations will be considered at further stages of the design in accordance with the Green Star Buildings Movement and Place Credit 27 criteria.

This site is undergoing a feasibility assessment for electric vehicle charging stations and will address if deemed appropriate the future provisions for sub-station capacity, spatial requirements, designed and assumed future charging infrastructure.

[4] Source: The Australian Renewable Energy Agency

5.5 Communications Plan

5.5.1 Channels

New Starter Kits

To ensure new travellers have information regarding all their travel options, a Travel Access Guide should be provided. This brochure can easily be included as part of an induction or orientation package. This is especially important for travellers new to the area and who may be completely unfamiliar with the transport options.

Periodic Reminders

One method to enable periodic information sharing is to include a sustainable travel section within a school newsletter. The content may include details about new travel initiatives, mode share progress updates, upcoming events or changes, as well as reminding travellers about the importance of sustainable travel. It should also allow for feedback or questions regarding any travel-related concerns.

School Website

The school website is to be utilised to provide up-to-date transport information, and to provide a central source of information for students and parents. External visitors would also have access to the website.

5.5.2 Messages

Key points of information and typical messages to the school community could include:

- Transport goals, safety requirements, and parent expectations
- On-site bicycle storage areas and end-of-trip facilities
- School Student Transport Scheme (SSTS) and School Term Bus Pass availability
- Changes to local public transport routes (as they occur)
- Changes to local pedestrian and cyclist facilities (as they occur)
- Opal card reminders (to ensure students tap on and off even if public transport is free)
- Any available memberships or discounts
- How to contact the Travel Coordinator or governance committee

5.5.3 Travel Access Guide

The aim of a Travel Access Guide is to present staff and students with information about the available safe and sustainable transport options in the local area. This action involves presenting this information in a simple and understandable manner through an educational brochure. Staff and students are more likely to change their travel behaviour after being made aware of the public and active transport options and how to safely and easily utilise these alternatives.

Recommendations for the brochure content includes bus and train routes and how to access these from the site. It should also include information about end-of-trip facilities and safe routes to surrounding neighbourhoods for staff and students able to participate in active transport.

Travel Access Guides can be distributed to staff, students and parents and can be developed in-house or by an external consultant. The brochure should also be accessible online through the school's website for visitors and ease of access.

A Travel Access Guide template is provided in Figure 5.1 and Figure 5.2. This guide gives the type of content and advice to include in a Travel Access Guide for an educational development.

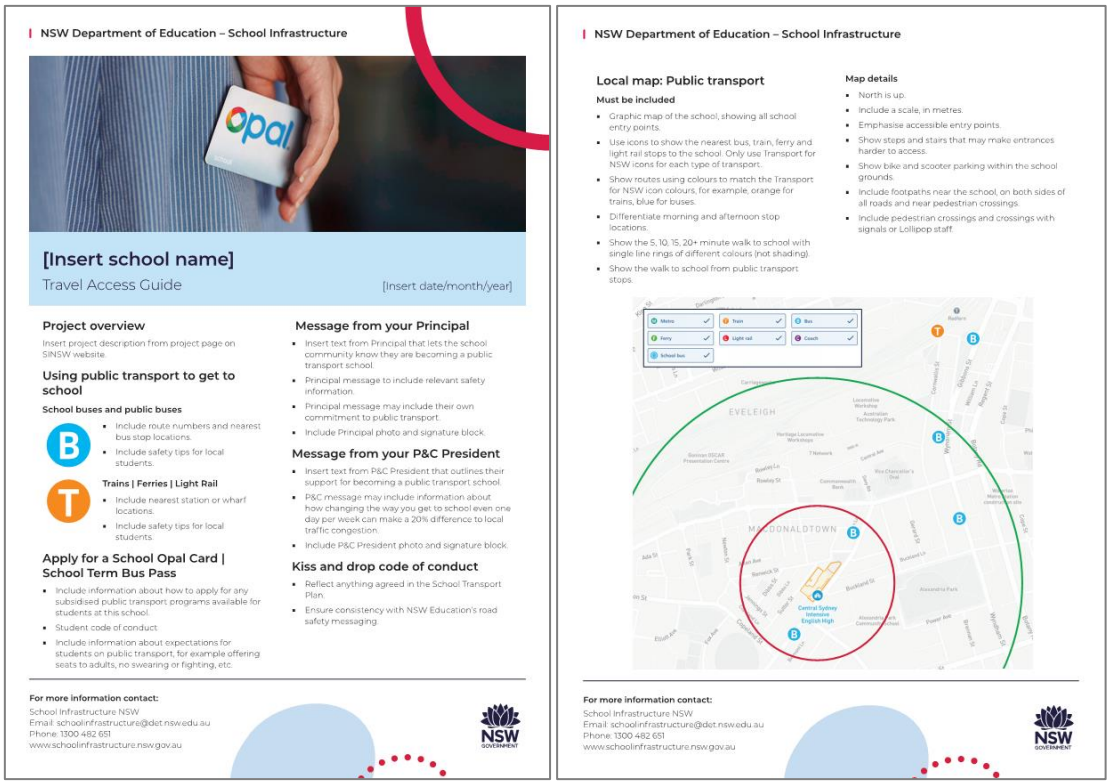

Figure 5.1: Travel Access Guide public transport template
Source: School Infrastructure NSW

Figure 5.2: Travel Access Guide active transport template
Source: School Infrastructure NSW

5.6 Data Collection and Monitoring

5.6.1 Data Collection

Transport Data Collection

Data collection is required for the ongoing management and reviewing of this Plan. These investigations are intended to evaluate whether a particular operation, facility, or management system is still successfully functioning and meeting demands. Table 5.2 contains suggestions for the data collection context and the types of data to be collected.

Table 5.2: Data Collection Summary

Context	Data to be collected
Pedestrian Facilities	• Number of pedestrians entering through gates • Arrival and departure times through school gates • Number of pedestrians using pedestrian crossings • Number of pedestrians jaywalking as well as the time and location
Cyclist Facilities	• Number of daily vacant and occupied bicycle parking spaces • Number of cyclists entering through each site access point • Number of end-of-trip facility users
Buses	• Number of public bus users (morning, afternoon and overall) • Number of school bus users (morning, afternoon and overall) • Number of school vs non-school users at nearby bus stops • Observational assessments (e.g. queuing, safety concerns)
PUDO Zone	• Number of users (morning, afternoon and overall) • Set down times • Arrival and departure times • Number of students exiting/entering vehicles • Number of any non-formal pick-up and drop-off occurrences as well as the time and location • Observational assessments (e.g. queuing, illegal stopping, safety concerns)
Car Parking	• Number of daily vacant and occupied spaces • Number of passengers per vehicle • Arrival and departure times

Incident Recording System

It is recommended that the school should keep and maintain an on-site traffic incident record. This record would contain a description of the incident, including contact details and what actions were taken by the school in response to the incident. It is advised that records of incidents be kept for an extended period of time following the incident occurrence.

The school should be able to provide the traffic incident register to relevant authorities on request.

Complaints Management

It is recommended that the school should keep and maintain a record of all complaints made in relation to any transport or access issues in a complaint register. Suggestions for what the record may include are:

- The date and time of the complaint
- The method by which the complaint was made (e.g. phone or email)
- Any personal details provided by the complainant
- The nature of the complaint
- Any action taken by the school in relation to the complaint including any follow-up communication

It is advised that records of the complaint be kept for an extended period of time after the complaint was made. The school should be able to provide a copy of the complaints register to relevant authorities on request.

5.6.2 Program Evaluation

Once the School Transport Plan is finalised, it is to be maintained by the school and shall be distributed to all the concerned logistic personnel and managers. The school is also responsible for distributing appropriate information to staff and contractors as necessary.

This STP should be reviewed regularly and updated as required. It is recommended that an initial review should take place following six months of operation. This review should include detailed observations of the transport operations of the site and adjustments to procedures where necessary.

Following this initial review, a review every two years would likely be an appropriate schedule. To ensure that the ongoing review of this STP is carried out as expected, responsibility for this task should be allocated to the Travel Coordinator or a specific alternative staff member.

5.6.3 Reporting Findings

The School Travel Plan and other associated documentation including the Travel Access Guide should be regularly reviewed and updated as required. It is recommended that an annual review would be an appropriate schedule. The review should include an updated travel mode survey, consultation with staff, students and visitors, and adjustments to initiatives and targets.

Sample evaluations and outputs to stakeholders may include:

School data	School Infrastructure NSW	Students / parents	State / local government
▪ Annual update to dashboard ▪ Compare results ▪ Document progress or deficiencies during delivery ▪ Results to communicate ▪ Analyse policies, infrastructure, or programs to revisit	▪ Annual update to dashboard ▪ Compare results ▪ Document progress or deficiencies during delivery ▪ Results to communicate ▪ Analyse policies, infrastructure, or programs to revisit	▪ Issue report	▪ Issue verification ▪ Issue resolution ▪ Review school and public transport network and services

5.7 Governance Framework

5.7.1 Travel Coordinator Responsibilities

Transport programs must be implemented to achieve travel behaviour change. The school principal and teachers are not travel coordinators, so a dedicated role is required to implement and manage these programs.

The dedicated Travel Coordinator shall:

- Liaise with the School Principal as the nominated transport representative for the school
- Liaise with other internal stakeholders (see below)
- Coordinate communications and publications to staff and students as required
- Directly oversee implementation of transport programs where relevant
- Consult and engage external parties to implement transport programs where relevant
- Liaise with the Contractor prior to the construction phase to review and approve proposed construction traffic and access methodologies
- Liaise with the Contractor during the construction phase to maintain safe operations at and around the site

A dedicated Travel Coordinator is generally required for the duration of construction and the first year post-occupancy. This role is funded by the project during delivery.

After this period, subsequent arrangements for this role are under discussions between School Infrastructure, the Department of Education, and Transport for NSW.

5.7.2 Internal School Stakeholders

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

- School Principal
- Other school Executive Staff as relevant
- Road Safety Education Officer
- Asset Management
- Grounds Management
- WHS Representative
- P&C

5.7.3 State and Local Government Stakeholders

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

- Blacktown City Council
- Transport for NSW
- Busways

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

The nominated point of contact at **Blacktown City Council** is as follows:

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

  - *TBC*
- Email:
  - *TBC*

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

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

The nominated point of contact at **Busways** is as follows:

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

6.0 Construction Traffic and Pedestrian Management Plan

This preliminary Construction Traffic and Pedestrian Management Plan (CTPMP) addresses the proposed construction of the Glenwood High School redevelopment. It discusses the management of construction vehicles and activities, and an investigation of the local traffic and safety conditions throughout the construction process. A draft CTPMP is required in accordance with the SEARs for this development.

This preliminary CTPMP is intended to provide a framework within which a finalised CTPMP can be developed and implemented. The final CTPMP will be prepared by the builder with consideration of all final design selections. This final CTPMP would be subject to consultation and approval with Blacktown City Council.

6.1 Construction Operations

6.1.1 Access Arrangements

The north-east quadrant of the site contains the majority of proposed works, with suitable construction traffic access from Glenwood Park Drive at the northern end of the site. The establishment of this access driveway may result in 1 – 2 on-street parking spaces to be removed.

Other refurbishment works are proposed for Building E at the southern side of the site, adjacent to the drop off and pick up bay on Forman Avenue. This bay is separated from the general traffic on Forman Avenue and may provide a secondary construction access point for the Building E refurbishment. Additionally, the staff carpark to along the western site boundary may allow suitable construction access for the Building J refurbishment works. The draft access plan (developed by Jacobs) is shown in Figure 6.1 for Stage 1, however this is expected to be consistent in regards to traffic and access throughout the construction period.

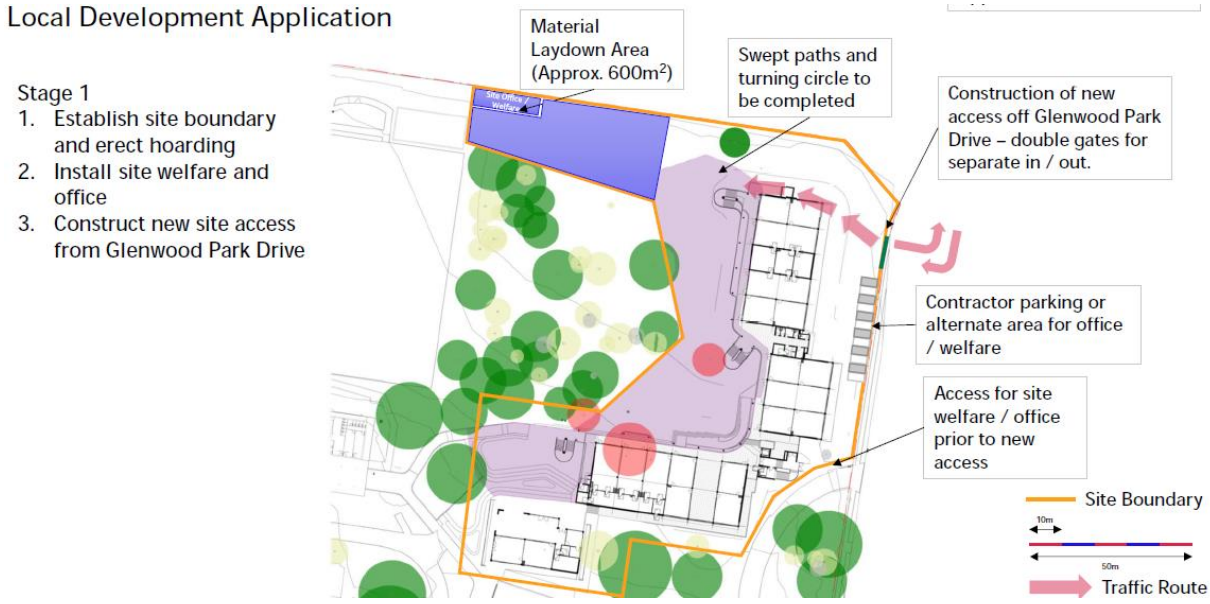

Figure 6.1: Construction site access (preliminary)
Source: Jacobs

6.1.2 Construction Worker Parking

There are several potential options for the provision of construction worker parking with several management considerations. Mainly, it is suggested to decrease the workers' parking demand by encouraging workers to use public transport and carpool. However, on-street and off-street car parking options are as follows:

Option 1 On-Street Worker Parking

There is prevalent unrestricted parking along Glenwood Park Drive, Forman Avenue and Shaun Street, with vacant spaces readily available. The parking capacity study undertaken in Section 2.7.2 provides a summary of the available on-street parking spaces on the surrounding roads. There are several management measures that may need to be established to allow on-street worker parking such as:

- Providing workers with information on available public transport options and transport planning
- Encouraging workers to carpool where possible
- Advise to workers about preferred on-street parking locations which would not occupy residential frontages (such as the southbound side of Glenwood Park Drive and the north-westbound side of Shaun Street). This is to reduce impacts to residents for those workers who do choose to drive
- No workers to park within 100m of the site boundary to ensure parking availability for school users

Workers must follow all on-street regulatory signage including compliance with pick-up and drop-off zones and bus zones around the school.

Option 2 Establish an On-Site Worker Car Park

The school site contains a large area of open play space adjacent to the proposed location of the new buildings. There is a potential to establish a temporary car park in this space to provide working parking. This would reduce the impact on the surrounding road network and improve the safety of other road users by removing construction traffic from the local roads.

Option 3 Glenwood Reserve

There is limited spare parking capacity within the school site, but Glenwood Reserve has large numbers of vacant car parking spaces. The last five years has shown an average of 110 vacant car parking spaces each day at the reserve. Subject to Council consultation, designating a number of parking spaces at the reserve may be an option to support the construction workers. In the instance where a Saturday sporting event takes place at the reserve, consideration may be given to allow construction workers to park within the school site since the staff car park has close to 100% vacancy on non-school days.

6.1.3 Construction Program

Table 6.1 indicates a preliminary phasing outline of each construction stage including estimated vehicle types and volumes, as well as the approximate number of daily workers. These stages are based on the current estimated program of a 12-month construction period but are subject to change following the appointment of a contractor. The data in the table below is to be updated by the builder once appointed and currently represents estimates only.

Table 6.1: Construction Phasing Summary

Stage	Anticipated Completion
Foundations	Q3 2022
Performance Centre	Performance Centre: Q3 2022 – Q2 2023 New Building: Q3 2022 – Q2 2023
New Building Construction	Q3 2022 – Q2 2023
External Works to New Building	Q1 2023
Internal Fit Out & Services	Q2 2023

Stage	Anticipated Completion
Landscaping & Earthworks	Q2 2023
Refurbishment of Blocks E & A	TBC

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

- Monday to Friday 7am to 5pm
- Saturday 8am to 1pm
- Sunday and public holidays None

6.2 Construction Traffic Management

6.2.1 Vehicle Management

Vehicle volumes for a development of this scale are likely to be on the order of approximately 10 vehicles per day (equivalent to 2 vehicles per hour), subject to confirmation by an appointed contractor. At these volumes, the local road network could accommodate the proposed standard construction vehicle movements subject to appropriate management.

Construction vehicle management will be subject to local traffic control by qualified traffic controllers. A detailed CTPMP will be developed prior to commencement of construction and will require further consultation with Council and Transport for NSW.

6.2.2 Construction Vehicle Routes

The main construction access point is anticipated to be located at the northern end of the site on Glenwood Park Drive, subject to the final CTPMP. Figure 6.2 outlines the recommended haulage routes for this potential construction access point. The recommended routes involve both left and right in and out movements at the construction access point.

Figure 6.2 shows the recommended haulage routes for arrival and departure from the north, south, east and west. Construction vehicles are expected to utilise Old Windsor Road for haulage in the north and south directions. Inbound and outbound vehicles from the east can travel via the M2 Motorway, which has connections to NorthConnex. Similarly, vehicles arriving and departing from the west can use the M7 Motorway, which connects to further regions via the M4 and M5 Motorways.

Construction vehicles arriving from and leaving toward the north are likely to access the site via the following route:

Old Windsor Road > Miami Street > Tarwin Avenue > Glenwood Park Drive

Construction vehicles arriving from and leaving toward the south are likely to access the site via the following route:

Old Windsor Road > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive

Construction vehicles arriving from and leaving toward the west are likely to access the site via the following route:

M7 > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive

Construction vehicles arriving from and leaving toward the east are likely to access the site via the following route:

M2 > Old Windsor Road > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive

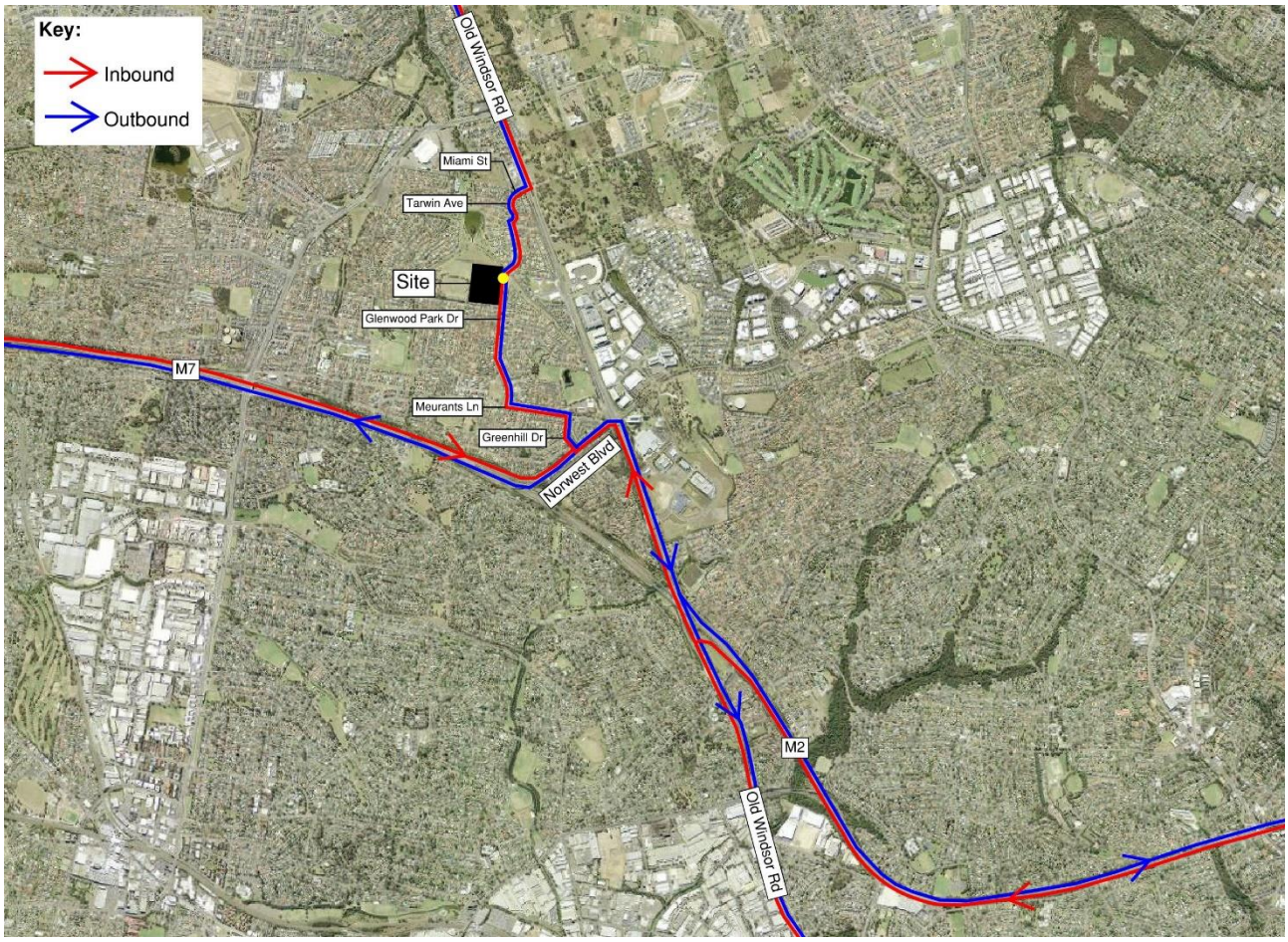

Figure 6.2: Truck Haulage Routes

6.2.3 Public Transport Impacts

It is anticipated that there will be no changes to the current public transport services (including the bus zone on Glenwood Park Drive). The potential construction access driveway is to the north of the bus bay and is not expected to interfere with the existing bus routes in any way.

6.2.4 Cumulative Impacts

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

6.3 Road Safety

6.3.1 Construction Vehicle Access Points

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

6.3.2 Construction Vehicle Routes and Intersections

The state roads providing connection to the site will comfortably accommodate all construction vehicles. These roads include:

- M7 Motorway
- M2 Motorway
- Old Windsor Road
- Norwest Boulevard

It is noted that some local roads will be included in the construction haulage routes. The local road network includes several roundabouts, some with narrow pedestrian medians. If required, there is an opportunity for heavy vehicles to mount most of these roundabouts. It is not recommended for construction vehicles to use these roundabouts to make U-turns, particularly large rigid vehicles or semi-trailers.

The final CTPMP should undertake further analysis of the construction vehicle haulage routes, including swept path analysis of tight turning movements if required. Detailed measures would be refined in consultation with Council prior to any implementation.

6.3.3 Pedestrians and Cyclists

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

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

It is noted that the travel study undertaken at the school reveals that only small numbers of students or staff are currently travelling to school via bicycle, meaning impacts to cyclists will be minimal.

7.0 Conclusion

7.1 Transport Strategy

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

- **Pedestrians**
  - Provide a new pedestrian entry to Glenwood Park Drive
- **Cyclists**
  - Provide new bicycle storage for students
  - Provide new bicycle storage and end-of-trip facilities for staff
- **Public transport**
  - No change; existing provisions to be retained
  - Usage of public transport to be encouraged through School Transport Plan and improved through ongoing consultation and governance measures
- **Freight & deliveries**
  - No change; existing provisions to be retained
- **Kiss & ride**
  - No change; existing provisions to be retained
  - Usage of kiss & ride to be discouraged through School Transport Plan and improved through ongoing consultation and governance measures
- **Car parking**
  - No change; existing provisions to be retained
  - Final parking provision of 93 spaces equates to approximately 0.7 spaces per staff member

This strategy has been proposed to, and discussed with, both Council and Transport for NSW during ongoing liaison through a Transport Working Group for the project. The project team has met with this group three times since August 2021 and the transport strategy for the project has been refined during that period in response to feedback received.

A preliminary School Transport Plan has been prepared which addresses the sustainable management of operational transport demands, and discusses different management options to ensure the success of the future operation of the School. A preliminary Construction Traffic and Pedestrian Management Plan has also been developed to assess any traffic impacts expected to occur during construction works.

7.2 Findings

This TAIA has analysed the proposed development and its transport strategy and found the following:

- The additional traffic generated by the kiss & ride area and staff car parking could be accommodated at the intersections of Glenwood Park Drive and Forman Avenue.
- The proposed improvements for pedestrians and cyclists will assist in reducing the total volume of vehicles accessing the kiss & ride zones, therefore offsetting the growth that would otherwise occur and retaining existing performance at the signalised intersection.
- Some usage of on-street parking by staff is anticipated, however analysis of historical usage of this parking shows good spare capacity, and staff will also be strongly encouraged to use alternative travel modes (including provision of new dedicated cyclist facilities).

The proposed development is deemed suitable on consideration of the traffic and transport elements of the site and its surrounds, and the transport strategy proposed for its management. Only minor items are required to be resolved during further design (see below).

7.3 Next Steps

Following the approval of this SSDA, the expected future works and actions would include:

- Further development of the School Transport Plan and Construction Traffic and Pedestrian Management Plan (subject to any relevant conditions of consent)

Prepared by	Reviewed by	Approved by
		
MINA GHANBARIKAREKANI	**MICHAEL BABBAGE**	**PAUL YANNOULATOS**
Senior Traffic Engineer	Associate	Technical Director

TAYLOR THOMSON WHITTING (NSW) PTY LTD

Appendix A – Meeting Minutes

Jacobs

Meeting Minutes

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Subject	**Transport Kick Off Meeting**		
Project	School Infrastructure NSW Glenwood High School		
Project No.	IW255800	**File**	MM - 210727 - GHS - Transport Kick Off Meeting Minutes
Prepared by	Marcus Hans Kraefft	**Phone No.**	
Location	MS Teams	**Date/Time**	27 July 2021

Participants

Name	Initial	Organisation and Role	Email	Attend / Apology (A/G)
Sukkwan Hart	SH	Jacobs – Project Manager	Sukkwan.hart@jacobs.com	G
Marcus Kraefft	MK	Jacobs – Assistant PM	Marcus.kraefft@jacobs.com	A
Marisa Sidoti	MS	Jacobs – Project Manager	Marisa.Sidoti@jacobs.com	A
Deborah Green	DG	SINSW – Project Officer	Deborah.Green22@det.nsw.edu.au	A
Jeremy Stott	JS	SINSW – Project Director	jeremy.stott4@det.nsw.edu.au	A
Peter Morrison	PM	Jacobs – Project Manager	Peter.Morrison2@jacobs.com	A
Michael Babbage	MB	TTW – Traffic consultant	Michael.Babbage@ttw.com.au	A
Mina Ghanbarikarekani	MG	TTW – Traffic consultant	mina.ghanbarikarekani@ttw.com.au	A
Paul Yannoulatos	PY	TTW – Traffic consultant	Paul.Yannoulatos@ttw.com.au	A
Rebecca Lehman	RL	SINSW - Sustainable Transport Technical Advisor	Rebecca.Lehman@det.nsw.edu.au	A

Copies to All participants

Notes		Action
1	**Cost plan** JS noted all traffic items were excluded in the business case cost plan. RL noted we will need to develop a briefing note.	MS to issue revised Cost Plan B to TTW and cc RL.
2	**Demountables relocation**	

Notes		Action
	MS noted the demountable relocations will be done under an Exempt Development through ProGroup i.e. no TTW involvement.	
3	**TTW information required** RL noted we will need bell times from the School. RL noted we will also require waste management details of what the School will do in future. MB to note in the RFI his availability to discuss with the School Principal.	MB to draft an RFI based on the template provided by Jacobs requesting any required information. Jacobs to then submit via SINSW.
4	**Western site entry** RL noted we requested a Western entry from TTPP during planning phase. JS noted this was never adopted.	
5	**Kiss and drops** MB queried what can TTW provide to aid SINSW. RL noted we need a list of requirements including path lengths, widths and quantities, etc.	MB to provide details.
6	**Council comments on issued SEARS** MS noted the Council comments on the issued SEARS. RL noted we do not have data on students driving to school and parking so this should not be raised with Council. MB noted TTW will collect this data. RL noted that COVID will impact our survey data – preference to use TTPP survey if one was done.	
7	**Transport Working Group (TWG)** RL noted we should keep John Palmer PS and Glenwood HS as separate TWGs. TWG meetings to be scheduled as follows: • Glenwood HS – 5th August • John Palmer PS – 19th August • Alternating TWGs every fortnight thereafter	*Following the meeting, MS and MB agreed that MB was to arrange the TWG due to existing relationships. MB to include Architectus (planner).
8	**TWG presentation format** RL preference for MB to present and take questions at the end. As the group matures, we can entertain more discussion throughout the presentations.	
9	**SSDA date** MS noted test of adequacy lodgement in early November 2021.	
10	**Survey data**	

Notes		Action
	Noted that traffic survey data may be inaccurate due to reduced travel during COVID. RL noted that Matrix may have data that we could purchase.	MB to liaise as required to ascertain accurate data.
11	**Catchment boundary** MB queried if SINSW has plans to change the catchment boundary. JS to review business case to confirm but suspects no major changes to the catchment.	JS to confirm catchment boundary changes.
12	**Next meeting** Next meeting to be scheduled for Tuesday 3rd August and weekly meetings thereafter.	MS to issue transport planning meeting invites.

Jacobs

Meeting Minutes

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Subject	Internal Transport Planning Meeting No 4		
Project	School Infrastructure NSW Glenwood High School		
Project No.	IW255800	File	MM - 210817 - GHS - Internal Transport Planning Minutes No 4
Prepared by	Marisa Sidoti	Phone No.	
Location	MS Teams	Date/Time	17 Aug 2021

Participants

Name	Initial	Organisation and Role	Email	Attend / Apology (A/G)
Jeremy Stott	JS	SINSW – Project Director	jeremy.stott4@det.nsw.edu.au	A
Rebecca Lehman	RL	SINSW - Sustainable Transport Technical Advisor	Rebecca.Lehman@det.nsw.edu.au	A
Helen Mulcahy	HM	SINSW - Planner	helen.mulcahy@det.nsw.edu.au	G
Deborah Green	DG	SINSW – Project Officer	Deborah.Green22@det.nsw.edu.au	A
Michael Babbage	MB	TTW – Traffic consultant	Michael.Babbage@ttw.com.au	A
Paul Yannoulatos	PY	TTW – Traffic consultant	Paul.Yannoulatos@ttw.com.au	A
Boris Santana	BS	Architectus - Planner	boris.santana@architectus.com.au	G
Jo Drummond	JD	EcCell – Waste Mgt	jodrummond71@gmail.com	A
Peter Morrison	PM	Jacobs – Project Manager	Peter.Morrison2@jacobs.com	A
Sukkwan Hart	SH	Jacobs – Project Manager	Sukkwan.hart@jacobs.com	G
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Marisa Sidoti	MS	Jacobs – Project Manager	Marisa.Sidoti@jacobs.com	A

Copies to	All participants		
Simon Lunn	SL	EcCell – Waste Mgt	simon@eccell.com.au
Michael Mihailou	MM	RLB	Michael.Mihailou@au.rlb.com

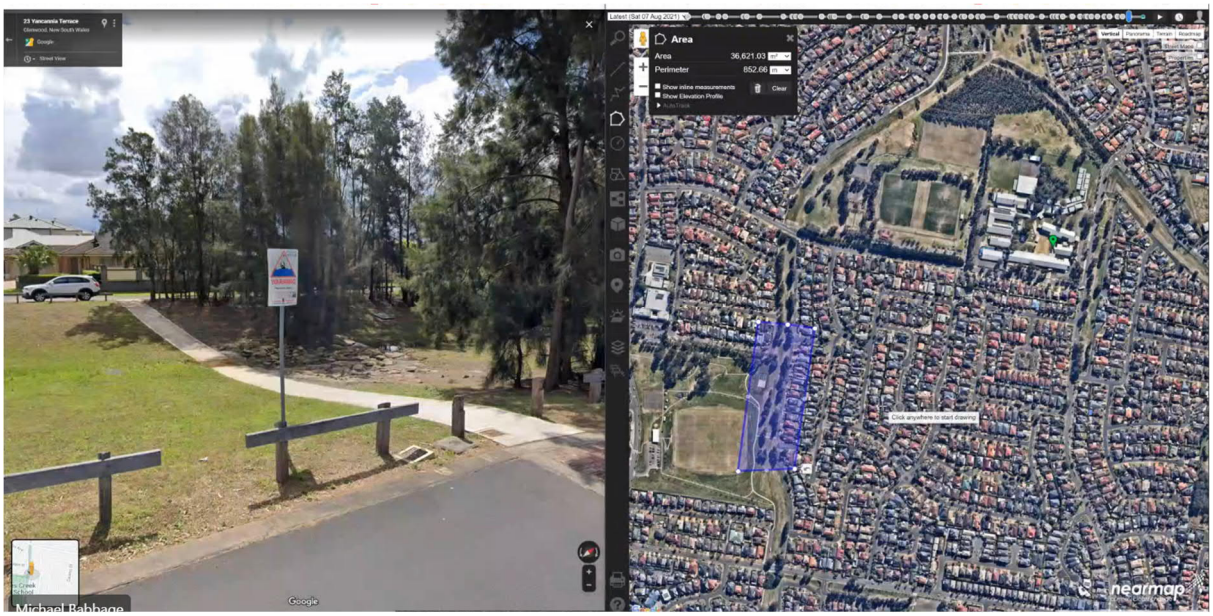
Notes		Action
1	Cost plan RLB Cost Managers has included in their contingency transport/traffic items - Cost Plan issued 13.08.21	Note
2	Demountables relocation RL requested the demountable relocation plan be reviewed with RL, JS, TTW prior to submission to Council. MS/PM to coordinate. Demountables team developing Transport Mgt Plan for review Consider the flow on impacts e.g., close off portions of carpark, possibly increasing existing on street parking	PM/MS
3	Planning Pathways It was noted that the project will have several planning pathways: • 1a) REF: removal of demountable buildings • 1b) Exempt Development: relocation of demountable bldgs. (by Progroup) • 2 DA: bulk earthworks, relocation of sewer/inground services • 3 SSDA: new building, refurbishment works	Note
4	Construction Management Plan Construction Mgt plan will be prepared– proposals for all construction based on staging plans, transport impacts. If possible, avoid bus bays and bus stops. Construction traffic? Civil confirm volumes, fill/soil? Civil Engineer to estimate this if possible. (This may be a condition of consent for a detailed Traffic Management Plan.) *Post meeting note: Civil engineer has issued dwgs of bulk earthworks – issue to TTW for their information.*	PM/MS Note
5	Transport Management Plans ProGroup is putting together the Transport Mgt Plan and to be reviewed by team REF Deliverables ProGroup are providing Traffic Mgt Plan for the REF- and PM to monitor progress and ensure all due diligence checks undertaken DA Deliverables A specific Traffic Mgt Plan is required for the DA – TTW to provide a 'parent' report with associated addenda noting specific elements relating to bulk earthworks. (TTW advised information may be limited due to COVID lockdown and little data available – it was agreed to be a preliminary Traffic Mgt Plan and Contractor to finalise when appointed)	PM RL/MB to review T Mgt Plan prior to issue

Notes		Action
	It was noted that the Traffic Mgt Plan should not be too prescriptive to allow the Contractor some flexibility with their methodology/approach. Restrictions are more around times for the school hours and activities/terms.	
6	TTW information required from the School A Q&A Session has been arranged with the School Principal for 17.08.21. Pat Cordina, Rachel Shahdin SINSW PPP/AMU representatives have been invited as per JS request. RL suggested that TTW refer also to the School transport plan. RL noted it is important to ensure the project team agrees with the intent and messaging regarding transport issues. *Post meeting Note: Information provided and discussed with the School – TTW to assess/analyse responses.*	Note MB
7	Western site entry The Team is considering the inclusion of a western entry to the school (not currently shown on the drawings). RL advised will get funding if this option is necessary. Briefing note for extended Kiss and Drop or western entry – TTW to advise, budgets to be reviewed. TTW advised this is in progress. Will this proposed entry point be supported by a DA? TTW reviewing this and to provide data Timing: MB to provide data and sketches for PTW to draw up by 20.08.21	MB In progress
8	Catchment Data RL to request catchment data for Glenwood and issue to TTW for a detailed analysis.	Closed
9	Kiss and drops/Encouraging Pedestrian usage Catchment and proportion of students who could use the western shared path, what are the scenarios, travel times? Path across the oval is considered 'off site infrastructure' – project team to understand and plan for costs and scope at this stage to avoid escalated/exorbitant costs. Explore the potential for a footpath through play fields through the western side of the school. High student demand in localised area. SINSW is seeking a shared use of play space to western oval (temporary) and has commenced discussions with Council. *Post Meeting Note: Negotiations with Council commenced* It was noted that the future footpath would be for daytime travel, no night lighting.	MB to provide details. In progress MB Note MB in progress

	Notes	Action
	This could be a good alternative to an extended Kiss and Drop zone. Discussion held around Contributions (financial) – options are a) pay a contribution to Council and pathways installed by Council. b) SINSW to include this in the project scope – SINSW/TTW check if agreements have been arranged with council. The above depends on School Principal Questionnaire responses – significance of the Kiss & Drop up to 400 m of queues – this activity is a major issue and a significant issue to remedy. Council is aware of this and may put pressure on the project for a solution. Emphasis on alternative solutions (e.g., pedestrian access given extent of problem)	TTW student location analysis will feed into this
10	Briefing Note Optional costs for RLB to provide and include in Briefing notes for executive approval (TTW, Jacobs to arrange with RLB, and discuss with JS). Refer to the Blacktown DCP and use this as a 'base case' for end of trip, bike racks, use this to accommodate for max/moderate scenario. When developed, ensure RL, MB are issued proposals for coordination purposes. ESD consultant will provide req'ts but facilities to allow for 100-200 staff – final location, extent, and spec TBA.	MB, MS ongoing
11	Council comments on issued SEARS MB advised an RFI was issued to Council for data. No response yet. MB to follow up. MB advised no response received – TTW to issue a formal follow up to determine what type of data is acceptable to Council? Collate data from other sources e.g., bus movement and goggle maps data and convert to traffic volume nos. reasonably new process and not familiar to Council. TTW: to follow up by week ending 20.08.21 and discuss with Council. Seek agreement about is acceptable?	MB
12	Transport Working Group (TWG) Scheduled for 02. 09.21 Architectus (Planner) is to be invited to the meetings. MB advised that Richard Campbell from Council has been invited but has so far declined to attend. TTW will continue to include Richard Campbell and their correspondence and contacting him.	MB
13	Presentation Material for TWG Mtg No 2 The presentation for the next TWG will include: • PowerPoint for location analysis, detailed data, progress construction methodology,	MB & TTW team

Notes		Action
	• Sketch provided scope TBA - Look at Eagle Way change in level and need for a bridge • Off set the costs of the pathway against the Kiss & Drop. Assess the scope and costs pedestrian bridges • Flat pack 'IKEA' type bridges available (?) Consider scope and costs and consider base line standards. • Prepare a single public domain plan with all transport modes/structures on the one plan • DA for bulk earthworks – site establishment, hoarding, own traffic implications, DA goes in before SSD. • Key matters to get the pathway to the road network crossing the stormwater channel.	MB & TTW team
14	SSDA date MS noted test of adequacy lodgement in early November 2021.	Note
15	Traffic Survey data *Post Meeting note: Council at TWG held 19.08.21 for John Palmer Public School advised they will accept alternative data available – assumed this will be acceptable for use on the Glenwood High School Traffic Management Plan*	Note
16	Waste Management Plan JD advised Operational Waste Management Plan due 20.08.21 Reuse the existing Waste pad and confirm size. Check collection times and trick sizes Swept paths to be prepared by TTW EcCell can obtain more information from Cleanaway but are not yet able to advise details of the School due to formal notices of contractual issues with Axiom. Any information required should be done via an RFI.	 JD MB
17	Other Issues Continue to invite Richard Campbell or his manager/s to attend Intent is to engage and allay the negative response from Council. Escalate if required. MS to address this through Planner. MB noted concrete footpath to the southern side of site, and this could be a good precedent for a new footpath to the western side of the site. (See areal snippets below) Demonstrate SINSW's attempts to engage with Council with the planning team before the DA is lodged. It was noted there was a lack of receptiveness from Council and important to build trust with council before the DA is lodged. It was acknowledged that there was good support from TfNSW. Important to demonstrate this through measured improvements and empirical data.	 MB MS

Notes		Action
	MB noted that Staff numbers are at 135 on a typical day - differs from business case numbers.	
18	Next meeting Next meeting to be scheduled for Tuesday 24th August and weekly meetings thereafter.	Note



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Meeting Minutes

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Subject	**Internal Transport Planning Meeting No 5**		
Project	School Infrastructure NSW Glenwood High School		
Project No.	IW255800	**File**	MM - 210824 - GHS - Internal Transport Planning Minutes No 5
Prepared by	Marisa Sidoti	**Phone No.**	
Location	MS Teams	**Date/Time**	24 Aug 2021

Participants

Name	Initial	Organisation and Role	Email	Attend / Apology (A/G)
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Rebecca Lehman	RL	SINSW - Sustainable Transport Technical Advisor	Rebecca.Lehman@det.nsw.edu.au	G
Helen Mulcahy	HM	SINSW - Planner	helen.mulcahy@det.nsw.edu.au	G
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Copies to All participants

Michael Mihailou MM RLB Michael.Mihailou@au.rlb.com

Jacobs

Meeting Minutes

Internal Transport Planning Meeting No 5
24 Aug 2021

Notes		Action
1	**Cost plan** RLB Cost Managers has included in their contingency transport/traffic items - Cost Plan issued 13.08.21	Note
2	**Demountables relocation** RL requested the demountable relocation plan be reviewed with RL, JS, TTW prior to submission to Council. MS/PM to coordinate. Consider the flow on impacts e.g., close off portions of carpark, possibly increasing existing on street parking.	PM
3	**Planning Pathways** It was noted that the project will have several planning pathways: • 1a) REF: removal of demountable buildings • 1b) Exempt Development: relocation of demountable bldgs. (by Progroup) • 2 DA: bulk earthworks, relocation of sewer/inground services • 3 SSDA: new building, refurbishment works	Note
4	**Construction Management Plan** Construction Mgt plan: proposals for all construction based on staging plans, transport impacts. If possible, avoid bus bays and bus stops. Construction traffic? Civil confirm volumes, fill/soil? Civil Engineer to estimate this if possible. (This may be a condition of consent for a detailed Traffic Management Plan.) Civil engineer has issued dwgs of bulk earthworks CMP progressing – due on 27.08.21 Jacobs to issue to TTW for review.	PM Note MB/PM
5	**Transport Management Plans** ProGroup is putting together the Transport Mgt Plan and to be reviewed by team Transport Mgt plan due 25.08.21 from ProGroup TTW, RL, Jacobs to review. **REF Deliverables** ProGroup are providing Traffic Mgt Plan for the REF- and PM to monitor progress and ensure all due diligence checks undertaken **DA Deliverables** A specific Traffic Mgt Plan is required for the DA – TTW to provide a 'parent' report with associated addenda noting specific elements relating to bulk earthworks.	PM MB RL RL/MB to review T Mgt Plan prior to submission

	Notes	Action
	(TTW advised information may be limited due to COVID lockdown and little data available – it was agreed to be a preliminary Traffic Mgt Plan and Contractor to finalise when appointed) It was noted that the Traffic Mgt Plan should not be too prescriptive to allow the Contractor some flexibility with their methodology/approach. Restrictions are more around times for the school hours and activities/terms.	Note
6	**TTW information required from the School** A Q&A Session held with the School Principal 17.08.21. RL suggested that TTW refer also to the School Transport Plan. RL noted it is important to ensure the project team agrees with the intent and messaging regarding transport issues. Information provided and discussed with the School – TTW continuing to assess/analyse responses. TTW satisfied with information provided by School. Working through base case transport solution – assuming existing conditions/behaviours.	Note MB
7	**Western site entry** RL advised will get funding if this option is necessary. Briefing note for extended Kiss and Drop or western entry – TTW to advise, budgets to be reviewed. TTW advised this is in progress. Will this proposed entry point be supported by a DA? Confirmed that proposed entry point will be included in the SSDA TTW reviewing this and to provide data Jacobs to provide this information to Cost planners and project team RLB to cost this once the scope has been refined Jacobs to check with Architectus (Planner) Boris to confirm req'ts for DA. Risks identified: 1. Uncertain of outcomes if Council say we must extend carpark AND have the footpath –Council response unknown at this stage 2. If SINSW does not provide funding for transport matters, Council may disapprove/condition the EIS submission JS advised that SINSW to seek executive approval before we include the western entry proposal in SSDA via a Briefing Note. To include: • Options for external pedestrian Area to Northwest of site	MB In progress PM Note Note

Notes		Action
	• Assess and outline the pros and cons of options considered • Kiss & Drop has dedicated internal bay and extends to on street – is it as simple as providing signage? • TTW: Establish what the options are and suitability of Kiss & Drop	
	JS noted this is not included in the Final Business Case and must seek approval to access Project contingency. Project budget to be closely monitored.	Note
	TTW to provide advice regarding what would need to happen noting that the pedestrian pathway is not in the Business Case. TTW to assess what is required for staff vs students. • No intersection upgrades in this area. • Base case for students not clear • Base case for staff is known because we have a better idea of numbers • Negotiate with Council and come to an agreement • Be seen to provide a positive message to Council. (extend Council's interest beyond parking spaces)	MB
	Timing: MB to provide data and sketches for PTW to draw up by 27.08.21 • To be issued to civil and RLB for review • JS to review this with SINSW executive team Next TWG No 2 scheduled for 2.09.21. **Aims:** reach an agreement at TWG discuss trade offs with Council for their feedback Table options to TWG and gauge response from Council. (TfNSW are supportive of what is proposed to date.)	MB MB
8	**Kiss and drops/Encouraging Pedestrian usage** Catchment and proportion of students who could use the western shared path, what are the scenarios, travel times? Path across the oval is considered 'off site infrastructure' – project team to understand and plan for costs and scope at this stage to avoid escalated/exorbitant costs. Explore the potential for a footpath through play fields through the western side of the school. SINSW is seeking a shared use of play space to western oval (temporary) and has commenced discussions with Council. Negotiations with Council ongoing for standard licence agreement with SINSW property team	MB to provide details. In progress MB Note

	Notes	Action
	It was noted that the future footpath would be for daytime travel, no night lighting.	MB in progress
	This could be a good alternative to an extended Kiss and Drop zone.	TTW student location analysis will feed into this
	Discussion held around Contributions (financial) – options are	
	a) pay a contribution to Council and pathways installed by Council.	
	b) SINSW to include this in the project scope – SINSW/TTW check if agreements have been arranged with council.	
	The above depends on School Principal Questionnaire responses – significance of the Kiss & Drop up to 400 m of queues – this activity is a major issue and a significant issue to remedy. Council is aware of this and may put pressure on the project for a solution. Emphasis on alternative solutions (e.g., pedestrian access given extent of problem)	Note
9	**Briefing Note**	
	Optional costs for RLB to provide and include in Briefing notes for executive approval (TTW, Jacobs to arrange with RLB, and discuss with JS).	
	Refer to the Blacktown DCP and use this as a 'base case' for end of trip, bike racks, use this to accommodate for max/moderate scenario.	
	When developed, ensure RL, MB are issued proposals for coordination purposes.	MB, MS ongoing
	ESD consultant will provide req'ts but facilities to allow for 100-200 staff – final location, extent, and spec TBA. • Provide TTW info on End of Trip facilities • Check Final Business Case allowance for 3 x showers – may need 4 No showers	
10	**Council comments on issued SEARS**	
	MB advised an RFI was issued to Council for data. No response yet.	
	MB advised no response received – TTW to issue a formal follow up to determine what type of data is acceptable to Council?	MB
	TTW advised no data available from Council for GHS – (only a response from JPPS.)	
	GHS has no adjacent traffic signals hence no data.	
	TTW will follow up with council separately this week before TWG	
11	**Transport Working Group (TWG) No 2**	
	Scheduled for 02. 09.21	
	Architectus (Planner) is to be invited to the meetings.	MB

Notes		Action
	MB advised that Richard Campbell from Council has been invited but has so far declined to attend. TTW will continue to include Richard Campbell and their correspondence and contacting him.	
12	**Presentation Material for TWG Mtg No 2** The presentation for the next TWG will include: • PowerPoint for location analysis, detailed data, progress construction methodology, • Sketch provided scope TBA - Look at Eagle Way change in level and need for a bridge – TTW to present only the footpath option not bridge • Prepare a single public domain plan with all transport modes/structures on the one plan (generic)	MB & TTW team MB & TTW team
13	**DA For Buk Earthworks** Site establishment, hoarding, own traffic implications. to be discussed separately.	PM
14	**SSDA date** MS noted test of adequacy lodgement in early November 2021.	Note
15	**Traffic Survey data** Council at TWG held 19.08.21 for John Palmer Public School advised they will accept alternative data available – assumed this will be acceptable for use on the Glenwood High School Traffic Management Plan. TTW to confirm.	MB
16	**Waste Management Plan** JD advised Operational Waste Management Plan due 20.08.21 Reuse the existing Waste pad and confirm size. Check collection times and truck sizes Swept paths to be prepared by TTW. Any information required by consultants should be done via an RFI. Different scenarios – to be developed by EcCell EcCell liaising with TTW swept path diagrams. *Post Meeting note: EcCell presented 5 x scenarios around waste pad sizes and collection frequencies at meeting held 27.08.21.* *Optional bin locations discussed with PPP Pat Cordina.*	JD MB Note
17	**Other Issues** Continue to invite Richard Campbell or his manager/s to attend Intent is to engage and allay the negative response from Council. Escalate if required. MS to address this through Planner.	MB MS

	Notes	Action
	MB noted concrete footpath to the southern side of site, and this could be a good precedent for a new footpath to the western side of the site. (See areal snippets below)	
	Demonstrate SINSW's attempts to engage with Council with the planning team before the DA is lodged. It was noted there was a lack of receptiveness from Council and important to build trust with council before the SSDA is lodged.	All
	It was acknowledged that there was good support from TfNSW.	
	Important to demonstrate this through measured improvements and empirical data.	
	MB noted that Staff numbers are at 135 on a typical day - differs from business case numbers.	Note
	Scope of the DA is distinct from the SSDA.	
18	**Next meeting** Next meeting to be scheduled for Tuesday 30th August and weekly meetings thereafter.	Note

Jacobs

Meeting Minutes

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Subject	Transport Working Group (TWG) Mtg No2		
Project	School Infrastructure NSW Glenwood High School		
Project No.	IW255800	File	MM - 210902 - GHS - TWG Meeting Minutes No 2
Prepared by	Marisa Sidoti	Phone No.	
Location	MS Teams	Date/Time	02 September 2021

Participants

Name	Initial	Organisation and Role	Email	Attend / Apology (A/G)
Nadeem Shaikh	NS	Blacktown Council - Traffic Coordinator	Nadeem.Shaikh@blacktown.nsw.gov.au	A
Fiona Frost	FF	Blacktown Council - Road Safety Officer	fiona.frost@blacktown.nsw.gov.au	G
Daryl Ninham	DN	TfNSW - Senior Manager Network and Safety Services	Daryl.Ninham2@transport.nsw.gov.au	G
David Surplice	DS	TfNSW - Senior PM (Traffic Management)	David.Surplice@transport.nsw.gov.au	A
Kshitij Shah	KS	TfNSW	Kshitij.Shah@transport.nsw.gov.au	G
Mohammed Irfan	MI	TfNSW - Network and Safety Services	Mohammed.Irfan@transport.nsw.gov.au	G
Dina Hanna	DH	TfNSW	Dina.HANNA@transport.nsw.gov.au	G
Jacqui Hicks	JH	TfNSW - Project Manager	Jacqui.Hicks@transport.nsw.gov.au	A
John Broady	JB	TfNSW - Bus and Ferry Planning	John.Broady@transport.nsw.gov.au	A
Mark Ozinga	MO	TfNSW - Principal Manager Land Use Planning & Development	Mark.Ozinga@transport.nsw.gov.au	G
Pahee Rathan	PR	TfNSW - A/Senior Manager Land Use Assessment Sydney Roads	Pahee.RATHAN@transport.nsw.gov.au	G

Jacobs

Meeting Minutes

Transport Working Group (TWG) Mtg No2
02 September 2021

Name	Initial	Organisation and Role	Email	Attend / Apology (A/G)
Robert Rutledge	RR	TfNSW - Transport Planning Manager	Robert.Rutledge@transport.nsw.gov.au	A
Jeremy Stott	JS	SINSW – Project Director	jeremy.stott4@det.nsw.edu.au	A
Deborah Green	DG	SINSW – Project Officer	Deborah.Green22@det.nsw.edu.au	A
Helen Mulcahy	HM	SINSW - Principal Development Planner	Helen.Mulcahy@det.nsw.edu.au	G
Rebecca Lehman	RL	SINSW - Sustainable Transport Technical Advisor	Rebecca.Lehman@det.nsw.edu.au	A
Michael Babbage	MB	TTW – Traffic consultant	Michael.Babbage@ttw.com.au	A
Mina Ghanbarikarekani	MG	TTW – Traffic consultant	mina.ghanbarikarekani@ttw.com.au	A
Paul Yannoulatos	PY	TTW – Traffic consultant	Paul.Yannoulatos@ttw.com.au	A
Marisa Sidoti	MS	Jacobs – Project Manager - Design	Marisa.Sidoti@jacobs.com	A
Pete Morrison	PM	Jacobs – Senior Project Manager	peter.morrison2@jacobs.com	G
Sukkwan Hart	SH	Jacobs – Project Manager	Sukkwan.hart@jacobs.com	G
Marcus Kraefft	MK	Jacobs – Assistant PM	Marcus.kraefft@jacobs.com	G

Copies to All participants plus

Richard Campbell – Blacktown Council

Notes		Action
1	Project Recap- Key Items and Actions TTW advised they have conducted a Baseline Transport Assessment Sports field carpark is used as overflow parking Project team is actively seeking to discourage use of vehicle usage.	Note

Notes		Action
	Met with the School Principal to obtain more details of the travel modes/needs	
2	Travel Mode Analysis TTW advised there are no detailed surveys of traffic movements due to COVID School's information will be utilised MB/MS to advise timing of maximum student population capacity. TTW to incorporate mesh data for the immediate/short term projections DS/JH questioned why there is such a heavy reliance on private vehicle use for both staff and students. MB advised that 'Active Transport' modes not encouraged and further discussions to be held with the school principal to better understand this. DS will provide input and review to Travel Behaviour Programs. MB to contact DS. NS noted that not all staff live locally and could be a contributing factor, there is a lack of transport 'convenience', how is the carpark managed e.g., carpooling – however this presents issues during COVID MB noted that the Metro corridor – additional bus services act as a link to the school and is a key opportunity	MB/MS MB Note
3	Staff Travel Modes High levels of vehicles used by staff 92% staff currently drive to school	Note
4	Student Travel Modes TTW presented data for number of students that live within a 5-10min bike ride from the school. Actions for project to consider: • Accommodate bike parking at the school, encouraging more bike riders	Note
5	Active Transport Strategy Project team is exploring options for pedestrian entry points to the school.	Note
6	Public Transport Strategy Uptake can be more substantial for high school students and staff. Actions for project to consider: • Travel Access Guide • School Bus Pass • School Transport Scheme JB noted:	MB

Notes		Action
	• There are no current changes to the 4 x bus services to access the school • loads will be monitored, will adjust bus services when necessary	Note
7	Kiss & Ride Strategy TTW tabled: • 50% students are travelling by car • 42% Kiss and ride • 8% use surrounding streets • 70% live within a 10min bike ride • Current Kiss and Ride to remain unchanged at this stage Actions for project to consider: • Aim to reduce Kiss and Ride usage by 10% (NS noted this reduction is optimistic)	Note MB
8	Car Parking Strategy Project Team proposed to retain the existing carparking numbers (0.5% per staff member) NS raised concerns that staffing levels will increase and this potentially adds more pressure for parking spaces. MB advised there are 88 x parking spaces (this does not include spaces for the Childcare parking area – additional 5 x parking spaces) Actions for project to consider: • Staff numbers to be advised by MB/MS • Investigate with School Travel Coordinator	Note MB/MS
9	Temporary access to the Sports Field (Glenwood Reserve) Consider timing of use of the sports field and obtain this information to include in the Traffic Management Plan	MB/MS
10	Roads and Traffic Strategy Data is limited during COVID lockdown. Council confirmed that no data is available. Project team not proposing changes to the physical road infrastructure. NO comments received by Council.	Note
11	Traffic data collection – Scats / Intelematics MB noted that SCAT (Traffic Signal) data cannot be utilised as there are no traffic signals nearby. Proposes to use Intelematics to provide volume data from several different sources. Council has stated this is acceptable.	Note

Notes		Action
12	Construction Strategy Student safety is an absolute priority. MB proposed that access for the future construction site will be via Glenwood Park Drive to the northwest of the site • Core restrictions in place e.g. no truck movements during school zone hours and focusing high intensity works during school holidays where possible.	Note
13	Construction access No comment on construction access. NS noted Council would need to review when TTW submit their construction management plan.	Note
14	Construction Traffic Management Plan NS advised that this is to be submitted as a separate document for council to review. MB reassured NS that site access points, vehicle routes will be considered NS accepted that a *preliminary* Construction Traffic Management Plan (CTMP) can be submitted for review by Council prior to submission of the EIS, however Council will not provide comments at this stage. The project team seeks to improve the process of approvals and review to ensure that all information is captured and coordinated given project and program parameters. Construction is to commence in mid 2023. A final CTMP will be provided when a Contractor is engaged and to be resubmitted to Council prior to construction.	Note Note
15	Pedestrian crossings/Travel JH asked if new pedestrian crossings proposed: • Modelling will identify pedestrian activity • Ability to review/improve pedestrian entry points Actions for project to consider: • MB/RL to arrange a separate meeting with the Greater Syd Division of TfNSW to obtain this information. (It was noted PR was on leave until 10.09.21 and TTW to seek alternative contact – RR suggested contacting Zala (?) for more information.)	MB To be explored by the project team.
16	Contact with Council Direct contact with Council for any queries with the Traffic Management Plan is welcome. All Correspondence to be addressed to NS and he will forward to his respective team members.	Note
17	Next meeting	MB

Notes	Action
TTW (MB) advised TWG Mtg No 3 scheduled for 30.09.21	

Appendix B - Travel Mode Survey Questionnaire

Question	*Response*	*Notes*
School activity		
How many students are currently enrolled?	1,410	*1381 – mainstream enrolments* *29 – support class enrolments*
How many staff are on-site on a typical day? • *Total of full-time, part-time, casual, volunteer etc. – provide breakdown if necessary*	~ 135	
What is the school start bell time?	8:40am	*The bell will ring at 8:38 to warn students they should be heading to class, and again at 8:43 as a sign that students should be in class by then.*
What is the school finish bell time?	Monday - 2:10pm Wednesday – 2:50pm Tuesday, Thursday, Friday – 3:00	
How many OOSH places?	??	*Whilst OOSH has been contracted, due to COVID and associated restrictions, it has not commenced*
When does OOSH start?	??	
When does OOSH finish?	??	
Is the school accessed during the evenings?	Yes	*Evening events do run on occasion, e.g., parent evenings, information sessions, etc*
Is the school accessed on weekends?	Yes	*Weekend access is required on occasion. e.g., for Musical*
School transport behaviour		
As an estimate, how many / what portion of **staff** travel by:		
Car (park, as driver)	110	
Car (park, as passenger/carpool)	0	
Car (drop-off)	2	
Walk only	2	
Scooter / skateboard	0	
Bicycle	4	
Motorbike	0	
Bus	1	
Train	1	
As an estimate, how many / what portion of **students** travel by:		
Car (park, as driver)	8% (approximate percentages)	*Year 12 mainly*
Car (park, as passenger/carpool)	2%	
Car (drop-off)	40%	*A large proportion will be dropped off in the 'Kiss and Drop' Zone* *Support Students are dropped off to the back of the Specialised Learning Hub (Block A) via Gate F.*
Walk only	36%	
Scooter / skateboard	0%	
Bicycle	1%	
Motorbike	0%	
Bus	12%	
Train	1%	
School transport facilities		
How many pedestrian entries to the school?	3	*2 on Forman Avenue – Gate B and Gate C* *1 on Glenwood Park Drive – Gate E* *Students will often use Gate F as well, however, this is a driveway for the Specialised Learning Hub, not a pedestrian entry.*
How much parking is available on the school grounds for?		
Cars (general staff)	88 – high school use 32 – childcare use	*30 near roundabout (Gate D), 58 near fields (Gate A) for High School Staff use only* *32 at childcare – Childcare use ONLY. High school staff are not permitted to use these*

Question	*Response*	*Notes*
Cars (accessible/disabled)	1 – high school use in car park near roundabout (Gate D) 1 – Childcare use only	*1 high school use in car park near roundabout (Gate D)* *1 near childcare centre for childcare use only*
Cars (service/maintenance)	NIL	
Cars (carpooling)	NIL	*No dedicated spaces*
Cars (visitors)	NIL	*Visitors use limited street parking*
Cars (students)	NIL	*Students park on the street or at Forman Reserve sport fields nearby*
Loading / delivery zones	2	*1 near Hall/J-Block – accessed via Gate A* *1 between the back of Childcare Centre and G-Block – accessed via Gate A* *Delivery vehicles to front office (via Gate D) are not catered for, with drivers often parking inappropriately in transit paces.*
Bicycles	20	
Scooters / skateboards	0	
Motorbikes	0	
Shuttle bus (on-site)	0	
Do the on-site parking facilities (all types above) have sufficient capacity for current demands? • *Consider any informal parking of bicycles, scooters, cars, maintenance vehicles etc.*	No	*There are insufficient spaces for current staff parking needs.* *There is insufficient space for front office deliveries (Gate D)* *There is sufficient bike parking for current capacity. However, if numbers grow, as expected, this may become inadequate.*
What end-of-trip facilities are available for staff or students? • *Showers, lockers, change rooms*	1 shower facility in Staff Services (Block F) Nil lockers available for individual staff	*Whilst there are some lockers located in the staffroom, these are limited and not assigned to individual staff*
Does the school have a formal 'kiss and ride' space <u>on the school grounds</u> for drop off and pick up by private car? • *On-site facilities only – refer separate question for frontage or nearby streets*	Yes	*The 'Kiss and Drop' zone is located on Forman Ave between Gate C and childcare centre. This does not cater to the needs of our current enrolment as during drop-off and pick-up times, the queue, on average, extends approximately 400-500m up Forman Ave and causes significant traffic disruption in the area.*
School transport management		
Does the school have any transport policies? • *e.g. when are students permitted to travel independently to school, are students discouraged from riding scooters etc.*	YES	*Senior students are required to complete a driver agreement.* *Students are discouraged from riding scooters to school.* *Students are not allowed to ride skateboards to school.*
How do you manage the pedestrian entries?	Pedestrian entries are open before and after school. They are locked during school hours.	*The only access during school hours is through Gate D, front office carpark.*
How is car parking allocated? • *e.g. longest service, hierarchy, furthest distance travelled, key roles*	Only Principal and DP have allocated spaces.	*Staff park on a 'first come, first choice' basis. Some need to park on the street or at Forman Ave playing fields.*
Are there any nearby pedestrian operations or School Crossing Supervisors (lollipop)?	No	*Lollipop is only used in Primary schools*
Does the school have a traffic/parking management plan for day-to-day operations or functions/events/carnivals?	No	
Does the school or any third party operate shuttles, buses, or vans for the daily journey to/from school?	Yes	*Busways and Hillsbus provide transport services along student residential routes.*
Do you offer staff any transport benefits? • *e.g. vehicle salary packaging, Opal cards, fleet vehicles, GoGet membership, travel reimbursement, carpool programs*	Some	*Some are provided via NSW DoE packages, e.g., novated leases.*

Question	*Response*	*Notes*
		There is no subsidised travel, memberships, reimbursements or Opal Cards. *Staff are expected to arrange and pay for their own travel. We are conveniently located to public transport routes for most staff.*
Do you offer students or parents any transport programs? • *e.g. Travel Access Guide or brochure, carpool programs, school crossing staff or volunteers at crossings, walking training, walking school bus, road safety education*	Some	*Assisted Travel for Support Unit students only.* *Road safety education is part of the PDHPE program.* *Staff do not supervise the crossing. This is external to the school.* *Executive staff do supervise the bus bay*
Does the school manage 'kiss and ride' activity on a street(s) adjacent to the school grounds?	No	*This is external to the school. Significant road chaos beyond the ability of the school to manage*
Do you place any restrictions on students riding a bicycle/scooter to school?	Yes	*Reinforce road safety rules, helmet wearing, etc*
Which communication channels do you use with staff, students, parents and friends? • *e.g. social media, E-newsletter, print newsletter/flyers, printed posters, school website, school intranet*	Social media E-Newsletter School website E-Learning Platforms Email Staff newsletter Sentral SMS	
Are you aware of any other transport initiatives in your local area or at other local schools?	Yes	*In non-COVID times, Parklea Public School occasionally operated a 'walking bus'*
Additional information		
Please provide information on waste management – time of day, number of times per week, collections for waste/recycling/greenwaste etc.	Managed by Spotless	
Please provide information on service and maintenance – trades vehicles, out of hours work etc.	Managed by Spotless	

Any other feedback or comments:

Survey completed by: Donna Healy

Date: 13.08.21

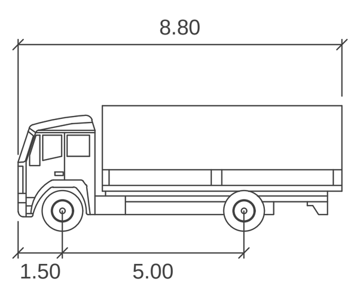
Appendix C - Historical Parking Occupancy (via Nearmap)

School Days		OCCUPIED																																					
Non School Days		OFF-STREET														ON-STREET																					RESERVE+STREET	
		SCHOOL				ELC	RESERVE									GLENWOOD PARK DRIVE										SHAUN ST		FORMAN AVENUE											
Capacity		*63*	*30*			*27*	*10*	*22*	*20*	*6*	*18*	*10*	*46*	*132*		*7*	*2*	*11*	*4*	*4*	*8*	*5*	*8*	*14*	*7*	*15*	*4*	*12*	*4*	*16*	*17*	*10*	*148*		*280*	
Day	**Date**	**A**	**B**	**Total**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**Total**	**Vacant**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	**Total**	**Vacant**	**Total**	**Vacant**
Saturday	7/08/2021	0	0	**0**	0	0	6	1	4	0	1	0	0	**12**	*120*	2	0	0	0	0	0	3	1	2	0	9	3	3	0	0	4	0	**27**	*121*	**39**	*241*
Saturday	5/06/2021	1	0	**1**	0	0	7	14	20	5	19	3	7	**75**	*57*	1	0	0	0	0	0	2	0	1	0	2	2	3	0	10	6	5	**32**	*116*	**107**	*173*
Thursday	15/04/2021	8	0	**8**	0	13	6	5	3	0	4	0	0	**18**	*114*	2	2	0	0	0	1	2	0	6	1	4	1	8	1	4	2	0	**34**	*114*	**52**	*228*
Saturday	10/04/2021	0	0	**0**	0	4	10	20	20	6	19	6	0	**81**	*51*	2	1	0	0	0	0	2	0	4	3	6	2	3	2	17	14	10	**66**	*82*	**147**	*133*
Tuesday	26/01/2021	3	0	**3**	0	0	3	0	1	0	2	0	0	**6**	*126*	2	0	0	0	0	0	2	0	1	0	6	1	6	0	0	5	1	**24**	*124*	**30**	*250*
Sunday	24/01/2021	3	0	**3**	0	0	5	1	13	0	5	0	0	**24**	*108*	1	0	0	0	0	0	1	0	1	2	2	2	4	0	2	2	0	**17**	*131*	**41**	*239*
Tuesday	8/12/2020	59	32	**91**	0	19	5	6	2	0	1	0	0	**14**	*118*	0	0	6	0	3	3	2	1	2	0	6	1	6	0	2	1	0	**33**	*115*	**47**	*233*
Sunday	6/12/2020	0	0	**0**	0	0	6	0	0	0	5	0	0	**11**	*121*	0	0	0	0	0	0	2	1	1	0	4	1	7	0	0	1	0	**17**	*131*	**28**	*252*
Friday	2/10/2020	4	0	**4**	0	12	1	0	0	0	1	0	0	**2**	*130*	2	0	0	0	0	0	1	3	3	0	5	0	5	0	1	2	0	**22**	*126*	**24**	*256*
Monday	3/08/2020	57	30	**87**	0	20	2	12	6	0	3	0	0	**23**	*109*	0	1	9	0	2	7	3	0	2	0	3	0	4	1	1	2	0	**35**	*113*	**58**	*222*
Tuesday	23/06/2020	60	31	**91**	0	19	4	6	8	0	0	0	0	**18**	*114*	2	0	6	0	2	6	1	1	3	0	4	2	4	1	0	4	0	**36**	*112*	**54**	*226*
Saturday	6/06/2020	55	28	**83**	0	20	1	8	5	0	0	0	0	**14**	*118*	0	0	0	0	2	5	1	0	3	0	4	2	7	0	1	5	0	**30**	*118*	**44**	*236*
Tuesday	14/04/2020	4	0	**4**	0	16	1	0	0	0	1	0	0	**2**	*130*	0	0	0	0	0	0	2	0	2	0	3	0	5	0	1	3	1	**17**	*131*	**19**	*261*
Monday	13/04/2020	5	0	**5**	0	16	0	0	1	0	1	0	0	**2**	*130*	0	0	0	0	0	0	2	0	2	0	3	0	4	0	1	2	0	**14**	*134*	**16**	*264*
Saturday	1/02/2020	0	0	**0**	0	0	0	0	0	0	1	2	0	**3**	*129*	0	1	0	0	0	0	1	0	1	0	4	0	4	0	0	1	1	**13**	*135*	**16**	*264*
Wednesday	22/01/2020	15	2	**17**	0	15	0	3	0	0	1	0	0	**4**	*128*	2	1	0	0	0	0	0	0	0	0	8	0	5	2	4	2	0	**24**	*124*	**28**	*252*
Tuesday	29/10/2019	62	29	**91**	0	22	0	9	1	0	0	0	0	**10**	*122*	2	1	9	0	0	5	3	2	8	1	15	3	7	4	9	3	0	**72**	*76*	**82**	*198*
Sunday	27/10/2019	0	0	**0**	0	0	0	0	5	0	0	2	0	**7**	*125*	0	0	0	0	0	0	1	1	2	0	6	1	2	0	0	4	0	**17**	*131*	**24**	*256*
Thursday	12/09/2019	63	36	**99**	0	24	7	16	2	0	1	0	0	**26**	*106*	0	0	10	0	5	7	2	2	10	4	7	3	9	3	7	6	0	**75**	*73*	**101**	*179*
Friday	16/08/2019	53	30	**83**	0	20	7	16	0	0	1	0	0	**24**	*108*	2	0	9	0	4	7	2	1	7	0	6	2	6	1	4	0	1	**52**	*96*	**76**	*204*
Sunday	21/07/2019	57	32	**89**	0	22	8	15	0	0	3	0	0	**26**	*106*	1	0	10	0	4	6	4	2	9	2	5	4	9	2	7	4	0	**69**	*79*	**95**	*185*
Saturday	20/07/2019	1	0	**1**	0	0	9	16	15	6	14	2	23	**85**	*47*	0	0	0	0	0	0	1	1	1	1	1	2	4	2	9	10	8	**40**	*108*	**125**	*155*

School Days		OCCUPIED																																					
Non School Days		OFF-STREET														ON-STREET																						RESERVE+STREET	
		SCHOOL				ELC	RESERVE									GLENWOOD PARK DRIVE										SHAUN ST		FORMAN AVENUE											
Friday	19/07/2019	9	0	**9**	0	18	4	1	1	1	1	1	0	**9**	*123*	0	0	1	0	0	2	3	0	4	0	2	0	1	2	4	5	0	**24**	*124*	**33**	*247*
Sunday	7/04/2019	2	0	**2**	0	0	0	7	20	4	15	4	0	**50**	*82*	0	0	0	0	0	0	0	0	1	3	1	0	4	1	6	4	0	**20**	*128*	**70**	*210*
Saturday	29/12/2018	0	0	**0**	0	0	0	0	0	0	2	0	0	**2**	*130*	1	0	0	0	0	0	1	1	0	3	0	0	5	2	1	4	0	**18**	*130*	**20**	*260*
Tuesday	13/11/2018	65	34	**99**	15	20	4	8	2	0	1	0	0	**15**	*117*	2	0	7	0	1	6	4	6	11	2	0	3	6	4	7	4	0	**63**	*85*	**78**	*202*
Sunday	16/09/2018	0	0	**0**	0	1	4	0	17	0	4	2	0	**27**	*105*	2	0	0	0	0	0	2	2	1	7	0	1	3	0	1	6	0	**25**	*123*	**52**	*228*
Monday	30/07/2018	39	31	**70**	10	22	2	8	0	0	2	0	0	**12**	*120*	1	0	4	0	1	6	1	0	11	5	0	4	11	3	4	6	1	**58**	*90*	**70**	*210*
Friday	22/06/2018	1	0	**1**	0	0	5	10	16	5	13	2	0	**51**	*81*	0	0	0	0	0	0	2	2	1	2	0	1	3	0	7	6	1	**25**	*123*	**76**	*204*
Tuesday	29/05/2018	64	34	**98**	11	19	8	15	1	0	3	0	0	**27**	*105*	4	0	11	0	4	6	3	1	9	3	0	3	5	4	8	6	1	**68**	*80*	**95**	*185*
Thursday	18/01/2018	3	0	**3**	0	16	0	0	1	0	1	0	0	**2**	*130*	2	0	0	0	0	4	2	1	5	5	0	3	2	2	4	7	0	**37**	*111*	**39**	*241*
Thursday	7/09/2017	64	30	**94**	16	20	4	20	4	0	0	0	0	**28**	*104*	0	0	4	0	2	5	2	2	7	1	1	2	10	4	6	5	2	**53**	*95*	**81**	*199*
Saturday	22/07/2017	0	0	**0**	0	1	8	11	16	4	16	9	15	**79**	*53*	3	1	0	0	0	1	3	2	1	2	0	2	4	1	14	7	7	**48**	*100*	**127**	*153*
Tuesday	16/05/2017	64	26	**90**	11	23	2	15	1	0	0	0	0	**18**	*114*	0	0	6	0	0	4	1	3	7	1	0	4	8	3	11	3	1	**52**	*96*	**70**	*210*
Sunday	12/03/2017	0	0	**0**	0	0	0	0	1	1	0	0	0	**2**	*130*	3	0	1	0	0	0	3	0	2	2	0	1	4	1	1	1	0	**19**	*129*	**21**	*259*
Saturday	11/02/2017	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	*132*	2	2	0	0	0	0	1	3	1	2	0	2	3	0	0	2	0	**18**	*130*	**18**	*262*
Friday	2/12/2016	60	33	**93**	12	26	3	8	0	0	0	0	0	**11**	*121*	0	0	1	0	1	4	3	5	8	1	0	2	5	1	7	2	0	**40**	*108*	**51**	*229*
Sunday	11/09/2016	0	0	**0**	0	0	1	1	1	1	2	0	0	**6**	*126*	2	1	0	0	0	0	0	1	1	2	0	0	4	1	0	1	0	**13**	*135*	**19**	*261*

	OCCUPIED																																	
	OFF-STREET														ON-STREET																				
	SCHOOL				ELC		RESERVE								GLENWOOD PARK DRIVE											SHAUN ST			FORMAN AVENUE					Reserve + Street	
SCHOOL DAYS																																		
Minimum	39	26	**70**	0	19	0	6	0	0	0	0	0	**10**	*104*	0	0	0	0	0	3	1	0	2	0	0	0	4	0	0	0	0	**30**	*73*	**44**	*179*
Average	59	31	**90**	5	21	4	12	2	0	1	0	0	**19**	*113*	1	0	7	0	2	6	2	2	7	1	4	3	7	2	5	4	0	**53**	*95*	**72**	*208*
Maximum	65	36	**99**	16	26	8	20	8	0	3	0	0	**28**	*122*	4	1	11	0	5	7	4	6	11	5	15	4	11	4	11	6	2	**75**	*118*	**101**	*236*
NON-SCHOOL DAYS																																		
Minimum	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	*47*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	**13**	*82*	**16**	*133*
Average	2	0	**3**	0	5	3	4	6	1	5	1	2	**23**	*109*	1	0	0	0	0	0	2	1	2	1	3	1	4	1	4	4	1	**25**	*123*	**49**	*231*
Maximum	15	2	**17**	0	18	10	20	20	6	19	9	23	**85**	*132*	3	2	1	0	0	4	3	3	6	7	9	3	8	2	17	14	10	**66**	*135*	**147**	*264*
TOTAL																																		
Minimum	0	0	**0**	0	0	0	0	0	0	0	0	0	**0**	*47*	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	**13**	*73*	**16**	*133*
Average	23	12	**35**	2	11	4	7	5	1	4	1	1	**22**	*110*	1	0	2	0	1	2	2	1	4	1	3	2	5	1	4	4	1	**35**	*113*	**57**	*223*
Maximum	65	36	**99**	16	26	10	20	20	6	19	9	23	**85**	*132*	4	2	11	0	5	7	4	6	11	7	15	4	11	4	17	14	10	**75**	*135*	**147**	*264*

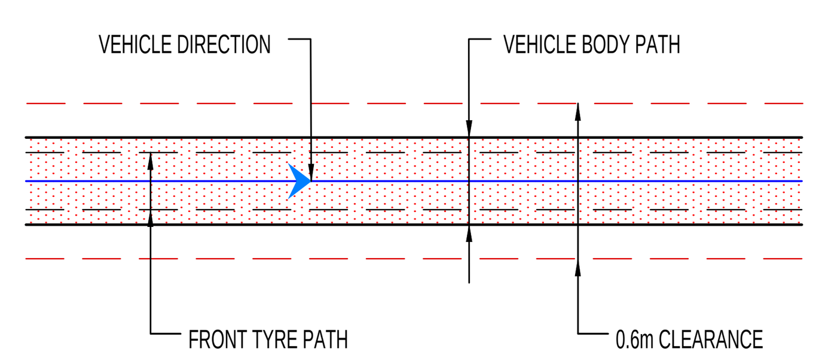
Appendix D - Service Vehicle Swept Paths



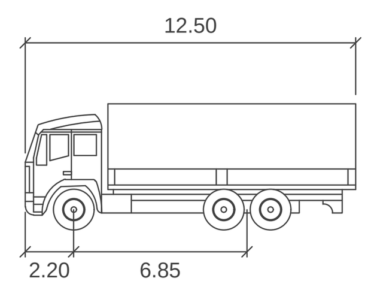
MRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

SWEPT PATH LEGEND:



NOTE: 600mm CLEARANCE IN ACCORDANCE WITH AS2890



HRV

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.7

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

FileName: SK01.dwg – USER: mbabbage – Plot File Created: Oct 11, 2021 – 10:17pm

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	MB	MB	11.10.21

Architect
PTW
LEVEL 11, 88 PHILIP STREET
SYDNEY NSW 2000

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project
GLENWOOD HIGH SCHOOL

Sheet Subject
WASTE COLLECTION SWEPT PATHS

Scale : A1	Drawn	Authorised
1:200	MB	-

Job No	Drawing No	Revision
211530	SK01	P1

Plot File Created: Oct 11, 2021 - 10:17pm

Appendix E - SIDRA Modelling Results

MOVEMENT SUMMARY

Site: 101 [2021 - East - G/F - AM (Site Folder: 2021)]

Network: N101 [2021 - AM (Network Folder: 2021)]

East - Froman/Glenwood Int - AM - 7:45-8:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	375	0.0	375	0.0	0.294	2.0	LOS A	0.8	5.4	0.26	0.31	0.26	37.8
2	T1	1	0.0	1	0.0	0.294	1.6	LOS A	0.8	5.4	0.26	0.31	0.26	40.1
Approach		376	0.0	376	0.0	0.294	2.0	LOS A	0.8	5.4	0.26	0.31	0.26	37.9
North: Glenwood Park Dr														
8	T1	282	0.0	282	0.0	0.279	1.6	LOS A	0.5	3.5	0.25	0.30	0.25	39.8
9	R2	60	0.0	60	0.0	0.279	5.9	LOS A	0.5	3.5	0.25	0.30	0.25	37.5
Approach		342	0.0	342	0.0	0.279	2.4	LOS A	0.5	3.5	0.25	0.30	0.25	39.6
West: Forman Ave														
10	L2	332	0.0	332	0.0	0.281	1.7	LOS A	0.6	3.9	0.02	0.36	0.02	39.2
12	R2	104	0.0	104	0.0	0.281	5.5	LOS A	0.6	3.9	0.02	0.36	0.02	40.5
Approach		436	0.0	436	0.0	0.281	2.6	LOS A	0.6	3.9	0.02	0.36	0.02	39.5
All Vehicles		1154	0.0	1154	0.0	0.294	2.3	LOS A	0.8	5.4	0.16	0.32	0.16	39.2

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

MOVEMENT SUMMARY

Site: 102 [2021 - West - G/F - AM (Site Folder: 2021)]

Network: N101 [2021 - AM (Network Folder: 2021)]

West - Froman/Glenwood Int - AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	260	0.0	260	0.0	0.202	0.8	LOS A	0.3	2.0	0.24	0.12	0.24	48.7
3	R2	64	0.0	64	0.0	0.202	6.7	LOS A	0.3	2.0	0.24	0.12	0.24	47.5
Approach		324	0.0	324	0.0	0.202	2.0	NA	0.3	2.0	0.24	0.12	0.24	48.6
East: Forman Ave														
4	L2	332	0.0	332	0.0	0.397	4.6	LOS A	0.8	5.8	0.00	0.53	0.00	45.7
6	R2	124	0.0	124	0.0	0.397	10.0	LOS A	0.8	5.8	0.00	0.53	0.00	45.6
Approach		456	0.0	456	0.0	0.397	6.0	LOS A	0.8	5.8	0.00	0.53	0.00	45.7
North: Glenwood Park Dr														
7	L2	384	0.0	384	0.0	0.207	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		385	0.0	385	0.0	0.207	4.6	NA	0.0	0.0	0.00	0.53	0.00	44.5
All Vehicles		1165	0.0	1165	0.0	0.397	4.4	NA	0.8	5.8	0.07	0.41	0.07	46.3

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:33:44 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 101 [2021 - East - G/F - PM (Site Folder: 2021)]

Network: N101 [2021 - PM (Network Folder: 2021)]

East - Froman/Glenwood Int - PM - 16:45-17:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	402	0.0	402	0.0	0.233	1.6	LOS A	0.7	4.7	0.02	0.27	0.02	38.6
2	T1	1	0.0	1	0.0	0.233	1.2	LOS A	0.7	4.7	0.02	0.27	0.02	40.6
Approach		403	0.0	403	0.0	0.233	1.6	LOS A	0.7	4.7	0.02	0.27	0.02	38.6
North: Glenwood Park Dr														
8	T1	272	0.0	272	0.0	0.193	1.5	LOS A	0.4	2.5	0.18	0.20	0.18	40.3
9	R2	1	0.0	1	0.0	0.193	5.7	LOS A	0.4	2.5	0.18	0.20	0.18	38.2
Approach		273	0.0	273	0.0	0.193	1.5	LOS A	0.4	2.5	0.18	0.20	0.18	40.3
West: Forman Ave														
10	L2	332	0.0	332	0.0	0.230	1.7	LOS A	0.4	3.1	0.01	0.34	0.01	39.3
12	R2	67	0.0	67	0.0	0.230	5.5	LOS A	0.4	3.1	0.01	0.34	0.01	40.7
Approach		399	0.0	399	0.0	0.230	2.3	LOS A	0.4	3.1	0.01	0.34	0.01	39.6
All Vehicles		1075	0.0	1075	0.0	0.233	1.8	LOS A	0.7	4.7	0.06	0.28	0.06	39.6

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:33:47 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 102 [2021 - West - G/F - PM (Site Folder: 2021)]

Network: N101 [2021 - PM (Network Folder: 2021)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	357	0.0	357	0.0	0.231	0.6	LOS A	0.2	1.6	0.16	0.06	0.16	49.1
3	R2	40	0.0	40	0.0	0.231	7.8	LOS A	0.2	1.6	0.16	0.06	0.16	48.2
Approach		397	0.0	397	0.0	0.231	1.3	NA	0.2	1.6	0.16	0.06	0.16	49.1
East: Forman Ave														
4	L2	337	0.0	337	0.0	0.662	8.7	LOS A	3.1	21.5	0.37	0.74	0.71	42.3
6	R2	217	0.0	217	0.0	0.662	17.8	LOS B	3.1	21.5	0.37	0.74	0.71	42.2
Approach		554	0.0	554	0.0	0.662	12.3	LOS A	3.1	21.5	0.37	0.74	0.71	42.3
North: Glenwood Park Dr														
7	L2	399	0.0	399	0.0	0.215	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	104	0.0	104	0.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		503	0.0	503	0.0	0.215	3.7	NA	0.0	0.0	0.00	0.42	0.00	46.2
All Vehicles		1454	0.0	1454	0.0	0.662	6.3	NA	3.1	21.5	0.19	0.44	0.32	45.2

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:33:47 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 101 [2021 - East - G/F - SchoolPM (Site Folder: 2021)]

Network: N101 [2021 - SchoolPM (Network Folder: 2021)]

East - Froman/Glenwood Int - PM - 14:15-15:15
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	320	0.0	320	0.0	0.243	1.6	LOS A	0.6	4.4	0.02	0.25	0.02	38.7
2	T1	57	0.0	57	0.0	0.243	1.2	LOS A	0.6	4.4	0.02	0.25	0.02	40.6
Approach		377	0.0	377	0.0	0.243	1.5	LOS A	0.6	4.4	0.02	0.25	0.02	39.2
North: Glenwood Park Dr														
8	T1	271	0.0	271	0.0	0.227	1.7	LOS A	0.4	2.9	0.27	0.23	0.27	40.1
9	R2	1	0.0	1	0.0	0.227	5.9	LOS A	0.4	2.9	0.27	0.23	0.27	37.8
Approach		272	0.0	272	0.0	0.227	1.7	LOS A	0.4	2.9	0.27	0.23	0.27	40.0
West: Forman Ave														
10	L2	275	0.0	275	0.0	0.297	1.9	LOS A	0.5	3.8	0.18	0.38	0.18	38.9
12	R2	116	0.0	116	0.0	0.297	5.7	LOS A	0.5	3.8	0.18	0.38	0.18	40.1
Approach		391	0.0	391	0.0	0.297	3.0	LOS A	0.5	3.8	0.18	0.38	0.18	39.2
All Vehicles		1039	0.0	1039	0.0	0.297	2.1	LOS A	0.6	4.4	0.14	0.30	0.14	39.5

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

MOVEMENT SUMMARY

Site: 102 [2021 - West - G/F - SchoolPM (Site Folder: 2021)]

Network: N101 [2021 - SchoolPM (Network Folder: 2021)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	315	0.0	315	0.0	0.209	0.5	LOS A	0.2	1.5	0.17	0.07	0.17	49.1
3	R2	43	0.0	43	0.0	0.209	7.0	LOS A	0.2	1.5	0.17	0.07	0.17	48.3
Approach		358	0.0	358	0.0	0.209	1.3	NA	0.2	1.5	0.17	0.07	0.17	49.0
East: Forman Ave														
4	L2	343	0.0	343	0.0	0.447	4.9	LOS A	1.1	7.5	0.12	0.53	0.13	45.3
6	R2	135	0.0	135	0.0	0.447	11.4	LOS A	1.1	7.5	0.12	0.53	0.13	45.2
Approach		478	0.0	478	0.0	0.447	6.8	LOS A	1.1	7.5	0.12	0.53	0.13	45.2
North: Glenwood Park Dr														
7	L2	391	0.0	391	0.0	0.210	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	34	0.0	34	0.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		424	0.0	424	0.0	0.210	4.3	NA	0.0	0.0	0.00	0.49	0.00	45.2
All Vehicles		1260	0.0	1260	0.0	0.447	4.4	NA	1.1	7.5	0.09	0.39	0.09	46.4

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

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - AM (Site Folder: 2026)]

Network: N101 [2026 - AM (Network Folder: 2026)]

East - Froman/Glenwood Int - AM - 7:45-8:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	404	0.0	404	0.0	0.318	2.0	LOS A	0.9	6.0	0.28	0.31	0.28	37.8
2	T1	1	0.0	1	0.0	0.318	1.6	LOS A	0.9	6.0	0.28	0.31	0.28	40.1
Approach		405	0.0	405	0.0	0.318	2.0	LOS A	0.9	6.0	0.28	0.31	0.28	37.8
North: Glenwood Park Dr														
8	T1	304	0.0	304	0.0	0.302	1.7	LOS A	0.6	3.9	0.26	0.30	0.26	39.8
9	R2	64	0.0	64	0.0	0.302	6.0	LOS A	0.6	3.9	0.26	0.30	0.26	37.4
Approach		368	0.0	368	0.0	0.302	2.4	LOS A	0.6	3.9	0.26	0.30	0.26	39.6
West: Forman Ave														
10	L2	357	0.0	357	0.0	0.302	1.7	LOS A	0.6	4.3	0.02	0.36	0.02	39.2
12	R2	113	0.0	113	0.0	0.302	5.5	LOS A	0.6	4.3	0.02	0.36	0.02	40.5
Approach		469	0.0	469	0.0	0.302	2.6	LOS A	0.6	4.3	0.02	0.36	0.02	39.5
All Vehicles		1243	0.0	1243	0.0	0.318	2.3	LOS A	0.9	6.0	0.18	0.33	0.18	39.2

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - AM (Site Folder: 2026)]

Network: N101 [2026 - AM (Network Folder: 2026)]

West - Froman/Glenwood Int - AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	280	0.0	280	0.0	0.220	0.9	LOS A	0.3	2.3	0.26	0.13	0.26	48.6
3	R2	69	0.0	69	0.0	0.220	7.0	LOS A	0.3	2.3	0.26	0.13	0.26	47.3
Approach		349	0.0	349	0.0	0.220	2.1	NA	0.3	2.3	0.26	0.13	0.26	48.4
East: Forman Ave														
4	L2	357	0.0	357	0.0	0.440	4.6	LOS A	0.9	6.6	0.00	0.53	0.00	45.5
6	R2	134	0.0	134	0.0	0.440	10.8	LOS A	0.9	6.6	0.00	0.53	0.00	45.5
Approach		491	0.0	491	0.0	0.440	6.3	LOS A	0.9	6.6	0.00	0.53	0.00	45.5
North: Glenwood Park Dr														
7	L2	414	0.0	414	0.0	0.223	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		415	0.0	415	0.0	0.223	4.6	NA	0.0	0.0	0.00	0.53	0.00	44.5
All Vehicles		1255	0.0	1255	0.0	0.440	4.6	NA	0.9	6.6	0.07	0.42	0.07	46.2

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:33:54 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - PM (Site Folder: 2026)]

Network: N101 [2026 - PM (Network Folder: 2026)]

East - Froman/Glenwood Int - PM - 16:45-17:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	434	0.0	434	0.0	0.251	1.6	LOS A	0.7	5.1	0.02	0.27	0.02	38.6
2	T1	1	0.0	1	0.0	0.251	1.2	LOS A	0.7	5.1	0.02	0.27	0.02	40.6
Approach		435	0.0	435	0.0	0.251	1.6	LOS A	0.7	5.1	0.02	0.27	0.02	38.6
North: Glenwood Park Dr														
8	T1	293	0.0	293	0.0	0.209	1.5	LOS A	0.4	2.8	0.19	0.21	0.19	40.2
9	R2	1	0.0	1	0.0	0.209	5.7	LOS A	0.4	2.8	0.19	0.21	0.19	38.1
Approach		294	0.0	294	0.0	0.209	1.5	LOS A	0.4	2.8	0.19	0.21	0.19	40.2
West: Forman Ave														
10	L2	357	0.0	357	0.0	0.248	1.7	LOS A	0.5	3.4	0.01	0.34	0.01	39.3
12	R2	73	0.0	73	0.0	0.248	5.5	LOS A	0.5	3.4	0.01	0.34	0.01	40.7
Approach		429	0.0	429	0.0	0.248	2.3	LOS A	0.5	3.4	0.01	0.34	0.01	39.6
All Vehicles		1158	0.0	1158	0.0	0.251	1.8	LOS A	0.7	5.1	0.06	0.28	0.06	39.6

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - PM (Site Folder: 2026)]

Network: N101 [2026 - PM (Network Folder: 2026)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	384	0.0	384	0.0	0.252	0.7	LOS A	0.3	1.9	0.17	0.06	0.18	49.0
3	R2	43	0.0	43	0.0	0.252	8.2	LOS A	0.3	1.9	0.17	0.06	0.18	48.1
Approach		427	0.0	427	0.0	0.252	1.5	NA	0.3	1.9	0.17	0.06	0.18	48.9
East: Forman Ave														
4	L2	363	0.0	363	0.0	0.755	11.5	LOS A	4.4	31.1	0.42	0.86	1.01	40.6
6	R2	234	0.0	234	0.0	0.755	22.4	LOS B	4.4	31.1	0.42	0.86	1.01	40.6
Approach		597	0.0	597	0.0	0.755	15.8	LOS B	4.4	31.1	0.42	0.86	1.01	40.6
North: Glenwood Park Dr														
7	L2	429	0.0	429	0.0	0.231	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	113	0.0	113	0.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		542	0.0	542	0.0	0.231	3.7	NA	0.0	0.0	0.00	0.42	0.00	46.2
All Vehicles		1566	0.0	1566	0.0	0.755	7.7	NA	4.4	31.1	0.21	0.49	0.43	44.3

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:33:58 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - SchoolPM (Site Folder: 2026)]

Network: N101 [2026 - SchoolPM (Network Folder: 2026)]

East - Froman/Glenwood Int - PM - 14:15-15:15
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	344	0.0	344	0.0	0.261	1.6	LOS A	0.7	4.8	0.02	0.25	0.02	38.7
2	T1	61	0.0	61	0.0	0.261	1.2	LOS A	0.7	4.8	0.02	0.25	0.02	40.6
Approach		405	0.0	405	0.0	0.261	1.5	LOS A	0.7	4.8	0.02	0.25	0.02	39.2
North: Glenwood Park Dr														
8	T1	292	0.0	292	0.0	0.247	1.7	LOS A	0.5	3.2	0.28	0.24	0.28	40.0
9	R2	1	0.0	1	0.0	0.247	6.0	LOS A	0.5	3.2	0.28	0.24	0.28	37.7
Approach		293	0.0	293	0.0	0.247	1.7	LOS A	0.5	3.2	0.28	0.24	0.28	40.0
West: Forman Ave														
10	L2	296	0.0	296	0.0	0.321	1.9	LOS A	0.6	4.2	0.19	0.39	0.19	38.9
12	R2	125	0.0	125	0.0	0.321	5.7	LOS A	0.6	4.2	0.19	0.39	0.19	40.1
Approach		421	0.0	421	0.0	0.321	3.0	LOS A	0.6	4.2	0.19	0.39	0.19	39.2
All Vehicles		1119	0.0	1119	0.0	0.321	2.1	LOS A	0.7	4.8	0.15	0.30	0.15	39.4

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - SchoolPM (Site Folder: 2026)]

Network: N101 [2026 - SchoolPM (Network Folder: 2026)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	339	0.0	339	0.0	0.227	0.6	LOS A	0.2	1.7	0.18	0.07	0.18	49.0
3	R2	46	0.0	46	0.0	0.227	7.4	LOS A	0.2	1.7	0.18	0.07	0.18	48.1
Approach		385	0.0	385	0.0	0.227	1.4	NA	0.2	1.7	0.18	0.07	0.18	49.0
East: Forman Ave														
4	L2	369	0.0	369	0.0	0.499	5.5	LOS A	1.6	10.9	0.13	0.54	0.16	44.7
6	R2	145	0.0	145	0.0	0.499	13.1	LOS A	1.6	10.9	0.13	0.54	0.16	44.7
Approach		515	0.0	515	0.0	0.499	7.7	LOS A	1.6	10.9	0.13	0.54	0.16	44.7
North: Glenwood Park Dr														
7	L2	421	0.0	421	0.0	0.227	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	36	0.0	36	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		457	0.0	457	0.0	0.227	4.3	NA	0.0	0.0	0.00	0.49	0.00	45.2
All Vehicles		1357	0.0	1357	0.0	0.499	4.8	NA	1.6	10.9	0.10	0.39	0.11	46.1

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - AM (Site Folder: 2031)]

Network: N101 [2031 - AM (Network Folder: 2031)]

East - Froman/Glenwood Int - AM - 7:45-8:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	435	0.0	435	0.0	0.344	2.0	LOS A	1.0	6.7	0.30	0.32	0.30	37.7
2	T1	1	0.0	1	0.0	0.344	1.7	LOS A	1.0	6.7	0.30	0.32	0.30	40.0
Approach		436	0.0	436	0.0	0.344	2.0	LOS A	1.0	6.7	0.30	0.32	0.30	37.7
North: Glenwood Park Dr														
8	T1	327	0.0	327	0.0	0.327	1.7	LOS A	0.6	4.3	0.28	0.31	0.28	39.8
9	R2	69	0.0	69	0.0	0.327	6.0	LOS A	0.6	4.3	0.28	0.31	0.28	37.3
Approach		397	0.0	397	0.0	0.327	2.5	LOS A	0.6	4.3	0.28	0.31	0.28	39.5
West: Forman Ave														
10	L2	385	0.0	385	0.0	0.326	1.7	LOS A	0.7	4.8	0.02	0.36	0.02	39.2
12	R2	121	0.0	121	0.0	0.326	5.5	LOS A	0.7	4.8	0.02	0.36	0.02	40.5
Approach		506	0.0	506	0.0	0.326	2.6	LOS A	0.7	4.8	0.02	0.36	0.02	39.5
All Vehicles		1339	0.0	1339	0.0	0.344	2.4	LOS A	1.0	6.7	0.19	0.33	0.19	39.1

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

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - AM (Site Folder: 2031)]

Network: N101 [2031 - AM (Network Folder: 2031)]

West - Froman/Glenwood Int - AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	302	0.0	302	0.0	0.241	1.0	LOS A	0.4	2.6	0.27	0.13	0.27	48.5
3	R2	75	0.0	75	0.0	0.241	7.4	LOS A	0.4	2.6	0.27	0.13	0.27	47.1
Approach		377	0.0	377	0.0	0.241	2.3	NA	0.4	2.6	0.27	0.13	0.27	48.3
East: Forman Ave														
4	L2	385	0.0	385	0.0	0.490	5.0	LOS A	1.3	9.4	0.00	0.53	0.00	45.1
6	R2	144	0.0	144	0.0	0.490	12.3	LOS A	1.3	9.4	0.00	0.53	0.00	45.1
Approach		529	0.0	529	0.0	0.490	7.0	LOS A	1.3	9.4	0.00	0.53	0.00	45.1
North: Glenwood Park Dr														
7	L2	446	0.0	446	0.0	0.240	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		447	0.0	447	0.0	0.240	4.6	NA	0.0	0.0	0.00	0.53	0.00	44.5
All Vehicles		1354	0.0	1354	0.0	0.490	4.9	NA	1.3	9.4	0.08	0.42	0.08	45.9

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - PM (Site Folder: 2031)]

Network: N101 [2031 - PM (Network Folder: 2031)]

East - Froman/Glenwood Int - PM - 16:45-17:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	466	0.0	466	0.0	0.270	1.6	LOS A	0.8	5.7	0.02	0.27	0.02	38.6
2	T1	1	0.0	1	0.0	0.270	1.2	LOS A	0.8	5.7	0.02	0.27	0.02	40.6
Approach		467	0.0	467	0.0	0.270	1.6	LOS A	0.8	5.7	0.02	0.27	0.02	38.6
North: Glenwood Park Dr														
8	T1	315	0.0	315	0.0	0.225	1.5	LOS A	0.4	3.1	0.20	0.21	0.20	40.2
9	R2	1	0.0	1	0.0	0.225	5.8	LOS A	0.4	3.1	0.20	0.21	0.20	38.1
Approach		316	0.0	316	0.0	0.225	1.5	LOS A	0.4	3.1	0.20	0.21	0.20	40.2
West: Forman Ave														
10	L2	385	0.0	385	0.0	0.267	1.7	LOS A	0.5	3.8	0.02	0.34	0.02	39.3
12	R2	78	0.0	78	0.0	0.267	5.5	LOS A	0.5	3.8	0.02	0.34	0.02	40.7
Approach		463	0.0	463	0.0	0.267	2.3	LOS A	0.5	3.8	0.02	0.34	0.02	39.6
All Vehicles		1246	0.0	1246	0.0	0.270	1.8	LOS A	0.8	5.7	0.07	0.28	0.07	39.5

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

Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 12 October 2021 2:34:09 PM
Project: C:\Users\minag\OneDrive - Taylor Thomson Whitting\Glenwood HS\Project-Model.sip9

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - PM (Site Folder: 2031)]

Network: N101 [2031 - PM (Network Folder: 2031)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	414	0.0	414	0.0	0.274	0.9	LOS A	0.3	2.4	0.19	0.07	0.20	48.9
3	R2	46	0.0	46	0.0	0.274	8.8	LOS A	0.3	2.4	0.19	0.07	0.20	47.8
Approach		460	0.0	460	0.0	0.274	1.7	NA	0.3	2.4	0.19	0.07	0.20	48.8
East: Forman Ave														
4	L2	391	0.0	391	0.0	0.866	18.8	LOS B	7.4	51.7	0.47	1.12	1.65	37.1
6	R2	252	0.0	252	0.0	0.866	32.1	LOS C	7.4	51.7	0.47	1.12	1.65	37.1
Approach		642	0.0	642	0.0	0.866	24.0	LOS B	7.4	51.7	0.47	1.12	1.65	37.1
North: Glenwood Park Dr														
7	L2	463	0.0	463	0.0	0.249	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	121	0.0	121	0.0	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		584	0.0	584	0.0	0.249	3.7	NA	0.0	0.0	0.00	0.42	0.00	46.2
All Vehicles		1686	0.0	1686	0.0	0.866	10.9	NA	7.4	51.7	0.23	0.59	0.68	42.3

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - SchoolPM (Site Folder: 2031)]

Network: N101 [2031 - SchoolPM (Network Folder: 2031)]

East - Froman/Glenwood Int - PM - 14:15-15:15
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	372	0.0	372	0.0	0.282	1.6	LOS A	0.8	5.3	0.02	0.25	0.02	38.7
2	T1	66	0.0	66	0.0	0.282	1.2	LOS A	0.8	5.3	0.02	0.25	0.02	40.6
Approach		438	0.0	438	0.0	0.282	1.5	LOS A	0.8	5.3	0.02	0.25	0.02	39.2
North: Glenwood Park Dr														
8	T1	314	0.0	314	0.0	0.267	1.8	LOS A	0.5	3.5	0.30	0.25	0.30	40.0
9	R2	1	0.0	1	0.0	0.267	6.0	LOS A	0.5	3.5	0.30	0.25	0.30	37.7
Approach		315	0.0	315	0.0	0.267	1.8	LOS A	0.5	3.5	0.30	0.25	0.30	40.0
West: Forman Ave														
10	L2	319	0.0	319	0.0	0.347	1.9	LOS A	0.7	4.7	0.20	0.39	0.20	38.8
12	R2	135	0.0	135	0.0	0.347	5.7	LOS A	0.7	4.7	0.20	0.39	0.20	40.1
Approach		454	0.0	454	0.0	0.347	3.1	LOS A	0.7	4.7	0.20	0.39	0.20	39.2
All Vehicles		1206	0.0	1206	0.0	0.347	2.2	LOS A	0.8	5.3	0.16	0.30	0.16	39.4

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

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - SchoolPM (Site Folder: 2031)]

Network: N101 [2031 - SchoolPM (Network Folder: 2031)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	365	0.0	365	0.0	0.248	0.7	LOS A	0.3	2.0	0.19	0.08	0.19	48.9
3	R2	51	0.0	51	0.0	0.248	7.8	LOS A	0.3	2.0	0.19	0.08	0.19	47.9
Approach		416	0.0	416	0.0	0.248	1.6	NA	0.3	2.0	0.19	0.08	0.19	48.9
East: Forman Ave														
4	L2	398	0.0	398	0.0	0.561	6.4	LOS A	2.2	15.5	0.15	0.56	0.21	44.0
6	R2	157	0.0	157	0.0	0.561	15.4	LOS B	2.2	15.5	0.15	0.56	0.21	44.0
Approach		555	0.0	555	0.0	0.561	9.0	LOS A	2.2	15.5	0.15	0.56	0.21	44.0
North: Glenwood Park Dr														
7	L2	454	0.0	454	0.0	0.244	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	39	0.0	39	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		493	0.0	493	0.0	0.244	4.3	NA	0.0	0.0	0.00	0.49	0.00	45.2
All Vehicles		1463	0.0	1463	0.0	0.561	5.3	NA	2.2	15.5	0.11	0.40	0.13	45.7

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

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - AM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - AM - Dev (Network Folder: 2026 - Dev)]

East - Froman/Glenwood Int - AM - 7:45-8:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	446	0.0	446	0.0	0.416	2.4	LOS A	1.1	7.5	0.39	0.37	0.39	37.4
2	T1	1	0.0	1	0.0	0.416	2.0	LOS A	1.1	7.5	0.39	0.37	0.39	39.9
Approach		447	0.0	447	0.0	0.416	2.4	LOS A	1.1	7.5	0.39	0.37	0.39	37.4
North: Glenwood Park Dr														
8	T1	304	0.0	304	0.0	0.386	1.9	LOS A	0.7	4.7	0.33	0.36	0.33	39.5
9	R2	106	0.0	106	0.0	0.386	6.2	LOS A	0.7	4.7	0.33	0.36	0.33	37.0
Approach		411	0.0	411	0.0	0.386	3.0	LOS A	0.7	4.7	0.33	0.36	0.33	39.1
West: Forman Ave														
10	L2	399	0.0	399	0.0	0.399	1.7	LOS A	0.8	5.6	0.02	0.37	0.02	39.2
12	R2	155	0.0	155	0.0	0.399	5.5	LOS A	0.8	5.6	0.02	0.37	0.02	40.5
Approach		554	0.0	554	0.0	0.399	2.7	LOS A	0.8	5.6	0.02	0.37	0.02	39.5
All Vehicles		1412	0.0	1412	0.0	0.416	2.7	LOS A	1.1	7.5	0.23	0.37	0.23	39.0

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - AM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - AM - Dev (Network Folder: 2026 - Dev)]

West - Froman/Glenwood Int - AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	280	0.0	280	0.0	0.273	1.6	LOS A	0.5	3.8	0.37	0.20	0.38	47.9
3	R2	112	0.0	112	0.0	0.273	7.5	LOS A	0.5	3.8	0.37	0.20	0.38	45.9
Approach		392	0.0	392	0.0	0.273	3.3	NA	0.5	3.8	0.37	0.20	0.38	47.5
East: Forman Ave														
4	L2	399	0.0	399	0.0	0.564	6.1	LOS A	2.3	15.8	0.00	0.53	0.01	44.2
6	R2	176	0.0	176	0.0	0.564	14.3	LOS A	2.3	15.8	0.00	0.53	0.01	44.2
Approach		575	0.0	575	0.0	0.564	8.6	LOS A	2.3	15.8	0.00	0.53	0.01	44.2
North: Glenwood Park Dr														
7	L2	456	0.0	456	0.0	0.245	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		457	0.0	457	0.0	0.245	4.6	NA	0.0	0.0	0.00	0.53	0.00	44.5
All Vehicles		1423	0.0	1423	0.0	0.564	5.9	NA	2.3	15.8	0.10	0.44	0.11	45.2

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

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - PM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - PM - Dev (Network Folder: 2026 - Dev)]

East - Froman/Glenwood Int - PM - 16:45-17:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	434	0.0	434	0.0	0.251	1.6	LOS A	0.7	5.1	0.02	0.27	0.02	38.6
2	T1	1	0.0	1	0.0	0.251	1.2	LOS A	0.7	5.1	0.02	0.27	0.02	40.6
Approach		435	0.0	435	0.0	0.251	1.6	LOS A	0.7	5.1	0.02	0.27	0.02	38.6
North: Glenwood Park Dr														
8	T1	293	0.0	293	0.0	0.209	1.5	LOS A	0.4	2.8	0.19	0.21	0.19	40.2
9	R2	1	0.0	1	0.0	0.209	5.7	LOS A	0.4	2.8	0.19	0.21	0.19	38.1
Approach		294	0.0	294	0.0	0.209	1.5	LOS A	0.4	2.8	0.19	0.21	0.19	40.2
West: Forman Ave														
10	L2	357	0.0	357	0.0	0.248	1.7	LOS A	0.5	3.4	0.01	0.34	0.01	39.3
12	R2	73	0.0	73	0.0	0.248	5.5	LOS A	0.5	3.4	0.01	0.34	0.01	40.7
Approach		429	0.0	429	0.0	0.248	2.3	LOS A	0.5	3.4	0.01	0.34	0.01	39.6
All Vehicles		1158	0.0	1158	0.0	0.251	1.8	LOS A	0.7	5.1	0.06	0.28	0.06	39.6

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - PM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - PM - Dev (Network Folder: 2026 - Dev)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	384	0.0	384	0.0	0.252	0.7	LOS A	0.3	1.9	0.17	0.06	0.18	49.0
3	R2	43	0.0	43	0.0	0.252	8.2	LOS A	0.3	1.9	0.17	0.06	0.18	48.1
Approach		427	0.0	427	0.0	0.252	1.5	NA	0.3	1.9	0.17	0.06	0.18	48.9
East: Forman Ave														
4	L2	363	0.0	363	0.0	0.755	11.5	LOS A	4.4	31.1	0.42	0.86	1.01	40.6
6	R2	234	0.0	234	0.0	0.755	22.4	LOS B	4.4	31.1	0.42	0.86	1.01	40.6
Approach		597	0.0	597	0.0	0.755	15.8	LOS B	4.4	31.1	0.42	0.86	1.01	40.6
North: Glenwood Park Dr														
7	L2	429	0.0	429	0.0	0.231	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	113	0.0	113	0.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		542	0.0	542	0.0	0.231	3.7	NA	0.0	0.0	0.00	0.42	0.00	46.2
All Vehicles		1566	0.0	1566	0.0	0.755	7.7	NA	4.4	31.1	0.21	0.49	0.43	44.3

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

MOVEMENT SUMMARY

Site: 101 [2026 - East - G/F - SchoolPM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - SchoolPM - Dev (Network Folder: 2026 - Dev)]

East - Froman/Glenwood Int - PM - 14:15-15:15
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	386	0.0	386	0.0	0.374	1.8	LOS A	0.9	6.6	0.23	0.28	0.23	38.0
2	T1	61	0.0	61	0.0	0.374	1.5	LOS A	0.9	6.6	0.23	0.28	0.23	40.2
Approach		447	0.0	447	0.0	0.374	1.8	LOS A	0.9	6.6	0.23	0.28	0.23	38.5
North: Glenwood Park Dr														
8	T1	292	0.0	292	0.0	0.323	2.0	LOS A	0.6	4.0	0.34	0.32	0.34	39.7
9	R2	43	0.0	43	0.0	0.323	6.2	LOS A	0.6	4.0	0.34	0.32	0.34	37.2
Approach		335	0.0	335	0.0	0.323	2.5	LOS A	0.6	4.0	0.34	0.32	0.34	39.5
West: Forman Ave														
10	L2	338	0.0	338	0.0	0.426	1.9	LOS A	0.8	5.7	0.21	0.40	0.21	38.8
12	R2	167	0.0	167	0.0	0.426	5.7	LOS A	0.8	5.7	0.21	0.40	0.21	40.0
Approach		505	0.0	505	0.0	0.426	3.2	LOS A	0.8	5.7	0.21	0.40	0.21	39.2
All Vehicles		1287	0.0	1287	0.0	0.426	2.5	LOS A	0.9	6.6	0.25	0.34	0.25	39.1

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

MOVEMENT SUMMARY

Site: 102 [2026 - West - G/F - SchoolPM - Dev (Site Folder: 2026 - Dev)]

Network: N102 [2026 - SchoolPM - Dev (Network Folder: 2026 - Dev)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	339	0.0	339	0.0	0.281	1.4	LOS A	0.5	3.6	0.31	0.14	0.33	48.2
3	R2	88	0.0	88	0.0	0.281	8.0	LOS A	0.5	3.6	0.31	0.14	0.33	46.5
Approach		427	0.0	427	0.0	0.281	2.7	NA	0.5	3.6	0.31	0.14	0.33	48.0
East: Forman Ave														
4	L2	412	0.0	412	0.0	0.638	7.7	LOS A	3.2	22.2	0.15	0.58	0.25	43.0
6	R2	187	0.0	187	0.0	0.638	17.6	LOS B	3.2	22.2	0.15	0.58	0.25	43.0
Approach		599	0.0	599	0.0	0.638	10.8	LOS A	3.2	22.2	0.15	0.58	0.25	43.0
North: Glenwood Park Dr														
7	L2	463	0.0	463	0.0	0.249	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	36	0.0	36	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		499	0.0	499	0.0	0.249	4.3	NA	0.0	0.0	0.00	0.49	0.00	45.1
All Vehicles		1525	0.0	1525	0.0	0.638	6.4	NA	3.2	22.2	0.15	0.43	0.19	44.9

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - AM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - AM - Dev (Network Folder: 2031 - Dev)]

East - Froman/Glenwood Int - AM - 7:45-8:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	477	0.0	477	0.0	0.446	2.4	LOS A	1.2	8.3	0.41	0.38	0.41	37.4
2	T1	1	0.0	1	0.0	0.446	2.1	LOS A	1.2	8.3	0.41	0.38	0.41	39.8
Approach		478	0.0	478	0.0	0.446	2.4	LOS A	1.2	8.3	0.41	0.38	0.41	37.4
North: Glenwood Park Dr														
8	T1	327	0.0	327	0.0	0.414	2.0	LOS A	0.7	5.2	0.34	0.37	0.34	39.5
9	R2	112	0.0	112	0.0	0.414	6.3	LOS A	0.7	5.2	0.34	0.37	0.34	36.9
Approach		439	0.0	439	0.0	0.414	3.1	LOS A	0.7	5.2	0.34	0.37	0.34	39.1
West: Forman Ave														
10	L2	427	0.0	427	0.0	0.426	1.7	LOS A	0.9	6.2	0.02	0.37	0.02	39.2
12	R2	163	0.0	163	0.0	0.426	5.5	LOS A	0.9	6.2	0.02	0.37	0.02	40.5
Approach		591	0.0	591	0.0	0.426	2.7	LOS A	0.9	6.2	0.02	0.37	0.02	39.5
All Vehicles		1507	0.0	1507	0.0	0.446	2.7	LOS A	1.2	8.3	0.24	0.37	0.24	38.9

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

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - AM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - AM - Dev (Network Folder: 2031 - Dev)]

West - Froman/Glenwood Int - AM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	302	0.0	302	0.0	0.297	1.8	LOS A	0.6	4.5	0.39	0.20	0.43	47.7
3	R2	117	0.0	117	0.0	0.297	8.0	LOS A	0.6	4.5	0.39	0.20	0.43	45.6
Approach		419	0.0	419	0.0	0.297	3.6	NA	0.6	4.5	0.39	0.20	0.43	47.3
East: Forman Ave														
4	L2	427	0.0	427	0.0	0.623	7.1	LOS A	3.1	21.7	0.00	0.53	0.01	43.4
6	R2	186	0.0	186	0.0	0.623	16.7	LOS B	3.1	21.7	0.00	0.53	0.01	43.4
Approach		614	0.0	614	0.0	0.623	10.0	LOS A	3.1	21.7	0.00	0.53	0.01	43.4
North: Glenwood Park Dr														
7	L2	488	0.0	488	0.0	0.263	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.4
8	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		489	0.0	489	0.0	0.263	4.6	NA	0.0	0.0	0.00	0.53	0.00	44.5
All Vehicles		1522	0.0	1522	0.0	0.623	6.5	NA	3.1	21.7	0.11	0.44	0.12	44.7

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - PM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - PM - Dev (Network Folder: 2031 - Dev)]

East - Froman/Glenwood Int - PM - 16:45-17:45
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	466	0.0	466	0.0	0.270	1.6	LOS A	0.8	5.7	0.02	0.27	0.02	38.6
2	T1	1	0.0	1	0.0	0.270	1.2	LOS A	0.8	5.7	0.02	0.27	0.02	40.6
Approach		467	0.0	467	0.0	0.270	1.6	LOS A	0.8	5.7	0.02	0.27	0.02	38.6
North: Glenwood Park Dr														
8	T1	315	0.0	315	0.0	0.225	1.5	LOS A	0.4	3.1	0.20	0.21	0.20	40.2
9	R2	1	0.0	1	0.0	0.225	5.8	LOS A	0.4	3.1	0.20	0.21	0.20	38.1
Approach		316	0.0	316	0.0	0.225	1.5	LOS A	0.4	3.1	0.20	0.21	0.20	40.2
West: Forman Ave														
10	L2	385	0.0	385	0.0	0.267	1.7	LOS A	0.5	3.8	0.02	0.34	0.02	39.3
12	R2	78	0.0	78	0.0	0.267	5.5	LOS A	0.5	3.8	0.02	0.34	0.02	40.7
Approach		463	0.0	463	0.0	0.267	2.3	LOS A	0.5	3.8	0.02	0.34	0.02	39.6
All Vehicles		1246	0.0	1246	0.0	0.270	1.8	LOS A	0.8	5.7	0.07	0.28	0.07	39.5

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

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - PM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - PM - Dev (Network Folder: 2031 - Dev)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	414	0.0	414	0.0	0.274	0.9	LOS A	0.3	2.4	0.19	0.07	0.20	48.9
3	R2	46	0.0	46	0.0	0.274	8.8	LOS A	0.3	2.4	0.19	0.07	0.20	47.8
Approach		460	0.0	460	0.0	0.274	1.7	NA	0.3	2.4	0.19	0.07	0.20	48.8
East: Forman Ave														
4	L2	391	0.0	391	0.0	0.866	18.8	LOS B	7.4	51.7	0.47	1.12	1.65	37.1
6	R2	252	0.0	252	0.0	0.866	32.1	LOS C	7.4	51.7	0.47	1.12	1.65	37.1
Approach		642	0.0	642	0.0	0.866	24.0	LOS B	7.4	51.7	0.47	1.12	1.65	37.1
North: Glenwood Park Dr														
7	L2	463	0.0	463	0.0	0.249	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.5
8	T1	121	0.0	121	0.0	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		584	0.0	584	0.0	0.249	3.7	NA	0.0	0.0	0.00	0.42	0.00	46.2
All Vehicles		1686	0.0	1686	0.0	0.866	10.9	NA	7.4	51.7	0.23	0.59	0.68	42.3

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

MOVEMENT SUMMARY

Site: 101 [2031 - East - G/F - SchoolPM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - SchoolPM - Dev (Network Folder: 2031 - Dev)]

East - Froman/Glenwood Int - PM - 14:15-15:15
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
1	L2	414	0.0	414	0.0	0.400	1.8	LOS A	1.0	7.3	0.23	0.28	0.23	37.9
2	T1	66	0.0	66	0.0	0.400	1.5	LOS A	1.0	7.3	0.23	0.28	0.23	40.2
Approach		480	0.0	480	0.0	0.400	1.8	LOS A	1.0	7.3	0.23	0.28	0.23	38.4
North: Glenwood Park Dr														
8	T1	314	0.0	314	0.0	0.346	2.0	LOS A	0.6	4.4	0.36	0.33	0.36	39.7
9	R2	43	0.0	43	0.0	0.346	6.3	LOS A	0.6	4.4	0.36	0.33	0.36	37.1
Approach		357	0.0	357	0.0	0.346	2.5	LOS A	0.6	4.4	0.36	0.33	0.36	39.5
West: Forman Ave														
10	L2	361	0.0	361	0.0	0.456	2.0	LOS A	0.9	6.3	0.23	0.40	0.23	38.7
12	R2	177	0.0	177	0.0	0.456	5.8	LOS A	0.9	6.3	0.23	0.40	0.23	40.0
Approach		538	0.0	538	0.0	0.456	3.2	LOS A	0.9	6.3	0.23	0.40	0.23	39.1
All Vehicles		1375	0.0	1375	0.0	0.456	2.5	LOS A	1.0	7.3	0.27	0.34	0.27	39.1

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

MOVEMENT SUMMARY

Site: 102 [2031 - West - G/F - SchoolPM - Dev (Site Folder: 2031 - Dev)]

Network: N101 [2031 - SchoolPM - Dev (Network Folder: 2031 - Dev)]

West - Froman/Glenwood Int - PM
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Glenwood Park Dr														
2	T1	365	0.0	365	0.0	0.305	1.6	LOS A	0.6	4.3	0.33	0.14	0.37	48.0
3	R2	93	0.0	93	0.0	0.305	8.5	LOS A	0.6	4.3	0.33	0.14	0.37	46.2
Approach		458	0.0	458	0.0	0.305	3.0	NA	0.6	4.3	0.33	0.14	0.37	47.8
East: Forman Ave														
4	L2	440	0.0	440	0.0	0.712	9.7	LOS A	4.4	31.0	0.17	0.61	0.35	41.8
6	R2	199	0.0	199	0.0	0.712	21.4	LOS B	4.4	31.0	0.17	0.61	0.35	41.7
Approach		639	0.0	639	0.0	0.712	13.3	LOS A	4.4	31.0	0.17	0.61	0.35	41.8
North: Glenwood Park Dr														
7	L2	496	0.0	496	0.0	0.267	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	44.4
8	T1	39	0.0	39	0.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		535	0.0	535	0.0	0.267	4.3	NA	0.0	0.0	0.00	0.49	0.00	45.1
All Vehicles		1632	0.0	1632	0.0	0.712	7.5	NA	4.4	31.0	0.16	0.44	0.24	44.2

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